

Lucent Technologies
Bell Labs Innovations



4ESS™ Switch
Product Release Document

4E23 Release 4 Generic

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Issue 1
September 1998

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Document Title: **4ESS™ Switch Product Release Document 4E23 Release 4 Generic**

Document No.: 234-090-234

Issue 1

Date: September 1998

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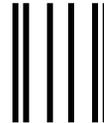
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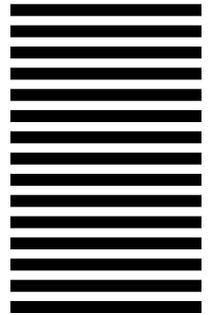
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About This Document

1. Purpose

1.01 The purpose of the Product Release Document (PRD) is to provide customers with information pertaining to the new features that are introduced in the *4ESS*[™] switch. A PRD is written to cover the features introduced in quarterly generic releases and full generic releases. This particular PRD provides information pertaining to the new features included in the 4E23 Release 4 Generic.

2. Scope

2.01 The Product Release Document provides customers with information not covered in other *4ESS* switch documentation. It is not a replacement for other documentation such as Standard Lucent Technologies Practices, Task Oriented Practices (TOP), Maintenance Reference Handbooks, etc., that support the *4ESS* switch. The information in this document is intended only for the introduction of the new 4E23 Release 4 features, not the long-term maintenance. Since other documentation is used for the operation and maintenance of features after their introduction into the *4ESS* switch, this PRD will not be reissued.

3. Intended Audience

3.01 This document is intended for people involved in testing, provisioning, maintenance, administration, and technical support of the *4ESS* switch. Feature managers, Integrated Test Network (ITN) personnel, field support, Network Control Center (NCC), Product Engineering Control Center (PECC), and National Electronic Switching Assistance Center (NESAC) personnel are examples of some of the people who will use the PRD.

4. How to Use This Document

4.01 The PRD for 4E23 Release 4 Generic includes x new features for non-Lucent Technologies *4ESS* switches.

4.02 The following is a list of the chapters contained in this document with a brief description of the feature covered in that chapter (chapter titles are also the feature names):

Chapter 1: ***4ESS™ Switch 3B21D Attached Processor System Upgrade Feature (528)***

This feature provides the hardware and software necessary to introduce the 3B21D, which is a new Attached Processor System (APS) for use with the *4ESS™* switch. The 3B21D APS replaces the 3B20D APS, which is no longer available [(Manufacture Discontinued (MD))].

Chapter 2 ***LEC Originating Number Portability Module AMA Enhancements Feature (537)***

This feature appends a Location Routing Number (LRN) Automatic Message Accounting (AMA) module to all terminating AMA records generated by the *4ESS* switch. The appended AMA module contains the LRN of the originating end office if it is known by the switch. This capability provides originating wire center identification for calls that are received from ported subscribers.

Chapter 3 ***Additional Operations, Administration, and Maintenance (OA&M) Enhancements Feature (538)***

This feature enhances the Local Number Portability (LNP) in the following ways:

- Restricts network management call gap / call trap to 6 digits or less when a control is applied to a Location Routing Number (LRN)

- Modifies default population handling for the Interexchange Carrier (IC)/International Carrier (INC) and dialing indicator fields in the Connecting Network Access (CNA) Automatic Message Accounting (AMA) record
- Appends the appropriate Numbering Plan Area (NPA) to a 7-digit LRN prior to using the LRN to populating the terminating party LNP Bellcore AMA Format (BAF) module.

Chapter 4 ***DSC™ Service Control Point Interface Modification for Number Portability Feature (540)***

This feature provides 4ESS switch support for an additional Signaling Connection Control Part (SCCP) header format. This SCCP header format is used in Advanced Intelligent Network (AIN) and Number Portability messages that are received from the Service Control Point (SCP). The additional SCCP header format supported by the switch is the Called Party Address containing Point Code (PC) and Sub-System Number (SSN) with the Calling Party Address containing SSN.

Chapter 5 ***Release Summary—4E23 Release 4 Generic***

This chapter summarizes several aspects of the features in this document. This chapter identifies Growth and Retrofit documents (if any) affected by this release; new, changed, or deleted input and output messages; Operations Support Systems impacts of the release; and new or changed alarms and measurements. The final section of this chapter tells how each of the new features is turned on and off.

- 4.03** A list of abbreviations and acronyms, and their definitions, is included at the end of this document.

5. Product Safety Labels

5.01 There are three types of safety labels used in Lucent Technologies documentation: DANGER, WARNING, and CAUTION. This document contains admonishments in the form of CAUTIONS. A CAUTION admonishment indicates the presence of a hazard that will or can cause minor personal injury or property damage if the hazard is not avoided.

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4ESS™ Switch 3B21D Attached Processor System Upgrade Feature (528)

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4ESS™ Switch 3B21D Attached Processor System Upgrade Feature (528)

1

1. Feature Description

- 1.01** This feature provides the hardware and software necessary to introduce the 3B21D, which is a new Attached Processor System (APS) for use with the 4ESS™ switch. The 3B21D APS replaces the 3B20D APS, which is no longer available [(Manufacture Discontinued (MD)].
- 1.02** Replacement of the 3B20D APS is an option for offices approaching real-time exhaust or Automatic Message Accounting (AMA) exhaust. Special maintenance support has been set up for the 3B20D APS.
- 1.03** The new 3B21D APS permits the switch to perform the same functions that were performed by the 3B20D APS, but at a higher overall switch capacity. The 3B21D APS also permits using the switch in ways that were previously constrained by resource limitations within the office.
- 1.04** The 3B21D APS provides the following improvements:
- 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.
- 1.05** The new 3B21D APS is basically a smaller version of the 3B20D, but with updated processor and memory speeds. The IOP, DFC and Direct Memory Access Controller (DMAC) have been updated. The 3B21D APS supports two DMACs, each with four channels, and each channel supports four devices.

1.06 The Dual Serial Channel (DSCH) interfaces are unchanged, and a Small Computer System Interface (SCSI) is provided. The tape and disk drives are new, as are two Digital Audio Tape (DAT) SCSIs. Two slots per Central Controller (CC) are included for future expansion.

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

1.08 As with the discontinued 3B20D APS, the new 3B21D APS performs the following functions:

- Call Detail Recording and Teleprocessing
- Disk backup of all Call Detail Recording (CDR) data
- System disk backup and recovery of 1B Processor memory for files and data
- Recent Change (RC) and Verify interface for the 3B Common Network Interface (CNI) Direct Link Node (DLN) based data structures
- Switch interface to Operations Support Systems (OSS)
- Pseudo 1B Processor data channel for the OSS to interact with the 1B Processor through a 3B Input/Output (I/O) port
- Interface to the CNI ring
- Interface to the Call Detail Recording Platform (CDRP)
- Interface to the 1B Processor for Out-of-Band (OOB) signaling.

1.09 Two new manuals are available for the 3B21D APS: the *System Maintenance Manual* (254-303-106) and the *Hardware Reference Manual* (254-303-105).

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Deployment Requirements

- 7.01** It is not necessary for all 4ESS switches in the network to be running the 4E23 Release 1 Generic for this feature to be fully operational.

Feature Activation

- 7.02** This feature is turned on automatically with hardware and software deployment.

8. Input/Output Manual Pages (Not Affected)

LEC Originating Number Portability Module AMA Enhancements Feature (537)

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LEC Originating Number Portability Module AMA Enhancements Feature (537)

2

1. Feature Description

1.01 This feature appends a Location Routing Number (LRN) Automatic Message Accounting (AMA) module to all terminating AMA records generated by the 4ESS™ switch. The appended AMA module contains the LRN of the originating end office if it is known by the switch. This capability provides originating wire center identification for calls that are received from ported subscribers.

⇒ NOTE:

Ported subscribers have the ability to physically move from one switch to another while retaining their original Directory Number. This capability is provided by Number Portability. Refer to the *Number Portability with Location Routing Number Feature (450)* for additional information on Number Portability. Feature 450 was introduced in 4E22 Release 2 and is documented in the *4ESS Switch Product Release Document, 234-090-222*.

1.02 This feature must be purchased before it can be activated and used. The features listed in the Feature Dependencies section of this chapter are also required for the the operation of this feature. Contact your Lucent Technologies Sales Representative for additional information.

2. Call Flow (Not Affected)

3. Provisioning

Recent Change Form 809

- 3.01** This feature is activated (after purchase) by setting its on/off office indicator, F22, using Recent Change (RC) Form 809 and Verify Forms 16az and 8j.
- 3.02** To activate this feature, populate the ITEM field on RC Form 809 with F22 and set the ON OR OFF field to ON. To deactivate this feature, set the the ON OR OFF field on RC Form 809 to OFF. The default is OFF.

4. Recording

- 4.01** When the 4ESS switch (serving as a tandem) generates a terminating access record, it also appends the originating party LNP Module 720 to the terminating access record, which includes the LRN of the originating end office if it is available.
- 4.02** The LRN of the originating switch is recorded only when it is available from either of the following sources:
- The Jurisdiction Information Parameter (JIP) of the incoming Integrated Services Digital Network-User Part (ISUP) Initial Address Message
 - The JIP/LRN provisioned on the incoming Trunk Sub-Group (TSG).
- 4.03** When it is recorded, the originating party LNP Module 720 is populated with the following:
- Party Identifier of "Originating Party" (001)
 - LRN Source Indicator of "Incoming Signaling" (3), or "Switch Data" (2), depending on the source that was used to populate the LRN field
 - Query Status Indicator of "No Query Performed" (09)
 - First 6 digits (NPA-NXX) of the LRN field populated with the data from the JIP signaled (last 4 LRN field digits are zero filled), or with the 10-digit JIP/LRN assigned to the incoming TSG.
- 4.04** The 4ESS switch generates the following Terminating access records: CSDC Terminating Access CC121, FG-B 132, FG-D 119, CNA CC720, CMC Type 2B CC65, CMC Type 2A CC66, Terminating Access High Bandwidth call CC150, and Terminating PVN call CC172.
- 4.05** The switch does not generate CMC Type 2B CC65, Terminating Access High Bandwidth CC150, or Terminating PVN CC172.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Feature Dependencies

- 7.01** The operation of this feature is dependent on the following features:
- The *Advanced Intelligent Network (AIN) Feature (375)*, which was introduced in 4E18 Release 2 and documented in the *4ESS Switch Product Release Document, 234-090-182*.
 - Number Portability with Location Routing Number Feature (450).

Feature Activation

- 7.02** This feature must be purchased before it can be activated and used. It can be activated after purchase by performing the provisioning procedure described in the Provisioning section of this chapter.

8. Input/Output Manual Pages (Not Affected)

Additional Operations, Administration, and Maintenance (OA&M) Enhancements Feature (538)

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Additional Operations, Administration, and Maintenance (OA&M) Enhancements Feature (538)

3

1. Feature Description

- 1.01** This feature enhances the Local Number Portability (LNP) in the following ways:
- Restricts network management call gap / call trap to 6 digits or less when a control is applied to a Location Routing Number (LRN)
 - Modifies default population handling for the Interexchange Carrier (IC)/International Carrier (INC) and dialing indicator fields in the Connecting Network Access (CNA) Automatic Message Accounting (AMA) record
 - Appends the appropriate Numbering Plan Area (NPA) to a 7-digit LRN prior to using the LRN to populate the terminating party LNP Bellcore AMA Format (BAF) module.

Background

- 1.02** Feature 538 is built on Feature 450, *Number Portability With Location Routing Number (LRN)*, 234-090-222. Feature 450 allows the 4ESS™ switch to act as a local tandem or terminating access tandem in local networks implementing Number Portability (NP) using the LRN method. The NP provides the network infrastructure to give subscribers the ability to physically move from one switch to another while retaining their original Directory Number (DN). This ability is called porting.

1.03 Feature 450 is built on the Advanced Intelligent Network (AIN) platform and is based on the Illinois Generic Requirements for NP. The NP introduced a new AIN LNP trigger and the concept of an LRN. The LRN is a 10-digit number, NPA-NXX-XXXX, that uniquely identifies an End Office (EO) or rate center within the EO; and is used as a virtual address for the switch-serving ported subscribers. When a DN is defined as portable by the provisioning of the new LNP trigger, checks are made to determine whether a query should be launched to the Service Control Point (SCP). When a query is launched, service logic in the SCP determines whether the DN has been ported; and returns either an LRN, if the number is ported; or the original DN, if the number is not ported. Calls to ported numbers are routed using the LRN returned from the SCP. Calls to non-ported numbers are routed using the DN as usual.

1.04 The NP also introduced new requirements for AMA in order to support accurate billing and cost recovery. Whenever LNP is activated, a BAF module is appended to existing AMA records being generated by the switch. This module contains the LRN returned by the SCP for a ported terminating DN. This module is also appended to terminating access AMA records for calls to ported subscribers received by the queried switch.

1.05 The service provider has the option to produce a new method to provide AMA recording for calls crossing network boundaries between two local service providers. This new record is known as a CNA record and is available either for calls received from the connecting network, or only for those calls resulting in an LNP query.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording

4.01 Feature 538 modifies the population rules introduced by Feature 450 for the following two fields of the CNA AMA; and this modification is made to align with the the Illinois Generic Requirements:

- IC/INC Prefix (Table 57)— When no carrier is assigned to the incoming trunk, Character 5 is set to 9 to indicate the following:
 - Carrier Identification Code (CIC) is unknown.
 - IC/INC Operator System involvement cannot be determined.

- Dialing and Presubscription Indicator (Table 85)— Because this field is not applicable for Feature Group C (FGC) calls, a value of 8 is recorded to indicate the following:
 - Carrier Access Code (CAC) is not dialed.
 - Station is not presubscribed.
 - Presubscription is not indicated.

4.02 The following example provides rules for prepending the appropriate NPA to a 7-digit LRN received by the 4ESS switch in an Integrated Services Digital Network (ISDN) User Part (ISUP) Initial Address Message (IAM) before using the LRN to populate the terminating LNP AMA module.

4.03 When a 7-digit LRN is received by ISUP signaling, the following events occur:

1. The NPA associated with the called party number is prepended to the LRN.
2. The LRN populates the terminating party BAF Module 720 as follows:
 - For calls received over Plain Old Telephone Service (POTS) trunks, prepend the Home or Served NPA associated with the incoming trunk.
 - For calls received over non-POTS trunks, prepend the Home NPA.

5. Network Management

5.01 With Feature 538, the NM Call Gap/Call Trap control is restricted to checking for codes of 6 digits or less when a control is applied to a known LRN that is a working number in an office. The current sequence of controls still applies and is shown in the following:

Call Gap/Trap, ACG, query followed by Call Gap/Trap check.

5.02 The Call Gap/Trap sequence remains the same for LNP calls received with both DN and an LRN.

5.03 The output produced by the *4ESS* switch that includes the controlled digits and the Call Trap message, uses the contents of the Generic Address Parameter (GAP). This occurs when NM Call Gap/Trap is applied to the contents of the GAP and a match is found.

⇒ NOTE:

When the Call Gap/Trap control matches the LRN, the LRN in the Called Portability Number (CdPN) continues to be outputted.

6. Maintenance/Troubleshooting

New Final-Handling Code

6.01 There is one new Final-Handling Code (FHC) associated with this feature. The new FHC, 1355, occurs when the LEC LNP call with LRN and ported number gap digits are received; and the call is blocked by Network Management (NM) Call Gap control. As a result, the *4ESS* switch kills the call.

⇒ NOTE:

The FHC 1355 is restricted to LEC LNP calls.

6.02 The handling of failures is covered in the *4ESS Switch Domestic Call-Irregularity Maintenance Reference Handbook*, 234-010-315.

7. Transition Considerations

Feature Dependencies

7.01 This feature is dependent on the following features:

- Feature 450, *Number Portability with Location Routing* (4E22 Release 2 Generic), 234-090-222.
- Feature 375, *Advanced Intelligent Network Dialed Number Triggers* (4E18 Release 2 Generic), 234-090-182.

Deployment Requirements

7.02 It is not necessary for all *4ESS* switches in the network to be running the 4E23 Release 4 Generic for this feature to be fully operational.

Feature Activation

7.03 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

DSC™ Service Control Point Interface Modification for Number Portability Feature (540)

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DSC™ Service Control Point Interface Modification for Number Portability Feature (540)

4

1. Feature Description

- 1.01** This feature provides 4ESS™ switch support for an additional Signaling Connection Control Part (SCCP) header format. This SCCP header format is used in Advanced Intelligent Network (AIN) and Number Portability messages that are received from the Service Control Point (SCP).
- 1.02** With this capability, the switch accepts and processes the particular SCCP header format that is used by the DSC* Signal Transfer Point (STP)/SCP. It does not allow for all possible combinations of SCCP Called/Calling Party Address fields.
- 1.03** The additional SCCP header format supported by the switch is the Called Party Address containing Point Code (PC) and Sub-System Number (SSN) with the Calling Party Address containing SSN.
- 1.04** Prior to this feature, the switch supported only the SCCP header formats that were introduced by the Number Portability with Location Routing Number Feature (450). Feature 450 was introduced in 4E22 Release 2 and is documented in the *4ESS Switch Product Release Document*, 234-090-222.

2. Call Flow (Not Affected)

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3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Feature Dependency

7.01 In order to use this feature, the following features must be purchased:

- Feature 450, *Number Portability with Location Routing Number* (4E22 Release 2 Generic), 234-090-222.
- Feature 375, *Advanced Intelligent Network (AIN)* (4E18 Release 2 Generic), 234-090-182.

Feature Activation

7.02 This feature is automatically activated with software deployment.

8. Input/Output Manual Pages (Not Affected)

Release Summary—4E23 Release 4 Generic

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Release Summary—4E23 Release 4 Generic

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1. Growth and Retrofit Documents

1.01 The 4ESS™ switch Growth and Retrofit Planning Development group reports no growth and retrofit impacts on Lucent Practices, Task Oriented Practices, or Installation Engineering Handbooks as a result of new features in the 4E23 Release 4 Generic.

2. Input/Output Messages

2.01 The following lists include the input and output messages for the 4E23 Release 4 Generic. A notation is included indicating whether each message is new, revised, or deleted. If the change is related to a specific feature, the feature number is included in parentheses.

- 4E23R4 Input Messages (IM-4B000-01)
 - ex:tmsp REV
 - test.trk REV (6231)
 - ver:intlcode REV (6516c)
 - ver:misc REV (6516c)

- 4E23R4 Output Messages (IM-4B000-01)
 - test.trk REV (6231)
 - ver:codegrp-stdp NEW (6516c)
 - ver:misc-chgsdx NEW (6516c)
 - ver:miscchgtsg NEW (6516c)

- Proprietary Input Messages
 - test:sd REV (6947)
 - test:tcapdsd REV (6630)
 - ver:misc REV (6516c)
 - ver:misc REV (6500)

- Proprietary Output Messages
 - test:sd REV (6947)
 - test:tcapdsd REV (6620)
 - ver:misc-blkaid NEW (6500)
 - ver:misc-chgmct NEW (6516c)
 - ver:misc-chgmrt NEW (6516c)

■ 4AP16R4 Input Messages

— ver:atp-atv	REV (5892/7015)
— ver:atp-feature	REV (5892/7015)
— ver:atp-restrict	NEW (5892/7015)
— ver:atp-trigger	NEW (5892/7015)
— ver:memory	NEW (5892/7015)

■ 4AP16R4 Output Messages

— aud:atp	REV (5892)
— aud:atpn	REV (5892)
— ver:atp-atv	REV (5902/7015)
— ver:atp-restrict	NEW (5892/7015)
— ver:memory	REV (5892/7015)

3. OS Interfaces

NOTE: The information in this item is based on the Project Plan and the Product Release Document for this release.

- 3.01** Feature 528, the 3B21D Attached Processor System (APS), interfaces with the same Operations Support Systems as the 3B20D APS.

4. New or Changed Alarms

NOTE: The information in this item is based on the features documented in the Product Release Document for this release.

- 4.01** There are no new alarms related to the features documented in the Product Release Document for the 4E23 Release 4 Generic.

5. Measurements/OSOR

The information in this item is based on the features documented in the current Product Release Document.

- 5.01** There are no new measurements in this release for LEC features.

6. Feature Activation Summary

6.01 The following is a summary of how the features documented in the PRD for this release are activated.

(1) **Feature 528—4ESS Switch 3B21D Attached Processor System Feature (LEC)**

This feature is turned on by hardware and software deployment.

(2) **Feature 537—LEC Originating Number Portability Module AMA Enhancements**

This feature must be purchased before it can be activated and used. It can be activated after purchase by provisioning as described in the PRD chapter. Also, Features 375 and 450 must be active for this feature to work.

(3) **Feature 538—Additional Operations, Administration, and Maintenance (OA&M) Enhancements**

This feature is turned on automatically by software deployment. However, Features 375 and 450 must be active for this feature to work.

(4) **Feature 540—DSC Service Control Point Interface Modification for Number Portability**

This feature is turned on automatically by software deployment. However, Features 375 and 450 must be active for this feature to work.

Abbreviations and Acronyms

A

- AIN**
Advanced Intelligent Network
- AMA**
Automatic Message Accounting
- APS**
Attached Processor System

B

- BAF**
Bellcore AMA Format

C

- CdPN**
Called Portability Number
- CDR**
Call Detail Recording
- CDRP**
Call Detail Recording Platform
- CNI**
Common Network Interface

D

- DLN**
Direct Link Node

F

- FHC**
Final Handling Code

I

- IC**
Interexchange Carrier
- INC**
International Carrier
- ITN**
Integrated Test Network

L

- LEC**
Local Exchange Carrier
- LNP**
Local Number Portability
- LRN**
Location Routing Number

N

- NCC**
Network Control Center
- NESAC**
National Electronic Switching
Assistance Center
- NP**
Number Portability

O

OA&M

Operations, Administration, and
Maintenance

OOB

Out of Band

OSS

Operations Support Systems

P

PC

Point Code

PECC

Product Engineering Control Center

PRD

Product Release Document

R

RC

Recent Change

S

SCCP

Signaling Connection Control Part

SCP

Service Control Point

SSN

Sub-System Number

STP

Signal Transfer Point

T

TIRM

Technical Information Resource
Management