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4ESS™-2000 Switch 4E23 Generic Transition Document

234-090-051
Issue 2.0
July 1998

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We want to know how well this document meets your needs. Please take a few minutes and respond to the questions below.

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Introduction—How To Use This Document

Who Will Benefit From Reading This Document

This document is designed for circuit provisioning personnel, network administrators, network planners, equipment engineers, and maintenance engineers. By reading this document, these individuals will be able to identify the new generic:

- hardware and software impact.
- Recent Change (RC)/Office Data Assembler (ODA) impact.
- feature implications.
- feature dependencies.

Background

With each year's release of a new generic, TS R&D Information Development prepares and presents a seminar to teach customers what new features are available and how to use those features. Customers asked that instead of preparing a seminar TS R&D Information Development provide a document. This is that document. This document can be used in place of the seminar. It contains 18 chapters. Each chapter describes a new feature for the 4E23 Generic. Each chapter contains these nine sections:

- Introduction
- In This Chapter
- Advantages/Benefits
- Background
- Feature Description
- Provisioning
- Feature Implementation
- Acronyms and Abbreviations
- Self Check.

The sections that follow describe each chapter section in greater detail.

Introduction

This "Introduction" section provides a high level overview of the feature. By reading the introduction, the reader can determine if he or she wants more information about this feature. If that is the case, he or she can read the remainder of the chapter. If that is not the case, the reader can skip to the next chapter.

Continued on next page

Introduction—How To Use This Document, Continued

In This Chapter

The "In This Chapter" section provides a table of contents showing the name of each topic and the page in the chapter where that topic begins. By looking at the table, the reader can turn to the section he or she wants to reference without having to search through the whole chapter.

This chapter contains the following topics:

Advantages/ Benefits

The "Advantages/Benefits" topic provides a list of the key reasons that this feature is of interest. This section includes a list of advantages and benefits the reader can use to decide if this feature is useful in his or her situation.

Background

The "Background" topic describes how the work performed by this new feature was done previously. This section provides the reader with a context to understand why the new feature is better or different.

Feature Description

The "Feature Description" section describes how the feature works. By reviewing this section the reader can learn what the feature does and how the feature does it.

Continued on next page

Introduction—How To Use This Document, Continued

Provisioning

The "Provisioning" section describes the provisioning necessary to add the new feature. Included in this section are any retrofit rules used in implementing the feature. By reviewing this section the reader can determine what provisioning to do to implement a new feature.

Feature Implementation

The "Feature Implementation" section lists any documents that are referenced while implementing the feature. Reading this section helps determine what documents need to be referenced as one prepares to implement the feature.

Acronyms and Abbreviations

The "Acronyms and Abbreviations" section includes a table that shows each term used in this chapter and a definition for that term. The reader can quickly learn the meaning of any term that is unfamiliar by referring to this section.

Self Check

The "Self-Check" section includes questions about key information included in the chapter. By correctly answering the self-check questions, the reader can confirm his or her understanding of key point about the feature. If one answers incorrectly, reviewing the self check answer and reference provided can help learn the information or correct a misunderstanding.

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A Primary Features

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Chapter 1

4ESS Switch Year 2000 - Feature 476

Introduction

The Switch Year 2000 feature ensures that the 4ESS Switch is Year 2000 compliant. This compliance includes the 1B Processor, the 3B Processor, the Common Network Interface (CNI) Ring, the UNIX* Real Time Reliable Operating System (RTR), the On-Site Operations Report (OSOR) tape, and the Error Analysis Library (ERLI) tape.

In This Chapter

This chapter contains the following topics:

*UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Advantages/ Benefits

This feature provides the compliance as required by the Telecommunications Industry Standard Year 2000 specification. In this way, dates appearing as MMDDYY (where M=month, D=day, Y=year) or other versions, the implied century of either 19 or 20 is standardized.

Year 2000 Software Compliance Definition

4ESS Year 2000 compliance is defined as:

- A 2-digit year date representation will not result in any software errors in arithmetic, comparison, sorting, and input/output to databases or files when manipulating year date data.
- All leap year software algorithms will correctly recognize leap years including those for years divisible by 400.
- No software compliant code will have hardcoded first two digit year information of "19" into software routines or will use the 2-digit year dates "98", "99" or "00" as special reserved values or magic numbers (e.g., illegal value used to exit code, or this is a demonstration account number).
- System date values that roll over and could cause software failures due to a storage or data register filling up and/or overflowing must not happen.

Background

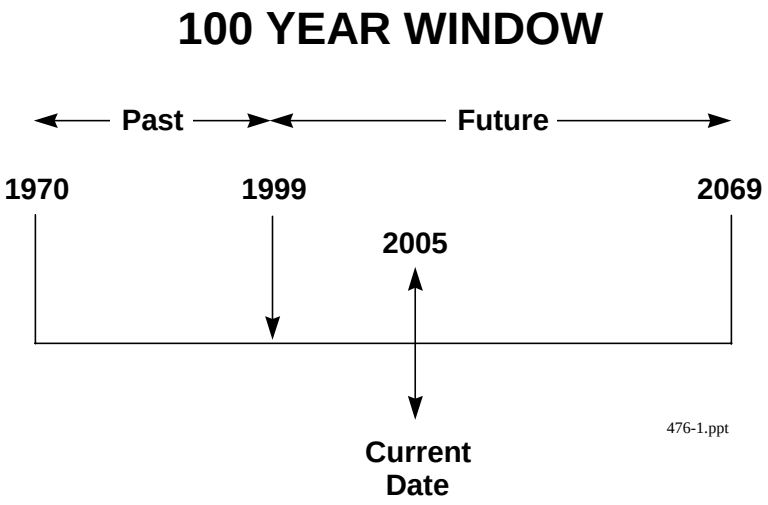
Most computer systems use a six digit format for the date, usually MMDDYY where the first two digits of the year are implied as 19. However, within two years, those implied two digits could be either 19 or 20. So at the turn of the century, the interpretation of a data with the YY field = 00 begs the question of whether this date refers to 1900 or 2000. Up to this point, this question did not exist. In addition, some software code uses a YY=99 as a code exit point (somewhat like an illegal result). Therefore, when using the date data in arithmetic operations, incorrect results ensue thereby yielding wrong switch operation.

Today, the 4ESS Switch software considers that the YY field in six-digit date format as 19. Also, incorrect use of YY=99 has not occurred as yet, but the issue is approaching fast.

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Feature Description



Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Feature Description (cont'd.)

This feature provides the software that ensures that the 4ESS Switch is Year 2000 compliant. The software utilizes a two-digit solution with a ten year window. This system has the advantage that it requires program only changes (i.e., no data changes are required).

With this method, a 100 year logic window is assigned and a system determines the century or decade of a given year by comparing the value in a two-digit field against an application window. This figure illustrates the 100 year window logic. As shown, all two-digit year date values between 00 to 69 will map to 2000 to 2069, and all date values 70 to 99 will map to 1970 to 1999. In this example, the two-digit date value 05 would map to the four digit value 2005.

The 5ESS® Switch has also chosen this option with a 100 year window of 1970 to 2069. The year 1970 was selected as starting year because historically it was felt that prior to 1970 there were no 5ESS offices in the field; hence, there would be no date records prior to 1970.

The reasons for choosing this option are:

- It covers the years 1970 to 2069 which covers the expected 4ESS life span.
- It meets the minimum requirement for the Telecommunications Industry Standard Year 2000 specification of January 1, 1980, to December 31, 2036.
- It does not impact existing user interfaces.
- It is consistent with the 5ESS.
- It is seen as the lowest cost option.

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Provisioning

Recent Change (RC) Forms Impacted

The following is a summary of the data administration requirements:

- Add a Televote Announcement (RC 607)
- Add a Cut-Thru Announcement (RC 610)
- Change a Cut-Thru Announcement (RC 611).

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Provisioning (cont'd.)

Recent Change Form 607 (RC 607) – Add a Televote Announcement

```
# FORM 607   ADD A TELEVOTE ANNOUNCEMENT

 RC:PAS;NEW;OPT(TELEVOTE);___: MSI _, SAPN __, MAPN __,

 ORNU _____,

 START DATE

   STRTM __, STRTD __, STRTY __,

 STOP DATE

   STOPM __, STOPD __, STOPY __,

 STRTT __:__, STOPT __:__,

 DUPID __, DSFUN _____, SKEW ___,

    MAN      VSSID    SID   TCNTR ACNTR

 _________, _____, _______, ___,  ___,
 _________, _____, _______, ___,  ___,
 _________, _____, _______, ___,  ___,
 _________, _____, _______, ___,  ___,

 REMARKS _____________________________________________!

                EQUIVALENT ODA INPUT FORM - ESS 408E

                     ASSOCIATED VERIFY MESSAGES

                       INPUT-16f-VER:PASTVOTE

                  OUTPUT-6h-VER:PASTVOTE,OPT(SLAVE):
                  OUTPUT-6i-VER:PASTVOTE,OPT(MASTER):
```

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Provisioning (cont'd.)

RC 607 – Add a Televote Announcement

This feature changes the population rules for the Stop Year (STOPY) field.

- STOPY Entries: 00-99

  Note: For 4E23R3 and later generics, value 00 to 69 signify years 2000 to 2069, respectively and values 70 to 99 signify years 1970 to 1999, respectively.

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Provisioning (cont'd.)

RC 610 – Add a Cut-Thru Announcement

```
# FORM 610   ADD A CUTTHRU ANNOUNCEMENT
 RC:PAS;NEW;OPT(CUTTHRU);___: CAPPN __, CTTYPE _, VSSID _____, SID _______,
 ORNU _______,
 START DATE
   STRTM __, STRTD __, STRTY __,
 STOP DATE
   STOPM __, STOPD __, STOPY __,
 STRTT __:__, STOPT __:__,
 MAN __________, CTN __________, GAPI __,

 REMARKS ____________________________________________!
               EQUIVALENT ODA INPUT FORM - ESS 408D
                    ASSOCIATED VERIFY MESSAGES
                      INPUT-16e-VER:PASCTHRU
                OUTPUT-6g-VER:PASCTHRU,OPT(CUTHRU)
```

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Provisioning (cont'd.)

RC 610 – Add a Cut-Thru Announcement

This feature changes the population rules for two fields:

- Start Year Entries (STRTY): 00-99

  For 4E23 R3 and later generics, value 00 to 69 signify years 2000-2069, respectively and values 70 to 99 signify years 1970 to 1999, respectively.

- Stop Year (STOPY) Entries: 00-99

  For 4E23 R3 and later generics, value 00 to 69 signify years 2000-2069, respectively and values 70 to 99 signify years 1970 to 1999, respectively.

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Provisioning (cont'd.)

RC 611 – Change a Cut-Thru Announcement

```
# FORM 611   CHANGE A CUTTHRU ANNOUNCEMENT

 RC:PAS;CHG;OPT(CUTTHRU);___: CAPPN __, CTTYPE _, VSSID _____, SID _______,

 ORNU _______,

 START DATE

   STRTM __, STRTD __, STRTY __,

 STOP DATE

   STOPM __, STOPD __, STOPY __,

 STRTT __:__, STOPT __:__,

                 CTN __________, GAPI __,

 REMARKS ____________________________________________________!

               EQUIVALENT ODA INPUT FORM - ESS 408D

                    ASSOCIATED VERIFY MESSAGES

                      INPUT-16e-VER:PASCTHRU

                OUTPUT-6g-VER:PASCTHRU,OPT(CUTHRU)
```

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Provisioning (cont'd.)

RC 611 – Change a Cut-Thru Announcement

This feature changes the population rules for two fields:

- Start Year Entries (STRTY): 00-99

  For 4E23 R3 and later generics, value 00 to 69 signify years 2000-2069, respectively and values 70 to 99 signify years 1970 to 1999, respectively.

- Stop Year (STOPY) Entries: 00-99

  For 4E23 R3 and later generics, value 00 to 69 signify years 2000-2069, respectively and values 70 to 99 signify years 1970 to 1999, respectively.

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Provisioning (cont'd.)

Verify Forms/Messages Affected

The following 4E Verify Forms/Messages are affected:

- Verify Public Announcement Service (PAS) Announcement Output Form - 6f
- Verify PAS Cut-Thru - 6g
- Verify PAS with Televote - 6h
- Verify PAS with Master Televote Application - 6i.

This feature changes the population rules for two fields:

- Start Year Entries (STRTY): 00-99

  For 4E23 R3 and later generics, value 00 to 69 signify years 2000-2069, respectively and values 70 to 99 signify years 1970 to 1999, respectively.

- Stop Year (STOPY) Entries: 00-99

  For 4E23 R3 and later generics, value 00 to 69 signify years 2000-2069, respectively and values 70 to 99 signify years 1970 to 1999, respectively.

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Feature Implementation

This feature is automatically activated by software deployment of the 4E23 Release 3 generic.

OS Impact

An extremely necessary adjunct to the installation of Feature 476 into the 4E23 generic involves testing with this generic to ascertain that inputs from and outputs to connecting Operating Systems (OS) function correctly. Therefore, complete compatibility should be established by testing with affected OS.

This feature does impact:

- Netminder/NTP and requires Release 2NTP5.
- Total Network Management (TNM) and requires Release 6.2
- Connect VU/Trunk and requires Release 6.0.

Continued on next page

4ESS Switch Year 2000 - Feature 476, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
CNI	Common Network Interface
ERLI	Error Analysis Library
OS	Operating Systems
OSOR	On-Site Operations Report
RC	Recent Change
RTR	Real Time Reliable Operating System
PAS	Public or Phase Announcement System
STOPY	Stop Year
STRTY	Start Year
TNM	Total Network Management

SELF CHECK

Chapter 1

4ESS Switch Year 2000 - Feature 476

1. Describe the logic built within the "100 Year Window:"

   _____

   _____

   _____

2. The two-digit year data value between 00 to 69 will map to _____.

   The two-digit year data value between 70 to 99 will map to _____.

3. List the three Recent Change (RC) Forms impacted by this feature:

   _____

   _____

   _____

4. Describe the three Operating Systems (OSs) impacted as a result of this feature:

   _____

   _____

   _____

5. What is the name of the two Recent Change Fields impacted by this feature?

   _____

   _____

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2 Local Number Portability Feature 450 (4E22 Feature)

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Chapter 2

Local Number Portability - Feature 450

Introduction

The Local Number Portability (LNP) feature allows the end user the capability of moving their original directory number from one central office to another central office.

In This Chapter

This chapter contains the following topics:

Continued on next page

Local Number Portability - Feature 450, Continued

Advantages/ Benefits

This feature is a necessary capability in order for local loop competition to take place. Local loop competition is a requirement for the Local Exchange Carriers (LECs) to enter new markets like long distance and video.

Definitions

The following are definitions of terms used throughout this document:

Terms	Definitions
Advanced Intelligent Network (AIN) Dialed Number Trigger (DNT)	This is an existing capability which utilizes switch logic and network data bases to provide enhanced features for specific called numbers.
Dialed Number (DN)	A dialed number may consist of a prefix plus address digits or an access code.
Geographic Portability	Allows the end-user to retain his/her dialed number after changing physical locations.
Incumbent Exchange	The switch the dialed number was initially ported from, also referred to as the "donor switch."
IntraLATA Portability	Providing Local Number Portability within a Local Area Transport Access (LATA).
LATA	Defined geographic area.
Location Routing Number (LRN)	A 10-digit number used to route calls to a switch that serves ported numbers. The Numbering Plan Area-Central Office Code (NPA-NXX) portion of the LRN is used to uniquely identify the switch (end office within the switch) and the last four digits of the LRN corresponds to an unassigned line number within that NPA-NXX. LRN is also known as Network Routing Address (NRA).

Continued on next page

Local Number Portability - Feature 450, Continued

Definitions
(cont'd.)

Terms	Definitions
Non-involved Switch	A switch that does not have any numbers ported to/from it.
Non-LNP Capable Switch	A switch that does not have LNP capability but may still have numbers ported to/from it.
Portable NPA-NXX	NPA-NXX which has at least one number ported from it.
Ported Number	A dialed number that has been moved from one exchange to another exchange or from one rate center to another on the same switch.
Rate Center	The division of an exchange into zones for billing purposes.
Service Portability	Allows an end-user to retain his/her dialed number after changing services, e.g., Plain Old Telephone Service (POTS) to Integrated Services Digital Network (ISDN).
Service Provider Portability	Allows an end-user to retain his/her dialed number after changing service providers.
Serving Exchange	The switch the dialed number is ported to (also referred to as the “recipient” switch) or the switch providing LNP capability for an old-technology switch the dialed number is ported to.
Signal Ported Number	Outgoing Trunk Subgroup (TSG) indicator which tells if the destination switch supports Local Number Portability. The population of this indicator is: Y if destination switch is not LNP capable so only ported number is signaled, blank or N if destination switch is LNP capable so LRN is signaled.

Continued on next page

Local Number Portability - Feature 450, Continued

Background

Local Number Portability utilizes two existing facets of the network: Advanced Intelligent Network (AIN) capabilities and the Signaling System 7 (SS7) capabilities. So the triggering (determining that an NPA-NXX requires a database query), querying of a database and receiving a response from a database operate with AIN functionality. The signaling network facilities, i.e., the signaling links, Signal Transfer Points (STPs), Service Control Points (SCPs), and System Management System (SMS) provide the mechanism to accomplish the querying and response processes.

SS7 signaling links must be engineered to handle the additional load of Local Number Portability queries and SS7 call legs needed to route calls to ported customers from a switch.

AIN Existing Capabilities

Advanced Intelligent Network (AIN) capabilities are utilized by this feature. These capabilities allow the LEC 4ESS Switch, referred to as the Service Switching Point (SSP), to recognize calls that require advance call treatment and to obtain instructions for processing the call from a centralized database, known as a Service Control Point (SCP), instead of from logic contained in the switch. The SCP database is connected via data links to a Signal Transfer Point (STP) as well as the SSP office. The interface with the SCP database uses SS7 Transaction Application Part (TCAP) protocol. The STP provides routing of the TCAP messages sent between the SSP and the SCP. The process of identifying calls that require AIN processing is known as "triggering" since a particular characteristic of the call "triggers" the switch into providing AIN treatment. Once a trigger occurs, the SSP temporarily suspends the call processing and sends a query message to the SCP requesting instructions. Based on information contained in the query message, the SCP determines which service is being requested and provides appropriate information, such as routing and billing instructions, that the SSP then executes to complete the call.

Continued on next page

Local Number Portability - Feature 450, Continued

Feature Description

This feature allows the 4ESS™ Switch Access Tandem (AT) to act as an LNP capable tandem exchange in local networks which supports Local Number Portability. The methodology uses a 10-digit Local Routing Number (LRN) (also referred to as a Network Routing Address) to route to the switch serving the ported number. Only intra-Local Area Transport Access (intraLATA) geographic portability is supported at this time.

LNP Dialed Number Trigger (DNT)

This feature introduces a new AIN DNT, termed an LNP DNT. When an NPA-NXX is defined as portable, an LNP DNT is assigned to that number in the switch so that a query to the SCP is made. SCP service logic is defined to return a Local Routing Number (LRN) of the serving switch for the dialed numbers within the NPA-NXX that have been ported. When the SSP receives the LRN from the SCP, the LRN is used to route the call to its correct destination.

ISUP and TCAP Messages

The LRN is forwarded in the ISDN User Part (ISUP) Initial Address Message (IAM) in the Called Party Number parameter. The actual called party number will be carried in the Generic Address Parameter (GAP). The Forward Call Indicator (FCI) parameter in the IAM is used to indicate whether an LNP query has been performed. This is used to prevent more than one LNP query from being launched on a call.

Non-ported dialed numbers in portable NPA-NXXs result in the SCP sending an Analyze Route with the actual called number and no LRN.

AIN Default routing may be applied if the SCP cannot be accessed due to abnormal circumstances. If AIN Default routing has not been purchased or has not been provisioned, the call receives final handling.

LNP Queries

LNP Queries are made by the network "owning" the call. For calls routed to an Interexchange Carrier (IC) network, the Local Exchange Carrier (LEC) forwards the call without making an LNP query, and the carrier performs the LNP query. Calls routed entirely within the LEC network have the LNP query performed by the first LNP-capable switch handling the call, typically the originating end office. If the switch serving the calling subscriber does not have LNP capability, the call is routed to a tandem switch which is LNP-capable, and the tandem launches the query to determine routing.

Continued on next page

Local Number Portability - Feature 450, Continued

Call Flow (Intermediate 4ESS Switch Performs LNP Query)

The steps below describe the performance of the LNP query for calls from non-LNP capable originating end offices:

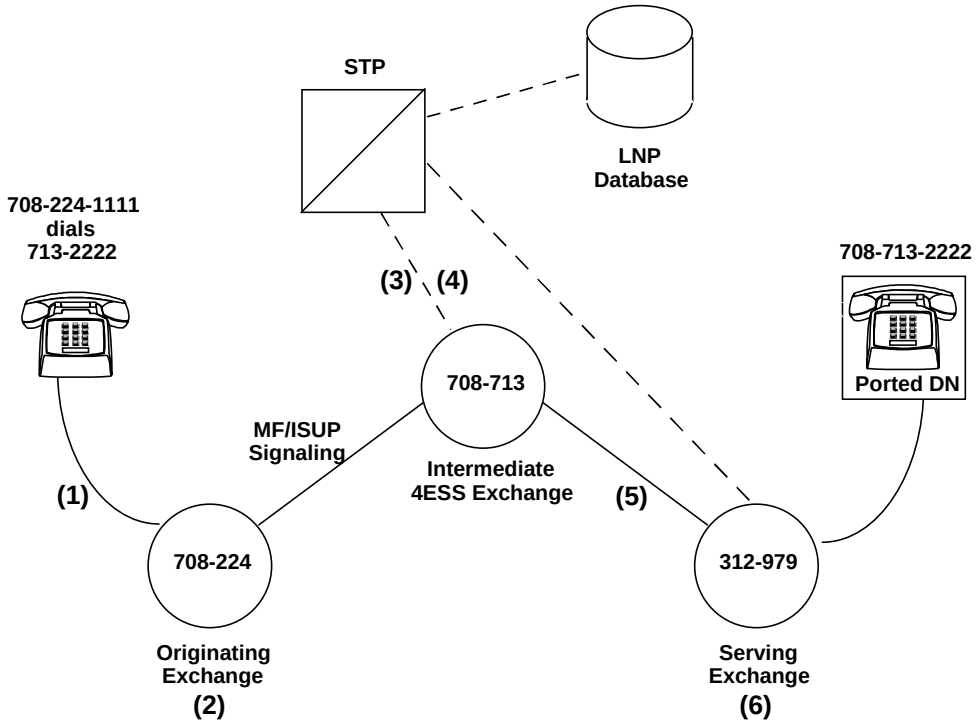

Figure 1. Intermediate 4ESS Switch Performs LNP Query

Continued on next page

Local Number Portability - Feature 450, Continued

Call Flow (Intermediate 4ESS Switch Performs LNP Query) (cont'd.)

Task	Description
1	Line A (708-224-1111) dials Line B (708-713-2222).
2	The Originating Exchange (non-LNP-capable) performs digit analysis on the called number and routes the call to the 4ESS Intermediate Exchange.
3	The 4ESS Intermediate Exchange translates the called number and encounters an LNP DNT. The switch sends a query to the LNP-SCP.
4	The SCP response contains the LRN of the Serving Exchange.
5	The 4ESS translates the LRN and determines an ISUP route out of the office. The "signal ported number" option is NO for the outgoing TSG, so the LRN is forwarded in the Called Party Number (CdPN) parameter and the called party number received from the Originating Exchange is forwarded in the Generic Address Parameter (GAP). The 4ESS sets the Forward Call Indicator (FCI) Translated Called Number Indicator to indicate that an LNP query has been performed (i.e., set to 1).
6	The Serving Exchange receives and processes the Initial Address Message (IAM). It recognizes the LRN as its own, so it uses the called party digits stored in the GAP parameter to complete the call to the subscriber.

The following are the implications of the above call flow as pertains to the different network entries involved:

1. The LNP data base must be provisioned with ported numbers.

2. STP pairs must be specified, i.e., subsystem numbers assigned for Global Title Translation (GTT).

3. RC 345 form must be defined for each NPA-NXX used for porting and used as triggering mechanism between 4E/STP/data base.

4. Each LEC must determine how many digits to be used for populating RC 345 form, i.e., which switch makes the query.

5. Data base responds with LRN (**remember**, routing must be defined for LRN).

Continued on next page

Local Number Portability - Feature 450, Continued

Call Flow (Originating and Terminating Exchanges Both LNP-Capable)

The steps below describe the origination and termination exchanges both LNP-capable:

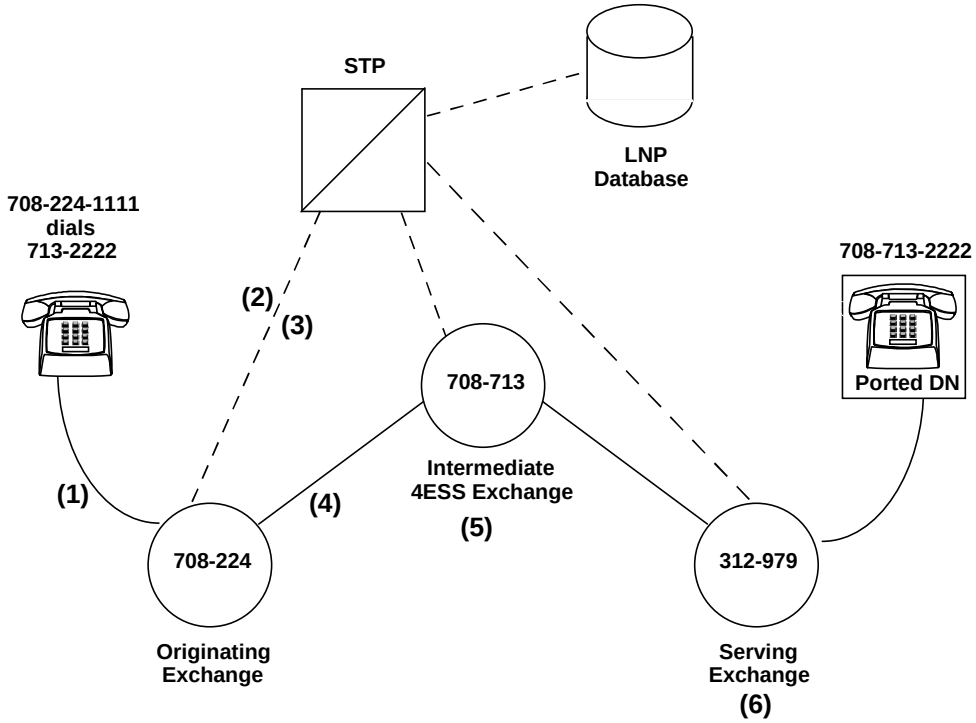

Figure 2. Originating and Terminating Exchanges Both LNP-Capable

Continued on next page

Local Number Portability - Feature 450, Continued

Call Flow (Originating and Terminating Exchanges Both LNP-Capable) (cont'd.)

Task	Description
1	Line A (708-224-1111) dials Line B (708-713-2222).
2	The originating exchange encounters an LNP trigger on 708-713 and queries the LNP-SCP.
3	The SCP response contains the LRN of the Serving Exchange.
4	The originating exchange translates the LRN and routes the call to the 4ESS intermediate exchange. The LRN is forwarded in the CdPN parameter, the called party number is forwarded in the GAP, and the FCI Translated Called Number Indicator is set to indicate an LNP query has already been performed (i.e., set to 1).
5	The 4ESS Intermediate Exchange receives and processes the IAM. The outgoing route is chosen based on translation of the LRN. The outgoing TSG is marked to outpulse the LRN ("signal ported number," option set to NO), so the LRN (contained in the CdPN), the GAP, and FCI are forwarded to the Serving Exchange.
6	The Serving Exchange receives and processes the contents of the IAM. It recognizes the LRN as its own, so it uses the called party digits contained in the GAP parameter to complete the call to the subscriber.

Continued on next page

Local Number Portability - Feature 450, Continued

Call Flow (Intermediate LNP Hub for Non-LNP Capable Terminating EO)

The steps below describe the intermediate LNP hub for non-LNP capable terminating End Office (EO):

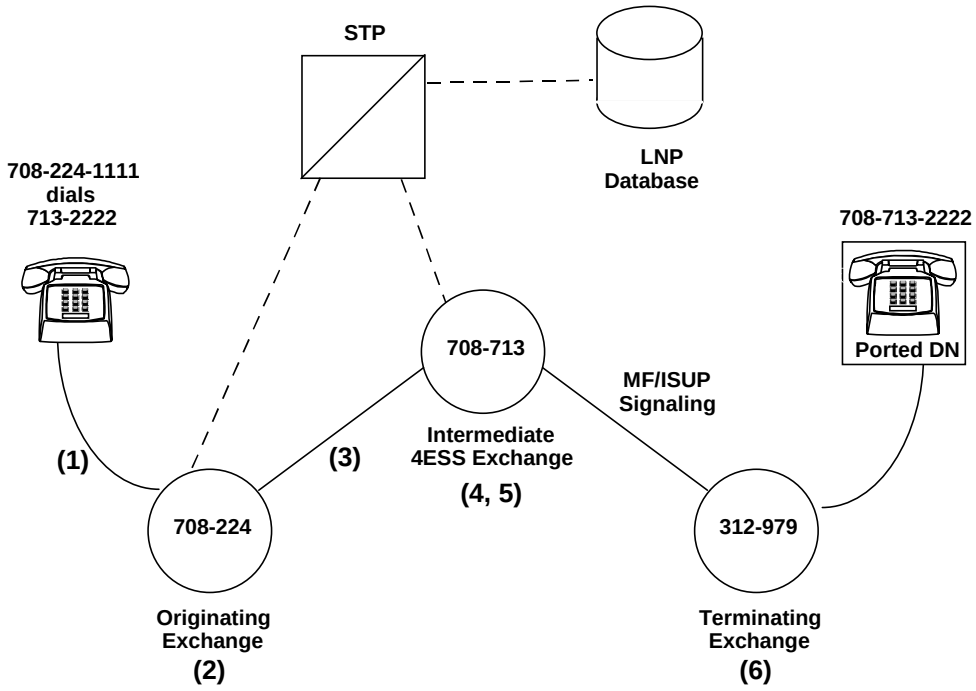

Figure 3. Intermediate LNP Hub for Non-LNP Capable Terminating EO

Continued on next page

Local Number Portability - Feature 450, Continued

Call Flow (Intermediate LNP Hub for Non-LNP Capable Terminating EO) (cont'd.)

Task	Description
1	Line A (708-224-1111) dials Line B (708-713-2222).
2	The originating exchange encounters an LNP trigger on 708-713 and queries the LNP-SCP.
3	The SCP response contains the LRN of the Serving Exchange. The originating exchange translates the LRN and routes the call to the 4ESS intermediate exchange. The LRN is forwarded to the CdPN parameter, the called party number is forwarded in the GAP, and the FCI Translated Called Number Indicator is set to indicate an LNP query has already been performed (i.e., set to 1).
4	The 4ESS Intermediate Exchange receives and processes the IAM. The outgoing route is chosen based on translation of the LRN. The outgoing ISUP TSG's "signal ported number" option is marked YES (outpulse the called party number rather than the LRN) so the 4ESS is acting as an LNP Hub for a non-LNP capable end office.
5	Because of the TSG marking (ISUP) or in-band signaling (MF), the 4ESS replaces the LRN with the called party number digits contained in the ported number GAP parameter to signal to the non-LNP capable exchange.

Continued on next page

Local Number Portability - Feature 450, Continued

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Local Number Portability - Feature 450, Continued

Provisioning

Recent Change (RC) Forms Impacted

The following is a summary of the data administration requirements:

- Two new code group Called Number Trigger indicators for AIN & LNP (RC 345)
- Code group Type of Service item for LNP (RC 345)
- Routing Data Block indicator, revised population rules (RC 500)
- TSG (outgoing) Signal Ported Number, new field (RC 100)
- TSG (incoming) 10 digit Location Routing Number, new field (RC 100)
- TSG (incoming) 10 digit Connecting Network Access Billing Number Option, new field (RC 100)
- TSG (incoming) Connecting Network Billing Number, new field (RC 100)
- TSG FENCLASS revised population rules (RC 617)

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 100 – Series Trunk Subgroup Group

```
 # FORM 100           ADD A NEW TWO WAY TRUNK SUBGROUP
   4E22

RC:TSG;NEW;OPT(TWOWAY),___:                          BTFN TOWN ST BL FBS NBS

ORNU ______,                                      TSG ____ ____ __ __ ___ ___,
PCF____,    AOPC _________,                       DPC _________,

FENCLASS ______, FENID ______,           TFG _, TSGBBC _, VDCAP _____, DATAF _,
FEAREA ____________, FESWID ____________, EXSEQ _, FEPTY _,

QTFN ___,   TOT _____, SAT _,            DOM ____, ACD _,  IT _, FAI _,
FENPA ___,  FEOFC ___, FELATA ___,       FESC6 _,  IWZ1 _,
MEM _,      PSES _,    INSEP ___,        MTSC __,  GNSC _, GEOSEP __,

ISC _______, RFA _,    ADIG _,                     CCIS2WRE _, CBNPR ___,
OSC _______, RFMP _,   DPSTOP _,         DELAY ___,   MFSPEED __, DNHR _,
XCPA _,      DNP _,                      REV _,       GLARE _,    PSOLI _,

BN __________, BRL _,  ITC _,  GSDN _,   GSDNPHSE _,  EAS _,          NPARINH _,
WATSBN __________, PSBN _, PSCPN _,      ANISID ____, WANISID ____, PSUUI _,
BNPT  ____,  WBNPT ____,   CMERGE _,     SCFN _,  OVLP _,  PRIT _____,
APS _, CHNEG _, PSATP _, PBXESGD _,      PBXAW _, FAR4E _, DOFP _, SBRIV _,
MEGC _, SDNA _, OWAT _, DATA _, CBC _,   DDD _, IDDD _,    FOSPS _, CCIF _,
SDNPLAN ____, BFTIS ___, BFTNI ___,      SKSP _, PBXNWW _, HYBRD _,
INCID _, ITELCO _, S5DIG _, SDS _, FVSR _,  IFITR _,   PCPEACEL _, UT15DA _,
LRN 713 222 1234, CBN DIGS _______, CBN _,
ONCID _, D3DBN _, MULAW _,     CSCSET _____,  CID ____, ITCENC _, OFITR _,
SPN _, LNPIC _,
ANCR _,  ACCID __,  PSTNG _, FLDSPR _, REVAMP _, E1T1 _, SUPBLK _, ATRIG _,
IXC _,

CAREA _,    CPOS _,   SINDEX __,         CODSC _,    NEOTR _,    TRIDX __,
OTSTT ____, OTSTN ________,              OTMTT ____, OTMTN ________.
XTSTT ____, XTSTN ________,              XTMTT ____, XTMTN ________,

S1 _, S2 _, S3 _, S4 _, S5 _, S6 _, S7 _, S8 _, S9 _, S10 _,

REMARKS ____________________________________________!

     RECENT CHANGE INPUT SOURCE - FORM #100 - RC:TSG;NEW;OPT(TWOWAY),- - -:
```

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 100 – Series Trunk Subgroup Group

New Trunk Subgroup (TSG) characteristics are added on the RC 100 Series forms. Four new fields are added for this feature:

CBN -	Incoming trunk connecting network access billing number option. Valid entries: "blank" - no special Automatic Message Accounting(AMA) recording options (the default), "N" - Non-Feature group-D signaled calls, and "L" - Local Number Portability Non-Feature group-D signaled calls."
CBN DIGS -	Incoming Trunk TSG connecting network access billing number digits. Valid entry: 10-digit number.
LRN -	Local Routing Number. Valid entry: 10-digit number identifying a Local Service Provider (LSP) End Office. LRN is used to provide Jurisdiction Information Parameter (JIP) if not present in initial ISUP IAM or Incoming Trunk (ICT) is Multifrequency (MF). Will use first six digits of LRN. NOTE: The translation domain for LRN must be in the POTS domain. The exception would be for data calling which must be translated in the data domain.
SPN -	Signal Ported Number (SPN) outgoing TSG indicator. Valid entries: Y, N, blank (if "Y," the destination switch is not considered LNP-capable and only the Ported Number will be signaled, not the LRN. SPN is used if destination switch is not LNP capable.

Whether to bill call, used for Competitive Local Exchange Carrier (CLEC). Always get bill for interLATA calls.

CBN	CBN Digits	
N	10D	IntraLATA calls billed LNP & others
L	10D	LNP (queried)

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 500 – Series Routing Data Blocks

```
# FORM 500   ADD A NEW DOMESTIC INCHAIN/ADG ROUTING DATA BLOCK
   4E18>

 RC:RDB;NEW;___:                                              RDBI ____,

 ORNU ______,

 TTSI ___, RDBFHT ___, ADG _, ANFHT ___,

 BTFN TOWN ST BL FBS NBS       DEL      PREFIX    DNHRTYPE

 1000 ISUP HA IR PIN 04T,      _3,      ______,      ID,
 ____ ____ __ __ ___ ___,      __,      ______,      __,
 ____ ____ __ __ ___ ___,      __,      ______,      __,
 ____ ____ __ __ ___ ___,      __,      ______,      __,
 ____ ____ __ __ ___ ___,      __,      ______,      __,
 ____ ____ __ __ ___ ___,      __,      ______,      __,
 ____ ____ __ __ ___ ___,      __,      ______,      __,
 ____ ____ __ __ ___ ___,      __,      ______,      __,

 REMARKS ____________________________________________!

              EQUIVALENT ODA INPUT FORM - ESS 405B

                   ASSOCIATED VERIFY MESSAGES

               INPUT-15a-VER:RDB:RDBI ----!(EOT)

                 OUTPUT-5a-VER:RDB,OPT(INCHAIN)
```

- This says ignore prefix/delete if LNP call.
- If not LNP, use prefix delete.
- Particularly for use with SPN =Y when sending ported number.

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 500 – Series Routing Data Blocks

Population rules for this form are impacted as a result of this feature.

DNHRTYPE -	Dynamic Non-Hierarchical Routing Type. Valid entry: "ID". This entry specifies that delete and prefix are ignored for LNP calls routed on a LRN where signaling is done on the ported number.

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 617 – Far End Network

```
INPUT:                          VERIFY #16m

VER:FEN:CLASS a[,FID b]!(EOT)

OUTPUT:                          VERIFY 6s

VER:FEN:                               CLASS ------,      FID ------,

AFA --,

RECORDING SCREENING AND QUERY TREATMENT

UNSP -,    ATAP -,    CUSP -,    CARP -,    CANP -,    HAWP -,    NWZ1 -,    INW -,

DSD -,     DLT -,     TC -,      DA -,      IOP -,     TST -,     RSYS -,    MSC1 -,

MSC2 -,    MSC3 -,    MSC4 -,    INCN -,    ALAP -,    CUTP -,    INCO -,    EASC -,

ICIN -,    SC1 -,     SC2 -,     SC3 -,     SC4 -,     SC5 -,     SC6 -,     SC7 -,


SC8 -,     SC9 -,     SC10 -,    SC11 -,    SC12 -,    SC13 -,    SC14 -,    SC15 -,

SC16 -,    SC17 -,    SC18 -,    SC19 -,    SC20 -,    SC21 -,    SC22 -,    SC23 -,

SC24 -,    SC25 -,    SC26 -,    SC27 -,    SC28 -,    SC29 -,    SC30 -,    SC31 -,

SC32 -,    SC33 -,    SC34 -,    SC35 -,    SC36 -,    SDN -,     LDA -,     SSP -,

SPDI -,    MULT -,    MCPP -,    INET -,    SDND -,    QTM -,

SCREENING TREATMENT

DEF1 -,    DEF2 -,    DEF3 -,    DEF4 -,                          DFHT ---,

                    ODA INPUT SOURCE - FORM ESS 406L

               RECENT CHANGE INPUT SOURCE - FORM # 617/618
```

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 617 – Far End Network

CLASS -	Far End Network Classification. The population rules that allow a **FENCLASS** to be **OEO** are modified to allow (LEC) LNP feature Connecting Network Access (CNA) recording.

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 345 – AIN Trigger

```
# FORM 345   SET/RESET AIN TRIGGER
  4E22R2>

RC:AIN;OPT(LIST),____:

ORNU ______,         ACTION _,

DOM    AC      ABC  DEF  GHI  J
____,  _,      ___, ___, ___, _,

TTYPE  LTOS  TOS   FH   SCSANN   DRCC      DFRN
  _,    __,  __,   __,   _____,   ___,   _________,

REMARKS _____________________________________________!

                      ASSOCIATED VERIFY MESSAGES

                        INPUT-13t-VER:AIN:LIST

                       OUTPUT-3aj-VER:AIN;OPT(LIST)
```

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 345 – AIN Trigger

Triggers are added or deleted one at a time using the RC345 Form. Two new fields (TTYPE and LTOS) are being added to accommodate this feature. These new fields are required to differentiate an AIN trigger from an LNP trigger, allowing a trigger to be assigned as either LNP, AIN, or both. Also, the population rules for the existing TOS requires updating to have it relate to the new Trigger Type indicators for both AIN and LNP.

TTYPE -	Trigger Type. Valid entries can be either AIN (A), LNP (L), or Both (B).
LTOS -	Local Number Portability Type of Service. Valid entries: 0 to 31 or blank.
TOS -	Call Type - Type of Service. Valid entries: 0 to 31, blank.

Valid form entries - TTYPE versus LTOS & TOS if the LTOS/TOS "must be" conditions are not met reject RC Form 345		
Valid Entries	**LTOS must be**	**TOS must be**
TTYPE is "A"	blank	0 - 31
TTYPE is "L"	0 - 31	blank
TTYPE is "B"	0 - 31	0 - 31

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 345 – AIN Trigger

```
# FORM 345   SET/RESET AIN TRIGGER
  4E22R2>

RC:AIN;OPT(LIST),____:

ORNU ______,         ACTION _,

DOM     AC      ABC   DEF   GHI   J
POTS,   Y,      708,  713,  ___,  _,

TTYPE   LTOS   TOS    FH    SCSANN    DRCC       DFRN
  L,     2,    __,    __,    _____,    ___,    _________,

REMARKS _____________________________________________!

                        ASSOCIATED VERIFY MESSAGES

                          INPUT-13t-VER:AIN:LIST

                        OUTPUT-3aj-VER:AIN;OPT(LIST)
```

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

RC 345 – AIN Trigger

```
# FORM 345   SET/RESET AIN TRIGGER
  4E22R2>

RC:AIN;OPT(LIST),____:

ORNU ______,         ACTION _,

DOM     AC      ABC  DEF  GHI  J
POTS,   N,      713, ___, ___, _,

TTYPE  LTOS  TOS   FH   SCSANN   DRCC       DFRN
  L,    2,   __,   __,   _____,   ___,   _________,

REMARKS _____________________________________________!

                      ASSOCIATED VERIFY MESSAGES

                        INPUT-13t-VER:AIN:LIST

                       OUTPUT-3aj-VER:AIN;OPT(LIST)
```

- Assumes 708 Home Numbering Plan Area (HNPA).
- Also TOS 2 is AIN TOS or may be a unique LNP TOS.
- Note that LNP uses AIN Sub System Number (SSN).
- If unique TT for LNP, need RC 626 and GTTRAN.
- Need RC 626 and GTTRAN if using AIN for first time.
- For FH → DFRN, same rules for AIN default routing.

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

Verify Forms/Messages Affected

The following 4E Verify Forms/Messages are affected**:**

- Verify AIN output form - 3aj
- Verify CODEGRP output forms - 3a, 3c, 3e, 3v
- Verify Routing Data Block (RDB) output forms - 5a & 5f
- Verify TSG forms - Incoming TSG 1a & 1b
- Verify VER:TSGLIST input message - 11d.

Continued on next page

Local Number Portability- Feature 450, Continued

Provisioning (cont'd.)

Global Title Translation

Global Title Translation (gttran) Data Items

GTTRAN DATA ITEMS	DATA TYPE	RANGE
ITEM NUMBER	numeric	001 to 999
TRANSLATION TYPE	numeric	0 to 256
EVEN STP PC	numeric	9 characters
ODD STP PC	numeric	9 characters

Global Title Translator (gttran) - (chg) Page Example

```
***** CNI DATA MANAGEMENT SYSTEM ***** DATE:  04/23/86  TIME:  13:42 *****
FUNCTION:  gttran  ACTION:  chg  ORDER:  06Y00055500   OFFICE:  NPVLILIH2MD

                      GLOBAL TITLE TRANSLATIONS

                      ITEM:                 001

                      TRANSLATION TYPE:     241
                      EVEN STP PC:          250007000
                      ODD STP PC:           250007000
```

Continued on next page

Local Number Portability - Feature 450, Continued

Provisioning (cont'd.)

Form RC 626 – Type of Service to Dialed Code Mapping

```
# FORM 626  TYPE OF SERVICE TO DIALED CODE MAPPING
   4E21R3>

 RC:TOS;CHG;___:

 ORNU ______,

 TOS  2,   TT 241,   SSN 248*,   OLD CODE 000,   NEW CODE 199,  AIN TFREE _,

 REMARKS _________If Adding a New TOS for NP_____________________!

               EQUIVALENT ODA INPUT FORM - ESS 406R

                    ASSOCIATED VERIFY MESSAGES

                        INPUT-16v-VER:TOS

                    OUTPUT-6ac-VER:MISC,OPT(TOS)
```

*This entry is a required field but is not currently being used in software. Recommend putting the previously provisioned AIN SSN here for consistency.

Continued on next page

Local Number Portability - Feature 450, Continued

Feature Implementation

An On/Off purchased bit must be assigned to activate this feature. Refer to the LNP-LRN Feature User Guide (234-090-020) for implementation of this feature. This feature is available with the 4E22 Generic.

AMA

A flexible new LNP AMA module (720) is appended to existing AMA records for calls encountering the LNP trigger which result in querying the LNP SCP.

The Module 720 appears as follows:

Information	Table Number	# of Characters
Module Code	88	4
Party Identifier	730	4
LRN	731	12
Service Provider Identity	732	10
Location	733	16
Supporting Info	734	8

In addition, a new AMA call code is defined to support "Connecting Network Access" charge recording for calls which cross local network boundaries but for which existing access charge recording does not apply. This new "Connecting Network Access" call code is used in conjunction with existing AMA structure code.

Measurements

Three new counts are added to the existing set of AIN measurements for this feature.

These counts are:

- LNP queries sent
- LNP queries successful
- LNP Ported Number calls

Continued on next page

Local Number Portability - Feature 450, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
AIN	Advanced Intelligent Network
AMA	Automatic Message Accounting
AT	Access Tandem
CBN	Connecting Billing Number
CdPN	Called Party Number
CLEC	Competitive Local Exchange Carrier
CNA	Connecting Network Access
DN	Dialed Number
DNT	Dialed Number Trigger
DNHRTYPE	Dynamic Non-Hierarchical Routing Type
EO	End Office
FCI	Forward Call Indicator
GAP	Generic Address Parameter
GTTRAN	Global Title Translation
HNPA	Home Number Plan Area
IAM	Initial Address Message
IC	Interexchange Carrier
ICT	Incoming Trunk
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
JIP	Jurisdiction Information Parameter
LATA	Local Area Transport Access
LEC	Local Exchange Carrier
LNP	Local Number Portability
LRN	Location Routing Number
LSP	Local Service Provider
MF	Multifrequency
NRA	Network Routing Address
POTS	Plain Old Telephone Service
RDB	Routing Data Block
RC	Recent Change
SCP	Service Control Point
SMS	System Management System

Continued on next page

Local Number Portability - Feature 450, Continued,
Continued

Acronyms and Abbreviations
(cont'd.)

Terms	Definitions
SSN	Sub System Number
SPN	Signal Ported Number
SS7	Signal System 7
SSP	Service Switching Point
STP	Signal Transfer Point
TCAP	Transaction Application Part
TOS	Type of Service
TSG	Trunk Subgroup

SELF CHECK

Chapter 2

Local Number Portability - Feature 450

1. List an advantage of the Local Number Portability (LNP) feature:

   _____

2. List and define the four new fields on the RC 100 Form associated with this feature:

   _____

   _____

   _____

   _____

3. What happens to a call if the switch serving the calling subscriber does not have the LNP capability?

   a. The call does not complete.
   b. The call is routed to a tandem switch which is LNP capable.
   c. The call is routed to a recorded announcement.

4. List three Recent Change (RC) Forms required for call processing:

   _____

   _____

   _____

5. Which RC Form is required to add a new Type of Service (TOS) for this feature?

   _____

6. Which database must be provisioned with the signal ported numbers?

   _____

7. What is the name of the new trigger for LNP?

   _____

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3 Analyze Ported Number GAP for AIN DNTs Feature 515

4ESS™-2000 Switch 4E23 Generic Transition Document

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Chapter 3

Analyze Ported Number GAP for AIN DNTs - Feature 515

Introduction

This feature enhances the capabilities of the Local Number Portability (LNP) Feature (Feature 450) which was introduced in 4E22. Feature 515 allows the 4ESS™-2000 Switch to check the contents of the ported number Generic Address Parameter (GAP), looking for Advanced Intelligent Network (AIN) Dialed Number Triggers (DNTs).

In This Chapter

This chapter contains the following topics:

Continued on next page

Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

Advantages/ Benefits

This feature improves the storage and monitoring of the ported number. Allows AIN DNTs to be defined on ported numbers at the 4ESS tandem switch.

Continued on next page

Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

Background

Local Number Portability (LNP) gives subscribers the ability to physically move from one switch to another while retaining their original Directory Number. This ability is known as "porting." The initial implementation of LNP allowed for porting of numbers within rate center boundaries.

When an Numbering Plan Area (NPA)-NXX is defined as portable, an LNP Called Number Trigger (DNT) is assigned to that number in the switch so that a query to the Service Control Point (SCP) is made. SCP service logic is defined to return a Local Routing Number (LRN) of the serving switch for the dialed numbers within the NPA-NXX that have been ported. When the Service Switching Point (SSP) receives the LRN from the SCP, the LRN is used to route the call to its correct destination.

The LRN is forwarded in the ISDN User Part (ISUP) Initial Address Message (IAM) in the Called Party Number (CdPN) parameter. The actual called party number will be carried in the Generic Address Parameter (GAP). The Forward Call Indicator (FCI) parameter in the IAM is used to indicate whether an LNP query has been performed. This is used to prevent more than one LNP query from being launched on a call.

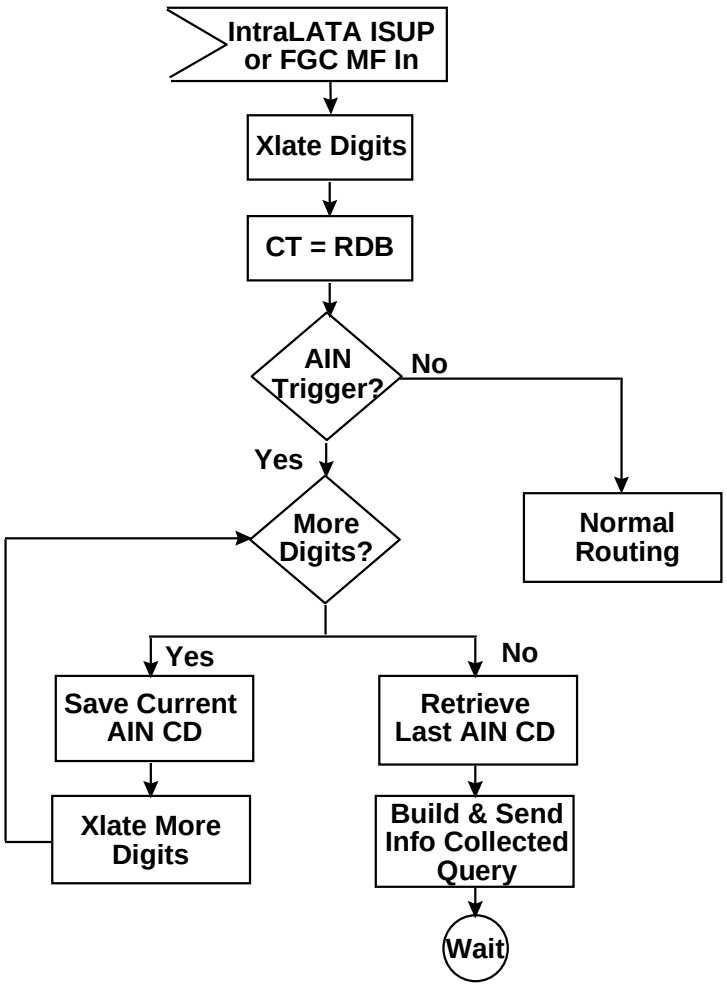
Non-ported dialed numbers in portable NPA-NXXs result in the SCP sending an Analyze Route with the actual called number and no LRN.

Continued on next page

Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

Background
(cont'd.)

DIALED NUMBER TRIGGERS



Legend:

AIN	Advanced Intelligent Network
CD	Call Data
CT	Call Type
FGC	Feature Group C
ISUP	ISDN User Part
LATA	Local Access Transport Area
MF	Multifrequency
RDB	Routing Data Block
Xltate	Translate

Continued on next page

Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

Background
(cont'd.)

Dialed Number Triggers (DNTs)

For EAMF and ISUP Network Interconnect calls, the only way to detect DNTs is via 0ZZ-XXXX or Transit Network Selection (TNS) translation in the form of XXXX-YY. For traditional (i.e., Feature Group C) or non-Network Interconnect ISUP call, normal digit translation can also result in DNTs. A DNT is indicated by the "Send Information Analyzed Query." AIN DNTs can be defined for any number of digits in the dialed number from 3 to 10 digits. The DNT defined for the longer string of digits is always used if multiple DNTs are encountered during digit translations (e.g., a trigger defined for 630-971-5133 would be used even if another trigger existed for 630). This means a DNT encountered during translation must be saved, translation continues, and the last DNT detected is the one used to build and send the query to the SCP.

This picture depicts the call flow process when DNTs are assigned for analyzing called party numbers or analyzing ported number GAP. Both of these types of triggers require activation of a feature bit.

Continued on next page

Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

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Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

Feature Description

For LNP calls to ported subscribers, the ISDN User Part (ISUP) Initial Address Message (IAM) Called Party Number (CdPN) parameter contains the Local Routing Number (LRN), while the original Dialed Number (DN) is carried in the Ported Number GAP (PNG). AIN DNTs defined at tandem switches for the original DN are not currently encountered for LNP calls to ported numbers received by the tandem switch already queried. In this case, the original DN is carried in the GAP, while current processing only analyses the CdPN.

This feature allows the 4ESS™-2000 Switch to analyze the contents of the ported number GAP for AIN DNTs. The switch will analyze already queried LNP calls which are ported into the Local Exchange Carrier (LEC) network.

If an LNP query has been performed at a previous switch for a call received from an Interexchange Carrier (IC) or another local network (i.e., calls ported into the LEC network), then this feature allows the contents of the ported number GAP to be analyzed for AIN DNTs. If an AIN DNT on the PNG is encountered and an AIN query is performed, the switch will use the contents of the GAP to populate the CalledPartyID parameter in the AIN query. Analysis of the ported number GAP is done in addition to analysis of the CdPN (containing the LRN) performed to determine call routing. Any routing information associated with the ported number GAP analysis is ignored. If the SCP response to the AIN query for the PNG contains a different CalledPartyID than was sent in the query, this new called party number will be used to determine call routing, and the LNP indication (FCI bit M and ported number GAP) originally associated with the call will be dropped.

Continued on next page

Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

Provisioning

Recent Change (RC) Form Impacted

RC 809 – Change Feature Bits

```
# FORM 809   CHANGE FEATURE BITS
   4E18>

 RC:FTR;CHG;OPT(BIT),___:

 ORNU ______,

 FEATURE ITEM ________,        ON OR OFF ___,

 REMARKS ____________________________________________!

                EQUIVALENT ODA INPUT FORM - NONE

                   ASSOCIATED VERIFY MESSAGES

                 OUTPUT - 8j VER:MISC;OPT(ONOFF)

                   INPUT - 16az VER:MISC ONOFF
```

Continued on next page

Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

Provisioning
(cont'd.)

RC 809 – Change Feature Bits

This form is used to enable and disable this feature. This feature cannot be activated unless it has been purchased.

- Feature Item

  F19 - Analyze Ported Number GAP for AIN DNTs Feature.

- On or Off

  Valid Entries: On - Feature is enabled
  Off - Feature disabled. Default is off.

Verify Forms/Messages Affected

There are no 4E Verify Forms/Messages affected by this feature.

Continued on next page

Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

Feature Implementation

This feature is implemented via software deployment of 4E23. In addition, LNP Feature 450 and AIN Feature 375 must have been previously installed. This feature also requires specific purchase indicators to be set accordingly.

OS Impact

Some testing for this feature should be accomplished with the Total Network Management (TNM) operational system installed with R4.2 to establish compatibility.

Continued on next page

Analyze Ported Number GAP for AIN DNTs - Feature 515,
Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
ACPN	Analyze the Called Party Number
AIIO	Analyze the II/OLI Digits
AIN	Advanced Intelligent Network
CD	Call Data
CdPN	Called Party Number
CT	Call Type
DN	Dialed Number
DNT	Dialed Number Trigger
FCI	Forward Call Indicator
FGC	Feature Group C
GAP	Generic Address Parameter
IAM	Initial Address Message
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
LATA	Local Access Transport Area
LEC	Local Exchange Carrier
LNP	Local Number Portability
LRN	Local Routing Number
MF	Multifrequency
NPA	Numbering Plan Area
PNG	Ported Number GAP
RDB	Routing Data Block
SCP	Service Control Point
SICQ	Send AIN Information Collected Query
SSP	Service Switching Point
TNS	Transit Network Selection
TNM	Total Network Management
Xlate	Translate

SELF CHECK

Chapter 3

Analyze Ported Number GAP for AIN DNTs - Feature 515

1. List an advantage of this feature.

   _____

   _____

2. Which ISDN User Part (ISUP) parameter carries the called party number?

   _____

3. How will ported number GAPs be analyzed with this feature?

   _____

   _____

   _____

4. If a new called party number is used for call routing, what happens to the routing data from the original call?

   _____

   _____

5. What Recent Change (RC) Form activates the purchase of this feature?

   _____

   _____

6. This feature is dependent on which two features?

   _____

   _____

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4 AIN 6-Digit CNT Expansion Feature 516

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Chapter 4

AIN 6-Digit CNT Expansion - Feature 516

Introduction

This feature enhances the capabilities of the Local Number Portability (LNP) Feature (Feature 450) which was introduced in 4E22. Feature 516 increases the number of 6-digit Advanced Intelligent Network (AIN) Called Number Triggers (CNTs) provisioned on the 4ESS Switch to 50,000. Traditional AIN CNT detection via digit translation will continue to be supported on a 3- thru 10-digit basis with the existing 8,191 limit.

In This Chapter

This chapter contains the following topics:

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Advantages/ Benefits

This feature increases the capacity of 6-digit DNTs to 50,000.

Background

DNTs are assigned on Numbering Plan Area (NPA)-NXX numbers combinations to indicate that the call requires a query to the Service Control Point (SCP) database. DNTs are detected as part of digit analysis based on the routing translations. DNTs can be associated with 3 through 10 digits of the called number. The DNTs must be assigned to the domain for which the call is to be translated. There are several types of AIN triggers available for call processing:

- Shared Interoffice Trunk Triggers
- Dialed Number Triggers
- Trunk Subgroup Triggers
- Tollfree Triggers
- Local Number Portability Triggers

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Feature Description

This feature will increase the number of 6-digit AIN DNTs which can be provisioned on the 4ESS Switch to at least 50,000. The new 6-digit triggers can be designated as either LNP or AIN or both and will be associated with a set of translation domains for which the triggers apply. Note, this means that each new 6-digit trigger will be encountered in all the specified domains and will receive either AIN or LNP treatment according to the designation associated with the trigger, i.e., treatment is the same in all domains. Traditional AIN CNT detection via digit translation will continue to be supported on a 3- through 10-digit basis as well, with the existing 8,191 limit.

New AIN 6-digit DNTs provided by this feature will increase the number of possible 6-digit triggers by at least 50,000. These new triggers will be applied based on domain as well as called digits. Traditional 6-digit DNTs will have precedence over the new 6-digit DNTs. The LNP CNT defined by Feature 450 will be supported by the new 6-digit DNTs; however, Tollfree DNTs will not be supported. New office-wide Type of Service (TOS) values will be defined for use with the new DNTs: one for DNTs designated for AIN treatment and one for DNTs designated for LNP treatment. Note, traditional DNTs have a per trigger TOS defined. The new DNTs will support AIN Global Default Routing Feature 411(default routing to the original called number) but will not support AIN Selective Default Routing Feature 415 (default routing to a specific new number associated with the CNT).

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Provisioning

Recent Change (RC) Forms Impacted

RC 667 – 6-Digit NPA-NXX AIN/LNP CNT Assignment

```
# FORM 667  6-DIGIT NPA-NXX AIN/LNP CNT ASSIGNMENT
# 4E23R3>

RC:TRIGASIGN;CHG;___:

ORNU ______,

     NPA     NXX     CNT          NPA     NXX     CNT

     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
     ___,    ___,    _____,       ___,    ___,    ____,
```

ASSOCIATED VERIFY MESSAGES

INPUT-16bu-VER:MISC;OPT(TRGASN):NPANXXa!EOT)

OUTPUT-6bu-VER:MISC;OPT(TRGASN)

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Provisioning (cont'd.)

RC 667 – 6-Digit NPA-NXX AIN/LNP CNT Assignment

This Recent Change (RC) Form is used to assign 6-digit NPA-NXX to AIN/LNP Called Number Triggers.

- **CNT – Called Number Trigger**
  - Blank – No Trigger (default)
  - AIN – 6-Digit AIN Trigger assigned
  - LNP – 6-Digit LNP Trigger assigned
  - Both – 6-Digit AIN and LNP Trigger are both assigned
- **NPA – Number Planned Area 3-digit (NPA) code**

  Entries: 200 to 999
- **NXX – 3-digit (NXX) code**

  Entries: 200 to 999
- **ORNU – Order Number**

  Entries: 1 to 999999

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Provisioning (cont'd.)

RC 344 – Add/Delete a Domain Type Information

```
# FORM 344   ADD/DELETE A DOMAIN TYPE INFORMATION
   4E18>

 RC:CODEGRP;CHG;OPT(DOMTYP),___:              DOMTYPE ____,

 ORNU _______,      ACTION _,

 DOM   DOM   DOM   DOM   DOM

 ____, ____, ____, ____, ____,

 ____, ____, ____, ____, ____,

 ____, ____, ____, ____, ____,

 ____, ____, ____, ____, ____,

 ____, ____, ____, ____, ____,

 REMARKS ____________________________________________!

               EQUIVALENT ODA INPUT FORM - ESS 4030

                    ASSOCIATED VERIFY MESSAGES

                    INPUT-13s-VER:CODEGRP:TYPE

                  OUTPUT-3ai-VER:CODEGRP;OPT(TYPE)
```

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Provisioning (cont'd.)

RC 344 – Add/Delete a Domain Type Information

This feature introduces three new domain types.

DOMTYPE

- **FCID – Feature Group D Carrier ID**

  This is a yes or no indicator that Feature Group D Carrier ID is 4 digits for that domain. (There are no domain restrictions for this domain type.)

- **SDAC – 6-Digit AIN/LNP Called Number Trigger**

  This is a yes or no indicator that indicates that the domain is allowed for an Access Tandem (AT), 6-Digit Called Number Trigger (CNT) for either the Advanced Intelligent Network (AIN) or the Local Number Portability (LNP) features. Provisioning restrictions: This DOMTYP can only be provisioned if this feature has been purchased.

- **TDAC – 10-Digit AIN/LNP Called Number Trigger**

  This is a yes or no indicator that indicates that the domain is allowed for an Access Tandem (AT) 10-Digit Called Number Trigger (CNT) for the Advanced Intelligent Network (AIN) or the Local Number Portability (LNP) features. Provisioning restrictions: This DOMTYP can only be provisioned if both this feature and the AIN Called Number Trigger Expansion (#442) feature have been purchased.

  NOTE: Call Processing will only reference this domain type indicator if the 10-Digit Domain option is turned "ON" via the "F20" FEATUREITEM feature indicator.

ACTION

- Valid Entries: A = Add or D = Delete

Population Rules

1. The data entries of "64C" and "56K" can only be allowed if the AIN capabilities for Data Calls Feature (Feature 419) purchase indicator is set to yes.
2. The footprint domain entries "SF00-SF39" can only be allowed if the Access Tandem Routing Enhancement (#488) feature purchase indicator is set to yes.

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Provisioning (cont'd.)

RC 809 – Change Feature Bits

```
# FORM 809   CHANGE FEATURE BITS
  4E18>

RC:FTR;CHG;OPT(BIT),___:

ORNU ______,

FEATURE ITEM ________,         ON OR OFF ___,

REMARKS _____________________________________________!

                EQUIVALENT ODA INPUT FORM - NONE

                   ASSOCIATED VERIFY MESSAGES

                 OUTPUT - 8j VER:MISC;OPT(ONOFF)

                   INPUT - 16az VER:MISC ONOFF
```

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Provisioning (cont'd.)

RC 809 – Change Feature Bits

This form is used to enable and disable this feature. This feature cannot be activated unless it has been purchased.

- **Feature Item**

  F20 – Domain check capability for AIN/LNP CNT expansion.

  NOTE: This capability cannot be activated unless both this feature and the AIN Called Number Trigger Expansion (#442) feature have been purchased.

- **On or Off**

  On – This feature is enabled.
  Off - This feature is disabled. Default is off.

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Provisioning (cont'd.)

RC 810 – Change Miscellaneous Feature Information

```
# FORM 810   CHANGE MISCELLANEOUS FEATURE INFORMATION

RC:FTR;CHG;OPT(MSC),___:

ORNU ______,

FEATURE INFO ________,        DATA ________,

REMARKS ____________________________________________!

               EQUIVALENT ODA INPUT FORM - NONE

                  ASSOCIATED VERIFY MESSAGES

                            NONE
```

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Provisioning (cont'd.)

RC 810 – Change Miscellaneous Feature Information

There are two new fields associated with this feature:

Feature Information	Data
A6TOS – 6-Digit AIN Type Of Service Index This is an office wide parameter which is used instead of the Call Type TOS when querying on AIN database based on a 6-digit AIN Trigger	Legal Values are: Blank, 0-31 (Blank means the parameter is not populated.)
L6TOS - 6-Digit LNP Type Of Service Index This is an office wide parameter which is used instead of the Call Type TOS when querying an AIN database based on a 6-digit LNP Trigger.	Legal Values are: Blank, 0-31 (Blank means the parameter is not populated.)

NOTE: This feature will also allow "blank" as a valid entry in the data field for AIN Type of Service (ATOS).

Population Rules

- The purchase indicator must be set to yes on RC 809 Form for this feature prior to provisioning this form.
- The Local Exchange Carrier (LEC) Local Number Portability Feature (Feature 450) purchase indicator must be set to yes on RC 809 Form.

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Provisioning (cont'd.)

Verify Forms/Messages Affected

- VER:CODEGRP:TYPE 13s/3ai
- VER:MISC,OPT(TRGASN) 16bu/6bu
- VER:MISC,OPT(AINITM) 6br

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Feature Implementation

This feature is implemented via software deployment of 4E23. In addition, AIN (Feature 450) and LNP (Feature 450) must have been previously installed. This feature (if purchased) works with:

- AIN Data Calls (Feature 419)
- AIN Called Number Trigger Expansion (Feature 442)
- AIN Global Default Rerouting (Feature 411)
- AT Routing Enhancement (Feature 488)

OS Impact

Some testing for this feature should be accomplished with the Total Network Management (TNM) operational system installed with R4.2 to establish compatibility.

Continued on next page

AIN 6-Digit CNT Expansion - Feature 516, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
AIN	Advanced Intelligent Network
AT	Access Tandem
ATOS	AIN Type Of Service
CNT	Called Number Trigger
FCID	Feature Group D Carrier ID
LEC	Local Exchange Carrier
LNP	Local Number Portability
NPA	Numbering Plan Area
ORNU	Order Number
RC	Recent Change
SCP	Service Control Point
SDAC	6-Digit AIN/LNP Called Number Trigger
TDAC	10-Digit AIN/LNP Called Number Trigger
TOS	Type Of Service
TNM	Total Network Management

SELF CHECK

Chapter 4

AIN 6-Digit CNT Expansion - Feature 516

1. List an advantage of this feature.

_____

_____

2. How will these new triggers be applied in the switch?

_____

_____

3. What is the new Recent Change (RC) Form as a result of this feature?

_____

_____

4. What are the valid entries for CNT on the RC 667 Form?

_____

_____

_____

_____

5. What are the three new Domain Types allowed on the RC 344 Form?

_____

_____

_____

Continued on next page

SELF CHECK

Chapter 4

AIN 6-Digit CNT Expansion - Feature 516 (Cont'd.)

6. What RC Form activates the purchase of this feature?

_____

_____

7. This feature is dependent on which two features?

_____

_____

8. With which existing features does this new feature interact?

_____

_____

_____

_____

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5 LEC LNP OA&M Enhancements Feature 517

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Chapter 5

LEC LNP OA&M Enhancements - Feature 517

Introduction

This feature enhances the measurements capabilities for the Local Number Portability (LNP) Feature (Feature 450) which was introduced in 4E22. The feature adds additional LNP measurements as well as providing better existing and new LNP measurement data to be sent to Netminder/NTM.

In This Chapter

This chapter contains the following topics:

Continued on next page

LEC LNP OA&M Enhancements - Feature 517, Continued

Advantages/ Benefits

This feature provides the following:

- Enhances existing measurement data
- New measurement data to be sent to Netminder
- Local Exchange Carrier (LEC) network monitoring data
- Modifications to Automatic Message Accounting (AMA) records.

Background

The LNP feature has substantially increased the database queries placed on the LEC network. Traffic/Plant measurement data must be collected to ensure network is meeting performance objectives.

Traffic/Plant measurement data must be classified in order to ensure proper recording of data.

- Measurement Class (MC)
  - To help with the internal manipulation of data, the set of all traffic/plant measurements has been partitioned into Measurement Classes (MCs). Related measurements are, in general, assigned to the same MC. For example, all the Trunk Subgroup (TSG) measurements make up one MC. Associated with the MCs, where required, are blocks of accumulating registers and holding registers on disk.

- Measurement Subclass (MSC)/Output Measurement Set (OMS)
  - To simplify measurement accumulation and output processing and to conserve memory, all the MCs are divided into subsets (which may, or may not, be used to form some of the same measurements) called Measurement Subclasses (MSCs). Within an MSC, all the measurements associated with a particular facility or entity are called an Output Measurement Set (OMS). When a user requests an output of measurements, the measurements are identified by specifying an OMS within an MSC.

Continued on next page

LEC LNP OA&M Enhancements - Feature 517, Continued

Feature Description

This feature adds additional LNP measurements to those initially defined for Feature 450, as well as providing both existing and new LNP measurement data to be sent to Netminder/NTM. In addition, this feature makes changes to rules governing Connecting Network Access (CNA) AMA record generation for calls encountering both Advanced Intelligent Network (AIN) and LNP triggers.

Measurement Reports

The initial LNP feature provided for three measurements to the Measurement Report (MEASREPT):

- LNP Queries sent
- LNP Queries successful
- LNP Ported Number calls.

For 4E22 Generic, Release 2, these counts are recorded on MSC-55/OMS-0. With this feature the following peg count will be added to the reports:

- ISUP REL with ANSI Cause Value 26 received
  - This count measures the number of ISUP REL Messages received which contain ANSI Cause Value 26.

With the 4E23 Generic, all four of the counts are recorded on MSC-49/OMS-1 on the MEASREPT. In addition, all four of these measurements will be included in the On-Site Operations Report (OSOR) Machine Load Service Summary (MLSS) Report and will appear on Page 1 of the report. For additional information on this report, refer to TG4, Div. 10, Sec. 4.0.

Continued on next page

LEC LNP OA&M Enhancements - Feature 517, Continued

Feature Description (cont'd.)

Netminder/NTM

LNP peg counts will now be sent to Netminder/NTM on a five-minute basis. These counts can be used to identify and monitor LNP effects on local networks.

The following measurements are available on both Netminder/NTM MSC-OMS Reports and MLSS Reports:

- LNP Queries sent
- LNP Queries successful
- LNP Ported Number calls
- ISUP REL with ANSI Cause 26 received.

The following five-minute peg counts will be available only from Netminder/NTM:

1. LNP Tandem Calls
   This count measures the number of calls received with Forward Call Indicator (FCI) bit M set to "number translated."

2. LNP Calls canceled by Manual Call GAP (MCG)
   This count measures the number of LNP calls canceled by Manual Call Generic Address Parameter (GAP) control and is pegged by network management whenever an LNP call (i.e., a call for which FCI bit M is set to "number translated") is canceled by MCG.

3. LNP Queries block by Service Control Point (SCP) overload Automatic Congestion Control (ACG)
   This count measures the number of LNP queries which are blocked by an SCP overload ACG control and is pegged by network management whenever an LNP query is blocked by an SCP overload ACG.

4. LNP Queries blocked by Service Management System (SMS)-Initiated ACG
   This count measures the number of LNP queries which are blocked by an SMS-Initiated ACG control and is pegged by network management whenever an LNP query is blocked by an SCP Overload ACG.

Continued on next page

LEC LNP OA&M Enhancements - Feature 517, Continued

Feature Description (cont'd.)

Connecting Network Access (CNA) AMA Recording

This feature provides clarifications on interactions between CNA recording and AIN or Service Switching Point (SSP)/800 recording occurring on the same call. The AMA Records will be modified as follows:

- When a call is received over a TSG with the "connecting network access recording" option set to "all non-Feature Group D (FGD) calls," and the incoming call results in an SSP/800 or AIN query, the CNA record shall be generated as specified in existing Feature 450 requirements, in addition to any AMA records generated for the SSP/800 or AIN query. The CNA record shall be generated as described in Feature 450 Requirement S40, with the terminating number field of the CNA record populated with the called number received over the incoming trunk. In this case, if an LNP query is performed following an SSP/800 or AIN query, the resulting LNP module shall be appended to the SSP/800 or AIN AMA record, if present, as this AMA record is the record applicable to the "pre-LNP query" call leg.

- When the call incoming to the switch is received over a TSG with the connecting network access recording option set to "calls resulting in LNP query and generating an LNP module," the CNA record shall be generated as described in existing Feature 450 requirements only when the switch performs an LNP query for the incoming call, with the following exception:

  - This "limited recording of connecting network access" option shall NOT apply when a switch performs an LNP query following a change in the called party number via SSP/800 or AIN trigger (i.e., no CNA record should be generated when the called party number is changed via SSP/800 or AIN trigger prior to the switch performing an LNP query).

Continued on next page

LEC LNP OA&M Enhancements - Feature 517, Continued

Provisioning

Recent Change (RC) Forms Impacted

There are no 4E Recent Change Forms impacted by this feature.

Verify Forms/Messages Affected

There are no 4E Verify Forms or Messages affected by this feature.

Continued on next page

LEC LNP OA&M Enhancements - Feature 517, Continued

Feature Implementation

This feature is implemented via software deployment of 4E23. In addition, Feature 450 must have been previously installed and purchase indicators be set accordingly.

Operating System (OS) Impact

Some testing for this feature should be accomplished with the Total Network Management (TNM) operational system installed with R4.2 to establish compatibility.

Continued on next page

LEC LNP OA&M Enhancements - Feature 517, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
ACG	Automatic Congestion Control
AIN	Advanced Intelligent Network
AMA	Automatic Message Accounting
ANSI	American National Standards Institute
CNA	Connecting Network Access
FCI	Forward Call Indicator
FGD	Feature Group D
GAP	Generic Address Parameter
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
LEC	Local Exchange Carrier
LNP	Local Number Portability
MC	Measurement Class
MCG	Manual Call GAP
MEASREPT	Measurement Report
MLSS	Machine Load Service Summary
MSC	Measurement Subclass
OA&M	Operations, Administration and Maintenance
OMS	Output Measurement Set
OS	Operating System
OSOR	On-Site Operations Report
RC	Recent Change
REL	Release
SCP	Service Control Point
SMS	Service Management System
SSP	Service Switching Point
TNM	Total Network Management
TSG	Trunk Subgroup

SELF CHECK

Chapter 5

LEC LNP OA&M Enhancements - Feature 517

1. List two advantages of this feature.

   _____

   _____

2. What were the initial Local Number Portability (LNP) measurements?

   _____

   _____

   _____

3. What is the new peg count measurement added with this feature?

   _____

4. What additional measurement report will reflect LNP measurement data?

   _____

Continued on next page

SELF CHECK

Chapter 5

LEC LNP OA&M Enhancements - Feature 517 (Cont'd.)

5. List the eight measurements available from Netminder/NTM:

_____

_____

_____

_____

_____

_____

_____

_____

6. Are there any Recent Change (RC) Forms impacted by this feature? _____

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6 AIN/LNP Domain Option Feature 534

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Chapter 6

AIN/LNP Domain Option - Feature 534

Introduction

This feature is an enhancement to the Advanced Intelligent Network (AIN) Local Number Portability (LNP) feature.

This enhancement allows the option of using the Incoming Trunk (ICT) domain to translate numbers returned by the Service Control Point (SCP), since they make extensive use of the non-Plain Old Telephone Service (POTS) domains in local routing and would like to continue this practice after LNP introduction.

In This Chapter

This chapter contains the following topics:

Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Advantages/ Benefits

This feature minimizes network provisioning required to introduce LNP for service providers utilizing non-POTS domain routing.

Background

Local Exchange Carrier (LEC) Domain Selection

The domain originally used to translate the called number is typically the domain associated with the incoming trunk in local (i.e., non-Feature Group D [FGD]) routing.

AIN Domain Selection

For serial triggering, the domain will be chosen based on the domain of the original translated number.

Note: The domain could be a footprint domain if Feature 488 (Access Tandem Enhancement) has been purchased. If the query was generated under the AIN Shared Interoffice Trigger (SIT) Analyze Called Party scenario, it could be an equal access domain. This domain will also be used for AIN default routing to the original number, if invoked.

Continued on next page

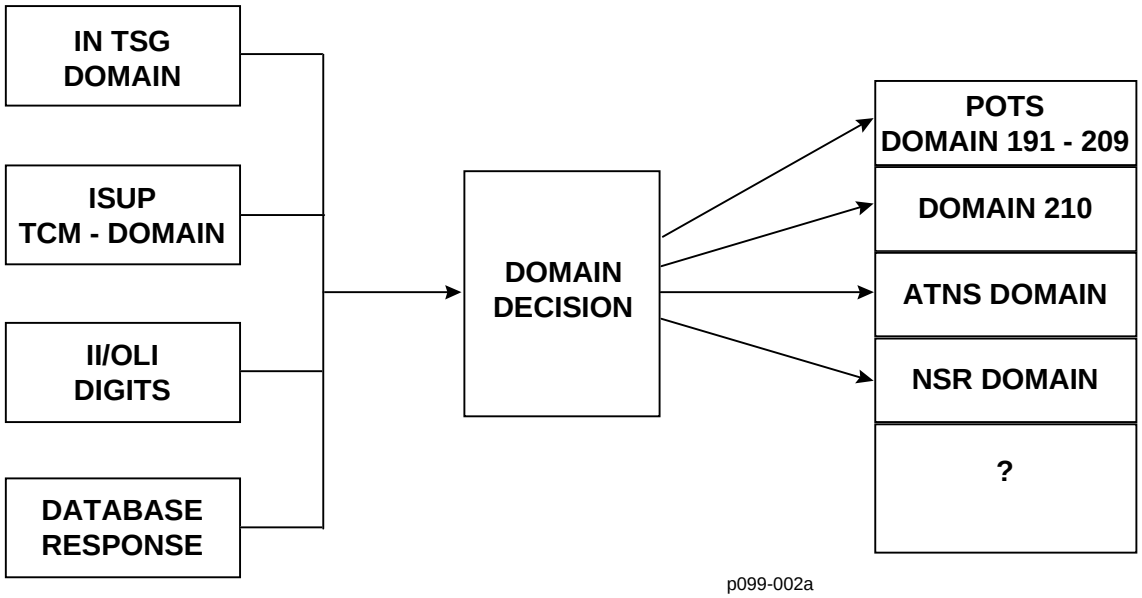
AIN/LNP Domain Option - Feature 534, Continued

Background (cont'd.)

Shared Interoffice Trigger (SIT)

LEC DOMAIN SELECTION

INCOMING CALL



Legend:

ATNS	Access Tandem Transit Network Selection
II/OLI	Information Digits/Originating Line Information
IN TSG	Incoming Trunk Subgroup
ISUP	ISDN User Part
NSR	Number Services Routing
POTS	Plain Old Telephone Service
TCM	Traveling Class Mark

Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Background (cont'd.)

Shared Interoffice Trigger (SIT)

Domain Selection - Incoming Call
Domain selection for an incoming call is based on the following input:

- **Incoming Trunk Subgroup (IN TSG) Domain**
  The initial domain used for digit translation is contained in the DOM field of the TSGs characteristics. For most TSGs, the entry is POTS. In addition, special use domains are available for data, verify, and international services.

- **Traveling Class Mark (TCM) Domain**
  The out-of-band signaling Integrated Services Digital Network User Part (ISUP) provides for the change in domain through the use of a TCM embedded in the message.

  EXAMPLE:

  ISUP - TCMs are used on POTS domain TSGs to alter the routing domain.

- **Information /Originating Line Information (II/OLI) Digits**
  The II/OLI digits in the received ANI stream also may be used to change the routing domain.

  EXAMPLE:

  If the first 2 digits are 61 or 63, the call processing is changed from a POTS call to a cellular mobile type call.

- **Database Response**
  Information for calls requiring a database dip (for example, 800 service) may result in a change of the domain.

Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Background (cont'd.)

Shared Interoffice Trigger (SIT)

Interoffice Trunk Subgroups (TSGs) can carry Service Switching Point/800 (SSP/800), AIN and POTs traffic. Because of this, the SSP must be able to detect which calls are AIN calls so that it can send a query. This detection mechanism is known as the Shared Interoffice Trigger.

The signaling used between the End Office (EO) and SSP for AIN is very similar to the Equal Access Multifrequency (EAMF)/Integrated Service Digital Network (ISDN) User Part End Office (ISUP) signaling used between an Equal Access End Office (EAEO) and an Access Tandem (AT) for inter-Local Area Transport Access (LATA) traffic. Only this type of signaling is supported between the EAEO and SSP for AIN.

The SSP is able to distinguish the various types of traffic by using the signaling parameters shown below:

EO-SSP Signaling Parameters			
EAMF PARAMETER	**SS7-ISUP PARAMETER**	**INTER-LATA POTS USAGE**	**AIN USAGE**
XXX/XXXX	Transit Network Selector (TNS), Carrier ID digits	IC Selection	Indicate Database Services Call
0ZZ	Transit Network Selector (TNS), Circuit Code field	IC Trunk Group Selector	Indicates AIN call
II	Originating Line Information (OLI)	Calling Station Information	Indicates AIN call

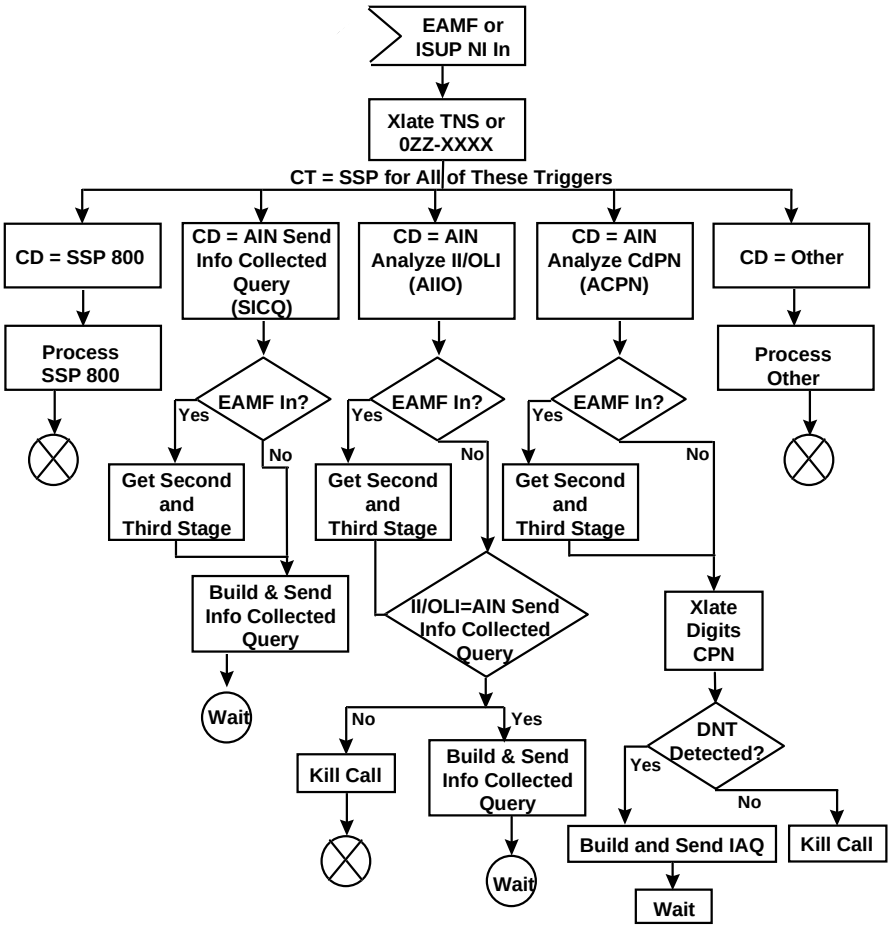
Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Background (cont'd.)

Shared Interoffice Trigger (SIT)

SHARED INTEROFFICE TRIGGERS (SIT)



Legend:

AIN	Advanced Intelligent Network	ISUP	ISDN User Part
CD	Call Data	NI	Network Interconnect
CT	Call Type	OLI	Original Line Information
DNT	Dialed Number Trigger	SSP	Service Switching Point
EAMF	Equal Access Multifrequency	TNS	Transit Number Selection
IAQ	Information Acknowledgment Query	XLATE	Translate
II	Information Digits		

Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Background (cont'd.)

Shared Interoffice Trigger (SIT)

This capability utilizes the 0ZZ-XXXX portion of the EAMF signaling sequence or the TNS parameter in the ISUP Initial Address Message (IAM) to identify AIN calls. The Code Group Call Type is SSP for all of these triggers.

CODE GROUP Call DATA WORDS (Triggers)

- **Send AIN Information Collected Query (SICQ)**
- **Analyze the II/OLI digits (AIIO)**
- **Analyze the Called Party Number (ACPN)**

Some examples are:

- **Send AIN Information Collected Query (SICQ)** — The 0ZZ-XXXX or TNS translation indicates "Send AIN Information Collected Query (SICQ)." This results in the Automatic Number Identification (ANI) and Dialed Number to be sent to the SCP.
- **Analyze the II/OLI digits (AIIO)** — The 0ZZ-XXXX or TNS translation indicates "Analyze the II/OLI (AIIO) digits." This causes the switch to check the II or OLI digits for "Send AIN information collected query." If II/OLI = AIN, then the Information Collected query is sent to the SCP.
- **Analyze the Called Party Number (ACPN)** — The 0ZZ-XXXX or TNS translation indicates "Analyze the Called Party Number (ACPN)." The switch proceeds with Digit Translation looking for Dialed Number Trigger (DNT).

Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

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Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Feature Description

This feature will allow the 4ESS Switch to perform special domain determination logic when preparing to translate the called number received from the AIN or LNP SCP. If this feature is active, the 4E will translate the called number returned by the SCP in the same domain which the original called number was translated. If the called number received in incoming signaling was not translated, then the 4E will default to the appropriate data or voice domains (82, N64C, or POTS).

If this feature is activated, then the domain used to translate the called number prior to launching the AIN or LNP Info Analyzed Query will be used to translate the address digits returned by the SCP. This will only apply when local routing is requested by the SCP (i.e., when no carrier id is returned by the SCP, or when the carrier id returned is the “local” [0110] carrier).

If the called number is not translated prior to the query, (e.g., Shared Interoffice Trunk Trigger [SICQ]) or this feature has not been activated, then existing domain rules shall apply (i.e., the domain used will be POTS or the appropriate voice/data domain).

Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Provisioning

Recent Change (RC) Form Impacted

RC 809 – Change Feature Bits

```
# FORM 809   CHANGE FEATURE BITS
   4E18>

 RC:FTR;CHG;OPT(BIT),___:

 ORNU ______,

 FEATURE ITEM ________,        ON OR OFF ___,

 REMARKS ____________________________________________!

                EQUIVALENT ODA INPUT FORM - NONE

                   ASSOCIATED VERIFY MESSAGES

                 OUTPUT - 8j VER:MISC;OPT(ONOFF)

                   INPUT - 16az VER:MISC ONOFF
```

Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Provisioning (cont'd.)

RC 809 – Change Feature Bits

This form is used to enable and disable this feature. This feature cannot be activated unless it has been purchased.

- Feature Item

  F21 - LEC/LNP/AIN Domain Option (#534) Feature.

- On or Off

  Valid Entries: On - Feature is enabled
  Off - Feature disabled. Default is off.

Verify Forms/Messages Affected

Div. 8, 8J
(VER:MISC;OPT)

Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Feature Implementation

This feature is implemented via software deployment of a 4E22 Software Change Program (SCP) or 4E23R1.

Feature Dependencies:

AIN (Feature 375) and LNP (Feature 450) must have been previously installed. This feature (if purchased) works with:

- Analyze Ported Number GAP for AIN DNTs (Feature 515)
- AIN 6-Digit DNT Expansion (Feature 516)
- LEC LNP OA&M Enhancement (Feature 517)
- Access Tandem Routing Enhancement (Feature 488).

OS Impact

No impact as a result of this feature.

Continued on next page

AIN/LNP Domain Option - Feature 534, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms:	Definitions
ACPN	Analyze the Called Party Number
AII	Analyze the II/OLI digits
AIN	Advanced Intelligent Network
ANI	Automatic Number Identification
AT	Access Tandem
ATNS	Access Tandem Transit Network Selection
DNT	Dialed Number Trigger
EAMF	Equal Access Multifrequency
EO	End Office
FGD	Feature Group D
GAP	Generic Address Parameter
IAM	Initial Address Message
ICT	Incoming Trunk
II/OLI	Information/Originating Line Information
IN TSG	Incoming Trunk Subgroup
ISDN	Integrated Service Digital Network
ISUP	Integrated Services Digital Network User Part
LATA	Local Area Transport Access
LEC	Local Exchange Carrier
LNP	Local Number Portability
NSR	Number Services Routing
OA&M	Operations, Administration and Maintenance
OLI	Originating Line Information
POTS	Plain Old Telephone Service
SCP	Service Control Point
SCP	Software Change Program
SICQ	Send AIN Information Collected Query
SS7	Signaling System 7
SSP	Service Switching Point
SIT	Shared Interoffice Trigger
TCM	Traveling Class Mark
TNS	Transit Network Selector
TSG	Trunk Subgroup

AIN/LNP Domain Option - Feature 534, Continued

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SELF CHECK

Chapter 6

AIN/LNP Domain Option - Feature 534

1. List the advantage of the Advanced Intelligent Network (AIN)/Local Number Portability (LNP) Domain Option:

   _____

2. Upon activation of this feature, the called number will be translated in which domain?

   _____

3. What Recent Change (RC) Form activated the purchase of this feature?

   _____

4. This feature is dependent on which two features?

   _____

   _____

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7 Originating LNP Module AMA Enhancement Feature 537

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Chapter 7

Originating LNP Module AMA Enhancement - Feature 537

Introduction

This feature is an enhancement to the Local Number Portability (LNP) Automatic Message Accounting (AMA) recording and provides originating wire center identification for calls received from ported subscribers.

In This Chapter

This chapter contains the following topics:

Continued on next page

Originating LNP Module AMA Enhancement - Feature 537,
Continued

Advantages/ Benefits

This feature allows accurate cost recovery for calls terminated within the Local Exchange Carrier (LEC) network which are originated by ported subscribers.

Background

Whenever an LNP query is launched, a Bellcore AMA Format (BAF) module is appended to the existing AMA records being generated by the switch.

The initial Local Number Portability (LNP) (Feature 450) required modifications to AMA recording. A new LNP AMA module (720) was appended to existing AMA records for calls encountering the LNP trigger which result in querying the LNP Service Control Point (SCP).

The Module 720 appears as follows:

Information	Table Number	# of Characters
Module Code	88	4
Party Identifier	730	4
Location Routing Number (LRN)	731	12
Service Provider Identity	732	10
Location	733	16
Supporting Info	734	8

In addition, a new AMA call code was defined to support Connecting Network Access (CNA) charge recording for calls which cross local network boundaries but for which existing access charge recording does not apply. This new CNA call code is used in conjunction with existing AMA structure code.

Continued on next page

Originating LNP Module AMA Enhancement - Feature 537,
Continued

Feature Description

This feature appends the LNP BAF Module 720. The module will be appended as follows:

- Contains the LRN of the originating end office to all terminating AMA records generated by the switch
- Appends the record when the LRN of the originating end office is known as the 4ESS Switch

Continued on next page

Originating LNP Module AMA Enhancement - Feature 537,
Continued

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Continued on next page

Originating LNP Module AMA Enhancement - Feature 537,
Continued

Feature Description

The LRN of the originating switch will be obtained from the Jurisdiction Information Parameter (JIP) of the incoming ISDN User Part (ISUP) Initial Address Message (IAM), or if the JIP is not available via signaling, from the JIP/LRN provisioned on the incoming Trunk Subgroup (TSG). If neither an ISUP JIP nor incoming TSG JIP/LRN is available, the originating party LNP module will not be recorded.

If recorded, the originating LNP BAF module shall be populated with:

- A Party Identifier of “originating party” (001)
- An LRN Source Indicator of “incoming signaling” (3) or “switch data” (2) depending upon the source used to populate the LRN field
- A Query Status Indicator of “no query performed” (09)
- The first six digits (NPA-NXX) of the LRN field populated with the data from the JIP with the last four digits of the LRN field zero filled or with 10-digit JIP/LRN assigned to the incoming TSG.

Continued on next page

Originating LNP Module AMA Enhancement - Feature 537,
Continued

Provisioning

Recent Change (RC) Form Impacted

RC 809 – Change Feature Bits

```
# FORM 809   CHANGE FEATURE BITS
  4E18>

RC:FTR;CHG;OPT(BIT),___:

ORNU ______,

FEATURE ITEM ________,         ON OR OFF ___,

REMARKS _____________________________________________!

                EQUIVALENT ODA INPUT FORM - NONE

                   ASSOCIATED VERIFY MESSAGES

                 OUTPUT - 8j VER:MISC;OPT(ONOFF)

                   INPUT - 16az VER:MISC ONOFF
```

Continued on next page

Originating LNP Module AMA Enhancement - Feature 537,
Continued

Provisioning
(cont'd.)

RC 809 – Change Feature Bits

This form is used to enable and disable this feature. This feature cannot be activated unless it has been purchased.

- Feature Item

  F22 - LEC Originating
  LNP Module
  AMA Enhancement.

- On or Off

  Valid Entries: On - Feature is enabled
  Off - Feature disabled. Default is off.

Verify Forms/Messages Affected

Division 8, 8J
(VER:MISC;OPT)

Continued on next page

Originating LNP Module AMA Enhancement - Feature 537,
Continued

Feature Implementation

This feature is implemented via software deployment of 4E23R3.

Feature Dependencies

Local Number Portability (LNP) (Feature 450) must have been previously deployed.

Operating System (OS) Impact

No impact as a result of this feature.

Continued on next page

Originating LNP Module AMA Enhancement - Feature 537,
Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
AMA	Automatic Message Accounting
BAF	Bellcore AMA Format
CNA	Connecting Network Access
IAM	Initial Address Message
IC	Interexchange Carrier
JIP	Jurisdiction Information Parameter
LEC	Local Exchange Carrier
LNP	Local Number Portability
LRN	Location Routing Number
NPA	Numbering Plan Area
OS	Operating System
RC	Recent Change
SCP	Service Control Point
TSG	Trunk Subgroup

Originating LNP Module AMA Enhancement - Feature 537,
Continued

This page is intentionally left blank.

SELF CHECK

Chapter 7

Originating LNP Module AMA Enhancement - Feature 537

1. List an advantage of this feature.

   _____

2. Which Automatic Message Accounting (AMA) billing module is affected by this feature?

   _____

3. This feature is dependent on which other feature?

   _____

4. Are there any Operating Systems (OSs) impacted by this feature?

   _____

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8 Additional LNP OA&M Enhancements Feature 538

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Chapter 8

Additional LNP OA&M Enhancements - Feature 538

Introduction

This feature will provide Operations, Administration and Maintenance (OA&M) enhancement for Local Number Portability (LNP).

In This Chapter

This chapter contains the following topics:

Continued on next page

Additional LNP OA&M Enhancements - Feature 538,
Continued

Advantages/ Benefits

This feature:

- Restricts Network Management Call Gap/Call Trap to six digits or less when the control is applied to a Local Routing Number (LRN)
- Modifies default population handling for the Interexchange Carrier (IC) and Dialing Indicator fields in the Connecting Network Access (CNA) Automatic Message Accounting (AMA) record
- Appends the appropriate Numbering Plan Area (NPA) to a seven-digit LRN prior to using the LRN to populate the terminating party LNP Bellcore AMA Format (BAF) module.

Background

When LNP was introduced, AMA requirements were developed to support accurate billing and cost recovery. Whenever a LNP query is launched, a BAF module is appended to the existing AMA records being generated by the switch.

This module contains the LRN returned by the Service Control Point (SCP) for a ported terminating Dialed Number (DN). This module is also appended to Terminating Access AMA records for calls to ported subscribers received by the switch already queried.

To provide AMA recording for calls crossing network boundaries between two local service providers, a new type of AMA record was produced at the option of the Service Provider. This new record is known as a Connecting Network Access (CNA) Record and is available either for all calls received from the connecting network or only for those calls resulting in an LNP query.

Continued on next page

Additional LNP OA&M Enhancements - Feature 538,
Continued

Feature Description

This feature will provide enhancements to AMA recording and network management controls.

AMA Recording

The population rules for two fields of the CNA AMA record are being modified:

- Whenever a CNA record is generated, the fields below shall be populated as follows:
  - **IC/INC Prefix (AMA Records/Table 57)** If no carrier is assigned to the incoming trunk, character 5 shall be set to the value of "9" to indicate that "Carrier Identification Code (CIC) is unknown, and IC/INC operator system involvement cannot be determined.
  - Dialing and Presubscription Indicator (AMA Records/Table 85) Record a value of "8" to indicate no Carrier Access Code (CAC) dialed, station not presubscribed, no presubscription indication since this field is not applicable to Feature Group C (FGC) type calls.
  - The following provides rules for pre-pending the appropriate Numbering Plan Area (NPA) to 7-digit LRN received by the switch in an ISDN User Part (ISUP) Initial Address Message (IAM) before using the LRN to populate the terminating LNP AMA Module.

    NOTE: The SCP always returns a 10-digit LRN.

- When a 7-digit LRN is received via ISUP signaling by the switch, the NPA normally associated with the called party number shall be prepended to the LRN prior to using the LRN to populate the terminating party LNP BAF Module 720 as follows:
  - For calls received over Plain Old Telephone Service (POTS) trunks, pre-pend the Home or Served NPA associated with the incoming trunk
  - For calls received over non-POTS trunks, pre-pend the Home NPA

Continued on next page

Additional LNP OA&M Enhancements - Feature 538,
Continued

Feature Description (cont'd.)

Network Management (NM)

The NM Call Gap/Call Trap control will be restricted to 6 digits or less when the control is applied to a known LRN. The current sequence of controls will still apply (i.e., Call Gap/Trap, Automatic Congestion Control (ACG), query followed by Call Gap/Trap check). Also, for LNP calls received with both a DN (contents of the Generic Address Parameter [GAP]) and an LRN, the Call Gap/Trap sequence will remain the same (i.e., GAP checked for 10-digit controls first, followed by LRN check for codes of 6 digits or less).

The NM Call Gap/Call Trap control shall be restricted to checking for the codes for 6 digits or less when the control is applied to a known LRN (i.e., the call is received with Forward Call Indicator (FCI) set and GAP present with the LRN in the Called Party Number (CdPN) or following an LNP query performed in the switch for which the SCP has returned to an LRN).

NM Call Trap was designed to print out the address digits associated with the Call Trap whenever a match is encountered as part of the Call Gap control. When Call Gap/Trap was extended to check the GAP digits, the corresponding switch output was modified to print the GAP digits when a match on those digits were encountered.

NOTE: When the Call Gap/Trap control matches the LRN, the LRN (in the CdPN) should continue to be output as is currently done.

Continued on next page

Additional LNP OA&M Enhancements - Feature 538,
Continued

Provisioning

Recent Change (RC) Forms Impacted

There are no 4E Recent Change Forms impacted by this feature.

Verify Forms/Messages Affected

There are no 4E Verify Forms or Messages Affected by this feature.

Continued on next page

Additional LNP OA&M Enhancements - Feature 538,
Continued

Feature Implementation

Feature Availability

This feature is implemented via software deployment of 4E23R4.

Feature Dependencies

Local Number Portability (LNP) (Feature 450) must have been previously deployed.

Operating System (OS) Impact

No impact as a result of this feature.

Continued on next page

Additional LNP OA&M Enhancements - Feature 538,
Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
ACG	Automatic Congestion Control
AMA	Automatic Message Accounting
BAF	Bellcore AMA Format
CAC	Carrier Access Code
CdPN	Called Party Number
CIC	Carrier Identification Code
CNA	Connecting Network Access
DN	Dialed Number
FCI	Forward Call Indicator
FGC	Feature Group C
GAP	Generic Address Parameter
IAM	Initial Address Message
IC	Interexchange Carrier
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
LNP	Local Number Portability
LRN	Local Routing Number
NM	Network Management
NPA	Numbering Plan Area
OA&M	Operations, Administration and Maintenance
POTS	Plain Old Telephone Service
SCP	Service Control Point

Additional LNP OA&M Enhancements - Feature 538,
Continued

This page is intentionally left blank.

SELF CHECK

Chapter 8

Additional LNP OA&M Enhancements - Feature 538

1. Describe the enhancements of this feature.

   _____

2. Which Automatic Message Accounting (AMA) record is being modified by this feature?

   _____

3. With this feature, the Network Management Call Gap/Call Trap controls for a Local Routing Number (LRN) will be limited to what number of digits?

   _____

4. How is this feature activated?

   _____

5. This feature is dependent on which other feature?

   _____

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9 DSC* SCP Interface Modification for LNP Feature 540

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Chapter 9

DSC*SCP Interface Modification for LNP - Feature 540

Introduction

This feature provides a modification to the DSC Service Control Point (SCP) and allows the 4ESS to support the reception of an additional Service Control Connection Part (SCCP) header format.

In This Chapter

This chapter contains the following topics:

* DSC is a trademark of DSC Communications Corporation.

Continued on next page

DSC SCP Interface Modification for LNP - Feature 540,
Continued

Advantages/ Benefits

This feature allows the 4ESS to recognize and process a particular SCCP header format utilized by the DSC Signal Transfer Point/Service Control Point (STP/SCP).

Background

The DSC combination STP/SCP utilized by Pacific Bell for the Local Number Portability (LNP) application is sending an SCCP format which was not expected nor allowed by the 4ESS Switch Advanced Intelligent Network (AIN)/LNP implementation.

Continued on next page

DSC SCP Interface Modification for LNP - Feature 540,
Continued

Feature Description

This feature will allow the 4ESS to support the reception of an additional SCCP header format, specifically with Called Party Address including Point Code and Subsystem Number and the Calling Party Address including Subsystem Number. This will allow the 4ESS to recognize and process the particular SCCP header format utilized by the DSC STP/SCP but does not allow for all possible combinations of SCCP Called/Calling Party Address fields.

An additional SCCP header format will be supported for AIN and LNP messages received from the SCP.

The 4ESS Switch shall accept the following combinations of SCCP header fields as valid for AIN and LNP messages received from the SCP:

- SCCP Called Party Address containing Point Code (PC) and Sub System Number (SSN)
- SCCP Calling Party Address containing SSN.

Continued on next page

DSC SCP Interface Modification for LNP - Feature 540,
Continued

Provisioning

Recent Change (RC) Forms Impacted

There are no 4E Recent Change Forms impacted by this feature.

Verify Forms/Messages Affected

There are no 4E Verify Forms or Messages Affected by this feature.

Continued on next page

DSC SCP Interface Modification for LNP - Feature 540,
Continued

Feature Implementation

This feature is dependent upon the installation of the 4E22 and 4E23 Generic.

Feature Dependencies

Advanced Intelligent Network (AIN) (Feature 375) and Local Number Portability (LNP) (Feature 450) must have been previously deployed.

Operating System (OS) Impact

No impact as a result of this feature.

Continued on next page

DSC SCP Interface Modification for LNP - Feature 540,
Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
AIN	Advanced Intelligent Network
DSC	DSC Communications Corporation
LNP	Local Number Portability
OS	Operating System
PC	Point Code
RC	Recent Change
SCCP	Service control Connection Part
SCP	Service Control Point
SSN	Sub System Number
STP	Signal Transfer Point

SELF CHECK

Chapter 9

DSC SCP Interface Modification for LNP - Feature 540

1. List the advantage for this feature.

   _____

2. What are the two Digital Switch Corporation (DSC) Service Control Connection Part (SCCP) header fields that will be valid for Advanced Intelligent Network (AIN) and Local Number Portability (LNP)?

   _____

3. When is this feature available?

   _____

4. The feature is dependent upon which other features?

   _____

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B 3B Processor Features

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Chapter 10

Header Validation and Circulation Message Removal - Feature 505

Introduction

This feature provides integrity checks on hardware command messages on the Common Network Interface (CNI) Ring. The software requires the use of the Integrated Ring Node Version 2 (IRN2) and ULN packs in order for it to perform. This feature provides the error handling software in all the IRN2 and ULN based ring nodes in the 3B.

In This Chapter

This chapter contains the following topics:

Continued on next page

Header Validation and Circulation Message Removal - Feature 505, Continued

Advantages/ Benefits

This feature increases the robustness of the CNI Ring for those nodes which contain an IRN2. Also, this feature reduces the frequency of CNI Ring outages and reduces the total system down time.

Continued on next page

Header Validation and Circulation Message Removal - Feature 505, Continued

Background

The Signal Transfer Point (STP) is a node in Signaling System 7 (SS7) Network that operates under program control to connect signaling links to switching systems and other STPs.

The STP is a 3B20D computer equipped with a CNI Ring. The STP software consists of four subsystems working together. Each subsystem performs a share of the functions necessary to keep an STP operational.

The four software subsystems are:

- UNIX* Real Time Reliable (RTR)
  - Performance measurements, Recent Change (RC), diagnostics, database management
- Interprocess Message Switch (IMS)
  - Maintains the ring, transports signaling messages among ring nodes
- Common Network Interface (CNI)
  - Hardware and software to implement signaling protocols.
- STP Application
  - Message routing, network management, Operations Support System (OSS) interfaces.

This feature will improve the IMS architecture.

With the current IMS architecture, unintentional corruption of an IMS header can occur while a message is waiting to be written to the ring. This can cause a software message to look like a hardware control message, causing unintended hardware state changes in one or more nodes. Corruption of IMS headers also happens on the ring due to fault ring hardware by adding or deleting message bytes.

*UNIX is a registered trademark in the United States and other countries, licensed exclusively through X/Open Company Limited.

Continued on next page

Header Validation and Circulation Message Removal - Feature 505, Continued

Feature Description

This feature is developed to ensure the validity of the IMS headers as they travel around the ring. IMS software will place an error control code such as checksum in the IMS header. The value of the error code will depend on the exact contents of the headers. The ring interface will check the error control code for its correctness and allow the message to proceed, if it is good. This feature validates hardware control messages only.

Continued on next page

Header Validation and Circulation Message Removal - Feature 505, Continued

Provisioning

This feature does not impact or affect any 4E Recent Change (RC) Forms or Verify Messages. All of the changes are in the 3B Attached Processor System (APS)/CNI Ring area.

Continued on next page

Header Validation and Circulation Message Removal - Feature 505, Continued

Feature Implementation

IMS Impact

Hardware

Additional logic will have to be added to the ring interface circuit for header validation and for removing circulating messages. Since all ring interface logic is contained in a Single Ring Interface (SRI), it will have to be modified. IMS hardware design impacts are:

1. To design and manufacture SRI2 by making minor modifications to SRI
2. To build a new IRN2 Board (IRN2B). IRN2B will house SRI2. This feature does not require any design changes in IRN2 processor design.

Software

IMS software areas affected are:

1. Message formatting in all note types
2. Porting IRN Ring Peripheral Controller (RPC) code to IRN2B
3. 3B Ring Error Analysis and Recovery (EAR)
4. Node Ring EAR
5. RPC monitor node administration (3B)
6. 3B message switch
7. Diagnostics (Phase 10).

Application Impact

This feature should not require applications (CNI and others) to make any changes in their code. It should improve total system down time.

This feature involves changes to:

1. The header format of hardware control messages
2. Destination address field of general broadcast and take messages for check field. Applications cannot make us of these fields.

Additions to message formatting software will result in a small expansion of memory usage by IMS in all existing node types.

Assignment Restrictions

In order for circulating message removal part of the feature to work, IRN2B Ring Peripheral Controller Node (RPCN) is required and for header validation part of the feature to work, an IRN2B is required at minimum of one node.

Continued on next page

Header Validation and Circulation Message Removal - Feature 505, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
APS	Attached Process System
CNI	Common Network Interface
EAR	Error Analysis and Recovery
IMS	Interprocess Message Switch
IRN2	Integrated Ring Node Version 2
OSS	Operations Support System
RC	Recent Change
RPC	Ring Peripheral Controller
RPCN	Ring Peripheral Controller Node
RTR	Real Time Reliable
SRI	Single Ring Interface
STP	Signal Transfer Point

SELF CHECK

Chapter 10

Header Validation and Circulation Message Removal - Feature 505

1. List the advantage of this feature.

   _____

   _____

2. Which Signal Transfer Point (STP) software subsystem is improved with this feature?

   _____

3. How does this feature work?

   _____

   _____

   _____

4. Are there any 4E Recent Change (RC) Forms impacted by this feature?

   _____

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11 3B20D APS Software Upgrade to UNIX RTR 21.17 Feature 478

4ESS™-2000 Switch 4E23 Generic Transition Document

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Chapter 11

3B20D APS Software Upgrade to UNIX RTR 21.17 - Feature 478

Introduction

This feature provides a software upgrade of the 4ESS™-2000 Switch Attached Processor System (APS) operating system software from UNIX* Real Time Reliable (RTR) 21.7 to RTR 21.17. This is included as part of the 4AP 16 Release.

In This Chapter

This chapter contains the following topics:

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Continued on next page

3B20D APS Software Upgrade to UNIX RTR 21.17 - Feature 478, Continued

Advantages/ Benefits

This feature provides the latest APS software generic current with the latest RTR Operating System (OS) release. In addition, this software generic is needed for the 3B20D to 3B21D upgrade.

Background

The 3B20D APS provides for data storage and backup copies of the generic programs and office translations. Currently, UNIX RTR 21.7 is the operating system for the 3B20D APS. The 3B20D processor is currently manufactured discontinued and the real-time capacity is nearly exhausted. Therefore, the operating system as well as the processor are being upgraded in the 4E23 generic.

Continued on next page

3B20D APS Software Upgrade to UNIX RTR 21.17 - Feature 478, Continued

Feature Description

This feature provides for the 3B software upgrade for the UNIX RTR OS. The software will be upgraded from UNIX RTR 21.7 to RTR 21.17. The current UNIX RTR 21.7 uses SUN Operating System (SUNOS) for its build environment. With the upgrade to UNIX 21.17, the build environment platform is SOLARIS 2.3. SOLARIS 2.3 is the latest SUNOS platform.

Continued on next page

3B20D APS Software Upgrade to UNIX RTR 21.17 - Feature 478, Continued

Provisioning

Recent Change (RC) Forms Impacted

There are no 4E Recent Change Forms impacted by this feature.

Verify Forms/Messages Affected

There are no 4E Verify Forms or Messages affected by this feature.

Continued on next page

3B20D APS Software Upgrade to UNIX RTR 21.17 - Feature 478, Continued

Feature Implementation

This feature is dependent upon the installation of the 4E23 generic. This feature must be installed prior to the installation of the 3B21D computer (Feature 5222).

The retrofit steps for the upgrade to UNIX RTR 21.17 will follow the standard APS retrofit process.

OS Impact

Some testing for this feature should be accomplished with the Total Network Management (TNM), Version 4.2, to establish compatibility.

Continued on next page

3B20D APS Software Upgrade to UNIX RTR 21.17 - Feature 478, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
APS	Attached Processor System
OS	Operating System
RTR	Real Time Reliable
SUNOS	SUN Operating System
TNM	Total Network Management

SELF CHECK

Chapter 11

3B20D APS Software Upgrade to UNIX RTR 21.17 - Feature 478

1. List the advantage of this feature.

   _____

   _____

2. This feature is part of which 4AP Release?

   _____

3. Is this feature required for the upgrade to the 3B21D Computer?

   _____

   _____

4. What is the build environment for the upgrade to UNIX RTR 21.17?

   _____

   _____

   _____

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Chapter 12

3B21D APS Upgrade - Feature 5222

Introduction

This feature provides the hardware and software requirements for the upgrade to the 3B21D Attached Processor System (APS).

In This Chapter

This chapter contains the following topics:

Continued on next page

3B21D APS Upgrade - Feature 5222, Continued

Advantages/ Benefits

The introduction of the 3B21D Processor into the 4ESS Switch office configuration permits the switch to perform the same functions as before but at a higher overall switch capacity. Its introduction also permits using the 4ESS Switch in ways that had previously been constrained by resource limitations within the office.

The 3B21D Processor will provide an increase in the following:

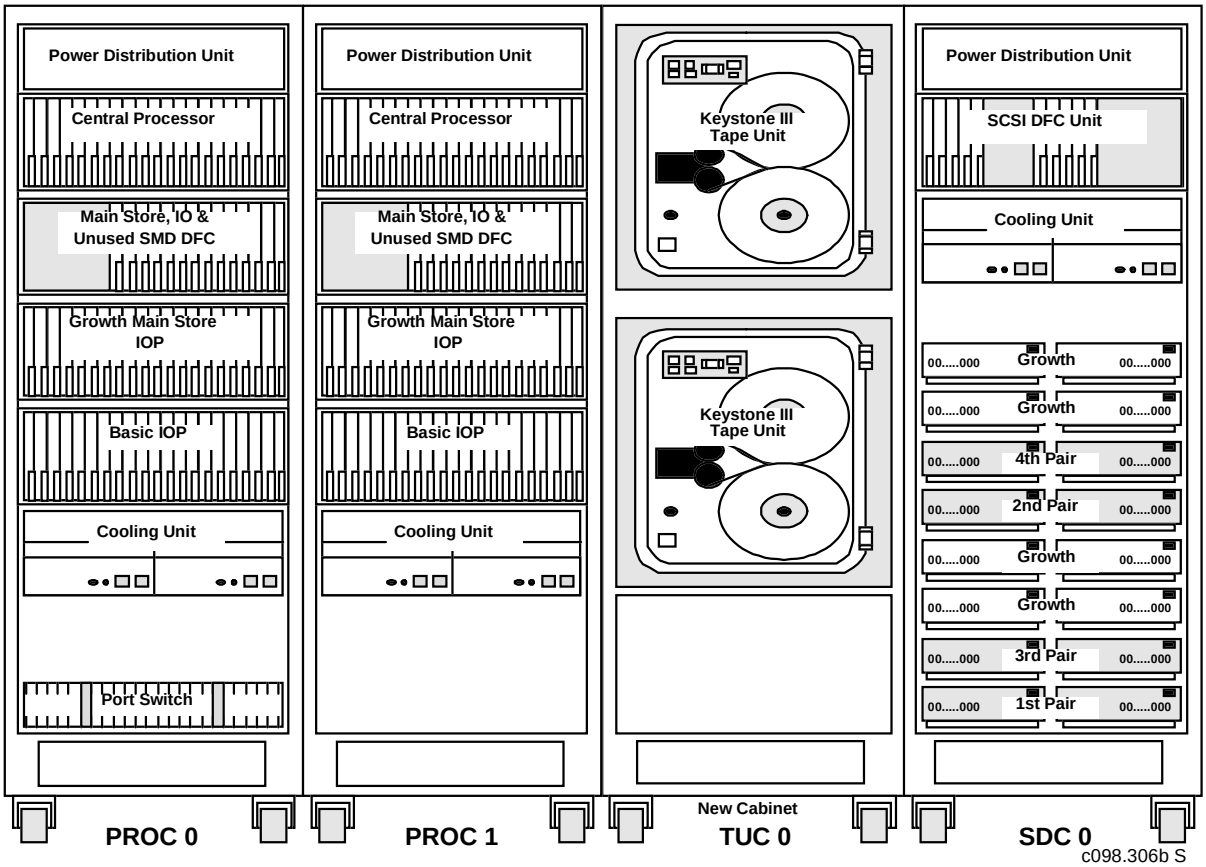
- Real Time Capacity enhanced Disk File Controller (DFC)-Input/Output Processor (IOP)
- Larger physical and virtual memory
- Two expansion slots for future evolution
- Reduced footprint and processor cost.

Continued on next page

3B21D APS Upgrade - Feature 5222, Continued

Background The 3B20D Processor is currently used as the Attached Processor System (APS) for the 4ESS-2000 Switch.

ATTACHED PROCESSOR SYSTEM



LEGEND:

DFC	Disk File Controller
IO	Input/Output Frame
IOP	Input/Output Processor
SCSI	Small Computer System Interface
SDC	Synchronous Data Controller
SMD	Surface Mount Device
TUC	Tape Unit Controller

Continued on next page

3B21D APS Upgrade - Feature 5222, Continued

Background (cont'd).

Currently, the APS is a 3B20D Computer that provides for data storage and backup copies of generic programs and office translations. The APS is the interface to the CNI Ring for ISDN User Part (ISUP) signaling. In addition, billing information is stored for downstream processing. The 3B disc drives are sized appropriately depending on the office use.

The APS is resident on the Auxiliary Unit Bus (AUB). The APS operates on a 32-bit word basis.

Auxiliary Tape Drives

Auxiliary tape drives are used for loading various library programs making system backup tapes and loading new generic programs. These tape drives are located on the AUB. Two tape drives are all that is generally required in today's environment.

Small Computer System Interface (SCSI)

The APS uses an SCSI that can be equipped with 1 Gb disc drives. Either two or four disc drives are required based on the quantity of billing records to be stored.

There are issues with the current 3B20D that need to be addressed. The 3B APS (3B20D) capacity is at a premium. The 3B20D is approaching exhaust in terms of real time, disk capacity is starting to run out, repose time for RC/V activity is unacceptable, and software updates are too slow. In addition, the 3B20D has been manufactured discontinued and special maintenance support had to be set up for it. The 3B21D can solve all of these problems.

Continued on next page

3B21D APS Upgrade - Feature 5222, Continued

Feature Description

This feature provides the hardware and software requirements for converting from 3B20D Computer System to a 3B21D Computer System. The 3B21D Processor has been designed to support a wide range of switch-based configurations (Signal Transfer Point [STP] 4E, 5E).

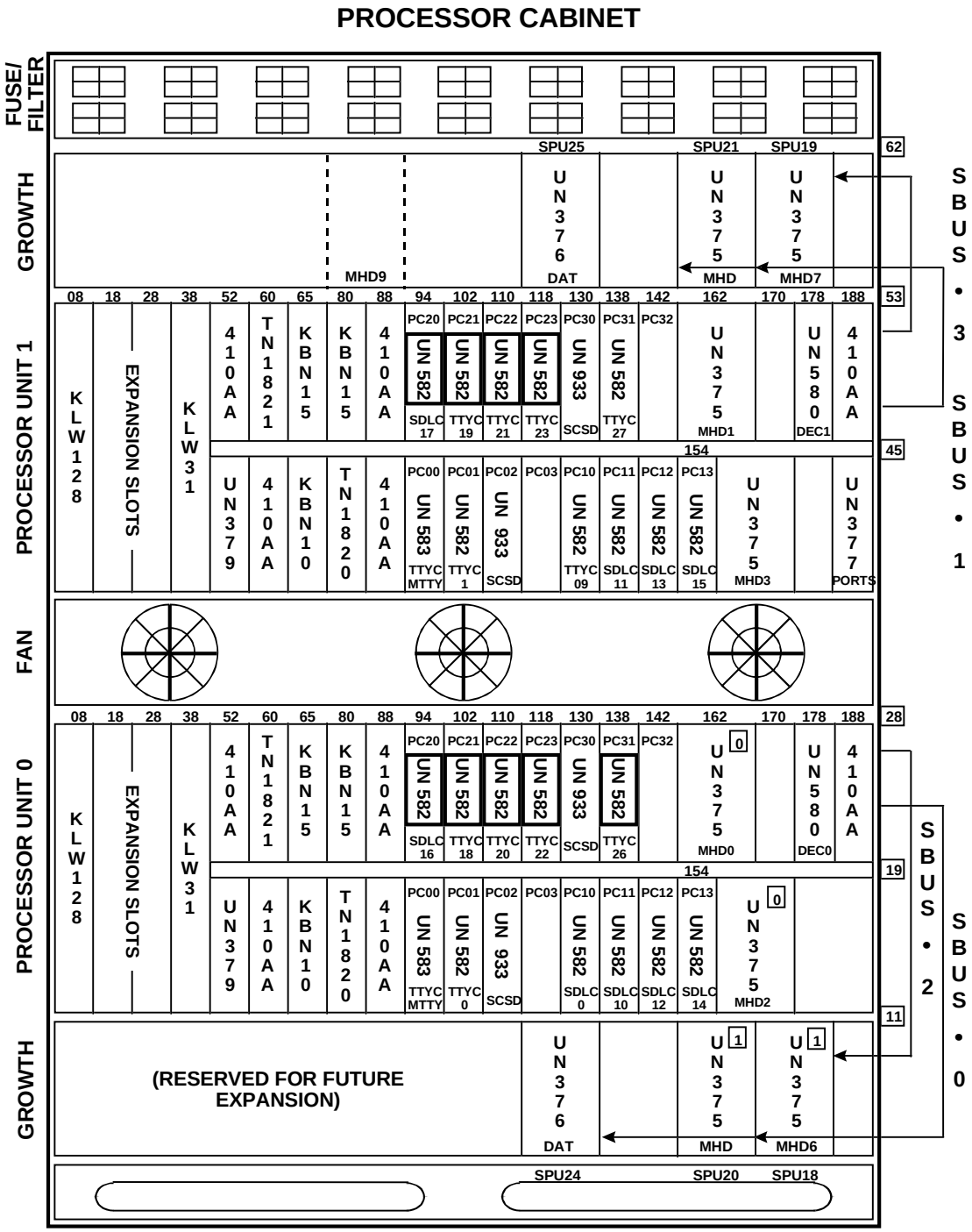
In the 4ESS-2000 Switch APS configuration, the 3B21 will support:

- One processor cabinet
- 128 Mb RAM memory
- Two duplexed pair of Direct Memory Access Controllers (DMACs), supporting the same number of Dual Serial Channel (DSCH) devices as are currently used on the 3B20.
- One pair of Digital Audio Tape (DAT) units
- Four pair of Small Computer System Interface (SCSI) disk drives
- Enhanced 3B20D DFC and 3B20D IOP.

Continued on next page

3B21D APS Upgrade - Feature 5222, Continued

Feature Description
(cont'd.)



Continued on next page

3B21D APS Upgrade - Feature 5222, Continued

Feature Description (cont'd.)

The 3B21D is basically a smaller 3B20D in which the processor and memory speeds have been updated. The Input/Output Processor (IOP), Disk File Controller (DFC) and Direct Memory Access Controller (DMAC) have been updated. The Dual Serial Channel (DSCH) interfaces are unchanged and a Small Computer Scale Interface (SCSI) is provided. The tape and disk drives are new and two Digital Audio Tape (DAT) SCSIs are added. Two expansion slots per Central Controller (CC) are provided for future expansion. The 3B21D Supports two DMACs, each with four channels and each channel supports four devices.

The 3B21D APS complex consists of one processor cabinet. The cabinet consists of the following layout:

- Modular Fuse and Filter Unit
- Growth Units
- Processor Units
- Bi-directional Fan Unit.

The main processor unit consists of two CC units (Units 0 and 1) in a duplex configuration. Each simplex unit (located above and below the cooling fan unit) consists of a basic apparatus housing that contains the processor, main memory, DMACs, IOP and DFC units, and a growth housing (located above) for additional IOP and/or DFC units.

Continued on next page

3B21D APS Upgrade - Feature 5222, Continued

Provisioning

Recent Change (RC) Forms Impacted

There are no 4E Recent Change Forms impacted by this feature.

Verify Forms/Messages Affected

There are no 4E Verify Forms or Messages affected by this feature.

Continued on next page

3B21D APS Upgrade - Feature 5222, Continued

Feature Implementation

Feature 5222 is implemented via hardware deployment of the 3B21D.

Operating System (OS) Impact

Some testing for this feature should be accomplished with the Total Network Management (TNM) operational system installed with R4.2 to establish compatibility.

Training Available

- *ES4850 – 4ESS™-2000 Switch 3B21 Application to 4ESS Multimedia for LEC*
- *ES4855 – 4ESS™-2000 Switch 3B20 to 3B21 Conversion Hands-on for LEC*

Continued on next page

3B21D APS Upgrade - Feature 5222, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
APS	Attached Processor System
AUB	Auxiliary Unit Bus
DAT	Digital Audio Tape
DFC	Disk File Controller
DMAC	Direct Memory Access Controller
DSCH	Dual Series Channel
Gb	Gigabyte
IO	Input/Output Frame
IOP	Input/Output Processor
ISDN	Integrated Systems Digital Network
ISUP	ISDN User Part
OS	Operating System
RAM	Random Access Memory
RC	Recent Change
SCSI	Small Computer System Interface
SDC	Synchronous Data Controller
SMD	Surface Mount Device
STP	Signal Transfer Point
TNM	Total Network Management
TUC	Tape Unit Controller

SELF CHECK

Chapter 12

3B21D APS Upgrade - Feature 5222

1. List the advantages of this feature.

_____

_____

_____

_____

2. Describe the 3B21 configuration.

_____

_____

_____

_____

_____

_____

3. What are the four units of the 3B21D Computer?

_____

_____

_____

_____

4. List the training courses on the 3B21D Computer.

_____

_____

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C Routing Features

4ESS™-2000 Switch 4E23 Generic Transition Document

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Chapter 13

Code Group Restructure - Feature 497

Introduction

This feature impacts the population of the call routing information on the Recent Change (RC) Code Group tables.

In This Chapter

This chapter contains the following topics:

Continued on next page

Code Group Restructure - Feature 497, Continued

Advantages/ Benefits

This feature provides increased call options on the Code Group tables. This capability allows for future introduction of new call processing features.

Background

Recent Change (RC) Code Group tables are used in software to determine the routing of NPA/NXX codes. These Code Group tables consist of call information for the proper disposition of the calls.

There are many data elements contained on the Code Group tables. This feature impacts the Call Type/Call Data words and the additional data fields on the tables. The Call Type/Call Data words are used to determine the specific type of routing. The additional data fields provide additional call routing instructions.

Continued on next page

Code Group Restructure - Feature 497, Continued

Feature Description

This feature increases the Call Type options for subsequent digit routing. In addition, this feature expands the allowable entries in the Additional Data 3 (AD3) field on the Code Group tables.

This feature impacts these Call Type combinations:

	Call Type/Call Data Words	Additional Data 1 (AD1)
SD1	SDINDEX	SDTYPE
SD2	SDINDEX	SDTYPE
SD3	SDINDEX	SDTYPE

The "SD1, SD2 and SD3" Call Type words are used for manual and automatic subsequent digit routing. Currently, the subsequent digit types are nearing exhaust.

This feature will restructure the SD Call Types. The existing "SD1, SD2 and SD3" Call Type words will now be used only for automatic (routing on digits) Code Groups and the SDTYPE field for these Call Type words are deleted. A new Call Type word, Subsequent Digit Manual (SDIGM) is being created for manual subsequent digit routing indexes. This Call Type will contain the SDTYPE field and it will grow from 16 to 32 entries. Recent Change (RC) and Verify Forms will use "SDX" for this Call Type.

In addition, this feature will expand the AD3 field on the Code Group Form. This is being expanded to allow for future call processing features.

Continued on next page

Code Group Restructure - Feature 497, Continued

Provisioning **Recent Change Forms Impacted**

RC 300 – Change 3 Digit Translation

```
# FORM 300   CHANGE 3 DIGIT TRANSLATION
  4E23R1>

RC:CODEGRP;CHG;OPT(DIG3),___:                    DOM ____, NTD 3,   AC _,

ORNU ______,

     CALLTYP     CALLDATA          AD1     AD2     SC    CHI  DESEP   DNST
OLD   ___, ___________________,   ____,   ______,  ____,  ____,  ___,  ______,

               AD3 ________,  ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

NEW   ___,  ___________________,   ____,   ______,  ____,  ____, ___,  ______,

               AD3 ________,  ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

ABC  ABC  ABC  ABC  ABC  ABC  ABC  ABC

___, ___, ___, ___, ___, ___, ___, ___,
___, ___, ___, ___, ___, ___, ___, ___,
___, ___, ___, ___, ___, ___, ___, ___,
___, ___, ___, ___, ___, ___, ___, ___,

REMARKS _____________________________________________________!

               EQUIVALENT ODA INPUT FORM - ESS 403D

                    ASSOCIATED VERIFY MESSAGES

                      INPUT-13b-VER:CODEGRP

                   OUTPUT-3a-VER:CODEGRP;OPT(DIG3)
```

Continued on next page

Code Group Restructure - Feature 497, Continued

Provisioning (cont'd.)

Code Group Forms: RC 300 Series

Currently SD1, SD2, SD3 or SDX are allowed to be entered in the CALLTYP and CALLDATA fields with a manual SDTYPE entered in the AD1 field. With the introduction of this feature, Call Types of SD1/SD2/SD3 are now for automatics only: no SDTYPE applies. Therefore, the only entry allowed on the forms listed below is SDX, which is for manual SDTYPEs. Internally, the code will determine whether the size is 1, 2 or 3.

CALLDATA, CALLTYP Fields – Recent Change Forms 300-303, 304, 313-316, 346

All Code Grouping forms that contain the CALLDATA and CALLTYP fields and currently allow entries of SD1, SD2, SD3 and SDX will be modified to accept only an input of SDX. When SDX is input, RC will build the Call Type of SDIGM.

AD3 – Additional Data 3

Four additional entries will be allowed for this field. The new entries are: I, J, K and L. These entries are being reserved for future use. The following Call Type words are reserved in software for these entries:

Call Type	Description
DSD	Direct Services Dialing Capability
RDB	Routing Data Block
TST	Maintenance Code Line
GNS	Go/No Go Screening
IRA	International Routing Actions
CRB	Customer Routing Block
PRT	Proportional Routing Treatment
RNHR	Robust Nonhierarchical Routing
DSN	Destination Switch Number
MRT	Multiple Routing Treatment
INW	INWATS
PAS	Mass Announcement System (MAS) Announcement
TEL	MAS Announcement with Televote Counting
TTS	Terminating Toll Switch
TTS_GNS	Terminating Toll Switch with Go/No-Go Screening
MMT	Meet-Me Teleconferencing
MCT	Multiple Carrier Treatment
EAR	Emergency Alternate Routing

The SSP Call Type will be limited to the current A through H entries.

Continued on next page

Code Group Restructure - Feature 497, Continued

Provisioning (cont'd.)

RC 343 – FG-D CIC Expansion

```
# FORM 343   FG-D CIC EXPANSION
  4E18>
RC:CODEGRP;CHG;OPT(FCIC),___:       DOM ____,

ORNU _______,

ABC  DEF  GHI
___, ___, ___,

REMARKS_____________________________________________!

              EQUIVALENT ODA INPUT FORM - ESS 4032

                    ASSOCIATED VERIFY MESSAGES

                       INPUT-13b-VER:CODEGRP

           OUTPUT-3a/3c/3e/3v-VER:CODEGRP;OPT(DIG3/6/9/12)
```

RC 345 – Set/Reset AIN Trigger

```
# FORM 345   SET/RESET AIN TRIGGER
  4E22R2>

RC:AIN;OPT(LIST),____:

ORNU ______,         ACTION _,

DOM    AC      ABC   DEF  GHI  J
____,  _,      ___, ___, ___, _,

TTYPE  LTOS  TOS   FH   SCSANN   DRCC      DFRN
  _,    __,  __,   __,   _____,   ___,   ________,

REMARKS _____________________________________!

                       ASSOCIATED VERIFY MESSAGES

                         INPUT-13t-VER:AIN:LIST

                       OUTPUT-3aj-VER:AIN;OPT(LIST)
```

Continued on next page

Code Group Restructure - Feature 497, Continued

Provisioning (cont'd.)

ABC, DEF, GHI Field (RC 343 Form)

For 4E23R1, "SDX" only allowed. SD1, SD2, SD3 will not be allowed.

ABC, DEF, GHI Field (RC 345 Form)

For 4E23R1, SD1, SD2, SD3, or SDX will be valid for this form.

Continued on next page

Code Group Restructure - Feature 497, Continued

Provisioning (cont'd.)

Verify Forms/Messages Affected

The following 4E Verify Forms/Messages are affected:

- 13f, 13g, 13m
- 3a - 3g, 3i - 3l, 3n, 3v, 3w, 3y, 3z, 3ab, 3ak, 3al, 3an
- 13a, 13b, 13f, 13g, 13m, 13w

Continued on next page

Code Group Restructure - Feature 497, Continued

Feature Implementation

This feature will be implemented via deployment of the 4E23 generic.

Continued on next page

Code Group Restructure - Feature 497, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
AD3	Additional Data 3
CRB	Customer Routing Block
DSD	Direct Services Dialing Capability
DSN	Destination Switch Number
EAR	Emergency Alternate Routing
GNS	Go/No Go Screening
INW	INWATS
IRA	International Routing Actions
MAS	Mass Announcement System
MCT	Multiple Carrier Treatment
MMT	Meet-Me Teleconferencing
MRT	Multiple Routing Treatment
NPA	Numbering Plan Area
PAS	Mass Announcement System (MAS) Announcement
PRT	Proportional Routing Treatment
RC	Recent Change
RDB	Routing Data Block
RNHR	Robust Nonhierarchical Routing
SD	Subsequent Digit
SDIGM	Subsequent Digit Manual
SDX	Subsequent Digit Index
TEL	MAS Announcement with Televote Counting
TST	Maintenance Code Line
TTS	Terminating Toll Switch
TTS_GNS	Terminating Toll Switch with Go/No-Go Screening

SELF CHECK

Chapter 13

Code Group Restructure - Feature 497

1. List the advantage of this feature.

   _____

   _____

2. What is the new Call Type word for Manual Subsequent Digit Routing Indexes?

   _____

3. What are the four new valid entries for the AD3 field?

   _____

   _____

   _____

   _____

4. Which Call Type word will be limited to A-H on the AD3 field?

   _____

5. This feature is dependent on which feature?

   _____

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14 AT Routing Enhancement Feature 488/488i

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Chapter 14

AT Routing Enhancement - Feature 488/488i

Introduction

This feature provides up to 40 footprint areas for completion of calls within the Local Exchange Carrier (LEC) network.

Feature 488 became available with 4E22 Generic, Release 4. Feature 488i is available with Generic 4E23 and provides enhancements to this feature.

In This Chapter

This chapter contains the following topics:

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Advantages/ Benefits

This feature allows the LECs to provide wholesale service to Interexchange Carriers (ICs).

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Background

Feature 488 introduced in Generic 4E22, Release 4, provided the initial capabilities for this feature. This feature allows the LECs to leverage the embedded base in-region networks to provide in region interLATA transport as a service to other carriers. These plans to offer in-region interLATA transport to other carriers is being referred to as wholesale service. The region is which the LEC currently owns and operates local network switches/services is referred to as the LEC "footprint" (e.g., the Ameritech footprint consists of Illinois, Indiana, Ohio, Wisconsin, and Michigan).

ICs subscribing to LEC wholesale service will establish a Point of Presence (POP) connecting to an Access Tandem (AT) switch for the entire LEC footprint (or a subset of the footprint, consisting of NPA-NXXXs within the footprint, referred to as the subscribed footprint area) versus the current POP per LATA. The LEC will terminate calls received from the IC via this POP to any destination within the subscribed footprint. Likewise, calls originated anywhere within the subscribed footprint but terminating outside the subscribed footprint (out-of-subscribed-footprint calls) will be delivered to the IC at the designated POP. Calls which both originate and terminate within the subscribed footprint (in-subscribed-footprint calls) will be completed using the LEC network. Current Automatic Message Accounting (AMA) records generated at the Equal Access End Office (EAEO) (Originating Access) or at the AT (Terminating Access) will be used to bill the carrier for this service. Originating Access records may also be made at the AT (e.g., for non-LEC owned EOs), using capabilities provided by Feature 455, AT Trunk Trigger and Equal Access (EA) AMA Enhancements.

This feature allows the LECs to route the in-footprint calls without carrier involvement.

This initial feature provided support for up to 70 Subscribed Footprint areas (SF00-SF06).

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Feature Description

Feature 488 provided the ability to determine at the 4ESS AT, for carriers subscribed to LEC wholesale service, whether a Feature Group D (FGD) call (either ISDN User Part-Network Interconnect [ISUP-NI] or Equal Access Multifrequency [EAMF]) terminates in- or out- of the carrier's subscribed footprint. The call is either completed via the LEC network (in-subscribed-footprint destination) or handed off to the carrier (out-of-subscribed-footprint destination).

Feature 488I expands the number of Subscribed Footprint areas from 7 (SF00-SF06) to 40 (SF00-SF039).

This feature requires:

- A feature purchase indicator (Feature 488)
- New Super Tandem Carrier ID domain (Feature 488)
- 40 new Subscribed Footprint area domains (vs. 7 in Feature 488)
- New Service Switching Point (SSP) subtype and associated Call Type layout (Feature 488).

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Feature Description (cont'd.)

Access Tandem (AT) Routing

Current AT Routing

When a call is routed to a carrier, the Carrier ID (CID) associated with the call is signaled to the 4ESS Switch. This CID may be received in incoming trunk signaling (via Signaling System 7 [SS7] or EAMF), or it may be received from a Service Control Point (SCP) either SSP800 or Advanced Intelligent Network [AIN]). In any case, the CID is translated to determine the routing treatment associated with that carrier. Normally, this translation indicates the set of Trunk Subgroups (TSG) to use to get to the carrier, and all calls that are directed to the carrier must be routed to the carrier, even if the call is destined to an area served by the LEC. The carrier would have to direct the call back to the LEC network for completion.

AT Routing Enhancement (Feature 488/488i)

With this enhancement, the CID will indicate that the 4ESS Switch should analyze the Called Digits associated with the call. The switch will translate the Called Digits to determine if the call is destined for a portion of the LEC network to which the carrier has subscribed. If it is not, the call will be directed to the carrier using current procedures. If the call is destined to a carrier-subscribed portion of the network in-footprint, the call will be routed (via intraLATA signaling) to the intended destination.

Continued on next page

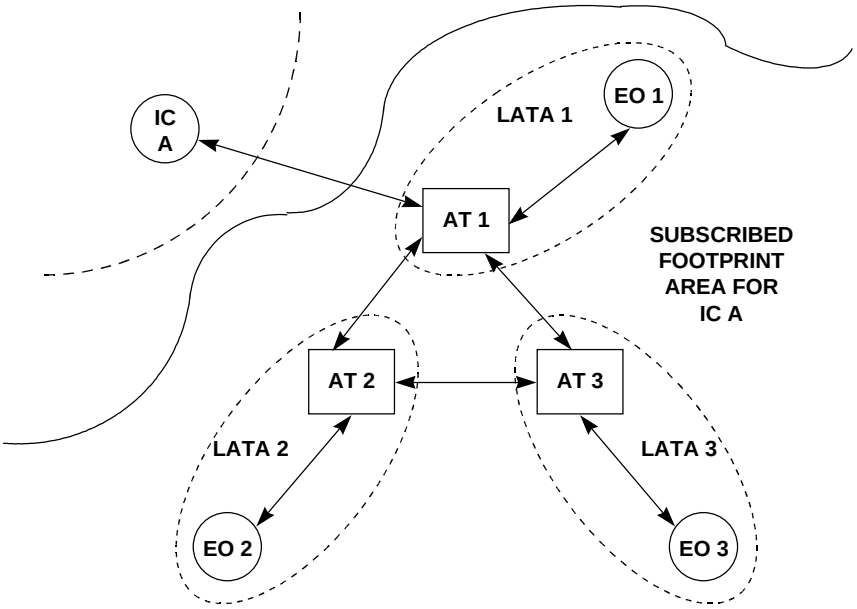
AT Routing Enhancement - Feature 488/488i, Continued

Feature Description (cont'd.)

Call Flow

The EAEO will route originating interLATA calls destined for carrier subscribing to wholesale service to the AT serving the LATA, as done for traditional interLATA traffic. Existing AT-AT FGD routing capability will be used to route the out-of-subscribed-footprint calls to the AT connecting to the IC POP for completion. The AT will route in-subscribed-footprint calls to the appropriate EO via the LEC network use FGC/intra-network signaling and routing capability.

LEC NETWORK ARCHITECTURE



Legend:

AT - Access Tandem
EO - End Office
IC - Interexchange Carrier
LATA - Local Access Transport Area

Terminating Call Flow (existing functionality)

1. Call destined to EO 3 is received from the IC at AT 1.
2. AT 1 generates a Terminating Access AMA record for the call.
3. AT 1 routes the call to EO 3 via AT 3 using FGC signaling.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Feature Description (cont'd.)

Originating Call Flow – Out-of-Subscribed-Footprint Call

1. Caller at EO 2 Presubscribed Interexchange Carrier (PICed) to IC A subscribing to wholesale service places an interLATA call to a destination located outside of the subscribed footprint.

2. EO 2 generates an Originating Access AMA record and routes the call to AT 2 via FGD signaling.

3. AT 2 translates the carrier ID and determines this carrier is subscribed to wholesale service.

4. Because IC A subscribes to wholesale service, AT 2 translates the called number based on the carrier's subscribed footprint and determines this call is destined for an out-of-footprint location.

5. AT 2 retranslates the carrier ID and routes the call to AT 1 using FGD inter-AT routing.

6. AT 1 translates the carrier ID and delivers the call to the IC.

Originating Call Flow – In-Subscribed-Footprint Call

1. Caller at EO 3 PICed to IC subscribing to wholesale service places an interLATA call to EO 1.

2. EO 3 generates an Originating Access AMA record and routes the call to AT 3 via FGD signaling.

3. AT 3 translates the carrier ID and determines this carrier is subscribed to wholesale service.

4. Because the IC subscribes to wholesale service, AT 3 translates the called number for the carrier's subscribed footprint and determines this call is destined for an in-footprint location.

5. AT 3 routes the call to EO 1 via AT 1 using FGC signaling.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning

Recent Change (RC) Forms Impacted

RC 300 – Change 3 Digit Translation

```
# FORM 300   CHANGE 3 DIGIT TRANSLATION
  4E23R1>

RC:CODEGRP;CHG;OPT(DIG3),___:                    DOM ____, NTD 3,    AC _,

ORNU _____,

     CALLTYP     CALLDATA          AD1     AD2     SC    CHI  DESEP   DNST
OLD   ___, ________________,   ____,   _____,   ____,   ____,   ___,   _____,

                AD3 ________,
ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

NEW   ___,   ________________,   ____,   _____,   ____,   ____, ___,   _____,

                AD3 ________,
ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

ABC   ABC   ABC   ABC   ABC   ABC   ABC   ABC

___, ___, ___, ___, ___, ___, ___, ___,
___, ___, ___, ___, ___, ___, ___, ___,
___, ___, ___, ___, ___, ___, ___, ___,
___, ___, ___, ___, ___, ___, ___, ___,

REMARKS ____________________________________________________!

              EQUIVALENT ODA INPUT FORM - ESS 403D

                   ASSOCIATED VERIFY MESSAGES

                     INPUT-13b-VER:CODEGRP

                  OUTPUT-3a-VER:CODEGRP;OPT(DIG3)
```

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

This feature impacts the routing RC Forms. Various forms are impacted by this feature: RC 300, 301, 302 and 303.

The following RC fields are changed on these forms:

- **DOM - Domain**

  Additional Valid Entries:

  - STCD - Super Tandem Carrier ID
  - SF00 thru SF39 - Subscribed Footprint Area 00 thru 39.

- **CALLTYP/CALLDATA**

  Additional Valid Entries:

  - SSP/SFA - Service Switching Point/Subscriber Footprint Area.

- **AD1 - Additional Data 1**

  Additional Valid Entries:

  - SFAI - Subscriber Footprint Area Index
  - Range: 00-39

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Population Rules – RC 300

1. STCD and SF00 thru SF39 will be new legal domains in the DOM field.

2. If DOM equals STCD, then CALLTYPE must be FHT, SDX, or SSP.

3. If DOM equals STCD and CALLTYP equals SSP, then CALLDATA must be TNSND.

4. If DOM equals STCD and CALLTYP equals SDX, then SDTYPE must be either MTS or DRTC.

5. The SDTYPE of DRTC is only valid in either the ATNS or STCD domains. If AD1 on RC 300-303 equals DRTC, the DOM must be ATNS or STCD or NSR. If DOM is not ATNS or STCD or NSR and CALLTYP is SDX, then the subsequent digit block and any subsequent digit blocks linked below it must be searched for any DRTC entry. If one is found, the codegroup must be rejected.

6. If CALLTYP equals SSP and CALLDATA equals TNSND, then DOM must be ATNS or STCD.

7. If CALLTYP equals SSP and CALLDATA equals SFA, then:

   - The purchased indicator must be set to YES
   - The AD1 field must have a valid SFAI entry which may be 0 thru 39
   - Non-blank, valid: ADC, SC and CHI fields entries are optional
   - Non-blank AD2, AD3, DESEP and DNST field entries are not allowed.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

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Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

RC 304 – Change Subsequent Digit Routing

```
# FORM 304   CHANGE SUBSEQUENT DIGIT ROUTING
  4E23R1>

RC:CODEGRP;CHG;OPT(SDX),___:        SDINDEX _____, SIZE _, DOMCLASS ____,

ORNU ______,  ACTION _,

INDEX  CALLTYP    CALLDATA       AD1    AD2    SC    CHI   DESEP   DNST

____,   ___,   __________________, _____, ______,  _____,  _____,   ___,  ______,
                AD3 ________, ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

____,   ___,   __________________, _____, ______,  _____,  _____,   ___,  ______,
                AD3 ________, ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

____,   ___,   __________________, _____, ______,  _____,  _____,   ___,  ______,
                AD3 ________, ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

____,   ___,   __________________, _____, ______,  _____,  _____,   ___,  ______,
                AD3 ________, ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

 ____,   ___,   __________________, _____, ______,  _____,  _____,   ___,  ______,
                AD3 ________, ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

 ____,   ___,   __________________, _____, ______,  _____,  _____,   ___,  ______,
                AD3 ________, ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

 ____,   ___,   __________________, _____, ______,  _____,  _____,   ___,  ______,
                AD3 ________, ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

 ____,   ___,   __________________, _____, ______,  _____,  _____,   ___,  ______,
                AD3 ________, ADC__,__,__,__,__,__,__,__,__,__,__,__,__,__,

    REMARKS ___________________________________________________!

                EQUIVALENT ODA INPUT FORM - ESS 403G

                    ASSOCIATED VERIFY MESSAGES

                   INPUT-13c-VER:CODEGRP:SDINDEX

                   OUTPUT-3g-VER:CODEGRP;OPT(SDX)
```

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

RC 304 – Change Subsequent Digit Routing

The following RC fields are changed on this form:

- **DOMCLASS - Domain Classification**

  Additional Software Rules:

  - The Super Tandem Carrier ID (STCD) domain is defined within the "ATNS" DOMCLASS and the new Subscribed Footprint Area domains SF00-SF39 is defined within the "DOM" DOMCLASS.

- **AD1 - Additional Data 1**

  - The new CALLTYPE/CALL DATA word of Service Switching Point/ Subscribed Footprint Area (SSP/SFA) will allow SFAI in the AD1 field.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Population Rules – RC 304

1. The SDTYPE of DRTC is only valid in the ATNS domclass. If AD1 on Form 304 equals DRTC, then the DOMCLASS must be ATNS or NSR. If the DOMCLASS is not ATNS or NSR and CALLTYP is SDX, then the subsequent digit block and any subsequent digit blocks linked below it must be searched for any DRTC entry. If one is found, the codegroup must be rejected.

2. If an existing SDX block is being changed and AD1 equals DRTC, then all codegroups (including intermediate SDX blocks) that point to the SDX block must be in the ATNS or NSR domclass.

3. If an existing SDX block is being changed and any SDX blocks downchain contain a DRTC entry, then all codegroups (including intermediate SDX blocks) that point to the SDX block must be in the ATNS or NSR domclass.

4. If CALLTYP equals SSP and CALLDATA equals TNSND, then the DOMCLASS must be ATNS.

5. If CALLTYP equals SSP and CALLDATA equals SFA, then:

   - The purchased indicator must be set to YES
   - The AD1 field must have a valid SFAI entry which may be 0 thru 39
   - Non-blank, valid: ADC, SC and CHI fields entries are optional
   - Non-blank AD2, AD3, DESEP and DNST field entries are not allowed.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

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Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

RC 309 – Add a New NONPOTS Domain

```
# FORM 309   ADD  A  NEW  NONPOTS  DOMAIN

RC:CODEGRP;NEW;OPT(DOM),___:                                    DOM ____,

ORNU ______,

FSONLY N,

REMARKS _____________________________________________!

              EQUIVALENT ODA INPUT FORM - ESS 403C

               ASSOCIATED VERIFY MESSAGES - NONE
```

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

Various forms are impacted by this feature: RC 309, 311, 327-330 and 344.

The following RC field is changed on these forms:

- **DOM - Domain**

  Additional Valid Entries:

  - STCD - Super Tandem Carrier ID
  - SF00 thru SF39 - Subscribed Footprint Area 00 thru 39.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

RC 341 – Emergency Alternate Routing Database

```
# FORM 341  EMERGENCY ALTERNATE ROUTING DATABASE
  4E18>

RC:CODEGRP;CHG;OPT(EARDAT),___:

ORNU ______,     ACTION _,

  PRIMNUM     PRIMDOM     ALTNUM_,

__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,
__________,     ____,     __________,

REMARKS ------------------------------------------------!

              EQUIVALENT ODA INPUT FORM - ESS 4031

                   ASSOCIATED VERIFY MESSAGES

                    INPUT-13r-VER:CODEGRP:EAR

                  OUTPUT-3q-VER:CODEGRP;OPT(EAR)
```

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

Various forms are impacted by this feature: RC 341 and 342.

The following RC field is changed on these forms:

- **PRIMDOM - Primary Domain**

  Additional Valid Entries:

  - SF00 thru SF39 - Subscribed Footprint Area 00 thru 39.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

RC 343 – FG-D CIC Expansion

```
# FORM 343   FG-D CIC EXPANSION
  4E18>
RC:CODEGRP;CHG;OPT(FCIC),___:       DOM ____,

ORNU _______,

ABC  DEF  GHI
___, ___, ___,

REMARKS_____________________________________________________!

              EQUIVALENT ODA INPUT FORM - ESS 4032

                    ASSOCIATED VERIFY MESSAGES

                       INPUT-13b-VER:CODEGRP

           OUTPUT-3a/3c/3e/3v-VER:CODEGRP;OPT(DIG3/6/9/12)
```

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

Various forms are impacted by this feature: RC 343 and 345.

The following RC field is changed on these forms:

- **DOM - Domain**

  Additional Valid Entries:

  - SF00 thru SF39 - Subscribed Footprint Area 00 thru 39.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

RC 631 – Change Service Parameters

```
# FORM 631  CHANGE SERVICE PARAMETERS
  4E22>

RC:SERVICE;CHG;OPT(PARAMS),___:                              SRVC ____,

ORNU ______,

RTDOM ____,    RSI ___,    RSIDF _,    RSFHT ___,

REMARKS _____________________________________________!

              EQUIVALENT ODA INPUT FORM - ESS 406V

                   ASSOCIATED VERIFY MESSAGES

               INPUT-16z-VER:SERVICE:SRVC a!(EOT)

               OUTPUT-6ag-VER:SERVICE,OPT(PARAMS)
```

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Recent Change (RC) Forms Impacted

RC 631 – Change Service Parameters

The following RC field is changed on this form:

- **RTDOM - Routing Domain**

  Additional Valid Entries:

  - SF00 thru SF39 - Subscribed Footprint Area 00 thru 39.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Provisioning (cont'd.)

Verify Forms/Messages Affected

The following Verify Forms/Messages are affected by this feature:

- Verify Forms 3a-3f, 3v, 3w, 3z, 3ab, 3ai, 13b, 13f, 13m
- Verify Forms 3g, 3z & 13m
- Verify Form 3aj
- Verify Form 3q
- Verify Form 6ag.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Feature Implementation

This feature will be implemented via deployment of the 4E23 generic and the purchase of Feature 488.

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
AD	Additional Data
ADC	Acceptable Digit Count
AIN	Advanced Intelligent Network
AMA	Automatic Message Accounting
AT	Access Tandem
ATNS	Access Tandem Transit Network Selection
CHI	Call Handling Instructions
CIC	Carrier Identification Code
CID	Carrier ID
DESEP	Destination Separation
DNST	Dialed Number Service Type
DOM	Domain
DRTC	Data Rate Transfer Capability
EA	Equal Access
EAEO	Equal Access End Office
EAMF	Equal Access Multifrequency
EO	End Office
FGC	Feature Group C
FGD	Feature Group D
FHT	Final Handling Treatment
IC	Interexchange Carrier
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
LATA	Local Access Transport Area
LEC	Local Exchange Carrier
MTS	Multiple Treatment Screening
NI	Network Interconnect
NPA	Numbering Plan Area
NSR	Number Services Routing
POP	Point Of Presence
SC	Service Category
SCP	Service Control Point
SDX	Subsequent Digit Index

Continued on next page

AT Routing Enhancement - Feature 488/488i, Continued

Acronyms and Abbreviations (cont'd.)

Terms	Definitions
SF	Subscribed Footprint
SFA	Subscribed Footprint Area
SFAI	Subscribed Footprint Area Index
SS7	Signaling System 7
SSP	Service Switching Point
STCD	Super Tandem Carrier ID
TSG	Trunk Subgroup
TNSND	Access Tandem Transit Network Selection Digit

SELF CHECK

Chapter 14

Access Tandem (AT) Routing Enhancement - Feature 488/488i

1. List the advantage of this feature.

   _____

   _____

2. What is the definition of a footprint?

   _____

   _____

3. How does this feature work?

   _____

   _____

   _____

4. What are the new Domains associated with this feature?

   _____

   _____

5. What are the new Call Type/Call Data and AD1 entries for this feature?

   _____

   _____

6. Which Recent Change (RC) Form is used for adding the new Domains?

   _____

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D Miscellaneous Features

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Chapter 15

Trunk Maintenance Restructure - Feature 490

Introduction

The purpose of this feature is to restructure certain critical Trunk Maintenance (TM) software.

In This Chapter

This chapter contains the following topics:

Continued on next page

Trunk Maintenance Restructure - Feature 490, Continued

Advantages/ Benefits

This feature will increase the assigned states for three items. This will allow for development of new states for future features in the trunk maintenance area. This increased capacity will provide for future downloading of trunk maintenance data.

Continued on next page

Trunk Maintenance Restructure - Feature 490, Continued

Background Not Applicable

Continued on next page

Trunk Maintenance Restructure - Feature 490, Continued

Feature Description

Feature 490 restructures three Trunk Maintenance (TM) structures. This increases the assigned states.

The items that will have more assigned states are:

- REPT:Message Printing states
- Group Trunk Processing states
- Trunk Maintenance Register (TMR) items used to terminate message processing and/or search all TMRs in the office.

This feature does not change customer capabilities.

Continued on next page

Trunk Maintenance Restructure - Feature 490, Continued

Provisioning

Recent Change (RC) Forms Impacted

There are no 4E Recent Change (RC) Forms impacted by this feature.

Verify Forms/Messages Affected

There are no 4E Verify Forms/Messages affected by this feature.

Continued on next page

Trunk Maintenance Restructure - Feature 490, Continued

Feature Implementation

This feature is automatically activated by software deployment of the 4E23 Generic.

OS Impact

No impact as a result of this feature.

Continued on next page

Trunk Maintenance Restructure - Feature 490, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
OS	Operating System
RC	Recent Change
TM	Trunk Maintenance
TMR	Trunk Maintenance Register

SELF CHECK

Chapter 15

Trunk Maintenance (TM) Restructure - Feature 490

1. List the advantage of this feature.

   _____

   _____

2. Which three items are impacted by this feature?

   _____

   _____

   _____

3. Are there any Operating System (OS) impacts as a result of this feature?

   _____

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16 Backward Code Group Translator Feature 495

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Chapter 16

Backward Code Group Translator - Feature 495

Introduction

This feature provides for backward pointers to the code grouping translators.

In This Chapter

This chapter contains the following topics:

Continued on next page

Backward Code Group Translator - Feature 495, Continued

Advantages/ Benefits

This feature allows for a faster search within the routing tree structure.

Background

Routing data is constructed using NPA-NXX code group tables. These tables define the codes, number of digits to receive, the number of digits to use in translations, the Call Type (CT) words, and how to handle the call.

Currently the only way to determine the code that uses a specific treatment is to search the routing tree structure. This results in slow searches for the Recent Change (RC)/Verify program and the Next Generation-Office Data Assembler (NG-ODA) program.

Feature Description

This feature has been developed to allow for a faster search within the code group translators. This feature defines a new translator. This will allow the codes to be pointed directly to the call type words. When a search is required on a code, the call type word is searched and the backward pointer identifies the code.

Continued on next page

Backward Code Group Translator - Feature 495, Continued

Provisioning

Office Data Assembler (ODA) Forms Impacted

A new office level field is being added to the ODA 406C Form to determine the location of the subtranslator.

Call Type Word Backward in Window Call Store (CTWB in WCS).

Valid Entries:

- Y – The subtranslators will be in WCS memory.
- N, Blank – The subtranslator will be in 1B main memory.

Recent Change (RC) Forms Impacted.

The layout of the RC Forms is not being changed. This feature only affects the internal form processing.

Verify Forms/Messages Affected

There are no 4E Verify Forms/Messages affected by this feature.

Continued on next page

Backward Code Group Translator - Feature 495, Continued

Feature Implementation

This feature is available with the software deployment of the 4E23 Generic.

Feature Dependencies

This feature works with the Code Group Restructure (Feature 5898).

Operating System (OS) Impact

There is no impact as a result of this feature.

Continued on next page

Backward Code Group Translator - Feature 495, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
CT	Call Type
CTWB	Call Type Word Backward
NG-ODA	Next Generation-Office Data Assembler
NPA	Numbering Plan Area
OS	Operating System
RC	Recent Change
WCS	Window Call Store

Backward Code Group Translator - Feature 495, Continued

This page is intentionally left blank.

SELF CHECK

Chapter 16

Backward Code Group Translator - Feature 495

1. List the advantage of this feature.

_____

2. Which Office Data Assembler (ODA) Form is used to activate this feature?

_____

3. Does this feature impact the Recent Change (RC) or Verify programs?

_____

4. When is this feature available?

_____

5. The feature works with what other feature?

_____

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Chapter 17

Enhanced Trunk Maintenance Messages - Feature 496

Introduction

The purpose of this feature is to provide additional trunk data on output messages.

In This Chapter

This chapter contains the following topics:

Continued on next page

Enhanced Trunk Maintenance Messages - Feature 496,
Continued

Advantages/ Benefits

This feature provides enhancements to Trunk Maintenance (TM) Messages.

Background

The CLR:TRKSTAT message provides a means of removing trunk conditions from a single trunk or a group of trunks.

The VER:TRKNAME message output consists of trunk related information.

The OP:TSGHC message output contains the Trunk Subgroup (TSG) Head Cell and associated adjunct and linkage data.

Feature Description

Feature 496 provides enhancements to the following TM messages.

CLR:TRKSTAT – Allow Test Control Area (TCA) as an input option.

VER:TRKNAME – Allow for printing of available data for unassigned trunk cases when the Trunk Scanner Number (TSN) is non-zero.

OP:TSGHC – Allow TSN, TAN and Octal Trunk Appearance Number (OTAN) as input options.

Continued on next page

Enhanced Trunk Maintenance Messages - Feature 496,
Continued

Provisioning

Recent Change (RC) Forms Impacted.

There are no 4E Recent Change (RC) forms impacted by this feature.

Verify Forms/Messages Affected

There are no 4E Verify Forms/Messages affected by this feature.

Feature Implementation

This feature is automatically activated by software deployment of the 4E23 Generic.

Feature Dependencies

None

Operating System (OS) Impact

There is no impact as a result of this feature.

Continued on next page

Enhanced Trunk Maintenance Messages - Feature 496,
Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
CLR	Clear
OTAN	Octal Trunk Appearance Number
OP	Output
OS	Operating System
RC	Recent Change
TAN	Trunk Appearance Number
TCA	Test Control Area
TM	Trunk Maintenance
TRKSTAT	Trunk Status
TRKNAME	Trunk Name
TSG	Trunk Subgroup
TSGHC	Trunk Subgroup Head Cell
TSN	Trunk Scanner Number
VER	Verify

SELF CHECK

Chapter 17

Enhanced Trunk Maintenance Messages - Feature 496

1. List an advantage of this feature.

_____

2. Which three Trunk Maintenance (TM) Messages are enhanced by this feature?

_____

3. How is this feature activated?

_____

4. What Recent Change (RC) and Verify Forms are affected by this feature?

_____

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18 4ESS Input/Output Naming Standardization Feature 5427

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Chapter 18

4ESS I/O Naming Standardization - Feature 5427

Introduction

This Synchronous Data Link (SDL) feature updates the Input/Output (I/O) messages associated with the 3B20D/3B21D computer.

In This Chapter

This chapter contains the following topics:

Continued on next page

4ESS I/O Naming Standardization - Feature 5427, Continued

Advantages/ Benefits

This feature corrects formats of messages and adds new requirements for the SDL name update.

Background

The SDL and the Synchronous Data Link Control (SDLC) reside within a circuit pack in the input/output processor of the 3B20/3B21D computer.

Feature Description

This feature creates a data file in the 3B20D/3B21D containing the current name assigned to each SDL and SDLC. The updates to the SDL names will be included in the following Teletype (TTY) messages:

UPD:Label;SDLa b;SID c

- Label = Constant defined in the I/O manual.
- a = The SDL or SDLC number requiring the name change.
- b = New name assigned to the SDL or SDLC.
- c = Security ID.

UPD:Label;DUMP

Prints the currently assigned names of all SDL ports to the terminal screen and Read Only Printer (ROP).

UPD:Label;REFRESH

This command refreshes the terminal screen.

Note: An update to an SDL name shall result in an update of the 114 and 115 pages on the 3B Maintenance Terminal.

Continued on next page

4ESS I/O Naming Standardization - Feature 5427, Continued

Provisioning

Recent Change (RC) Forms Impacted.

There are no 4E Recent Change (RC) forms impacted by this feature.

Verify Forms/Messages Affected

There are no 4E Verify Forms/Messages affected by this feature.

Feature Implementation

This feature is dependent upon the installation of the 4E23 Generic.

Feature Dependencies

None

Operating System (OS) Impact

There is no impact as a result of this feature.

Continued on next page

4ESS I/O Naming Standardization - Feature 5427, Continued

Acronyms and Abbreviations

The following are acronyms and abbreviations of terms used throughout this document:

Terms	Definitions
I/O	Input/Output
OS	Operating System
RC	Recent Change
ROP	Read Only Printer
SDL	Synchronous Data Link
SDLC	Synchronous Data Link Control

SELF CHECK

Chapter 18

4ESS™ Input/Output (I/O) Naming Standardization - Feature 5427

1. List the advantage of this feature.

_____

2. What are the three TTY Messages updated in this feature?

_____

3. How is this feature activated?

_____

4. Are there any Operating Systems (OSs) impacted by this feature?

_____

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E Operating System (OS) Compatibility Chart

4ESS™-2000 Switch 4E23 Generic Transition Document

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OPERATING SYSTEM (OS) COMPATIBILITY CHART

The following table will provide status of the 4E23R1/R3 features:

4E23 Generic Features for LECs						
Feature #	**Feature Name**	**Netminder/NTM**	**Netminder/NTP**	**TNM**	**Connect VU/ Trunk**	**Billdats**
RELEASE 1						
497	Code Group Restructure	No impact (R3.0 or later)	No impact (R2NTP3-now)	No impact (R4.2-now)	T (R5.2-done)	No impact (R5.1-now)
5222	3B21-APS Upgrade	No impact (R3.0 or later)	No impact (R2NTP3-now)	T (R4.2)	T (R5.2-done)	No impact (R5.1-now)
478	3B APS SW upgrade (UNIX)	No impact (R3.0 or later)	No impact (R2NTP3-now)	T (R4.2)	T (R5.2-done)	No impact (R5.1-now)
RELEASE 3						
515	Analyze Ported Number Gap	No impact (R3.0 or later)	No impact (R2NTP3-now)	T (R4.2)	T (R5.2-done)	No impact (R5.1-now)
516	AIN 6-Digit CNT	No impact (R3.0 or later)	No impact (R2NTP3-now)	T (R4.2)	T (R5.2-done)	No impact (R5.1-now)
517	LNP OA&M Enhancements	3 (R8.0-3Q98)*	No impact (R2NTP3-now)	T (R4.2)	T (R5.2-done)	No impact (R5.1-now)
476	Year-2000	No impact (R7.0-1Q98)	T (R2NTP5-12/97)	2(R6.2-2 Q98)	T (R6.0-3/98)	No impact (R5.4-now)

*No work is planned pending customer input

Definition of impact categories on Operations Systems:

1. Category 1 Impact: Functions currently available, stop working altogether because of the implementation of the feature.
2. Category 2 Impact: Functions currently available to user, stop working only when used in conjunction with the new feature.
3. Category 3 Impact: 4ESS feature provides an opportunity for the OS to enhance its feature offering.
4. Category T Impact: Testing required. Feature development not anticipated, but test results may suggest a need.
5. No impact implies that the current generic will be compatible with the 4ESS feature and no testing is required.

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F Answers to Self Checks

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ANSWERS TO SELF CHECK

Chapter 1

4ESS Switch Year 2000 - Feature 476

1. Describe the logic built within the "100 Year Window:"

   With the 100 Year Logic Window, a system determines the century or decade of a given year by comparing the value in a two-digit field against an application window.

2. The two-digit year data value between 00 to 69 will map to **2000 to 2069**.

   The two-digit year data value between 70 to 99 will map to **1970 to 1999**.

3. List the three Recent Change (RC) Forms impacted by this feature:

   RC 607 -- Add a Telvote Announcement

   RC 610 -- Add a Cut-Thru Announcement

   RC 611 -- Change a Cut-Thru Announcement

4. Describe the three Operating Systems (OSs) impacted as a result of this feature:

   Netminder/NTP -- Release 2NTP5

   Total Network Management (TNM) --Release 6.2

   Connect VU -- Release 6.0

5. What is the name of the two Recent Change Fields impacted by this feature?

   STARTYEAR (STRTY)

   STOPYEAR (STOPY)

ANSWERS TO SELF CHECK

Chapter 2

Local Number Portability - Feature 450

1. List an advantage of the Local Number Portability (LNP) feature:

   Local loop competition

2. List and define the four new fields on the RC 100 form associated with this feature:

   CBN - Incoming trunk connecting network access billing option
   CBN DIGS - Incoming Trunk TSG connecting network access billing number digits
   LRN - Local Routing Number which identifies a Local Service Provider (End Office)
   SPN - Signal Ported Number outgoing TSG indicator which is used when the destination switch is not LNP capable

3. What happens to a call if the switch serving the calling subscriber does not have the LNP capability?

   a. The call does not complete.
   b. The call is routed to a tandem switch which is LNP capable.
   c. The call is routed to a recorded announcement.

4. List three Recent Change (RC) forms required for call processing:

   RC 100 - Trunk Subgroup Characteristics
   RC 500 - Routing Data Block
   RC 345 - AIN Trigger

5. Which Recent Change form is required to add a new Type of Service (TOS) for this feature?

   RC 626 - Type of Service to Dialed Code Mapping

6. Which database must be provisioned with the signal ported numbers?

   The Local Number Portability Database

7. What is the name of the new trigger for LNP?

   Local Number Portability (LNP) Dialed Number Trigger (DNT)

ANSWERS TO SELF CHECK

Chapter 3

Analyze Ported Number GAP for AIN DNTs - Feature 515

1. List an advantage of this feature.

   This feature improves the storage and monitoring of the porting number which allows the switch to check the contents of the ported number looking for Advanced Intelligent Network (AIN) Dialed Number Triggers (DNTs).

2. Which ISDN User Part (ISUP) parameter carries the called party number?

   Generic Address Parameter (GAP)

3. How will ported number GAPs be analyzed with this feature?

   If an AIN DNT on Ported Number GAP (PNG) is encountered and an AIN query is performed, the switch will use the contents of the GAP to populate the Called Party ID parameter in the AIN query. If the Service Control Point (SCP) response to the AIN query for the PNG contains a different Called Party ID than was sent in the query, this new called party number will be used to determine call routing.

4. If a new called party number is used for call routing, what happens to the routing data from the original call?

   The LNP indication (Forward Call Indicator [FCI] bit M and PNG) from the original routing data will be dropped.

5. What Recent Change (RC) Form activates the purchase of this feature?

   RC 809 – Change Feature Bits (This feature is activated by Feature Item – F19)

6. This feature is dependent on which two features?

   Feature 450 – Local Number Portability
   Feature 375 – AIN

ANSWERS TO SELF CHECK

Chapter 4

AIN 6-Digit CNT Expansion - Feature 516

1. List an advantage of this feature.

   This feature increases the capacity of 6-digit Called Number Triggers (CNTs) to 50,000 that can be designated as Local Number Portability (LNP) or Advanced Intelligent Network (AIN) triggers.

2. How will these new triggers be applied in the switch?

   These new triggers will be applied based on Domain as well as called digits.

3. What is the new Recent Change (RC) Form as a result of this feature?

   The RC 667 Form is used to designate the type of 6-Digit NPA-NXX trigger.

4. What are the valid entries for CNT on the RC 667 Form?

   - **Blank – No Trigger**
   - **AIN – 6-Digit AIN Trigger assigned**
   - **LNP – 6-Digit Local Number Portability (LNP) Trigger assigned**
   - **Both – 6-Digit AIN and LNP Trigger are both assigned**

5. What are the three new Domain Types allowed on the RC 344 Form?

   - **FCID – Feature Group D Carrier ID**
   - **SDAC – 6-Digit AIN/LNP Called Number Trigger**
   - **TDAC – 10-Digit AIN/LNP Called Number Trigger**

ANSWERS TO SELF CHECK

Chapter 4

AIN 6-Digit CNT Expansion - Feature 516 (Cont'd.)

6. What RC Form activates the purchase of this feature?

   RC809 – Change Feature Bits (This feature is activated by Feature Item – F20)

7. This feature is dependent on which two features?

   Feature 450 – Local Number Portability

   Feature 375 – AIN

8. Which existing features does this new feature interact with?

   Feature 411 – AIN Global Default Routing

   Feature 419 – AIN Data Calls

   Feature 442 – AIN DNT Expansion

   Feature 488 – Access Tandem (AT) Routing Enhancement

ANSWERS TO SELF CHECK

Chapter 5

LEC LNP OA&M Enhancements - Feature 517

1. List two advantages of this feature.
   - **Enhances existing measurement data**
   - **New measurement data to be sent to Netminder**
   - **LEC network monitoring data**
   - **Modification to Automatic Message Accounting (AMA) records**

2. What were the initial Local Number Portability (LNP) measurements?
   - **LNP Queries Sent**
   - **LNP Queries Successful**
   - **LNP Ported Number Calls**

3. What is the new peg count measurement added with this feature**?**

   ISDN User Part (ISUP) REL with ANSI Cause Value 26

4. What additional measurement report will reflect LNP measurement data?

   Machine Load Service Summary (MLSS)

ANSWERS TO SELF CHECK

Chapter 5

LEC LNP OA&M Enhancements - Feature 517(Cont'd.)

5. List the eight measurements available from Netminder/NTM:

   - **LNP Queries Sent**
   - **LNP Queries Successful**
   - **LNP Ported Number Calls**
   - **ISUP REL with ANSI Cause Value 26 Received**
   - **LNP Tandem Calls**
   - **LNP Calls Canceled by Manual Call GAP (MCG)**
   - **LNP Queries Blocked by Service Control Point (SCP) Overload Automatic Congestion Control (ACG)**
   - **LNP Queries Blocked by Service Management System (SMS) – Initiated ACG**

6. Are there any Recent Change (RC) Forms impacted by this feature?

   No

ANSWERS TO SELF CHECK

Chapter 6

AIN/LNP Domain Option - Feature 534

1. List the advantage of the Advanced Intelligent Network (AIN)/Local Number Portability (LNP) Domain Option:

   This feature minimizes network provisioning for non-POTS domain routing

2. Upon activation of this feature, the called number will be translated in which domain?

   The same domain in which the original called number was translated.

3. What Recent Change (RC) Form activated the purchase of this feature?

   RC 809 - Change Feature Bits (This feature is activated by Feature Item - F21.)

4. This feature is dependent on which two features?

   Feature 450 - Local Number Portability (LNP)

   Feature 375 - Advanced Intelligent Network (AIN)

ANSWERS TO SELF CHECK

Chapter 7

Originating LNP Module AMA Enhancement - Feature 537

1. List an advantage of this feature.

   This feature allows accurate cost recovery for calls terminated within the Local Exchange Carrier (LEC) Network which are originated by ported subscribers

2. Which Automatic Message Accounting (AMA) billing module is affected by this feature?

   Local Number Portability (LNP) Bellcore Automatic Message Accounting (AMA) Format (BAF) Module 720

3. This feature is dependent on which other feature?

   Feature 450 - Local Number Portability

4. Are there any Operating Systems (OSs) impacted by this feature?

   No

ANSWERS TO SELF CHECK

Chapter 8

Additional LNP OA&M Enhancements - Feature 538

1. Describe the enhancements of this feature.

   This feature provides enhancements to Automatic Message Accounting (AMA) recording and Network Management controls.

2. Which Automatic Message Accounting (AMA) record is being modified by this feature?

   Connecting Network Access (CNA) AMA record.

3. With this feature, the Network Management Call Gap/Call Trap controls for a Local Routing Number (LRN) will be limited to what number of digits?

   6 digits or less.

4. How is this feature activated?

   It is activated by software deployment of Generic 4E23R4.

5. This feature is dependent on which other feature?

   Feature 450 - Local Number Portability (LNP)

ANSWERS TO SELF CHECK

Chapter 9

DSC SCP Interface Modification for LNP - Feature 540

1. List the advantage for this feature.

   This feature allows the 4ESS to process a Service Control Connection Part (SCCP) header format utilized by the Digital Switch Corporation (DSC) Signal Transfer Point/Service Control Point (STP/SCP).

2. What are the two Digital Switch Corporation (DSC) Service Control Connection Part (SCCP) header fields that will be valid for Advanced Intelligent Network (AIN) and Local Number Portability (LNP)?

   - **SCCP Called Party Address containing Point Code (PC) and Sub System Number (SSN)**
   - **SCCP Calling Party Address containing SSN.**

3. When is this feature available?

   This feature is available with the 4E22 and 4E23 Generics.

4. The feature is dependent upon which other features?

   Feature 375 - Advanced Intelligent Network (AIN)

   Feature 450 - Local Number Portability (LNP

ANSWERS TO SELF CHECK

Chapter 10

Header Validation and Circulation Message Removal - Feature 505

1. List the advantage of this feature.

   This feature increases the robustness of the Common Network Interface (CNI) Ring for those nodes which contain an Integrated Ring Node Version 2 (IRN2) and reduces CNI Ring outages and down time.

2. Which Signal Transfer Point (STP) software subsystem is improved with this feature?

   Interprocess Message Switch (IMS)

3. How does this feature work?

   IMS software places an error control in the IMS header. The value of the error code depends on the contents in the header. The CNI Ring interface will check the error control code for its correctness and allow good messages to proceed.

4. Are there any 4E Recent Change (RC) Forms impacted by this feature?

   No, all changes are in the 3B/Attached Processor System (APS) CNI Ring area.

ANSWERS TO SELF CHECK

Chapter 11

3B20D APS Software Upgrade to UNIX RTR 21.17 - Feature 478

1. List the advantage of this feature.

   This feature provides the latest software upgrade of the UNIX Real Time Reliable (RTR) System.

2. This feature is part of which 4AP Release?

   4AP 16 Release

3. Is this feature required for the upgrade to the 3B21D Computer?

   Yes, this feature upgrade is necessary prior to converting to the 3B21D Computer

4. What is the build environment for the upgrade to UNIX RTR 21.17?

   UNIX RTR 21.7 used the SUN Operating System. With the upgrade to UNIX 21.17, the build environment platform is SOLARIS 2.3.

ANSWERS TO SELF CHECK

Chapter 12

3B21D APS Upgrade - Feature 5222

1. List the advantages of this feature.

   - **Relief for real time exhaustion**
   - **Additional disk capacity**
   - **Improvements to RC/V activities**
   - **Faster software updates.**

2. Describe the 3B21 configuration.

   - **One processor cabinet**
   - **128 Mb RAM memory**
   - **Two pair of Direct Memory Access Controllers (DMACs)**
   - **One pair of Digital Audio Tape (DAT) units**
   - **Four pair of Small Computer System Interface (SCSI) disk drives**
   - **Enhanced 3B20D Disk File Controller (DFC) and 3B20D Input/Output Processor (IOP).**

3. What are the four units of the 3B21D Computer?

   - **Modular Fuse and Filter Unit**
   - **Growth Units**
   - **Processor Units**
   - **Bi-directional Fan Units**

4. List the training courses on the 3B21D Computer.

   - **ES4850 – 4ESS™-2000 Switch 3B21 Application to 4ESS Multimedia for LEC**
   - **ES4855 – 4ESS™-2000 Switch 3B20 to 3B21 Conversion Hands-on for LEC**

ANSWERS TO SELF CHECK

Chapter 13

Code Group Restructure - Feature 497

1. List the advantage of this feature.

   This feature increases the Call Type options for subsequent digit routing and expands the Additional Data 3 (AD3) field.

2. What is the new Call Type word for Manual Subsequent Digit Routing Indexes?

   SDIGM – Subsequent Digit Manual

3. What are the four new valid entries for the AD3 field?

   - **I – Reserved for future use**
   - **J – Reserved for future use**
   - **K – Reserved for future use**
   - **L – Reserved for future use.**

4. Which Call Type word will be limited to A-H on the AD3 field?

   SSP – Service Switching Point

5. This feature is dependent on which feature?

   Feature 488 – AT Routing Enhancement.

ANSWERS TO SELF CHECK

Chapter 14

Access Tandem (AT) Routing Enhancement - Feature 488/488i

1. List the advantage of this feature.

   This feature allows the LECs to provide wholesale service to Interexchange Carriers (ICs)

2. What is the definition of a footprint?

   A footprint is a region in which the LEC currently owns and operates local network switches/services.

3. How does this feature work?

   The Carrier ID (CID) will indicate that the switch should analyze the called digits associated with the call. The switch will translate the digits and determine if the calls is destined for footprint routing.

4. What are the new Domains associated with this feature?

   STCD – Super Tandem Carrier ID

   SF00 thru SF39 – Subscribed Footprint Area 00 thru 39.

5. What are the new Call Type/Call Data and AD1 entries for this feature?

   Call Type/Call Data
   SSP/SFA – Service Switching Point/Subscriber Footprint Area

   Additional Data 1 (AD1)
   SFAI – Subscriber Footprint Area Index

6. Which Recent Change (RC) Form is used for adding the new Domains?

   RC 309 – Add a New NONPOTS Domain

ANSWERS TO SELF CHECK

Chapter 15

Trunk Maintenance (TM) Restructure - Feature 490

1. List the advantage of this feature.

   This feature increases the assigned states for three items.

2. Which three items are impacted by this feature?

   - **REPT Message Printing**
   - **Group Trunk Processing States**
   - **Trunk Maintenance Register (TMR) item used to terminate message processing and/or search all TMRs in the office.**

3. Are there any Operating System (OS) impacts as a result of this feature?

   No

ANSWERS TO SELF CHECK

Chapter 16

Backward Code Group Translator - Feature 495

1. List the advantage of this feature.

   This feature allows for a faster search within the routing tree structure.

2. Which Office Data Assembler (ODA) Form is used to activate this feature?

   ODA 406C Form - new field Call Type Word Backward in Window Call Store (CTWB in WBC)

3. Does this feature impact the Recent Change (RC) or Verify programs?

   No, the feature affects only the internal form processing.

4. When is this feature available?

   Feature is available with the software deployment of the 4E23 Generic.

5. The feature works with what other feature?

   Feature 5898 - Code Group Restructure

ANSWERS TO SELF CHECK

Chapter 17

Enhanced Trunk Maintenance (TM) Messages - Feature 496

1. List an advantage of this feature.

   This feature enhances the Trunk Maintenance (TM) Messages by providing additional trunk data on output messages.

2. Which three TM Messages are enhanced by this feature?

   CLR:TRKSTAT
   VER:TRKNAME
   OP:TSGHC

3. How is this feature activated?

   This feature is automatically activated by software deployment of the 4E23 Generic.

4. What Recent Change (RC) and Verify Forms are affected by this feature?

   None

SELF CHECK

Chapter 18

4ESS™ Input/Output (I/O) Naming Standardization - Feature 5427

1. List the advantage of this feature.

   This feature corrects formats of messages and adds new requirements for the Synchronous Data Link (SDL) name update.

2. What are the three TTY Messages updated in this feature?

   UPD:Label;SDLa b,SID c
   UPD:Label;DUMP
   UPD:Label;REFRESH

3. How is this feature activated?

   The feature is dependent upon the installation of the 4E23 Generic.

4. Are there any Operating Systems (OSs) impacted by this feature?

   No. There is no impact as a result of this feature.