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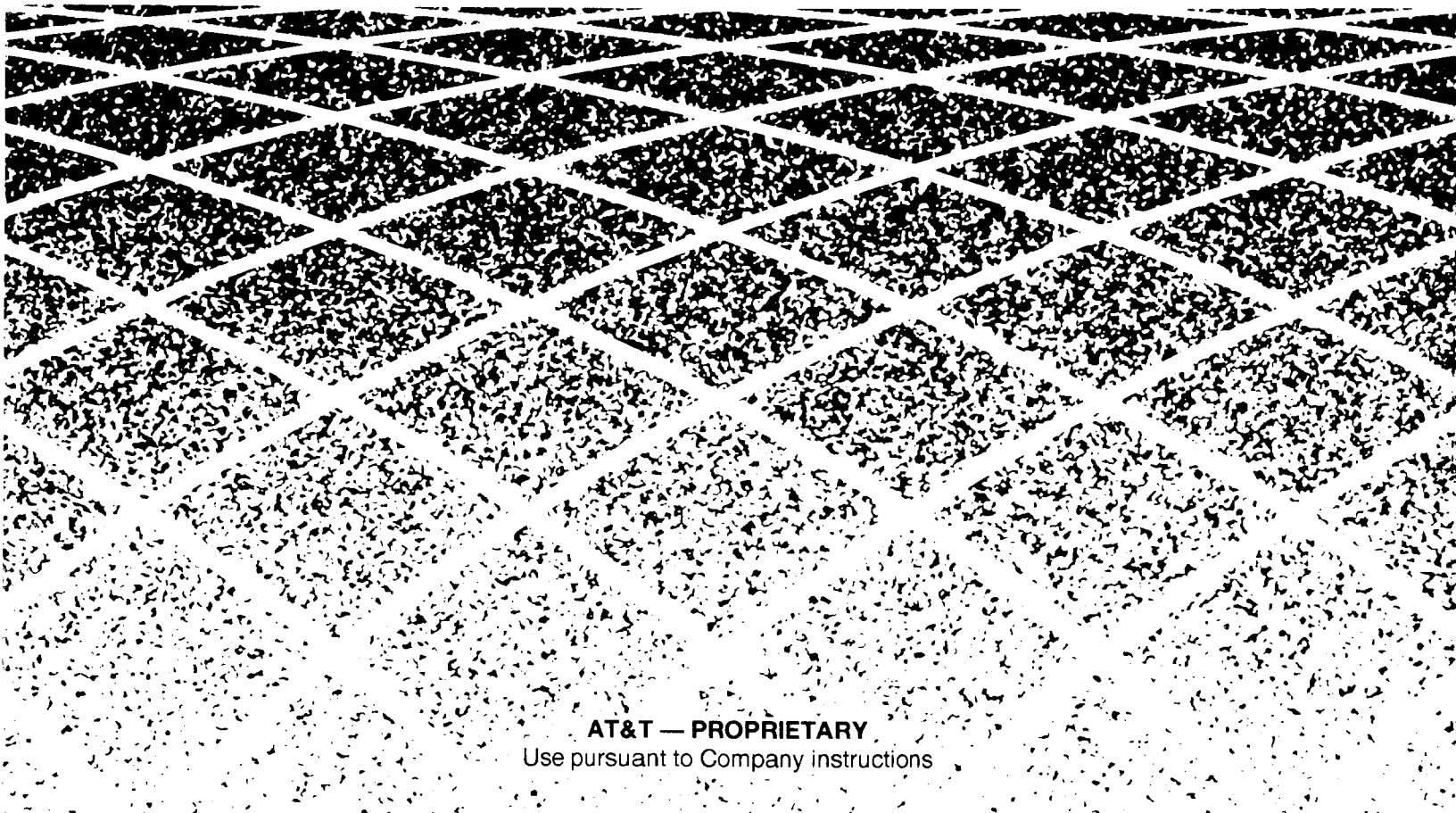
Issue 1
June 1992

4ESS™ SWITCH

Product Release Document
4E16 Release 3 Generic



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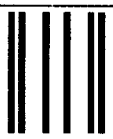

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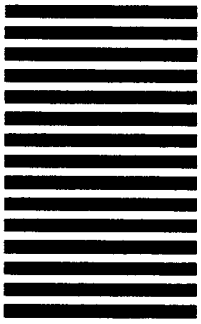

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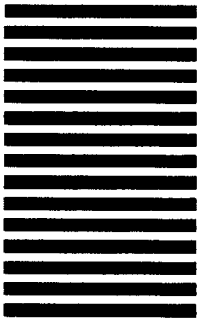

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Introduction

1

1. Overview

1.01 The purpose of this document is to provide information for engineering, provisioning, operating, administering, and maintaining the features available in the *4ESS*™ switch 4E16 Release 3 Generic. This document only applies to the *4ESS* switch and not to any other network elements [for example, Operation Support System (OSS), Network Control Points (NCPs), Signal Transfer Point (STP)]. The information is intended only for the introduction and initial maintenance of the new features.

In this document, the fifteen features assigned to Chapters 2 through 16 are in Requirement Control Board (RCB) number order. The document is divided into the following chapters:

- Chapter 1 — Introduction
- Chapter 2 — *Multiquest*® Telecommunications Service Sponsor Flexible Rating (SFR) Feature (145)
- Chapter 3 — Service Identity (SI) Mapping to International Call Detail Recording (ICDR) Feature (265)
- Chapter 4 — 3-Digit Billing Number Delivery Feature (289)
- Chapter 5 — Announcement Restructure — Time Sensitive Pricing Feature (292)
- Chapter 6 — I800 Network Routing Number (NRN) Exhaust Feature (294)

- Chapter 7 — Automatic Removal of Adjunct TSG Head Cells by Recent Change Message Feature (305)
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- Chapter 11 — Signaling Connection Control Part Routing Verification Test (SRVT) Feature (3037)
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- Chapter 13 — Private Branch Exchange (PBX) High and Wet Wink Release Feature (3572)
- Chapter 14 — Direct-Connect Trunk Subgroup (TSG) Feature (3618)
- Chapter 15 — Transaction Capabilities Application Part (TCAP) End Message Fix for Network Remote Access (NRA) Improved Sequence Dialing Feature (3637)
- Chapter 16 — Final Handling Code on Automatic Message Accounting (AMA) Record Feature (3640)

An Abbreviations and Acronyms list is placed in the last section of this document.

1.02 Whenever a chapter is reissued, the reason(s) for reissue will be listed in this paragraph.

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2. Audience

2.01 This document is intended for feature managers, support personnel, operations centers, headquarters support staff and maintenance, central office and design engineers.

2.02 The above list is not all inclusive. Other areas not identified may find this document useful.

3. Contacts

3.01 If problems are encountered with any feature in 4E16 Release 3 Generic, use normal escalation channels for resolution [such as Maintenance Operation Center (MOC) to Technology Control Center (TCC) to National Electronic Switching Assistance Center (NESAC) and/or Product Engineering Control Center (PECC)].

MultiQuest® Telecommunications Service Sponsor Flexible Rating (SFR) Feature (145)

2

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MultiQuest® Telecommunications Service Sponsor Flexible Rating (SFR) Feature (145)

2

1. Feature Description

1.01 The *MultiQuest*® Telecommunications Service Sponsor Flexible Rating (SFR) feature allows a *MultiQuest* Service Interacter sponsor to change the caller rate at some point while a 900 call is stable. Using an Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI), the sponsor will send information to the AT&T Switched Network (ASN) specifying the new caller rate. SFR will be available only for an Interacter sponsor and will not be available for any of the other *MultiQuest* Services.

1.02 The SFR feature can be subscribed to by any *MultiQuest* Service Interacter sponsor who purchases ISDN PRI access. Subscription to the SFR feature will be maintained by the Service Support System (SSS), which will build the call processing record in the Direct Services Dialing (DSD) Network Control Point (NCP) to indicate to the *4ESS*™ switch if the SFR feature is available on a call.

Caller Rate Options

1.03 The Interacter sponsor may change the caller rate to one of the following:

- Free - no charge to the caller for the entire duration of the call.
- Flat Charge - a flat charge (that is, time-independent) for the duration of the call after the sponsor's instruction is received.
- Remainder Free - a flat charge of zero to the caller for the duration of the call after the sponsor's instruction is received. This is a subset of Flat Charge.

- New Rate - a new per-time unit rate for the duration of the call after the sponsor's instruction is received.
- Premium Charge - a positive flat charge to be applied in addition to the existing per-time unit rate for the duration of the call after the sponsor's instruction is received.
- Premium Credit - a negative flat charge, or credit, to be applied in addition to the existing per-time unit rate for the duration of the call after the sponsor's instruction is received. If a Premium Credit is specified, the total price of the call cannot drop below $0.

In all cases, the provisioned rate associated with the 900 number will be applied to the duration of the call prior to receipt of the sponsor's instruction.

1.04 In the cases above where a flat charge, premium charge, or new rate is specified by the sponsor, the amount of the charge or rate will be limited to an agreed upon maximum value. These maximum values will be determined for each 900 number during the *MultiQuest* Service presale process and should reflect the nature of the sponsor's application for that 900 number. In no case will a maximum value exceed $999.

Rate Disclosure

1.05 Rate disclosure is the responsibility of the sponsor. Before instructing the network to change the caller rate, the sponsor must inform the caller of the new rate and gain confirmation of the rate from the caller. No attempt will be made by the AT&T network to perform rate disclosure or confirmation.

Limitations

1.06 Ideally, the SFR feature would be available on all calls for which the ASN receives an Automatic Number Identification (ANI) and can make an Automatic Message Accounting (AMA) record for caller and sponsor billing. Calls received without an ANI would still be completed to the sponsor's premises, but the sponsor cannot instruct the network to change the caller rate on these calls.

However, in order to make the feature available as soon as possible, the following limitations are acceptable:

- The SFR feature will be available only on calls from areas where AT&T has completed 1+ Recording Takeback. For calls from other areas, the DSD NCP will indicate to the *4ESS* switch that the SFR feature is not available.

- The SFR feature will be denied on calls from areas where 1+ Recording Takeback has been completed, but for which AT&T does not perform all recording at the originating *4ESS* switch (for example, calls using the *MultiQuest* Service/Card Interim Solution).

Technical Plan

1.07 The network architecture for the SFR feature includes the following elements:

- *4ESS* switch
- 1DSD NCP
- 2DSD NCP
- User Support System (USS)
- Feature Routing Enhanced Dynamically (FRED) Service Support System (FSSS) (USS and FSSS are known collectively as SSS)
- Common Administrative Operations Support System (CAOSS)
- 2NCP Administrative System (2NCPAS).

1.08 The 1DSD NCP and 2DSD NCP provide per-call screening for subscription to the SFR feature by the *MultiQuest* Service Interacter sponsor and availability of this feature from the originating end office. USS and FSSS maintain per-termination subscription to the SFR feature and build call processing records in the 1DSD NCP and 2DSD NCP, respectively, to perform screening. USS and FSSS also provide a maximum charge amount and a maximum rate amount for each 900 number to the downstream billing systems [Message Processing System (MPS) and Usage Processing System (UPS)]. CAOSS and 2NCPAS provision and update a common table of SFR feature availability by originating end offices in the 1DSD NCP and 2DSD NCP, respectively.

1.09 Based on response from the DSD NCP, the *4ESS* switch informs the sponsor that the SFR feature is available on a call. To invoke this feature, the sponsor sends a signaling message to the *4ESS* switch containing the type of billing change and amount of billing change desired. The *4ESS* switch maps the type and amount of change desired onto the AMA record, which is used by downstream billing systems to correctly rate the call.

1.10 The SFR feature is proprietary to AT&T. The capabilities to map an indication from an NCP that the SFR feature is available on a call to a sponsor, and to map the type of rate change and amount of change information received from a sponsor onto an AMA record, must be present only in *4ESS* switches operated by AT&T.

2. Call Flow

Call Flow Diagram

2.01 The *Multiquest* Telecommunications Service SFR Call Flow is shown in Figure 2.1.

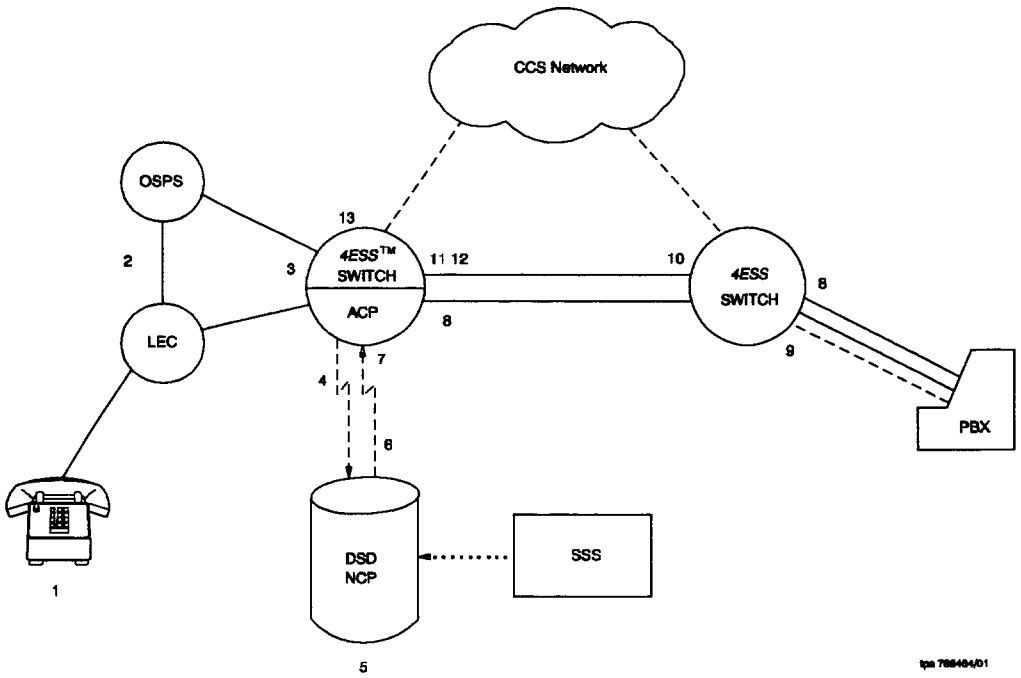

Figure 2-1. *Multiquest*® Telecommunications Service Sponsor Flexible Rating (SFR) Call Flow

Call Flow Narrative

2.02 This section describes the call flow for the SFR feature.

(1) The caller dials a number that has one of the following formats: 1-900-NXX-XXXX or 0-900-NXX-XXXX.

(2) If the caller dials 0-900-NXX-XXXX, the call is routed to an Operator Services Position System (OSPS), which collects calling card information, ANI and/or Operator Number Identification (ONI) and forwards the call to the originating *4ESS* switch.

(3) If the caller dials 1-900-NXX-XXXX, the call is routed to the originating *4ESS* switch, possibly via a *5ESS*® Toll switch.

(4) The originating *4ESS* switch sends a query to the DSD NCP. The call may query a 1DSD NCP or a 2DSD NCP. The originating *4ESS* switch includes an indication of the presence of an OSPS or Cellular Carrier on the call in the *MultiQuest* Service/OSPS Indicator of the Transaction Capabilities Application Part (TCAP) Inbound Supplemental Originating Information (ISOI) parameter.

(5) In addition to applying routing features and selecting a termination, the DSD NCP performs screening for the SFR feature. For calls where an OSPS is not present, if the SFR feature is subscribed and the originating end office [as determined by the originating Numbering Plan Area (NPA)] is in Category A, at the direction of the call processing record, the DSD NCP sets the Billing Option Parameter (BOP) field in the TCAP A800 Billing Data parameter equal to Binary Coded Decimal (BCD) "5" to indicate that this feature is available on the call. The DSD NCP also sets the SFR Indicator field in the TCAP Generic Routing Information (GRI) parameter equal to binary "1". If the originating end office is in Category B or C, then regardless of subscription to the SFR feature, the DSD NCP sets the BOP and GRI to indicate that SFR is not available.

At the direction of the call processing record, for calls with an OSPS present and with *5ESS* switch Recording or a Cellular Carrier present, the DSD NCP sets the A800 Billing Data and GRI parameters to indicate that the SFR feature is not available. For calls with an OSPS present with *4ESS* switch Recording, the DSD NCP sets the A800 Billing Data and GRI parameters to indicate that SFR is available.

(6) The A800 Billing Data parameter and the GRI parameter are included in the Charging — Bill Call and Connection Control — Connect Operations of a TCAP CONTINUE or END message and returned to the originating *4ESS* switch.

(7) The originating *4ESS* switch interprets the SFR Indicator in the GRI parameter to determine what SFR functionality, if any, is available. If the GRI indicates that SFR functionality is available, the originating *4ESS* switch includes an indication that SFR is available in the Common Channel Signaling No. 7 (CCS7) Initial Address Message (IAM) or Q.931 SETUP message. The originating *4ESS* switch also retains the BOP from the A800 Billing Data parameter.

(8) The originating *4ESS* switch routes the call across the ASN to the terminating *4ESS* switch, using the routing number provided by the DSD NCP. The terminating *4ESS* switch routes the call via an ISDN PRI to the sponsor's Customer Premises Equipment (CPE).

(9) Once the call is in an answered state, the terminating *4ESS* switch may receive a Q.931 FACILITY message from the sponsor invoking SFR. When this message is received, the terminating *4ESS* switch responds with a Q.931 FACILITY message.

(10) If the terminating *4ESS* switch is not also the originating *4ESS* switch, the terminating *4ESS* switch maps the type of rate change and amount of change information into a CCS7 ISDN User Part (ISUP) Facility Request (FAR) message and sends the FAR message to the originating *4ESS* switch.

(11) The originating *4ESS* switch checks the value of the BOP. If the BOP equals 5, indicating that the SFR feature is available on the call, the originating *4ESS* switch retains the type of rate change and amount of change information from the Q.931 FACILITY or ISUP FAR message; otherwise, the originating *4ESS* switch discards this information. This information consists of four values which designate the type of rate change and five digits for the amount of change. The switch also retains a timestamp indicating the point in time when the message is received.

(12) If the originating *4ESS* switch receives a subsequent Q.931 FACILITY or ISUP FAR message on the call, it compares the type of rate change in the subsequent message to that of the initial message. If both "type of rate changes" are Flat Charge, or if both are New Rate, then the originating *4ESS* switch overwrites the amount of change previously retained with information from the subsequent message. The originating *4ESS* switch *does not* overwrite the timestamp. If both "type of rate changes" are Premium Charge or Credit (that is, 2 Charges, 2 Credits, or 1 Charge and 1 Credit), then the originating *4ESS* switch overwrites the type of rate change and amount of change information previously retained with information from the subsequent message. The originating *4ESS* switch *does not* overwrite the timestamp. If any other combination of "type of rate changes" is received, the originating *4ESS* switch discards the information from the subsequent message.

(13) When the call is disconnected, the originating *4ESS* switch performs AMA recording. The originating *4ESS* switch uses the type of rate change, amount of change, and timestamp information to populate the Elapsed-Time, Rate Indicator and New Rate on the AMA record. The AMA record is later collected by the Recorded Information Collection System (RICS) and transmitted to MPS and UPS to be used to rate the call for caller and sponsor billing.

Capabilities Overview

2.03 This section summarizes the new capabilities required in the *4ESS* switch and the DSD NCP to support SFR.

A. *4ESS*™ Switch Capabilities

2.04 The following new capabilities are required by the *4ESS* switch to support SFR:

(a) The originating *4ESS* switch must include an indication of the presence of an OSPS or Cellular Carrier and the OSPS architecture used on the call in the TCAP ISOI parameter in the Provide Instruction - Start Operation.

(b) The originating *4ESS* switch must interpret the SFR Indicator field of the TCAP GRI parameter and populate the outgoing IAM or SETUP message.

(c) The terminating *4ESS* switch must map the indication that the SFR feature is available from the IAM to the Q.931 SETUP message.

(d) The terminating *4ESS* switch must recognize the Q.931 FACILITY message with the codings to trigger this feature.

(e) If the terminating *4ESS* switch is not also the originating *4ESS* switch, the terminating *4ESS* switch must map the codings for the SFR feature into an ISUP FAR message and return the FAR message to the originating *4ESS* switch.

(f) If the FACILITY message is accepted, the terminating *4ESS* switch must return a Q.931 FACILITY message.

(g) If the FACILITY message is not accepted, the terminating *4ESS* switch must return a Q.931 FACILITY message except when the rate change is sent before ANSWER. If the rate change is sent before ANSWER, the *4ESS* switch sends a STATUS message.

(h) If the BOP equals 5, the originating *4ESS* switch must map the codings for the SFR feature from the ISUP FAR message or Q.931 FACILITY message onto the AMA record; otherwise, the originating *4ESS* switch must discard the codings for SFR.

(i) If a subsequent ISUP FAR message or Q.931 FACILITY message is received requesting the SFR feature, the *4ESS* switch must compare the type of change in the subsequent message to the type of change in the initial message and either overwrite with or drop the information in the subsequent message.

B. NCP Capabilities

2.05 The Inward Wide Area Telephone Service (INWATS) Data Base (IDB) NCP must accept the TCAP ISOI parameter in a BEGIN message and continue normal call processing. Otherwise, no new capabilities are required.

1DSD NCP Capabilities

2.06 The following capabilities are required in the 1DSD NCP to support the SFR feature:

(a) The 1DSD NCP must provide the capabilities for the call processing record to examine the contents of the incoming TCAP ISOI parameter and execute a logical branch based on the contents of this parameter.

(b) The 1DSD NCP must provide the capability for the call processing record to search a network table using the caller's NPA-NXX and execute a logical branch based on the result of the search (found/not found).

(c) The 1DSD NCP must support a network table containing the NPA-NXXs in which 1+ Recording Takeback has been implemented. This table will be updated by CAOSS.

(d) The 1DSD NCP must provide the capability for the call processing record to set the BOP field in the TCAP A800 Billing Data parameter equal to "5" and the SFR Indicator in the TCAP GRI parameter equal to "1". The call processing record will set these parameters to these values when the SFR feature is available on the call.

2DSD NCP Capabilities

2.07 The following capabilities are required in the 2DSD NCP to support the SFR feature:

(a) The 2DSD NCP must provide the capability for the call processing record to examine the contents of the incoming TCAP ISOI parameter and execute a logical branch based on the contents of this parameter.

(b) The 2DSD NCP must support a network table containing the NPA-NXXs in which 1+ Recording Takeback has been implemented. This table will be updated by 2NCPAS.

(c) The 2DSD NCP must provide the capability for the call processing record to set the SFR Indicator in the TCAP GRI parameter of a Connection Control — Connect Operation equal to binary "1".

(d) For interactions with Variable Queuing, the 2DSD NCP must provide the capability for the call processing record to include a new TCAP parameter, BOP, in the TCAP Charging — Update Bill and Provide Instruction — Redirection Operations and set the BOP parameter equal to BCD "5".

(e) For interactions with Fixed and Variable Queuing, the 2DSD NCP must support a new read/write predefined variable *sfr_indic*. This variable will contain an indication of the availability of this feature to be used by the DEQUEUED Macro. The default value for this variable is "SFR not available" ("0").

(f) For interactions with Variable Queuing, the 2DSD NCP must support a new field, SFR, in the TERM message processing data used by the DEQUEUED Macro. The 2DSD NCP must modify the DEQUEUED Macro to examine the SFR field in

conjunction with the predefined variable *sfr_indic* and populate the TCAP Charging — Update Bill and Connection Control — Connect Operations to indicate whether the SFR feature is available on the call.

(g) For interactions with Fixed Queuing, the 2DSD NCP must modify the DEQUEUED Macro to use the predefined variables*fr_indic* to determine if the SFR feature is available and code the TCAP Connection Control — Connect Operation accordingly.

3. Provisioning (Not affected)

4. Recording

4.01 A new Extended Bellcore AMA Format (EBAF) module, Module 917, lists information that is related to this feature. Module 917 contains the following information:

- New rate change table (843) which is populated with the values:
  - — 0 - Reserved value
  - — 1 - New Rate
  - — 2 - Flat Rate
  - — 3 - Premium Rate
  - — 4 - Premium Credit
  - — 9 - Free Call.
- New charge table (23) which is populated with the values 00000 through 99999
- New elapsed time table (19)
- New bill to indicator table (132) should contain a value of 5.

5. Network Management (Not affected)

6. Maintenance/Troubleshooting (Not affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on by setting the OD4MQSFR Office Data Assembler (ODA) bit (bit 19 of address 7702632). This bit is changed using Recent Change Form 800.

8. Input/Output Manual Pages (Not affected)

Service Identity (SI) Mapping to International Call Detail Recording (ICDR) Feature (265)

3

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Service Identity (SI) Mapping to International Call Detail Recording (ICDR) Feature (265)

3

1. Feature Description

1.01 This feature will enhance International Call Detail Recording (ICDR) on the *4ESS*™ switch International Switching Centers (ISC) and *4ESS* Gateway switches by enabling the switches to record the Service Identity (SI) requested by an international customer.

1.02 The ICDR is the process used within the *4ESS* ISCs and Gateway switches to record information on calls that enter, exit, or transit the AT&T Switched Network (ASN) from international locations and World Zone 1 locations outside the continental United States. The information collected includes the following:

- Service Identity
- Call Duration
- Address Digits
- Call Failures
- Trunk Identification.

1.03 The ICDR data is used for settlement auditing, service quality management, resource management, fraud investigation, and market management.

1.04 The SI in the Routing Information Indicator parameter indicates the service that the customer requested. The Real Time Network Routing (RTNR)/Class of Service (COS) routing capability derives the SI at the originating *4ESS* switch by analyzing the following information:

- Origin Type
- Destination Type
- Signaling Service Type
- Dialed Number Service Type.

1.05 The SI in combination with the the Transport Capability (TC) maps to a Routing Pattern Identity (RPI) which determines the service performance parameters for the call. The derived SI parameter is passed to the destination switch in the Common Channel Signaling No. 7 (CCS7) Integrated Services Digital Network User Part (ISUP) Initial Address Message (IAM).

1.06 The size of the ICDR record is not changing. Unused portions of the record are being used for the new data.

2. Call Flow (Not affected)

3. Provisioning (Not affected)

4. Recording

4.01 A new SI field will be added to the ICDR records. See Figure 3-1.

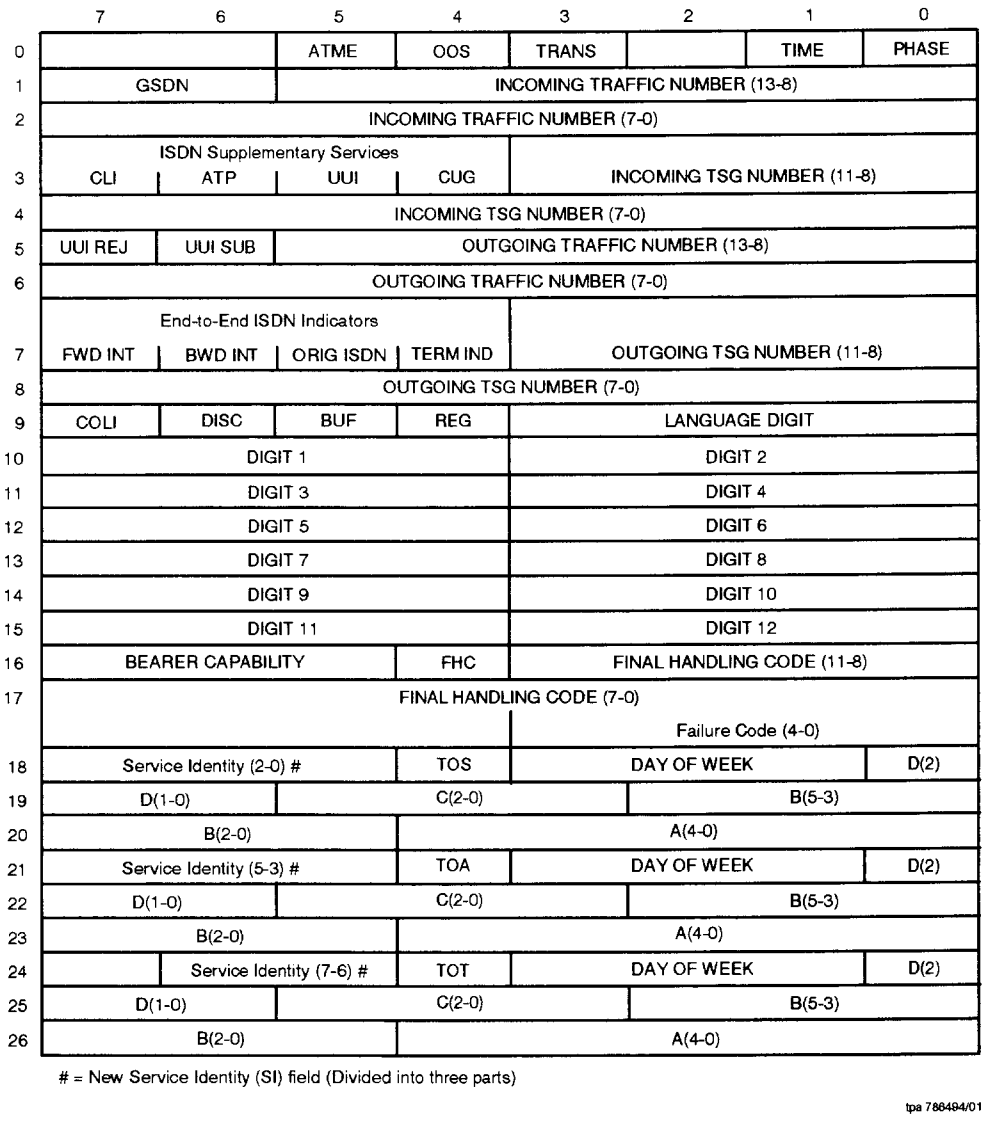

Figure 3-1. International Call Detail Recording (ICDR) Record

4.02 The International Transit Accounting and Maintenance Analysis Center (ITAMAC) system will receive ICDR records from the *4ESS* ISCs and Gateway switches as currently performed. The addition of the SI will not affect this procedure. The downstream processing by ITAMAC will be modified to handle this new data.

5. Network Management (Not affected)

6. Maintenance/Troubleshooting (Not affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not affected)

3-Digit Billing Number Delivery Feature (289)

4

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3-Digit Billing Number Delivery Feature (289)

4

1. Feature Description

1.01 Before the introduction of this feature, the terminating *4ESS*™ switch only delivered the 10-digit billing number (BN) to terminating Primary Rate Interface (PRI) Direct-Connect customers. However, some PRI customers are now interested in receiving a 3-digit BN, consisting of the Numbering Plan Area (NPA) that the call originated from, when a complete BN is not available. The NPA gives the customer at least some useful information about where the call originated.

1.02 The 3-Digit Billing Number Delivery feature gives the egress Integrated Services Digital Network (ISDN) PRI customer the option of having the 3-digit BN delivered if the 10-digit BN is not available. Delivery of the 3-digit BN is based on a new Trunk Subgroup (TSG) subscription option.

1.03 This new option applies to all existing provisioning options involving the delivery of BN; for example, BN only, BN preferred, Calling Party Number (CPN) preferred, and Per-Call CPN/BN Delivery where the Network Specific Facilities (NSF) Information Element (IE) in the FACILITY message requesting CPN/BN delivery indicates either BN only, BN preferred, or CPN preferred.

1.04 In the following scenarios, the *4ESS* switch looks for information to send to the terminating Customer Premises Equipment (CPE) in the order shown:

(a) The terminating CPE subscribes to "BN Only" and "3-digit BN delivery when a complete BN is not available":

(1) The 10-digit BN, if available and unrestricted

(2) The 3-digit BN, if available.

(b) The terminating CPE subscribes to "BN Preferred" and "3-digit BN delivery when a complete BN is not available":

(1) The 10-digit BN, if available and unrestricted

(2) The 10-digit CPN, if available and unrestricted

(3) The 3-digit BN, if available.

(c) The terminating CPE subscribes to "CPN Preferred" and "3-digit BN delivery when a complete BN is not available":

(1) The CPN, if available and unrestricted

(2) The 10-digit BN, if available and unrestricted

(3) The 3-digit BN, if available.

1.05 Where the terminating CPE subscribes to Per-Call CPN/BN Delivery and 3-Digit BN Delivery, the terminating *4ESS* switch looks for information in the order shown in the following lists, depending on the option selected by the customer. In each case, the switch sends to the terminating CPE **the first piece of information that is available and unrestricted. (Note that the 3-digit BN is never restricted.)** If none of the information looked for is available and unrestricted, the switch sends a FACILITY REJECT message to the terminating CPE.

(a) The terminating Per-Call CPN/BN CPE selects "CPN Preferred":

(1) CPN

(2) The 10-digit BN

(3) The 3-digit BN.

(b) The terminating Per-Call CPN/BN CPE selects "BN Only":

(1) The 10-digit BN

(2) The 3-digit BN.

(c) The terminating Per-Call CPN/BN CPE selects "BN Preferred":

(1) The 10-digit BN

(2) The CPN

(3) The 3-digit BN.

2. Call Flow (Not affected)

3. Provisioning

Office Data Administration (ODA)

A. Overview

3.01 A new TSG bit is defined to identify if delivery of 3-digit BN is allowed. The bit, which is proprietary, is defined for ODA and Recent Change/Verify (RC/V) for 2-way and 1-way outgoing TSGs.

3.02 In 4E16, trunks with 3-digit BN delivery are identified by the SPARE2 field on ODA Forms 401A and 401C and Recent Change Forms 100, 102, 107, and 109. Current plans call for a new field, D3DBN (Delivery of 3-Digit Billing Number), to be added in 4E17 to ODA Forms 401A and 401C and Recent Change Forms 100, 102, 107, and 109 to identify these trunks.

4. Recording

4.01 There are no new recording requirements for this feature, as 3-digit BN is recorded the same way as 10-digit BN. The billing for a 3-digit BN is the same as for a 10-digit BN.

4.02 Q.931 causes a Station Identification/Automatic Number Identification (SID/ANI) Increment message to be sent back to the originating switch so the per-call record indicates that BN was delivered and calls billing to peg the existing CPN/BN aggregate counts at the terminating switch. The message does not specify whether a 3-digit or a 10-digit BN has been delivered.

5. Network Management (Not affected)

6. Maintenance/Troubleshooting (Not affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on by ODA or RC forms to set an ODA bit. See the section on Provisioning.

8. Input/Output Manual Pages (Not affected)

Announcement Restructure — Time Sensitive Pricing Feature (292)

5

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Announcement Restructure — Time Sensitive Pricing Feature (292)

5

1. Feature Description

1.01 The Announcement Restructure — Time Sensitive Pricing feature for all customized announcements is part of the Advanced 800 Service Announcement Restructure project. This feature is the only announcement enhancement that requires development in a network element.

1.02 All customized announcement features will be priced on a time-sensitive basis. In this structure, each time an announcement is activated in the network, a timer measures the exact length that it is actually played. An incremental billing scheme is used, where customers are charged based on the number of 6-second increments in each announcement. If an announcement plays for 30 seconds, the number of 6-second increments is five. If the announcement plays for 33 seconds, the number of increments is six.

1.03 This feature provides a mechanism for timing how long all announcements on a call were played, not how long each individual announcement was played. The downstream billing system uses the recorded timer value to determine the number of 6-second increments.

1.04 The announcements subject to the time sensitive pricing scheme are all customized announcements played at the Network Services Complex (NSCX). The announcements include Interactive announcements (Call Prompter), Terminating announcements (Courtesy Response), Introductory (Enroute) announcement, and the Into Queue announcement.

1.05 In the case of the Courtesy Response and Call Prompter announcements, this feature sends an Automatic Message Accounting (AMA) record to the customer when a caller disconnects in the middle of the announcement.

2. Call Flow

Call Flow Key Points

2.01 The call flows presented in this section are general and can be adapted to any announcement source [NSCX or Improved Service Announcement and Information Collection/Service Circuit Unit (ISAIC/SCU)] in the network. The call flows presented here, however, are based on the NSCX as the source. The steps highlighted in **bold print** indicate new events occurring in the network.

2.02 In the following scenarios, the call flows begin when the Network Control Point (NCP) has executed the customer record and has encountered an announcement node (Call Prompter or Courtesy Response) in the processing path. The following call flow scenarios are presented:

(a) The Originating AT&T Switch (OAS) has a collocated NSCX with the required announcement set, and an interactive announcement (Call Prompter) is required.

(b) The OAS does not have a collocated NSCX or the required announcement set, and an interactive announcement (Call Prompter) is required.

(c) The OAS has a collocated NSCX with the required announcement set, and a terminating announcement (Courtesy Response) is required.

(d) The OAS does not have a collocated NSCX or the required announcement set, and a terminating announcement (Courtesy Response) is required.

Call Flow Narratives

2.03 In the first scenario, the OAS has a collocated NSCX and the NCP requests the NSCX to play an interactive announcement and collect digits (Call Prompter).

(1) The NCP instructs the *4ESS*™ switch to play an announcement. The NCP sends a Transaction Capability Application Part (TCAP) CONTINUE message containing the operation Caller Interaction — Play Announcement and Collect Digits (Call Prompter).

(2) Upon receipt of the TCAP Caller Interaction request, the OAS sets up a connection to the announcement source. If the announcement source is an NSCX, the OAS sends a CCIS6 Command List (CML) message to the NSCX.

(3) **When the first announcement begins at the announcement source, the OAS must start the announcement timer.** If the announcement source is the NSCX, the OAS must start the announcement timer upon receipt of the first Start of Multiunitmessage (SOM) received from the NSCX.

(4) The TCAP Caller Interaction request is performed at the announcement source.

(5) Upon receipt of Caller Entered Digit(s) (CED), the announcement source sends the data back to the OAS, which in turn sends the returned data back to the NCP.

(6) Upon receipt of the TCAP CONTINUE message carrying the CEDs, the NCP determines further call processing.

(7) At this point, the NCP logic may request another Caller Interaction or Connection Control as follows:

(a) If the NCP logic requests another Call Prompter announcement, the OAS receives a TCAP CONTINUE message with the operation Caller Interaction — Play Announcement and Collect Digits. In this case, the call flow continues as above, *except* that the OAS must not start the timer for subsequent Caller Interaction requests.

(b) If the NCP logic requests a Terminating Announcement (Courtesy Response) or an Into Queue Announcement, the OAS receives a TCAP CONTINUE or END message with the operations Charging — Bill Call and Caller Interaction — Play Announcement (Courtesy Response). In this case, the call flow continues as described in the third scenario, *except* that the OAS must not start the timer again.

(c) If the OAS receives a TCAP CONTINUE or END message with a Connection Control request, the OAS must do the following:

— **Stop the announcement timer**

— **Start recording AMA information, including recording the timer value for announcements played.** Note that an AMA record is created at this point whether or not the OAS has received a TCAP Charging — Bill Call operation.

2.04 In the second scenario, the OAS does not have a collocated NSCX or the required announcement set, and an interactive announcement (Call Prompter) is required. In this case, a Service Assist (S/A) is required in the network.

(1) The NCP instructs the OAS to S/A to another switch (referred to as an assisting *4ESS* switch) that has the required capabilities. The NCP sends a TCAP CONTINUE message containing the operation Connection Control — Temporary Connect.

(2) The OAS sets up a connection to the assisting *4ESS* switch by sending a CCS7 Integrated Services Digital Network User Part (ISUP) Initial Address Message (IAM).

(3) When the connection between the OAS and the assisting *4ESS* switch is established, the assisting *4ESS* switch sends the NCP a TCAP BEGIN message containing the operation Provide Instruction — Assist.

(4) Upon receipt of the TCAP operation Provide Instruction — Assist, the NCP instructs the assisting *4ESS* switch to play an announcement and collect digits. The NCP sends a TCAP CONTINUE message containing the operation Caller Interaction — Play Announcement and Collect Digits.

(5) The assisting *4ESS* switch then sets up a connection to the announcement source.

(6) **The assisting *4ESS* switch must populate and send an ISUP Call Progress (CPG) message to the OAS when the assisting *4ESS* switch receives acknowledgement that the announcement has started at the announcement source.**

(7) **Upon receipt of the ISUP CPG message from the assisting *4ESS* switch, the OAS must start the announcement timer.**

(8) The TCAP Caller Interaction request is performed at the announcement source collocated at the assisting *4ESS* switch.

(9) The assisting *4ESS* switch sends the returned data or announcement completion notification to the NCP via TCAP.

(10) Upon receipt of the TCAP CONTINUE message carrying the returned data or the announcement completion notification, the NCP determines further call processing. At this point, the NCP may request another caller interaction or may request assist termination.

(11) If the NCP requests another caller interaction, the call flow continues as above, *except* that the announcement timer at the OAS will not be triggered to start again — that is, a subsequent ISUP CPG message (encoded appropriately) **will not** be sent from the assisting *4ESS* switch to the OAS.

(12) If the NCP requests assist termination, the NCP sends a TCAP END message with operation Procedural — Report Assist Termination to the assisting *4ESS* switch to terminate the assist, and a TCAP CONTINUE or END message with operation Connection Control — Forward Disconnect to disconnect the connection to the OAS.

(13) **Upon receipt of the TCAP CONTINUE or END message containing the Connection Control request, the OAS must stop the announcement timer.**

(14) At this point, the OAS must start recording AMA information, **including recording the the timer value for announcements played.** Note that an AMA record will be created at this point whether or not the OAS has received a TCAP Charging — Bill Call operation.

2.05 In the third scenario, the OAS has a collocated NSCX and the NCP requests the NSCX to play a Terminating Announcement (Courtesy Response), an Into Queue Announcement, or an Introductory (Enroute) Announcement.

(1) The NCP instructs the *4ESS* switch to play an announcement. The NCP sends a TCAP CONTINUE message containing the operations Caller Interaction — Play Announcement and Charging — Bill Call (send if NCP is requesting a Terminating Announcement or an Into Queue Announcement).

(2) Upon receipt of the TCAP operation Charging — Bill Call, the OAS begins AMA recording for the call.

(3) Upon receipt of instructions to play an announcement, the OAS sets up a connection to the announcement source. Again, if the announcement source is the NSCX, the OAS sends a CCIS6 CML message to the NSCX.

(4) **When the OAS receives acknowledgement that the announcement has started, the OAS must start the announcement timer.**

(5) **Upon receipt of Caller Disconnect, NCP notification to interrupt the announcement (TCAP CONTINUE message with operation Caller Interaction — Cancel) or an NCP Connection Control request, the OAS must stop the announcement timer.**

(6) **When the timer stops, the OAS must record the timer value along with the information being recorded for the call.**

(7) At this point, call processing continues normally. That is, the OAS sends notification to the NCP that the announcement has completed. For terminating announcements, the NCP instructs the OAS to disconnect the call, and for calls that are in queue, call processing continues normally — the NCP instructs the OAS to route the call.

2.06 In the fourth scenario, the OAS does not have a collocated NSCX or announcement set, and a terminating announcement is required, or the OAS does not have queue slots available. In this situation, a Handoff is required.

(1) The NCP instructs the OAS to hand off to another switch (referred to as the handoff *4ESS* switch) that has the required capabilities. The NCP sends a TCAP CONTINUE message containing the operation Connection Control — Connect.

(2) The OAS sets up a connection to the handoff *4ESS* switch by sending a CCS7 ISUP IAM.

(3) When the connection between the OAS and the handoff *4ESS* switch is established, the handoff *4ESS* switch sends a TCAP BEGIN message back to the NCP containing the operation Provide Instruction — Assist.

(4) Upon receipt of the TCAP operation Provide Instruction — Assist, the NCP instructs the handoff *4ESS* switch to play an announcement. The NCP sends a TCAP CONTINUE message containing the operations Charging — Bill Call and Caller Interaction — Play Announcement.

(5) Upon receipt of the TCAP operation Charging — Bill Call, the handoff *4ESS* switch (now the controlling switch) begins the AMA recording for the call.

(6) Upon receipt of the TCAP operation Caller Interaction — Play Announcement, the handoff *4ESS* switch sets up a connection to the announcement source.

(7) **When the announcement starts, the handoff *4ESS* switch starts the announcement timer.**

(8) **Upon receipt of Caller Disconnect, NCP notification to interrupt the announcement (TCAP CONTINUE message with operation Caller Interaction — Cancel) or an NCP Connection Control request, the handoff** *4ESS* switch must stop the announcement timer.

(9) **When the timer stops, the handoff *4ESS* switch must record the timer value along with the AMA information being recorded for the call.**

(10) At this point, call processing continues normally. That is, the OAS sends notification to the NCP that the announcement has completed. For terminating announcements, the NCP instructs the OAS to disconnect the call, and for calls that are in the queue, call processing continues normally — the NCP instructs the OAS to route the calls.

3. Provisioning

Office Data Administration (ODA)

3.01 An ODA bit must be set to activate this feature. See paragraph 7.02, "Turn On/Turn Off Mechanism."

4. Recording

4.01 AMA recording for this feature is performed at the Originating AT&T Switch (OAS) or the handoff *4ESS* switch using the existing inbound AMA structures and adding a *new* Announcement Module (AMA Module 927). If a caller disconnects after listening to one or more interactive announcements and no billing instruction is received, the *4ESS* switch creates a "canned" AMA record.

4.02 This "canned" record, AMA Structure 01144, includes the following default values:

- The Call Type Code (CC) field = "100" [AMA Table 1].
- The Service Identification Code (SIC) field = "016" [AMA Table 13].

- The Dialed Numbering Plan Area (NPA) field [AMA Table 13] and Dialed Number field [AMA Table 14] are populated with the Originally Dialed Number.
- The Overseas Indicator field = "1" [AMA Table 15].
- The fields for Terminating NPA [AMA Table 16] and Terminating Number [AMA Table 17] are populated with zeros.
- The fields for Originating NPA [AMA Table 13] and Originating Number [AMA Table 14] are populated in the normal manner.
- The Answer Indicator field = "1" (Unanswered) [AMA Table 9].
- The Operator Action field [AMA Table 11] is populated as normal.
- The Operator Charge Indicator field = "0" (Operator charges apply to customer) [AMA Table 131].
- The Bill To Indicator field = "1" (All charges to customer) [AMA Table 132].
- The Service Feature Indicator field ="000" [AMA Table 134].
- The Market Segmentation field = "0" (Ignore) [AMA Table 399].
- The Revenue Accounting Office (RAO) field = "999" (Default) [AMA Table 46].
- The Caller Feature Available (CFA) field = "00000" (Default) [AMA Table 135].
- The Announcements Before Routing (ABR) field = "000" [AMA Table 136].
- The Call Progress Stopped (CPS) field = "0" (No indication in this field) [AMA Table 137].
- The *4ESS* switch will include the Announcement Price Restructure (APR) call (Call Code "100") in the "Toll" category of the "Call Assembly Tracer Record," and the "Direct Services Dialing Capability" (DSDC) service tracer count will be pegged in the "*4ESS* Switched Service Count Tracer Record."

5. Network Management (Not affected)

6. Maintenance/Troubleshooting (Not affected)

7. Transition Considerations

Ubiquity

7.01 ***Full deployment of the generic across the network is required; otherwise, there will not be ubiquity in billing for the announcement features.***

Turn On/Turn Off Mechanism

7.02 To turn on this feature in 4E16, use Recent Change Form 800 to set the feature bit. The address (ODA structure OD4ANRPC) is 7702632 data bit 20. ODA Form D7 is also affected.

7.03 In 4E16, use Recent Change Form 800 to modify the existing OD4ANIPARM table (address 7702704) so the Generic Operation Parameter (GOP) entry (index 364 octal) indicates to treat the GOP as "normal" in the CPG message. The address to be changed is 7703270, and bits 16 and 17 (starting with the rightmost bit as zero) should contain zeroes.

7.04 The change to OD4ANIPARM is only necessary in 4E16, since a generic table developed in 4E17 will correctly handle the GOP parameter in the CPG message.

8. Input/Output Manual Pages (Not affected)

I800 Network Routing Number (NRN) Exhaust Feature (294)

6

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I800 Network Routing Number (NRN) Exhaust Feature (294)

6

1. Feature Description

1.01 The customer demand generated by the introduction of International *Megacom*® 800 Service exceeded the predicted demand. As a result, I800 Service Development and Management (SD&M) predicts that, provided no new service enhancements are tariffed, approximately all 10,000 Inbound I800 Phase 2 customer records will be in use by 2Q92. Thus, the numbering plan will have reached a state of exhaustion.

1.02 This feature alleviates the Network Routing Number (NRN) exhaust problem by making the following changes in the AT&T Switch Network:

- Changing the current screening of the DEF digits for 196 Network Routing Numbers received at the *4ESS*™ switch
- Use of 10-digit Global Title Translation (GTT) at the *4ESS* switch
- Use of the Dialed Number Translation Table (DNTT) in the No. 1 Direct Services Dialing Network Control Point (1DSD NCP)
- Expansion of the I800 Phase 1 numbering plan to support advanced feature customers.

1.03 The following sections briefly describe how each of the items listed above will help to alleviate the NRN exhaust problem.

1.04 Before this feature, numbers received at a *4ESS* switch were screened on the fourth, fifth, and sixth (DEF) digits. For I800 service, those are the digits following the 196 special service code. If the D digit (the fourth digit) of any number received was

zero or one, the call was blocked at the *4ESS* switch and sent on for final handling treatment. The I800 NRN Exhaust feature lifts that restriction for 196 numbers. Now, if the *4ESS* switch receives an Inbound I800 call, it processes the call regardless of the value of the D digit.

1.05 The 10-digit GTT was designed to support the elimination of the double dip. The double dip is the need for domestic 800 calls that require advanced features out of the 1DSD NCP to dip into two data bases: the Inward Wide Area Telephone Service (INWATS) Data Base Network Control Point (IDB NCP) to determine that the dialed 800 number belongs to a customer with advanced features, and the DSD NCP to apply the advanced features to the call. With 10-digit GTT, the *4ESS* switch, upon receiving a dialed 800 number or 196 Network Routing Number, searches for the number in the 10-digit GTT table to determine to which NCP the call should be routed.

Network Routing Number Exhaust (NRNX) uses 10-digit GTT by populating 196 Foreign Subscriber Identifying Telephone numbers (FSITs) into the 10-digit GTT table at the seven AT&T International Switching Centers (ISCs). The 196 numbers being used for I800-Mexico service are populated in the 10-digit GTT table at the three AT&T Mexican gateway/ISC switches.

1.06 The 1DSD NCP uses the DNTT to convert a dialed number sent by the *4ESS* switch into a Customer Record Number (CRN). This table allows I800 Phase 3 NRNs to map to domestic 195 CRNs. For this project, the DNTT will be populated with 196 FSITs and the CRNs associated with each 196 NRN.

To access this table, the 1DSD converts the 196 NRN it receives into a DNTT key which is equivalent to the 196 FSIT. The 1DSD then looks for the key in the table and pulls out the CRN if a match is found. If no match is found, the 1DSD falls back to the current conversion algorithm to determine the CRN from the NRN. The 1DSD then uses the CRN to find the Customer Processing Record it should execute for the number it received.

1.07 Expanding the use of the I800 Phase 1 numbering plan requires discontinuing the use of 196 NRNs for Outbound I800 service and making all of the 196 NRNs available to Inbound I800 service. This change increases the number of inbound subscribers that can be supported with the 196 NRN. To discontinue Outbound I800 Phase 1, the embedded base of Outbound I800 Phase 1 subscribers will be changed to use 19[4,5] NRNs.

2. Call Flow

Call Flow Narrative

A. Outbound I800 Calls

2.01 This section describes the call flow for Outbound I800 service. The Outbound I800 call flow is shown in Figure 6-1.

2.02 All Outbound I800 service calls (except those I800-Caribbean calls that only access the IDB NCP) will use either the 19[4,5] or 12[3,4] numbering plan. The 19[4,5] numbering plan, used to access the 1DSD NCP, uses an NRN in the format 19[4,5]-WXY-NV'AZ. The 12[3,4] numbering plan, used to access the 2DSD NCP during the Feature Routing Enhanced Dynamically (FRED) transition, uses an NRN in the format 12[3,4]-TUV-WXYZ.

(1) The domestic caller dials a number in the form (1+)800-NXX-XXXX.

(2) The Local Exchange Carrier (LEC) recognizes the call as one destined to AT&T and forwards the dialed 800 number to an Originating AT&T Switch (OAS), along with the 10-digit Billing Number (BN) or 3-digit Originating NPA (ONPA).

(3) The OAS retains the 10-digit BN (if it is available) and sends a query to the IDB NCP through the No. 2 Signaling Transfer Point (2STP) over the signaling network using the dialed 800 number and the ONPA.

(4) Using the 800 number and the ONPA, the IDB NCP executes the customer record and determines that the call should be processed in one of two ways:

(a) The call should be routed from the OAS to the Caribbean.

(b) The DSD NCP will determine the final destination for the call, and the call is routed as described in Step 5.

(5) The IDB returns an NRN in the form 19[4,5]-WXY-NV'AZ or 12[3,4]-TUV-WXYZ to the OAS.

(6) The OAS translates the 19[4,5]-WXY-NV'AZ or 12[3,4]-TUV-WXYZ NRN to determine which DSD NCP should be queried for instructions. The OAS then queries the DSD NCP using the 19[4,5] or 12[3,4] NRN and the 10-digit BN (if available).

(7) Using the 19[4,5]-WXY-NV'AZ or 12[3,4]-TUV-WXYZ number, the originating NPA, and the 10-digit BN (if available), the DSD NCP executes the customer record, including the processing needed for any required customer

interactions, and determines that the call should be processed in one of the following manners:

(a) The call should be routed to a Caribbean destination using the 178 code.

(b) The call should be routed to a Caribbean destination using a number in the form 809-NXX-XXXX.

(c) The call should be routed to a location overseas or in Mexico.

B. Inbound I800 Calls

2.03 This section describes the call flow for Inbound I800 service. The Inbound I800 call flow is shown in Figure 6-2.

(1) An Inbound I800 call originates in an overseas, Caribbean, or Mexican location when the caller dials a toll free access code designated by the Postal, Telephone, and Telegraph (PTT) in that country (for example, 0800 in the United Kingdom, 95 in Mexico, or 1-800 in the Bahamas), followed by digits identifying the AT&T subscriber in the United States.

(2) The PTT converts the dialed number to a NRN in the form 196-WXY-CCVZ or 196-WXY-VCCZ, where the 196 digits are a Special Service Code (SSC) indicating I800 service, WXYVZ identifies the subscriber, and CC is the I800-specific pseudo country code identifying the country and/or carrier of origin. Each of the WXYZ digits may assume values between 0 and 9. The CC digits have values between 10 and 99. When the NRN is in the form:

196-WXY-CCVZ	the V digit has values between 1 and 9.
196-WXY-VCCZ	the V digit has value 0.

(3) The PTT's ISC forwards the 196 number to an AT&T ISC using any available international trunk.

If the call is routed over a CCITT7 Integrated Services Digital Network User Part (ISUP) trunk, the CCITT7 ISUP Initial Address Message (IAM) may contain the Calling Party Number (CPN) parameter. The address digits, if available, are placed in the address digits field of the CPN parameter. If address digits are not available and the CPN parameter is included, the CPN is two octets and the presentation indicator in the CPN parameter is coded "address digits not available" or is not included.

(4) The AT&T ISC functions as an OAS for these calls. The ISC looks at the seventh digit of the 196 NRN to determine which of the two formats was received. The ISC determines where the CC digits are located within the number and creates a Global Title Record Key by copying the NRN in the key and removing the CC digits from the key. This key is then used to perform 10-digit GTT. If a match is found, the ISC/OAS determines which DSD NCP pair should receive the query using information in the GTT table. If a match is not found, the ISC will default to 2STP 6-digit routing to route the call to the correct DSD NCP pair.

(5) Once the correct DSD NCP is determined, the ISC queries the DSD NCP with a Transaction Capabilities Application Part (TCAP) BEGIN message containing a Provide Instruction — Start Operation message. The 196 NRN, containing the CC, is included in the Digits (Dialed Number) parameter, and the Call Line Identification (CLI), if available and 7-12 digits in length, is included in the Digits (ANI) parameter of the TCAP BEGIN message. If CLI is not available or is not 7-12 digits in length, the Automatic Number Identification (ANI) parameter is not included in the TCAP BEGIN message. The TCAP BEGIN message is routed through a 2STP in the Common Channel Signaling (CCS) network to the appropriate DSD NCP pair.

(6) The DSD NCP that receives the TCAP BEGIN message does the following:

(a) Extracts the CC digits from the 196 NRN; these digits are used for country code routing and for blocking. The 1DSD NCP sets ONPA=0CC, and the 2DSD NCP sets the value of the GeoArea predefined variable equal to 0CC.

(b) Sets the Call Processing Record (CPR) ANI parameter to the CLI (if received). If CLI is not received, the CPR ANI is set to 0CC-000-0000.

(c) Converts the 196 NRN to a DNTT key. The key is used to access the DNTT. The DNTT is searched for a match on this number.

(d) If a match is found:

- in the 1DSD NCP, a CRN in the form 195-0VW-0XYZ is returned, indicating that an integrated record exists for this subscriber.
- in the 2DSD NCP, the call processing record associated with the Call Processing Record ID corresponding to the 196 key in the DNTT is executed.

(e) If no match is found:

- in the 1DSD NCP, the determination of the CRN will default back to the current conversion algorithms.
- in the 2DSD NCP, the call is vacant coded and an error message is returned to the *4ESS* switch.

(7) After executing the customer record, including any needed announcements or call prompter interactions, the call can be routed to its destination. To do so, the DSD NCP sends an END message containing two operations (Charging — Bill Call and Connection Control — Connect) as follows:

(a) The Charging — Bill Call operation specifies that an Automatic Message Accounting (AMA) record should be made. The Service Indicator Code (SIC) is contained in the A800 Billing Data parameter of this operation, and it corresponds to the egress type. The Call Code is also contained in this operation; it should be set to 324, indicating Inbound I800 service.

(b) The Connection Control — Connect operation indicates to the ISC/OAS that it should route the call and provides the routing number in the Digits (Routing Number) parameter. The Generic Routing Information parameter contains the routing domain indicator. The routing number is either an Action Point Number (APN) in the form SSS-TTT-XXXX, in which case the Generic Routing Information parameter indicates Dedicated Egress Voice (DEV) domain routing, or a Plain Old Telephone Service (POTS) number in the form NPA-NXX-XXXX (in which case POTS domain routing is used).

(8) Using Real Time Network Routing (RTNR), the ISC routes the call across the AT&T network to the terminating *4ESS* switch. The call is then routed either to the direct-connect sponsor location (for *Megacom* 800 Service terminations) or to the LEC (for Classic 800, *Masterline*℠ 800 and 800 *READYLINE*® Telecommunications Service terminations); the LEC completes call routing for switched egress subscribers.

If address digits are included in the CPN parameter of the CCITT7 ISUP IAM (so CLI is available at the ISC), the ISC copies that information into the CPN parameter of the outgoing CCS7 ISUP IAM. (If address digits are not included or are coded as "address unavailable," or if the call is not routed using CCITT7 ISUP, the CPN parameter is not included in the CCS7 ISUP IAM.) The CLI may then be delivered to the subscriber. If CLI is delivered, the terminating *4ESS* switch sends back a SID/ANI Increment message to peg the billing record for CLI delivery.

(9) If the Customer Premises Equipment (CPE) answers the call, answer supervision is returned from the CPE back to the originating ISC/OAS. Upon receipt of answer supervision, the OAS begins elapsed timing and cuts the incoming trunk through in the backwards direction (if it has not done so already). When the call is terminated, the ISC/OAS completes an AMA billing record. The AMA record also contains the SIC value, other data provided in the Charging-Bill Call operation of the END message, and other call-associated data sent from the DSD NCP to the Action Control Point (ACP). An AMA attempt record is made for unanswered as well as answered call attempts. If the call is not answered, a field is set indicating that the call was unanswered.

Feature/Service Evolution

2.04 Development of the capabilities described in this document are meant to be an interim solution until CCITT7 is widely deployed in the networks of the foreign PTTs. At that time, the routing and numbering schemes used in the AT&T Switched Network for I800 will be changed to take advantage of the enhanced features of CCITT7. This evolution will also include such capabilities as deriving the Country Codes from the incoming trunk subgroup. That capability will free up two more digits in the NRN so they can be allocated to subscriber IDs.

Call Flow Diagram

2.05 The following diagrams show the call flow for Outbound I800 calls and Inbound I800 calls.

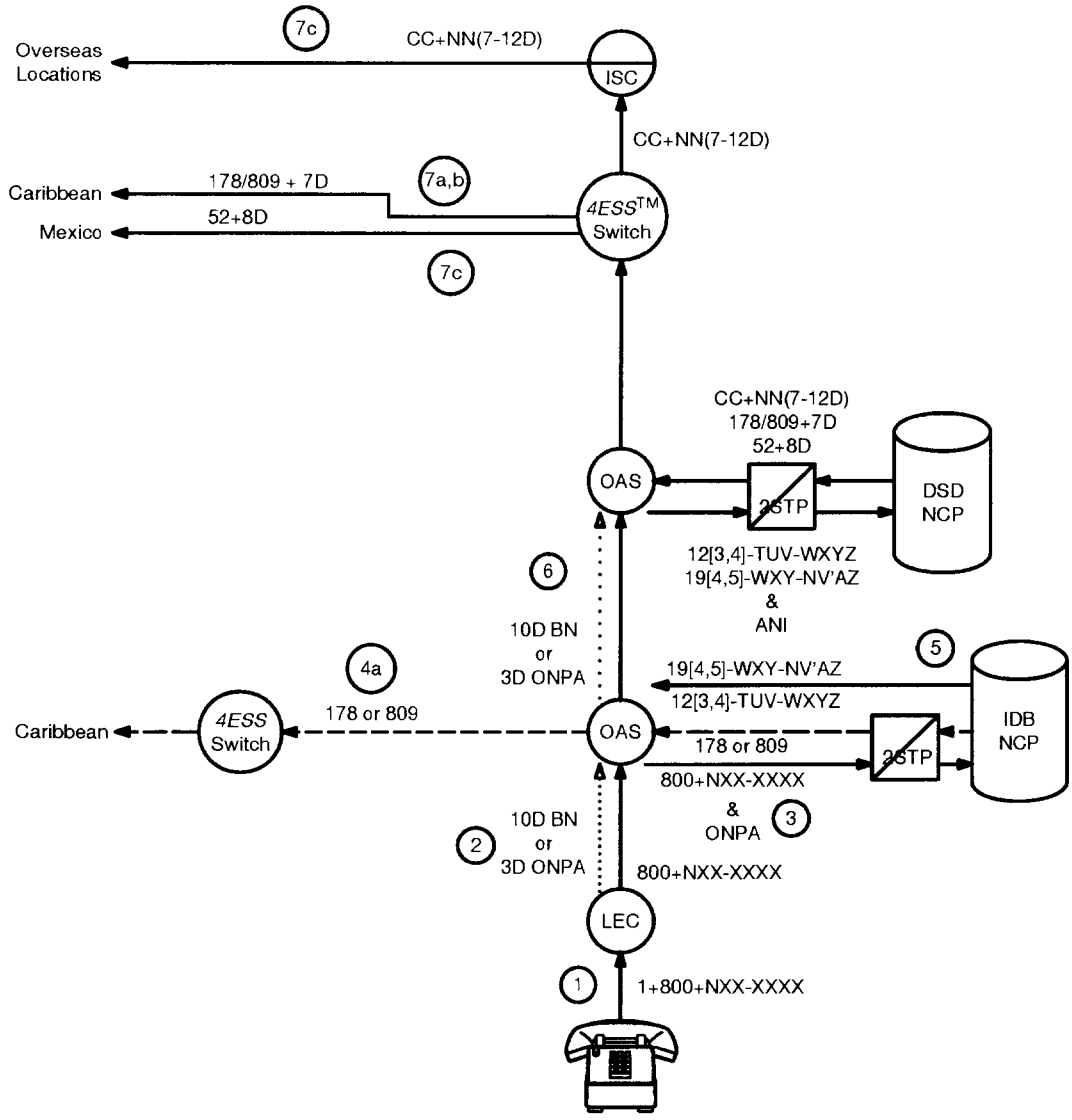

Figure 6-1. Outbound I800 Call Flow

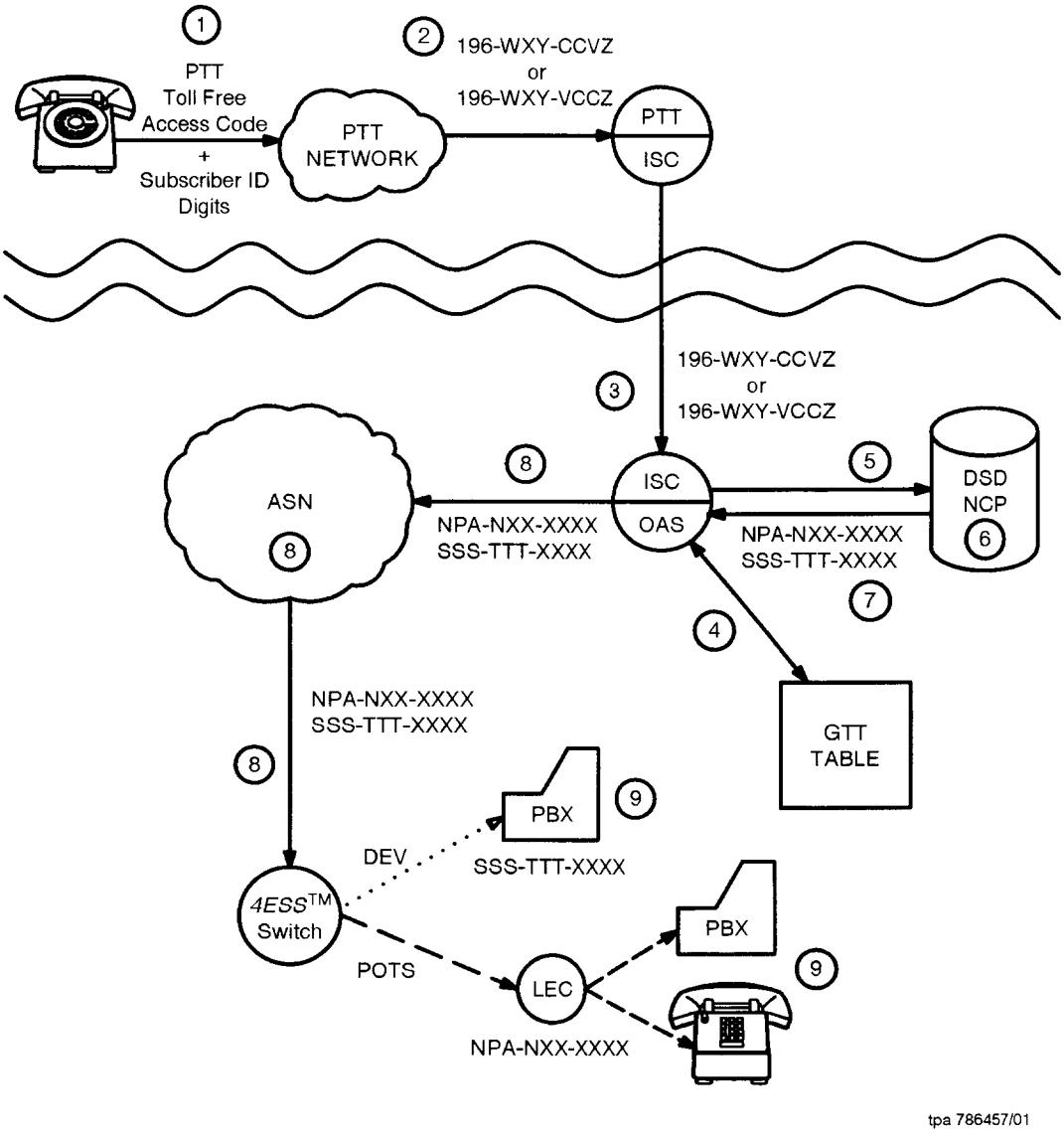

Figure 6-2. Inbound I800 Call Flow

3. Provisioning

3.01 The 10-digit GTT capability allows the *4ESS* switch to determine which NCP should receive the query. To make this determination, the *4ESS* switch must determine the Global Title (GT) record key. The GT record key derivation used for I800 service will be as follows:

(A) Global Title for Inbound I800 is "196-WXY-CCVZ" or "196-WXY-VCCZ,"

where CC = I800-specific pseudo country code: CC = 10 - 99

V = 1 - 9 for the first NRN

V = 0 for the second

W, X, Y, and Z = 0 - 9

and the GT record key for this service is 196-00W-XYVZ.

For this reason, in 4E16, whenever the *4ESS* switch receives an NRN with a 196 SSC, it will set the GT record key for that call to 196-00W-XYVZ.

To derive the record key, the switch must continue to look at the 7th digit in the 196 NRN to determine the position of the VWXYZ digits.

(B) Outbound I800 service uses the same GT record keys as domestic 800 service and does not use the 196 numbering plan, so no new requirements are needed.

4. Recording (Not affected)

5. Network Management (Not affected)

6. Maintenance/Troubleshooting (Not affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 The NRN Exhaust feature alleviates NRN exhaust by skipping the screening of DEF digits for designated ABC digits for customer-initiated I800 calls. An ODA bit (XL4NRN_I800) in translator HT4OVP_ADC must be indexed with the ABC digits. To

skip DEF-digit screening for given ABC digits (ABC=196 for this feature), XL4NRN_I800 must be set equal to 1 **on a per-office basis** for those ABC digits using Recent Change (RC) form 800. The starting address of the table is 7714167 for 4E16R3 and 7507762 for 4E17R1. The size is 1 and the displacement is 23. By default, the ODA bit referred to above will be 0 for ABC digits, so it must be set to 1 for ABC=196 in order to turn on the feature. If this bit is set for 4E16, it will automatically be set for 4E17.

Internal Transition Issues

The following transition is planned for the deployment of this project:

- I800-Mexico Phase 2 must be deployed.
- The User Support System (USS) capabilities described must be developed and deployed.
- The 10-digit GTT software must be loaded into the switch.
- At a minimum, the 10-digit GTT tables at the 7 ISCs, the 3 Mexican gateway switches, and the 16 Emergency Signaling Transport Network (ESTN) helper switches must then be populated.
- At a minimum, 6-digit Global Title Translation will be turned on at the 7 ISCs, the 3 Mexican gateway switches, and the 16 ESTN helper switches by July 1992 to provide default 6-digit routing through the 2STP for I800 stand-alone customers.
- Outbound 196 Network Routing Numbers will not be reused for Inbound I800 service until 4E16R3 is fully deployed in the network. (July 1992)
- All the necessary billing systems must have their development in place.
- The 1DSD capabilities must be developed and deployed.
- The Engineering Network Administration Center (ENAC) will begin provisioning customers using the new numbering plan.
- TCAP must be used to access the IDB, 1DSD, and 2DSD data bases.

8. Input/Output Manual Pages (Not affected)

Automatic Removal of Adjunct TSG Head Cells by Recent Change Message Feature (305)

7

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Automatic Removal of Adjunct TSG Head Cells by Recent Change Message Feature (305)

7

1. Feature Description

1.01 Prior to the introduction of this feature, the only way to remove a Trunk Subgroup (TSG) after the physical facility it was associated with was reassigned or removed from the network was through a cumbersome manual process. The *4ESS*™ switch administrator had to notify the Regional Network Operations Center (RNOC) that the TSG should be deleted. The RNOC then removed the adjunct TSG head cells from the TSG so the TSG could be deleted and notified the *4ESS* switch administrator that the procedure had been completed. Finally, the *4ESS* switch administrator could issue the TSG removal command at the switch. This procedure was time-consuming and prone to errors.

1.02 The Automatic Removal of Adjunct TSG Head Cells by Recent Change Message feature allows the above procedure to be performed directly by the *4ESS* switch administrator using the "Delete a Trunk Subgroup (Recent Change 106)" message. When the *4ESS* switch receives this message, the switch automatically removes the adjunct TSG head cell, deletes the TSG, and sends the appropriate notification to the Regional Network Management System (RNMS) and the Network Management Operations System (NEMOS). In this way, the waiting periods and multiple transfers of information under the old procedure are eliminated, allowing quicker and more accurate removal of TSGs and a quicker return of memory to the network.

1.03 As of late 1991, there were 21,653 TSGs with no circuits out of 109,000 TSGs across 117 AT&T switches. Therefore, nearly 20% of the TSGs in the network have no circuits associated with them. If all of those invalid TSGs were deleted, about 2 million words of call store and 1.5 million words of disk memory could be restored to the network.

1.04 It must be noted that it is still up to the front end process to ensure that only eligible TSGs are identified for deletion. This feature will not remove TSGs that are in Routing Data Blocks or TSGs that have circuits assigned to them.

2. Call Flow (Not affected)

3. Provisioning

Office Data Administration

3.01 Recent Change Form 106 is used to delete the TSG head cell.

4. Recording (Not affected)

5. Network Management

5.01 When a TSG head cell is deleted, Network Management (NM) sets two existing discretes (flags) for NEMOS and RNMS. One discrete indicates that an adjunct head cell (AHC) assignment has changed, and the other indicates that a TSG has been deleted.

5.02 Any existing TSG controls are removed when the TSG is deleted.

Measurements

5.03 There is no development impact in the measurements area. However, it should be noted that NM 5-minute TSG data may be in error for up to 15 minutes if an AHC is seized again immediately after it is released. This fact should not be a problem, though, because the data is in synch at the end of every 15-minute window, and information retrieval can be scheduled accordingly.

6. Maintenance/Troubleshooting (Not affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment. Ubiquity of the generic across the network is not required.

8. Input/Output Manual Pages (Not affected)

Improved Automatic D-Channel Recovery Feature (320)

8

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Improved Automatic D-Channel Recovery Feature (320)

8

1. Feature Description

The Problem

1.01 For the Network Services Division (NSD) customer, the field maintenance of D-Channel nodes is divided between the Technology Control Center (TCC) and the Transaction Center (TC). The TCC is responsible for maintaining equipment **internal** to the *4ESS*™ switch, such as the Common Network Interface (CNI) ring node hardware and the CNI Ring/Digital Interface Frame (DIF) cables. The TC, on the other hand, is responsible for handling **external** D-Channel link problems between the *4ESS* switch and the PBX customer.

1.02 D-Channel link outages can be caused by either internal or external conditions. The previous maintenance strategy was to put all D-Channel link outages, whether of internal or external causes, on the Service Degrading Condition (SDC) list. As a result, the SDC list, which is used only by the TCC, included both the internally caused outages the TCC could correct and the externally caused outages the TC was supposed to correct.

1.03 To clear externally caused outages from the SDC list, TCC personnel would place the affected D-Channels in the Manually Out Of Service (MOOS) state. Doing so would turn off the continuously generated SDC alarm and enable the TCC personnel to better monitor the other nodes.

1.04 Putting the node in the MOOS state had two bad effects, however. First, it inhibited automatic recovery, so that the affected nodes would not recover automatically even after the external faults were cleared. Secondly, the TC would see an access facility alarm and the D-Channel alarm (not the SDC alarm), but the TC personnel would not know that the node had been placed in the MOOS state by the TCC.

1.05 As a result, the TC personnel sometimes learned that the problem with the node was theirs to correct only after a customer inquiry about the outage. At that point, the TC personnel would have to check the MOOS status with the TCC and request the TCC to remove the node from the MOOS state so that the problem could be corrected.

The Solution

1.06 The Improved Automatic D-Channel Recovery feature solves the problem described above by enabling the *4ESS* switch to determine whether a D-Channel link outage results from internal or external causes. After identifying the cause of the outage, the feature places only outages with internal causes on the SDC list. As a result, the TCC only receives alarms for the internally caused outages that it can correct.

1.07 The externally caused outages, which are the responsibility of the TC to correct, are reported to the TC by the Testing Operations Provisioning Administration System (TOPAS). Since the D-Channel link nodes will not be placed in MOOS state, the D-Channels will restore automatically once the external faults are cleared.

Application

1.08 The SDC logic for D-Channel nodes is different for AT&T switches than for non-AT&T switches. In the case of AT&T switches, only D-Channel links with **internal** switch problems are included in the SDC list. Since this feature has no requirements that relate to non-AT&T switches, in the case of non-AT&T switches, **all** D-Channel link nodes that go into the Out Of Service (OOS) state continue to be included in the SDC list.

2. Call Flow (Not affected)

3. Provisioning (Not affected)

4. Recording (Not affected)

5. Network Management (Not affected)

6. Maintenance/Troubleshooting

6.01 The following requirements relate to the Improved Automatic D-Channel Recovery feature:

- The SDC Indicator should not be flagged (SDC alarm should not be generated) when a D-Channel link is in OOS state and both of the following conditions apply:
  - — NO failure in the CNI ring hardware including the LI-4 card, the T1 Facility Access (T1FA), and the D-Channel node
  - — NO failure in the Direct Signaling 1 (DS1) facility between the CNI ring and the DIF/1A Processor.
- In all other circumstances, the SDC Indicator should be flagged (that is, the SDC alarm should be generated) as usual when a D-Channel link is in OOS state.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages

8.01 The manual pages that follow explain the OP:SDC output message with the changes introduced by the Improved Automatic D-Channel Recovery feature.

ID . . . . . OP:SDC
WORK CENTER . . MOC
GENERIC . . . . . 4AP10 and later
APPLICATION . . 4E
TYPE . . . . . Input

1. PURPOSE

This command causes the 3B-based Service Degrading Condition (SDC) list to be printed. This command has a similar purpose to the OP:SDC command on the 1A, except only 3B-based devices are on the SDC list. A device is put on the SDC list if that device is causing a loss of service for the office.

For the 3B, the service degrading conditions are defined as follows.

1. Ring initialization in progress.
2. Ring is in quiet mode.
3. DLN input stream is not active.
4. DLN output stream is not active.
5. API input stream is not active.
6. API output stream is not active.
7. An office with two DLNs has both DLNs not active.
8. An office with greater than two DLNs has at least three DLNs not active..
9. A domestic CCS7 linkset has 50% or fewer active links.
10. An international CCITT7 linkset is 100% not active.
11. A simplex D-Channel or SADC link is not active.
12. Both D-Channels failed in a D-Channel backup.

The output will give the condition for items 1-6 and will give the affected ring node addresses (RNA) for items 7-12. For items 11 and 12 for the AT&T customer, failures are put on the SDC list only if the cause is internal equipment.

2. FORMAT

OP:SDC!

3. EXPLANATION OF MESSAGE

None.

4. SYSTEM RESPONSE

PF OP-SDC output message will follow.

5. REFERENCES

Output Message
OP-SDC

ID ..... OP-SDC
WORK CENTER.. MOC
GENERIC ..... 4AP10 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

This message has two output formats.

```
OP SDC COMPLETE                    [1]
[a]
LNbb cc - dddd
[LIe-f g]

OP SDC COMPLETE                    [2]
NO SDC CONDITION EXISTS
```

2. REASON FOR OUTPUT

This output message is the result of a previous OP:SDC input message. It lists the 3B-based devices that are causing loss of service to the office. Format [1] is printed when there exists at least one device causing a service degrading condition (SDC); format [2] is printed when no SDC exists.

For format [1], only the list of failed conditions is output. This massage gives all possible conditions.

3. VARIABLE FIELD DEFINITIONS

a — This field is optional in the output message based on the status of the system. All events that are true are printed; i.e., more than one event of the following list may be printed. If none of the events are true, then no entry will be made for a. Values for a are:

```
RING QUIET
RING INIT
DLN INPUT STREAM
DLN OUTPUT STREAM
API INPUT STREAM
API OUTPUT STREAM
```

The definitions of these values are as follows.

RING QUIET - The ring is in quiet mode. The ring is down and automatic recovery has failed.

RING INIT - A ring initialization is taking place.

DLN INPUT STREAM - The stream is down between the DLN and the 3B for traffic destined from the DLN to the 1A.

DLN OUTPUT STREAM - The stream is down between the DLN and the 3B for traffic destined from the 1A to the DLN.

API INPUT STREAM - The stream is down between the 3B and the API for traffic destined from the DLN to the 1A.

API OUTPUT STREAM - The stream is down between the 3B and the API for traffic destined from the 1A to the DLN.

bb — Group number of the node {00-63}.

cc — Member number of the node {01-15}.

dddd — Node type; one of the following:

DLN - Direct Link Node
CCS7 - Domestic CCS7
CIT7 - International CCITT7
DCHN - D-Channel Node
SADC - Special Access Data Channel

The criteria for DLN nodes to be on the SDC list is based on the number of equipped DLNs in the office. If the office has two DLNs, then both DLNs must be down. If the office has greater than two, then three DLNs must be down. In the four DLN office, having one active twoway DLN is considered an SDC because the office was engineered to need two active DLNs for load capacity.

The criteria for CCS7 nodes to be on the SDC list is a domestic CCS7 linkset has 50% or fewer active links. Each node that is down that is part of the affected linkset is put on the SDC.

The criteria for CCITT7 nodes to be on the SDC list is that an international CCITT7 linkset is 100% failed. Each node in the linkset is put on the SDC.

The criteria for DCHN and SADC nodes with simplex links is if there exists a link down, then the node is put on the SDC. Additional output will distinguish affected links. For DCHN nodes with D-Channel backup links, if both links of a D-Channel backup pair are down, then both nodes that contain those links are put on the list. For AT&T offices, DCHN nodes are put on the list only if the link problem is internal to the office.

LIe-f — This is an optional field for DCHN and SADC nodes only. These nodes have up to 8 links per node and any single link can cause the node to be on the SDC list. Therefore, a list of the links on the node that are causing the SDC condition are given. The format of e is 0 or 1 to indicate which LI board. The format of f is 0,1,2, or 3 to indicate which link on the LI board.

g — This is an optional field for DCHN and SADC nodes only. Format g gives an indication of where the problem exists for the DCHN or SADC link. Values are:

```
T1FA FAILURE
NODE FAILURE
INTERNAL LINK FAILURE
EXTERNAL LINK FAILURE
```

4. ACTION TO BE TAKEN

For every case except RING QUIET, the 3B will be attempting automatic recovery on the failed devices. To monitor automatic recovery for stream failures, see the 1107 display page. To monitor automatic recovery on node or link failures, see the 1107 display page for DLN nodes and 1108 display page for other nodes.

If automatic recovery mechanisms fail to recover the device, seek technical assistance. For the RING QUIET case, seek technical assistance.

5. REFERENCES

1107 Display Page
1108 Display Page

Input Message
OP : SDC

International Communications Service (ICS) Task Force Phase 2 Enhancements Feature (323)

9

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International Communications Service (ICS) Task Force Phase 2 Enhancements Feature (323)

9

1. Feature Description

The International Communications Services (ICS) Task Force Phase 2 (PH2) Enhancements feature consists of 14 subfeatures. Since some of these subfeatures were previously associated with other feature numbers, they are listed here with their original Requirement Control Board (RCB) numbers and their Network Services Division (NSD) request numbers.

- 323b/3375 - TUP Continuity Check Call with an Unsuccessful COT
- 323c/3376 - Automatic Repeat Attempt on Receipt of Unreasonable Signaling Information
- 323d/3377 - Automatic Repeat Attempt on Receipt of Blocking Signaling
- 323e/3378 - TUP Unsuccessful COT Check - CCR Received
- 324a/3383 - ISUP Continuity Check Test Calls - CCR Received Unsuccessful: Verify T27 Timer
- 324b/3384 - Check of Timers T14 and T15
- 324c/3385 - ISUP Continuity Check Test Call - COT Unsuccessful
- 324e/3387 - ISUP Continuity Check Test Call - CCR Received Unsuccessful
- 324f/3388 - Check of Timers T1 and T5: Failure to Receive a Release Complete Message
- 324g/3389 - Check of Timers T16 and T17

- 297b/3393 - Cause Value Problem #19
- 297g/3398 - Backward Call Indicator in "ACM"
- 323k/3517 - Requirements for Rejection of Implicit Request for User-to-User Service 1
- 323j/3518 - Additional Requirement for Interworking Between DSS1 and International CCITT No. 7 ISUP.

Descriptions of Individual Subfeatures

1.01 323b/3375 - Continuity Check Call With an Unsuccessful COT

In testing, the Telephone User Part (TUP) level 4 test specification #6.1.6 (Unsuccessful Continuity Check) failed during testing with foreign correspondents. The purpose of this test is to verify that repeated attempts of the continuity check are made on the failed circuit. The current subfeature assures that these attempts are actually made.

The new requirement calls for the outgoing exchange to indicate whether or not a continuity check is required by the continuity check indicator in the Initial Address Message (IAM). If no backward tone is detected at the outgoing exchange within the timer T8 (≤2 seconds), a Continuity Check Failure signal (CCF) is sent to the incoming exchange. T8 starts when the check tone is sent. A Continuity Check Request (CCR) of the speech path is made on the failed outgoing circuit within timer T9 (1-10 seconds). T9 starts on detection of the initial continuity check failure.

A CCR is sent on the failed outgoing circuit within timer T10 (1-3 minutes). T10 starts on detection of continuity check failure. If this check fails, a CCF signal is sent, and the check is repeated at intervals of 1 to 3 minutes. The repeated continuity check is only finished when continuity is detected or when the maintenance staff disables the circuit. A limited number of circuits (128 suggested)* will be in this repeated check operation for TUP protocol. Circuits not entering this repeated check operation will send Blocking (BLO) and Clear Forward (CLF) signals to the incoming exchange after the second CCF signal is sent.

1.02 323c/3376 - Automatic Repeat Attempt on Receipt of Unreasonable Signaling Information

The CCITT No. 7 recommendation is that an automatic repeat attempt will be made on receipt of unreasonable signaling information after the sending of an IAM and before one of the backward signals required for call setup is received.

---

* These 128 circuits are in a common table of 254 usable words with ISUP circuits for conservation of resources.

This subfeature specifies that after unreasonable signaling information is received, the *4ESS*™ switch International Switching Center (ISC) shall send a ReSet Circuit (RSC) message and then make one repeat attempt on an available circuit.

1.03 323d/3377 - Automatic Repeat Attempt on Receipt of Blocking Signaling

The CCITT No. 7 recommendation is that an automatic repeat attempt will be made on receipt of the BLO signal after the sending of an IAM and before one of the backward signals required for call setup is received.

This subfeature specifies that an automatic repeat attempt shall be made on an available circuit upon receipt of the BLO signal after the IAM is sent and before any backward signal has been received. However, a Blocking-Acknowledgement (BLA) signal shall be sent first, and then a CLF signal shall be sent to clear the first call attempt.

1.04 323e/3378 - TUP Unsuccessful COT Check - CCR Received

In testing, the Telephone User Part (TUP) level 4 test specifications #1.4.3 and 1.4.4 (Unsuccessful Continuity Check Test Call) failed during testing with foreign correspondents. The purpose of this test is to verify that the continuity-check procedure can be correctly invoked and received. This subfeature assures that the appropriate messages are sent to the incoming and outgoing exchanges.

On receipt of an indicator of continuity check failure in a continuity (COT) message, timer T27 (4 minutes) is started, awaiting the next message. On receipt of a RSC or CLF, the timer T27 is stopped and a Release Guard (RLG) message is sent to the outgoing exchange to set the circuit to idle. If the timer T27 expires, a RSC is sent to the outgoing exchange.

1.05 324a/3383 - ISUP Continuity Check - CCR Received Unsuccessful: Verify T27 Timer

This subfeature adds an additional requirement in Integrated Services Digital Network User Part (ISUP) continuity-check procedures to comply with CCITT recommendations about the implementation of a different message sequence for the continuity recheck attempt after expiration of the timer to detect a backward tone.

The new requirement specifies that when an IAM is received with a request for a continuity check, ISUP timer T8 (10-15 seconds) is started at the incoming exchange. On receipt of a successful indication of a COT message, timer T8 is stopped. If timer T8 expires, the connection is cleared. On receipt of an indication of CCF before expiration of ISUP timer T8, timer T27 (4 minutes) is started at the incoming exchange awaiting a continuity recheck request. Also, the connection to a succeeding exchange, if any, is cleared.

On receipt of a BLO message before expiration of timer T27 (4 minutes), the trunk should be marked "blocked" and acknowledged with a BLA message without stopping the timer. On receipt of an Unblocking (UBL) message, the trunk should be marked "unblocked" and acknowledged with a Unblocking-Acknowledgement (UBA) message without stopping the timer.

On receipt of a RSC or Release (REL) message, the timer at the incoming exchange would be stopped and a Release Complete (RLC) message sent to the outgoing exchange to set the circuit to idle. Receipt of RLC message should stop the timer and set the circuit to idle. Timer T27 is also stopped when the CCR message is received, and timer T36 (10-15 seconds) is started awaiting a COT or a REL message. Timer T36 at the incoming exchange should be stopped and the circuit set to idle on receipt of the RSC message. Timer T36 should also be stopped and an RLC message sent on receipt of a REL message. On receipt of a COT message, timer T36 should also be stopped and timer T27 started awaiting a CCR or a REL message. If either timer T27 or timer T36 expires, a RSC message is sent to the outgoing exchange. On receipt of the RLC message, the circuit is set to idle.

1.06 324b/3384 - Check of Timers T14 and T15

This subfeature fixes problems related to the lack of appropriate follow-up when acknowledgement is not received within 1 minute to blocking (unblocking) or circuit group blocking (unblocking) messages. An AT&T requirement has been added to address this problem.

The new requirement specifies that after sending the initial UBL signal to a foreign correspondent, the ISC will start the T14 (4-15 seconds) and T15 (1 minute) timers. Without the arrival of the UBA signal at T14 time-out, another UBL signal will be sent and T14 will be repeated within the first T15 (1 minute) interval.

Without the arrival of the UBA signal at expiration of the first T15, the ISC will alert the maintenance system (see the I/O change in Section 7.01), stop T14, send another UBL signal, restart T15, and continue to send UBL signals at T15 intervals until maintenance intervention occurs.

This subfeature makes a change in the output message **REPT:CIN** in OM-4A000-01. The change is detailed in Section 8 of this chapter.

1.07 324c/3385 - ISUP Continuity Check Call - COT Unsuccessful

This subfeature fixes problems related to the continuity recheck attempt after expiration of the timer to detect backward tone. The purpose of this subfeature is to ensure that a repeat attempt of the continuity check is made on the failed circuit.

With this subfeature, the outgoing exchange indicates whether or not a continuity check is required by the continuity-check indicator in the IAM. If no backward tone is detected at the outgoing exchange within the expiration of the timer T24 (≤2 seconds), a COT

failed message is sent to the incoming exchange. T24 is initiated when check tone is sent. A CCR message of the speech path is made on the failed outgoing circuit within timer T25 (1-10 seconds). T25 starts on detection of the initial CCF.

A CCR is sent on the failed outgoing circuit within timer T26 (1-3 minutes). T26 starts on detection of CCF. If this check fails, a COT failed message is sent and the check is repeated at intervals of 1-3 minutes. The repeated continuity check will only be finished when continuity is detected or when the maintenance staff disables the circuit.

A limited number of circuits (128 suggested for ISUP protocol)* will be in this repeated check operation. Circuits not entering this repeated check operation send a BLO message and a REL message to the incoming exchange after the second COT failed message is sent.

1.08 324e/3387 - ISUP Continuity Check Test Call - Continuity Check Request (CCR) Received Unsuccessful

In testing, the ISUP level 4 test specifications #1.4.3 and 1.4.4 (Unsuccessful Continuity Check Request Sent/Received) failed during testing with foreign correspondents. The purpose of this test is to verify that the continuity-check procedure can be correctly invoked and received. During testing, it was observed that when the *4ESS* switch receives a CCR and a COT failed message, a RSC signal was sent to the outgoing exchange.

On receipt of an indication of continuity check failure in a COT message, timer T27 (4 minutes) is started awaiting the next message. On receipt of RSC, REL, or RLC message, the timer T27 is stopped and a RLC signal is sent to the outgoing exchange to set the circuit to idle. If the timer T27 expires, a RSC message is sent to the outgoing exchange.

This subfeature assures that the appropriate messages are sent to the incoming and outgoing exchanges.

1.09 324f/3388 - Check of Timers T1 and T5: Failure to Receive a Release Complete Message

This subfeature complies with the CCITT recommendations for follow-up if an RLC message is not timely received in response to a REL message. An AT&T requirement has been added to address this recommendation.

The new requirement specifies that after sending an initial REL message to a foreign exchange, the ISC will start timers T1 (4-15 seconds) and T5 (1 minute). Without the arrival of the RLC message and before the expiration of the first T5 interval, the REL

---

* These 128 circuits are in a common table of 254 usable words with TUP circuits for conservation of resources.

message will be retransmitted at a frequency of T1. However, only the mandatory parameters of the REL message will be retransmitted. The optional parameters will not be retransmitted, since they will not be stored in the buffer.

Without arrival of the RLC message on the expiration of the first T5, the ISC will send a RSC signal, alert the maintenance system, remove the circuit from service, and continue sending the RSC signal at T17 (1 minute) intervals until maintenance action occurs or a RLC message arrives. Timer T16 should be bypassed in this case.

1.10 324g/3389 - Check of Timers T16 and T17

This subfeature complies with the CCITT recommendation for follow-up if a RLC message is not received before 4-15 seconds in acknowledgement of the RSC signal. An AT&T requirement has been added to address this recommendation.

The new requirement specifies that after sending an initial RSC signal, and if this is not as a result of expiration of timer T5, the ISC will start timers T16 (4-15 seconds) and T17 (1 minute) and wait for the RLC message. Without arrival of the RLC message, the RSC signal will be repeated at intervals of T16 until the first T17 expires. At the expiration of the first T17, T16 should be stopped and the maintenance system notified. The sending of the RSC signal should be continued at 1-minute intervals until maintenance action occurs.

If the original RSC signal was sent as a result of an expired T5 (as in 324f/3388), the ISC will start only T17, and the RSC signal will be sent every minute until maintenance action occurs. This new requirement does not apply to test calls or to reset messages sent during system initialization.

1.11 297b/3393 - Cause Value Problem #19

This subfeature involves the issue of the cause value returned when the wait-for-answer timer expires in the case of outgoing U. S. calls.

With the international interface, Cause Value 19 (no answer from user - user alerted) should be in the CCITT No. 7 REL message sent toward the terminating (non-answering) user when the wait-for-answer timer expires.

With the domestic interface, there are different treatments with both ISUP access and Digital Subscriber System 1 (DSS1) access for data and voice calls.

In the case of data calls (not speech or 3.1 kHz or 7 kHz) with ISUP access to the ISC, when the *4ESS* switch wait-for-answer timer expires, an ISUP REL message with a cause value of 19 should be sent. No announcement or tone should be played. [This CCS7 REL message will be mapped into a DSS1 Disconnect (DISC) message with Cause Value 19 by the *4ESS* switch. The originating user will receive the message:.....,ALERTING,DISC(cv=19).]

In the case of voice calls (speech and 3.1 kHz or 7 kHz) with ISUP access, when the *4ESS* switch wait-for-answer timer expires, the appropriate tone or announcement should be played. After the announcement, if the far end has not already cleared the call, an ISUP REL message with a cause value of 16 should be sent. [The originating user will receive the message:.....,ALERTING,audible tone,DISC(cv=16).]

In the case of data calls with access to the ISC via a directly connected DSS1, when the *4ESS* switch wait-for-answer timer expires, a Q.931 DISC message with a cause value of 19 should be sent. No announcement or tone should be played. [The originating user will receive the message:.....,ALERTING, DISC(cv=19).]

In the case of voice calls with access to the ISC via a directly connected DSS1, when the *4ESS* switch wait-for-answer timer expires, the appropriate tone or announcement should be played. After the announcement, if the far end has not already cleared the call, a Q.931 DISC message with a cause value of 102 should be sent. [The originating user will receive the message:.....,ALERTING,audible tone,DISC(cv=102).]

1.12 297g/3398 - Backward Call Indicator in Address Complete Message

This subfeature corrects a situation where, on an outbound call, a Q.931 PROGRESS message may erroneously indicate that an international outbound call is not end-to-end ISDN when it actually is. With this subfeature, that inaccurate message is blocked.

Blocking this inaccurate PROGRESS message allows the originating Customer Premises Equipment (CPE) to receive a Q.931 CONNECT message as the first message after the Call Proceeding.

In addition, this subfeature affects domestic Primary Rate Interface (PRI) customers. In the past, terminating PRI customers could return a PROGRESS message under certain conditions (for example, when the call terminates on an analog phone) to alert the originating PRI customer that the call did not terminate end-to-end ISDN.

To prevent this subfeature from blocking valid domestic PROGRESS messages, a method of distinguishing between valid and invalid PROGRESS messages is desired. If the Progress Indicator information from the terminating customer is mapped back through the network to the originating switch, the presence of this information can be used to prevent the blocking of the valid PROGRESS message.

The Progress Indicator information is carried through the AT&T Switched Network (ASN) as part of the ISUP Access Transport Parameter (ATP) of the Address Complete Message (ACM).

The requirements in this subfeature distinguish an ACM due to a user-provided PROGRESS message from an ACM generated by the network and ensures that end-to-end Progress information is properly delivered.

1.13 323k/3517 - Rejection of Implicit Request for User-to-User Service 1

CCITT Recommendation Q.767 has introduced a Network Discard indicator to be used exclusively for rejection by the network of the implicit request for User-to-User Service 1.

In the case of an inbound call for which the network is unable to handle User-to-User Service 1 after an implicit request [User-to-User Information (UUI) parameter in the IAM], the ISC shall include the User-to-User Indicator in the ACM message with only the A and H bits set to 1 (1000 0001), indicating that UUI is rejected by the network.

Previously, the A, B, and C bits in the User-to-User Indicator parameter were set to 011 (0000-0011) to indicate that either the transit network or the destination network had rejected the implicit request for User-to-User Service 1. Under Q.767, the incoming ISC must send the rejection (Network Discard) to the originating network, mapping any rejection indication into bits A and H of the User-to-User Indicator parameter. This means that the rejection sent is independent of the way in which the rejection was received from the destination network or the method used to transfer the rejection between the ISCs.

1.14 323j/3518 - Additional Requirement for Interworking Between DSS1 and International CCITT No. 7 ISUP

This subfeature corrects a mapping problem between DSS1 and CCITT No. 7 ISUP that occurred in the case of ISDN subscribers with a Primary Rate Interface (PRI) directly connected to an ISC. This problem was discovered during compatibility testing with Kokusai Denshin Denwa (KDD). In the case of inbound 64 kbps calls to such subscribers, AT&T would send an ACM with the "called party's status indicator" set to "no indication" after receiving the Alerting message from the called party. As a result, KDD was unable to receive the User-to-User Indicators transmitted in the ACM.

This subfeature corrects this problem by setting the called party status indicator of the backward call indicator parameter field in the ACM to "subscriber free" rather than "no indication."

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 (Not affected)

8. Input/Output Manual Pages

8.01 Subfeatures 3384 (Check of Timers T14 and T15), 3375 (TUP Continuity Check Test Call - COT Unsuccessful), and 3385 (ISUP Continuity Check Test Call - COT Unsuccessful) affect the output message **REPT:CIN** in OM-4A000-01.

On **REPT:CIN-3**, the following new Group Trunk Reasons are added as a result of subfeature 3375/3385:

- CFA 1 Continuity Failure Analysis removed a CCITT No. 7 trunk
- CFR 1 Continuity Failure Analysis restored a CCITT No. 7 trunk.

On **REPT:CIN-6**, as a result of subfeature 3384, the UAT Reason is expanded to add "or CCITT No. 7" as follows:

- UAT Time-out waiting for an unblocking acknowledgment signal on a CCITT No. 6 **or CCITT No. 7** trunk has occurred.

ID . . . . . REPT:CIN
WORK CENTER . . MOC,TEC,TOC
GENERIC . . . . . 4E16 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
REPT:CIN a;b; STAT d:e f
```

2. REASON FOR OUTPUT

To report trunk state and group status changes.

The REPT:CIN message is output every time a trunk has its basic maintenance state changed, or has its maintenance state qualifier changed. Thus, this message is generated when a trunk makes the transition from ACT, MTC, CAD, or BLK to any different state of ACT, MTC, CAD, or BLK.

REPT:CIN is also used to report cases where the 4ESS™ switch attempts to change the state of a trunk, but was prevented from doing so by some control. In these cases, the state the trunk was left in and the type of control is output. The message is output to the TTY channel defined as the trouble reporting channel in the unit type data of the 51A test position to which the trunk subgroup is assigned. For message trunks, this message is normally sent to CMS in CMS, not manual, format (see REPT:OTAN).

This message is also used to report changes in group status for carrier groups, VIUs, DTUs, MF signaling frame and CCIS XCVR power alarm groups, MF signaling frame tone supply groups, and the CCIS bands. The group messages are sent when the group changes state, independent of the maintenance status of the individual trunks in the group.

3. VARIABLE FIELD DEFINITIONS

a — Circuit identification number (CIN).

b — Reason for, or source of, the state change. These reasons are listed below under headings covering three categories: digroup trunk reasons; group trunk reasons; and individual trunk reasons.

Note: The variables d, e, and f for this message are dependent on the contents of variable b and certain other factors. For ease of explanation and reference, the description of these three variables has been placed within each individual discussion of the possible contents of the variable b.

Unless otherwise indicated:

d — Maintenance status:

MTC — Maintenance; indicates an automatic removal from service.

ACT — Active; indicates the trunk(s) is still in service.

e Null.

f Null.

DIGROUP TRUNK REASONS

For all of the following digroup messages, variable e contains a summary of the current digroup status data in the following format:

```
[BVRx][,RMA][,LCA][,LSA][,RSA][,DGO][,IGN][,OFL|,OFH][,SLL|,SLH]
[,BVL|,BVH][,FBL|,FBH]
```

The parameter BVRx, bipolar violation rate, will only be output when variable b = BVL.

ACP 24 Digroup has been taken out of ignore state.

BVH 24 Digroup bipolar violation high (or out-of-service) threshold has been reached. Trunks are not removed from service for this reason. (DT only.)

BVL 24 Digroup bipolar violation low (or maintenance) threshold has been reached. Trunks are not removed from service for this reason. (DT only.)

DTU 120 A DTU has been removed from service and not protection switched.

DUR 120 A DTU has been restored to service.

ESU 120 An ESU has been removed from service and not protection switched.

EUR 120 An ESU has been restored to service.

IGN 24 Digroup on a DT or DIF has been put into the ignore state via a manual request.

LSA 23 Local subframing alarm on a digroup of a DIF.

LSC 23 Local subframing alarm cleared on a digroup of a DIF.

RSA 23 Remote subframing alarm on a digroup of a DIF.

RSC 23 Remote subframing alarm cleared on a digroup of a DIF.

LAC 24 Local alarm on a digroup on a DT or DIF has cleared.

LCA 24 Local alarm on a digroup on a DT or DIF.

OFH 24 Digroup out of frame high (or out-of-service) threshold has been reached. Trunks are not removed from service for this reason.

OFL 24 Digroup out-of-frame low (or maintenance) threshold has been reached. Trunks are not removed from service for this reason.

RAC 24 Remote alarm on a digroup on a DT or a DIF has cleared.

RMA 24 Remote alarm on a digroup on a DT or DIF.

SLH 24 Digroup slip high (or out-of-service) threshold has been reached. Trunks are not removed from service for this reason.

SLL 24	Digroup slip low (or maintenance) threshold has been reached. Trunks are not removed from service for this reason.
FBL 24	Digroup framing bit low (or maintenance) threshold has been reached. Trunks are not removed from service for this reason (DIF only).
FCL 24	Digroup framing bit low (or maintenance) threshold has been cleared (DIF only)
FBH 24	Digroup framing bit high (or out-of-service) threshold has been reached. Trunks are not removed from service for this reason (DIF only).
FCH 24	Digroup framing bit high (or out-of-service) threshold has been cleared (DIF only).
DGO 24	Digroup has been taken out of service for a hardware failure (DIF only).
DGC 24	Digroup has been restored to service from a hardware failure (DIF only).
DSO 8	Digital service circuits on an MF type DIU have been removed from service due to a PSW (for 4E9 and later).
DSI 8	Digital service circuits on an MF type DIU have been restored to service after a PSW (for 4E9 and later).

GROUP TRUNK REASONS

CAC n	Carrier group alarm cleared. n=12 for analog, 24 for digital.
CAR n	Carrier group alarm. n=12 for analog, 24 for digital.
CFA 1	Continuity failure analysis removed a CCITT No. 7 trunk.
CFA 12	Software carrier group alarm (CCIS continuity failure analysis) removed up to 12 CCIS trunks.
CFR 1	Continuity failure analysis restored a CCITT No. 7 trunk.
CFR 12	Software carrier group alarm restored up to 12 CCIS trunks.
CTS n	MF signaling frame common tone supply duplex failure.
GRB n	Group blocking received on a band of CCIS trunks, n=16, if report to TCA channels, n=1 if to CMS.
GRU n	Group unblocking, n=16, if a TCA channels, n=1 if to CMS.
PWA n	Loss of power to a group of circuits.
RSB n	CCIS reset band received on a band with some blocked trunks. n=number of blocked trunks which were unblocked.
TFA 16	Transfer allowed received from STP on a band of trunks. Trunks restored to service.
TFP 16	Dual transfer prohibit received from STP on a band of trunks. When a

CCIS total signaling failure occurs, TFP is not printed per band removed. Instead the link failure message which is printed at the maintenance channel is broadcast to all TCA channels.

`RPF n` Software carrier group alarm (receive path failure). n=number of E&M trunks removed (1-12).

`RPR n` Software carrier group alarm. n=number of E&M trunks restored (1-12).

`TPF n` Software carrier group alarm (transmit path failure). n=number of E&M trunks removed (1-12).

`TPR n` Software carrier group alarm. n=number of E&M trunks restored (1-12).

`DCO 1` D - Channel has gone out of service.

`DCI 1` D - Channel has been restored to service.

INDIVIDUAL TRUNK REASONS

`BAT` 1-minute time-out waiting for a blocking acknowledgment signal on a CCITT No. 6 trunk has occurred.

`BLK` A blocking signal has been received and not removed within 2 minutes on a CCIS trunk or 5 minutes on a CCITT No. 6 trunk.

`BMT` Received maintenance service message on Q931 trunk; trunk marked blocked.

`BOS` Received out-of-service message on Q931 trunk; trunk marked blocked.

`BSC` A ROTL or 105 responder has been removed from service because of a bad self check.

`CCF` Individual CCIS trunk encountered continuity check failure and failed retest. Attempted to make trunk MTC.LKD subject to automatic test control (ATC) or magic number control (MGC).

`ERA` Trunk error analysis has detected a trunk or service circuit which is failing at a rate high enough to warrant removing the trunk from service or just reporting the trunk and not removing it from service.

For a report only case, ie, the error rate is not high enough to automatically remove the trunk from service, variable `d` will be ACT and `e` will be null.

For removal from service cases, `d` will be MTC and `e` null if the trunk was actually removed from service, or `d` will be ACT and `e` will indicate either a magic number control (MGC) or trunk subgroup error analysis control (EAC) prevented the trunk from being removed from service.

Variable field `f` always contains data about the type and number of failures observed. See Practice 234-100-050 for complete description.

FAL — A circuit has been removed from service because of a fuse alarm.

HAW — The trunk went high and wet.

HWC — A high and wet trunk came clear, ie, it went idle.

MAN — A TTY SET:TRKSTAT message, 51A test position state control button, or manual ROTL request caused the trunk to change state. If manual ROTL, then variable f = CID x (where x is up to 9 characters giving the call back identity of the source of the request).

OPR ttnn — A routine or automatic (as the result of a call failure) operational trunk test has failed: Depending on the type of failure, the 4ESS™ switch will attempt to remove the trunk from service or just report the failure and not attempt to remove the trunk from service.

ttnn = Trouble number indicating how the test failed:

tt - The phase number where the test failed.

nn - The failure type.

If tt=4 then the failure occurred during outpulsing and variable f contains the final handling code data.

If tt is greater than 4, then the failure occurred after successful outpulsing and variable f contains the type of operational test that was run. In this case, see TEST:TRK output message documentation, Section 3.1, for how to interpret the trouble number for the type of test indicated.

If the type of failure does not warrant automatic removal from service, variable d will be ACT and e will be null.

If the type of failure indicates that the trunk should be removed from service, d will be MTC and e will be null if the trunk was successfully removed from service. If the trunk could not be removed from service, d will be ACT and e will indicate that a trunk subgroup automatic test control (ATC) or magic number control (MGC) was in effect.

PSR — Protection switch removal has allowed a circuit removed by PSW to be restored to service.

PSW — Protection switching of a VIU has caused the removal of a trunk maintenance test circuit that does not have a protection switch relay.

QTF — Prior to TPF carrier restoral, the last failing trunk is retested. If a failure is encountered, an attempt is made to mark the trunk MTC.LKO, subject to test control (ATC) or magic number control (MGC).

RTL — The trunk was requested to be removed or restored by ROTL via CAROT. Variable d indicates the state; if a removal request, variable e will indicate ATC or MGC if automatic test control or magic number

control prevented the removal. Variable f=CID x (where x is up to 9 characters identifying the call back identity of CAROT requesting the state change).

RTR — A restart message has been returned on a Q931 trunk. Trunk has been placed in the out-of-service, DSA automatic state.

SVC — An automatic service circuit test has failed. The 4ESS™ switch will always try to remove the trunk from service.

If successfully removed, variable d will be MTC and e will be null.

If the trunk could not be removed, d will be ACT and e will indicate that an automatic test control (ATC) or magic number control (MGC) was in effect.

Variable f will always be null. The failing results data must be obtained via the TEST:TRK message.

TAL — Tone alarm on tone trunks.

TQB — Trunk query has blocked a CCIS trunk.

TQU — Trunk query has unblocked a CCIS trunk.

TUE — Trunk query has removed a trunk from service because the far end is unequipped.

UAT — Time-out waiting for an unblocking acknowledgment signal on a CCITT No. 6 or CCITT No.7 trunk has occurred.

UBL — A CCIS/CCITT No. 6 trunk previously reported as BLK has been unblocked due to receipt of unblocking.

ULB — Unequipped label has received on a CCIS trunk. The trunk is put in MTC.DSA<AUT> state.

VFC — A CCIS VFL has been automatically restored to service because of a successful test message sent by the STP.

VFL — A CCIS voice frequency link has been automatically removed from service due to loss of synchronization or a failing test result message sent by the STP.

CTO — Call time-out. A stable call involving a CCITT No. 5, CCITT No. 6, or CCIS trunk has been in progress for more than one hour after a phase 3. Suspect call is really not there any more and monitor from 51A test position.

MSP — Multiple scan points off-hook on a CCITT No. 5 trunk.

For International Trunks Only

HAW n — The last clearing sequence that was run by the high and wet PIDENT. The clearing sequences are as follows:

1 — CCITT No. 5 with permanent signal on idle OGT or 2-way trunk.

2 — CCITT No. 5 with permanent signal on idle ICT.

3 — CCITT No. 5 quiet trunk used as OGT.

4 — CCITT No. 5 quiet trunk used as ICT.

5 — CCITT No. 5 with permanent signal used as OGT.

6 — CCITT No. 5 with permanent signal used as ICT.

7 — CCITT No. 5 2-Way trunk memory mutilation sequence.

8 — CCITT No. 6 used as OGT (send CLF).

9 — CCITT No. 6 used as ICT (send CFL).

10 — CCITT No. 6 2-Way trunk memory mutilation sequence (send CFL, CLF).

11 — CCITT No. 6 used as ICT (wait for response).

4. ACTION TO BE TAKEN

Take action to fix problem and restore trunks. Trunks which were not taken out of service because of a control should be investigated and manually removed, if necessary, to prevent repeated automatic reports.

5. REFERENCES

PIDENTs
CGAP00
SVCTCNTL
TERA00
TMAD0001
TMAIHWC5
TMAIHWC6
TMAIHWET
TOPT0000

Practice 234-103-016, *Error Analysis of Trunks and Trunk Related Circuits.*
Practice 234-180-240, *Trunk Maintenance Administration Program Description*
Practice 234-180-241, *Trunk Error Analysis Program Description*
Practice 234-180-242, *Service Circuit Test Program Description*
Practice 234-180-245, *Carrier Group Alarm Program Description*
Practice 234-180-246, *Trunk Testing Programs Description*

Input Messages
`SET:TRKSTAT`
`TEST:TRK`

Output Message
`REPT:OTAN`
`TEST:TRK`

700/800/900 Announcement Delay Feature (341)

10

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700/800/900 Announcement Delay Feature (341)

10

1. Feature Description

1.01 The 700/800/900 Announcement Delay feature will allow a *4ESS*™ switch to query the Direct Services Dialing (DSD) Network Control Point (NCP) after it receives a 700/800/900 number that indicates that a DSD NCP query is required. This feature also causes a *4ESS* switch to delay playing an announcement to ensure that there is enough time for a voice path to be established between the caller, through the Local Exchange Carrier (LEC) end office, and the Originating AT&T Switch (OAS). The delay prevents the possibility of announcements being clipped. The timing of the delay is as follows:

- 1.2 seconds after receiving dialed number for Equal Access Multifrequency (EAMF) signaling
- 0.7 seconds after receiving Initial Address Message (IAM) number for Signaling System 7 (SS7) Network Interconnect (NI) signaling.

This feature is required to realize the Post Dial Delay (PDD) savings anticipated with the implementation of the Interim Solution to Reduce the 800 Double Dip and the Elimination of 800 Double Dip features.

2. Call Flow

2.01 This section describes the call flow for the 700/800/900 Announcement Delay feature:

(1) The OAS receives the 10-digit 700/800/900 number.

(2) Once the OAS determines that the query to the DSD NCP is required, it will send a Transaction Capability Application Part (TCAP) message to the DSD NCP. The OAS will no longer delay the query.

(3) The NCP receives the TCAP query from the OAS and executes the customer record. If the customer record logic requires that an announcement be played, the DSD NCP will respond with a TCAP message containing a caller interaction request.

(4) The OAS will connect a voice path from the Network Services Complex (NSCX) to the caller and delay playing the announcement to allow for the voice path to be cut-through by the end office, so that the announcement will not be clipped. If the access signaling is EAMF, the announcement will be played after a delay of 1.2 seconds. If the access signaling is SS7 NI, the announcement will be played after a delay of 0.7 seconds.

(5) The call will then proceed and complete normally.

3. Provisioning (Not affected)

4. Recording (Not affected)

5. Network Management (Not affected)

6. Maintenance/Troubleshooting (Not affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

7.02 Prior to deployment, the two Office Data Administration (ODA) words containing the announcement delay must be populated. The words and their default values in centi-seconds are as follows:

- CCS7 NI: 0D4C7NIDLY = 70 cs
- MF/EA: 0D4MFEADLY = 120 cs.

8. Input/Output Manual Pages (Not affected)

Signaling Connection Control Part Routing Verification Test (SRVT) Feature (3037)

11

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Signaling Connection Control Part Routing Verification Test (SRVT) Feature (3037)

11

1. Feature Description

1.01 Queries expected within the network are 3, 6, 9, 10, and 12 digits in length. This feature allows only input messages that include 3, 6, 9, 10, and 12 digits. This feature also causes a Global Title Indicator of 0001 to be used in 10-digit input messages.

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

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not affected)

Testing Operations Provisioning Administrative System (TOPAS) Summary Trunk Turndown Improved Interface Feature (3512)

12

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8. **Input/Output Manual Pages (Not affected)** 12-3

Testing Operations Provisioning Administrative System (TOPAS) Summary Trunk Turndown Improved Interface Feature (3512)

12

1. Feature Description

1.01 This feature is being released in two phases. The first phase of this feature will enable the summary (SUM) option to be used with the **SET:TRKSTAT** command when executed from the Testing Operations Provisioning Administrative System (TOPAS). Previously, use of the SUM option was restricted and removing this restriction will allow up to 24 trunks to be removed from service with a single **SET:TRKSTAT** command.

1.02 The second phase of this feature causes some of the responses to **SET:TRKSTAT** and **OP:TRKSTST** commands, executed from TOPAS, to be sent to TOPAS instead of the Test Control Area (TCA) channel. See Table 12-A for details.

1.03 The response to the **OP:TRKSTAT** command is similar to that returned for the **SET:TRKSTAT** command. The TRK COUNT specifies the number of trunks that changed state or fit the request options.

2. Call Flow (Not affected)

3. Provisioning (Not affected)

4. Recording (Not affected)

5. Network Management

5.01 The type and location of responses to the **SET:TRKSTAT** and **OP:TRKSTAT** commands, entered from TOPAS, are listed in Table 12-A.

Table 12-A. Command Outputs

Input Command	Options	Output Location			Type of Response(s)
		Original	Phase 1	Phase 2	
SET:TRKSTAT	Single Circuit	TOPAS	TOPAS	TOPAS	Single
	Group Identifier	TCA	TCA	TCA	Multiple (N+1)
	Group Identifier and Sum Option	TCA	TCA	TOPAS	Single
OP:TRKSTAT	Single Circuit	TOPAS	TOPAS	TOPAS	Single
	Group Identifier	TCA	TCA	TOPAS	Multiple (N+1)
	Group Identifier and Sum Option	TCA	TCA	TOPAS	Single

6. Maintenance/Troubleshooting (Not affected)

7. Transition Considerations

Dependencies on Other Network Components

7.01 Phase 2 of this feature is not to be deployed until the TOPAS programs have been modified with transmission safeguards for group commands, and the Receive Logic has been modified for multipart returns.

Turn On/Turn Off Mechanism

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not affected)

Private Branch Exchange (PBX) High and Wet Wink Release Feature (3572)

13

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Private Branch Exchange (PBX) High and Wet Wink Release Feature (3572)

13

1. Feature Description

1.01 This feature introduces a new function to High and Wet trunk handling for Ear and Mouth (E&M) signaling Public Branch Exchange (PBX) trunks. These trunks are susceptible to a situation known as "inadvertent add-on" when a caller depresses the switchhook momentarily after a failed call attempt. Dependent on the duration of the switchhook, the switch can interpret this condition as a request for special services on the original trunk. This condition can result in the original trunk continuing to report off-hook, which can result in the trunk entering into High and Wet processing. This condition will not clear automatically.

1.02 This feature provides a mechanism which will free this trunk from the High and Wet processing by sending a short (2-second minimum) off-hook from the switch toward the PBX. The off-hook should cause the PBX to clear the trunk. The High and Wet condition will then be cleared, and the trunk will be idled.

1.03 A trunk that is not released by the PBX will receive normal High and Wet treatment. This may result in the trunk being marked on the High and Wet List (HWL). This specifies that the trunk is in a maintenance state, and a report of the condition is sent to the Testing Operations Provisioning Administrative System (TOPAS).

2. Call Flow (Not affected)

3. Provisioning (Not affected)

4. Recording (Not affected)

5. Network Management (Not affected)

6. Maintenance/Troubleshooting

Trunk Maintenance

6.01 An E&M signaling trunk that is not released by the PBX after receiving an off-hook from the switch will receive normal High and Wet treatment. This may result in the trunk being marked on the HWL. This specifies that the trunk is in a maintenance state, and a report of the condition is sent to TOPAS.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not affected)

Direct-Connect Trunk Subgroup (TSG) Feature (3618)

14

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Direct-Connect Trunk Subgroup (TSG) Feature (3618)

14

1. Feature Description

1.01 This feature prevents the removal of trunks from small trunk subgroups (three or less) as a result of Trunk Error Analysis processing. Trouble tickets will continue to be issued for the affected trunks; however, the trunks will remain active (will not be locked out).

1.02 Businesses with small trunk subgroups directly connected to the *4ESS*™ switch were experiencing service degradation when a trunk was removed from these small trunk subgroups as a result of Trunk Error Analysis processing.

1.03 This feature does not affect trunk subgroups that have more than three trunks.

2. Call Flow (Not affected)

3. Provisioning (Not affected)

4. Recording (Not affected)

5. Network Management (Not affected)

6. Maintenance/Troubleshooting

6.01 A trunk that is part of a small trunk subgroup (three or less trunks) will not be removed from service as a result of Trunk Error Analysis.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not affected)

Transaction Capabilities Application Part (TCAP) End Message Fix for Network Remote Access (NRA) Improved Sequence Dialing Feature (3637)

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Transaction Capabilities Application Part (TCAP) End Message Fix for Network Remote Access (NRA) Improved Sequence Dialing Feature (3637)

15

1. Feature Description

1.01 The 1 Direct Services Dialing (1DSD) Network Control Point (NCP) has been sending all customized terminating announcements for DSD-based services to *4ESS*™ switches in Transaction Capabilities Application Part (TCAP) CONTINUE messages. All standard terminating announcements have been sent to the *4ESS* switches in a TCAP END messages. However, for the Network Remote Access (NRA) Improved Sequence Dialing feature, the *4ESS* switch expects all calls that require termination treatment to be handled via a customized announcement in a TCAP CONTINUE message which is immediately followed by a TCAP END message.

1.02 This feature allows the *4ESS* switch to recognize an Software Defined Network (SDN) standard terminating announcement that is received in a TCAP END message. A *4ESS* switch will continue to recognize customized terminating announcements that are contained in TCAP CONTINUE messages.

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

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not affected)

Final Handling Code on Automatic Message Accounting (AMA) Record Feature (3640)

16

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Final Handling Code on Automatic Message Accounting (AMA) Record Feature (3640)

16

1. Feature Description

1.01 On-Line Call Detail Data/Real Time (OCDD/RT) makes data from the Automatic Message Accounting (AMA) records available to customers within a short time after call completion. Customers use this data for a variety of purposes including network monitoring and fraud detection. To improve the usefulness of the AMA data, additional data can be appended to the AMA records to meet specific customer needs.

1.02 The appending of the additional data is triggered in *4ESS*™ switch when certain OCDD flags are set by an Network Control Point (NCP) and transmitted to the switch. The flags result in the corresponding Service Option Flags being set in the switch.

1.03 The Call Disposition Information (CDI) Service Option Flag cause the Call Disposition Module to be appended to the AMA record. The Call Disposition Module contains the Final Handling Code, together with other data, that allows OCDD to determine, for example, approximately how long it took for the call to be answered or how long ringing was supplied for the call. The Final Handling Code is critically important for incomplete calls because it allows OCDD to distinguish between unanswered calls and those in which some network or customer failure prevented the completion.

1.04 Currently, Table 507 of the Call Disposition Module is populated with the Final Handling Code 99999C to indicate that a call has completed normally.

2. Call Flow (Not affected)

3. Provisioning (Not affected)

4. Recording

4.01 A Final Handling Code of 99999C is recorded in AMA Table 507 when a normally handled call is completed.

5. Network Management (Not affected)

6. Maintenance/Troubleshooting (Not affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not affected)

Abbreviations and Acronyms

A

ABR
Announcements Before Routing

ACM
Address Complete Message

ACP
Action Control Point

AHC
Adjunct Head Cell

AMA
Automatic Message Accounting

ANI
Automatic Number Identification

APN
Action Point Number

APR
Announcement Price Restructure

ASN
AT&T Switched Network

ATP
Access Transport Parameter

B

BCD
Binary Coded Decimal

BLA
Blocking-Acknowledgement

BLO
Blocking

BN
Billing Number

BOP
Billing Option Parameter

C

CAOSS
Common Administrative Operations Support System

CC
Call Code

CCF
Continuity Check Failure

CCIS6
Common Channel Interoffice Signaling System No. 6

CCITT
Consultative Committee on International Telephone and Telegraph

CCR
Continuity Check Request

CCS
Common Channel Signaling

CDI
Call Disposition Information

CED
Caller Entered Digit

CFA
Caller Feature Available

CLF
Clear Forward

CLI
Call Line Identification

CML
Command List

CNI
Common Network Interface

COS
Class of Service

COT
Continuity

CPE
Customer Premises Equipment

CPG
Call Progress

CPN
Calling Party Number

CPR
Call Processing Record

CPS
Call Progress Stopped

CRN
Customer Record Number

D

DEV
Dedicated Egress Voice

DIF
Digital Interface Frame

DISC
Disconnect

DNTT
Dialed Number Translation Table

DS1
Direct Signaling 1

DSD
Direct Services Dialing

DSDC
Direct Services Dialing Capability

DSS1
Digital Subscriber System 1

E

E&M
Ear and Mouth

EAMF
Equal Access Multifrequency

EBAF
Extended Bellcore AMA Format

ENAC
Engineering Network Administration Center

ESTN
Emergency Signaling Transport Network

F

FAR
Facility Request

FRED
Feature Routing Enhanced Dynamically

FSIT
Foreign Subscriber Identifying Telephone

FSSS
FRED Service Support System

G

GRI
Generic Routing Information

GT
Global Title

GTT
Global Title Translation

H

HWL
High and Wet List

I

IAM
Initial Address Message

ICDR
International Call Detail Recording

ICS
International Communications Services

IDB
INWATS Data Base

IE
Information Element

INWATS
Inward Wide Area Telephone Service

ISAIC
Improved Service Announcement and Information Collection

ISC
International Switching Center

ISDN
Integrated Services Digital Network

ISOI
Inbound Supplemental Originating Information

ISUP
Integrated Services Digital Network User Part

ITAMAC
International Transit Accounting and Maintenance Analysis Center

K

KDD
Kokusai Denshin Denwa

L

LEC
Local Exchange Carrier

M

MOC
Maintenance Operation Center

MOOS
Manually Out Of Service

MPS
Message Processing System

N

NCP
Network Control Point

NCPAS
Network Control Point Administrative System

NEMOS
Network Management Operations System

NESAC
National Electronic Switching Center

NI
Network Interconnect

NM
Network Management

NPA
Numbering Plan Area

NRA
Network Remote Access

NRN
Network Routing Number

NRNX
Network Routing Number Exhaust

NSCX
Network Services Complex

NSD
Network Services Division

NSF
Network Specific Facilities

O

OAS
Originating AT&T Switch

OCDD
On-Line Call Detail Data

ODA
Office Data Administration

ODA
Office Data Assembler

ONI
Operator Number Identification

ONPA
Originating Numbering Plan Area

OOS
Out Of Service

OSPS
Operator Services Position System

OSS
Operation Support System

P

PBX
Private Branch Exchange

PDD
Post Dial Delay

PECC
Product Engineering Control Center

POTS
Plain Old Telephone Service

PPT
Postal, Telephone, and Telegraph

PRI
Primary Rate Interface

R

RAO
Revenue Accounting Office

RC
Recent Change

RCB
Requirement Control Board

REL
Release

RICS
Recorded Information Collection System

RLC
Release Complete

RLG
Release Guard

RNMS
Regional Network Management System

RNOC
Regional Network Operations Center

RPI
Routing Pattern Identity

RSC
ReSet Circuit

RT
Real Time

RTNR
Real Time Network Routing

S

S/A
Service Assist

SCU
Service Circuit Unit

SD&M
Service Development and Management

SDC
Service Degrading Condition

SDN
Software Defined Network

SFR
Sponsor Flexible Routing

SI
Service Identity

SIC
Service Identification Code

SIC
Service Indicator Code

SID
Station Identification

SOM
Start of Multiunitmessage

SRVT
Signaling Connection Control Part Routing Verification Test

SS7
Signaling System 7

SSC
Special Service Code

SSS
Service Support System

STP
Signaling Transfer Point

SUM
Summary

T

T1FA
T1 Facility Access

TC
Transaction Center

TC
Transport Capability

TCA
Test Control Area

TCAP
Transaction Capabilities Application Part

TCC
Technology Control Center

TOPAS
Testing Operations Provisioning Administrative System

TSG
Trunk Subgroup

TUP
Telephone User Part

U

UBA
Unblocking-Acknowledgement

UBL
Unblocking

UPS
Usage Processing System

USS
User Support System

UUI
User-to-User Information