Lucent Technologies
Bell Labs Innovations

4ESS™ Switch
Product Release Document

4E24 Release 1 Generic

Notice

Every effort was made to ensure that the information in this document was complete and accurate at the time of printing. However, information is subject to change.

Trademarks

4ESS is a trademark of Lucent Technologies.
CLLI is a registered trademark ; and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.

Ordering Information

The ordering number for this document is Lucent Technologies 234-090-241. To order this document, call 1-888-LUCENT-8. For more ordering information, refer to "How to Order Documentation" in the section "About This Document."

Support Telephone Number

Lucent Technologies provides a telephone number (1-888-LTINF06) for you to use to report errors or to ask questions about the information in this document.

Developed by Lucent Technologies Network Systems TSVS Information Development.

How Are We Doing?

Document Title: **4ESS**™ **Switch Product Release Document 4E24 Release 1 Generic**

Document No.: 234-090-241AC   **Issue 1**   **Date: January 1999**

Lucent Technologies welcomes your feedback on this document. Your comments can be of great value in helping us improve our documentation.

1. Please rate the effectiveness of this document in the following areas:

	Excellent	Good	Fair	Poor	Not Applicable
Ease of Use					/////////////////////
Clarity					/////////////////////
Completeness					/////////////////////
Accuracy					/////////////////////
Organization					/////////////////////
Appearance					/////////////////////
Examples					
Illustrations					
Overall Satisfaction					/////////////////////

2. Please check the ways you feel we could improve this document:

☐ Improve the overview/introduction   ☐ Make it more concise/brief
☐ Improve the table of contents   ☐ Add more step-by-step procedures/tutorials
☐ Improve the organization   ☐ Add more troubleshooting information
☐ Include more figures   ☐ Make it less technical
☐ Add more examples   ☐ Add more/better quick reference aids
☐ Add more detail   ☐ Improve the index

Please provide details for the suggested improvement. _____
_____

3. What did you like most about this document?
_____
_____

4. Feel free to write any comments below or on an attached sheet.
_____
_____
_____
_____

If we may contact you concerning your comments, please complete the following:

Name: _____ Telephone Number: _____

Company/Organization: _____ Date: _____

Address: _____

When you have completed this form, please fold, tape, and return to address on back
or Fax to: 336-727-3043.

Lucent Technologies
Bell Labs Innovations
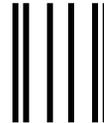
NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES
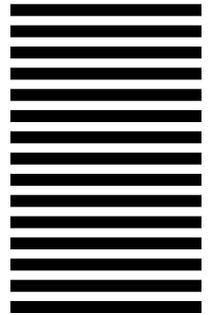
BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 1999 GREENSBORO, N.C.

POSTAGE WILL BE PAID BY ADDRESSEE

DOCUMENTATION SERVICES
2400 Reynolda Road
Winston-Salem, NC 27199-2029

Contents   Page

Contents   Page

Contents   **Page**

Contents **Page**

Contents   **Page**

Contents **Page**

Contents   **Page**

Contents   Page

Figures

Contents   **Page**

Tables

Contents   **Page**

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 full generic releases and quarterly generic releases. This particular PRD provides information pertaining to the new features included in the 4E24 Release 1 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 4E24 Release 1 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 4E24 Release 1 Generic contains 14 new features. Each chapter in this document provides information about these features. The chapters are in numerical order according to feature number. The chapter titles are also the feature names.

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 1: *Recent Change Form Metrics Reports Feature (523)*

This feature provides the verify command input to request a display of Recent Change (RC) counters that are incremented each time an RC form or RC message is activated. Also, a timer is maintained to provide cumulative processing time data per form message. These counters are included in Feature 522.

Chapter 2: *4ESS Switch 3B21D Attached Processor System Upgrade Feature (536)*

This feature provides a new 3B Processor (3B21D) that is used as the Attached Processor System (APS) for the *4ESS* switch.

Chapter 3: *Expanded Time Slot Interchange (XTSI) Modifications Feature (543)*

This feature provides minor modifications to two provisioning forms that are used in diagnostic routines related to the Expanded Time Slot Interchange (XTSI).

Chapter 4: *Automatic Routing Feature (4967)*

This feature offers significant profit from international traffic. It also provides an expanded routing infrastructure that better supports existing domestic features and new domestic features being developed by the use of Route Advance and Success-to-the-Top Routing.

Chapter 5: *Carrier Completion Rate Feature (5158)*

This feature is a new AT&T proprietary feature that enables the AT&T network to route calls to foreign carriers based on the reliability of those carriers in completing calls. The Carrier Completion Rate Feature (CCRF) minimizes Customer Waiting Time (CWT) and ensures a higher call-completion rate by selecting

carriers that are equipped with Route Advances (RAs) and Egress Busy Crankbacks (EBCs). This feature allows AT&T to better compete with international calling services offered by competitors and places them in a stronger position in the market.

Chapter 6: *Enhanced Calling Party Number Anomaly Report Feature (5906)*

This feature improves the accuracy and value of the *4ESS*™ switch Calling Party Number (CPN) Anomaly Report, which is used to indicate if CPNs are not being passed from switches connected to the AT&T Switched Network (ASN), as required by the Federal Communications Commission.

Chapter 7: *Foreign Administration Identifier Expansion Feature (5922)*

This feature increases the range of Foreign Administration Identifiers (FAIs) in a *4ESS* switch from 1 to 7 to 1 to 31. The maximum number of Overflow Foreign Administration Identifiers (OFAIs) for a specific FAI remains at 6, but an OFAI value may be in the range of 1 to 31.

Chapter 8: *1B File Expansion in the Attached Processor System Disk—Open Up Segment 2 of 1B File Store Feature (6296)*

This feature, 1B File Expansion in the Attached Processor System (APS) Disk, makes available the third segment (Segment 2) of the APS Small Computer System Interface (SCSI) disk for data storage.

Chapter 9: *4ESS*™ *Switch Routine Recent Change Verify Improvements Feature (6516)*

This feature improves throughput and reduces delays for the **VER:CODELIST** and **VER:INTLCODE** messages. Prior to this feature, the nightly batch process continued too frequently past the normal deadline of 8:00 a.m. and sometimes the process was killed by another application.

Chapter 10: *Expand the Automatic Number Identification Trigger Table Structure Size Feature (6982)*

This feature expands the existing size of the Automatic Number Identification Trigger Table (ANI-TT) ANI_IJLKP from 1.28 MegaWords to 2 Mega-Words.

Chapter 11: *Removal of Forced Overflow on User-Busy Trunks With Access IDs Feature(7102)*

This feature modifies Feature 4187,*Project L LookAhead* (4E18, Release 2). It removes the Project L LookAhead requirement which requests the *4ESS* switch to try the next route when it receives a

User Busy indication on a trunk group populated with an Access ID. Therefore, User-Busy indications received on trunks provisioned with an Access ID will receive the same Final-Handling treatment as trunks not provisioned with an Access ID.

Chapter 12:   *International Point Code Expansion Feature (7157)*

This feature expands the number of provisionable Destination Point Codes on a *4ESS* switch from 128 to 256.

Chapter 13:   *Removal of Network Switch Number for AT&T Digital Link Local Number Portability Processing Feature (7181)*

This feature changes the call-processing requirements to properly route a call to an AT&T Digital Link customer ported to a *4ESS* switch using Local Number Portability.

Chapter 14   *Release Summary—4E24 Release 1 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 safety labels in the form of CAUTIONS. A CAUTION safety label indicates the presence of a hazard that will or can cause minor personal injury or property damage if the hazard is not avoided.

6. How to Comment on This Document

6.01   Lucent Technologies welcomes your comments on this document. Your comments will aid us in improving the quality and usefulness of Lucent Technologies documentation. Please use the Feedback Form provided in the front of this document [mail in or fax (1-336-727-3043)] or call the Lucent Technologies Documentation Comment Hot-Line Service (1-888-LTINF06) to make your comments.

7. How to Order Documentation

7.01   Additional copies of this document, and all referenced documentation, may be ordered from the Lucent Technologies Customer Information Center (CIC). To order copies by mail, Lucent Technologies employees should mail Form IND 1-80.80, which is available from the Lucent Technologies Customer Information Center, to the following address:

> Lucent Technologies Customer Information Center
> Attention: Order Entry Department
> 2855 N. Franklin Road
> P. O. Box 19901
> Indianapolis, Indiana 46219-1999

⇒ **NOTE:**
When ordering documentation from the Lucent Technologies Customer Information Center, each Lucent Technologies Business Unit/Division must be identified and all required billing information must be provided.

7.02   Orders can also be placed by phone Monday through Friday by calling one of the following numbers:

> Within the United States: 1-888-LUCENT-8
>
> From Canada: 1-800-255-1242
>
> Worldwide: Toll 317-322-6848
>
> FAX: 317-322-6484

7.03   Bell Operating Companies must process orders through their company documentation coordinator.

7.04   Federal Government orders must be processed through CIC.

Recent Change Form Metrics Reports Feature (523)

1

Contents

Recent Change Form Metrics Reports Feature (523)

1

1. Feature Description

1.01 This feature provides the verify command input to request a display of Recent Change (RC) counters that are incremented each time an RC form or RC message is activated. Also, a timer is maintained to provide cumulative processing time data per form or message. These counters are included in Feature 522.

2. Call Flow (Not Affected)

3. Provisioning

Verify Message 16cm

3.01 The Verify message 16cm, **VER:VFUNC RCMEASCT**, requests the verification of the number of times all RC forms/messages were successfully activated, the longest successful activation times, and the cumulative processing times for those forms/messages.

Verify Message 6dm

    3.02 This output message, **VER:RCMEASCT**, provides the ability to verify the number of times all RC forms/messages were successfully activated, the longest successful activation times, and the cumulative processing times for those forms/messages.

    3.03 Since all forms/messages may be displayed, the length and time of the output may be significant. The output is presented in 15-line segments.

    3.04 When all counters for all RC forms/messages are empty, the standard "NO DATA FOUND" output message is printed. If any of the counters for any RC forms/messages have data, those counters are printed while empty counters are not printed.

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 4E24 Release 1 Generic for this feature to be fully operational.

Feature Activation

    7.02 This feature is turned on automatically by software deployment.

Feature Dependencies

    7.03 Feature 522 must be deployed prior to this feature being activated.

8. Input/Output Manual Pages

8.01   There is one new Input/Output message as follows:

   VER:RCMEASCT

8.02   This form provides the ability to verify the number of times all RC forms/messages were successfully activated.

4ESS™ Switch 3B21D Attached Processor System Upgrade Feature (536)

2

Contents	Page

4ESS™ Switch 3B21D Attached Processor System Upgrade Feature (536)

2

---

1. Feature Description

1.01   This feature provides a new 3B Processor (3B21D) that is used as the Attached Processor System (APS) for the *4ESS*™ switch. The 3B21D 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.

1.02   The introduction of the 3B21D processor permits the switch to perform the same functions as before, but at a higher overall switch capacity. The upgrade is both a hardware and software upgrade. There are two new manuals for the 3B21D: the *System Maintenance Manual* (254-303-106) and the *Hardware Reference Manual* (254-303-105).

1.03 The 3B Attached Processor System (APS) capacity is at a premium. The 3B20D is approaching exhaust in terms of real-time, that is, disk capacity is starting to run out, and software updates are too slow. A higher overall switch capacity is needed. The 3B20D has been Manufacture Discontinued (MD) and special maintenance support has been set up for it.

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 4E24 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)

Expanded Time Slot Interchange (XTSI) Modifications Feature (543)

3

Expanded Time Slot Interchange (XTSI) Modifications Feature (543)

3

1. Feature Description

1.01 This feature provides minor modifications to two provisioning forms that are used in diagnostic routines related to the Expanded Time Slot Interchange (XTSI). Refer to the "Provisioning" section in this chapter where this information is provided.

2. Call Flow (Not Affected)

3. Provisioning

Recent Change Form 705

3.01 The alignment of the commas, spaces, and periods in Recent Change (RC) Form 705 was modified to provide a position match with the corresponding commas, spaces and periods in Verify Form 7h. Data is now displayed in the same position on each form, which improves the accuracy of visual comparisons. No other content changes were made to RC Form 705.

3.02   This feature also introduces new population rules for RC Form 705. The **PUBI** and **EXEC** fields in RC Form 705 use the following population rules:

- If **PUBI** is blank, **EXEC** must be blank.

- If **PUBI** is 0, **EXEC** must be 0.

- If **PUBI** is 1, **EXEC** must be 1.

Verify Form 7h

3.03   A comma was deleted from Verify Form 7h so that it matches RC Form 705.

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 4E24 Release 1 Generic for this feature to be fully operational.

Feature Activation

7.02   This feature is activated automatically with software deployment.

8. Input/Output Manual Pages

8.01   The **VER:MISC-SUXTSI** output manual page was modified to support this feature.

Automatic Routing Feature (4967)

4

Contents   Page

Contents Page

Automatic Routing Feature (4967)

4

1. Feature Description

1.01 This feature, Automatic Routing (AR), provides routing enhancements that substantially increases the call completion rate of services that use Split-Access Flexible Egress Routing (SAFER). This includes most outbound international calling and an increasing set of specialized domestic applications for both the Business Markets Division (BMD) and the Consumer Markets Division (CMD). This document describes both Route Advance (RA) and Success-to-the-Top Routing (STT), referred to as AR1 and AR2, respectively.

1.02 The AR offers significant annual profit from international traffic and increased long-term profit by providing an expanded routing infrastructure that better supports domestic features (both existing and new features being developed). Customer satisfaction is enhanced because the call completion rate is substantially increased while the average Customer Waiting Time (CWT) in reduced. The AR also simplifies operations processes by removing several steps being used today. Table 4-A lists the specific enhancements of RA and STT.

Table 4-A. RA and STT Enhancements

Routing Type	Enhancement
RA	■ Dramatically increases the call completion rate, thereby translating to significant profit and a reduction in the average CWT ■ Offers a routing infrastructure to all applications that eliminates single points of failure
STT	■ Enhances customer satisfaction by reducing the average number of Egress Busy Crankbacks (EBCs) and the average CWT ■ Ensures efficient use of network resources ■ Simplifies operations by eliminating the need to plan and execute the reprovisioning of Multiple Routing Treatment (MRT) table percentages

Route Advance

1.03 The RA (for international and domestic applications) provides alternative routing for calls that would otherwise be blocked beyond the AT&T Switched Network (ASN) without having a chance to complete.

1.04 Today in the international application, once a call has seized a trunk between an International Switching Center (ISC) and a Foreign ISC (FISC), the ASN is assumed to have performed its function. If the call cannot be successfully routed through the foreign network, the call blocks. Using RA, the inability of a foreign network to complete a call does not automatically result in a call block. Instead, the routing procedure attempts to complete the call either by trying to find an idle trunk between the ISC and a different FISC or by generating an EBC (referred to as an RA-EBC to distinguish it from the current SAFER-EBC).

1.05 The RA reduces the CWT. If a call is blocked today, a customer can only redial, hoping to complete the call on the second try. Even if this process succeeds, it takes time to redial and reroute the call. If RA is used, the average number of advances is increased. However, the increase in CWT with RA is significantly less than without RA.

⇒ **NOTE:**

When STT routing is combined with RA, the number of SAFER-EBCs is reduced, translating into a reduction in CWT. The average reduction is 39 to 60 seconds.

1.06   With domestic applications using SAFER today, the situation is similar. Once a call has egressed the *4ESS*™ switch network, it cannot reenter the network. Within the Domestic End-to-End Class of Service (DECOS) environment, this denies a temporarily overloaded DECOS AREA the capability to reject calls in favor of a duplicate, less heavily loaded DECOS AREA. Using RA with STT routing, this capability exists and CWT is decreased just as in the international case.

Success-to-the-Top Routing

1.07   The STT routing is a provisionable option that automates SAFER MRT tables for better network performance, while simplifying operations considerably. Better performance is achieved by reducing the number of EBCs associated with a typical SAFER call, as well as reducing the number of new actions introduced by the RA capability (all of which translate into reduced CWT). Because of the simplified procedure, the following procedures are no longer necessary:

- Performing traffic engineering studies to populate the percentage field of the MRT tables

- Maintaining the associated modules of Operations Systems (OSs) that assist in performing these studies

- Implementing the thousands of Recent Change (RC) notices generated by these studies

1.08   The rules for STT routing ensure that the Egress Routing Indicator (ERI) is always respected. The STT chooses among routes whose ERIs are the same and is justified by the following:

- Demands upon network resources are reduced to a minimum by giving first preference to the route over which the call is most likely to complete.

- The route most likely to be successful is the one that was successful most recently.

Network Architecture

1.09   There is no actual change to the physical architecture. However, the entire ASN is subtly changing. Before AR, the function of the ASN was to deliver a call to the Terminating AT&T Switch (TAS) from which egress was available (participation in the not-yet-completed call is finished). With AR, the ASN stands by (waiting to offer further assistance if necessary) while the rest of the call is attempting to complete.

2. Call Flow

Call Flow Diagram
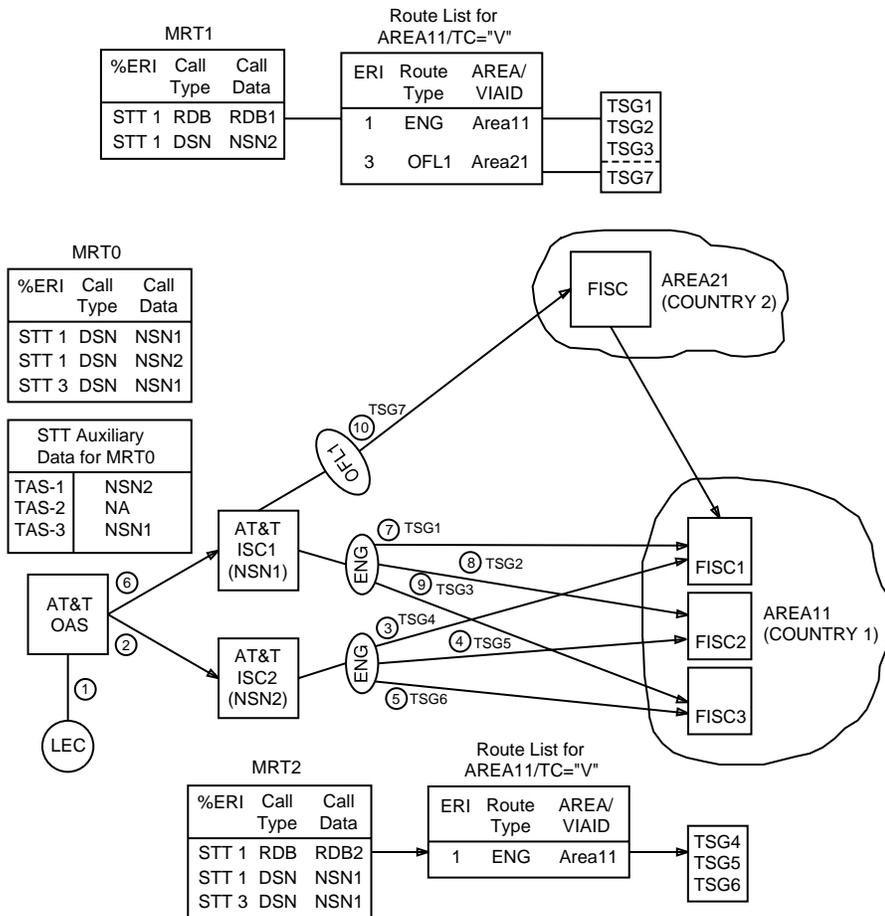
Figure 4-1. International Long Distance Service with STT and RA

Call Flow Narrative

2.01   This call flow addresses routing. For completeness, signaling flows and measurements are also incorporated. The following RA with STT call processing steps are based on the network configuration illustrated in Figure 4-1 . The signaling details are specified in the bulleted items below the numbered steps; and the measurement counts scored are contained within brackets:

1. The Originating AT&T Switch (OAS) receives CC-NN from the Local Exchange Carrier (LEC) and establishes the Class-of-Service (COS) for the call [Service Identification Indicator (SII) = 13], determines the Routing Pattern Identity (RPI) = 2, performs 3-digit translation, and locates MRT0.

2. The OAS selects ISC2 from the TAS-1 entry in the STT data for the MRT0 table and forwards the SI parameter, CC-NN, and ERI = 1 to ISC2. The OAS also sets the N-bit to 0 in the Dynamic Nonhierarchical Routing (DNHR) indicator parameter of the Common Channel Signaling System 7 (CCS7) Integrated Services Digital Network User Part (ISUP) Initial Address Message (IAM) it sends to ISC2 (the call is initially in a non-RA state).

3. The ISC2 performs the following actions:

    a. Translates (3-digit) the call in the International Voice Transport (IVT) domain

    b. Retranslates (1-digit) in the INTO domain

    c. Locates MRT2, Routing Data Block (RDB) 2, and ECOS marker Trunk Sub-Group (TSG) holding Area 11

    d. Determines ERPI = 33

    e. Builds the route list

    f. Attempts to complete the call on the engineered route over TSG4 to FISC1

    g. Receives a valid RA cause value in the Consultative Committee for International Telegraph and Telephone (CCITT) 7 ISUP Release message.

        ■ ISC2 sends the CCITT7 ISUP IAM over TSG4 to FISC1 [score ERCC].

        ■ ISC2 receives the CCITT7 ISUP Release message with cause value justifying RA prior to a CCITT7 ISUP IAM [score RAC and TSGRAC]. The call goes into an RA state.

        ■ ISC2 sends a CCS7 ISUP Call Progress Message (CPG) to the OAS with instructions to the OAS not to send the CPG backward. The OAS then classifies the call to be in an RA state.

4. The ISC2 searches for a TSG to another FISC in Area 11, attempts to complete the call over TSG5 to FISC2, and receives a CCITT7 ISUP IAM prior to a CCITT7 ISUP Release message.

- ISC2 sends the CCITT7 ISUP IAM over TSG5 to FISC2 [score RAERCC].

- FISC2 sends the CCITT7 ISUP Address Complete Message (ACM) to ISC2.

- ISC2 releases its routing capability.

- The CCITT7 ISUP ACM is sent backward to the OAS as a CCS7 ISUP ACM.

- The OAS updates the TAS01 entry since ERI = 1 was sent from the OAS to ISC2.

- The OAS releases its routing capability.

- The CCS7 ISUP Answer Message (ANM) may or may not be received at the OAS.

Call Processing

A. Route Advance

2.02 Table 4-B list the conditions for which RA is attempted. If any condition is not satisfied, the call is final handled.

Table 4-B. AR Phase 1 Conditions

Description	Value
Voice call or clear (64Kb/s) channel	Yes
Call failure on INUP/TUP/ISUP/Q.931 TSG	Yes
RA DISC/REL/UMB cause	Yes
ECOS AREA routed	Yes
ECOS insert override	No
NMGT controls allow area	Yes
Retrying a DPC	No
ACM or ANM received	No
Action	Perform route advance— send new IAM

2.03 If a switch is acting as a TAS for the outgoing call attempt and the call experiences failed egress on an RA-TSG because a REL(ISUP), UBM(TUP) or Disconnect/Release Complete (Q.931) message contains a cause code justifying RA, the switch makes an RA-justified decision for the call.

2.04 Table 4-C, Table 4-D, Table 4-E, and Table 4-F list the cause values and signal codes that justify an RA decision.

Table 4-C. CCS7 ISUP Cause Values Justifying RA

Cause Value	Event	Description
34	No Circuit/Channel Available	No appropriate circuit/channel is currently available to handle the call.
41	Temporary Failure	The network is not functioning correctly, but the condition is not likely to last a long period of time (that is, the user may wish to make another call attempt almost immediately).
42	Switching Equipment Congestion	Switching equipment generating the cause is experiencing a period of high traffic.
44	Requested Circuit/Channel Not Available	The other side of the interface cannot provide the circuit/channel indicated by the requesting entity.
47	Resource Unavailable/Unspecified	Reports a resource unavailable event only when no other cause in the resource unavailable class applies.
58	Bearer Capability Not Presently Available	User requested a bearer capability that is implemented by the equipment that generated this cause, but is not available at this time.
63	Service/Option Not Available–Unspecified	Reports a service or option not available event only when no other cause in the service or option not available class applies.

Table 4-D. Q.931 Cause Values Justifying RA

Cause Value	Event	Description
34	No Circuit/Channel Available	No appropriate circuit/channel is currently available to handle the call.
41	Temporary Failure	The network is not functioning correctly, but the condition is not likely to last a long period of time (that is, the user may wish to make another call attempt almost immediately).
42	Switching Equipment Congestion	Switching equipment generating the cause is experiencing a period of high traffic.
63	Service/Option Not Available–Unspecified	Reports a service or option not available event only when no other cause in the service or option not available class applies.

Table 4-E. CCITT7 ISUP Cause Values Justifying RA

Cause Value	Event	Description
34	No Circuit/Channel Available	No appropriate circuit/channel is currently available to handle the call.
41	Temporary Failure	The network is not functioning correctly, but the condition is not likely to last a long period of time (that is, the user may wish to make another call attempt almost immediately).
42	Switching Equipment Congestion	Switching equipment generating the cause is experiencing a period of high traffic.
44	Requested Circuit/Channel Not Available	The other side of the interface cannot provide the circuit/channel indicated by the requesting entity.
47	Resource Unavailable/Unspecified	Reports a resource unavailable event only when no other cause in the resource unavailable class applies.
58	Bearer Capability Not Presently Available	User requested a bearer capability that is implemented by the equipment that generated this cause, but is not available at this time.
63	Service/Option Not Available–Unspecified	Reports a service or option not available event only when no other cause in the service or option not available class applies.

Table 4-F. CCITT TUP Signal Codes Justifying RA

Signal Code	Event	Description
1	Switching Equipment Congestion	Switching equipment generating the cause is experiencing a period of high traffic.
2	Circuit Group Congestion	The circuit group is fully occupied and overflow is inappropriate.
3	National Network Congestion	Congestion occurred in the national network.
5	Call Failure	A time-out situation has occurred or a call attempt has failed and other specific signals do not apply

B. Signaling

2.05 The N-bit in the DNHR indicator parameter of the CCS7 ISUP IAM message is being given the new name Route Advance State and is used as follows:

■ **0**: Call is in a non-RA state

■ **1**: Call is in a RA state.

STT Routing

2.06 SAFER uses MRT tables to implement routing. Within an MRT table, the various routing treatments are graded with an ERI of 1, 2, or 3. The most desirable is 1; 2 is the next most desirable; and 3 is the next most desirable. Currently, each treatment is accompanied by a percentage, which indicates the percentage of calls that (on a random basis) should try that treatment first. The percentages are only applied at an OAS.

2.07 In routing international calls today, Real Time Network Routing (RTNR) is used to route a call from an OAS to a TAS (in this case an ISC) according to the routing treatment. The call is almost always successful in reaching the ISC/Gateway. However, no trunks may be available to connect the ISC to the foreign network; or the call may enter the foreign network, fail to complete and return for further processing under the RA capability. In either case, when a crankback occurs (either a SAFER-EBC or an RA-EBC), another routing treatment is attempted. Further routing treatments are obtained by going down the table from top to bottom (skipping the first one attempted) until the call is completed and no more routing treatments remain. Each failed routing treatment generates a crankback.

2.08 In routing domestic calls to adjuncts, MRT tables are currently used. In many instances, the capability of cranking back from the TAS to the OAS is turned off. In order to improve the rate of call completions to adjuncts, the wider use of crankbacks is under consideration.

2.09 The STT routing logic is complicated by the possibility that the OAS may be the same switch as the TAS. This is handled today by using the OAS(=TAS) to eliminate unnecessary RTNR. STT routing preserves this scheme, giving preference to call type of Routing Data Block (RDB) when RTNR can be avoided.

2.10 When the OAS is the same switch as the TAS, no crankback message is sent. Routing logic will ensure that the OAS(=TAS) will act as though a crankback message has been sent.

2.11 The STT routing uses the current state of the network in making decisions. By using the routing treatment most likely to succeed, STT routing reduces advances. Routing percentages will no longer have to be computed and provisioned.

3. Provisioning

Structures Affected

A. OD4MINSTT, OD4NUMSTT, and OD4MAXSTT

3.01 A new minimum-number-maximum structure, **STT**, is defined in the NO4MEM Library within the Protected, Disk-backed, API accessible and ODA (PBAO) populated memory. Memory assigned to this structure is located in Upper Call Store and stores one word of STT routing information for each MRT.

B. OD4OFCCOPY2

3.02 Item **OD4PF47** is assigned as an office parameter to indicate whether or not processing for RA is performed. Table 4-G lists the On/Off requirements.

Table 4-G. OD4OFCCOPY2 Assigned States

Item/State	Word	Displacement	Size	Description
OD4PF47	5	22	1	Automatic Routing–Route Advance
4ODFB_OFF(-0)				Off (default)
4ODFFB_ON(=1)				On

C. HT4MRTRTNG

3.03 A new **STT** MRT routing indicator is defined within the MRT routing structure as defined in Table 4-H.

Table 4-H. STT Routing Indicator

Item/State	Word	Displacement	Size	Description
XL4MRT_SST	1	23	1	MRT STT Routing Indicator
4XLMRT_STT_OFF(-0)				Off (default)
4XLMRT_STT_ON(=1)				On

Forms and Population Rules

A. OD4NUMSTT

3.04 This structure is set to the same value as OD4NUMMRT [entered using the **MRT** field on the Office Data Assembler (ODA) Form 406C].

B. OD4OFCCOPY2

3.05 This structure is populated as specified in Table 4-I using Recent Change (RC) Form 809 and is verified using Verify Forms 16az and 8j.

Table 4-I. Recent Change Form 809 Population Rules

Feature Item	On or Off	Populates	With	Checks
PF47	ON	OD4PF47	4ODFB_ON	None
	OFF	OD4PF47	4ODFB_OFF	A

A. This AR ON/OFF indicator (PF47) is not allowed to be deactivated
  unless the Carrier Completion Rate Feature (5158) indicator
  PF41 is also deactivated (OD4PF41 = 4ODFB_OFF).

C. HT4MRTRTNG

3.06 The new STT indicator is populated as specified in Table 4-J using RC Form 321 and verified using Verify Forms 13h and 3o (**PERCENT** field).

Table 4-J. Recent Change 321 Population Rules

Item	Entry	Populates	With
PERCENT	0 to 100	XL4MR_PCNT	Numeric data
		XL4MRT_STTL	4XLMRT_STT_OFF
	STT	XL4MRT_STT	4XLMRT_STT_ON
		XL4MR_PCNT	0

3.07 The following requirements also apply or the form(s) fails:

- The ERCs entered on RC Form 321 must be in non-decreasing order.

- Within each ERC value, the Network Switch Number (NSN), CALLDATA, for the Destination Switch Number (DSN), CALLTYP, must be unique.

4. Recording

4.01 The *4ESS* switch must capture the Final-Handling Code (FHC) associated with the cause values when RA is invoked on outbound calls that are routed on international trunks. The captured FHC is populated in the PURGE_SETUP event (W8_FHC) and is recorded on the International Call Detail Recording (ICDR) record.

5. Network Management

Message Types

5.01 The following Message Types (MSGTYPs) apply to Feature 4967:

- **MSGTYP 16:** This new demand message is used by the Network Management and Operations System (NEMOS) to request the status of all stop RA controls in an office. The response indicates the areas that are stopped for RA in a 32-word block, followed by 0 to 64 5-word entries for areas where RA is stopped for specific routes.

- **MSGTYP 17:** This modified demand message is used by NEMOS to request TAS-1, TAS-2 and TAS-3 indicators for an MRT. The input from NEMOS is an MRTI.

- **MSGTYP 75:** This modified demand message adds a new 1-bit field to the layout and copies the STT indicator from HT4MRTRTNG into bit 0 of word 0.

- **MSGTYP 1:** This modified 30-second message adds a new 1-bit field. When this bit is set, RA is stopped to all areas.

- **MSGTYP 3:** This modified 5-minute message is adding the new data item TSG Route Advance Count.

- **MSGTYP 116:** Eight data items are being added to this 5-minute message as follows:

  — Data Item 19: Route Advance Terminating Last Overflow Count

  — Data Item 20: Engineered and Alternate Route Advance Count

  — Data Item 21: Overflow Route Advance Count

  — Data Item 22: ATT-based Overflow Route Calls Carried Count

  — Data Item 23: Route Advance Engineered Route Calls Carried Count

  — Data Item 24: Route Advance Alternate Route Calls Carried Count

  — Data Item 25: ATT-based Overflow Route Success Count

  — Data Item 26: ATT-based Insert/Overflow Override Success Count.

- **MSGTYP 140:** This modified control message adds a new 1-bit field to request removal of all stop RA controls.

- **MSGTYP 128:** This new control message is used to stop or start RA.

4ESS™ **Switch-to-AREA Measurements**

5.02 For each AREA/ERPI combination, the *4ESS* switch-to-AREA counts are collected at the TAS. All of the counts are 5-minute counts (described in Table 4-K) for data transfer to NEMOS.

Table 4-K. *4ESS*™ **Switch-to-AREA Measurements**

Count	Code	Status	Description
Terminating Last Overflow Count	TLOC	Modified	Scored at the last TAS if the call attempts to terminate at a particular AREA as a last try while in a non-RA state, but no egress up to the level indicated by ERI has an idle circuit.
RA Terminating Last Overflow Count	RATLOC	New	Scored at the last TAS if the call attempts to terminate at a particular AREA using the last routing treatment available at that TAS consistent with the level indicated by ERI and the following occurred: ■ The call entered the last TAS in an RA state or it out-seized a trunk at the last TAS ■ Each out-seizure resulted in failed egress with this last routing treatment.
Route Advance Count	RAC	New	Scored at a TAS each time an RA-justified decision is made at the TAS on an ECOS Engineered or Alternate route. If RA is not justified, this count is not scored.
Overflow Route Advance	ORAC	New	Scored at a TAS each time an RA-justified decision is made at the TAS on an ECOS Overflow route. If RA is not justified, this count is not scored.
Egress Busy Crankback Sent Count	—	Modified	Scored whenever a CCS7 ISUP egress-busy CRB is sent to an OAS (whether or not the call seized a trunk at the TAS).

Table 4-K. *4ESS*™ **Switch-to-AREA Measurements (Contd)**

Count	Code	Status	Description
Engineered Route Carried Count	ERCC	Modified	Scored at a TAS when a call in a non-RA state out-seizes any engineered trunk group to a particular AREA.
Alternate Route Carried Count	ARCC	Modified	Scored at a TAS when a call in a non-RA state out-seizes any alternate trunk group to a particular AREA.
RA Engineered Route Carried Count	RAERCC	New	Scored at a TAS each time a call in an RA state out-seizes any engineered trunk group to a particular AREA.
RA Alternate Route Carried Count	RAARCC	New	Scored at a TAS each time a call in an RA state out-seizes any alternate trunk group to a particular AREA.
Overflow Route Attempt Count	ATT	Same	May be scored once on a visit to a TAS if the overflow route out-seizes, regardless if the call is in an RA or non-RA state.
ATT-based Overflow Route Carried Count	ATTORCC	New	Scored at a TAS on first out-seizure of any overflow route to a particular AREA (may be scored once on a visit to a TAS, regardless if the call is in an RA or non-RA state).
Overflow Route Carried Count	ORCC	Same	Scored at a TAS when a call out-seizes any overflow route trunk group to a particular AREA.
ATT-based Overflow Route Success Count	ATTSUCC	New	Scored once on a visit to a TAS if the first overflow route succeeds to complete the call, regardless if the call is in an RA or non-RA state.
Overflow Route Success Count	SUCC	Modified	Scored on a TAS to contain the number of calls that succeeded on first or any other overflow route.
Insert/Overflow Override Attempt Count	—	Same	May be scored once on a visit to a TAS, regardless if the call is in an RA or non-RA state, if an Insert or Override control is attempted to out-seizure.
ATT-based Insert/Overflow Override Success Count	—	New	The number of calls forwarded to a via office on first out-seizure of a route specified by the Insert/Overflow override that do not fail (may be scored once on a visit to a TAS, regardless if the call is in an RA or non-RA state).

Trunk Subgroup Measurements

5.03   The new RA count **TSGRAC** is scored for an RA-TSG whenever an RA-justified decision is made for a call that has out-seized a trunk on that RA-TSG. This is a 5-minute count (maximum value 4,095) for data transfer to NEMOS.

5.04   When a TSGRAC is scored for a call in an RA-TSG, the TSG overflow count is not scored.

SAFER MRT Counts

5.05   Since RA is restricted to calls destined to ECOS areas, any MRT applied to a call at a TAS that might use RA must be an ECOS MRT. Therefore, the counts listed in Table 4-K apply.

6. Maintenance/Troubleshooting

6.01   The new FHCs listed in Table 4-L were created to support this feature.

Table 4-L. Final-Handling Codes

Code	Description
2077	**Last Normal Condition**: A Setup message was sent.
	Irregular Condition: A Disconnect or Release Complete message was received on a Q.931 outgoing trunk with a cause value 34 indicating no circuit available.
	Handling: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2078	**Last Normal Condition**: A Setup message was sent.
	Irregular Condition: A Disconnect or Release Complete message was received on a Q.931 outgoing trunk with a cause value 41 indicating temporary failure.
	Handling: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2079	**Last Normal Condition**: A Setup message was sent.
	Irregular Condition: A Disconnect or Release Complete message was received on a Q.931 outgoing trunk with a cause value 42 indicating network congestion.
	Handling: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.

Table 4-L. Final-Handling Codes (Contd)

Code	Description
2080	**Last Normal Condition**: A Setup message was sent. **Irregular Condition**: A Disconnect or Release Complete message was received on a Q.931 outgoing trunk with a cause value 63 indicating service or option not available, unspecified. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2081	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the INUP Outgoing Trunk indicating no circuit is available (cause value 34). **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2082	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the INUP Outgoing Trunk indicating temporary failure (cause value 41). **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2083	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the INUP Outgoing Trunk with a cause value 42 indicating switching equipment congestion. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2084	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the INUP Outgoing Trunk with a cause value 44 indicating channel not available. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2085	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the INUP Outgoing Trunk with a cause value 47 indicating resource unavailable, unspecified. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.

Table 4-L. Final-Handling Codes (Contd)

Code	Description
2086	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the INUP Outgoing Trunk with a cause value 58 indicating bearer capability not available. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2087	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the INUP Outgoing Trunk with a cause value 63 indicating service option not available/unspecified. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2088	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: A UMB message was received on the TUP Outgoing Trunk with a signal value 1 indicating switching equipment congestion. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2089	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: A UMB message was received on the TUP Outgoing Trunk with a signal value 2 indicating circuit group congestion. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2090	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: A UMB message was received on the TUP Outgoing Trunk with a signal value 3 indicating national network congestion. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2091	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: A UMB message was received on the TUP Outgoing Trunk with a signal value 5 indicating call failure. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.

Table 4-L. Final-Handling Codes (Contd)

Code	Description
2092	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the ISUP Outgoing Trunk with a cause value 34 indicating call failure. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2093	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the ISUP Outgoing Trunk with a cause value 41 indicating call failure. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2094	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was on the ISUP Outgoing Trunk received with a cause value 42 indicating call failure. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2095	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the ISUP Outgoing Trunk with a cause value 44 indicating call failure. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2096	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the ISUP Outgoing Trunk with a cause value 47 indicating call failure. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2097	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the ISUP Outgoing Trunk with a cause value 58 indicating call failure. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.
2098	**Last Normal Condition**: An IAM was sent. **Irregular Condition**: Release message was received on the ISUP Outgoing Trunk with a cause value 63 indicating call failure. **Handling**: The *4ESS* switch attempts to rehunt a new outgoing trunk if the call is eligible for AR.

7. Transition Considerations

Interactions with Other Features

7.01 Feature 4967 interacts with Feature 5158, *Carrier Completion Rate*, included in this Generic Release.

Feature Deployment

7.02 The 4E24 Release 1 Generic must be deployed in all *4ESS* switches for this feature (AR1) to be fully operational.

Feature Activation

7.03 This feature is turned on by Recent Change as follows:

- AR1: The RC Form 809 is used to set item **PF47** to **ON**. The RA on/off bit defaults to **OFF** after the new generic is loaded into the *4ESS* switch. The feature will be deployed in the network starting with the ISCs.

- AR2: The RC Form 321 is used to include the new STT values (**0** to **100**).

Feature Deactivation

7.04 This feature is deactivated by Recent Change as follows:

- AR1: The RC Form 809 is used to set item PF47 to **OFF**.

- AR2: The RC Form 321 is used to stop STT routing by changing the STT field to **PERCENT**.

Absolute Word Change

7.05 This feature may also be activated by an absolute word change. Item **OD4PF47** in the ODA structure OD4OFCCOPY2 is the office parameter that controls the state of this feature.

⚠ CAUTION:
*The OD4OFCCOPY2 structure also contains the on/off bits for many other features. The core address is valid for the 4E24 Generic Release, but may **not** be valid for any subsequent generics. Be certain that any changes made only affect this feature.*

7.06 The following information is needed to turn ODA bit OD4PF47 on or off using the absolute word change:

- Structure: OD4OFCCOPY2

- Core Address (4E24 Generic): 7123617

- Size: 1

- Displacement: 22

- On: 1

- Off: 0.

8. Input/Output Manual Pages

8.01 The RC Form 321 is used to include the new STT values. The RC Form 809 is used to set the item PF47 **RA** indicator. The **VER:MISC** Input/Output message is then used to verify the **ON/OFF** status of PF47.

Carrier Completion Rate Feature (5158)/MR (6328)

5

Contents	Page

Carrier Completion Rate Feature (5158)/MR (6328)

5

1. Feature Description

1.01 This feature is a new AT&T proprietary feature that enables the AT&T network to route calls to foreign carriers based on the reliability of those carriers in completing calls. The Carrier Completion Rate Feature (CCRF) minimizes Customer Waiting Time (CWT) and ensures a higher call-completion rate by selecting carriers that are equipped with Route Advances (RAs) and Egress Busy Crankbacks (EBCs). This feature allows AT&T to better compete with international calling services offered by competitors and places them in a stronger position on the market.

1.02 CCRF develops a carrier selection process that achieves all of the following objectives:

- Respects Carrier Proportioned Routing (CPR) agreements.

- Respects Carrier Specific Routing (CSR).

- Selects best carriers to obtain a high call-completion rate.

- Maximizes AT&T's profits by selecting carriers that trigger End-to-End Class of Service (ECOS) overflow routes sparingly, but not at the expense of blocking calls.

- Minimize CWT and utilization of network resources by selecting carriers that trigger RAs and EBCs sparingly, but not at the expense of blocking calls.

2. Call Flow
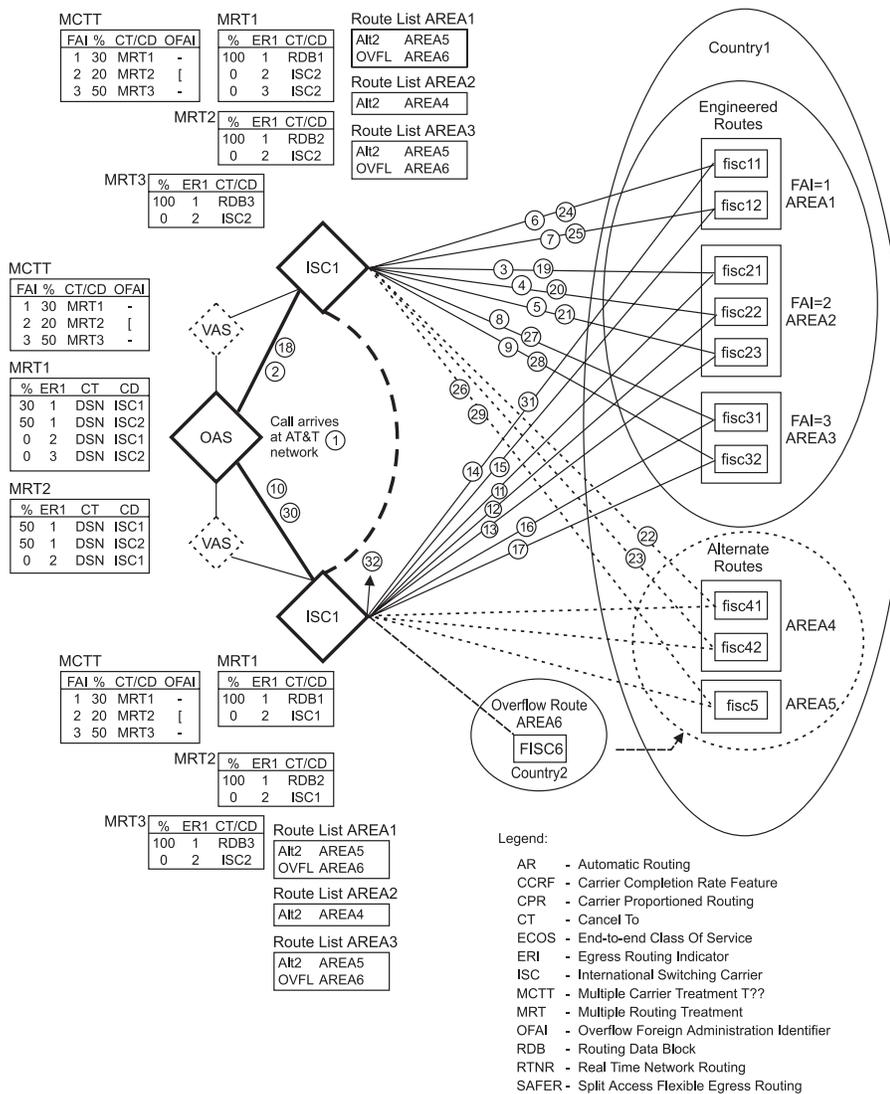
Figure 5-1. Example of a Routing Scenario for a CCRF Call

2.01   The CCRF functions mainly in the call process at the Terminating AT&T Switches (TASs), where the carrier histories are maintained and used to select multiple ECOS entries. Each ECOS entry applied by the CCRF to route the call from the TAS is identical to what it would be without the CCRF. An example of the call flow in the AT&T network where CCRF is used along with the RA portion of the Automatic Routing (AR) in presence of Split Access Flexible Egress Routing (SAFER) and CPR in the Real-Time Network Routing (RTNR) network is illustrated in Figure 5-1. The following hypothetical sequence illustrates one possible scenario:

1. The call arrives at the AT&T network and the Originating AT&T Switch (OAS), and receives the Country Code (CC) and National Number (NN). A Class of Service (COS) derivation is performed and the number is translated to locate the Multiple Carrier Treatment Table (MCTT). Foreign Administration Identifier (FAI) 2 is randomly selected and pointed to Multiple Routing Treatment (MRT) 2. The call is then identified as a CCRF call.

2. The call is routed to International Switching Center (ISC) 1 labeled with FAI2 and Egress Routing Indicator (ERI) 1.

3. The ISC1 locates MRT2 by using FAI2, and assigns MCTT to the call. Routing Data Block (RDB) 2 is selected and directed to ECOS area 2 where ECOS Routing Pattern Identifier (ERPI) is identified. The call is then routed to area 2 Foreign ISC (FISC) 21 where the trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 2.

4. The RA is justified and RA state is declared for the call. Assuming all the conditions were met in Step 3, the call is routed to area 2/FISC22. The Trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 2.

5. The RA is justified, and assuming all the conditions were met in Step 3, the call is routed to area 2/FISC23. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 2.

6. The RA is justified and its possibilities are exhausted for ERI1 in ECOS area 2. Because there are no alternate routes available for ERI1, the Overflow Foreign Administration Indicator (OFAI) is chosen from the remaining MCTT entries that have the best history; in this case, ECOS area 1. The FAI1 then selects MRT1, which in turn selects RDB1. Assuming that all conditions were met in Step 3, the call is routed to area 1/FISC11. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 1.

7. The RA is justified, and assuming that all conditions were met in Step 3, the call is routed to area 1/FISC12. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 1.

8. The RA is justified and its possibilities are exhausted for ERI1 in ECOS area 1. Because there are no alternate routes available for ERI1, the OFAI is chosen from the remaining MCTT entries that have the best history; in this case, ECOS area 3. The FAI3 then selects MRT3, which in turn selects RDB3. Assuming that all conditions were met in Step 3, the call is routed to area 3/FISC31. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 1.

9. The RA is justified, and assuming all conditions were met in Step 3, the call is routed to area 3/FISC32. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 3.

10. The RA is justified and its possibilities are exhausted for ERI1 in ECOS area 3. Because no alternate routes are available for ERI1 and ECOS entries are exhausted at ISC1, a crankback message is sent to the OAS. The MRT2 routes the call to ISC2 with FAI2 and ERI1.

11. The ISC2 picks the best ECOS entry; in this case, FAI2. It also locates MRT2, assigning MCTT to the call. The RDB2 is selected and directed to ECOS area 2 where ERPI is identified. The FAI2 is chosen by the OAS in this incident. Assuming that all conditions were met in Step 3, the call is routed to area 2/FISC21. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 2.

12. The RA is justified, and assuming all conditions were met in Step 3, the call is routed to area 2/FISC22. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 1.

13. The RA is justified, and assuming all conditions were met in Step 3, the call is routed to area 2/FISC23. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 1.

14. The RA is justified and its possibilities are exhausted for ERI1 in ECOS area 2. Because no alternate routes are available for ERI1, the OFAI is chosen from the remaining MCTT entries that have the best history; in this case, ECOS area 1. The FAI1 then selects MRT1, which in turn selects RDB1. Assuming that all conditions were met in Step 3, the call is routed to area 1/FISC11. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 1.

15. The RA is justified, and assuming all conditions were met in Step 3, the call is routed to area 2/FISC22. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 2.

16. The RA is justified and its possibilities are exhausted for ERI1 in ECOS area 1. Because no alternate routes are available for ERI1, the OFAI is chosen from the remaining MCTT entries that have the best history; in this case, ECOS area 3. The FAI3 then selects MRT3, which in turn selects RDB3. Assuming that all conditions were met in Step 3, the call is routed to area 3/FISC31. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 1.

17. The RA is justified, and assuming that all conditions were met in Step 3, the call is routed to area 3/FISC32. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 3.

18. The RA is justified and its possibilities are exhausted for ERI1 in ECOS area 3. Because no alternate routes are available for ERI1 and ECOS entries are exhausted at ISC2, a crankback message is sent to the OAS. The MRT2 routes the call back to ISC1 with FAI2 and ERI2.

19. AT ISC1, the MCTT selects FAI2, which is the best ECOS entry in this case, and directs it to MRT2 where RDB2 is chosen. The call is then pointed to ECOS area 2 for ERPI to take place. Assuming that all conditions were met in Step 3, the call is routed to area 2/FISC21. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 2.

20. The RA is justified, and assuming all conditions were met in Step 3, the call is routed to area 2/FISC22. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 2.

21. The RA is justified, and assuming all conditions were met in Step 3, the call is routed to area 2/FISC23. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 2.

22. The RA is justified and engineered routes in ECOS area 2 are exhausted. The ERI is 2, making ECOS area 4 the alternate route for ECOS area 2, according to the route list. The call is routed to area 4/FISC41. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 4.

23. The RA is justified, and assuming all conditions were met in Step 3, the call is routed to area 4/FISC42. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 2.

24. The RA is justified and its possibilities are exhausted for ERI2 in ECOS area 2. At ISC1, OFAI1 is chosen by MCTT with the best history; in this case, ECOS area 1. The FAI1 then selects MRT1, which in turn selects RDBI1. Assuming that all conditions were met in Step 3, the call is routed to area 1/FISC11. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 1.

25. The RA is justified, and assuming all conditions were met in Step 3, the call is routed to area 1/FISC12. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 1.

26. The RA is justified and engineered routes in ECOS area 1 are exhausted. The ERI is 2, making ECOS area 5 the alternate route for ECOS area 1, according to the route list. The call is routed to area 5/FISC5. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 5.

27. The RA is justified and its possibilities are exhausted for ERI2 in ECOS area 1. At ISC1, the OFAI3 with the best history is chosen by the MCTT; in this case, ECOS area 3. The FAI3 then selects MRT3, which in turn selects RDB3. Assuming that all conditions were met in Step 3, the call is routed to area 3/FISC31. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS area 3.

28. The RA is justified, and assuming that all conditions were met in Step 3, the call is routed to area 3/FISC32. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS1.

29. The RA is justified, and engineered routes in ECOS3 are exhausted. The ERI is 2, making ECOS5 the alternate route for ECOS3, according to the route list. The call is routed to area 5/FISC5. The trunk is seized, but the release message is returned due to congestion or malfunction in ECOS5.

30. The RA is justified, and its possibilities are exhausted for ERI1 in ECOS area 3. The ECOS entries are also exhausted ISC1. A crankback message is sent to OAS, where the MCTT selects OFAI1, which selects MRT1 and points to ISC2. The call is routed to ISC2 with FAI1 and ERI1.

31. The ISC2 uses FAI1, which is the best carrier in this incident to locate MRT1, which picks RDB1 and points to ECOS1. Assuming that all conditions were met in Step 3, the call is routed to area 1/FISC21. The trunk is seized, but the release message is returned containing a subscriber-busy message.

32. The call is final handled. **End of Call Flow**.

3. Provisioning

Structures Affected

OD4OFCCOPY2

3.01   Item **OD4PF41** is assigned as an office parameter to indicate whether or not the CCRF is on in the *4ESS* switch. Table 5-A lists the on/off requirements.

Table 5-A. OD4OFCCOPY2 Assigned States

Item/State	Word	Displacement	Size	Description

OD4PF41
    4ODFB_OFF(=0)
    4ODFFB_ON(=1)
	5	16	1	Carrier Completion Rate Feature
				    Off (default)
				    On

Recent Change Form 809

3.02   The on/off bit for this feature is populated with Recent Change (RC) Form 809. The Verify Forms associated with the on/off bit are 16az and 8j. The population rules for RC 809 are shown in Table 5-B and as follows:

Table 5-B. On/Off Indicator for Feature 5158

809 Form Entry				
FEATURE ITEM	**ON/OFF**	**Populates ITEM**	**With**	**Checks**
PF41	ON	OD4PF41	4ODFB_ON	none
	OFF		4ODFB_OFF	none

⇒ **NOTE:**
The CCRF has an on/off indicator at each switch and can be set to **ON** when the indicator for the RA portion of the AR is On. The indicator is only set to **ON** after generic 24R1 is completely loaded on all switches.

Recent Change Form 653

3.03   This form is used to populate the service/call ID type table with a yes or answer. The AT&T Service/Call ID Type (ASCIT) question 21 is associated with this form. The question asked is, "Is the CCRF allowed for this Service Identify Index (SII)?" In the event of a *yes* answer, the following fields are modified:

- SII is set to 13

- Question is set to Q21

- Answer is set to Y.

Recent Change Form 317

3.04   This form is used to add Country Code (CC) groups to translations at the ISC and domestic offices. The layout of this form has been modified to add a new field that identifies whether CCRF is active for the country code entered.

⇒ **NOTE:**
The CCRF indicator should be set to Y for the respective CC groups to activate the CCRF feature for the CC group.

4. Recording (Not Affected)

5. Network Management

5.01   The changes required by this feature are contained in the Network Management Operations System (NEMOS) requirement document and includes the following:

- Data Collection—Carrier performance demand data is modified to be delivered to the NEMOS.

- Traffic Data Display—The International Data Display is modified to show country wide and carrier specific data. NEMOS aggregates each existing ECOS count at the TAS by country and ERPI.

- Control Data Display—The Carrier Skip Control (CSC) Display is modified to have a warning message or protection mechanism to ensure CSC controls are entered at both the OAS and the serving ISC.

■ Code Routing Queries—The Code Routing Queries display is modified to obtain and display carrier performance snapshot data. The following measurements have been added or changed to support this feature:

— Route Advance Terminating Last Overflow Count (RATLOC)

— ERPI Calls In Progress (CIP) for CTUD (Total Usage to a designated carrier in a CCRF active country

— Terminating First Egress Count (TFE) ERPI

— TFE Service Identity Index (SII) SET

— Terminating Last Overflow Count (TLO) ERPI

— TLO SIISET

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 4E24 Release 1 Generic for this feature to be operational. However, CCRF only runs under the 4E24 Release 1 Generic and subsequent releases.

Feature Activation

7.02   This feature is activated or deactivated as described in the "Provisioning" section of this feature.

Feature Dependencies

7.03   This feature is dependent on Feature 4967, *Automatic Routing*, located in this same release, 234-090-241AC. In order to activate the Carrier Completion Rate Feature, the Automatic Routing (AR) bit must be turned on. Success to the Top (STT) does not need to be populated in Multiple Routing Treatments (MRTs) for this feature to be functional.

Absolute Word Change

7.04 This feature can also be turned ON or OFF by using an absolute word change. Item OD4PF41 in the OD4OFCCOPY2 structure is the office parameter that controls the on/off state of this feature.

⚠ CAUTION:

*The OD4OFCCOPY2 structure also contains the on/off bits for many other features. The core address listed below is valid for the 4E24 Generic Release, but may **not** be valid for any subsequent generics. Be certain that any changes made only affect this feature.*

7.05 The following information can be used to turn this feature on or off using the absolute word change:

- Structure: OD4OFCCOPY2

- Core address in 4E24 Generic: 7123617

- Size of OD4PF41: 1

- Displacement: 16 (decimal)

- On: 1

- Off: 0 (default)

8. Input/Output Manual Pages

8.01 The following two manpages are affected by this feature:

- **VER:CCDCONV:ABC, ###!** (where # represents the CC)

- **VER:CODEGRP:MCTI #!** (where # represents the MCT index)

Enhanced Calling Party Number Anomaly Report Feature (5906)

6

Contents — Page

Contents   Page

Enhanced Calling Party Number Anomaly Report Feature (5906)

6

1. Feature Description

1.01 This feature improves the accuracy and value of the *4ESS*™ switch Calling Party Number (CPN) Anomaly Report, which is used to indicate if CPNs are not being passed from switches connected to the AT&T Switched Network (ASN), as required by the Federal Communications Commission.

1.02 The Calling Number Identification Service (Caller ID) relies on the proper delivery of the CPN through the ASN. In the past, AT&T has been held responsible for CPN anomalies (deviations from normal conditions) that occurred because the CPN was not passed from connecting switches. This feature allows AT&T to detect and document these events, so that it can initiate prompt corrective action.

1.03 The CPN is included in the Initial Address Message (IAM), which originates at the call-originating switch, and should pass with the IAM from switch to switch. However, there are a number of reasons why the the CPN is not always delivered. One reason is MF interworkings, which prevent passing the CPN end-to-end. Other causes include the addition of new Trunk Sub-Groups (TSGs), new switches, new Switching System 7 (SS7) signaling capabilities in existing switches, new software, or even human error made during a provisioning change. In each case, a customer subscribing to Caller ID service will not receive Caller ID for calls originating at the problematic switch.

Feature Enhancements

1.04 This feature enhances and replaces the *CPN Anomaly Report Feature (5594)*, which was introduced in 4E22 Release 1. Feature 5594 is being removed in 4E24 Release 1.

1.05 Compared with Feature 5594, this feature provides the following improvements and enhancements:

■ Users have the option of not counting calls that experience MF interworkings. Feature 5594 counted calls with MF interworkings, and that often resulted in over-counting calls that did not contain CPNs. This led to misleading data that was difficult to interpret and use.

■ This feature uses more intelligence than was available with Feature 5594, which used raw counts of calls that were received without CPNs. The added intelligence and a new algorithm that uses additional information in the IAM allow the feature to more accurately establish whether a CPN is properly received for calls over a particular TSG.

■ Reports are outputted only for TSGs that are detected as being faulty.

■ This feature flags problems in the ASN and identifies problems in interconnecting networks. It applies to all switches connected to a *4ESS* switch via an SS7 trunk, including Local Exchange Carrier (LEC) and other AT&T switches.

Operating Modes

1.06 This feature provides two operating modes: Collection and a Detection, which are selected and activated using Recent Change Form 810. The default is off. Refer to the Provisioning section in this chapter for additional information on activating an operating mode.

A. Collection Mode

1.07 When the Collection Mode of operation is active, the *4ESS* switch increments a counter associated with a TSG when either of the following IAMs are received:

■ IAMs without CPNs

■ IAM CPN field with greater than 18 digits.

1.08 The IAM count is maintained for all SS7 TSGs that are not intertoll trunks.

1.09 The user can optionally ignore IAMs that have encountered MF interworkings. This is done using Recent Change Form 810 (CARMFCS DATA item), as described in the "Provisioning" section of this chapter.

1.10   The user can set a threshold value (within the range of 0 to 2047) for the number of collected IAMs. The switch regularly reports the collected information when it exceeds the set threshold value, as described in the "Maintenance/Troubleshooting" section of this chapter.

B. Detection Mode

1.11   When the Detection Mode of operation is active, the *4ESS* switch uses intelligence and an algorithm to determine if CPNs were correctly received for each SS7 TSG. Note that, unlike the Collection Mode, which applies to all SS7 non-intertoll TSGs, the Detection Mode applies to all SS7 TSGs (calls with MF interworking are not counted).

1.12   The switch regularly reports the detected CPN anomaly information on a channel selected by the user, as described in the "Maintenance/Troubleshooting" section of this chapter.

On-Demand Reporting

1.13   The user can enter the **OP:CAR** command to request a report of CPN anomaly information for a specific TSG or for all TSGs in the office, based on the current operating mode.

On-Demand Clearing

1.14   The user can enter the **ORD:CAR** command to zero collected data on a per-TSG or total office basis. Several formats allow differing levels of data clearing.

2. Call Flow (Not Affected)

3. Provisioning

Recent Change Form 810

3.01   Recent Change (RC) Form 810 is used to activate and control the CPN anomaly reporting capabilities provided by this feature and was not changed. Activation and control are achieved by using a number of new DATA items that were added for use with RC Form 810 . The new DATA items are as follows:

■   **CARCHAN**—Designates the output reporting I/O channel for autonomous periodic reports. Valid entries are 0 to 77.

■ **CARMFCS**—Selects if (yes or no) MF interworking counts are to be included for the Collection Mode. Valid entries are **N** or **Y**.

■ **CARMODE**—Selects the feature operating mode of Off, Collection or Detection. Valid entries are **OFF**, **COL** or **DET**. An **ERR** (error/illegal) mode is also provided as a verify state.

■ **CARTHRES**—Selects the threshold count value at which output reporting will occur when exceeded for the Collection Mode. Valid entries are 0 to 2047.

```
                    SAMPLE MESSAGES




 INPUT:         VERIFY 16do



    ex.1    VER:MISC:FHT CAROFCDAT! (EOT)




 OUTPUT:         VERIFY 6do

             VER:MISC:FHT CAROFCDAT



 RECENT CHANGE INPUT SOURC E- FORM# 810 - CHANGE MISCELLANEOUS
                   FEATURE INFORMATION
```

Figure 6-**1. Verify Form 16d0**

3.02 Two new Verify Forms are used to verify the operating mode data listed above. Input Verify Form 16d0 (see Figure 6-1) uses the following message to request verification, and Verify Form 6do provides output of this information (see Figure 6-2):

VER:MISC:FHT CAROFCDAT!

```
VERIFY CPN ANOMALY REPORTING FEATURE CONTROL DATA



 INPUT:              VERIFY #16do

VER:MISC:FHT CAROFCDAT! (EOT)






 OUTPUT:             VERIFY 6do

VER:MISC:FHT CAROFCDAT:



REPORTING OFFICE:-----------
FEATURE MODE:    ---
COUNT MF CALLS:  ---
THRESHOLD:       ----
CHANNEL:         ----  (---)



RECENT CHANGE INPUT SOURCE - FORM #810 - CHANGE MISCELLANEOUS
                 FEATURE INFORMATION
```

Figure 6-2. Verify Form 6do

100-Series Recent Change Forms

3.03   A new TSG field, **NCAR**, was added to RC Forms 100, 101, 102, 107, 108 and
            109 to support this feature. The term NCAR is an acronym for "No CPN Anomaly
Reporting", and is used to prohibit CPN anomaly reporting on a TSG. Valid entries are
as follows:

   ■   Blank (default) or N—CPN anomaly reporting allowed on this TSG

   ■   Y—CPN anomaly reporting prohibited on this TSG.

3.04   The **NCAR** field does not turn this feature on or off; it controls whether the trunks
            associated with a TSG are to be included in CPN anomaly reporting. The default
entry is Blank.

3.05 The TSG output Verify Forms 1a, 1b and 1c were modified to include the new **NCAR** field. Valid output entries are Blank, N or Y.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

6.01 Trunk maintenance is affected by the new Input/Output messages that were created to support this feature. Refer to the "Input/Output Manual Pages" section in this chapter for additional information.

6.02 Data collected is sent over a user-designated channel as follows:

- Data is sent every morning at 01:15 for the Collection Mode
- Data is sent on Sunday morning at about 01:15 for the Detection Mode.

6.03 The data that is sent applies to the operating mode of this feature. The following data is sent for the Collection Mode:

- Mode of operation—COLLECTION
- *4ESS* toll switch *CLLI** code of the reporting office
- TSG Number
- Base Traffic Number (BTFN)
- Interconnecting Switch *CLLI* code
- Count of received IAMs collected on a TSG basis. This includes IAMs without a CPN or with CPNs of more than 18 digits (if threshold is exceeded).

The following data is sent for the Detection Mode:

- Mode of Operation—DETECTION
- TSG Number

---

* This is a registered trademark; and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.

- *4ESS* toll switch *CLLI* code of the reporting office
- Base Traffic Number (BTFN)
- Interconnecting Switch *CLLI* code
- Current state when a single TSG request is made.

7. Transition Considerations

Deployment Requirements

7.01 It is not necessary for all *4ESS* switches in the network to be running the 4E24 Release 1 Generic for this feature to be fully operational.

Feature Activation

7.02 This feature is activated using RC Form 810, as described in the "Provisioning" section of this chapter.

8. Input/Output Manual Pages

8.01 Several manual pages were created or modified to support this feature, as shown in Table 6-A.

Table 6-A. Input/Output Manual Pages

ID	Type	New/Modified
CPN:ANOMALY	Output	Modified
OP:CAR	Input	New_
ORD:CAR	Input	New
STOP:OP-CAR	Input	New
VER:MISC-FHT-CAR	Input	New

Foreign Administration Identifier Expansion Feature (5922)

7

Contents

Page

Contents   Page

Foreign Administration Identifier Expansion Feature (5922)

7

1. Feature Description

1.01 This feature increases the range of Foreign Administration Identifiers (FAIs) in a *4ESS*™ switch from 1 to 7 to 1 to 31. The maximum number of Overflow Foreign Administration Identifiers (OFAIs) for a specific FAI remains at 6, but an OFAI value may be in the range of 1 to 31.

1.02 The increased capability provided by this feature is in response to the continuing growth in bilateral foreign administrations and the increased application of non-traditional routing.

1.03 Features that apply Carrier Proportional Routing (CPR) and Carrier Specific Routing (CSR) will benefit from the increased capability provided by this feature.

Signaling Requirements

1.04 The AT&T version of the Integrated Services Digital Network-User Part (ISUP)Transit Network Selection (TNS) parameter contains an FAI field when the "For national network identification" indicates "foreign administration identification". The use of "foreign identification" is AT&T specific.

1.05 To support this feature, the FAI field of the TNS parameter was modified from a 4-bit Binary-Coded Decimal (BCD) field to a 5-bit binary field.

2. Call Flow (Not Affected)

3. Provisioning

Affected Structures

3.01 This feature affects a number of data structures, as follows:

- The following new Network Management structures were defined to support this feature: OD4MINFAICNT, OD4MAXFAICNT, and OD4NUMFAICNT. A new min-num-max structure, FAICNT, was also defined.

- The structures NM4ISTSCSRCB and NM4ISTSCSROVCB were removed.

- The Multiple Carrier Treatment (MCT) Routing structure HT4MCTRTNG was increased to support 31 FAIs.

- The MCT to Originating Carrier and Terminating Country Pair (OCTCP) structure OD4MCT_OTCP was restructured to support 31 FAIs.

- The OCTCP structure HT4OCTCPOFAI was increased to support 31 FAIs.

- The Trunk Sub-Group (TSG) structure HT4TSG was restructured to support a maximum of 31 FAIs.

- Structures associated with OFAI values are in the range of 1 to 31.

Office Data Assembler (ODA) Form 406C

3.02 A new field, **FAICNT**, was added to the Office Data Assembler (ODA) Form 406C to support this feature. (The term **FAICNT** refers to foreign administration identifier counts.) This field is used to populate the OD4NUMFAICNT item and has valid entry values of 0 to 31. If a zero value is specified, a default value of 15 will be used for AT&T International Switching Center (ISC)/gateway offices.

Recent Change Forms Affected

A. 100-Series Recent Change Forms

3.03 The **FAI** field on Recent Change (RC) Forms 100, 101, 102, 107, 108, and 109 was modified to support 2-digit entries for values of 1 to 31.

B. Recent Change Form 339

3.04   Recent Change Form 339 (Add or Change Multiple Carrier Treatment Routing)
was modified to support from 1 to 31 FAI entries per form, and is shown in Figure
7-1. The form entries for the **FAI** and the **OFAI** fields on RC Form 339 were updated to
support values of 1 to 31.

C. Recent Change Form 662

3.05   Recent Change Form 662 (Change Originating Carrier and Terminating Country
Pair to Multiple Carrier Treatment Assignment) was modified to support from 1 to
31 entries per form, and is shown in Figure 7-2. The form entries for the **ORIGFAI**, **FAI**
and the **OVERFLOW FAI** fields on RC Form 662 were updated to support values of 1 to
31.

Verify Forms/Messages

A. Verify Input Form 11d

3.06   The input Verify Form 11d was modified to support 2-digit FAI entry values in the
range of 1 to 31. The input message for Verify Form 11d is as follows:

VER:TSGLIST:FD1 FAI, DT1, FAI#

B. Verify Output Forms 1a, 1b, and 1c

3.07   Verify Output Forms 1a, 1b, and 1c were modified to support 2-digit FAI entry
values in the range of 1 to 31.

C. Verify Output Form 3ac

3.08   Verify Output Form 3ac was modified to support 2-digit FAI and OFAI form entry
values in the range of 1 to 31.

D. Verify Output Form 6bf

3.09   Verify Output Form 6bf was modified to support 2-digit values in the range of 1 to
31 for the ORIGFAI, FAI, and the OVERFLOW FAI form entries.

```
# FORM 339  ADD OR CHANGE MULTIPLE CARRIER TREATMENT ROUTING
4E24 R1

RC:CODEGRP;CHG;OPT(MCT),___:                 MCTI ____, DOMCLASS ____,

ORNU _____,   ACTION _,

      MCT  CALL
FAI PERCENT TYP    CALLDATA       AD1  AD2    OFAI

__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__
__, ____·_, ___, _____, ____, _____, __,__,__,__,__,__


REMARKS _____!



                 ASSOCIATED VERIFY MESSAGES

                 INPUT-13i-VER:CODEGRP:MCTI #

                  OUTPUT-3ac-VER:CODEGRP:
```

Figure 7-1. Recent Change Form 339

```
# FORM 662  CHANGE ORIGINATING CARRIER AND TERMINATING COUNTRY PAIR
                  TO MULTIPLE CARRIER TREATMENT ASSIGNMENT
  4E24>


RC:OCTCP;CHG;___:

ORNU _____,  ACTION _,

OTYP ___, ONPACC ___, ONXX ___, ORIGFAI __,
TTYP ___, TNPACC ___, TNXX ___, SII ___,

TCSR ____, TEI ____,


FAI  PERCENT  OVERFLOW FAI        FAI  PERCENT  OVERFLOW FAI
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,     __,   ___._,  __,__,__,__,__,
__,   ___._,  __,__,__,__,__,


REMARKS _____!




                   ASSOCIATED VERIFY MESSAGES

                  INPUT-16ba-VER:VFUNC OCTCP

                  OUTPUT-6bf-VER:MISC;OPT(OCTCP):
```

Figure 7-2. Recent Change Form 662

4. Recording

4.01 To support this feature, the *4ESS* switch records values of 0 to 31 in Module 932 of the Automatic Message Accounting (AMA) Table 879 for the originating/terminating FAI.

4.02 For International Call Detail Recording (ICDR), the FAI fields used for ICDR recording were expanded to support from 1 to 31 FAIs.

5. Network Management

Network Management Operations Support (NEMOS)

5.01 The following *4ESS* switch to Network Management Operations Support (NEMOS) interface messages were modified to support this feature: 5, 33, 35, 43, 49, 56, 164, and 201.

6. Maintenance/Troubleshooting

Measurements

6.01 The *4ESS* switch no longer stores the MCT counts (Attempt and Overflow) on the 3B Processor disk for retrieval by the Dynamic Engineering Mechanized System (DEMS)/Data Acquisition Reports and Integrated Communications System (DARICS). The AT&T Network Servicing System (ANSER) obtains the MCT counts from NEMOS instead of from DEMS/DARICS.

7. Transition Considerations

Deployment Requirement

7.01 All *4ESS* switches must be running the 4E24 Release 1 Generic in order for this feature to be fully operational. Until all switches are running the 4E24 Release 1 Generic, only FAIs from 1 to 7 can be supported. This is due to the modifications in the ISUP TNS parameter described in section 1.05 in this chapter. In addition, the NEMOS software update that supports FAI expansion must also be deployed before an FAI greater than 7 is used in the AT&T network.

Feature Activation

7.02 This feature is turned on automatically with software deployment.

8. Input/Output Manual Pages

8.01 Input messages **VER:CODEGRP:MCTI** and **VER:VFUNC**, and the corresponding output manual pages **VER:CODEGRP-MCT** and **VER:MISC-OCTCP** were revised to support this feature.

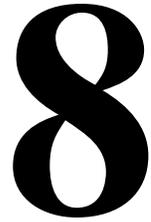# 1B File Expansion in the Attached Processor System Disk—Open Up Segment 2 of 1B File Store Feature (6296)

8

Contents | Page

Contents   Page

1B File Expansion in the Attached Processor System Disk—Open Up Segment 2 of 1B File Store Feature (6296)

8

1. Feature Description

1.01 This feature, 1B File Expansion in the Attached Processor System (APS) Disk, makes available the third segment (Segment 2) of the APS Small Computer System Interface (SCSI) disk for data storage. The APS SCSI system disk stores two copies of the 1B file (equivalent to 256MB of memory for a 32 Mega-Word (MW) file. The 3B APS pumps 1B file data into 1B Program Store (PS), Call Store (CS), and Extended Store (XS) memory. The existing bootstrap recovery strategy (which pumps all necessary data needed before beginning call processing) remains unchanged.

1.02 The 1B Processor architecture remains unchanged with the activation of this feature. Also, 23-bit addressing will continue to be used to access the PS/CS memory.

1.03 The maximum file capacity that the APS SCSI 600-megabyte system disk supports is 32 MW (128 megabytes) 1B file size with two copies on the APS disk. The actual size of the 1B file allocated for a specific generic is based on the needs of the *4ESS*™ switch office with the largest application (depends on the types of features implemented in 1B CS and XS memory). All *4ESS* switch offices running the same generic will have the same 1B file memory size, allocated in 8-MW blocks.

1.04 To reduce the design complexity involved in an expanded 1B file addressing scheme, static translation data in the 1B file is limited to up to 24 MW (96 megabytes), allowing 8-MW of 1B file memory for generic and disk-only data. This feature provides 1B memory backup capacity to meet unforeseen demands. Figure 8-1 illustrates a high-level expanded 1B file architecture.

1B Processor

PS	CS		wcs
2-3 Mw	5 Mw	....	0-15

MUP

IFB client

IFB client

IFB client

AUI — API — 3B APS

CNI Ring

CDR Platform

SM Seg. 0

SM Seg. 1

SM Seg. 2

SM Seg. 3

expanded view

Being added in this feature

8 Mw Classic, Traditional, disk only

24Mw Translations

3B Only file

DLN Data file

1 GByte System Disk

CDR 1GByte

CDR 1GByte

CDR 1GByte

NOTE: This diagram does not show duplication inherent to the switch

tpa 852860/01

Figure 8-1. 1B Processor File Expansion APS Disk

1.05   There is an increase in the demand of 1B main memory because of the increased demand in 1B disk backup memory. The data stored on this secondary memory [Windowed Call Store (WCS)] needs to be backed up on a disk.

1.06   Only two segments (0 and 1) of the 3B APS disk system are usable for program and data backup. Segment 0 of the 1B file store is nearly full, and about 3.5 MW of 8 MWs in Segment 1 are allocated for backup of Page Pidents, the Automatic Number Identification (ANI) Trigger Table, Positive Lookup (PLU) Tables, and Backward Codegroup translations in WCS. Since only 16 MWs can be currently backed up on the disk and the total forecasted demand could be greater than 16 MWs, Segment 2 is being opened to provide additional backup space. The following structures (residing in Segment 0) will be moved to Segment 2:

- MC5HRB

- VTF1

- VTG1.

Moving these structures creates additional growth for the structures remaining in Segment 0.

Background

1.07   The APS SCSI disk system provides 1B system, 3B system, Direct Link Node (DLN) data, and Call Detail Recording (CDR) backup. Each AT&T Central Office is equipped with three 1 gigabyte disk pairs and one 1 gigabyte system disk pair.

1.08   The CDR disk capacity serves as backup for downstream CDR failures. The APS SCSI system disk capacity serves as memory backup for the 1B Processor functionality and the APS 3B20/3B21D Processor functionality. The APS SCSI system disk primarily contains the following three types of files:

- 1B File (1B functionality)

- 3B-only files (APS 3B20/3B21D Processor functionality) which include backup for the following:

    — Real-Time Reliable (RTR) programs

    — Common Network Interface (CNI) programs

    — DLN Program Store

    — CDR programs

    — Broadcast Warning Message (BWM) programs

    — Traffic Data Administration System (TDAS)

- — Equipment Configuration Database (ECD)

- — Volume Table of Contents (VTOC)

- — 3B fault recovery programs.

- ■ DLN database files (APS 3B20/3B21D Processor functionality) which include backup for the following:

  - — Global Title Translation (GTT) data

  - — Positive Call Processing (PCP) data.

1.09 Continuous network growth and use of new features place heavy demands on the 1B Processor memory resource. Recent activities that impact 1B memory in the 4E24 Release 1 Generic include the following:

- ■ Potential Trunk Subgroup (TSG) Block usage increase

- ■ Backward Code Group Translator addition (Lucent internal feature)

- ■ Program Store Expansion (PSE).

1.10 These activities require a large amount of additional file store on the 3B20/3B21D Processor. This leaves Page Pidents, ANI Trigger Table, and Positive Look Up (PLU) translations with enough room to grow in Segment 1. In case the PLU Table grows beyond 8 MWs, Segment 3 can be opened to accommodate the extra PLU Table backup.

⇒ NOTE:

In some offices, it may not be necessary to accommodate PLU storage and the ANI Trigger Table beyond Segments 0 and 1.

1B File Contents

1.11 The 1B file contains a wide variety of data types and is accessed by over 25 subsystems. Table 8-A lists the data types and the related subsystems.

Table 8-A. Data Types and Related Subsystems

Data Type	Subsystem
Generic—Backup of PS/CS text and data	■ Processor Recovery ■ Store Recovery ■ Generic Utilities ■ 1B and 3B Processor Resident Generic Update Software ■ Audits ■ Input/Output (I/O) System ■ Tape Reading and Writing ■ Load-Building Support Software
Generic (disk only)	■ Recent Change Forms ■ I/O Output Catalogues ■ On-Site Operations Report (OSOR) Program Control ■ 3B Processor Direct Link Node (DLN) Recovery ■ Load-Building Support Software
Paged Generic (disk only)	■ Diagnostics ■ Generic Utilities ■ Maintenance Paging Supervisor ■ Load-Building Support Software
Library Program Area text (disk only)	■ Library Program Supervisor ■ Tape-Loading Programs ■ Load-Building Software

Table 8-A. Data Types and Related Subsystems (Contd)

Data Type	Subsystem
Error History (disk only)	■ Maintenance Logger and Database Manager ■ Network Management Display Subsystem
Network Management Algorithms (disk only)	■ Tape Reading and Writing ■ Network Management Display Subsystem
Trunk Maintenance Trunk State Backups Office Data Assembler (ODA) Defined (disk only)	■ Audits ■ Trunk Maintenance ■ Software Initialization ■ Trunk Error Analysis
Merge—System Memory Description Files and Checksums	■ Generic Utilities ■ Load From Tape Processes ■ 1B and 3B Processor Resident Update ■ Audits ■ Processor Recovery ■ Recent Change Programs ■ Load-Building Support Software
Recent Change Rollback Area (disk only)	Recent Change
Traffic and Plant Measurements and Schedules (disk only)	■ Traffic and Plant Subsystems ■ Tape Reading and Writing
OSOR Long-Term Measurement Storage (disk only)	OSOR Subsystem

Table 8-A. Data Types and Related Subsystems (Contd)

Data Type	Subsystem
Translations Office-Dependent Static Data PS/CS Backup	■ Processor Recovery ■ Store Recovery ■ Generic Utilities ■ 1B and 3B Processor Resident Generic Update Software ■ Audits ■ Recent Change and Verify ■ Tape Reading and Writing
Translations (disk only)	■ Recent Change and Verify ■ 3B Processor Resident DLN Recovery ■ Generic Utilities ■ Translation Access Primitives
Transient—non-ODA Defined (disk only)	Scratch pads for numerous subsystems [that is, Traffic Measurements, Generic Utilities, Network Management, Trunk Appearance Number (TAN)-to-TAN, Vacant Code Analysis, Maintenance Control]
Transient	■ ODA Defined (disk only) ■ Numerous applications (that is, Network Management, Hard-to-Reach data, Traffic Measurement holding areas, Network Management display buffers)

2. Call Flow (Not Affected)

3. Provisioning

Generic Retrofit

3.01   This feature does not require any additional *4ESS* switch capabilities (1B/3B Processor installation or retrofit) than those capabilities provided today. However, the time to execute a retrofit in an office will increase as the allocated size of the 1B file approaches 32 MWs because of larger amounts of translation data.

3.02   At retrofit, the 1B file is downloaded from an Off-Line Processor (OLP) to the 3B APS of the retrofit office. To shorten the download time, the file transmission stops at a logical End-of-File (EOF) rather than the physical EOF. This logical EOF is defined as the upper boundary of the highest hashed address range in the 1B file. Data residing above this logical EOF is not downloaded to the switch.

Structures Affected

A. DK1ID2FS

3.03   The ID to File Store map (**DK1ID2FS**) describes how the disk spectrum is allocated with respect to the ID tags. The first 32 words of the DK1ID2FS are a head table indexed by disk ID tag. The contents of each of the head table words are a pointer to a double-linked list of disk address information for that ID tag.

3.04   Disk IDTAG(18) 1DKDISKONLY2 contains the Segment 2 address range allocated in the following:

- OD4DMIN/DNUM/DMAX 5HR0
- OD4DMIN/DNUM/DMAX 5HR1
- OD4DMIN/DNUM/DMAX 5HR2
- OD4DMIN/DNUM/DMAX 5HR3
- OD4DMIN/DNUM/DMAX VTF1
- OD4DMIN/DNUM/DMAX VTG1.

The remaining unallocated words are assigned to disk IDTAG 1DKFREE2(15).

B. DK1SEGPTRS

3.05   The file segment number to map the core address to a disk address indexes this four word structure. If a file segment is used to provide disk backup of core memory, bits 22 and 23=0, and bits 0 through 21 in the structure contain bits 10 through 29 of a physical 32-bit 1B address. It is also possible to have an entire file segment store disk-only data/programs and not provide any core memory backup. Since Segment 2 contains disk-only data, the following population rules apply:

- Item DK1SEGUSAGE in word 2 (File Segment 2) is populated with **1DKSEGBKUP(=2) Disk Only**

- Item DK1SEGADDR is populated with **0**.

C. DK1ID2SEG

3.06   This 32-word structure is indexed by disk ID tag to obtain the associated file segment value (0 to 3). Any given disk ID tag can only be used in one file segment, although a file segment may contain data for a number of ID tags. The contents of each word in the structure are a number from **0** to **3** for assigned entries or set to **1DKNOSEG(-O(77777777))** for unassigned entries. Two words indexed by 1DKFREE2 (15) and new IDTAG 1DKDISKONLY2(18) are populated as follows:

- Word 15 is set to **1DKFILESEG2(=2)**

- Word 18 is set to **1DKFILESEG2(=2)**.

Verify Form 6c

3.07   Verify Form 6c is modified to retrieve a count and add a new field to output the blocks of file store memory in Segment 2.

```
DCLIP            -----,          -----,

FILE SEG2 DISK ONLY MIN/NUM/MAX ASSIGNED -----,
LARGEST GROUP IN ADJUNCT DESTINATION TABLE        -----,
NUMBER OF PCP2 ANIS ASSIGNED                     -------,
NUMBER OF CPA ANIS ASSIGNED                      -------,
NUMBER OF SPARE PCP ANIS                         -------,
NUMBER OF AIN DNTS ASSIGNED                      -------,
NUMBER OF PAIRS OF NAILED-UP TRUNKS         -----,
NUMBER OF LACIDs ASSIGNED                   -----,
```

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

Operation Support Systems

6.01 This feature does not change any physical interfaces connecting the *4ESS* switch to any of the Operation Support Systems (OSSs). However, any feature using large amounts of 1B Processor translation memory or translation data in the 1B file may impact the physical interface between the switch and the OSSs.

Disk Reliability

6.02 As the APS disks become more fully used, the amount of disk simplex time will increase. The simplex time is directly related to an increase in clock time to diagnose and restore (copy) a disk. Therefore, disks that store more data will negatively influence disk reliability.

6.03 The time to recover a disk increases because the time to copy from the in-service disk to the disk being restored depends on the number of disk partitions used and the size of the partitions (the magnitude of the assigned disk space).

6.04 Currently, disk restores are measured in multiples of 10 minutes, depending on other tasks the APS is performing simultaneously. The increased disk storage required to back up the expanded 1B file could add 10 minutes or more to a disk restore.

7. Transition Considerations

Deployment Requirements

7.01   It is not necessary for the 4E24 Release 1 Generic to be deployed in all *4ESS* switches for this feature to be fully operational.

Feature Activation

7.02   This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages

8.01   The Output Message **VER:MEMORY:EM** is modified to retrieve a count and output the blocks of file store memory in Segment 2.

4ESS™ **Switch Routing Recent Change Verify Improvements Feature (6516)**

9

Contents   Page

4ESS™ **Switch Routing Recent Change Verify Improvements Feature (6516)**

9

---

1. Feature Description

Background

1.01 The Integrated Routing Assignment System (IRAS) is the provisioning system that performs batch recent change and verify transactions for the *4ESS*™ switches in the AT&T Switched Network (ASN). The IRAS application runs on a mainframe computer in Kansas City, along with other provisioning applications.

1.02 A key function of IRAS is the nightly batch processing of recent changes to implement Numbering Plan Area (NPA) splits, international routing changes, and many other batch-oriented activities. The nightly batch process starts early in the evening, and it is supposed to be completed by 8:00 a.m. so that end users can start their daytime work.

1.03 Prior to the introduction of this feature, the nightly batch process continued past 8:00 a.m. too often to be acceptable. Also, the process could sometimes be killed by another application. The purpose of this feature is to improve throughput, and to reduce delays for the **VER:CODELIST** and **VER:INTLCODE** messages.

Description

1.04 The *4ESS* Switch Routing Recent Change and Verify Improvements feature includes seven performance improvements deployed in the network at different times. Six of those improvements were deployed during the 4E23 Generic. Those were described in 234-090-234AC as Feature 6516c. The final improvement is described in this chapter.

Detail of Improvement

1.05 The new capability, called Provide Recursive Search for Nested Data for INTLCODE and CODELIST Verifies, combines several verify input messages into one request. It modifies the searching algorithm to look for all codes pointing to the input call type and all codes pointing to any call types embedded in the input call type. Prior to this feature, IRAS job OM33K15R made repeated data queries for call types embedded in the SDX, MRT, MCT, and PRT call types.

1.06 This new capability allows IRAS to capture the necessary data in a single pass through the data structures, and it reduces the number of requests made to the switch.

A. VER:INTLCODE Message

1.07 The *4ESS* switch provides an additional output message to the **VER:INTLCODE** message. The **VER:INTLCODE** input message was modified to accept a new keyword, OPT, which will accept the input argument, **RECSCH**. If OPT is specified in the input message, the keywords CALLDATA, CALLTYP, and STDP must be inputted. The CALLTYP can only be one of the following: SDX, MRT, MCT, PRT, or RDB. The keyword DOM is optional. When the user enters **"VER:INTLCODE; STDP, OPT RECSCH: CALLTYP (PRT, SDX, MCT, MRT, and RDB), CALLDATA x!"**, the following data are provided:

- ■ All codes that point to the input SDX/MRT/MCT/PRT/RDB

- ■ All codes that point to any embedded SDX/MRT/MCT/PRT call types within the input call type

- ■ All codes that point to any call type using an embedded Routing Data Block Index (RDBI) in the input SDX/MRT/MCT/PRT call type.

1.08 The output data is displayed using a new output message.

B. VER:CODELIST Message

1.09 The *4ESS* switch provides an additional output format to the **VER:CODELIST** message. The **VER:CODELIST** OPT keyword was modified to accept an additional input, RECSCH. When OPT RECSCH is specified on the input message,

STDP,CALLTYP, and CALLDATA keywords must be inputted. The keyword DOM is optional. Valid inputs to the CALLTYP keyword are SDX, MCT, MRT, or PRT. When a user enters **"VER:CODELIST; STDP, OPT RECSCH: CALLTYP (MRT, PRT, MCT, or SDX), CALLDATA x!"**, the following data are provided:

- All codes that point to the input SDX/MRT/MCT/PRT

- All codes that point to any embedded SDX/MRT/MCT/PRT call types within the input call type

- All codes that point to any call type using an embedded RDBI in the input SDX/MRT/MCT/PRT call type.

1.10   The output data is displayed using a new output message.

2. Call Flow (Not Affected)

3. Provisioning

3.01   This feature involves the nightly batch processing of provisioning information. The setup of this processing is done by IRAS personnel.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Deployment Requirements

7.01   The capability specified in this feature must be deployed across all switches in the AT&T network before IRAS uses it.

Feature Activation

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages

8.01 A new input, **RECSCH**, was added to the OPT keyword for **VER:CODELIST**; also, a new keyword, OPT, was added to **VER:INTLCODE**. Valid inputs to OPT will be *RECSCH* for only **VER:INTLCODE**. Furthermore, new output messages for **VER:INTLCODE** and **VER:CODELIST** messages are defined.

Expand the Automatic Number Identification Trigger Table Structure Size Feature (6982)

10

_____

Contents   Page

Expand the Automatic Number Identification Trigger Table Structure Size Feature (6982)

10

1. Feature Description

1.01 This feature expands the existing size of the Automatic Number Identification Trigger Table (ANI-TT) ANI_IJLKP from 1.28 M to 2M. The ANI-TT points the 1B Processor to locations where information and instructions reside to process specific call types for specific customers. The instruction may be located in the *4ESS*™ switch, in a Network Control Point (NCP), or in an adjunct. Calling parties who subscribe to ANI-based features are identified by entries in the ANI-TT.

1.02 The following three structures exist for ANI-TT:

- PLUANI

- ANI_GHLKP

- ANI_IJLKP.

The three structures are in Windowed Call Store (WCS) for those *4ESS* switches equipped with WCS. If the switches are not equipped with WCS, the structures are in the 1B Processor main memory.

1.03 Each ANI occupies 1 word in the ANI_IJLKP structure. The other two structures [PLUANI (64K words) and ANI_GHLKP (128K words)] are the index tables for ANI_IJLKP.

1.04 No changes are being made to the overall architecture.

2. Call Flow (Not Affected)

3. Provisioning

3.01 To support up to 2M (2,097,152) ANIs, the HT4ANI_IJLKP structure will grow from 1282 words to 2048 words. The XL4ANI_IJLKP index is 11 bits and does not need to be grown.

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 the 4E24 Release 1 Generic to be deployed in all *4ESS* switches for this feature to be fully operational.

Feature Activation

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Removal of Forced Overflow on User-Busy Trunks With Access IDs Feature (7102)

11

Contents

Removal of Forced Overflow on User-Busy Trunks With Access IDs Feature (7102)

11

_____

1. Feature Description

1.01 This feature modifies Feature 4187, *Project L LookAhead* (4E18, Release 2). This feature removes the Project L LookAhead requirement which requests the *4ESS*™ switch to try the next route when it receives a User Busy indication on a trunk group populated with an Access ID. Therefore, User Busy indications received on trunks provisioned with an Access ID will receive the same Final- Handling treatment as trunks not provisioned with an Access ID.

1.02 Prior to this feature, when a call was rerouted and failed , the *4ESS* switch sent an All Circuits Busy indication back to the subscriber, rather than a User Busy indication. This situation caused the subscriber to interpret the failed call from an AT&T network blockage, rather than a subscriber busy condition. The Project L requirement caused false overflow peg counts on the trunk groups provisioned with Access IDs, which had a negative impact on AT&T's Network Management and Network Capacity Planning processes.

1.03 The removal of the 6- or 10-digit code grouping CAP Number indicator, which is associated with Feature 4187, is planned for a future release.

2. Call Flow (Not Affected)

3. Provisioning

Forms Affected

3.01 There are no changes to the layouts or inputs on the following forms; and an AD3 entry of "E" will be allowed, but it does not indicate a non-LEC number--it now has no feature meaning:

- Recent Change Forms--300-304 and 346

- Verify Forms--3a-3g, 3v, 3w, 3z, 3ab, 3ak, 3al, 13f, and 13m.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

To support this feature, the overflow peg count indications for trunk groups provisioned with Access IDs, and which were previously available at work centers, are no longer provided.

7. Transition Considerations

Deployment Requirements

7.01 It is not necessary for all *4ESS* switches in the network to be running the 4E24 Release 1 Generic for this feature to be fully operational.

Feature Activation

7.02 This feature is introduced in a Software Change Package (SCP), and it is activated automatically with software deployment.

8. Input/Output Manual Pages (Not Affected)

International Point Code Expansion Feature (7157)

12

_____

Contents   Page

International Point Code Expansion Feature (7157)

12

---

1. Feature Description

1.01 This feature, International Point Code Expansion (IPCExp), doubles the number of provisionable Destination Point Codes (DPCs) on a *4ESS*™ switch International Switching Center (ISC). Previously, a maximum of 128 DPCs could be provisioned. With the activation of this feature, the number increases to 256.

1.02 The 256 unique international DPCs are used to route international signaling messages and to maintain the routing status associated with the provisioned DPCs. The remaining capacity is available to provision the routing table for domestic signaling messages.

1.03 The *4ESS* switch 1B Processor can address a maximum of 512 signaling DPCs. This fixed limit is independent of the domestic and international DPCs that are provisioned. Therefore, the *4ESS* switches can address and maintain the routing status for up to 512 domestic DPCs, regardless of whether they are ISCs or not. This number includes DPCs used for Local Exchange Carrier (LEC) routing and clusters provisioned for routing within the AT&T Switched Network (ASN).

1.04 This feature must work on both the 3B20D and 3B21D Processors.

2. Call Flow (Not Affected)

3. Provisioning

3.01 The number of provisionable international DPCs is increased from 128 to 256.

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 the 4E24 Release 1 Generic to be deployed in all *4ESS* switches for this feature to be fully operational.

Feature Activation

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Removal of Network Switch Number for AT&T Digital Link Local Number Portability Feature (7181)

13

Contents **Page**

Removal of Network Switch Number for AT&T Digital Link Local Number Portability Feature (7181)

13

---

1. Feature Description

1.01 This feature, Removal of Network Switch Number (NSN) for AT&T Digital Link (ADL) Local Number Portability (LNP), changes the *4ESS*™ switch call processing requirements which define how calls are routed to an ADL customer ported to a *4ESS* switch using a Location Routing Number (LRN). An AT&T LPN toll data base record for an ADL customer ported to the *4ESS* switch reflects the ported customer's working number associated with the LRN of the serving *4ESS* switch End Office (EO) **and** the NSN of the *4ESS* switch serving the customer's trunk group.

1.02 With this feature, the need for provisioning an NSN in the data base record for ported ADL customers is being removed. Consequently, the data base will no longer be expected to return both an LRN and an NSN as an indication that a call may be destined to an ADL customer which has ported to an AT&T *4ESS* switch EO using LRN. Likewise, an Operator Service Position System (OSPS) will no longer be expected to send an NSN Generic Operation Parameter (GOP) as an indication that a call may be destined to an ADL customer which has ported to an AT&T *4ESS* switch EO using LRN. This feature specifically deals with how a *4ESS* switch should process calls to *4ESS* switch ADL customers when only an LRN is returned from the AT&T LNP toll data base or only an LRN is provided in the Integrated Services Digital Network (ISDN) User Part (UP) Initial Address Message (IAM) for OSPS originated calls.

⇒ **NOTE:**
>   This feature does not remove the need to provision an NSN in the AT&T LNP toll data base for ported Terminating Switched Access Arrangement (TSAA) customer records. The procedure for call processing to support calls ported to TSAA customers remains unchanged.

1.03 Specifically, this feature does the following:

- Eliminates the *4ESS* switch call-processing dependency on the AT&T LNP toll data base to return an LRN and an NSN as an indication that a call may be destined to an ADL customer which has ported to an AT&T *4ESS* switch EO using LRN

- Eliminates the *4ESS* switch call-processing dependency on an OSPS to send an NSN GOP as an indication that a call may be destined to an ADL customer which has ported to an AT&T *4ESS* switch EO using LRN.

1.04 When the *4ESS* switch queries the AT&T LNP toll data base and only an LRN is returned in response to the query, the switch determines if the LRN belongs to itself by checking the LRN table. Likewise, when a *4ESS* switch receives a ported number Generic Address Parameter (GAP) and the M bit of the Forward Call Indicator (FCI) parameter is set to 1 in an Integrated Services Digital Network (ISDN) User Part (UP) Initial Address Message (IAM) from an Operator Service Position System (OSPS), the switch determines if the LRN in the Called Party Number (CdPN) belongs to itself.

If the LRN...	Then the *4ESS* switch...
Is assigned to the *4ESS* switch	Routes on the destination number.
Belongs to another *4ESS* switch	Processes the call per Feature 4216 (4E22 Release 2 Generic, *Product Release Document 234-090-222AC*).
Does not belong to another *4ESS* switch	

1.05 A minor impact associated with removing the NSN is an increase in real-time processing. Most calls to ported numbers that require a query of the AT&T LNP toll data base or that arrive at a *4ESS* switch from an OSPS are calls that are not destined for ADL customer locations. Although checking the LRN table for these calls is overhead, the call processing time required is considered negligible.

1.06 This feature is applicable only to AT&T and AT&T Canada *4ESS* switches.

2. Call Flow (Not Affected)

3. Provisioning

3.01 Feature 4216, *Number Portability With Location Number Routing*, must be active (PF29 set to **ON**).

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

6.01 If the *4ESS* switch encounters unusable routing (destination number cannot be translated), the switch kills the call and returns a vacant code announcement [Final-Handling Code (FHC) 2185].

7. Transition Considerations

Feature Dependencies

7.01 This feature depends on the following:

- Feature 4216 (*Local Number Portability with Location Routing Number*, Product Release Document 234-090-222AC) must be active in all AT&T *4ESS* switches.

- Feature 6330 (*AT&T Digital Link Location Routing Number*, Product Release Document 234-090-232AC) LRN tables, but does not require that the feature be active.

Feature Limitations

7.02 In removing the NSN from the AT&T LNP toll data base, calls ported to ADL customers on a *4ESS* switch end office are final handled to the unassigned number announcement if Feature 6330 is turned off. This treatment occurs because the *4ESS* switch no longer recognizes its own LRN.

7.03 Previously, if Feature 6330 was turned off and the NSN was provisioned in the customer record, the *4ESS* switch would first route on the NSN to the switch serving the ADL customer trunk group. If unable to complete, the switch would route on LRN which would point to final-handling treatment.

Deployment Requirements

7.04 The 4E24 Release 1 Generic must be deployed in all *4ESS* switches for this feature to be fully operational.

8. Input/Output Manual Pages (Not Affected)

Release Summary—4E24 Release 1 Generic

14

Contents

		Page

Release Summary—4E24 Release 1 Generic

14

---

1. Growth and Retrofit Documents

1.01 The *4ESS*™ switch Growth and Retrofit Planning Development group has reported growth and retrofit impacts on Lucent Practices, Task Oriented Practices, and Installation Engineering Handbooks as a result of new features in the 4E24 Release 1 Generic. This information is shown in the table below.

Document	Description
Generic Retrofit and ODA Update: TOP 234-160-024	4E<23> to 4E<24> Retrofit
1B Retrofit and ODA Update Planing and Scheduling Guide: ATTP 234-185-024	4E<23> to 4E<24> Retrofit
3B20D Retrofit: TOP 234-160-317	4AP<16> to 4AP<17> Retrofit
3B21D Retrofit: TOP 234-160-417	4AP<16> to 4AP<17> Retrofit

2. Input/Output Messages

2.01   The following lists include the input and output messages for the 4E24 Release 1 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. tab (   )

- 4E24R1 Input Messages (IM-4B000-01)
    - analy:dif   DEL
    - analy:scs   DEL
    - analy:tlpfile   REV
    - analy:tsi   DEL
    - analy:xtsi   DEL
    - clr:ifbectrs   REV
    - copy:fs   REV (6296)
    - copy:xtsi   REV
    - dgn:sfi   REV
    - dgn:xtsi   REV
    - dump:fs   REV (6296)
    - ex:sfi   REV
    - in:owbuf   REV
    - op:oosunits   REV
    - op:sfistat   REV
    - srt:soak   REV
    - stop:analy-dif   DEL
    - stop:analy-scs   DEL
    - stop:analy-tsi   DEL
    - stop:analy-xtsi   DEL
    - stop:test-pusy   REV
    - sw:dif   REV
    - sw:sclk   REV
    - test:pusys   REV

    — ver:intlcode   REV (6516)

    — ver:rcform   NEW (523)

    — ver:ssn-nsn   REV

    — ver:tsglist   NEW

    — ver:utype   REV

    — ver:vfunc-stat   REV

    — ver:vfunc-xtsiib NEW

■ 4E23R4 Output Messages (IM-4B000-01)

    — dgn:sfi   REV

    — dgn:sfi-il   REV

    — dfn:sfi-not   REV

    — dgn:sfi-term   REV

    — dgn:sfi-test   REV

    — dgn:xtsi-pub   REV

    — dgn:xtsi-test   REV

    — dump:xtsi-cre REV

    — dump:xtsi-d3u REV

    — dump:xtsi-ireg REV

    — dump:xtsi-spu REV

    — ex:sfi   REV

    — ex:sfi-addr   REV

    — ex:ill   REV

    — ex:loop   REV

    — ex:sfi-not   REV

    — ex:sfi-susp   REV

    — ex:sfi-term   REV

    — ex:sfi-test   REV

    — ex:extsi-pub   REV

    — ex:xtsi-test   REV

    — op:audstat   REV

- — op:sfistat REV
- — op:tsghc REV (4967)
- — rept:0 REV
- — reptiaofc REV
- — rept:iatsg REV
- — sw:dif REV
- — test:pusys REV
- — test:tcapain REV
- — ver:codegrp-ccd REV (6328)
- — ver:codegrp-mct REV
- — ver:memory-em REV (6296)
- — ver:misc-octcp REV
- — ver:misc-suxtsi REV
- — ver:misc-xtsid3u REV
- — ver:rcform REV (523)
- — ver:ssn-nsn REV
- — ver:stat-xtsiab REV
- — ver:subutp-xtsii REV
- — ver:tsg-in1way REV
- — ver:tsg-out1way REV

■ Proprietary Input Messages

- — op:car NEW (5906)
- — op:dconn REV (5906)
- — ord:car NEW (5906)
- — stop:op-car NEW (5906)
- — ver:misc-fht-car NEW (5906)
- — ver:misc-fhtosid NEW
- — ver:vfunc-rcmeas NEW (523)

■ Proprietary Output Messages

— cpn:anomaly   REV (5906)

— dump:xtsi-spu   REV

— op:scrn   REV

— rept:iatsg   REV

— rept:iatsg   REV

— ver:codegrp-intl   NEW

— ver:misc-fht-car   NEW (5906)

— ver:rcmeasct   NEW (523)

■ 4AP16R4 Input Messages

— cfr:duplexdisks   NEW

— clr:iomem   NEW

— op:abd   NEW

— op:iop-info   NEW

— ver:dga   NEW

■ 4AP16R4 Ouput Messages

— app:bootdifkchk   NEW

— app:dfc-a   REV

— app:iop-f   REV

— aud:fmgr6   REV

— cfr:duplexdisks   NEW

— clr:iomem   NEW

— copy:bkdsk   NEW

— copy:spdisk   REV

— dgn:dfc   REV

— dgn:mttyc   REV

— op:abd   NEW

— op:dcf-info   REV

— op:iop-info   NEW

— op:mhd-info   REV

— rept:eai   REV

— rept:pcpaud   REV

— stop:dci   NEW

— ver:dga   NEW

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   Several features in this release interact with various Operation Support Systems (OSSs). The following features interact with various Operations Support Systems, including AMA, CDRP, IRAS, NEMOS, and TOPAS.

- 536   CDRP
- 4967   NEMOS
- 5158   NEMOS
- 5922   AMA, NEMOS
- 6516   IRAS
- 6296   TDAS

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 decumented in the Product Release Document for the 4E24 Release 1 Generic.

5. Measurements/OSOR

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

5.02   Feature 4967, Automatic Routing Feature, includes several new or modified measurements. The following *4ESS* switch-to-AREA counts are collected at the Terminating ASN Switch (TAS). All of the counts are 5-minute counts for data transfer to NEMOS:

- Terminating Last Overflow Count (TLOC) - Scored at the last TAS if the call attempts to terminate at a particular AREA as a last try while in a non-RA state, but no egress up to the level indicated by ERI has an idle circuit.

■ RA Terminating Last Overflow Count (RATLOC) - Scored at the last TAS if the call attempts to terminate at a particular AREA using the last routing treatment available at that TAS consistent with the level indicated by ERI and the following occurred:

— The call entered the last TAS in an RA state or it out-seized a trunk at the last TAS

— Each out-seizure resulted in failed egress with this last routing treatment.

■ Route Advance Count (RAC) - Scored at a TAS each time an RA-justified decision is made at the TAS on an ECOS Engineered or Alternate route. If RA is not justified, this count is not scored.

■ Overflow Route Advance (ORAC) - Scored at a TAS each time an RA-justified decision is made at the TAS on an ECOS Overflow route. If RA is not justified, this count is not scored.

■ Egress Busy Crankback Sent Count - Scored whenever a CCS7 ISUP egress-busy CRB is sent to an OAS (whether or not the call seized a trunk at the TAS).

■ Engineered Route Carried Count (ERCC) - Scored at a TAS when a call in a non-RA state out-seizes any engineered trunk group to a particular AREA.

■ Alternate Route Carried Count (ARCC) - Scored at a TAS when a call in a non-RA state out-seizes any alternate trunk group to a particular AREA.

■ RA Engineered Route Carried Count (RAERCC) - Scored at a TAS each time a call in an RA state out-seizes any engineered trunk group to a particular AREA.

■ RA Alternate Route Carried Count (RAARCC) - Scored at a TAS each time a call in an RA state out-seizes any alternate trunk group to a particular AREA.

■ Overflow Route Attempt Count (ATT) - May be scored once on a visit to a TAS if the overflow route out-seizes, regardless if the call is in an RA or non-RA state.

■ ATT-based Overflow Route Carried Count (ATTORCC) - Scored at a TAS on first out-seizure of any overflow route to a particular AREA (may be scored once on a visit to a TAS, regardless if the call is in an RA or non-RA state).

■ Overflow Route Carried Count (ORCC) - Scored at a TAS when a call out-seizes any overflow route trunk group to a particular AREA.

■ ATT-based Overflow Route Success Count (ATTSUCC) - Scored once on a visit to a TAS if the first overflow route succeeds to complete the call, regardless if the call is in an RA or non-RA state.

■ Overflow Route Success Count (SUCC) - Scored on a TAS to contain the number of calls that succeeded on first or any other overflow route.

■ Insert/Overflow Override Attempt Count - May be scored once on a visit to a TAS, regardless if the call is in an RA or non-RA state, if an Insert or Override control is attempted to out-seizure.

■ ATT-based Insert/Overflow Override Success Count The number of calls forwarded to a via office on first out-seizure of a route specified by the Insert/Overflow override that do not fail (may be scored once on a visit to a TAS, regardless if the call is in an RA or non-RA state).

A new Trunk Subgroup measurement, RA count TSGRAC, is scored for an RA_TSG whenever an RA-justified decision is made for a call that has out-seized a trunk on that RA-TSG. This is a 5-minute count (maximum value 4,095) for data transfer to NEMOS.

When a TSGRAC is scored for a call in a RA-TSG, the TSG overflow count is not scored. There are no new alarms related to the features documented in the Product Release Document for the 4E23 Release 4 Generic.

5.03 Feature 5158, Carrier Rate Feature, includes changes contained in the NEMOS requirement as follows:

■ Data Collection - Carrier performance demand data is modified to be deliverd to the NEMOS.

■ Traffic Data Display - The International Data Display is modified to show country wide and carrier specific data.

■ Control Data Display - The Carrier Skip Control (CSC) Display is modified to have a warning message or protection mechanism to ensure CSC controls are entered at both the OAS and the serving ISC.

■ Code Routing Queries - The Code Routing Queries display is modified to obtain and display performance snapshot data.

5.04 Feature 5922, Foreign Administration Identifier Expansion, has one measurement change as follows: The *4ESS* switch no longer stores the MCT counts (Attempt and Overflow) on the 3B Processor disk for retrieval by the Dynamic Engineering Mechanized System (DEMS)/Data Acquisition Reports and Integrated Communications System (DARICS). The AT&T Network Servicing System (ANSER) obtains the MCT counts from NEMOS instead of from DEMS/DARICS.

6. Feature Activation Summary

6.01 The following is a summary of how the features documented in the Product Release Document for this release are activated:

(1) **Feature 523—Recent Change Form Metrics Reports**

This feature is activated automatically by software deployment.

(2) **Feature 536—4ESS Switch 3B21D Attached Processor System Upgrade**

This feature is activated automatically by software deployment.

(3) **Feature 543—Expanded Time Slot Interchange (XTSI) Modifications.**

This feature is activated automatically by software deployment.

(4) **Feature 4967—Automatic Routing Feature.**

This feature is activated by on/off bits with RC Form 809. It can also be activated by absolute word change.

REL	ON/OFF	ODA Word	Field Name	Address	Disp&Size
4E24	RC 809	OD4OFCCOPY2+5	OD4PF47	7123617	H=22, S=1

This feature interacts with Feature 5158, Carrier Completion Rate Feature, included in this Generic Release.

(5) **Feature 5158—Carrier Completion Rate Feature**

This feature is activated by on/off bits with RC Form 809. It can also be activated by an absolute word change.

REL	ON/OFF	ODA Word	Field Name	Address	Disp&Size
4E24	RC 809	OD4OFCCOPY2+5	OD4PF41	7123617	H=16, S=1

(6) **Feature 5906—Enhanced Calling Party Number Anomaly Report**

This feature is activated automatically by software deployment.

(7) **Feature 5922—Foreign Administration Identifier Expansion**

This feature is activated automatically by software deployment. However, all *4ESS* switches must be running the 4E24 Release 1 Generic in order for this feature to be fully operational. Until all switches are running the 4E24 Release 1 Generic, only FAIs from 1 to 7 can be supported. This is due to the modifications in the ISUP TNS parameter. In addition, the NEMOS software update that supports FAI expansion must also be deployed before FAI gretaer than 7 is used in the AT&T network.

(8) **Feature 6296—1B File Expansion in the APS Disk - Open Up Segment 2 of 1B File Store**

This feature is activated automatically by software deployment.

(9) **Feature 6516—*4ESS* Switch Routing Recent Change and Verify Improvements**

This feature is activated automatically by software deployment.

(10) **Feature 6982—Expand the ANI Trigger Table Structure Size Enhancement**

This feature is activated automatically by software deployment.

(11) **Feature 7102—Removal of Forced Overflow on User-Busy Trunks With Access IDs**

This feature is activated automatically by software deployment.

(12) **Feature 7157—International Point Code Expansion**

This feature is activated automatically by software deployment.

(13) **Feature 7181—Removal of NSN for ADL LNP**

This feature is activated by software deployment; however, Feature 4216 (4E22 Release 2 Generic) must also be active.

Abbreviations and Acronyms

A

ACM
Address Complete Message

ADL
AT&T Digital Link

ANI
Automatic Number Identification

ANI-TT
Automatic Number Identification
Trigger Table

ANM
Answer Message

API
Applications Processor Interface

APS
Attached Processor System

AR
Automatic Routing

ASCIT
AT&T Service/Call ID Type

ASN
AT&T Switched Network

B

BCD
Binary Coded Decimal

BMD
Business Markets Division

BWM
Broadcast Warning Message

C

CC
Country Code

CCITT7
Consultative Committee for
International Telegraph and Telephone
7

CCRF
Carrier Completion Rate Feature

CCS7
Common Channel Signaling Signaling
System 7

CdPN
Called Party Number

CDR
Call Detail Recording

CDRP
Call Detail Recording Platform

CMD
Consumer Markets Division

CNI
Common Network Interface

COS
Class-of-Service

CPG
Call Progress Message

CPR
Carrier Proportioned Routing

CS
Call Store

CSC
Carrier Skip Control

CSR
Carrier Specific Routing

CWT
Customer Waiting Time

D

DARICS
Data Acquisition Reports and
Integrated Communications System

DECOS
Domestic End-to-End Class of Service

DEMS
Dynamic Engineering Mechanized
System

DLN
Direct Link Node

DNHR
Dynamic Nonhierarchical Routing

DPC
Destination Point Code

DSN
Destination Switch Number

E

EBC
Egress Busy Crankback

ECD
Equipment Configuration Database

ECOS
End-to-End Class of Service

EOF
End-of-File

ERI
Egress Routing Indicator

ERPI
ECOS Routing Pattern Identifier

F

FAI
Foreign Administration Identifier

FHC
Final-Handling Code

FISC
Foreign ISC

G

GAP
Generic Address Parameter

GOP
Generic Operations Parameter

GTT
Global Title Translation

I

I/O
Input Output

IAM
Initial Address Message

ICDR
International Call Detail Recording

IPCExp
International Point Code Expansion

IRAS
Integrated Routing Assignment System

ABB-2   January 1999

ISC
International Switching Center

ISDN
Integrated Services Digital Network

ISUP
Integrated Services Digital Network-
User Part

ITN
Integrated Test Network

IVT
International Voice Transport

L

LEC
Local Exchange Carrier

LERG
Local Exchange Routing Guide

LNP
Local Number Portability

LRN
Location Routing Number

M

MCT
Multiple Carrier Treatment

MCTT
Multiple Carrier Treatment Table

MRT
Multiple Routing Treatment

MSGTYP
Message Type

MW
Mega-Word

N

NCC
Network Control Center

NCP
Network Control Point

NEMOS
Network Management Operations
Support

NESAC
National Electronic Switching
Assistance Center

NN
National Number

NPA
Numbering Plan Area

NSN
Network Switch Number

O

OAS
Originating AT&T Switch

OCTCP
Originating Carrier and Terminating
Country Pair

ODA
Office Data Assembler

OLP
Off-Line Processor

OOB
Out of Band

OS
Operations System

OSOR
On-Site Operations Report

OSPS
Operator Service Position System

OSS
Operations Support System

P

PBAO
Protected, Disk-backed, API accessible and ODA

PCP
Global Title Translation

PECC
Product Engineering Control Center

PLU
Positive Look Up

PRD
Product Release Document

PS
Program Store

PSE
Program Store Expansion

R

RA
Route Advance

RATLOC
Route Advance Terminating Last Overflow Count

RC
Recent Change

RDB
Routing Data Block

RDBI
Routing Data Block Index

RTNR
Real-Time Network Routing

RTR
Real-Time Reliable

S

SAFER
Split Access Flexible Egress Routing

SCP
Software Change Package

SCSI
Small Computer System Interface

SII
Service Identification Indicator

T

TAN
Trunk Appearance Number

TAS
Terminating AT&T Switch

TDAS
Traffic Data Administration System

TFE
Terminating First Egress Count

TLO
Terminating Last Overflow Count

ABB-4   January 1999

TNS
  Transit Network Selection

TSG
  Trunk Subgroup

U

UP
  User Part

V

VTOC
  Volume Table of Contents

W

WCS
  Windowed Call Store

X

XS
  Extended Store

XTSI
  Expanded Time Slot Interchange