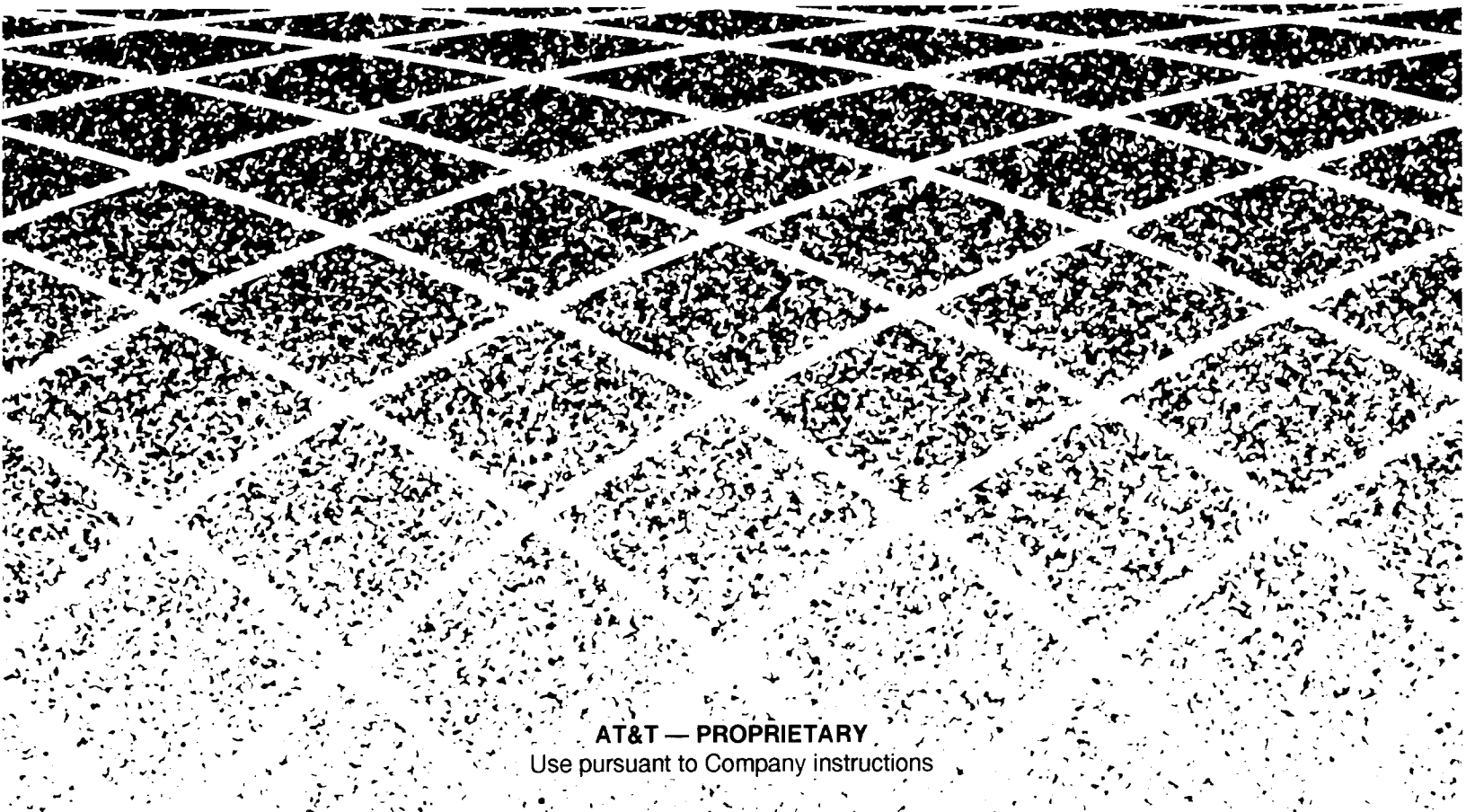
AT&T 234-090-183AC
Issue 1
July 1994

4ESS™ SWITCH

Product Release Document
4E18/4E19 Release 3 Generic



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Document Title: *4ESS*™ Switch - Product Release Document - 4E18/4E19 Release 3 Generic

Document No.: AT&T 234-090-183AC Issue Number: 1 Date: July 1994

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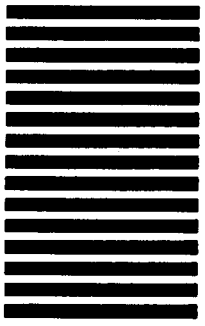

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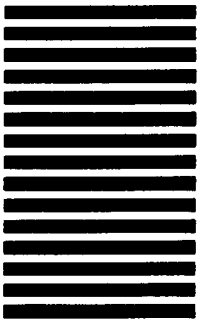

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About This Document

1. Purpose

1.01 The purpose of the Product Release Document (PRD) is to provide customers with information pertaining to the new features that are introduced in the *4ESS*™ switch. A PRD is written to cover the features introduced in quarterly generic releases and full generic releases. This particular PRD provides information pertaining to the new features included in the 4E18/4E19 Release 3 generic.

2. Scope

2.01 The Product Release Document provides customers with information not covered in other *4ESS* switch documentation. It is not a replacement for other documentation such as Standard AT&T Practices, Task Oriented Practices (TOP), Maintenance Reference Handbooks, etc., that support the *4ESS* switch. The information in this document is intended only for the introduction of the new 4E18/4E19 Release 3 features, not the long-term maintenance. Since other documentation is used for the operation and maintenance of features after their introduction into the *4ESS* switch, this PRD will not be reissued.

3. Intended Audience

3.01 This document is intended for people involved in testing, provisioning, maintenance, administration, and technical support of the *4ESS* switch. Feature managers, Integrated Test Network (ITN) personnel, field support, Technical Control

Center (TCC), Product Engineering Control Center (PECC), and National Electronics System Assistance Center (NESAC) personnel are examples of some of the people who will use the PRD.

4. How to Use This Document

4.01 The 4E18/4E19 Release 3 generic contains 16 new features. Each chapter in this document provides information about these features. The chapters are in numerical order according to feature number. The chapter titles are also the feature names.

4.02 The following is a list of the chapters contained in this document with a brief description of the feature covered in that chapter:

Chapter 1: *Local Exchange Carrier (LEC) Switched Digital Service—Phase 2 Feature (333)*

The Local Exchange Carrier (LEC) Switched Digital Service (LSDS) Phase 2 feature enhances the Intra-Local Access Transport Area (LATA) H0/H11 feature and the Inter-LATA Switched Digital Service and Network Interconnect for Primary Rate Interfaces Phase 1 feature. This feature is essentially a screening feature that determines if the called number received is compatible with the carrier to be used. It provides the LEC with carrier presubscription, per-call carrier selection screening, and originating called number routing.

Chapter 2: *SS7 Trunk Signaling Interface for Cellular Type 2A Connection Feature (401)*

This feature provides a trunk signaling interface that allows Signaling System 7 (SS7) signaling over a Type 2A connection between a *4ESS* access tandem switch and a cellular mobile carrier. Prior to this feature, only MF signaling could be used.

Chapter 3: *4 Gigabyte Disk Units on Service Circuit System (SCS) Feature (404)*

This feature adds a third size hard disk for the Service Circuit System (SCS): 4 Gigabytes. Previous generics support a 420 Megabyte and a 2 Gigabyte hard disk.

Chapter 4: *3.1-kHz Enhancement: Switch Options Feature (408)*

The 3.1-kHz Enchancement: Switch Options feature corrects a problem that caused some lost calls. This feature allows the Local Exchange Carrier office to control the encoding of the Information

Transfer Capability field in the User Service Information parameter of the Integrated Services Digital Network User Part Initial Address Message.

Chapter 5: *USEC Individual Per Call Control (iPCC) Feature (3795)*

AT&T Consumer Communications Service-Business Unit (CCS-BU) is offering customers enhanced voice quality. The enhancement is provided using the Universal Services Echo Canceler (USEC) platform. Feature 3795 provides the platform for Individual Per Call Control (iPCC) of the voice enhancement. The iPCC architecture provides a communication link between the *4ESS* switch and the USEC via a device referred to as a "Gateway." The iPCC Gateway is a stand-alone device located in the *4ESS* switch central office.

Chapter 6: *ANI/DN Per Call Control of Voice Enhancement Feature (3891)*

AT&T Consumer Communications Services-Business Unit (CCS-BU) is offering customers enhanced voice quality. The enhancement is provided using the Universal Services Echo Canceler (USEC) platform. Feature 3795 (covered in this document) provides the platform for Individual Per Call Control (iPCC) of the voice enhancement. Feature 3891, built on the Feature 3795 base, supports the sending of a control message for the voice enhancement based on the Automatic Number Identification (ANI) or Destination Number (DN).

Chapter 7: *Inbound International 800 Service Separation of Country Code from Network Routing Number Feature (3957)*

The Inbound International (I800) Service Separation of Country Code from Network Routing Number (NRN) feature increases the number of Telecommunications Administration (TA) identification codes for I800 Service traffic. The 1- to 3-digit International Direct Distance Dialing (IDDD) Country Codes (CCs), along with the Foreign Administration Identification (FAI), are derived from the incoming Trunk Subgroup (TSG). Two additional digits in the NRN become available and can be allocated to subscriber IDs.

Chapter 8: *Self-Provisioning Global Title Translation (SPGTT) Deferred Requirement Feature (4032a)*

The SPGTT feature introduced the method of provisioning the Global Title Translation (GTT) table in the Direct Link Node (DLN) from a Universal Global Translator (UGT) Network Control Point (NCP) database. This method of provisioning may add infrequently used records to the DLN GTT table or records that are only used one time. To keep the table from running out of space, the table is searched once a day for certain types of records. Records fitting the

predefined types are deleted. The SPGTT Deferred Requirement feature adds records for non-home/non-served Numbering Plan Areas (NPAs) to the types of records that are removed from the table.

Chapter 9: *Alternate Signaling Transport Network (ASTN) Gateway/Network Interconnect Backup Enhancements Feature (4033)*

The Alternate Signaling Transport Network (ASTN) Gateway/Network Interconnect (NI) provides signaling backup for the Common Channel Signaling System 7 (CSS7) NI Integrated Services Digital Network User Part (ISUP) messages when a *4ESS* switch/Common Network Interconnect (CNI) signaling failure occurs. Additional NI backup enhancements were needed to handle the increased traffic in the AT&T *4ESS* Switched Network. This feature enhances ASTN routing capabilities by providing for additional F-link layers, the selection of outbound helper switches in any region, and CNI route verification testing via the Message Transfer Part Route Verification (MRVT) and the Signaling Connection Control Part Route Verification Test (SRVT).

Chapter 10: *Alternate Signaling Transport Network (ASTN) 56-kbps Capability for UNITEL 4ESS™ Switches Feature (4168)*

This feature provides a backup capability during instances when UNITEL *4ESS* switch becomes isolated from the Common Channel Signaling 7 (CCS7) signaling network. This includes backup for Transaction Capabilities Application Part (TCAP) and RTNR signaling messages. Alternate Signaling Transport Network (ASTN) coverage is provided for signaling traffic between two UNITEL switches,and signaling traffic between UNITEL switches and the AT&T Switched Network (ASN) switches.

The ASTN UNITEL feature does not change the existing ASTN architecture. Software deployment is required for switches in the ASN and UNITEL switching network to recognize the new NID of the two UNITEL *4ESS* switches. In addition to software deployment, 56-kbps F-links must be deployed between the UNITEL switches, and a new STP pair will be added to the UNITEL switching network. The new UNITEL STP pair will be interconnected to the ASN, and it will be supported by AT&T work centers.

Chapter 11: *Inbound International 800 Service Overseas Access Feature (4170)*

The Inbound International 800 (I800) Service Overseas Access feature allows incoming 800 Service calls to have the Dialed Number (DN) format as 800+7D. The locations affected include Overseas, Mexico, and the Caribbean.

Chapter 12: *Universal Global Translator (UGT) Fall-Out Report Feature (4186)*

The UGT Fall-Out Report feature provides two enhancements to the Self-Provisioning Global Title Translation (SPGTT) feature. First, it provides work centers with a way of determining whether an update request from the UGT Network Control Point (NCP) to a *4ESS* switch was successful. Secondly, it adds the ability to delete entries in the DLN GTT table based on the Customer ID.

Chapter 13: *Enhanced I800 Service Using USADirect® Telecommunications Service Feature (4189)*

The Enhanced International 800 (I800) via *USADirect* Telecommunications Service feature satisfies both the AT&T business customer and the consumer customer by providing an international origination toll free capability to existing domestic toll free 800 numbers. The AT&T 800 business customer benefits by having a ubiquitous 800 number than can be marketed and dialed from overseas points of origination. The consumer customer, that is, overseas U.S. traveler and/or *AT&T Teleticket®* international long distance calling customer, benefits by having toll free international access service from overseas locations.

Chapter 14: *UNITEL Network Identification (NID) Code Feature (4215)*

This feature changes the Network Identification (NID) code for the *4ESS* switches in the UNITEL network. The new UNITEL NID code is NID 236. Switches in the UNITEL network have been using the same NID that is used in AT&T network switches. The new UNITEL NID code will be used to support Common Channel Signaling (CCS) traffic.

This feature also allows UNITEL switches to use the same features and services that are used in the ASN. Therefore, UNITEL switches will behave exactly like AT&T switches in the ASN.

Chapter 15: *Multiple 4ESS™ Switch Network Announcements Feature (4232)*

The Multiple *4ESS* Switch Network Announcement feature enables the switch to give final handling treatments and service terminating announcements in different languages based on the location of the caller. This capability is required for all services being offered in Canada on the *4ESS* switch platform. The first application is for UNITEL switches, and four versions of each announcement are available: English only, English followed by French, French followed by English, and French only.

Chapter 16: *Foreign-Billed 800 Service Feature (4322)*

The Foreign-Billed 800 Service feature, released in the first quarter of 1994, allows completion of foreign-dialed calls to all 800 numbers (both AT&T and non-AT&T). It also expands foreign-billed 800 service to as many World Zone 1 and non-World Zone 1 countries as possible. With this feature, the foreign Post Telecommunications and Telegraph bills the caller for the overseas portion of the call, and AT&T or the Other Common Carrier provides 800 service and bills the 800 subscriber in the United States.

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

5. Product Safety Labels

5.01 There are three types of safety labels used in AT&T documentation: DANGER, WARNING, and CAUTION. This document does not contain safety labels.

6. How to Comment on This Document

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

7.04 Federal Government orders must be processed through CIC.

Local Exchange Carrier (LEC) Switched Digital Service—Phase 2 Feature (333)

1

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Local Exchange Carrier (LEC) Switched Digital Service—Phase 2 Feature (333)

1

1. Feature Description

1.01 The *4ESS*™ Switch Local Exchange Carrier (LEC) Switched Digital Service (LSDS)—Phase 2 feature enhances the Intra-Local Access and Transport Area (LATA) H0/H11 feature (generic 4E16) and the Inter-LATA Switched Digital Service and Network Interconnect (NI) for Primary Rate Interfaces (PRI)—Phase 1 feature (generic 4E17R3). A brief description of these two features is covered in the Background section. Also covered is information on signaling protocols.

1.02 The LEC Switched Digital Service—Phase 2 is essentially a screening feature that determines if the called number received (a Q.931 data call) is compatible with the carrier to be used. If the called number is not compatible with the carrier, the call will be final handled with a Final Handling Code (FHC). Call types, carriers, and FHCs are discussed later in this chapter.

1.03 The Phase 2 LSDS feature enhancements impact incoming data calls using Q.931 signaling for LEC Integrated Services Digital Network (ISDN) PRI customers. The enhancements of Phase 2 LSDS will not occur until the Office Data Assembler (ODA) LSDS-PH2 transition indicator is activated. This transition indicator acts as an ON/OFF switch for the enhancements. Phase 2 enhancements provide the LEC with the following capabilities:

- Carrier Presubscription
- Per-Call Carrier Selection Screening
- Originating Called Number Routing.

Carrier Presubscription

1.04 Carrier presubscription provides the end customer with the option of presubscribing to an explicit carrier during initial service setup or requesting a carrier after service is initiated. Customers who have presubscribed to a carrier will not have to provide the Carrier Identification (CID) code during call setup.

Per-Call Carrier Selection Screening

1.05 Per-call carrier selection screening provides the end customer with the ability to select a carrier on a per-call basis. The customer can use this option to either override a presubscribed carrier by providing a CID code during call setup, or the customer can choose not to presubscribe to a carrier. If the customer chooses not to presubscribe to a carrier, a CID code must be provided during call setup for each call that requires a carrier. Per-call carrier selection screening consists of the following:

- Validating 3-digit and 4-digit CID codes
- Determining whether an inter-LATA carrier can route an originating intra-LATA switched data call (intra-LATA competition allowed)
- Determining whether a LEC can route an originating inter-LATA switched data call (corridor and privileged calls)
- Determining whether a carrier supports the 64-kbps, 384-kbps, and 1536-kbps bearer capability requested.

Originating Called Number Routing

1.06 Originating called number routing consists of obtaining relevant information from the called number and the carrier selected to route the call. This capability allows the LEC to assign a call based on the type of traffic the carrier can handle. The called number is 10 digits for domestic calls and 7-15 digits for international calls. The called number requires a 3- or 6-digit translation to distinguish between intra-LATA, inter-LATA, International World Zone 1 (IWZ1), corridor, and privileged calls. The originating called number routing also determines the type of Numbering Plan Area (NPA) and/or office code [that is, vacant, valid, restricted, Special Area Code (SAC), or N11).

Call Types/Carriers

1.07 Calling areas are divided into LATAs. Therefore, a distinction has to be made between calls that remain within the same LATA and calls that are made between LATAs, and the type of carrier that can handle each type of call.

1.08 A carrier can be designated as LEC (intra-LATA), inter-LATA, international, or combined. A LEC carrier handles traffic within a LATA. An inter-LATA carrier handles traffic within WZ1. An international carrier handles traffic outside the continental United States. A combined carrier handles both inter-LATA and international traffic.

1.09 Intra-LATA calls are made between stations assigned within the same LATA. Typically, intra-LATA calls are handled completely by a LEC. Inter-LATA calls are made between stations assigned in different LATAs within the continental United States. Inter-LATA calls are usually handled either by an inter-LATA carrier or by a combined carrier. The inter-LATA or combined carrier usually passes the call from the originating LEC to the terminating LEC over its own facilities. A WZ1 international call is a call that routes outside the United States but within WZ1. International calls are handled by an international carrier or a combined carrier.

1.10 Intra-LATA calls can also be handled by inter-LATA carriers when intra-LATA competition is permitted within the LATA. The inter-LATA carrier will handle the call when the calling party specifically selects the carrier by providing a CID code during call setup or when the calling party presubscribes to the carrier. However, the inter-LATA carrier must have regulatory approval to carry intra-LATA traffic.

1.11 Some inter-LATA calls can be defined as international, international WZ1, corridor, and privileged calls. Inter-LATA calls that have been defined as international calls are handled by international and combined carriers. International WZ1 calls are carried by inter-LATA, international, and combined carriers.

1.12 Corridor and privileged calls are inter-LATA calls that may be handled by the LEC if the LEC has special regulatory permission. When a call is designated as a corridor call and the carrier is a LEC (via the CID code during call setup or via presubscription), the call is handled by the LEC as an intra-LATA call. When a call is designated as a privileged call and no carrier is specified by a CID code during call setup (and the presubscribed carrier option is not checked), the call is handled by the LEC as an intra-LATA call.

Background

A. LEC Intra-LATA H0/H11 (4E16)

1.13 The Intra-LATA H0/H11 feature that was introduced in generic 4E16 allows LEC ISDN end users to transmit data at 384 kbps (H0) or 1536 kbps (H11) "within" LATAs. Access to the H0/H11 intra-LATA facilities on the LEC *4ESS* switch is via AT&T's Q.931 PRI that is dedicated to data services. The H0/H11 Customer Premises Equipment (CPE) is connected to the LEC *4ESS* switch. This intra-LATA switched service does not support carrier selection, and therefore does not support International Carrier routing of switched data calls.

1.14 When an end user requests a H0/H11 call, the following occurs:

- The CPE sends a 10-digit called party number and a 384-kbps or 1536-kbps data rate via a Q.931 SETUP message to the LEC *4ESS* switch.
- The LEC *4ESS* switch recognizes the data rate and translates the 10-digit called party number.
- If the called party number is not an intra-LATA H0/H11 number, the call is terminated and a DISCONNECT message is sent to the CPE.
- If the called party number is an intra-LATA number, an Automatic Message Accounting (AMA) record is generated and the call is routed to the terminating CPE.
- The terminating CPE is notified of the call by a Q.931 message with the bearer capability populated with a 384-kbps or 1536-kbps data rate.

1.15 When the originating and terminating customers are located on different LEC switches in the same LATA, Common Channel Signaling System 7 (CCS7) signaling is used between the two switches to complete the call. The originating *4ESS* switch makes an AMA record for the call. The call is recorded as Call Code 061, Structure Code 1081 or 1083.

B. LEC Inter-LATA Switched Digital Service—Phase 1 (4E17R3)

1.16 The *4ESS* Switch Inter-LATA Switched Digital Service—Phase 1 feature provides the LEC PRI customers with data services at rates of 56 kbps, 64 kbps, 384 kbps, and 1536 kbps. Phase 1 enhances the PRI capability to support per-call carrier selection. It also enhances NI by allowing NI to support data calls. Phase 1, which supports a 3-digit or 4-digit (in 4E18) CID code, allows LEC PRI customers to set up data calls "between" LATAs and to select the carrier, on a per-call basis, that will transport the call.

2. Call Flow (Not Affected)

3. Provisioning

Office Data Administration

3.01 The Phase 2 LSDS feature requires that the following translation data be provisioned before activating the ODA LSDS-PH2 transition indicator on Recent Change (RC) Form 809:

- International Data Calls
- Called Party Number Translation
- Carrier Presubscription
- Carrier Validation.

A. International Data Calls

3.02 To support or allow any incoming international Q931 data calls, an ODA Q931 Data Table (OD4Q931DDOM) must be updated via RC Form 800 using the following data to populate three words in generic 4E18/19:

Address	New Data	Old Data	Domain Type
7521034	00000154	00000000	International Clear 64-kbps Data Call
7521035	00033355	00000000	International 56-kbps Data Call
7521036	00000163	00000000	International 384-kbps Data Call

B. Called Party Number Translation

3.03 The called party number translation is provisioned to distinguish between the types of calls. For every incoming called number (NPA and NPA-NXX) that is to be completed successfully, a Called Number Type (CDNT) must be assigned. This CDNT screening Code Grouping is independent from the routing Code Grouping. The CDNT data is provisioned in the DAVT domain using RC Forms 300-304 (ODA Forms 403D-403G and 403V). These forms must be populated as follows:

- Domain=DAVT
- CALLTYP=FHT
- CALLDATA=LSA
- AD1 field populated with one of the following CDNTs:

AD1 Entry	Description
Blank	Unassigned called area
ITRA	Intra-LATA called area
PRIV	Privileged called area
CORR	Corridor called area
ITER	Inter-LATA called area
WZ1	International WZ1 called area

3.04 The **AD1** field is only provisioned for the Final Handling Treatment (FHT) call type when the domain is DAVT and CALLDATA=LSA. Otherwise, AD1 input is not allowed on RC Forms 300-304 with the FHT call type.

NOTE:
In 4E18 Release 3, LEC offices are allowed to provision the DAVT domain to support the LSDS Phase 2 feature. To define or open the DAVT domain, RC Form 309 is needed to add a new non-POTS domain. If the number of translatable digits for this domain is to be greater than 3, then RC Form 311 is also needed to change the number of translatable digits (NTDs).

C. Carrier Presubscription

3.05 The CID codes can be provisioned or populated at any time within the Trunk Subgroup (TSG) via RC Forms 100 and 107 (ODA Forms 401A). The TSG will store the customer's presubscribed carrier selected to handle inter-LATA and intra-LATA calls. The presubscription carrier is identified by a 4-digit number ranging from 0000-9999, indicating the XXXX digits of the desired carrier. In generic 4E18/19, the carrier is populated using the **XTSTN** field when the **XTSTT** field is set to "N."

D. Carrier Validation

3.06 For each CID code (3- or 4-digit code) that is to handle and route calls, a CID type must be assigned to the CID. The CID type is provisioned in the Access Tandem Transit Network Selection (ATNS) domain using RC Forms 300-303 (ODA Forms 403D-403G and 403V). These forms must be populated as follows:

- Domain=ATNS
- CALLTYP=SSP
- CALLDATA=TNSND
- AD2 field populated with the CID type as follows:

AD2 Entry	Description
Blank	Unassigned carrier
INTA	Intra-LATA carrier
INTR	Inter-LATA carrier
IAIR	Intra-LATA and Inter-LATA carrier
INTL	International carrier
IRIL	Inter-LATA and International carrier
CIII	Combined Intra-LATA, Inter-LATA, and International carrier

3.07 The combined intra-LATA and inter-LATA carrier type and the combined intra-LATA, inter-LATA, and non-international WZ1 carrier type are not allowed to be assigned a CID type unless the ODA Intra-LATA Competition Parameter is set. This parameter is a per-office parameter which can only be set via RC Form 809 if intra-LATA competition exists (ITRA=ON). It defaults to OFF (no intra-LATA competition).

Structures Affected

A. OD4OFCCOPY

3.08 Two new items have been defined to accommodate the LSDS Phase 2 feature. These items are populated from new entries on RC Form 809 (supported by ODA Form D7) for LEC-only offices. The OD4OFCCOPY structure is preserved across retrofits using ODA Form D7. Table 1-A gives a description of the form entries.

Table 1-A. RC Form 809 Entries

RC Form 809 Fields			
FEATURE ITEM	ON OR OFF	Item	Description
LSDS	OFF	OD4LSDSACT	LSDS Phase 2 is not activated (default).
LSDS	ON	OD4LSDSACT	LSDS Phase 2 is activated.
ITRA	OFF	OD4INTRA_LATA	No intra-LATA competition exists (default).
ITRA	ON	OD4INTRA_LATA	Intra-LATA competition exists.

B. HT4TSG

3.09 A new 16-bit item, XL4TS_CID, is defined in the TSG to store the presubscription carrier as a 4-digit number (ranging from 0000-9999). This number is populated (right justified) in Telco Binary Coded Decimal (BCD). In generic 4E18/19, the carrier is populated using the **XTSTN** field when the **XTSTT** and **XTMTT** fields are set to "N." If XTSTT and XTMTT are set to "N" and the XTSTN field is populated, the XL4TS_CID item will be populated with the value entered in the XTSTN field. See Table 1-B.

Table 1-B. XTSTN Valid Entries

XTSTT	XTMTT	Valid XTSTN	XL4TSCID	Checks
Not N	Not N	0000-9999	Binary Zero	—
N	N	0000-9999	Telco BCD 0000-9999	Office is LEC. Incoming Signaling Characteristic (ISC) is Q.931.
N	—	Blank	Binary Zero	—

C. HT43DIG, HT4CODEGRP

3.10 A new 3-bit item, XL4CT_CDNT, has been added to the FHT call type to identify the CDNT. This item is populated using the **AD1** field on RC Forms 300-303 when the domain is DAVT and CALLDATA=LSA.

3.11 A new 3-bit item, XL4CT_CIDT, has been defined for the Service Switching Point (SSP) call type to identify the CID type. This item is populated using the **AD2** field on RC Forms 300-304 when the domain is ATNS and CALLDATA=TNSND.

ODA Forms Affected

A. ODA Form 401A

3.12 In Generic 4E18/19, the XTSTN field on ODA Form 401A is used to populate the customer's presubscribed carrier. The population rules are as follows:

- If XTSTT is set to N, the XTSTN must be blank or 0000-9999.
- If XTSTT is set to N and XTSTN is set to 0000-9999, the office must be a LEC office.
- If XTSTT is set to N and XTSTN is set to 0000-9999, the ISC must be set to Q931.

B. ODA Forms 403D-403G, 403V

3.13 These forms are used to populate the AD1 and AD2 fields to identify the CDNTs and to provision the Carrier Validation data, respectively. The population rules are as follows:

- If DOM=DAVT, CALLTYP=FHT, and CALLDATA=LSA, valid AD1 entries are blank, ITRA, PRIV, CORR, ITER, and WZ1.
- If DOM=ATNS, CALLTYP=SSP, and CALLDATA=TNSND, valid AD2 entries are blank, INTA, INTR, IAIR, INTL, IRIL, and CIII.
- If DOM=ATNS, CALLTYP=SSP, CALLDATA=TNSND, and AD2 is set to IAIR or CIII, OD4INTRA_LATA must be set to 4ODINTRA_LATA_YES.

Recent Change Forms Affected

A. RC Forms 100 and 107

3.14 RC Forms 100 and 107 contain TSG-related data. These forms are used to enter carrier presubscription information. The population rules for the RC forms are the same rules used to populate ODA Form 401A. Following is a brief description of these forms.

RC Form	Description
100	Add a new 2-way TSG
107	Change a 2-way TSG

B. RC Forms 300-304

3.15 RC Forms 300-303 are used for provisioning translation data. The CDNTs are identified by entries in the AD1 field. Carrier Validation data is provisioned by inputs in the AD2 field. The population rules for these RC forms are the same rules used to populate ODA Forms 403D-403G and 403V. RC Form 304 is used to change subsequent digit routing. Following is a brief description of these forms.

RC Form	Description
300	Change 3-digit translation
301	Change 4-, 5-, and 6-digit translation
302	Change 7-, 8-, and 9-digit translation
303	Change 10-, 11-, and 12-digit translation
304	Change subsequent digit routing

C. RC Form 809

3.16 RC Form 809 is used to enable and disable various feature bits which require special processing. Two new feature items have been added as entries on this form to support the LSDS Phase 2 feature. There are no changes in the layout of this form. The two new entries, LSDS and ITRA, are valid inputs for the **FEATURE ITEM** field on RC Form 809. The population rules are as follows:

- If LSDS is set to ON, the Access Tandem indicator (OD4ATANDEM) must be set. ON indicates that LSDS Phase 2 is activated. If LSDS is set to OFF (default), LSDS Phase 2 is not activated.
- If ITRA is set to ON, Intra-LATA competition exists. If ITRA is set to OFF (default), no intra-LATA competition exists.
- If either LSDS or ITRA is entered, the office must be a LEC office.

Verify Forms Affected

3.17 Verify Form 1a is used to verify carrier presubscription information. Verify Forms 3a-3g, 3v, 3w, 3ab, and 13f are used to verify the AD1 and AD2 enties on the RC forms.

4. Recording

4.01 Calls are recorded as Call Code 061, Structure Code 1081 or 1083.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

Final Handling Treatment

6.01 There are 28 new FHCs associated with the LSDS Phase 2 feature. These final handling conditions will only occur at an access tandem (LEC) switch during incoming call setups using Q.931 incoming signaling for data calls. A description of these FHCs and their Q931 cause values are listed in Table 1-C.

Table 1-C. Final Handling Codes

FHC Code	Q931 Cause Value	Description
1729	3	No route to transit network. There is no CID code specified in the SETUP message or presubscribed in the TSG to route this call.
1730	2	Specified CID—No route to transit network. There is no routing for the CID code specified in the SETUP message for this call.
1731	2	Presubscribed CID—No route to transit network. The TSG presubscribed CID has no routing setup for this transit network selection.
1732	3	Specified CID—Called Number Type (CDNT) associated with the called number is unassigned or invalid. No routing to the destination.
1733	3	Presubscribed CID—CDNT is unassigned or invalid. No routing to the destination.
1734	2	Specified CID in the SETUP message for this call is unassigned or invalid. No routing to the specified transit network.
1735	2	Presubscribed CID is unassigned or invalid. No routing to destination.
1736	3	Specified CID Intra-LATA and CDNT Inter-LATA. The CID and CDNT are not compatible. No routing to the destination.
1737	3	Presubscribed CID Intra-LATA and CDNT Inter-LATA. The CID and CDNT are not compatible. No routing to the destination.
1738	3	Specified CID Intra-LATA and CDNT International. The CID and CDNT are not compatible. No routing to the destination.
1739	3	Presubscribed CID Intra-LATA and CDNT International. The CID and CDNT are not compatible. No routing to the destination.
1740	3	Specified CID Inter-LATA and CDNT Intra-LATA. The CID and CDNT are not compatible. No routing to the destination.
1741	3	Presubscribed CID Inter-LATA and CDNT Intra-LATA. The CID and CDNT are not compatible. No routing to the destination.
1742	3	Specified CID Inter-LATA and CDNT International. The CID and CDNT are not compatible. No routing to the destination.
1743	3	Presubscribed CID Inter-LATA and CDNT International. The CID and CDNT are not compatible. No routing to the destination.
1744	3	Specified CID Combined Intra-/Inter-LATA and CDNT International. The CID and CDNT are not compatible. No routing to the destination.
1745	3	Presubscribed CID Combined Intra-/Inter-LATA and CDNT International. The CID and CDNT are not compatible. No routing to the destination.

Table 1-C. Final Handling Codes (Contd)

FHC Code	Q931 Cause Value	Description
1746	3	Specified CID International and CDNT Intra-LATA. The CID and CDNT are not compatible. No routing to the destination.
1747	3	Presubscribed CID International and CDNT Intra-LATA. The CID and CDNT are not compatible. No routing to the destination.
1748	3	Specified CID International and CDNT Inter-LATA. The CID and CDNT are not compatible. No routing to the destination.
1749	3	Presubscribed CID International and CDNT Inter-LATA. The CID and CDNT are not compatible. No routing to the destination.
1750	3	Specified CID Combined Inter-LATA/International and CDNT Intra-LATA. The CID and CDNT are not compatible. No routing to the destination.
1751	3	Presubscribed CID Combined Inter-LATA/International and CDNT Intra-LATA. The CID and CDNT are not compatible. No routing to the destination.
1752	3	Specified CID is for SSP LEC calls and CDNT is non-Intra-LATA. The CID and CDNT are not compatible. No routing to the destination.
1753	3	Presubscribed CID is for SSP LEC calls and CDNT is non-Intra-LATA. The CID and CDNT are not compatible. No routing to the destination.
1758	3	No route to destination. Called number was translated (which was either an intra-LATA, privileged, or corridor CDNT) and was unable to obtain routing.
1759	3	CDNT translation failure. Unable to obtain or determine the CDNT from translations for the called number digits (translation failure using the DAVT domain). No routing to the destination.
1760	3	Illegal numbering plan type. The numbering plan type specified is other than the North American Numbering Plan or International. No routing to the destination.

7. Transition Considerations

Network Dependencies/Interactions

7.01 This feature is dependent on the LEC Intra-LATA Switched H0/H11 feature for providing the data transport between the CPE and the LEC *4ESS* switch. The other carrier's switch must support data calls via the CCS7 NI.

Turn On/Turn Off Mechanism

7.02 This feature should not be activated until the Code Grouping parameters (CDNTs and CID types) are populated for all Code Groupings. The enhancements of LSDS Phase 2 will not occur until the ODA LSDS-PH2 transition indicator is activated. This transition indicator acts as an ON/OFF switch for the enhancements. Until this feature is activated, the Phase 1 feature will continue to handle calls by looking for the presence or absence of a CID code during call setup.

7.03 The LSDS Phase 2 feature is turned on and off by 1A Processor recent change, using RC Form 809 (Change Feature Bits) as follows:

1. Enter "LSDS" in the **FEATURE ITEM** field.
2. Enter "ON" in the **ON OR OFF** field.
3. LSDS Phase 2 is activated.

7.04 To turn this feature off, use RC Form 809 as follows:

1. Enter "LSDS" in the **FEATURE ITEM** field.
2. Enter "OFF" in the **ON OR OFF** field.
3. LSDS Phase 2 is de-activated.

7.05 Ubiquity of the generic across a LEC's network is not required before the feature can be fully operational.

8. Input/Output Manual Pages (Not Affected)

SS7 Trunk Signaling Interface for Cellular Type 2A Connection Feature (401)

2

Contents

SS7 Trunk Signaling Interface for Cellular Type 2A Connection Feature (401)

2

1. Feature Description

1.01 Prior to this feature, only MF signaling could be used over a Type 2A connection between a *4ESS*™ access tandem (AT) switch and a cellular mobile carrier (CMC). This feature provides a trunk signaling interface that allows Signaling System 7 (SS7) signaling, in addition to MF signaling, over a Type 2A connection between a *4ESS* AT switch and a CMC.

1.02 With this feature, the cellular Type 2A connection between a CMC and a *4ESS* AT switch will support SS7 signaling for inter-Local Access Transport Area (LATA) Feature Group B calls, inter-LATA Feature Group D calls, and intra-LATA calls.

1.03 The use of SS7 signaling offers a number of important advantages including reduced call setup time and the recording of Service Switching Point (SSP) 800 calls. It also permits the interchange of internetwork data messages, which can facilitate the use of enhanced services, nationwide roaming, and fraud reduction.

1.04 As shown in Figure 2-1, CMCs provide mobile telephone service to mobile customers via radio links from cell sites connected to mobile telephone switching offices. An interconnection (or interface) is required to allow the the mobile customers to be able to send and receive telephone calls with land-based telephone customers and customers of other CMCs. Three types of interconnections are provided for this purpose as described below. Only Type 2A is affected by this feature; Type 1 and Type 2B are described and shown for reference.

- A Type 1 interconnection is a connection through a Local Exchange Carrier (LEC) end office (EO). It provides connection to and from lines, inter-LATA carriers, and other CMCs that have terminations within the LATA.

- A Type 2A interconnection is a connection to a LEC *4ESS* access tandem switch. It provides connections to and from the EOs, inter-LATA carriers, and other CMCs that have terminations within the LATA. The routing and signaling from the CMC are identical to the routing and signaling provided by equal access end office (EAEO) connections. With this type of connection, there are no line treatments and operator services (using operator services signaling) and N11 codes are not routed by the CMC to the *4ESS* access tandem switch.
- A Type 2B interconnection is a connection to a LEC EO that provides connections only to and from directory numbers served by that EO. A Type 2B interconnection is generally used by a CMC in conjunction with a Type 2A interconnection.

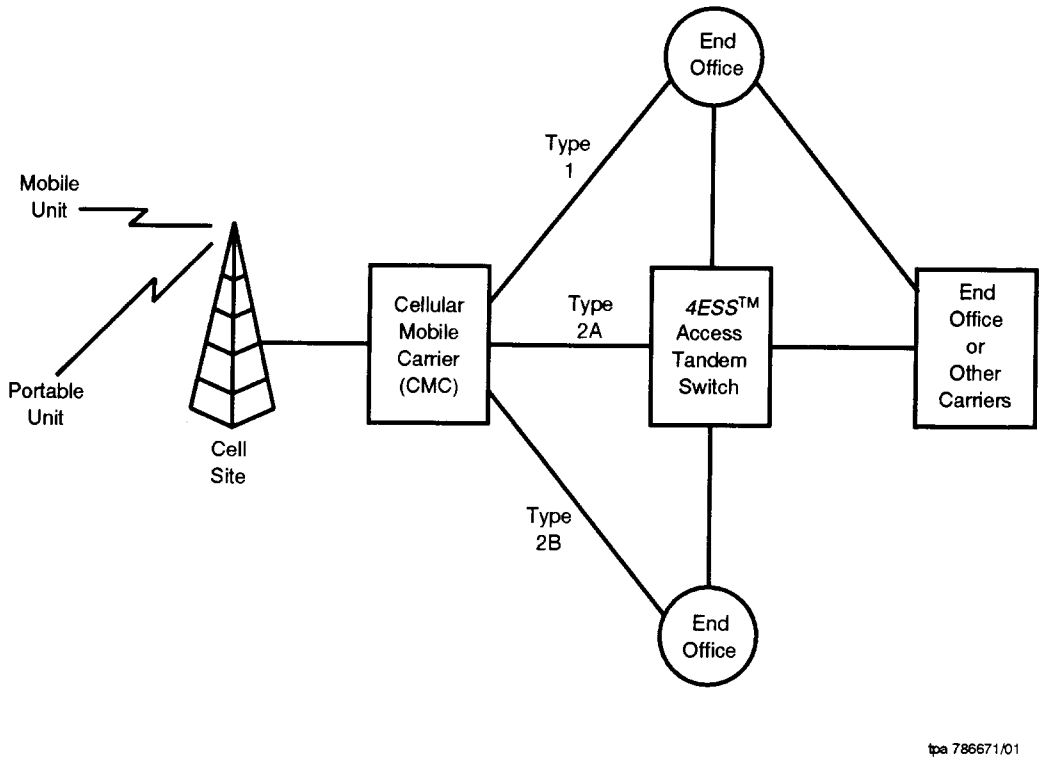

Figure 2-1. Cellular Mobile Carrier Connections

2. Call Flow (Not Affected)

3. Provisioning

3.01 A population rule for Office Data Assembler (ODA) Forms 401A, 401B and 401C and Recent Change (RC) Forms 100, 101, 102, 107, 108 and 109 is affected by this feature. There are no changes to the affected code structures (HT4TSG and HT4TBNCORE) or to any of the ODA or RC forms.

3.02 The affected population rule prior to this feature states:

If the FENCLASS is CMC, then the ISC/OSC must be MFWINK.

3.03 With this feature, the population rule changes to:

If the FENCLASS is CMC, then if ISC/OSC is not ISUP or the TOT is not ETC, and ISC/OSC is not MFWINK, the form will fail.

4. Recording

Automatic Message Accounting (AMA) Recording

4.01 AMA recording areas affected by this feature are as follows:

- Normal billing records will be generated for all CMC originating and terminating calls using the SS7 signaling interface.
- For both intra-LATA and inter-LATA calls originating on a SS7 signaling interface, the Trunk Subgroup (TSG) billing number will continue to be used to populate the Originating NPA and Originating Number fields in the AMA record.
- For inter-LATA calls originating on a SS7 signaling interface, the Terminating NPA and Terminating Number fields in the AMA record will be populated from data in the Called Party Number field in the Initial Address Message (IAM).
- For inter-LATA calls originating on a SS7 signaling interface, the IC/INC fields in the AMA record will be populated with the XXX/XXXX as received in the Transit Network Selection (TNS) of the IAM.

- For CMC calls originating on a SS7 signaling interface, the recorded CMC connect time will be the time the IAM is received.
- Character 1 of AMA Table 83 will be populated with the appropriate value that corresponds to the type of signaling connection as follows:
  - — 2 = A non-SS7 signaling interface between an interexchange carrier (IXC) and an AT; and a non-SS7 signaling interface between an AT and a CMC.
  - — 4 = A SS7 signaling interface between an IXC and an AT; and a SS7 signaling interface between an AT and a CMC.
  - — 5 = A non-SS7 signaling interface between an IXC and an AT; and a SS7 signaling interface between an AT and a CMC.
  - — 6 = A SS7 signaling interface between an IXC and an AT; and a non-SS7 signaling interface between an AT and a CMC.
  - — 9 = A signaling type not specified.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Off Mechanism

7.01 This feature is turned on automatically with deployment of the 4E18 Release 3 Generic software.

8. Input/Output Manual Pages (Not Affected)

4 Gigabyte Disk Units on Service Circuit System (SCS) Feature (404)

3

Contents Page

4 Gigabyte Disk Units on Service Circuit System (SCS) Feature (404)

3

1. Feature Description

1.01 Previous *4ESS*™ switch generic releases supported two sizes of hard disks on the Service Circuit System (SCS): 420 Megabytes (MB) and 2 Gigabytes (GB). This generic release (4E18 Release 3) introduces a 4 GB hard disk unit for the SCS.

1.02 The new 4 GB disk unit is actually two 2 GB disk drives mounted on one circuit pack. The other hard disks used in the SCS are also mounted on circuit packs. The 420 MB hard disk is mounted on a circuit pack designated TN1672, and the 2 GB hard disk is mounted on a circuit pack designated TN1972. The designation of the 4 GB hard disk circuit pack is TN4000.

1.03 Since the new 4 GB circuit pack is the same size as the 2 GB circuit pack, it can be installed in the same mounting slots as the 2 GB circuit pack.

1.04 For additional information on the Service Circuit System and the 4 GB hard disk, refer to the following AT&T Practices:

- AT&T 234-100-130, *Service Circuit System Description*
- AT&T 234-100-210, *Service Circuit System, 4ESS™ Switch Application*

2. Call Flow (Not Affected)

3. Provisioning

3.01 Translations for the SCS are updated with Office Data Administration (ODA) Form 407P and Recent Change (RC) Form 703. Because of the addition of a 4 GB disk, the population rules for the DSKC and DSKEQ fields on these forms have changed. (The DSKC field specifies the capacity of each disk pair at a given physical location, and the DSKEQ field specifies the disk pair equipage.) Valid entries for the DSKC field are still type 0, 1, 2, or 3, but new values have been assigned. The new values are as follows:

- 0 indicates a 422 MB (.5 GB) disk
- 1 indicates a 2 GB disk
- 2 indicates a 4 GB disk
- 3 is reserved for future use.

3.02 The population rules that now apply to the DSKC and DSKEQ fields are as follows:

- An entry of "2" (4 GB disk) is allowed only in positions 0 and 2 in the DSKC field.
- If a "2" is entered in position 0 in the DSKC field, position 1 in the DSKEQ and DSKC fields must be blank.
- If a "2" is entered in position 2 in the DSKC field, position 3 in the DSKEQ and DSKC fields must be blank.
- If a "2" is entered in position 0 in the DSKC field, an entry must be made in position 0 in the DSKEQ field.
- If a "2" is entered in position 2 in the DSKC field, an entry must be made in position 2 in the DSKEQ field.

3.03 The three different size hard disks can be installed in Service Circuit Units (SCUs) 0 through 15. When populating the DSKC field for SCU 0, however, the following rules must be followed:

- A 420 MB hard disk unit (type 0) can be populated in all 4 DSKC locations.
- A 2 GB hard disk unit (type 1) can only be populated in 3 of 4 DSKC locations.
- A 4 GB hard disk unit (type 2) can only be populated as shown in Table 3-A.

Table 3-A. Allowable Disk Pair Types

DSKC 0	DSKC 1	DSKC 2	DSKC 3
2	X		
2	X	0	
2	X	0	0
2	X	1	
2	X	0	1
2	X	1	0
0	0	2	X
0	1	2	X
1	0	2	X

Note: An "X" indicates DSKC fields that must be unpopulated.

3.04 Note from the table that the maximum SCU disk capacity defined by software is 6.5 GB.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

6.01 A light emitting diode (LED) is mounted on the front of the TN1672 (420 MB hard disk) and TN1972 (2 GB hard disk) circuit packs to indicate that an error or fault was encountered when the disk unit was being accessed. The new TN4000 (4 GB hard disk) circuit pack, however, does not have an LED.

6.02 Each 2 GB drive unit on the 4 GB circuit pack is treated as a unique logical unit for fault recovery. Diagnostic software diagnoses each individual drive unit, but the results of the diagnostic are reported as one pack type.

6.03 For additional information on maintaining the SCS and 4 GB hard disk, see Task Oriented Practices (TOP) AT&T 234-151-077AC, *Service Circuit System Maintenance.*

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on by a 1A/1B Recent Change. To replace an existing disk unit with a 4 GB disk unit requires degrowing the existing disk unit and then growing the 4 GB disk unit. Refer to TOP AT&T 234-153-060AC, *Service Circuit System-Growth/Add, 4ESS™ Switch*, for the procedure to follow to add a 4 GB hard disk to an SCU.

8. Input/Output Manual Pages (Not Affected)

3.1-kHz Enhancement: Switch Options Feature (408)

4

Contents

3.1-kHz Enhancement: Switch Options Feature (408)

4

1. Feature Description

1.01 The 3.1-kHz Enhancement: Switch Options feature enables a *4ESS*™ switch Local Exchange Carrier (LEC) office to control the encoding of the Information Transfer Capability (ITC) field in the User Service Information (USI) parameter of the Integrated Services Digital Network (ISDN) User Part (ISUP) Initial Address Message (IAM).

1.02 This feature is required as a result of problems introduced by Bellcore Technical Requirement (TR) 448, which called for the ITC field to be encoded as 3.1 kHz when the Incoming Trunk was MF and the Outgoing Trunk was ISUP. That requirement, which was implemented in 4E17R1 as feature 158, resulted in lost calls in some instances.

1.03 Subsequent to TR 448, Bellcore released a change to TR 317 Issue 3 requiring a set of options for proper encoding of the ITC field for this situation.

1.04 This feature includes the use of an office indicator and a trunk indicator to determine how the ITC should be encoded in the USI parameter when the incoming trunk is MF and the outgoing trunk is ISUP.

2. Call Flow (Not Affected)

3. Provisioning

3.01 This feature is provisioned using spare Trunk Block bits in 4E18, 19, and 20.

3.02 At each switch, a determination must be made as to whether the majority of calls on that switch are speech or 3.1-kHz audio, and the office indicator for that office must be set accordingly. There is also a trunk indicator for each Trunk Subgroup (TSG). The trunk indicator can be set to indicate that the trunk is either the "same" as or the "opposite" of the office indicator. The TSG setting takes precedence over the office setting.

3.03 The indicators are defaulted as follows: the office indicator defaults to "speech," and the trunk indicator defaults to "use the office indicator." Therefore, if no modifications are made via recent change, all calls with an MF incoming trunk and an ISUP outgoing trunk will have the ITC field populated with "speech" in the USI parameter in the IAM.

Recent Change (RC) Forms Affected

A. RC Form 809

3.04 A new office indicator, OD4F6, is defined in OD4OFCCOPY. This data component is in the existing OD4OFCCOPY word. This item may be populated via RC Form 809. The FEATURE ITEM field is set to F6. This field uses the F6 entry to indicate whether the ITC field should be populated with "speech" or "3.1-kHz audio" when the incoming trunk is MF and the outgoing trunk is ISUP. The valid entries are "OFF" to encode the ITC to speech and "ON" to encode the ITC to 3.1-kHz audio.

B. RC Forms 100-102 and 107-109

3.05 In 4E18, an existing Trunk Block field, S6, in the existing 100 series Trunk Subgroup Recent Change forms is used to indicate whether at the trunk level the ITC field in the IAM should be populated with the same setting as the office indicator or the opposite setting. The legal inputs for S6 are Blank, N, and Y. Blank and N mean use the office indicator to encode the ITC, while Y means use the opposite of the office indicator to encode the ITC.

3.06 The following table shows the possible combinations of office indicator and trunk block indicator.

Table 4-A. Office and Trunk Block Indicators

Office Indicator (OD4F6)	Trunk Block Indicator (S6)	Information Transfer Capability
OFF (speech)	Blank,N (same)	speech
OFF (speech)	Y (opposite)	3.1 kHz
ON (3.1 kHz)	Blank,N (same)	3.1 kHz
ON (3.1 kHz)	Y (opposite)	speech

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

6.01 The following commands can be used to verify the current settings of the office indicator and the trunk block indicator:

- VER:TSG can be used for the trunk indicator.
- VER:ABSOLUTE can be used for the office indicator, **but PECC assistance will be needed because the exact address of OD4OFCCOPY is used in this message.**

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)

USEC Individual Per Call Control (iPCC) Feature (3795)

5

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Contents

USEC Individual Per Call Control (iPCC) Feature (3795)

5

1. Feature Description

1.01 AT&T Consumer Communications Services-Business Unit (CCS-BU) is offering customers enhanced voice quality. The enhancement is provided using the Universal Services Echo Canceler (USEC) platform. Feature 3795 provides the platform for Individual Per Call Control (iPCC) of the voice enhancement. The iPCC architecture provides a communication link between the *4ESS*™ switch and the USEC via a device referred to as a "Gateway." The iPCC Gateway is a stand-alone device located in the *4ESS* switch central office. Gateway measurements and alarms are passed to the *4ESS* switch which passes them to the maintenance channel. The iPCC architecture requires dual Special Access Data Channel (SADC) nodes on the Common Network Interface (CNI) ring, dual Gateways, and a dedicated Common Processor (CP) port on each USEC frame. The Special Access Data Channel (SADC) node and the Gateway are duplicated for reliability purposes.

1.02 On call origination, the *4ESS* switch generates a message to the USEC via the Gateway if *4ESS* switch iPCC call processing indicates that a control message needs to be sent to the USEC. The *4ESS* switch sends the message to the Gateway, which sends the message to the appropriate USEC frame. The *4ESS* switch sends a message to the USEC at the end of every call using the iPCC link.

1.03 Feature 3795 supports the sending of a control message for voice enhancement to the USEC based on the Service Identity (SI) derived during call processing.

1.04 Feature 3795 also includes "via" call iPCC controls. At an iPCC enabled Via switch, the USECs on the incoming and outgoing trunks are both set to 64clear. This is done by *4ESS* switch call processing. No provisioning is required to set the USEC channels at the Via switches to 64clear.

2. Call Flow (Not Affected)

3. Provisioning

Population and Retrieval

3.01 Recent Change (RC) and Verify forms are impacted by this feature. A new form was created and a number of forms were modified.

New RC Forms

A. RC Form 210

3.02 A new RC form (Form 210) was created to support the USEC iPCC feature. This form is used to assign the Trunk Appearance Number to the Per Call Control (PCC) USEC assignment. Figure 5-1 shows the layout of RC Form 210. In this form, the meaning of each entry is as follows:

RC:TRK;CHG;OPT(USEC)	Entries include Blank, BUF, TST, ACT, FTA, FTB, and FTT
ORNU	Order Number
ACTION	Entries for 4E18 Release 3 and Later = A, C, or D
TAN	Trunk Appearance Number—A different range of numbers exists for TSI, SPC LVL and FTS
USEC	Universal Services Echo Canceler
TYPE	PCC Type
PAD	Packet Assembler/Disassembler when TYPE is S
SHELF	USEC Shelf Number when TYPE is S
ECLI	0 to 7

```
# FORM      210          TAN TO USEC ASSIGNMENT
  4E17>

RC:TRK;CHG;OPT(USEC),___:

ORNU _____,     ACTION__,

                                                 U S E C
         TAN                            SCS       IPA        LAN
TSI   SPC   LVL   FTS          TYPE     PAD      FRAME      SHELF     ECLI

___,  _,    _,    ___,         _,       __,      ___,       _,        _,
___,  _,    _,    ___,         _,       __,      ___,       _,        _,
___,  _,    _,    ___,         _,       __,      ___,       _,        _,
___,  _,    _,    ___,         _,       __,      ___,       _,        _,
___,  _,    _,    ___,         _,       __,      ___,       _,        _,
___,  _,    _,    ___,         _,       __,      ___,       _,        _,
___,  _,    _,    ___,         _,       __,      ___,       _,        _,
___,  _,    _,    ___,         _,       __,      ___,       _,        _,
___,  _,    _,    ___,         _,       __,      ___,       _,        _,
___,  _,    _,    ___,         _,       __,      ___,       _,        _,

REMARKS ____________________________________________________________:
```

Figure 5-1. Recent Change Form 210

Modified RC Forms

A. RC Form 202

3.03 A population rule has been added to RC Form 202. When the trunk block is deleted, the form fails if the trunks to be deleted are associated with the USEC through RC Form 210.

B. RC Form 203

3.04 A population rule has been added to RC Form 203 when additional trunks are being added to an existing trunk block. Additional trunks must be in sequential order with the trunks that already exist; otherwise, the form fails.

C. RC Form 627

3.05 An error check has been added to RC Form 627. The error check ensures that when a change is requested for NVIDN to be changed to NVIDN 99, for example, that there are no entries in the trunk assignment number/USEC translator with the old NVIDN.

D. RC Form 628

3.06 An error check has been added to RC Form 628. The error check ensures that when the NVIDN 99 entry is to be deleted, that all trunk assignment number/USEC entries have been previously deleted.

New Verify Forms

A. Verify Input Form 12h

3.07 The Input Verify Form 12h input message **VER:TRK:TAN a,OPT USEC!(EOT)** is used to request output of the Trunk Appearance Number to PCC USEC.

B. Verify Output Form 2s

3.08 This form is used to output the Trunk Appearance Number to PCC USEC. Verify Form 2s is shown in Figure 5-2.

```
                              VERIFY 2s

VER:TRK;OPT(USEC)


                                        U S E C
        TAN                      SCS     IPA        LAN
TSI  SPC  LVL   FTS      TYPE    PAD    FRAME      SHELF    ECLI

__,  _,   _,   ___,      _,      __,    ___,       _,       _
__,  _,   _,   ___,      _,      __,    ___,       _,       _
__,  _,   _,   ___,      _,      __,    ___,       _,       _
__,  _,   _,   ___,      _,      __,    ___,       _,       _
__,  _,   _,   ___,      _,      __,    ___,       _,       _
__,  _,   _,   ___,      _,      __,    ___,       _,       _
__,  _,   _,   ___,      _,      __,    ___,       _,       _
__,  _,   _,   ___,      _,      __,    ___,       _,       _
__,  _,   _,   ___,      _,      __,    ___,       _,       _
__,  _,   _,   ___,      _,      __,    ___,       _,       _
```

Figure 5-2. Verify Form 2s

C. Verify Input Form 12i

3.09 The Verify Form 12i input message **VER:USEC** a,**OPT** b!**(EOT)** requests output of the PCC assignment to Trunk Appearance Number for the specified USEC frame, shelf, and ECLI combination.

D. Verify Output Form 12t

3.10 Verify Output Form 12t (Figure 5-3) outputs the PCC USEC assignments to Trunk Appearance Number.

```
                              VERIFY 12t

VER:USEC


                 U S E C
        SCS        IPA       LAN                          TAN
TYPE    PAD       FRAME     SHELF      ECLI        TSI  SPC  LVL  FTS

 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
 _,     __,       ___,       _,         _,         __,   _,   _,  ___,
```

Figure 5-3. Verify Form 12t

Modified Verify Forms

A. Verify Form 6au

3.11 The description of Q4 (question 4) for Verify Form 6au has been updated with the following: Should the USEC enhancement feature be disabled for the SII? The description of Q8 (question 8) for Verify Form 6au has been updated with the following: Is this a handoff type of feature?

B. Verify Form 6bb

3.12 The description of Q4 (question 4) for Verify Form 6bb has been updated with the following: Should the USEC enhancement feature be disabled for the SII? The description of Q8 (question 8) for Verify Form 6bb has been updated with the following: Is this a handoff type of feature?

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

Measurements

6.01 Twenty new measurements have been added to the office totals peg count. These new measurements are shown in Table 5-A. The first seven shown in Table 5-A are generated in the 1A/1B Processor. The last 13 measurements are generated in the Gateway and read into the 1A Processor every 15 minutes. The *4ESS* switch merely outputs the Gateway measurements and alarms to the maintenance channel.

Table 5-A. New Traffic and Plant Measurements

Count	Definition
TOT ORD	The total number of orders contained in the REGISTER messages (Event Digits = 0001), irrespective of indicators in the order, sent to the Gateway. (Requirement 4900)
SOC ORD	The total number of operational USEC orders and test orders sent to the Gateway in a REGISTER message (Event Digits = 0001) with the start/end indicator set to "start" irrespective of other indicators. (Requirement 4400)
TEST ORD	The total number of test orders sent to the Gateway with the Maintenance indicator set to "on" in a REGISTER message irrespective of other indicators. (Requirement 5300)
REG MSG	The total number of REGISTER messages (Event Digits = 0001) sent to the Gateway. This counter is incremented by one each time a REGISTER message is sent irrespective of the number of orders in the message. (Requirement 4800)
UNACK	The total number of unacknowledged REGISTER messages sent to the Gateway. This counter is incremented by one each time a 4-second time-out occurs while waiting for a RELEASE COMPLETE message from the Gateway. (Requirement 5000)
SADC CON	The total number of REGISTER messages (irrespective of the value in the Event Digits field) not sent to the Gateway due to SADC node congestion. (Requirement 5100)

Table 5-A. New Traffic and Plant Measurements (Contd)

Count	Definition
REG FAIL	The total number of REGISTER messages failed to be sent to the Gateway, and the cause is anything other than SADC congestion or time-out of the REGISTER message. (Requirement 5200)
CRC ERR	The total number of Gateway Type 1 and Type 2 packets received since the last valid Type 2 packet that had the correct number of bytes but had a cyclic redundancy check (CRC) 6 error is collected by the *4ESS*™ switch for all USECs connected to the Gateway. (Requirement 5310)
FRAME	The total number of framing and overrun errors at the USEC Individual Per Call Control (iPCC) port Universal Asynchronous Receiver Transmitter (UART) since the last valid Gateway Type 2 packet was received. This count is for all USECs connected to the Gateway. A framing error is defined as a received byte with an invalid stop bit. An overrun error is defined as a new byte received at the UART before the previous byte is read. (Requirement 5320)
BAD PKT	The total number of bad packets received since the last valid Gateway Type 2 packet was received. This count is for all USECs connected to the Gateway. The number of bad packets is determined by the USEC by counting the number of Type 1 and Type 2 packets that did not have a correct number of bytes, did not have an all ones' Header byte, did not have a correct Message Type byte, or had a CRC 6 error. An incorrect number of bytes may be due to many factors including, but not limited to, UART overrun errors on the CP (defined as a new byte received at the UART before the previous byte is read), UART framing errors (count given in the 4th byte), and the Gateway not sending the correct number of bytes. (Requirement 5330)
ERRORED	The total number of errored 2-byte 4ESS-USEC-PCC (iPCC) commands (which are found inside each Type 1 packet) received since the last valid Type 2 packet. This count is for all USECs connected to the Gateway. A 4ESS-USEC-PCC (iPCC) command is in error when at least one of the following occurs: ■ An invalid channel address is received. An invalid channel address is defined as being outside the range of 0 to 6 for the shelf number, 0 to 7 for the digroup number, or 1 to 24 for the channel number. ■ The "Enhancement off" bit and/or the "End USEC" bit is set when the "Maintenance bit" is set. (Requirement 5340)

Table 5-A. New Traffic and Plant Measurements (Contd)

Count	Definition
GOOD PKT	The total number of good packets received by the Gateway since the last Type 2 packet was received. This count is for all USECs connected to the Gateway. This count is determined by the USEC by counting the number of Type 1 packets that have the correct number of bytes, correct header, message type, and CRC 6. Errors in the 10 bytes of data, which is considered to be part of the application message, will be reflected in the 6th byte of this Type 2 acknowledgement packet [that is, the invalid 4ESS-USEC-PCC (iPCC) command count]. The 7th byte contains the most significant byte, and the 8th byte contains the least significant byte. (Requirement 5350)
LOST MSG	The number of messages that the Gateway attempted to send to the USEC(s) but were lost. This count will be calculated by the Gateway by subtracting the number of good packets received by the USEC(s) from the total number of packets that the Gateway attempted to send to the USEC(s). (Requirement 5355)
PORT CRC	The total number of USEC port CRC errors detected by the Gateway. (Requirement 5360)
SADC PRT	The total number of SADC port errors detected by the Gateway. (Requirement 5340)
IG CRC	The total number of Inter-Gateway port CRC errors detected by the Gateway. (Requirement 5380)
SEC GATE	The total number of times that the secondary Gateway was used during the 15-minute report interval. (Requirement 5385)
MSG QOVF	The total number of times that the Gateway message queue overflowed during the 15-minute report interval. (Requirement 5390)
IG LINK	The total number of messages that could be sent from the Primary Gateway to the Secondary Gateway due to Inter-Gateway link problems during the 15-minute report interval. (Requirement 5395)
NO RCMSG	The number of REGISTER messages sent by the Gateway that did not receive a RELEASE COMPLETE message from the *4ESS*™ switch during the 15-minute report interval. The Gateway will peg this count when a RELEASE COMPLETE message is not returned by the *4ESS* switch within an expected time interval. (Requirement 5400)

6.02 Each of the new counts requires one call store word in the MC18 counter block. The new symbols are also defined in the existing MC18 Holding Register Block (HRB). Table 5-B defines the symbol names associated with the new counts.

Table 5-B. New Traffic/Plant Measurements Symbols

Measurement	Counter Block	HRB	Block Size
TOT ORD	PL4IPCCTOTORDMC18	PL4IPCCTOTORDHR18	1
SOC ORD	PL4IPCCSOCORDMC18	PL4IPCCSOCORDHR18	1
TEST ORD	PL4IPCCTESTORDMC18	PL4IPCCTESTORDHR18	1
REG MSG	PL4IPCCREGMSGMC18	PL4IPCCREGMSGHR18	1
UNACK	PL4IPCCUNACKMC18	PL4IPCCUNACKHR18	1
SADC CON	PL4IPCCSADCCONMC18	PL4IPCCSADCCONHR18	1
REG FAIL	PL4IPCCREGFAILMC18	PL4IPCCREGFAILHR18	1
CRC ERR	PL4IPCCCRCERRMC18	PL4IPCCCRCERRHR18	1
FRAME	PL4IPCCFRAMEMC18	PL4IPCCFRAMEHR18	1
BAD PKT	PL4IPCCBADPKTMC18	PL4IPCCBADPKTHR18	1
ERRORED	PL4IPCCERROREDMC18	PL4IPCCERROREDHR18	1
GOOD PKT	PL4IPCCGOODPKTMC18	PL4IPCCGOODPKTHR18	1
LOST MSG	PL4IPCCLOSTMSGMC18	PL4IPCCLOSTMSGHR18	1
PORT CRC	PL4IPCCPORTCRCMC18	PL4IPCCPORTCRCHR18	1
SADC PRT	PL4IPCCSADCPRTMC18	PL4IPCCSADCPRTHR18	1
IG CRC	PL4IPCCIGCRCMC18	PL4IPCCIGCRCHR18	1
SEC GATE	PL4IPCCSECGATEMC18	PL4IPCCSECGATEHR18	1
MSG QOVF	PL4IPCCMSGQOVFMC18	PL4IPCCMSGQOVFHR18	1
IG LINK	PL4IPCCIGLINKMC18	PL4IPCCIGLINKHR18	1
NO RCMSG	PL4IPCCNORCMSGMC18	PL4IPCCNORCMSGHR18	1

6.03 The new measurements are reported in a new Output Measurement Set (OMS) in Measurement Subclass (MSC) 56. Figure 5-4 shows the layout of the new OMS.

```
OMS 4   PER CALL CONTROL OF USEC

 TOT ORD    SOC ORD   TEST ORD    REG MSG      UNACK   SADC CON   REG FAIL
       0          0          0          0          0          0          0

 ------------------- GATEWAY/USEC GENERATED DATA -------------------
 CRC ERR      FRAME    BAD PKT    ERRORED  GOOD PKT   LOST MSG   PORT CRC
       0          0          0          0          0          0          0


SADC PRT     IG CRC   SEC GATE   MSG QOVF    IG LINK   NO RCMSG
       0          0          0          0          0          0          0
```

Figure 5-4. New Counts on OMS 4—MSC 56

Trunk Maintenance

6.04 The SET:CONN MODES 2/3 command logic was modified to permit digits 155.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 The iPCC feature is turned on manually by setting Office Data Assembler (ODA) bit OD4PUSECSAD to 1. This bit resides in the OD4OFCPARAM structure. Recent Change Form 800 is used to set this bit.

7.02 All Recent Changes to associate USECs with trunks should be performed prior to turning on this feature.

8. Input/Output Manual Pages

8.01 Several input and output messages were created or modified to support this feature. Tables 5-C and 5-D identify the new and modified messages. Versions of these messages released with this generic are included at the end of this chapter. The other new and modified messages have been distributed in earlier releases of the Input/Output Manual.

Table 5-C. New Input/Output Messages

Message	Type	Purpose
OP:PCCGW	Input	Requests the current status of the iPCC Gateway primary and secondary ports
RST:PCCGW*	Input	Requests the restoral of the specified iPCC Gateway primary or secondary port
RMV:PCCGW*	Input	Removes the specified iPCC Gateway port
OP:PCCGW	Output	Outputs the Gateway port status
RST:PCCGW	Output	Outputs status of requested Gateway restoral
RMV:PCCGW	Output	Outputs status of requested Gateway removal
REPT:IPCC-ALARMS	Output	Relays the current alarm status of the iPCC Gateway regarding Simplex/Duplex, Primary/Secondary Gateway mismatch, and Gateway role conflict
REPT:IPCC-USEC	Output	Relays current error status of specified USEC
REPT:IPCC-GATEWAY	Output	Outputs current Gateway port alarms for iPCC for port receiver errors and port transmitter errors
REPT:IPCC-MUL-USEC	Output	Relays the current USEC alarm status when more than six USECS are experiencing error conditions that exceed thresholds
REPT:IPCC MULT-GATE	Output	Relays the current port alarm status when more than six Gateway (iPCC) ports are experiencing error conditions that exceed thresholds
REPT:IPCC-BUFFER	Output	Reports on Buffer Overflow for iPCC orders

* These messages are honored only at the Gateway when received from the master switch. This is the lowest numbered switch part attached to the Gateway in a multi-switch complex.

Table 5-C. New Input/Output Messages (Contd)

Message	Type	Purpose
REPT:IPCC-LINKSTA	Output	Indicates iPCC returned messages and/or time-out occurrences which can result in shift to alternate LACID—Major alarm
REPT:IPCC-LINK	Output	Reports restoral to service of a LACID following an abatement of time-out and/or returned messages
REPT:IPCC-GW	Output	Reports that a Gateway has been restored to duplex operation
REPT:SDC-IPCC	Output	Reports the restoral of a Gateway. For duplex (a MAJOR alarm), both Gateways have failed

Table 5-D. Modified Input/Output Messages

Message	Type	Purpose
OP:SDC	Output	Reports service degrading condition on Gateway
OP:OOSUNITS-IPC	Output	Reports on individual Gateway out-of-service status
SET:CONN	Input	Logic was modified to permit digits 155. This is a test run between the *4ESS*™ switch and USEC
SET:CONN	Output	Responds to a SET:CONN input message
TEST:DSIG	Input	Requests message to the iPCC Gateway as specified in input data
TEST:DSIG;DAV	Output	Responds to a TEST:DSIG;DAV input message
OP:OOSUNITS:PCCGW	Input	Requests Gateway status
OP:OOSUNITS:PCCGW	Output	Reports Gateway 005 status

ID . . . . . RST:PCCGW
WORK CENTER . . MOC, TEC, TOC
GENERIC . . . . . 4E17 Rel. 4 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
RST:PCCGW a
 b
[c]
```

2. REASON FOR OUTPUT

To display the status of the gateway restoral request.

3. VARIABLE FIELD DEFINITIONS

a — Gateway:

1 — Primary.
2 — Secondary.

b — Explanatory text:

COMPLETED

LINKS TO VENDOR DOWN

REQUEST REJECTED BY GATEWAY

TIMEOUT WAITING FOR GATEWAY REPLY

TRANSLATION ERROR — Check the VER:ADSLINK output message with an ADSI keyword of 16 for translation accuracy.

c — Reason for failure:

2 — Invalid gateway requested (not primary or secondary) or invalid 4E.

3 — Restore in progress.

4 — Waiting for other gateway to reply.

4. ACTION TO BE TAKEN

Consult the Operations and Test Plan for 4ESS™ USEC Per Call Control (iPCC) Feature to determine the proper actions to be taken based on the failure condition specified. Corrective actions may be required to the service access data channel (SADC) links, SADC node, gateway and or the universal services echo cancellers (USECs).

5. REFERENCES

PIDENTs
ADJSCNTL
IPCC

Operations and Test Plan for 4ESS™ USEC Per Call Control (iPCC) Feature

Input Messages
OP:PCCGW
RMV:PCCGW
RST:PCCGW

Output Messages
OP:PCCGW
RMV:PCCGW
VER:ADSLINK

ID . . . . . RST:PCCGW
WORK CENTER . . MOC, TEC, TOC
GENERIC . . . . . 4E19 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
RST:PCCGW a
 b
[c]
```

2. REASON FOR OUTPUT

To display the status of the gateway restoral request.

3. VARIABLE FIELD DEFINITIONS

a — Gateway:

1 — Primary.
2 — Secondary.

b — Explanatory text:

`COMPLETED`

`LINKS TO VENDOR DOWN`

`REQUEST REJECTED BY GATEWAY`

`TIMEOUT WAITING FOR GATEWAY REPLY`

`TRANSLATION ERROR` — Check the `VER:ADSLINK` output message with an `ADSI` keyword of `16` for translation accuracy.

c — Reason for failure:

2 — Invalid gateway requested (not primary or secondary) or invalid 4E.

3 — Restore in progress.

4 — Waiting for other gateway to reply.

4. ACTION TO BE TAKEN

Consult the Operations and Test Plan for 4ESS™ USEC Per Call Control (iPCC) Feature to determine the proper actions to be taken based on the failure condition specified. Corrective actions may be required to the service access data channel (SADC) links, SADC node, gateway and or the universal services echo cancellers (USECs).

5. REFERENCES

PIDENTs
ADJSCNTL
IPCC

Operations and Test Plan for 4ESS™ USEC Per Call Control (iPCC) Feature

Input Messages
OP:PCCGW
RMV:PCCGW
RST:PCCGW

Output Messages
OP:PCCGW
RMV:PCCGW
VER:ADSLINK

ID . . . . . RMV:PCCGW
WORK CENTER . . MOC, TEC, TOC
GENERIC . . . . . 4E17 Rel. 4 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
RMV:PCCGW a
 b
[c] [d]
```

2. REASON FOR OUTPUT

To display the status of the gateway removal request and the reason for rejection.

3. VARIABLE FIELD DEFINITIONS

a — Gateway:

1 — Primary.
2 — Secondary.

b — Explanatory text:

COMPLETED

LINKS TO VENDOR DOWN

REQUEST REJECTED BY GATEWAY

REQUEST REJECTED BY SWITCH

TIMEOUT WAITING FOR GATEWAY REPLY

TRANSLATION ERROR — Check the VER:ADSLINK output message with an ADSI keyword of 16 for translation accuracy.

c — Four bit bitmap indicating which switch in the complex rejected the request. If 0 then it was rejected by the gateway.

BITMAP
xxxx
4321 SWITCH NUMBER

Obtain the switch identity via the OP:PCCGW input message.

d — Reason for failure:

0 Rejected by gateway due to switch links out of service.

1 Simplex gateway.

2 Invalid gateway requested (not primary or secondary) or invalid 4E.

3 Remove in progress.

4 Waiting for other gateway to reply.

5 Other gateway has been removed.

6 Conditional remove with universal services echo canceller (USEC) links out of service (OOS).

7 Denied by switch.

4. ACTION TO BE TAKEN

Consult the Operations and Test Plan for 4ESS™ USEC Per Call Control (iPCC) Feature to determine the proper actions to be taken based on the failure condition specified. Corrective actions may be required to the service access data channel (SADC) links, SADC node, gateway and or the USECs.

5. REFERENCES

PIDENTs
ADJSCNTL
IPCC

Operations and Test Plan for 4ESS™ USEC Per Call Control (iPCC) Feature

Input Messages
```
OP:PCCGW
RMV:PCCGW
RST:PCCGW
```

Output Messages
```
OP:PCCGW
RST:PCCGW
VER:ADSLINK
```

ID . . . . . RMV:PCCGW
WORK CENTER . . MOC, TEC, TOC
GENERIC . . . . . 4E19 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
RMV:PCCGW a
 b
[c] [d]
```

2. REASON FOR OUTPUT

To display the status of the gateway removal request and the reason for rejection.

3. VARIABLE FIELD DEFINITIONS

a — Gateway:

1 — Primary.
2 — Secondary.

b — Explanatory text:

COMPLETED

LINKS TO VENDOR DOWN

REQUEST REJECTED BY GATEWAY

REQUEST REJECTED BY SWITCH

TIMEOUT WAITING FOR GATEWAY REPLY

TRANSLATION ERROR — Check the VER:ADSLINK output message with an ADSI keyword of 16 for translation accuracy.

c — Four bit bitmap indicating which switch in the complex rejected the request. If 0 then it was rejected by the gateway.

BITMAP
———
xxxx
4321 SWITCH NUMBER

Obtain the switch identity via the OP:PCCGW input message.

d — Reason for failure:

0 Rejected by gateway due to switch links out of service.

1 Simplex gateway.

2 Invalid gateway requested (not primary or secondary) or invalid 4E.

3 Remove in progress.

4 Waiting for other gateway to reply.

5 Other gateway has been removed.

6 Conditional remove with universal services echo canceller (USEC) links out of service (OOS).

7 Denied by switch.

4. ACTION TO BE TAKEN

Consult the Operations and Test Plan for 4ESS™ USEC Per Call Control (iPCC) Feature to determine the proper actions to be taken based on the failure condition specified. Corrective actions may be required to the service access data channel (SADC) links, SADC node, gateway and or the USECs.

5. REFERENCES

PIDENTs
ADJSCNTL
IPCC

Operations and Test Plan for 4ESS™ USEC Per Call Control (iPCC) Feature

Input Messages
```
OP:PCCGW
RMV:PCCGW
RST:PCCGW
```

Output Messages
```
OP:PCCGW
RST:PCCGW
VER:ADSLINK
```

ANI/DN Per Call Control of Voice Enhancement Feature (3891)

6

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ANI/DN Per Call Control of Voice Enhancement Feature (3891)

6

1. Feature Description

1.01 AT&T Consumer Communications Services-Business Unit (CCS-BU) is offering customers enhanced voice quality. The enhancement is provided using the Universal Services Echo Canceler (USEC) platform. Feature 3795 (covered in this document) provides the platform for Individual Per Call Control (iPCC) of the voice enhancement. Feature 3891, built on the feature 3795 base, supports the sending of a control message for the voice enhancement based on the Automatic Number Identification (ANI) and/or Destination Number (DN).

1.02 On call origination, the *4ESS*™ switch generates a message to the USEC via the Gateway if *4ESS* switch iPCC call processing indicates that a control message needs to be sent to the USEC. The *4ESS* switch sends the message to the Gateway, and the Gateway sends the message to the appropriate USEC frame. The *4ESS* switch, using the iPCC link, sends a message to the USEC at the end of every call.

1.03 For each call, the ANI trigger table may be searched (according to existing procedures) at the Originating AT&T Switch (OAS). If an enhancement/ANI match is found, then a control message is sent to the USEC (adjacent to OAS) to control the enhancement in the direction of OAS.

1.04 For each call, the DN trigger table may be searched (according to existing procedures) at the Terminating AT&T Switch (TAS). If an enhancement/DN match is found, then a control message is sent to the USEC (adjacent to TAS) to control the enhancement in the direction of the TAS.

2. Call Flow

Call Flow at Originating AT&T Switch

2.01 The following generic call flow is described for calls that do not involve an adjunct. See Figure 6-1.

1. A switched-access or direct-connect incoming voice call arrives at the OAS.
2. An ANI record key is constructed (based on the 10-digit ANI/Billing Number, access type, numbering plan type and service type) according to existing procedures.
3. The Adjunct Based Capabilities (ABC) ANI trigger table is searched for a match on the ANI key.
4. If a match is found, the call flow continues as follows:
   - Processing based on the X (voice enhancement) Indicator
     - — If the X Indicator is set to ENABLE, the voice enhancement at the USEC on the outgoing intertoll trunk (USEC 1 in Figure 6-1) is controlled as per other iPCC features.
     - — If the X Indicator is set to DISABLE, the voice enhancement is disabled at the USEC on the outgoing intertoll trunk (USEC 1 in Figure 6-1).
   - Processing based on the Adjunct Logical Address (ALA) or Feature Indicators
     - — If the record contains an ALA that indicates an adjunct needs to be accessed, the call is treated per the ABC Architecture *4ESS* switch requirements.
     - — If the record contains an ALA that indicates an adjunct does *not* need to be accessed, the call is treated per normal *4ESS* switch procedures, that is, the Positive Call Processing (PCP) R2 ANI Table is searched.
     - — If the record contains Feature Indicators, the call is treated as per the requirements for the particular features.
5. If a match is not found, then the PCP R2 ANI Table is searched, and the voice enhancement is controlled per other iPCC features.

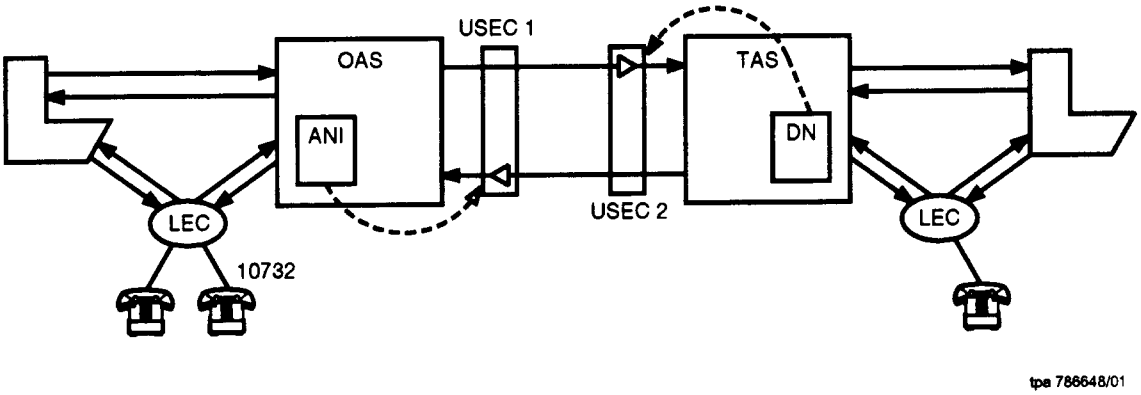

Figure 6-1. Call Flow at OAS and TAS

Call Flow at Terminating AT&T Switch

2.02 The following generic call flow applies to calls at all TASs that do not involve an adjunct. See Figure 6-1.

1. A call arrives at the TAS.
2. For all domestic voice calls for which the X Indicator associated with the SI value is set to ENABLE, a DN record key is constructed (based on the destination number and numbering plan type) according to existing procedures.
3. The ABC DN trigger table is searched for a match on the DN key.
4. If a match is found, the call flow continues as follows:
   - Processing based on the X Indicator
     - — If the DN indicator is set to ENABLE, the voice enhancement at the USEC on the incoming intertoll trunk (USEC 2 in Figure 6-1) is controlled as per other iPCC features.
     - — If the DN Indicator is set to DISABLE, the voice enhancement is disabled at the USEC on the incoming intertoll trunk (USEC 2 in Figure 6-1).

- Processing based on the ALA
  - — If the record contains an ALA that indicates an adjunct needs to be accessed, the call is treated in accordance with *4ESS* switch adjunct requirements.
  - — If the record contains an ALA that indicates an adjunct does *not* need to be accessed, the call is treated per normal *4ESS* switch procedures.

5. If a match is not found, the voice enhancement is controlled per other iPCC features.

Call Flow at Intermediate AT&T Switch

2.03 ANI/DN PCC processing is not invoked at intermediate Via switches. The only impact to the switch is that it must pass transparently the ANI X DISABLE Feature Indicator, a new Feature Indicator in the Initial Address Message (IAM), if it is sent.

Interactions with Other Features

A. Service Identity Feature

2.04 The Service Identity (SI), identified in Feature 3795, is applied at the OAS, Hand-off AT&T Switch (HAS), and TAS. Therefore, the voice enhancement may be disabled for the calling party and/or the called party based on the SI feature. Note that if this call involves an adjunct connected to the HAS, the SI used in the first leg is independent and/or different from the second leg. This creates the potential for a conflict between the setting of the voice enhancement based on the SI feature and the setting of the voice enhancement based on the ANI/DN PCC feature. If a conflict exists, the DISABLE setting takes precedence.

B. Routing to Remote Adjuncts: Remote Adjunct Call Handling (REACH) and Small Scale Adjunct (SSA) Calls

2.05 In most conditions, the OAS controls the voice enhancements heard by the calling party. However, when a call is routed to a HAS (per the REACH feature) or to a Small Scale Adjunct (TAS A) [when routing to a remote SSA or Software Defined Network (SDN) Network Remote Access (NRA) Adjunct)], the HAS or TAS A needs to control the setting of the voice enhancement. If the X indicator is set to DISABLE at the OAS and the call is routed using REACH or routed to an SSA or SDN-NRA adjunct, the ANI X DISABLE Feature Indicator is passed from the OAS to the HAS or TAS A in the IAM.

2.06 If the ANI X DISABLE Feature Indicator has been sent from the OAS in the IAM, the HAS or TAS A forwards this information to the network adjunct in the Q.931 SETUP message. On the incoming call leg to the adjunct, the HAS or TAS A do not receive the ANI X DISABLE Feature Indicator in the incoming IAM, and the voice enhancement is controlled as per the other iPCC features. On the outgoing call leg from the adjunct based on information from the network adjunct or other iPCC features, HAS or TAS A appropriately sets the voice enhancement on the outgoing intertoll trunk (at USEC 3).

C. AT&T Trigger Platform and AT&T Network Call Redirection

2.07 An AT&T trigger platform identified as ATP-Jr is a *4ESS* switch feature targeted for the generic 4E20 Release 1 time frame. ATP-Jr provides the capability for inband or out-of-band monitoring for specific triggers on eligible calls. Upon receiving a trigger, ATP-Jr determines what actions to perform.

Interactions with Other Network Elements

A. Network Adjuncts

2.08 Currently, the voice enhancement is *not* deployed at USECs that may exist on trunks between the *4ESS* switch and a network adjunct. Therefore, a message must be sent to the USEC on the outgoing intertoll trunk in order to disable the enhancement on calls involving adjunct-based features. For calls that involve adjunct query or interactive mode processing, the call information at the *4ESS* switch is retained in the switch while the call is routed to the adjunct. Therefore, when the adjunct redirects a call, the X Indicator value (obtained either from the trigger table or the IAM) is used to control the voice enhancement at the USEC on the outgoing intertoll trunk.

2.09 For calls that involve adjunct monitor mode processing, however, the call information is dropped. Furthermore, the *4ESS* switch does not associate an incoming call that the switch routed to an adjunct (B1 leg in Figure 6-2) with a particular call originated by that adjunct (B2 leg in Figure 6-2). This implies that the X Indicator obtained either from the trigger table or the IAM cannot be used to control the enhancement at the USEC on the outgoing intertoll trunk. Instead, an X Feature Indicator is sent in the Q.931 SETUP message from the *4ESS* switch to the adjunct, and this Feature Indicator is passed back in the Q.931 SETUP message from the adjunct to the *4ESS* switch Feature Indicator. The *4ESS* switch checks all Q.931 SETUP messages received from adjuncts for this Feature Indicator and disables the voice enhancement when it is set to DISABLE.

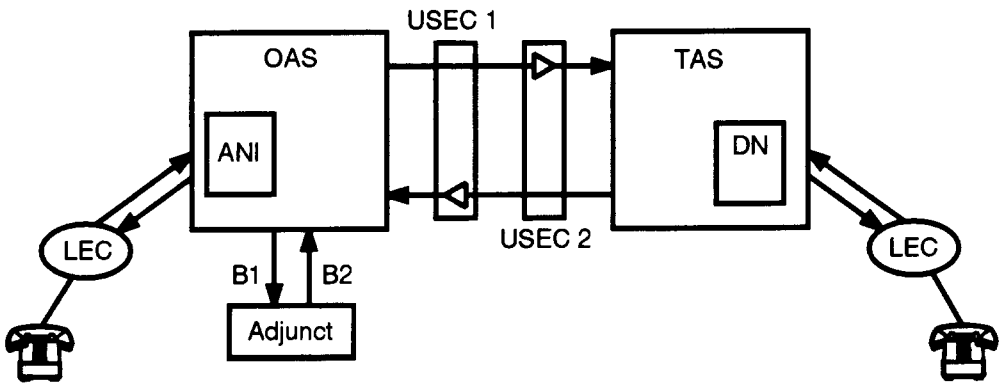

Figure 6-2. Control of Voice Enhancement on Calls Involving Network Adjuncts

Call Flow at Originating AT&T Switch With Adjunct

2.10 The following is a description of calls that involve an adjunct homed to the OAS. See Figure 6-2.

1. A call arrives at the OAS.
2. If a match is found in the ANI trigger table for which the X Indicator is set to DISABLE and the adjunct logical address indicates that an adjunct needs to be accessed, the OAS sends the X Feature Indicator in the Q.931 SETUP message to the adjunct. The call flow continues as follows:
   - If the adjunct redirects the call (as per features that require adjunct query or interactive mode processing), the OAS controls the voice enhancement at the USEC on the outgoing intertoll trunk (USEC 1 in Figure 6-2) based on the value of the X Indicator in the ANI trigger table record as follows:
     — If the X Indicator is set to ENABLE, the voice enhancement is controlled per other iPCC features.
     — If the X Indicator is set to DISABLE, the voice enhancement is disabled.

- If the adjunct originates a call, the OAS checks the value of the X Feature Indicator in the Q.931 SETUP message received from the adjunct and then controls the voice enhancement at the USEC on the outgoing intertoll trunk (USEC 1 in Figure 6-2) as follows:
  - — If the X Feature Indicator is not present, the voice enhancement is controlled per other iPCC features.
  - — If the X Feature Indicator is set to DISABLE, the voice enhancement is disabled.

Call Flow at HAS and TAS A With Adjunct

2.11 For this feature, the call flow at a HAS or a TAS A changes only if the OAS passes the ANI X DISABLE Feature Indicator in the IAM to the HAS or TAS A. See Figure 6-3. If this Feature Indicator is sent in the IAM, the HAS or TAS A sends the X Feature Indicator in the Q.931 SETUP message to the adjunct. The call flow continues as follows:

- If the adjunct redirects the call (as per features that require adjunct query or interactive mode processing), the HAS controls the voice enhancement at the USEC on the outgoing intertoll trunk (USEC 3 in Figure 6-3) as follows:
  - — If the HAS did *not* receive the ANI X DISABLE Feature Indicator in the incoming IAM, the voice enhancement is controlled as per the other iPCC features.
  - — If the HAS received the ANI X DISABLE Feature Indicator in the incoming IAM, the voice enhancement is disabled.
- If the adjunct originates a call, the call is processed per the call flow at an OAS to which an adjunct is directly connected.

Call Flow at TAS

2.12 If a match is found in the DN trigger table for which the X Indicator is set to DISABLE and the adjunct logical address indicates that an adjunct needs to be accessed, the TAS sends the X Feature Indicator in the Q.931 SETUP message to the adjunct. The call flow continues as follows:

- If the adjunct redirects the call (as per features that requires adjunct query or interactive mode processing), the call is processed as per the call flow at an OAS to which an adjunct is directly connected.
- If the adjunct originates a call, the call is processed as per the call flow at an OAS to which an adjunct is directly connected.

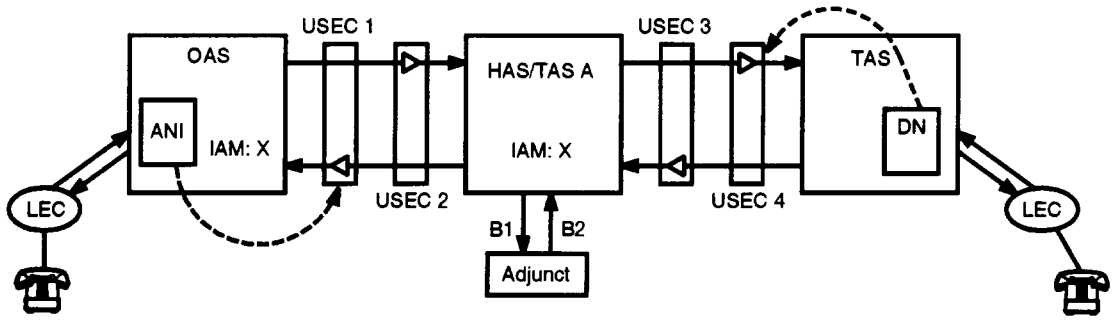

Figure 6-3. Call Flow at HAS and TAS A

3. Provisioning

Structures Affected

3.01 The adjunct access trigger table is a 2-level structure that contains the list of subscribed customers (customer database). This table is populated by Office Data Administration (ODA) Form 408K and Recent Change (RC) Forms 650, 900 (4E17) and 658 (4E18). A new bit has been added to the subtranslator.

3.02 The destination trigger table is a 2-level structure for customers with terminating services. This table is populated by ODA Form 408L and RC Forms 651, 905 (4E17), and 654 (4E18). A new bit has been added to the subtranslator.

ODA Forms

A. Modified ODA Forms

ODA Form 408K

3.03 ODA Form 408K defines the common adjunct customer database. The new field X, meaning X Indicator, has values "Y" or blank for enabling the X Indicator and "N" for disabling the X Indicator. Valid entries for the new field X used in combination with the ALA and the Transition Indicator (TRI) for 4E17 or Feature Processing Data Type (FPDT) X Indicator for adjunct customer database for 4E18 are shown in Table 6-A. The combinations selected in Table 6-A are mapped into data in HT4CPAATT.

Table 6-A. X Indicator for Adjunct Customer Database

TRI (4E17) or FPDT (4E18)	ALA	X Indicator	Description
NEW/ALA	0→14	Y	An Adjunct with X enabled
NEW/ALA	0→14	blank	An Adjunct with X enabled
NEW/ALA	0→14	N	An Adjunct with X disabled
NEW/ALA	15	N	No adjunct or feature info—X disabled
OLD/FI	1→15	N	Feature information and X disabled
OLD/FI	1→15	Y	Feature information and X enabled
OLD/FI	1→15	blank	Feature information and X enabled

ODA Form 408L

3.04 ODA Form 408L defines the adjunct customer with terminating services. The new field X, meaning X Indicator, has values "Y" or blank for enabling the X Indicator and "N" for disabling the X Indicator. Valid entries for the new field X used in combination with the ALA field are shown in Table 6-B. The combinations selected in Table 6-B are mapped into the data.

Table 6-B. X Indicator for Customer Terminating Services

ALA	X Indicator	Description
0→14	Y	An adjunct with X enabled
0→14	blank	An adjunct with X enabled
0→14	N	An adjunct with X disabled
15	N	No adjunct and X disabled

Recent Change Forms

A. Modified Recent Change Forms

RC Form 650

3.05 RC Form 650, available with generic 4E17, is covered in AT&T 234-090-172AC, *4ESS™ Switch, Product Release Document, 4E17 Release 2 Generic.*

3.06 The form is used to populate the adjunct access trigger table, and Table 6-C shows the mapping of the ALA to Feature Indicators. The ALA field is comprised of two characters. The first character, the ALA, depends on the requirement for TRI (4E17) or FPDT (4E18). The ALA field is presented in hexadecimal.

Table 6-C. ALA to Feature Indicators Mapping

ALA Values			Feature Indicator Bit Status			
ODA	RC	VER				
408K	650 658 900	6ax	Spare 1	Spare 2	ANI NCD	PCP ON #2 NCP
0	0	0	OFF	OFF	OFF	OFF
1	1	1	OFF	OFF	OFF	ON
2	2	2	OFF	OFF	ON	OFF
3	3	3	OFF	OFF	ON	ON
4	4	4	OFF	ON	OFF	OFF
5	5	5	OFF	ON	OFF	ON
6	6	6	OFF	ON	ON	OFF
7	7	7	OFF	ON	ON	OFF
8	8	8	ON	OFF	OFF	OFF
9	9	9	ON	OFF	OFF	ON
10	A	10	ON	OFF	ON	OFF
11	B	11	ON	OFF	ON	ON
12	C	12	ON	ON	OFF	OFF
13	D	13	ON	ON	OFF	ON
14	E	14	ON	ON	ON	OFF
15	F	15	ON	ON	ON	ON

Indicators for Add

3.07 The second character in the ALA field is the X Indicator. When "A" (add) is entered in the ACTION field, the valid entries for the ALA field for TRI (4E17) or FPDT (4E18) are shown in Table 6-D.

Table 6-D. Population Rules for Adjunct Access Trigger Table ALA Field

TRI(4E17) FPDT(4E18)	ALA Field (2 Characters) 1st Char.	2nd Char.	Description
NEW/ALA	0-9,A-E	Y	An adjunct with X enabled
NEW/ALA	0-9,A-E	blank	An adjunct with X enabled
NEW/ALA	0-9,A-E	N	An adjunct with X disabled
NEW/ALA	F	N	No adjunct or feature info—X disabled
OLD/FI	1-9,A-F	N	Feature information and X disabled
OLD/FI	1-9,A-F	Y	Feature information and X enabled
OLD/FI	1-9,A-F	blank	Feature information and X enabled

Invalid Additions

3.08 The result of the add or change action must **never** be the following:

- An ALA value for the ALA field of "F" (unique ALA) and the X Indicator for the ALA field of enable with the feature type/transition indicator or NEW/ALA (4E17/4E18)
- A feature type/transition indicator of OLD/FI (4E17/4E18) but no feature bits (ALA value for the ALA field of 0).

Indicators For Delete

3.09 A "D" (delete) in the ACTION field is handled the same way it currently is, that is, neither the ALA nor TRI/FPDT (4E17/4E18) fields must be entered.

Indicators For Change

3.10 A "C" (change) in the ACTION field means the ALA field can be entered with the following values:

- 0y->9Y,AY->EY, ON->9N, and AN->FN to change both the X Indicator and ALA (when TRI/FPDT is set to NEW/ALA)
- 1Y->9Y, AY->FY, 1N->9N, and AN->FN to change both the X Indicator and Feature Indicators (when TRI/FPDT is set to OLD/FI)
- 0->9 and A->F to change the ALA (when TRI/FPDT is set to NEW/ALA)
- 1->9 and A->F to change the Feature Indicators (when TRI/FPDT is set to OLD/FI)

- Y and N to change the X Indicator
- Blank for no change.

Invalid Changes

3.11 For the change action, either the ALA or TRI/FPDT (4E17/4E18) field must not be blank, which is the current rule. Following are some examples that are invalid:

- An ALA field of "FN" originally added and TRI/FPDT (4E17/4E18) field of "NEW". Then a change operation of the ALA field to "Y"
- An ALA field of "ON" originally added and TRI/FPDT (4E17/4E18) field of "NEW". Then a change operation of the TRI/FPDT (4E17/4E18) field to "OLD"
- An ALA field of "1Y" originally added and TRI/FPDT (4E17/4E18) field of "NEW". Then a change operation of the ALA field to "F".

RC Form 651

3.12 RC Form 651, available with generic 4E17, is covered in AT&T 234-090-172AC. The form is used to populate the adjunct destination trigger table. As with RC Form 650, the ALA field is now composed of two characters. The first character is the Adjunct Logical Address (ALA). The second character in the ALA field is the X Indicator. For the add action, valid entries for the ALA field are shown in Table 6-E.

Table 6-E. Population Rules for Adjunct Destination Trigger Table ALA Field

ALA Field (2 Characters)		
1st Char.	2nd Char.	Description
0-9,A-E	Y	An Adjunct with X enabled
0-9,A-E	blank	An Adjunct with X enabled
0-9,A-E	N	An Adjunct with X disabled
F	N	No Adjunct and X disabled

Indicators For Add, Change, or Delete

3.13 The result of the add or change action must never result in an ALA field value of "F" (unique ALA) and the X Indicator for the ALA field of enable.

3.14 A "D" (delete) in the ACTION field is handled the same way it currently is, that is, the ALA field must not be entered.

3.15 A "C" (change) in the ACTION field means the ALA field can be entered with the the following values:

- 0Y->9Y, AY->EY, 0N->9N, and AN->FN to change both the ALA and X Indicator
- 0->9 and A->F to change the ALA
- Y and N to change the X Indicator
- Blank for no change.

Invalid Changes

3.16 The following changes are invalid:

- An ALA field of "FN" originally added. Then a change operation of the ALA field to "Y"
- An ALA field of "0Y" originally added. Then a change operation of the ALA field to "F"
- A change operation of the ALA field to "FY".

RC Forms 900 and 658

3.17 RC Forms 900 (4E17 Release 2) and RC Form 658 (4E18 Release 1) populate the adjunct access trigger table using the same rules for populating RC Form 650 described previously. However the following values in Table 6-D have been renamed for RC Forms 900 and 658 as follows:

OLD = 0
NEW = N
FI = F
ALA = A

Verify Forms

A. New Verify Forms

Verify Form 16aq

3.18 A new format message for Form 16aq is added as follows:

"VER:CPA;STD,OPT X *a*:ORIGLIST!"

where "a" is equal to either "Y" for enable or "N" for disable. Depending upon "a", all the information in the ANI trigger table is printed that has "X" enabled or disabled.

B. Modified Verify Forms

Verify Form 6ax

3.19 The 6ax Verify form is the output message for entries requested in the adjunct access trigger table. The data outputs an ALA, TRI/FPDT (4E17/4E18), and X Indicator (either "Y" or "N").

Verify Form 16ar

3.20 A new format message for Form 16ar is added as follows:

"VER:CPA;STD,OPT X *a*:DESTLIST!"

where "a" is equal to either "Y" for enable or "N" for disable. Depending upon "a", all the information in the DN trigger table is printed that has "X" enabled or disabled.

Verify Form 6ay

3.21 This is the output message for entries requested in the adjunct destination trigger table. The data outputs an ALA and X Indicator (either "Y" or "N").

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Inbound International 800 Service Separation of Country Code from Network Routing Number Feature (3957)

7

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Inbound International 800 Service Separation of Country Code from Network Routing Number Feature (3957)

7

1. Feature Description

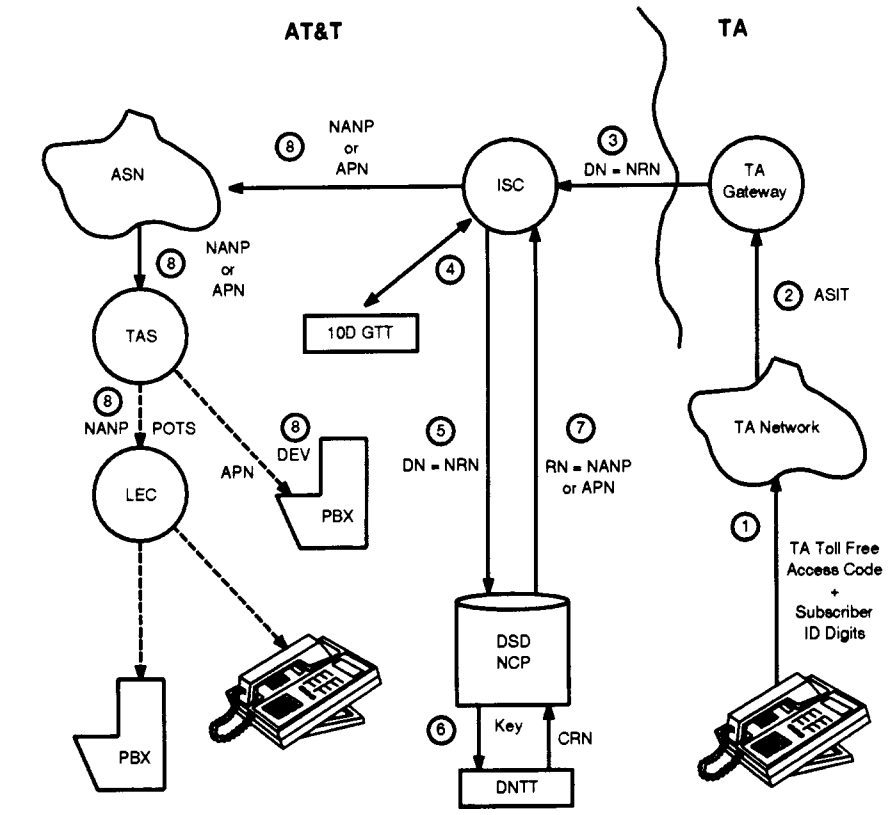
1.01 Currently, Inbound International 800 (I800) Service traffic arrives at the AT&T Switched Network (ASN) with Dialed Number (DN) formats 196-WXY-CCVZ or 196-WXY-VCCZ. These formats constitute the Network Routing Number (NRN). Within each NRN is an embedded 2-digit Pseudo Country Code (PCC). Each Telecommunications Administration (TA) has a unique value. Because of the rapid growth of service, the PCCs, TA identification numbers, and Subscriber IDs (WXYVZ) will soon be exhausted.

1.02 The I800 Service Separation of Country Code From NRN feature increases the number of TA identification codes for I800 Service traffic. The 1- to 3-digit International Direct Distance Dialing (IDDD) Country Codes (CCs), along with the Foreign Administration Identifier (FAI), are derived from the incoming Trunk Subgroup (TSG). Two additional digits in the NRN become available and can be allocated to subscriber IDs. This feature is proprietary and applicable to I800 Service calls only.

1.03 This feature is divided into two phases. In Phase 1, the DN received may be either an NRN or Foreign Subscriber Identification Telephone Number (FSIT). In Phase 2, all received DNs will be FSIT. Both phases are activated by feature bits. If both feature bits are activated, the Phase 2 bit takes precedence over Phase 1.

2. Call Flow

Call Flow Diagrams and Narratives



Legend:

APN	Action Point Number
ASIT	Additional Special Identifying Telephone
ASN	AT&T Switched Network
CRN	Customer Record Number
DEV	Dedicated Egress Voice
DN	Dialed Number
DNTT	Dialed Number Translation Table
DSD	Direct Services Dialing
FAI	Foreign Administration Identifier
FSIT	Foreign Subscriber Identification Telephone Number
GTT	Global Title Translation
ISC	International Switching Center
LEC	Local Exchange Carrier
NANP	North American Numbering Plan
NCP	Network Control Point
NRN	Network Routing Number
PBX	Private Branch Exchange
TA	Telecommunications Administration
TAS	Terminating AT&T Switch
TSG	Trunk Subgroup

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Figure 7-1. Current I800 Service Call Flow

2.01 The following call flow is illustrated in Figure 7-1.

1. An I800 Service call originates in an Overseas, Caribbean, or Mexican location when the caller dials a toll-free access code designated by the Post 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 DN to an NRN in the form 196-WXY-VCCZ or 196-WXY-CCVZ. The 196 digits are a Special Service Code (SSC) indicating I800 Service. WXYVZ identifies the subscriber, and CC is the I800 Service-specific PCC that identifies the country and/or carrier of origin. The PCC digits range from 10 to 99.

3. The International Switching Center (ISC) of the PTT forwards the 196 number to an AT&T ISC using any available international trunk.

   If the call is routed over a Common Channel Signaling System 7 (CCS7) Integrated Services Digital Network User Part (ISUP) trunk, the ISUP Initial Address Message (IAM) may contain the Calling Party Number (CgPN) parameter. If available, the address digits are placed in the address digits file of the CgPN parameter. If the CgPN parameter is included and the address digits are not available, the presentation indicator in the CgPN is coded ***address digits not available***.

4. The ISC checks the 7th digit of the 196 NRN to determine which format was received. After determining where the PCC digits are located within the number, the ISC creates a Global Title Record Key in the form of 196-00WXYVZ. This key is then used to perform 10-digit Global Title Translation (GTT). If a match is found, the Originating AT&T Switch (OAS) determines which Direct Services Dialing (DSD) Network Control Point (NCP) pair should receive the query using information in the GTT table. If a match is not found, the switch sends the call to the No. 2 Signal Transfer Point (2STP) where the default 6-digit GTT occurs and the 2STP routes the query to the appropriate DSD NCP. The 6-digit GTT feature must be turned on in the *4ESS*™ switch to allow 6-digit GTT in the 2STP if the 10-digit GTT fails on the 196 number.

   Note: The ISC functions as an OAS for these calls. Therefore, references to the ISC in the remainder of this call flow actually mean the OAS.

5. Once the correct DSD NCP pair is determined, the OAS queries the DSD NCP with a Transaction Capabilities Application Part (TCAP) BEGIN message containing a Provide Instruction-Start operation. The 196 NRN (containing the PCC) is included in the Digits (DN) parameter, and the Calling Line Identification (CLI), 7 to 12 digits if available, is included in the Digits [Automatic Number Identification (ANI)] parameter of the TCAP BEGIN message.

   Note: For unavailable CLI, the Digits (ANI) parameter is sent to the database with no digits (zero length).

6. The DSD NCP that receives the TCAP BEGIN message performs the following routines:

   - Extracts the PCC digits from the 196 NRN. These digits are used to perform CC routing and for blocking. The DSD NCP sets Originating Numbering Plan Area (ONPA)=0CC and the value of the GeoArea predefined variable equal to 0CC.
   - 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 (where CC is the 2-digit PCC).
   - Converts the 196 NRN to a Dialed Number Translation Table (DNTT) key in the form 196-00WXYVZ. This key is used to access the DNTT. The DNTT is searched for a match on the number.
   - If a match is found in the:
     - — 1DSD NCP, a Customer Record Number (CRN) in the form 194/195-0VW-0XYZ is returned, indicating that an integrated record exists for this subscriber.
     - — 2DSD NCP, the call processing record associated with the Customer Account ID corresponding to the 196 key in the DNTT is executed.
   - If no match is found in the:
     - — 1DSD NCP, the determination of the CRN will default back to the current conversion algorithms.
     - — 2DSD NCP, the call is vacant coded and an error is returned to the *4ESS* switch.

7. After the customer record is found and any needed announcements or call prompter interactions executed, the DSD NCP sends an END message containing the following two operations:

   - The ***Charging-Bill Call*** operation specifying that an Automatic Message Accounting (AMA) record should be made. The Service Indicator Code (SIC) is contained in the Advanced 800 (A800) Service Billing Data parameter and corresponds to the egress type. The Call Code is also contained in this operation. It is set to 324 by the DSD, indicating I800 Service in the Inbound Services Intelligent Network (ISIN) architecture. The DSD sets the Call Code=Type of Service.
   - The ***Connection Control-Connect*** operation indicating to the ISC that it should route the call. This operation also provides the routing number in the Digits (Routing Number) parameter. The Generic Routing Information (GRI) parameter contains the routing domain indicator. The routing number is either an Action Point Number (APN) in the form SSS-TTT-XXXX [Dedicated Egress Voice (DEV) domain routing] or a POTS number in the form NPA-NXX-XXXX (POTS domain routing).

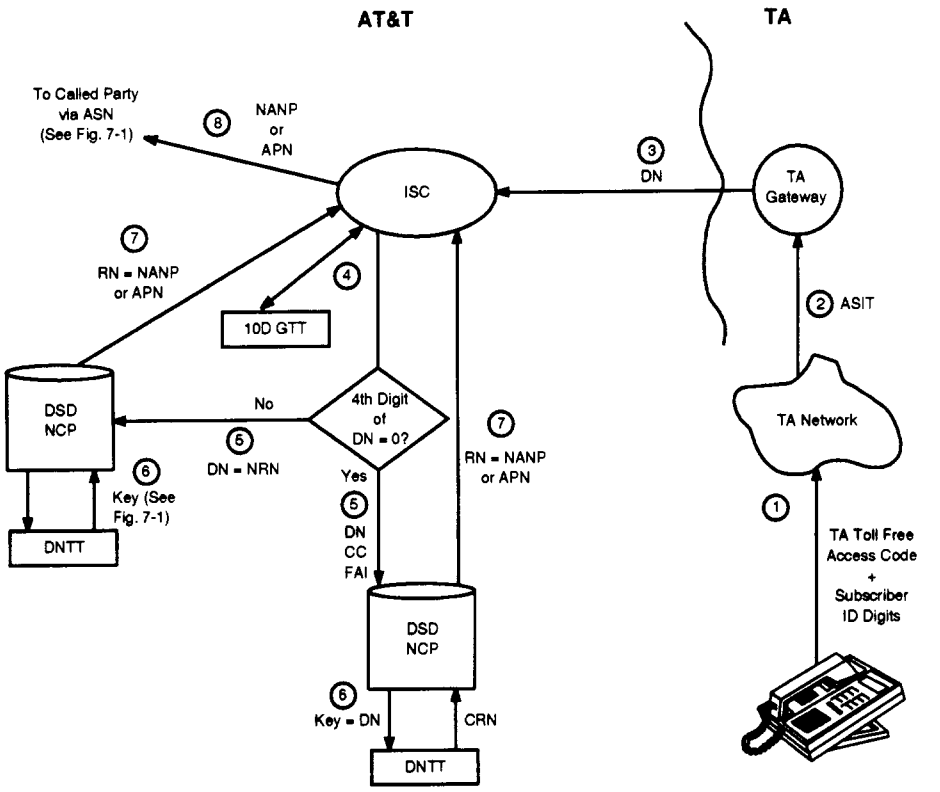
8. Using Real Time Network Routing (RTNR), the ISC routes the call across the AT&T network to the terminating *4ESS* switch. The call is then routed to one of the following:

   - The direct-connect sponsor location for 800 *Megacom*® telecommunications service terminations
   - The Local Exchange Carrier (LEC) for Classic 800 Service, 800 *Masterline*® telecommunications service, and 800 *READYLINE*® telecommunications service terminations. The LEC completes the call routing for switched-egress subscribers.

   If address digits are included in the CgPN parameter of the IAM, the ISC copies that information into the CgPN parameter of the outgoing IAM. The CLI may then be delivered to the subscriber. If the CLI is delivered, the terminating *4ESS* switch sends back a Subscriber Identification (SID)/ANI increment message to peg the billing record for CLI delivery.

   Note: If address digits are not included or coded as ***address unavailable*** in the CgPN parameter or if the call is not routed using International Telephone and Telegraph Consultative Committee 7 (CCITT7) ISUP, the CgPN parameter is not included in the IAM.

9. If the Customer Premises Equipment (CPE) answers the call, answer supervision is returned to the originating ISC. Upon receipt of answer supervision, the ISC begins elapsed timing and cuts the incoming trunk through in the backward direction. When the call is terminated, the ISC completes an AMA billing record. 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.



Legend:

APN	Action Point Number
ASIT	Additional Special Identifying Telephone
ASN	AT&T Switched Network
CC	Country Code
CRN	Customer Record Number
DN	Dialed Number
DNTT	Dialed Number Translation Table
DSD	Direct Services Dialing
FAI	Foreign Administration Identifier
GTT	Global Title Translation
ISC	International Switching Center
NANP	North American Numbering Plan
NCP	Network Control Point
NRN	Network Routing Number
RN	Routing Number
TA	Telecommunications Administration

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Figure 7-2. Phase 1 (Bimodal) I800 Service Call Flow

2.02 The following call flow is illustrated in Figure 7-2.

1. An I800 Service call originates in an Overseas, Caribbean, or Mexican location when the caller dials a toll-free access code designated by the 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 DN to an NRN in the form 196-WXY-VCCZ or 196-WXY-CCVZ. The 196 digits are an SSC indicating I800 Service. WXYVZ identifies the subscriber, and CC is the I800 Service-specific PCC that identifies the country and/or carrier of origin. The PCC digits range from 10 to 99.
3. Calls are routed from the foreign switch to the ISC with a DN. In the bimodal phase, the DN can have two possible formats: NRN or FSIT. In order to distinguish between the two, the *4ESS* switch looks at the 4th digit of the DN received.
4. The OAS performs a 10-digit GTT on the DN. If a match is found, the OAS determines which DSD NCP pair should receive the query using information in the GTT table. If a match is not found, the switch sends the call to the 2STP where the default 6-digit GTT occurs. Once the correct DSD NCP pair is determined, the OAS queries the DSD NCP with a TCAP BEGIN message containing a Provide Instruction-Start operation. The following parameters are included:
   - The Digits (DN) parameter.
   - The Digits (ANI) parameter. This includes the CLI if available. The CLI is 7 to 12 digits in length. If the CLI is not available or is 0 to 6 digits, then the ANI is sent with a null value.
   - The Country Code parameter [includes the Far End Numbering Plan Area (FENPA)].
   - The FAI parameter (includes the FAI from the TSG characteristics).

5. If the 4th digit is zero (FSIT format 196-00W-XYVZ), the new switch capabilities are triggered.

   Note: For NRN, the 4th digit can ***never*** be zero.

   The switch includes the new CC and FAI parameters in the TCAP BEGIN message using the TSG characteristic fields of FENPA and FAI, respectively. The new CC parameter populated with the FENPA field values is also the true IDDD code. The *4ESS* switch performs a 10-digit GTT on 196-00W-XYVZ. If this fails, then the default 6-digit GTT process takes place.

6. The switch then queries the DSD NCP with the appropriate fields populated in the TCAP BEGIN message. The DSD NCP must be able to function in a bimodal mode. The presence or absence of CC acts as a flag to decide whether the mode of operation is to be based on the CC and FAI received in the TCAP message or whether to use the existing logic.

   If the CC parameter is not present in the TCAP BEGIN message, DN=NRN and existing call processing logic follows. If present, DN=FSIT and the call is processed using the FSIT, CC, and FAI received.

7. The remainder of this call flow is the same as for the Current I800 Service Call Flow (Step 7, Step 8, and Step 9).

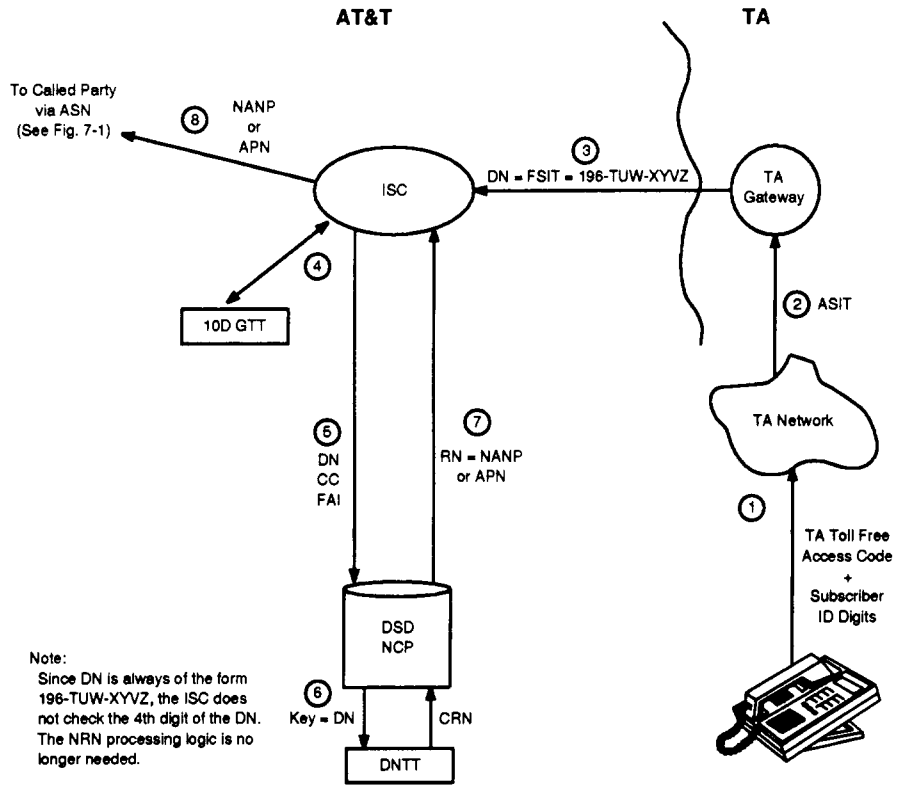

Figure 7-3. Phase 2 I800 Service Call Flow

2.03 The Phase 2 call flow is illustrated in Figure 7-3. This call flow is identical to the Phase 1 call flow with the following exception. In Step 3, calls are routed from the foreign switch to the ISC. The DN has an FSIT format. The switch always populates the TCAP BEGIN message with CC and FAI parameters from the TSG characteristics information. At this stage, DN=NRN processing logic is no longer needed.

3. Provisioning

Office Data Administration

A. Forms 401A, 401B, and 401C

3.01 These Office Data Administration (ODA) forms are used as follows:

- 401A—to specify the characteristics of a 2-way message TSG
- 401B—to specify the characteristics of a 1-way incoming message TSG
- 401C—to specify the characteristics of a 1-way outgoing message TXG.

The SPARE1 (S1) field is used to populate the **XL4TB_S1** item. Valid entries are as follows:

If S1 is populated with...	Then **XL4TB_S1** is populated with...
0 or Blank	0
1 to 7	1 to 7 (Binary)

B. XL4TS_FEOFC

3.02 The **XL4TS_FEOFC** item is used to store the Far End NXX for AT&T offices. This field should be set to 0 (TELCO zero) if the FENPA is populated with a country code.

Recent Changes

A. Recent Change Forms 100, 101, 102, 107, 108, and 109

3.03 These Recent Change (RC) forms are used to establish or change the characteristics of 2- and 1-way incoming/outgoing TSGs.

3.04 The S1 field is used to store the FAI for this feature. Valid entries are **Blank** (defaults to 0) and **1** to **7**.

B. Recent Change Forms 319 and 320

3.05 RC Form 319 specifies codes to be added (turns on screening) to a Digit Type category, while RC Form 320 specifies codes to be deleted (turns off screening).

3.06 Valid entries are as follows:

- DIG: **000** to **999**
- DIGTYP: **BNPA, DEF1, DEF2, DEF3, DEF4, DNHR, DP3, DP6, I809, IIA, IIC, INO, INT, IRS, ITS, IWZ1, NRA, NRN, NRNX, UTC** and **WZ1A**.

3.07 For this feature, the entry is **NRNX**. Based on the ABC digits=196, this entry turns off the screening for the DEF digits.

C. Recent Change Form 809

3.08 This form is used to enable and disable various feature bits that require special processing. Although the layout of this form is not changing, new values are being added to existing fields.

3.09 Valid entries for this feature are as follows:

- FEATURE ITEM: **I800P1** or **I800P2**
- ON OR OFF: **ON** or **OFF**.

Proprietary Translation Guide (PTG)-4 Updates

A. Division 2, Section 6

3.10 The following will be added to the entries for FEATURE ITEM:

- I800P1—Inbound 800 Separation of Country Code Phase 1. When this feature bit is set to **ON**, both the NRN and FSIT formats of the DN are acceptable.
- I800P2—Inbound 800 Separation of Country Code Phase 2. When this feature bit is set to **ON**, only the FSIT format of the DN is acceptable. This feature bit will override the I800P1 feature bit.

B. Division 7, Section 8j

3.11 The following will be added to the entries for FEATURE ITEM:

- I800P1—Inbound 800 Separation of Country Code Phase 1.
- I800P2—Inbound 800 Separation of Country Code Phase 2.

4. Recording

4.01 When a hand-off is required, the following information is recorded after receiving the Charge-Bill Call operation with the optional parameters IDDD CC and ANI:

- The Originating IDDD Country Code in the ONPA/Number fields.
- The SID received in the ANI parameter.

4.02 When a hand-off is not required and the call is I800, the following is recorded:

- The Originating IDDD Country Code (809-0000) in the ONPA/Number fields. This information is obtained from the foreign PTT or from the FENPA.
- The Originating Numbering Plan Type with the value IDDD CC=3.

4.03 Module 923, Numbering Plan Type, contains two indicators. One indicator designates the Originating Number Numbering Plan while the other designates the Terminating Number Dialing Plan. The Numbering Plan is recorded using one bit (0 or 1). In AMA Table 869, the Numbering Plan is recorded as a 1 or a 2.

4.04 If the *4ESS* switch receives or retrieves an originating IDDD CC, it must record a **3** in AMA Table 869 and append AMA Module 923. Table 7-A and Table 7-B list the values for AMA Tables.

Table 7-A. AMA Table 869 Values

Binary Coded Decimal (BCD)	Value	Description
1	0	Undefined
	1	E.164
	2	APN
	3	IDDD CC (New)
2	—	Hex C (Sign)

Table 7-B. Module Code 923 Values—FAI

Information	Table No.	BCD
Module Code	88	4
FAI	879	8

4.05 If the *4ESS* switch receives only one FAI (either originating or terminating), the other FAI in AMA Table 879 is set to the default (000). Table 7-C lists the values for AMA Table 879.

Table 7-C. AMA Table 879 Values

BCD	Values	Description
1	0	Reserved
2 - 4	000	Default
	001 - 007	Terminating FAI
5 - 7	000	Default
	001 - 007	Originating FAI
8		Hex C (Sign)

5. Network Management

Operations Support Systems

5.01 Table 7-D describes the Operations Support Systems (OSSs) affected by this feature.

Table 7-D. OSSs Affected by Overseas Access

OSS	Use	Impact
Direct Signaling Assignment System (DSAS)	Assign NRNs, FSITs in the form 196-00W-XYZVZ, and 800+7D numbers [controlled by the Engineering Network Administration Center (ENAC)]	For Phase 1, must be able to assign any of the three types of numbers. For Phase 2, must have the capability to assign a general form of FSITs and 800+7D numbers .
10-Digit Routing Support System (10DRSS)	Provide the 10-digit GTT that indicates the Network Point Code (NPC) of the appropriate NCP (routes an I800 Service call from the *4ESS*™ switch)	For Phase 1, NPCs are required for all three types of numbers. For Phase 2, NPCs are required for FSITs and 800+7D numbers.
Network Control Point Administrative System (NCPAS)	Collect data on NCP usage	Ensures that the data logged is for I800 Service and ***not*** for Domestic 800 Service call.
Centralized Automated Data Collection System (CADCS)	Receives call records from Data Collection and Distribution Systems (DCDSs) and 2DSD, and sends accumulated data to customers	Must be able to perform the following functions: ■ Extract the IDDD Country Code and Carrier ID from call records received from DCDs and 2DSDs ■ Translate an IDDD Country Code and Carrier ID to the appropriate country label for delivery to customers ■ Simultaneously support call records with CC and FAI during the transition period.

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Interaction with Other Features

7.01 This feature interacts with Feature 4170, Inbound I800 Overseas Access. Feature 4170 reuses the feature bit indicators required for Feature 3957. Both features ***must*** be in the same phase at the same time (that is, Feature 3957 cannot be in Phase 2 and Feature 4170 in Phase 1).

Ubiquity

7.02 This feature requires ubiquity of the generic across the network before activation and ***must*** be loaded in the following order:

1. AT&T 3B20D Processor
2. 3B20D Processor Direct Link Node (DLN)
3. 1A Processor.

A failure will occur if not loaded in this order, and the call will be killed.

Turn On/Turn Off Mechanism

7.03 This feature is turned on by the ODA bit **OD4OFCCOPY**. RC Form 809 is used to enable and disable the feature bits.

8. Input/Output Manual Pages (Not Affected)

Self-Provisioning Global Title Translation (SPGTT) Deferred Requirement Feature (4032a)

8

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Self-Provisioning Global Title Translation (SPGTT) Deferred Requirement Feature (4032a)

8

1. Feature Description

1.01 The Self-Provisioning Global Title Translation (SPGTT) feature was introduced in Generic 4E18 Release 2. The main components of the SPGTT feature are the database in the Universal Global Translator (UGT) Network Control Point (NCP) and the Global Title Translation (GTT) table in the Direct Link Node (DLN). A master copy of all the Business Long Distance Services (BLDS) Automatic Number Identification (ANI) ranges and their associated translations is stored in the UGT NCP database. The GTT table, which is in the DLN at each *4ESS*™ switch, contains a subset of the GTT data stored in the UGT NCP database.

1.02 Since the DLN GTT table has a finite size, it is important to only retain frequently used translation data. In Generic 4E18 Release 2, the DLN GTT table is searched once a day for the following types of records:

- Records with a Numbering Plan Type (NPT) equal to the North American Numbering Plan (NANP) and a Number Plan Area (NPA) that is a Service Select Code (SSC) with a value of 125, 128, or 130.
- ANI ranges (NANP) with a home or served NPA that have not been accessed in 16 days.
- ANI ranges with an NPT equal to Action Point Number (APN) that have not been accessed in 16 days. (These could be either home/served or non-home/non-served NPAs.)

Any records fitting one of these categories are deleted.

1.03 This feature adds another type of record to the search list: records that contain non-home/non-served NPAs with an NPT equal to NANP. Any records of this type are automatically removed at the end of each day.

1.04 Table 8-A summarizes the types of records that are automatically removed from the DLN GTT table and indicates how long they are retained before being removed.

Table 8-A. Records Automatically Removed From DLN GTT Table

Type of Record		
NPT	NPA	Retention Period
NANP	Non-Home or Non-Served	One day
NANP	SSC with a value of 125, 128, or 130	One day
NANP	Home or Served	16 days
APN	All	16 days

2. Call Flow (Not Affected)

3. Provisioning(Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

3B System Integrity

6.01 In Generic 4E18 Release 2, no entries were saved following a 53 or 54 level initialization. In Generic 4E18 Release 3, at least 500 entries will be saved. The *4ESS* switch keeps a list of the ANIs in the cache table and saves the most frequently used and most recently added ANIs.

NOTE:
Update request messages are not affected by an initialization. They will always be saved.

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)

Alternate Signaling Transport Network (ASTN) Gateway/Network Interconnect Backup Enhancements Feature (4033)

9

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Alternate Signaling Transport Network (ASTN) Gateway/Network Interconnect Backup Enhancements Feature (4033)

9

1. Feature Description

1.01 The Alternate Signaling Transport Network (ASTN), which is a proprietary feature, provides the AT&T Switched Network with a backup capability when there is a *4ESS*™ switch/Common Network Interface (CNI) signaling failure. The ASTN is responsible for routing messages when the CNI becomes inoperable. The following types of messages are handled by the ASTN:

- Common Channel Signaling System 7 (CCS7)
- Real Time Network Routing (RTNR)—(load map query/response)
- Transaction Capabilities Application Part (TCAP).

1.02 Should the CNI become inoperable (CNI Ring down), the ASTN will trigger within 2 seconds. Helper switches are then used to route messages between the originating and terminating switches.

1.03 The ASTN has undergone several enhancements since it was first introduced into the AT&T *4ESS* Switched Network. Initially, the ASTN capability relied on A-links, 4.8-kbps F-links, and helper *4ESS* switches to route messages to their destinations. In generic 4E17 Release 1, the ASTN 56-Kbps Capacity Increase feature added 56-kbps Link Access Procedure Balanced (LAPB) F-links to the *4ESS* switch. This additional link capacity significantly reduced the amount of congestion in the ASTN. The ASTN 56-Kbps Capacity Increase feature provides for a maximum of three 56-kbps F-link layers (two F-links per layer) and additional CCS7 signaling backup for services that rely on large-size TCAP messages. An F-link layer is used between two *4ESS* switches.

1.04 The ASTN was further enhanced by the ASTN Gateway/Network Interconnect (NI) Backup feature in generic 4E17 Release 3. This feature provides signaling backup for CCS7 NI Integrated Services Digital Network User Part (ISUP) messages when a *4ESS* switch/CNI signaling failure occurs. For incoming NI traffic, the ASTN Gateway/NI Backup capability relies on a *4ESS* Gateway switch, 56-kbps F-links, and helper switches to route signaling messages to the destination (that is, the *4ESS* victim switch). For outgoing NI traffic, the ASTN Gateway/NI Backup capability relies on A-links, 56-kbps F-links, and outbound helper switches to route NI ISUP messages from a *4ESS* victim switch to the Local Exchange Carrier (LEC) end office. This feature is controlled by an Office Data Assembler (ODA) bit that is set in AT&T offices only.

1.05 With the increase in traffic in the AT&T Switched Network, additional NI backup enhancements were still needed. Thus, in generic 4E18 Release 3, the ASTN Gateway/NI Backup Enhancements feature will provide an additional F-link layer to handle the projected traffic load. (Refer to "Network Capabilities" for detailed enhancements.)

Network Capabilities

1.06 This feature improves both the ASTN Gateway/NI Backup capability (4E17R3) and the ASTN in general. Improvements are made in network routing (capacity and testing), F-link maintenance, provisioning, and administration. The following network capabilities are provided:

a. Increased F-link layers—The maximum number of 56-kbps F-link layers that can terminate at helper switches has been increased from three to four. To accommodate traffic increases, load sharing will be used across F-links, rather than F-link layers.

b. Storage of helper information at the victim switch—Each *4ESS* switch in the AT&T Switched Network stores status information for its helper switches. Periodically, the helper switch F-link status information is updated and transmitted to other *4ESS* switches in the network. A Recent Change/Verify (RC/V) capability has been added to allow the addition of out-of-region helpers. This capability allows the victim switch to route outgoing NI traffic via the specified outbound helper switch. **When an outbound helper list is provisioned, all helpers including the in-region helpers must be included on that list.**

c. Ability to select outbound helper switches in any region—Prior to this feature, outbound helper switches were located in the same region as the victim switch, except for the Ellisville switch. Now, outbound helper switches can be located in the same or different region as the victim switch. This simplifies Message Transfer Part (MTP) routing at the Signaling Transfer Point (STP) and allows for flexible outgoing NI traffic. Additionally, MTP routing tables are kept at the outbound helper switch to ensure that traffic from the victim switch is routed from the outbound helper to the appropriate LEC end office.

d. Complete MTP Route Verification Test (MRVT) and Signaling Connection Control Part (SCCP) Route Verification Test (SRVT)—The MRVT provides for testing CCS7 messages routed between two end points in the network. The SRVT provides for testing SCCP/TCAP messages routed between a *4ESS* switch and a Network Control Point (NCP). Refer to "Maintenance/Troubleshooting" for additional information on these CNI tests (MRVT and SRVT).

e. Alarms—When a *4ESS* switch/CNI network event occurs, major alarms will be activated. An alarm may be used to indicate that the F-links carrying NI outgoing traffic are unavailable. This is important when only a single outbound helper is supporting a victim switch. In this case, a major alarm has been provided to indicate that one F-link of an F-link layer is out of service.

f. F-links state/monitoring improvements—To avoid erroneous trouble reports on the F-links because of a facility failure, F-link states can be set to allow link provisioning and to prevent false alarms during F-link service turnup. A capability is also provided to monitor the F-links during maintenance and troubleshooting.

g. Administration of *4ESS* switch/CNI network events—The Data Acquisition Reports and Integrated Control System (DARICS) records and reports the following data when a network failure occurs:

- Time and duration of the failure
- Switching/STP network elements affected (victim, helper, gateway, E–link, F-link, and A-link)
- Usages of the affected network elements and Signaling System 7 (SS7)/ASTN signaling links
- Impact the failure has on the B-links and C-links.

h. Load sharing of traffic that is per F-link rather than per F-link layer.

Customer Benefits

1.07 The ASTN Gateway/NI Backup Enhancements feature offers the following benefits to customers:

- Additional maintenance capabilities to monitor, test, and maintain the ASTN Gateway/NI backup
- No significant change in call processing
- No negative impact on non-ASTN/NI messages
- Remains transparent to existing services features.

2. Call Flow

2.01 The ASTN Gateway/NI Backup Enhancements feature supports both incoming and outgoing NI ISUP traffic. Incoming NI ISUP traffic is sent from the LEC to the AT&T Switched Network. Outgoing traffic is sent from the AT&T Switched Network to the LEC. The message flow for the incoming NI ISUP traffic does not change with this feature. For outgoing NI ISUP traffic, Figure 9-1 shows the message flow as follows:

1. The outgoing ASTN/NI message is routed from the victim switch to the outbound helper switch using 56-kbps F-links. As indicated in Figure 9-1, the outbound helper switch may be located in the **same** region as the victim switch (1a) or in a **separate** region (1b).
2. The outbound helper switch converts the ASTN/NI message into the CCS7 NI ISUP format and routes the message to the STP Gateway (2a and 2b).
3. The STP Gateway routes the NI ISUP message to the LEC STP.
4. The LEC STP routes the NI ISUP message to the LEC end office.

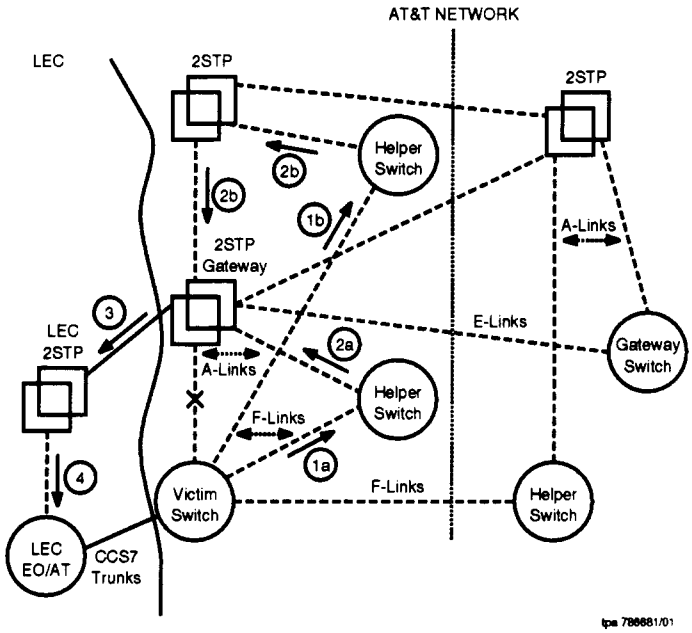

Figure 9-1. Outgoing NI ISUP Message Flow

3. Provisioning

Office Data Assembler (ODA)

3.01 An ODA bit is set at AT&T *4ESS* switch offices to activate the ASTN/NI capability deployed in generic 4E17 Release 3. This bit is located in bit position D(22) in the OD4OFCCOPY word and will be maintained across generic and ODA retrofits. The ASTN Gateway/NI Backup Enhancements feature was deployed in the "off" (0) state. Currently, all ASTN/NI Gateway *4ESS* switch offices have the ODA bit set to "on."

Recent Change (RC)

3.02 Two new Recent Change formats (RC:MISC) are required for the ASTN Gateway/NI Backup Enhancements feature: Outbound Helper Recent Change and Growth/Available State Recent Change.

⇒ NOTE:
The RC:MISC forms used with this feature are separate and distinct from the RC:MISC (ASTN56Kx) form used to enter 56-kbps ASTN F-links into the ASTN routing tables.

A. Outbound Helper Recent Change

3.03 A new RC:MISC capability is provided that allows up to four ASTN 56-kbps F-link layers to be input and identified as outbound helpers for a given switch. The identities of the outbound helpers are entered into the ASTN translation structure that is used to locate outbound helpers. Outbound helpers are identified by Network Switch Numbers (NSNs). Once an outbound helper has been identified via the RC process, **all** outbound helpers, including in-region helpers, must be specified via this form.

3.04 Data is entered on the RC:MISC;FHT,FTA:ASTN56OBH form using the following format:

RC:MISC;FHT,FTA: ASTN56OBH,a,b,c,d!

Where a = RC order number

b = A (add outbound helpers) or D (delete outbound helpers)

c = P (indicates that F-link layer is to be specified as an outbound helper)

d = NSN of the F-link layer to be specified as an outbound helper

NOTE:
Up to four F-link layers can be entered using NSNs. The NSNs entered must be separated by commas. A 6-digit NSN is required. Use leading zeroes when necessary.

3.05 Sample inputs are as follows:

RC:MISC;FHT,FTA; ASTN56OBH,1,A,P,000001,000110!

RC:MISC;FHT,FTA; ASTN56OBH,2,A,P,000040,000006,000100,000101!

RC:MISC;FHT,FTA; ASTN56OBH,3,D,P,000001!

3.06 Once the outbound helpers have been identified, the following defensive checks are performed to verify outbound helper data:

- Is the NSN a valid number?
- Is the NSN located in the 56-kbps F-link translator (IO4SLINKCHAN)?
- Is the 56-kbps F-link populated in the ASTN translator (OD4SLNKTERM)?

3.07 An RC/V table (ASTN/NI Outbound Helper Routing Table), which contains a list of all outbound helpers for a particular switch, must be located at each victim switch. This table is used to determine which helper can be designated for ASTN/NI routing at the victim toward the LEC. When this table is empty, the ASTN will determine the outbound helpers based on the point code of the available 56-kbps F-links. Those 56-kbps F-links that are in the same region as the victim switch will be designated as outbound helpers.

3.08 When data is entered via the RC:MISC form for 56-kbps F-links, only the operational 56-kbps F-links entered can be used as outbound helpers. The identities of the outbound helpers that are in the growth state will be retained and added to the Outbound Helper Routing Table when they become operational. Once an outbound helper is determined, that helper is used to route NI ISUP messages to their final destination (using the originating point code of the victim switch).

B. Growth/Available State Recent Change

3.09 The RC:MISC;FHT,FTA: ASTN56GRO/ASTN56AVL form allows ASTN 56-kbps F-links and F-link layers to be placed in or removed from the growth state. When placed in the growth state, the 56-kbps F-links or layers cannot carry ASTN traffic (that is, they can no longer send messages). Also, they should not be considered for outbound helpers.

3.10 Data is entered on the RC:MISC;FHT,FTA: ASTN56GRO/ASTN56AVL form using the following format:

RC:MISC;FHT,FTA: ASTN56aaa,b,c,d,e**!**

Where aaa = GRO (insert growth state) or AVL (available, remove growth state)

b = RC order number

c = C (change, the only option allowed)

d = I (individual link involved) or P (pair of links involved)

e = 6-digit link identity, maximum 8 (000000-000007) separated by commas or 6-digit link layer, maximum 4 (000000-000007) separated by commas

3.11 If the "P" (for pair of links) and one link number of the pair are selected, this Recent Change will place both 56-kbps F-links of a layer in the growth state. Sample inputs of this RC:MISC form are as follows:

RC:MISC;FHT,FTA: ASTN56GRO,1,C,P,000000,000002,000005,000006!
(Links 000000-000007 are placed in growth state.)

RC:MISC;FHT,FTA: ASTN56GRO,1,C,I,000000,000002,000005,000006!
(Links 000000, 000002, 000005, and 000006 are placed in growth state.)

RC:MISC;FHT,FTA: ASTN56AVL,1,C,P,000001,000005,000007!
(Links 000000, 000001, and 000004-000007 are placed in available state.)

RC:MISC;FHT,FTA: ASTN56AVL,1,C,I,000000,000002!
(Links 000000 and 000002 are placed in available state.)

C. 56-Kbps F-Link Recent Change (ASTN56Kx)

3.12 The RC:MISC form used to enter 56-kbps F-links into the ASTN routing tables has been modified to initiate Audit 48 and to request the UPD:BUNSTAT function. Audit 48 is used to enter newly received 56-kbps F-link data into the translators. The UPD:BUNSTAT function is used to send the newly received data to all *4ESS* switches in the AT&T Switched Network.

D. Recent Change Error Codes

3.13 While processing Recent Changes for outbound helpers and growth/available states, errors may be encountered. When errors occur, the first NSN, the F-link/layer, or the first link number containing the error is output. The errors are identified with a code number. Table 9-A lists the error codes and their meanings.

Table 9-A. Recent Change Error Codes

Code Number	Explanation	
	Outbound Helper Recent Change	Growth/Available State Recent Change
10	Action field not A (add) or D (delete)	Action field incorrect (only "C" allowed)
449	NSN field more than 6 digits	Link or layer field more than 6 digits
762	More than four NSNs (layers) entered	More than eight links entered when "I" is selected More than four layers entered when "P" is selected
763	First 3 digits of NSN not zeroes Illegal NSN (no NSN or more than four entered) NSN not populated in ASTN translations	First 5 digits of link/layer not zeroes Link/layer more than a value of 7 (000000-000007)
770	Requested action already performed	Requested action already performed
795	N/A	Link or layer not 56-kbps equipped
798	N/A	Mate link already in requested state
1726	N/A	Duplicate entries on RC form

Verify

3.14 To verify the outbound helpers for a particular office, an existing message is used: OP:BUNSTAT. The OP:BUNSTAT message is used to locate the identities of outbound helpers and all F-links in an office. A terminating character is used at the end of each F-link data line to specify the outbound helper and link layer identities as well as the growth state of F-links. The OP:BUNSTAT message only outputs links/layers that are ASTN-equipped via the RC:MISC ASTN56Kx form.

3.15 When outbound helper data is required at the victim switch, the OP:BUNSTAT message will display the outbound helpers with an "&" (ampersand) at the end of the F-link data output line. When output helper data is required at other switches in the AT&T Switched Network, the OP:BUNSTAT:NSNx message will display the outbound helpers for a specific NSN.

3.16 The OP:SCHAN;LINKSTAT message has a **GRO** field populated with a "Y" if the link is in growth and an "N" if the link is not in growth.

3.17 Table 9-B explains the meaning of the terminating characters when an OP:BUNSTAT message is output. Refer to Figure 9-2 for a layout of the OP:BUNSTAT and OP:SCHAN;LINKSTAT messages.

Table 9-B. ASTN Verify Messages Line Terminating Characters

Character	Meaning
	Blank indicates a -4.8 layer.
*	Layer is assigned as 56 kbps.
&	Layer is a 56-kbps outbound helper.
g	One link of the defined 56-kbps pair of this layer is in growth.
G	The only defined 56-kbps link of this layer is in growth. Both defined 56-kbps links of this layer are in growth.
h	One link of the defined 56-kbps outbound helper pair is in growth.
H	The only defined 56-kbps outbound helper link in this layer is in growth. Both defined 56-kbps outbound helper links in this layer are in growth.

4. Recording (Not Affected)

5. Network Management

5.01 This feature impacts the *4ESS* Switch-Network Management Operations System (NEMOS) interface. NEMOS is used by the Network Operations Center (NOC) to monitor and control the ASTN/NI network.

5.02 Two new fields in Message Type 32 were created as a result of this feature. Message Type 32, which specifies the F-link layer status and type, contains the NSN of the far-end *4ESS* switch for each F-link layer. This message has been modified to include the far-end NSNs that are to be used as outbound helper switches.

5.03 Message Type 32 also specifies that the *4ESS* switch must provide NEMOS with F-link status information that will help NEMOS to distinguish which F-links are unavailable (due to growth) and which F-links are out of service (due to automatic failure or manual operations).

OP:BUNSTAT!

```
OP:BUNSTAT!


M OP:BUNSTAT

 OD4BUNSDIS     07522567  ENABLED
 0D4SLKNTERM    07400000  BU4SLKNNSN     00024006
 BU4TERMSLKN    00023406  BU4NSNSLKN     00023126
 BU4MYSLKNTST   00741505  BU4MYSLKNCST   00741506
 BU4MYSLKNINH   01000173  BU4MYSLKNSTAT  01000616


SLKN  ID  TERM0  ID  TERM1          CLLI          TST  CST  DSIG  NSN

   01  1   240    1   241   SNDG CA 07 87T 1MD    0    0   0000  088H
   02  1   242    1   243   DYTN OH 15 04T 1MD    1    0   1010  029h
   03  1   244    1   245   WNDR FL TL 01T 1MD    1    0   1010  001*
   04  1   246    0   000   ATLN GA TL 01T 1MD    0    0   0000  007G
```

OP:SCHAN;LINKSTAT

```
OP:SCHAN;LINKSTAT!

M OP:SCHAN;LINKSTAT

LINK  CHAN  NAME  MEMN  LINK STATE  GRO  NSN           DATA

 0     84   ASTN0 0,15  REX OOS      Y   088  SNDG CA 07 87T 1MD
 1     85   ASTN1 1,15  CONNECTED    Y   088  SNDG CA 07 87T 1MD
 2     86   ASTN2 0,14  CONNECTED    Y   029  DYTN OH 15 04T 1MD
 3     87   ASTN3 1,14  CONNECTED    N   029  DYTN OH 15 04T 1MD
 4     88   ASTN4 2,14  CONNECTED    N   001  WNDR FL TL 01T 1MD
 5     89   ASTN5 2,15  CONNECTED    N   001  WNDR FL TL 01T 1MD
 6     90   ASTN6 3,14  CONNECTED    Y   007  ATLN GA TL 01T 1MD
```

tpa 786701/01

Figure 9-2. OP:BUNSTAT and OP:SCHAN;LINKSTAT Message Layout

6. Maintenance/Troubleshooting

Audit 48

6.01 The ASTN Audit 48 has been modified to accommodate the F-link/F-link layer growth state and the specific day and time for routine exercises (REX) on the 56-kbps links. The *4ESS* switch will automatically perform Audit 48 processing and invoke the UPD:BUNSTAT function when a Recent Change is performed on a list of outbound helpers or when an RC:MISC operation is performed on an F-link.

REX

6.02 The *4ESS* switch performs REX operations once a week on the ASTN F-links. REX is only allowed to run on Sunday morning between 2:30 a.m. and 2:35 a.m. (Network time) on ASTN F-links. If F-links are provisioned on a switch on IOUS 0, surveillance information will not be logged by the Total Network Management (TNM) system if the TNM system cannot monitor the Secondary Records Channel (SREC).

MRVT

6.03 The MRVT is initiated at the gateway to test ASTN routes. It was enhanced to better support the ASTN. The MRVT checks CCS7 routing. It also tests the routing from outbound helpers to LEC end offices. Additional requirements were needed at the helper switch to test MTP routes in the ASTN Gateway/NI Backup network. Feature enhancements are as follows:

- All routes to the *4ESS* switch (the test destination) via the *4ESS* Gateway switch and inbound helpers are to be tested.
- All routes from the *4ESS* switch to the LEC offices via the outbound helpers and the STP gateway are to be tested.
- The *4ESS* switch can now recognize all STPs in the AT&T Switched Network as a test initiator for an MRVT.

A. Inbound MRVT Testing

6.04 The MRVT can be initiated at a *4ESS* switch or an STP. The *4ESS* Gateway switch must test all routes to the victim switch via the 56-kbps ASTN network if the *4ESS* switch has routing to that test destination. Testing is performed when an MRVT is received at the *4ESS* Gateway switch for a test destination that is not the *4ESS* Gateway switch's point code. If the *4ESS* Gateway switch does not have routing to the test destination, the *4ESS* switch will respond with an error message indicating "wrong SP" (signaling point).

B. Outbound MRVT Testing

6.05 When an MRVT is originated at the *4ESS* switch with the ASTN option, all 56-kbps ASTN routes to the test destination must be tested. To reduce complexity, an outbound helper testing a LEC point code will appear to launch a separate MRVT toward the LEC point code. Since the MRVT tests only routing data that has been provisioned, the routing of Signaling Network Management Transfer-Controlled (TFC) messages (nonprovisioned data) is not tested.

6.06 When the *4ESS* switch receives an MRVT message over the 56-kbps ASTN network and the test destination is accessed via an A-link in the SS7 network, the test initiator's point code in the MRVT message is changed to the *4ESS* switch helper's point code. The *4ESS* switch helper keeps a record of the original test initiator and returns any MTP Route Verification Result (MRVR) messages received for that test to the original test initiator. Table 9-C contains the MRVT test results and the contents of the MRVR field.

Network Events

6.07 Figure 9-3 through Figure 9-11 are network architecture diagrams depicting possible failures in the network that can be detected by MRVTs.

6.08 If the STP initiates an MRVT to the victim switch, several things happen:

- All paths to the victim are tested.
- Responses from the gateway contain the E-link point code.
- No failure occurs if a Symmetrical Route Check (SRC) is requested.

6.09 If the *4ESS* switch initiates an MRVT to the victim switch, the *4ESS* Gateway switch does not test ASTN routes because messages during ASTN conditions would be routed directly to the helper switch.

Table 9-C. MRVR Information Field Content

Test Result	Content of Field
Successful	Point codes of the signaling points crossed and the associated route priorities contained in the MRVT message
Detected a loop	Point codes of the STPs crossed and the associated route priorities that are in the loop
Detected excessive long route	Point codes of the STPs crossed and the associated route priorities contained in the MRVT message
Unknown destination point code (DPC)	Point codes of the STPs crossed and the associated route priorities contained in the MRVT message
MRVT not sent due to inaccessibility	Point code of the inaccessible signaling point
MTP Route Verification Acknowledgement (MRVA) not received	Identity of the signaling point(s) from which an MRVA was not received
Unknown initiator point code	Point code of the signaling point returning an MRVA that caused the MRVT to be sent
Test cannot be run due to local conditions	No additional information
Wrong SP	Point codes of the STPs crossed and the associated route priorities contained in the MRVT message
Asymmetrical route detected in the network	Point code of the signaling point from which the MRVT was sent, for which no return route is available
Success to gateway	Point codes of the STPs crossed and the associated route priorities contained in the MRVT message. This is a new capability that requires STP generic 8.1

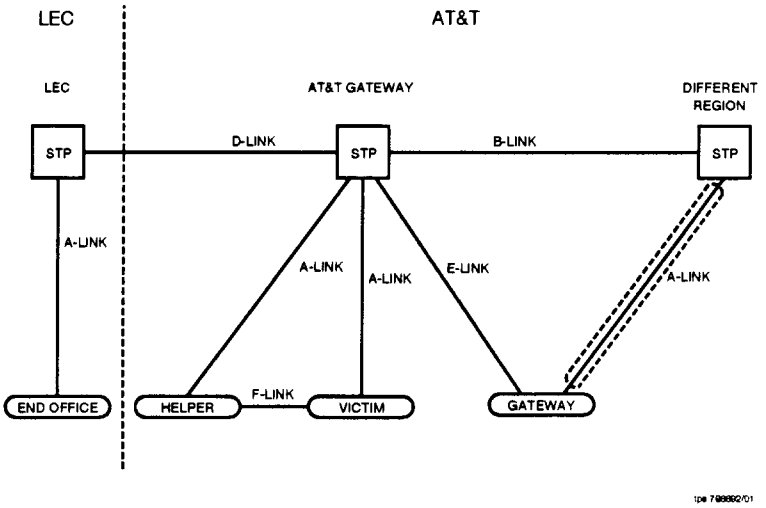

Figure 9-3. Failure at Gateway—All A-Links Unavailable

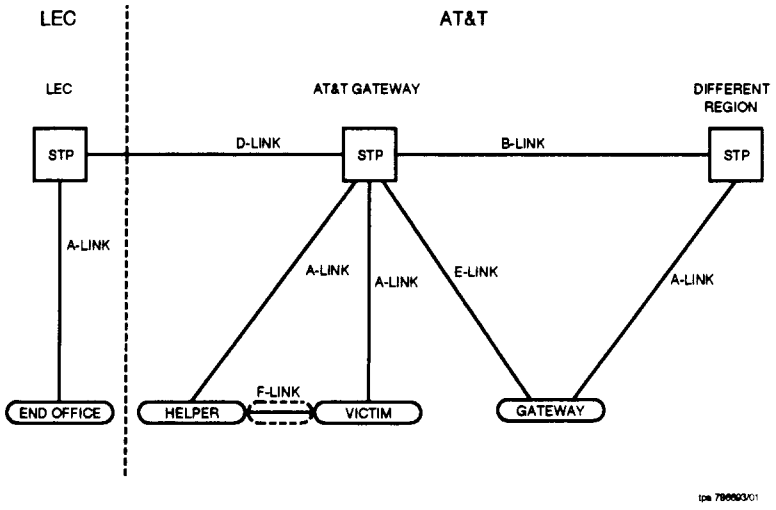

Figure 9-4. Failure at F-Link Between Helper and Victim

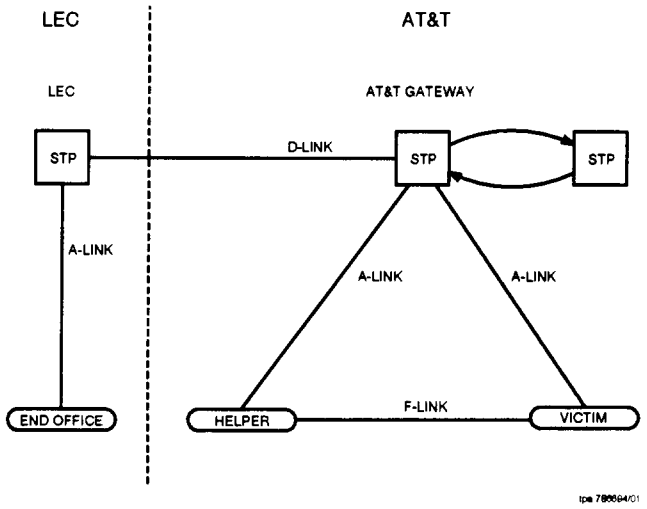

Figure 9-5. Detected Loops—No Routing to End Office

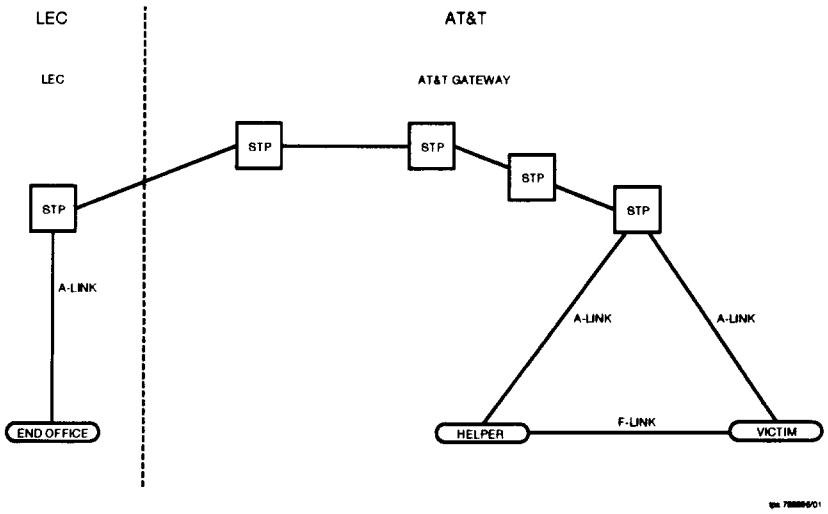

Figure 9-6. Excessive Length Route—Too Many STPs

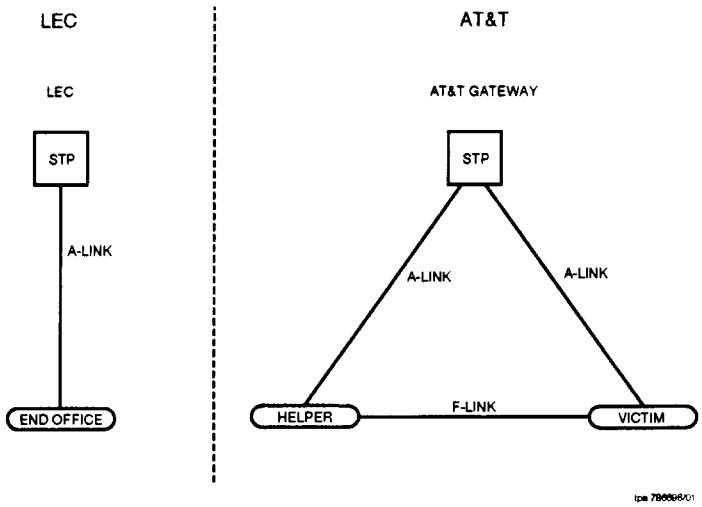

Figure 9-7. Unknown Terminator Point Code From STP

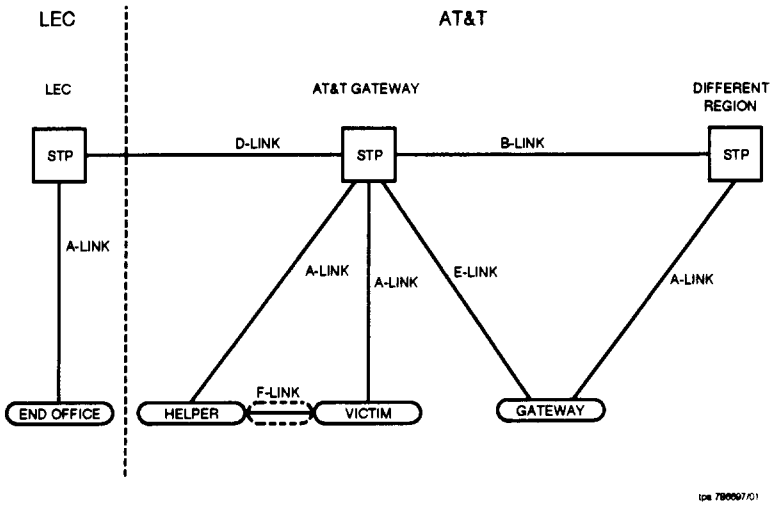

Figure 9-8. F-Link Failure—Inaccessibility

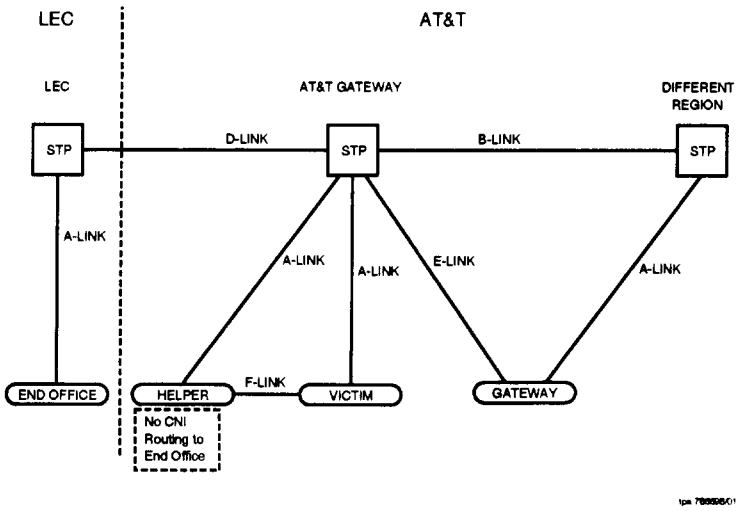

Figure 9-9. No CNI Routing at Helper to End Office—Unknown Terminator Point Code

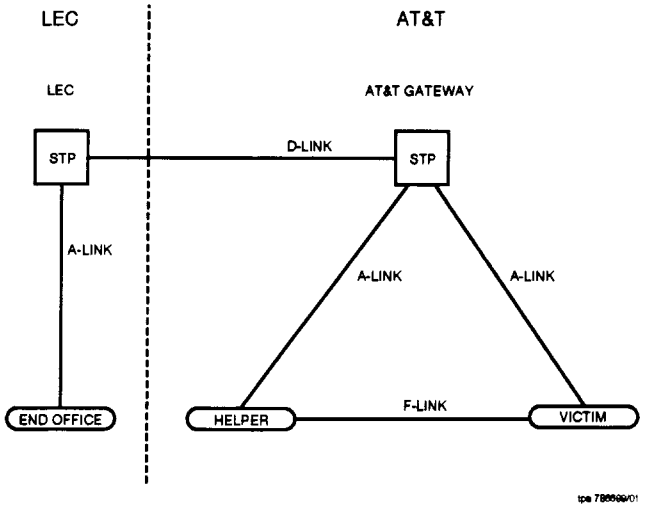

Figure 9-10. Timer Expired—Congestion on A-Links

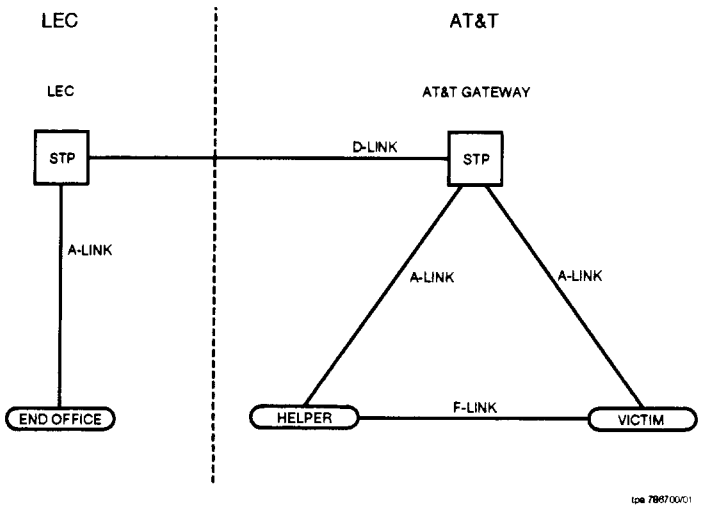

Figure 9-11. Inaccessible SP (STP Generic=7.2) or Success to Gateway (STP Generic=8.1)

SRVT

6.10 The SRVT checks SCCP routing information, especially Global Title Translation (GTT). The SRVT has been enhanced at the *4ESS* switch to perform a comparison of the SCCP routing data at its helpers. When an SRVT is originated at the *4ESS* switch and the switch performs a GTT, a "compare form" SRVT message is sent to the helpers. The helpers, in return, perform a duplicate (backup) GTT function. The "compare form" message is sent by a Translation Signaling Point to a signaling point that performs the duplex GTT. The results of both translations are compared.

6.11 When a Translation Signaling Point receives an SRVT message with the form indicator set to "Compare," it does the following:

a. Checks to determine if the originating signaling point is a mated SCCP relay node to the receiving signaling point. A mated SCCP relay node is referred to as a *4ESS* helper switch, accessed via the 56-kbps ASTN, that performs a duplex translation. Duplex translations are performed for translation types 242 and 253. If the signaling point is not a mated SCCP relay node, an SCCP Route Verification Acknowledgment (SRVA) message is returned indicating "SRVT arrived at the wrong SP."

b. Attempts a duplex translation and compares the results with the information contained in the SRVT message. If the SRVT received contains an original GTI+GT parameter, the duplex translation is performed on the original GTI+GT

parameter and the result is compared to the test GTI+GT parameter in the SRVT message. If the SRVT received does not contain an original GTI+GT parameter, the duplex translation is performed on the test GTI+GT parameter and the result is compared to the point code information in the SRVT message. The following SRVA messages are returned:

- "Success"—Results of the duplex translation match the data in the SRVT message from the previous translation
- "No translation data exists for the GTI+GT"—No translation data exists for the Global Title
- "Incorrect intermediate translation," "Incorrect translation for PPC+SSN," or "Incorrect translation for SPC+SSN"—Results of the duplex translation do not match the data in the SRVT message from the previous translation
- "Wrong signaling point"—The helper switch does not perform duplex translations (that is, GTT is turned off at the helper switch).

7. Transition Considerations

Dependencies on Other Network Components

A. Signaling Transfer Point

7.01 This feature impacts the No. 2 STP (2STP) because of the MRVT messages that are received for testing a LEC point code. To support this feature, the following is required at the STP:

- If the MRVT is received with a LEC point code as a test destination, an MRVR is returned to the initiator and an MRVA is sent to the sender of the MRVT with the indication "SUCCESS TO GATEWAY." The MRVT trace includes the stored list of LEC point codes, the STP gateway point code, and the adjacent network's point code (which is used to reach the test destination). In most cases, the adjacent network's point code is an STP gateway. This is not true where networks with A-links are directly connected to the STP.
- The default value of "N" must be changed to N=4 in the STP MRVT to ensure that tests initiated at the STP are completed through the 56-kbps ASTN network.
- When the STP receives the Original Test Initiator parameter, the STP must pass this parameter unchanged in any outgoing MRVT messages. When the STP receives the SUCCESS TO GATEWAY indication in the MRVA message, the STP must pass this information in any outgoing MRVA messages along with the results in other MRVAs received.

B. Work Centers Impacted

7.02 Several Work Centers are impacted by this feature. The Work Centers and some of their major responsibilities are as follows:

a. CCS Network Administration Center (CNAC)

- Works with Network Capacity Planning to determine out-of-region outbound helpers for all *4ESS* switches
- Tests MTP provisioned routing data using the enhanced MRVT
- Monitors A-, B-, E-, and F-links, 1A/1B Processor, Direct Link Node (DLN), and STP usage during network events
- Performs RC:MISC operations.

b. Fundamental Switch Planner

- Consults with CNAC and Network Capacity Planning
- Analyzes 1A/1B Processor real time and DLN usage during network events.

c. Network Capacity Planning

- Works with CNAC to determine *4ESS* switch inbound and outbound helpers
- Is responsible for (along with CNAC and Fundamental Switch Planner) gateway disaster and relief planning for gateways and helpers that are exhausted.

d. Network Operations Center (NOC)

- Is responsible for Network Management functions provided by NEMOS
- Provides real time surveillance and control to minimize signaling problems on the circuit-switched network.

e. Technology Control Center (TCC)/On-Site Work Force (OSWF)

- Sets minor link state value to "Available" when on-site provisioning work is completed
- Monitors F-link alarms and reports
- Performs MRVTs and SRVTs using Total Network Management
- Serves as primary contact for Digital Signal Zero (DS0) level maintenance.

C. Operations Systems Impacted

7.03 The following Operations Systems are impacted by this feature:

a. Data Acquisition Reports and Integrated Control System (DARICS)—DARICS network event report has been enhanced to be generated autonomously. The report includes the following data:

- CNI stream interfaces down count
- The interval (within 15-minute accuracy of start and end times) of the network event
- An indication of which helpers are outbound helpers.

b. Facility Performance Analysis System (FPAS)

- Processes enhanced F-link telemetry alarms and F-link major alarm
- Provides an alert when the third-choice Alternate Link Set Routing is invoked for a *4ESS* switch at its STPs indicating that ASTN is being used.

c. Network Management Operations System (NEMOS)—Message Type 32 has been modified to:

- Distinguish between the F-links unavailable due to growth and those out of service due to automatic failure or manual operations
- Indicate which of the far-end NSNs connected by F-links are outbound helpers.

d. Total Network Management (TNM)

- Accepts the F-link major alarm
- Supports the enhanced MRVT and SRVT
- Supports a new command for minor state turn-up of F-links.

e. Common Channel Interoffice Signaling (CCIS) Network Total Assignment System (CINTAS)

- Administers the outbound helper list
- Provisions the outbound helper list via Service Now-Routing (SNOW-R)
- Provisions MTP routing at out-of-region helpers and STPs
- Provides exception-handling for switches not subject to ASTN gateway/NI backup.

f. CCS Network Forecasting System (CNFS)

- Passes the planned lists of helpers to SLINKY
- Passes the region selections for first-choice outbound helper placement to SLINKY
- Compares helpers from CINTAS to the planned helpers entered into CNFS.

g. CCS Network Operations System-Recent Change System (CNOS-RCS)

- Supports the enhanced MRVT at the STP.

h. SLINKY

- Selects out-of-region outbound helpers from an input list of planned helpers
- Provides support for out-of-region outbound helpers in its A-, B-, and F-links.

i. SNOW-R

- Accepts a list of up to four outbound helpers from CINTAS for a *4ESS* switch
- Does a Recent Change on the list in the *4ESS* switch.

Internal Transition Issues

7.04 The MRVT has been modified to allow inbound helpers to send messages to victim switches. With the old MRVT, inbound helpers did not actually send messages to victim switches. The transition issue arises when the inbound helper and victim are running on two different generics.

7.05 If the victim switch is running on generic 4E18R2 and the inbound helper and *4ESS* Gateway switches are running on generic 4E18R3, the MRVT will fail (time out). Contrastly, if the inbound helper switch is running on generic 4E18R2 and the *4ESS* Gateway switch is running on generic 4E18R3, these problems will not exist. In this case, only the 4E18R2 MRVT trace capabilities are available. Until all offices are upgraded to 4E18R3, an outbound MRVT with the outbound helper switch running on generic 4E18R2 will result in a time-out and test failure. Therefore, the outbound MRVT should not be requested until generic 4E18R3 is fully deployed in the network.

7.06 If the victim switch is running on generic 4E18R3 and the helper switch is running on generic 4E18R2, the SRVT will indicate time-out from the helper switch. This will occur for translation types 242 and 253 but will not affect the responses from the NCPs.

Turn On/Turn Off Mechanism

7.07 This feature is turned on automatically by software deployment.

7.08 Ubiquity of the generic (4E18R3) across the network is required for **accurate** MRVT and SRVT results.

8. Input/Output Manual Pages

8.01 Table 9-D lists the input/output messages that have been modified or deleted as a result of this feature. The OP:BUNSTAT output message layout is shown in Figure 9-2. Manual pages for the input/output messages are included at the end of this chapter.

Table 9-D. Input/Output Messages

Message	Type	Status
DGN:IOUS	Output	Modified
RMV:IOUS	Output	Modified
OP:SCHAN	Output	Modified
OP:BUNSTAT	Output	Modified
REPT:SCHAN	Output	Modified
EXC:MRVT	Output	Modified
EXC:MRVT	Input	Modified
ALW:SCHAN	Input	Deleted
INH:SCHAN	Input	Deleted

ID . . . . . DGN:IOUS-NOT
WORK CENTER . . MOC
GENERIC . . . . . 4E18 Rel. 3 and later
APPLICATION . . 4E,1A
TYPE . . . . . Output

1. FORMAT

```
DGN:IOUS a[,{IPUB b|IOUC c|IOMP d}] NOT STARTED - e
```

2. REASON FOR OUTPUT

To report that the diagnostic request cannot be started. This usually occurs when the input/output (I/O) unit selector (IOUS) for which the diagnostic was requested cannot be removed from service.

3. VARIABLE FIELD DEFINITIONS

a	The member number of the IOUS (0-7).
b	The I/O channel member number (0-15).
c	The interface peripheral unit bus (IPUB) member number (0 or 1).
d	The input/output processor (IOP) microprocessor number (0 or 1).
e	The reason the diagnostic was not started.

4. ACTION TO BE TAKEN

If the specified unit cannot be removed from service because there is no spare, restore a spare unit to service.

5. REFERENCES

PIDENTs
DCONMAIN
IOCPIOH4
MIRA
PFLRDGNH
IODG-- where-- represents all valid phase numbers
listed in PIDENT DCONTABL for PREFIX=IODG, UTYP=1XLUIOUS for IOP
I2DG-- where-- represents all valid phase numbers
listed in PIDENT DCONTABL for PREFIX=I2DG, UTYP=1XLUIOUS for IOP

Practice 254-280-040, *Diagnostic Language - DL-1*
Practice 254-280-220, *Diagnostic Programs - Description*

PA-4A002-01, *4ESS™ User's Manual*

ID . . . . . DGN:IOUS-NOT
WORK CENTER . . MOC
GENERIC . . . . . 4E19 Rel. 3 and later
APPLICATION . . 4E,1B
TYPE . . . . . Output

1. FORMAT

```
DGN:IOUS a[,{IPUB b|IOUC c|IOMP d}] NOT STARTED - e
```

2. REASON FOR OUTPUT

To report that the diagnostic request cannot be started. This usually occurs when the input/output (I/O) unit selector (IOUS) for which the diagnostic was requested cannot be removed from service.

3. VARIABLE FIELD DEFINITIONS

a	The member number of the IOUS (0-7).
b	The I/O channel member number (0-15).
c	The interface peripheral unit bus (IPUB) member number (0 or 1).
d	The input/output processor (IOP) microprocessor number (0 or 1).
e	The reason the diagnostic was not started.

4. ACTION TO BE TAKEN

If the specified unit cannot be removed from service because there is no spare, restore a spare unit to service.

5. REFERENCES

PIDENTs
DCONMAIN
IOCPIOH4
MIRA
PFLRDGNH
IODG-- where-- represents all valid phase numbers
listed in PIDENT DCONTABL for PREFIX=IODG, UTYP=1XLUIOUS for IOP
I2DG-- where-- represents all valid phase numbers
listed in PIDENT DCONTABL for PREFIX=I2DG, UTYP=1XLUIOUS for IOP

Practice 254-280-040, *Diagnostic Language - DL-1*
Practice 254-280-220, *Diagnostic Programs - Description*

PA-4A002-01, *4ESS™ User's Manual*

ID . . . . . RMV:IOUS
WORK CENTER. . MOC
GENERIC . . . . . 4E18 Rel. 3 and later
APPLICATION . . 4E,1A
TYPE . . . . . Output

1. FORMAT

```
RMV:IOUS a [b] c
```

2. REASON FOR OUTPUT

To report the results of request to remove an input/output (I/O) unit selector (IOUS), IOUS bus access, or an input/output unit controller (IOUC) on an IOUS.

3. VARIABLE FIELD DEFINITIONS

a — Member number of the IOUS (0-7).

b — If present, the subunit type and submember number.

IOMP — I/O microprocessor (0 - 1).

IOUC — I/O unit controller (0 - 15).

IPUB — Interface peripheral unit bus (0 - 1).

c — Disposition of the request:

COMPLETED — Requested action completed.

NOT STARTED FAC BUSY RETRY LATER — The frame request was not started because the scan point acknowledgement table was full.

STOPPED ACT MAIN: MATE OOS — Removal of unit or subunit denied since backup is out-of-service (OOS).

STOPPED COULD NOT CONFIGURE MATE IOUS TO OTHER BUS — Could not remove IPUB because other IOUS in frame could not be configured to opposite peripheral unit bus (PUB).

STOPPED COULD NOT CONFIGURE UNIT TO OTHER BUS — Could not remove interface peripheral unit bus (IPUB) because unit could not be configured to other bus.

STOPPED DENIED BY ASTN — This unit is or contains an alternate signaling transport network (ASTN) channel. ASTN has denied a routine exerciser (REX) request to diagnose the unit.

STOPPED GROWTH UNIT — Unit and/or subunit specified is in growth state.

STOPPED INVALID UNIT OR SUBUNIT — Member number, subunit type, or submember number invalid.

STOPPED MATE IOUS ACCESS TO OTHER BUS OUT OF SERVICE — Could not remove IPUB because other IOUS in frame has bus access to opposite peripheral unit bus (PUB) removed.

STOPPED REMOVE DENIED — Removal of bus access denied because of inability to configure IOUS to other bus.

4. ACTION TO BE TAKEN

If removal is denied, either restore backup to service or correct problem preventing IOUS access to other bus.

5. REFERENCES

PIDENTs
DCONMAIN
IOCPIOH4
MIRA
PFLRDGNH

Input Message
RMV:IOUS

ID . . . . . RMV:IOUS
WORK CENTER . . MOC
GENERIC . . . . . 4E19 Rel. 3 and later
APPLICATION . . 4E,1B
TYPE . . . . . Output

1. FORMAT

```
RMV:IOUS a [b] c
```

2. REASON FOR OUTPUT

To report the results of request to remove an input/output (I/O) unit selector (IOUS), IOUS bus access, or an input/output unit controller (IOUC) on an IOUS.

3. VARIABLE FIELD DEFINITIONS

a — Member number of the IOUS (0-7).

b — If present, the subunit type and submember number.

IOMP — I/O microprocessor (0 - 1).

IOUC — I/O unit controller (0 - 15).

IPUB — Interface peripheral unit bus (0 - 1).

c — Disposition of the request:

COMPLETED — Requested action completed.

NOT STARTED FAC BUSY RETRY LATER — The frame request was not started because the scan point acknowledgement table was full.

STOPPED ACT MAIN: MATE OOS — Removal of unit or subunit denied since backup is out-of-service (OOS).

STOPPED COULD NOT CONFIGURE MATE IOUS TO OTHER BUS — Could not remove IPUB because other IOUS in frame could not be configured to opposite peripheral unit bus (PUB).

STOPPED COULD NOT CONFIGURE UNIT TO OTHER BUS — Could not remove interface peripheral unit bus (IPUB) because unit could not be configured to other bus.

STOPPED DENIED BY ASTN — This unit is or contains an alternate signaling transport network (ASTN) channel. ASTN has denied a routine exerciser (REX) request to diagnose the unit.

STOPPED GROWTH UNIT — Unit and/or subunit specified is in growth state.

STOPPED INVALID UNIT OR SUBUNIT — Member number, subunit type, or submember number invalid.

`STOPPED MATE IOUS ACCESS TO OTHER BUS OUT OF SERVICE` — Could not remove IPUB because other IOUS in frame has bus access to opposite peripheral unit bus (PUB) removed.

`STOPPED REMOVE DENIED` — Removal of bus access denied because of inability to configure IOUS to other bus.

4. ACTION TO BE TAKEN

If removal is denied, either restore backup to service or correct problem preventing IOUS access to other bus.

5. REFERENCES

PIDENTs
DCONMAIN
IOCPIOH4
MIRA
PFLRDGNH

Input Message
`RMV:IOUS`

ID . . . . . OP:SCHAN
WORK CENTER. . MOC
GENERIC . . . . . 4E18 Rel. 3 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
OP:SCHAN;LINKSTAT

LINK   CHAN   NAME   MEMN   LINK STATE   GRO   NSN        DATA
  a     bb    cccccc d,ee   fffffffff     g    hhh   iiiiiiiiiiiiiii
```

2. REASON FOR OUTPUT

This message prints in response to the OP:SCHAN input message. It reports the status of input/output (I/O) signaling system links.

3. VARIABLE FIELD DEFINITIONS

a — Link number (0 - 7).

b — Channel number assigned to the link (84 - 91).

c — Name of the channel that is assigned to the link. The channel name indicates the assigned client.

d — Hardware unit number of the channel (0 - 7).

e — Hardware subunit number of the channel (8 - 15).

f — Link status:

CONNECTED — Link is available for use.

DGN OOS — Channel assigned to the link is out-of-service due to a hardware failure. The cause of the failure should be determined and the channel restored to service.

DISCONNECT — Channel assigned to the link is in-service but no communication exists with the far end. Expect the link to connect once the far end is restored to service.

INVALID — Link status is undetermined. This state should clear within 1 second and advance to a connected state.

LINK RESET — Channel has experienced transmission errors and is resetting. This state should clear within 30 seconds, and the link should advance to a connected state.

LINK TEST — Channel assigned to the link is in-service and the link is in a test state. This state should advance to the connect state.

MAN OOS — Channel assigned to the link has been removed from service by manual request.

OUTPUT — Link is waiting to accept data for transmission. This is an error condition — seek assistance.

REX OOS — Channel assigned to link has been removed from service for routine exerciser (REX).

UNEQUIPPED — Channel assigned to the link is hardware unequipped.

g — Link growth state indicator:

N — Indicates the link is not in the growth state. The link is available for alternate signaling transport network (ASTN) traffic.

Y — Indicates the link is in the growth state. The link is not available for ASTN traffic.

h — If present, this is the national switch number assigned to the far end of the link.

i — For ASTN channels, this represents CLLI™ information for the far end switch.

4. ACTION TO BE TAKEN

Corrective actions are listed with the preceding state definitions. Assistance should be sought if states do not clear or advance as indicated.

5. REFERENCES

PIDENT
IOCPIOH4

Input Message
OP : SCHAN

ID . . . . . OP:SCHAN
WORK CENTER. . MOC
GENERIC . . . . . 4E19 Rel. 3 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
OP:SCHAN;LINKSTAT

LINK   CHAN   NAME   MEMN   LINK STATE   GRO   NSN        DATA
  a     bb    cccccc  d,ee   fffffffff    g    hhh   iiiiiiiiiiiiiii
```

2. REASON FOR OUTPUT

This message prints in response to the OP:SCHAN input message. It reports the status of input/output (I/O) signaling system links.

3. VARIABLE FIELD DEFINITIONS

a — Link number (0 - 7).

b — Channel number assigned to the link (84 - 91).

c — Name of the channel that is assigned to the link. The channel name indicates the assigned client.

d — Hardware unit number of the channel (0 - 7).

e — Hardware subunit number of the channel (8 - 15).

f — Link status:

CONNECTED — Link is available for use.

DGN OOS — Channel assigned to the link is out-of-service due to a hardware failure. The cause of the failure should be determined and the channel restored to service.

DISCONNECT — Channel assigned to the link is in-service but no communication exists with the far end. Expect the link to connect once the far end is restored to service.

INVALID — Link status is undetermined. This state should clear within 1 second and advance to a connected state.

LINK RESET — Channel has experienced transmission errors and is resetting. This state should clear within 30 seconds, and the link should advance to a connected state.

LINK TEST — Channel assigned to the link is in-service and the link is in a test state. This state should advance to the connect state.

MAN OOS — Channel assigned to the link has been removed from service by manual request.

OUTPUT — Link is waiting to accept data for transmission. This is an error condition — seek assistance.

REX OOS — Channel assigned to link has been removed from service for routine exerciser (REX).

UNEQUIPPED — Channel assigned to the link is hardware unequipped.

g — Link growth state indicator:

N — Indicates the link is not in the growth state. The link is available for alternate signaling transport network (ASTN) traffic.

Y — Indicates the link is in the growth state. The link is not available for ASTN traffic.

h — If present, this is the national switch number assigned to the far end of the link.

i — For ASTN channels, this represents CLLI™ information for the far end switch.

4. ACTION TO BE TAKEN

Corrective actions are listed with the preceding state definitions. Assistance should be sought if states do not clear or advance as indicated.

5. REFERENCES

PIDENT
IOCPIOH4

Input Message
OP : SCHAN

CAUTION
This message may be service-affecting.
See explanation at end of message.

ID . . . . . REPT:SCHAN-FAIL
WORK CENTER. . MOC
GENERIC . . . . . 4E18 Rel. 3 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
REPT:SCHAN LINK a b TELEMETRY FAILED CLIENT=c
```

2. REASON FOR OUTPUT

This message reports that an input/output (I/O) system signaling link has lost its communication path to its far-end device. The link reported in this message is no longer available for data transport for the given client.

3. VARIABLE FIELD DEFINITIONS

a — Link number (0 - 7).

b — Reason for telemetry failure:

- `DIAGNOSTIC FAILURE` — The link has experienced a hardware diagnostic failure.
- `DISCONNECT` — The channel has lost communication with the far end of the link. This may be caused by transmission problems or by far-end hardware failures.
- `MANUAL REMOVE` — The link has been removed with a tty input message.
- `REX IN PROGRESS` — The channel has been removed from service for routine exerciser (REX).

c — Client assigned to this link:

`ASTN` — Alternate signaling transport network.

4. ACTION TO BE TAKEN

If this is not an expected condition, then use the `OP:SCHAN` input message to do the following:

1. determine the channel assigned to the link, and
2. restore that channel back to service.

Program action will automatically attempt to reestablish telemetry once the channel is restored. A `REPT:SCHAN-EST` output message will report this fact when it occurs.

5. REFERENCES

PIDENT
IOCPIOH4

Input Message
OP:SCHAN

Output Messages
OP:SCHAN
REPT:SCHAN-EST

CAUTION
The failure reported by this condition is potentially service affecting.

CAUTION
This message may be service-affecting.
See explanation at end of message.

ID . . . . . REPT:SCHAN-FAIL
WORK CENTER. . MOC
GENERIC . . . . . 4E19 Rel. 3 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
REPT:SCHAN LINK a b TELEMETRY FAILED CLIENT=c
```

2. REASON FOR OUTPUT

This message reports that an input/output (I/O) system signaling link has lost its communication path to its far-end device. The link reported in this message is no longer available for data transport for the given client.

3. VARIABLE FIELD DEFINITIONS

a — Link number (0 - 7).

b — Reason for telemetry failure:

- `DIAGNOSTIC FAILURE` — The link has experienced a hardware diagnostic failure.
- `DISCONNECT` — The channel has lost communication with the far end of the link. This may be caused by transmission problems or by far-end hardware failures.
- `MANUAL REMOVE` — The link has been removed with a tty input message.
- `REX IN PROGRESS` — The channel has been removed from service for routine exerciser (REX).

c — Client assigned to this link:

`ASTN` — Alternate signaling transport network.

4. ACTION TO BE TAKEN

If this is not an expected condition, then use the `OP:SCHAN` input message to do the following:

1. determine the channel assigned to the link, and
2. restore that channel back to service.

Program action will automatically attempt to reestablish telemetry once the channel is restored. A `REPT:SCHAN-EST` output message will report this fact when it occurs.

5. REFERENCES

PIDENT
IOCPIOH4

Input Message
OP:SCHAN

Output Messages
OP:SCHAN
REPT:SCHAN-EST

CAUTION
The failure reported by this condition is potentially service affecting.

ID . . . . . EXC:MRVT
WORK CENTER . . MOC
GENERIC . . . . . 4AP12 Rel. 3 and later
APPLICATION . . 4E,CNI
TYPE . . . . . Output

1. FORMAT

This message has four formats.

[1] `EXC:MRVT PC a STPS b NO TRACE e n SUCCESS`

[2]
```
EXC:MRVT PC a STPS b TRACE e n SUCCESS
  STPS CROSSED c
```

[3]
```
EXC:MRVT PC a STPS b d e n f
  MRVA MESSAGES RECEIVED j k l
  STPS CROSSED c
  ERRORS DETECTED
  g h
  i
```

[4] `EXC:MRVT PC a STPS b FAILURE, m`

2. REASON FOR OUTPUT

Prints in response to an MRVT request. The output will be directed to the standard output associated with the initiator of the test, and also to the maintenance class. If they are the same device, only one printout will occur.

Format 1 prints when the MRVT is successful and the MRVT user did not request a trace.

Format 2 prints when the MRVT is successful and the user requested a trace.

Format 3 prints when either a partial success or failure occurs.

Format 4 prints by the initiating signaling point (SP) if the MRVT message cannot be sent due to local conditions.

3. VARIABLE FIELD DEFINITIONS

a — The point code of the terminating node for the test. It will be printed in one of the following formats:

1) ANSI Standard - nnncccmmm
2) AT&T - nnnrrcmmm

Where: nnn - The network identifier

ccc - The cluster identifier
mmm - The member identifier
rr - The region identifier
c - The cluster identifier

Note: Non-local network point codes always use ANSI standard format.

b — Value of the parameter N, which is the maximum number of STPs the MRVT is allowed to cross.

c — The list of STP point codes in the trace of a received MRVR message indicating success. If multiple success-indicating MRVR messages were received, this line would be printed for each such message (three success-indicating MRVR messages result in three lists of point codes).

Note: In Format 3, if f = FAILURE, item c will not be present in the output.

d
TRACE — if the user requested a trace of all the STPs crossed.
NO TRACE — if the user did not request a trace of all the STPs crossed.

e
SRC — if the user requested an SRC, or made no entry for SRC.
NO SRC — if the user requested NO SRC.

f — PARTIAL SUCCESS, or FAILURE depending upon the responses received.

g — One of the following text phrases that describes the problem found:

```
LOOP
EXCESSIVE LENGTH ROUTE
UNKNOWN TERMINATOR POINT CODE
INACCESSIBLE SIGNALING POINT
TIMER EXPIRED
UNKNOWN INITIATOR POINT CODE
TEST CANNOT BE RUN DUE TO LOCAL CONDITIONS
WRONG SIGNALING POINT
ASYMMETRICAL ROUTE
SUCCESS TO GATEWAY
UNKNOWN ERROR CODE
```

n
ASTN — if the user requested ASTN only.
SS7 — if the user requested SS7 only.
SS7 ASTN — if the user requested both.

h — Error number associated with error described in g.

1 — Detected loop.

2 — Excessive length route.

3 — Unknown resource instance.

4 — Route inaccessible.

5 — Processing failure.

6 — Unknown initiating SP.

7 — Timer expired.

8 — Wrong signaling point.

9 — Asymmetrical route.

10 — Success to gateway.

i Point code(s) associated with the failure being reported.

Value of g	Explanation of i
LOOP	Point code of the signaling point (SP) detecting the loop, followed by the point codes paired with the routing priorities used to get to the point codes enclosed in parentheses. Primary route=(1), f-links = (2), alternate route=(3).
EXCESSIVE LENGTH ROUTE	Point code of the SP detecting the excessive length route, followed by the point codes paired with the route priorities that were in the route up to the detecting SP.
UNKNOWN TERMINATOR POINT CODE	Point code of the SP that doesn't know the terminator, followed by the unknown terminator point code.
INACCESSIBLE SIGNALING POINT	Point code of the SP that cannot access the inaccessible SP, followed by the point code of the inaccessible SP.
TIMER EXPIRED	Point code of the SP where the timer expired, followed by the list of point codes from which expected MRVA messages were not received.
UNKNOWN INITIATOR POINT CODE	Point code of the reporting SP, followed by the point code of the SP that does not know the initiator.

TEST CANNOT BE RUN DUE TO LOCAL CONDITIONS	Point code of the SP that cannot run the test.
WRONG SIGNALING POINT	Point code of the SP that detected the error followed by the list of point codes in the TRACE.
ASYMMETRICAL ROUTE	The point code of the SP that detected the asymmetrical route followed by the point code of the SP that sent the MRVT message causing the asymmetrical route.
SUCCESS TO GATEWAY	The point code of the gateway followed by the point codes paired with routing priorities used to get to the gateway and the nonlocal gateway point code.
UNKNOWN ERROR CODE	The error number received that is not on the preceding list.

Note: If multiple errors were detected, items g, h, and i will be printed for each error received.

j Point code of the SP from which the MRVA message was received.

k SUCCESS, PARTIAL SUCCESS, or FAILURE, depending upon the message received.

l The failure type in hexadecimal notation.

At an intermediate SP, the failure types from the MRVAs received are logically ORed together. The initiating SP then prints the aggregate of failure types received in its MRVAs. Below are the MRVA failure types and the bits that represent them.

Detected loop	-	1000 0000 0000 0000
Excessive length route	-	0100 0000 0000 0000
Unknown resource instance	-	0010 0000 0000 0000
Route inaccessible	-	0001 0000 0000 0000
Processing failure	-	0000 1000 0000 0000
Unknown initiating SP	-	0000 0100 0000 0000
Timer expired	-	0000 0010 0000 0000
Wrong signaling point	-	0000 0001 0000 0000
Asymmetrical route	-	0000 0000 1000 0000
Success to gateway	-	0000 0000 0100 0000
Success	-	0000 0000 0000 0000

Example: MRVA MESSAGES RECEIVED
254999000 FAILURE 0x8200

The preceding MRVA had two errors:
1) detected loop - 0x8000
2) timer expired - 0x0200

m — One of the following text phrases that describe the problem found:

```
SRC SHOULD BE 0 FOR ASTN
STPS NOT IN 0 - 15 RANGE
MAXIMUM MRVTS ALREADY IN PROGRESS
MRVT ALREADY IN PROGRESS WITH TERMINATOR
NO NEW TRANSACTIONS ALLOWED
TERMINATOR IS UNKNOWN
TERMINATOR IS UNKNOWN VIA ASTN
TERMINATOR IS DCIS6 POINT CODE
TERMINATOR IS ALIAS FOR LOCAL PC
TERMINATOR SAME AS ORIGINATOR
UNABLE TO GET ASTN ROUTING
```

4. ACTION TO BE TAKEN

None.

5. REFERENCES

Input Messages
CHG:MRVT
EXC:MRVT

Output Messages
CHG:MRVT
REPT:MRVR

ID . . . . . EXC:MRVT
WORK CENTER . . MOC
GENERIC . . . . . 4AP12 Rel. 3 and later
APPLICATION . . 4E,CNI
TYPE . . . . . Input

1. PURPOSE

Initiates the MTP routing verification test (MRVT).

2. FORMAT

[1] **EXC:MRVT;PC** a [,**STPS** b][,**TRACE**][,**SRC** c]!

[2] **EXC:MRVT;PC** a [,**STPS** b][,**TRACE**][,**SRC** c][,**SS7**][,**ASTN**]!

3. EXPLANATION OF MESSAGE

a — The point code (**PC**) of the terminating node for the test. Must be entered in one of the following formats:

1) ANSI Standard - nnncccmmm
2) AT&T - nnnrrcmmm

Where: nnn - Network identifier
ccc - Cluster identifier
mmm - Member identifier
rr - Region identifier
c - Cluster identifier

Note: Non-local network point codes always use ANSI standard format.

b — Value of the parameter N, which is the maximum number of STPs the **MRVT** is allowed to cross. Default is 2 for LEC networks and 4 for AT&T. The range for this parameter is 0-15, inclusive.

TRACE — If this keyword is present, traces of STPs crossed during the test will be included in the output if the test was a success or partial success. If a failure occurs, and this keyword is present, the "trace" will not appear; however, some error messages do contain a listing of point codes which is similar to the "trace".

c — The flag for a symmetrical route check (**SRC**). When requested, this check ensures that the routing at all intermediate signaling points and at the terminator is symmetrical. The default value is 1.

If 0 is specified, the check is not done. If 1 is specified, the check is done.

SS7 — This keyword is useful only for AT&T PCs. If it is present, the **SS7** routes to the destination are tested.

Alternate Signaling Transport Network (ASTN) 56-kbps Capability for UNITEL *4ESS*™ Switches Feature (4168)

10

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Alternate Signaling Transport Network (ASTN) 56-kbps Capability for UNITEL *4ESS*™ Switches Feature (4168)

10

1. Feature Description

1.01 This feature provides a backup capability during instances when a UNITEL Communications, Inc. *4ESS*™ switch becomes isolated from the Common Channel Signaling System 7 (CCS7) signaling network. This includes backup for Transaction Capabilities Application Part (TCAP) and Real Time Network Routing (RTNR) signaling messages. Alternate Signaling Transport Network (ASTN) coverage is provided for signaling traffic between two UNITEL switches, and signaling traffic between UNITEL switches and the AT&T Switched Network (ASN) switches. A *4ESS* switch can use up to eight 56-kbps Link Access Procedure Balanced (LAPB) F-Links for ASTN traffic. However, only one F-link layer (pair of F-links) can be deployed between two *4ESS* switches.

1.02 This feature allows SubSystem Prohibit (SSP) messages and Signaling Connection Control Part (SCCP) messages to be passed between the UNITEL Signaling Transfer Point (STP) network and the ASN STP network. Access to the ASN STP network is not available to other signaling networks.

1.03 Previously, only offices with an NID of 254 could use the ASTN feature. This feature allows offices with an NID value of 236 to use the ASTN feature.

1.04 The ASTN UNITEL feature does not change the existing ASTN architecture. Software deployment is required for switches in the ASN and UNITEL switching network to recognize the new NID of the two UNITEL *4ESS* switches. In addition to software deployment, 56-kbps F-links must be deployed between the UNITEL switches. The new UNITEL STP pair will be interconnected to the ASN, and it will be supported by AT&T work centers. Figure 10-1 illustrates the UNITEL signaling network.

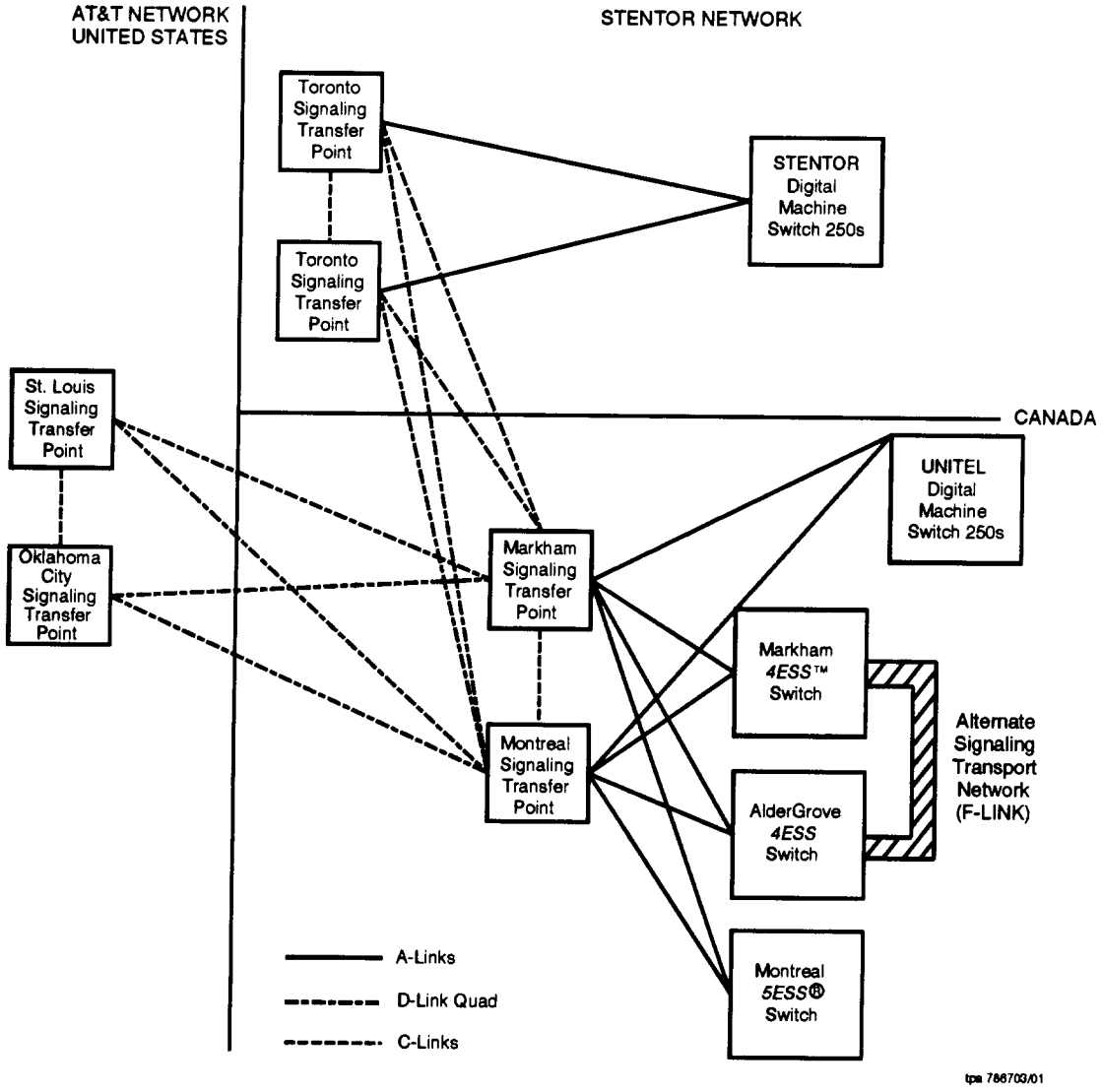

Figure 10-1. Phase 2 UNITEL Common Channel Signaling Network

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management

Network Management Operations System (NEMOS)

5.01 The signaling operations system will be updated to support provisioning of the UNITEL Network Switch Numbers (NSNs).

Network Management Capabilities

A. ASTN Signaling

5.02 The six signaling routes illustrated in Figure 10-2 represent how ASTN operates in both the UNITEL and ASN ASTN signaling networks. The following list describes signaling messages used by ASTN:

- Signaling Route 1: After ASTN is triggered, the originating switch reformats the CCS7 message into ASTN format and forwards the message over direct 56-kbps F-links to the destination.
- Signaling Routes 2, 3, and 6: After ASTN is triggered, the originating switch reformats the CCS7 message into ASTN format and forwards the message over 56-kbps F-links to a helper switch. The helper switch envelopes the the CCS7 message into an ASTN SCCP message and forwards the message to the destination.
- Signaling Routes 4 and 5: After ASTN is triggered, the originating switch reformats the CCS7 message into ASTN format, envelopes the ASTN message into a SCCP message, and forwards the message to the destination through a helper switch. The helper switch only passes the ASTN message portion, minus the SCCP portion, over 56-kbps F-links to the destination. These SCCP messages can be transported between the UNITEL network and the ASN.

- Signaling Routes 1, 2, 5, and 6: When a UNITEL *4ESS* switch undergoes signaling failure, a Transfer Prohibit (TFP) message will be sent to all *4ESS* switches informing them of the failure. TFP messages can be transported between the UNITEL network and the ASN.
- Signaling Routes 3 and 4: When an ASN *4ESS* switch undergoes signaling failure, a SSP message will be sent to all *4ESS* switches informing them of the failure. SSP messages and the corresponding response messages can be transported between the UNITEL network and ASN.

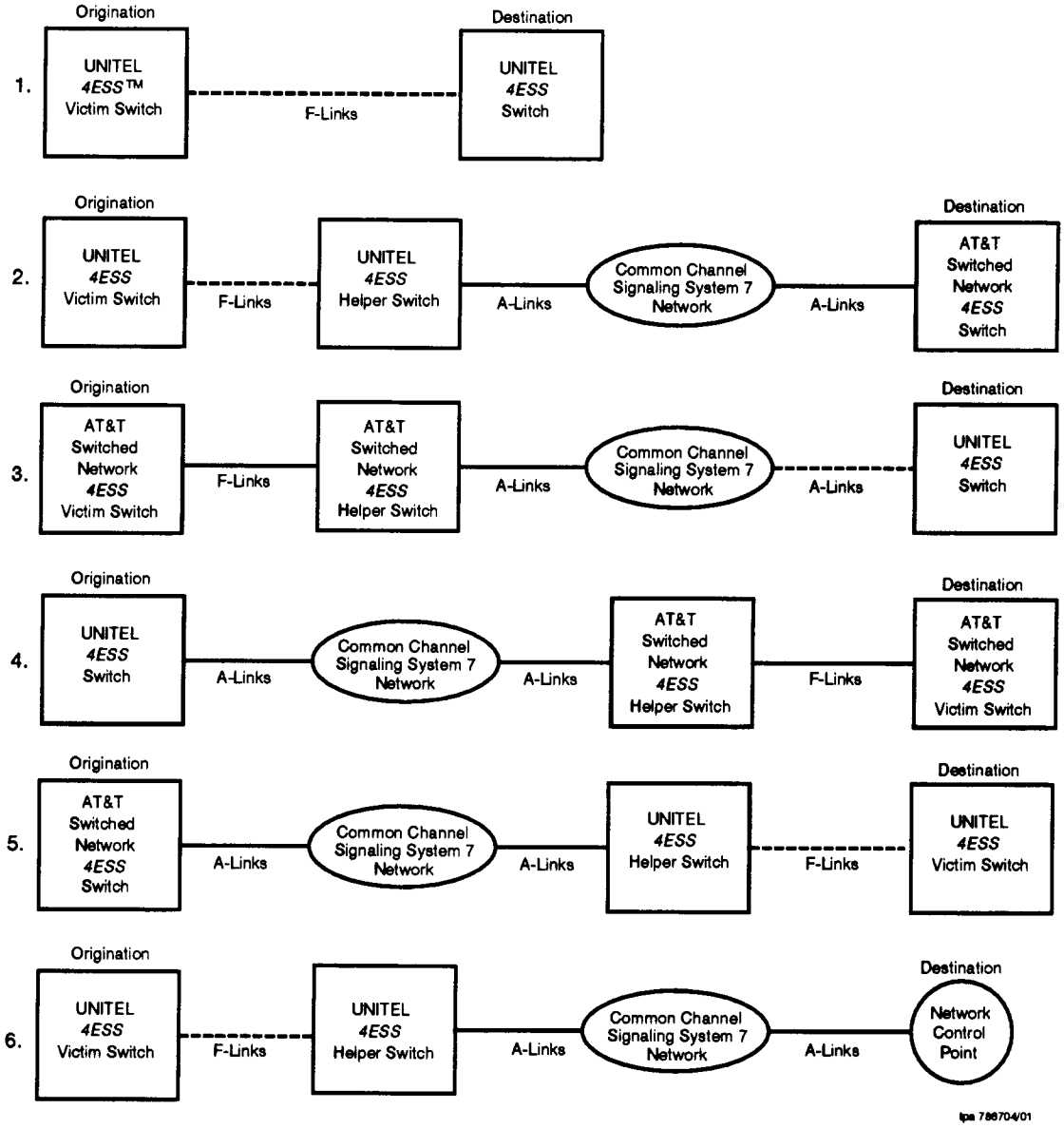

Figure 10-2. ASTN Signaling Routes

Signaling Backup

5.03 When failures occur at a *4ESS* switch (victim), the ASTN capability relies on F-links, A-links, *4ESS* helper switches, and the CCS7 signaling network to transport signaling messages to the destination switch or Network Control Point (NCP). The following sections under Signaling Backup describe how ASTN is used in the network. The six signaling routes illustrated in Figure 11-2 represent how ASTN operates in both the UNITEL and ASN ASTN signaling networks.

A. UNITEL *4ESS* Switch Signaling Backup

5.04 Signaling backup will be provided for signaling traffic routed between the two UNITEL *4ESS* switches. See signaling route 1 in Figure 11-2. In this case, one UNITEL *4ESS* switch is the originating switch, and the other UNITEL *4ESS* switch is the destination switch. If a UNITEL *4ESS* switch has the signaling failure (victim), ASTN will be used to route messages to the destination UNITEL *4ESS* switch via direct 56-kbps F-links.

B. UNITEL *4ESS* Switch/ASN *4ESS* Switch Signaling Backup

5.05 Signaling backup will be provided for signaling traffic between the UNITEL *4ESS* switch and a ASN *4ESS* switch. There are four cases:

- The UNITEL *4ESS* switch is the originating switch, and the ASN *4ESS* switch is the destination switch. See signaling route 2 in Figure 11-2. If the UNITEL *4ESS* switch has a signaling failure (victim), ASTN will be used to route messages to the UNITEL *4ESS* helper switch via 56-kbps F-links. The UNITEL *4ESS* helper switch routes messages to the destination ASN *4ESS* switch via the CCS7 network using ASTN SCCP messages.
- The ASN *4ESS* switch is the originating switch, and the UNITEL *4ESS* switch is the destination switch. See signaling route 3 in Figure 11-2. If the ASN *4ESS* switch has a signaling failure (victim), ASTN will be used to route messages to the ASN *4ESS* helper switch via F-links. The ASN *4ESS* helper switch routes messages to the destination UNITEL *4ESS* switch via the CCS7 network using ASTN SCCP messages.
- The UNITEL *4ESS* switch is the originating switch, and the ASN *4ESS* switch is the destination switch. See signaling route 4 in Figure 11-2. If the destination ASN *4ESS* switch has a signaling failure (victim), ASTN will be used to route messages from the UNITEL *4ESS* switch to the ASN *4ESS* helper switch via the CCS7 network using ASTN SCCP messages. The ASN *4ESS* helper switch routes messages to the destination ASN *4ESS* switch via the F-links.

- The ASN *4ESS* switch is the originating switch, and the UNITEL *4ESS* switch is the destination switch. See signaling route 5 in Figure 11-2. If the destination UNITEL *4ESS* switch has a signaling failure (victim), ASTN will be used to route messages from the UNITEL *4ESS* helper switch via the CCS7 network using ASTN SCCP messages. The UNITEL *4ESS* helper switch routes messages to the destination UNITEL *4ESS* switch via 56-kbps F-links.

C. UNITEL *4ESS* Switch/NCP Signaling Backup

5.06 Signaling backup will be provided for TCAP traffic routed between a UNITEL *4ESS* switch and an AT&T NCP. See signaling route 6 in Figure 11-2. If a UNITEL *4ESS* switch has a signaling failure (victim), ASTN will be used to route messages to the UNITEL *4ESS* helper switch via 56-kbps F-links. The UNITEL *4ESS* helper switch routes the message to the destination NCP via the CCS7 network using TCAP messages.

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Hardware Dependencies

7.01 One pair of 56-kbps F-links between the two UNITEL *4ESS* switches must be installed, provisioned, and tested before this feature is turned on.

Dependencies on Other Network Components

7.02 Software updates must be made to ASN and UNITEL STPs.

Turn On/Turn Off Mechanism

7.03 The ASTN feature is turned on by National Electronics System Assistance Center (NESAC). Recent Change (RC) Form 800 is used to turn on the ASTN on/off bit (OD4BUNSDIS).

Ubiquity

7.04 All *4ESS* switches and STPs in the ASN and UNITEL switching network must be updated for the feature to operate.

8. Input/Output Manual Pages (Not Affected)

Inbound International 800 Service Overseas Access Feature (4170)

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Inbound International 800 Service Overseas Access Feature (4170)

11

1. Feature Description

1.01 The Inbound International 800 (I800) Service Overseas Access feature allows incoming 800 Service calls to have the Dialed Number (DN) format as 800+7D. The locations affected include Overseas, Mexico, and the Caribbean.

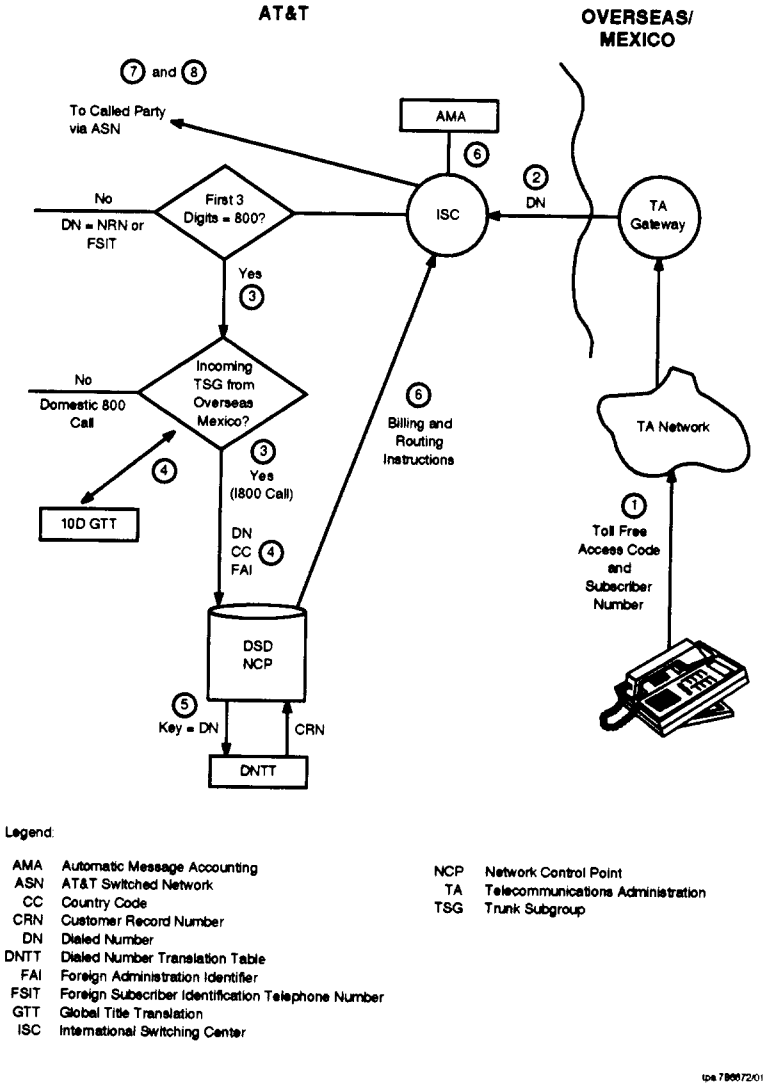
1.02 This feature depends upon Feature 3957, Inbound International 800 Service Separation of Country Code from Network Routing Number (NRN). With the implementation of Feature 3957, the country of origin information is obtained independently of the DN received. Therefore, a DN can be processed in any format, including 800-NXX-XXX. Table 11-A summarizes the types of DN formats available.

Table 11-A. Dialed Number Formats

Location(s)	Dialed Number Formats	
	Phase 1	Phase 2
Overseas and Mexico	• NRN = 196-WXY-CCVZ or • NRN = 196-WXY-VCCZ • Foreign Subscriber Identification Telephone Number (FSIT) = 196-00W-XYVZ	• FSIT = 196-TUW-XYVZ • 800+7D
Caribbean	• NRN = 196-WXY-VCCZ or • NRN=196-WXY-CCVZ	• 800+7D

2. Call Flow

Call Flow Diagrams and Narratives



Legend:

AMA	Automatic Message Accounting
ASN	AT&T Switched Network
CC	Country Code
CRN	Customer Record Number
DN	Dialed Number
DNTT	Dialed Number Translation Table
FAI	Foreign Administration Identifier
FSIT	Foreign Subscriber Identification Telephone Number
GTT	Global Title Translation
ISC	International Switching Center
NCP	Network Control Point
TA	Telecommunications Administration
TSG	Trunk Subgroup

tpa 78672/01

Figure 11-1. Overseas/Mexican 800 Service Access Call Flow

2.01 The following call flow is illustrated in Figure 11-1.

1. An I800 Service call originates in an Overseas or Mexican location when the caller dials a toll-free access code designated by the Post Telephone and Telegraph (PTT) in that country (for example, 0800 in the United Kingdom or 95 in Mexico) followed by digits identifying the AT&T subscriber in the United States.
2. The PTT converts the DN to one of the following three formats:
   - NRN in the form 196-WXY-VCCZ or 196-WXY-CCVZ
   - FSIT in the form 196-00W-XYVZ
   - 800 in the form 800+7D.

   The 196 code is a Special Service Code (SSC) indicating I800 Service. WXYVZ identifies the subscriber, and Country Code (CC) is the I800 Service-specific Pseudo Country Code (PCC) that identifies the country and/or carrier of origin. The PCC digits range from 10 to 99 for NRN only.
3. If the incoming DN is in one of the 196 formats (one of the first two listed in Step 2), the International Switching Center (ISC) forwards the 196 number to an AT&T ISC using any available international trunk.

   If the first three digits of the DN are 800, the Originating AT&T Switch (OAS) checks to see if the incoming Trunk Subgroup (TSG) is from Overseas/Mexico. If so, the call is I800 Service. If not, the call is Domestic 800 Service.

   Note: The ISC functions as an OAS for these calls.

4. After it is determined that the call is I800 Service, the OAS performs a 10-digit Global Title Translation (GTT) on the DN. If a match is found, the OAS determines which Direct Services Dialing (DSD) Network Control Point (NCP) pair should receive the query using information in the GTT table. If a match is not found, the switch sends the call to the No. 2 Signal Transfer Point (2STP) where the default 6-digit GTT occurs. Once the correct DSD NCP pair is determined, the OAS queries the DSD NCP with a Transaction Capabilities Application Part (TCAP) BEGIN message containing a Provide Instruction-Start operation. The following parameters are included:
   - The Digits (DN) parameter.
   - The Digits [Automatic Number Identification (ANI)] parameter. This includes the Calling Line Identification (CLI) if available. The CLI is 7 to 12 digits in length. If the CLI is not available or is 0 to 6 digits, then the ANI is sent with a null value.

- The Country Code parameter. This information includes the Far End Numbering Plan Area (FENPA) information (Country Code for Mexico/Overseas and NPA for the Caribbean) from the TSG characteristics.
- The Foreign Administration Identifier (FAI) parameter (includes the FAI from the TSG characteristics).

The BEGIN message is routed through a 2STP in the Common Channel Signaling (CCS) network to the appropriate DSD NCP pair.

Note: If 10-digit GTT, Phase 2 capabilities are not available, then the following workaround is required:

- The *4ESS*™ switch sends a TCAP BEGIN message to the INWATS Data Base (IDB) with DN=800+7D and ANI=199-CCC.
- The IDB returns an END message with DN=123/124 NRN.
- The *4ESS* switch queries the DSD with DN=123/124 NRN and includes CC and FAI parameters.
- The IDB NCP must be able to accept ANI=199-CCC in the Originating NPA (ONPA) field and return 123/124 NRN to the switch.

5. The presence of the International Direct Distance Dialing (IDDD) CC and the FAI in the TCAP BEGIN message indicates that the call is an I800 Service call. The DSD NCP that receives the TCAP BEGIN message performs the following tasks:
   - Uses the IDDD CC to perform Country Code routing and to block
   - Uses the Dialed Number Translation Table (DNTT) key to access the customer record.

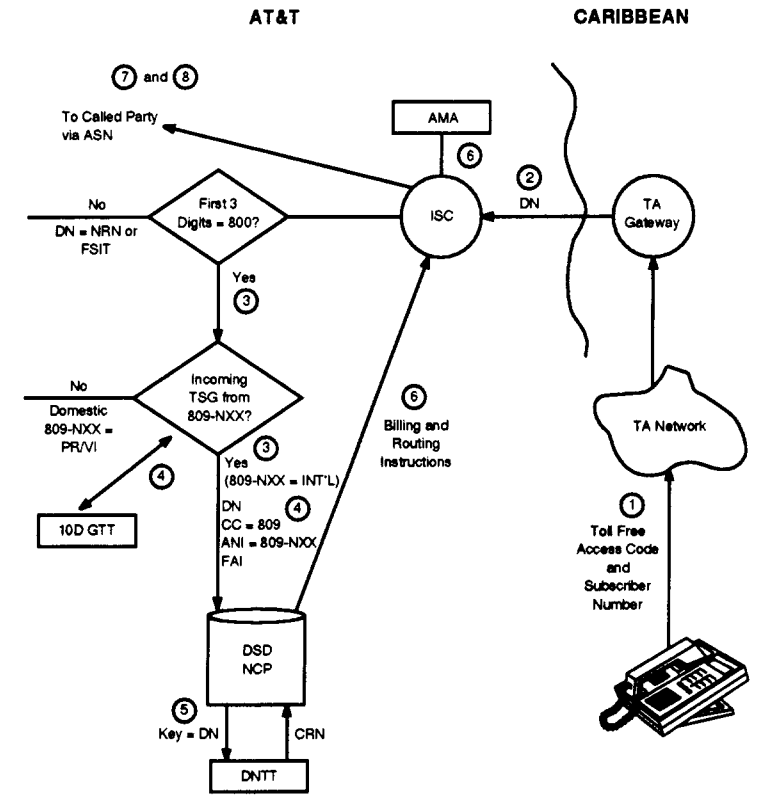
   The ANI parameter contains the 7- to 12-digit CLI or has a null value.
6. After the customer record is found and any needed announcements or call prompter interactions executed, the DSD NCP sends an END message containing the following two operations:
   - The ***Charging-Bill Call*** operation specifying that an Automatic Message Accounting (AMA) record should be made. The Service Indicator Code (SIC) is contained in the Advanced 800 (A800) Service Billing Data parameter and corresponds to the egress type. The Call Code is also contained in this operation. It is set to 324 by the DSD, indicating I800 service in the Inbound Services Intelligent Network (ISIN) architecture.

- The ***Connection Control-Connect*** operation indicating to the ISC/OAS that it should route the call. This operation also provides the routing number in the Digits (Routing Number) parameter. The Generic Routing Information (GRI) parameter contains the domain indicator. The routing number is either an Action Point Number (APN) in the form SSS-TTT-XXXX [Dedicated Egress Voice (DEV) domain routing] or a POTS number in the form of NPA-NXX-XXXX (POTS domain routing). The IDDD CC is also sent in the Hand-off condition along with the ANI, if available.

7. 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 to either the direct-connect location for *Megacom*® 800 service terminations or to the Local Exchange Carrier (LEC) for Classic 800 Service, *Masterline*® telecommunications service, and 800 *READYLINE*® telecommunications service terminations. The LEC completes the call routing for switched-egress subscribers.

   If address digits are included in the Calling Party Number (CgPN) parameter of the Initial Address Message (IAM), the ISC copies that information into the CgPN parameter of the outgoing IAM. The CLI may then be delivered to the subscriber. If CLI is delivered, the terminating *4ESS* switch sends back a Subscriber Identification (SID)/ANI Increment message to peg the billing record for CLI delivery.

8. 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 ISC begins elapsed timing and cuts the incoming trunk through in the backward direction. When the call is terminated, the ISC/OAS completes an AMA billing record. 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.



Legend:

AMA	Automatic Message Accounting
ANI	Automatic Number Identification
ASN	AT&T Switched Network
CC	Country Code
CRN	Customer Record Number
DN	Dialed Number
DNTT	Dialed Number Translation Table
FAI	Foreign Administration Identifier
FSIT	Foreign Subscriber Identification Telephone Number
GTT	Global Title Translation
ISC	International Switching Center
NCP	Network Control Point
TA	Telecommunications Administration
TSG	Trunk Subgroup

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Figure 11-2. Phase 2 Overseas 800 Service Access Call Flow

2.02 The following call flow is illustrated in Figure 11-2.

1. An I800 Service call originates in a Caribbean location when the caller dials a toll-free number. For example, in the Bahamas, the caller dials 1-800 followed by the digits identifying the AT&T subscriber in the United States.
2. The PTT sends a DN in the format 800+7D to the OAS.
3. Since the first three digits of the DN are 800, the OAS checks to see if the FENPA field of the incoming TSG is populated with 809. If so, the switch performs a screening task to determine from which NXX the call originated. Calls originating in the International 809 area share the same NPA/CC parameter. Therefore, it is necessary to obtain the NXX information from the TSG characteristics.
4. After it is determined that the call is I800 Service from the International 809 area, the OAS performs a 10-digit GTT on the DN. Once the correct DSD NCP pair is determined, the OAS queries the DSD NCP with a TCAP BEGIN message containing a Provide Instruction-Start operation. The following parameters are included:
   - The Digits (DN) parameter.
   - The Digits (ANI) parameter which includes the 809-NXX.
   - The Country Code parameter (includes the FENPA information from TSG 809).
   - The FAI parameter (includes the FAI from the TSG characteristics).

   The BEGIN message is routed through a 2STP in the CCS network to the appropriate DSD NCP pair.

   Note: If 10-digit GTT Phase 2 capabilities are not available, then the following workaround is required:
   - The *4ESS* switch sends a TCAP BEGIN message to the IDB with DN=800+7D and ANI=199-CCC.
   - The IDB returns an END message with DN=123/124 NRN.
   - The *4ESS* switch queries the DSD with DN=123/124 NRN and includes CC and FAI parameters.
   - The IDB NCP must be able to accept ANI=199-CCC in the ONPA field and return 123/124 NRN to the switch.
5. The remainder of the call flow is the same as for the Overseas/Mexican Location, beginning at Step 5.

2.03 The preceding call flow must be in place to eliminate DN=NRN processing logic. If the CC and FAI are present in the TCAP BEGIN message, DN=FSIT or 800+7D. The call is processed using the DN, CC, and FAI received.

3. Provisioning

Office Data Administration

A. Forms 401A, 401B, and 401C

3.01 The **XL4TB_S1** item is populated using Office Data Administration (ODA) Forms 401A, 401B, and 401C. The S1 (Spare 1) field is used to store the FAI. Valid entries are as follows:

If S1 is populated with...	Then **XL4TB_S1** is populated with...
0 or Blank	0
1 to 7	1 to 7 (Binary)

B. XL4TS_FEOFC

3.02 The **XL4TS_FEOFC** item is used to store the Far End NXX for AT&T offices. After this feature is activated, this field will contain the Far End NXX for 809 International.

Recent Changes

A. Recent Change (RC) Forms 100, 101, 102, 107, 108, and 109

3.03 The S1 field is used to store the FAI for this feature. Valid entries are **Blank** (defaults to 0) and **1** to **7**.

B. Recent Change Forms 319 and 320

3.04 RC Form 319 specifies codes to be added (turns on screening) to a Digit Type category, while RC Form 320 specifies codes to be deleted (turns off screening).

3.05 Valid entries are as follows:

- DIG: **000** to **999**
- DIGTYP: **BNPA, DEF1, DEF2, DEF3, DEF4, DNHR, DP3, DP6, I809, IIA, IIC, INO, INT, IRS, ITS, IWZ1, NRA, NRN, NRNX, UTC** and **WZ1A**.

3.06 For this feature, the entry is **NRNX**. Based on the ABC digits=800, this entry turns off the screening for the DEF digits. At present, Inbound I800 calls are not allowed. The *4ESS* switch checks the DEF digits. If the 4th digit is 0, the new switch capabilities are triggered.

C. Recent Change Form 809

3.07 This form is used to enable and disable various feature bits. Although the layout of this form is not changing, new values are being added to existing fields.

3.08 Valid entries for this feature are as follows:

- FEATURE ITEM: **I800P1, I800P2**, or **F4**
- ON OR OFF: **ON** or **OFF**.

Proprietary Translation Guide (PTG)-4 Updates

A. Division 2, Section 6

3.09 The following will be added to the entries for FEATURE ITEM:

- I800P1—Inbound 800 Separation of Country Code Phase 1. When this feature bit is set to **ON**, both the NRN and FSIT formats of the DN are acceptable.
- I800P2—Inbound 800 Separation of Country Code Phase 2. When this feature bit is set to **ON**, only the FSIT format of the DN is acceptable. This feature bit will override the I800P1 feature bit.
- 10-D GTT Phase 2 Feature F4—I800 Overseas 10-D GTT feature bit.

B. Division 7, Section 8j

3.10 The following will be added to the entries for FEATURE ITEM:

- I800P1—Inbound 800 Separation of Country Code Phase 1.
- I800P2—Inbound 800 Separation of Country Code Phase 2.
- 10-D GTT Phase 2 Feature F4—I800 Overseas 10-D GTT feature bit.

4. Recording

4.01 When a hand-off is required and the IDDD CC is not 809, the following information is recorded after receiving the Charge-Bill Call operation with the optional parameters IDDD CC and ANI:

- The Originating IDDD Country Code in the ONPA/Number fields.
- The Originating Numbering Plan Type with the value IDDD CC=3
- The SID received in the ANI parameter.

4.02 If the IDDD CC is 809, the following information is recorded:

- The Originating ANI (809-NXX-0000) in the ONPA/Number fields
- The Originating Numbering Plan Type with the value IDDD CC=3
- The originating FAI.

The NXX information is obtained from the Far End Office (FEOFC) field of the TSG characteristics.

4.03 When a hand-off is not required and the call originates from the International portion of 809, the *4ESS* switch records the following information:

- The Originating IDDD Country Code (809-NXX-0000) in the ONPA/Number fields. This information is obtained from the FENPA (809) and FEOFC (NXX) fields of the TSG characteristics.
- The Originating Numbering Plan Type with the value IDDD-CC=3.

4.04 When the call originates from Overseas/Mexico and a hand-off is not required, the *4ESS* switch records the following information:

- The Originating IDDD Country Code in the ONPA/Number fields. This information is received from the foreign PTT or from the FENPA.
- The FAI parameter.

4.05 If the *4ESS* switch receives or retrieves an originating IDDD-CC, it must record a **3** in AMA Table 869 and append AMA Module 932. Table 11-B and Table 11-C list the values for AMA Tables 869 and AMA Module 932, respectively.

Table 11-B. AMA Table 869 Values

Binary Coded Decimal (BCD)	Value	Description
1	0	Undefined
	1	E.164
	2	APN
	3	IDDD CC (New)
2	—	Hex C (Sign)

Table 11-C. Module Code 932 Values—FAI

Information	Table No.	BCD
Module Code	88	4
FAI	879	8

4.06 If the *4ESS* switch receives only one FAI (either originating or terminating), the other FAI in AMA Table 879 is set to the default (000). Table 11-D lists the values for AMA Table 879.

Table 11-D. AMA Table 879 Values

BCD	Values	Description
1	0	Reserved
2 - 4	000	Default
	001 - 007	Terminating FAI
5 - 7	000	Default
	001 - 007	Originating FAI
8		Hex C (Sign)

5. Network Management

Operations Support Systems

5.01 Table 11-E describes the Operations Support Systems (OSSs) affected by this feature.

Table 11-E. OSSs Affected by Overseas Access

OSS	Use	Impact
Direct Signaling Assignment System (DSAS)	Assigns NRNs, FSITs in the form 196-00W-XYZVZ, and 800+7D numbers [controlled by the Engineering Network Administration Center (ENAC)]	For Phase 1, must be able to assign any of the three types of numbers. For Phase 2, must have the capability to assign a general form of FSITs and 800+7D numbers .
10-Digit Routing Support System (10DRSS)	Provides the 10-digit GTT that indicates the Network Point Code (NPC) of the appropriate NCP (routes an I800 Service call from the *4ESS*™ switch)	For Phase 1, NPCs are required for all three types of numbers. For Phase 2, NPCs are required for FSITs and 800+7D numbers.
Network Control Point Data Collection System (NCPDS)	Collects data on NCP usage	Ensures that the data logged is for I800 Service and ***not*** for Domestic 800 Service calls.
Centralized Automated Data Collection System (CADCS)	Receives call records from Data Collection and Distribution Systems (DCDSs) and 2DSD, and sends accumulated data to customers	Must be able to perform the following functions: ■ Extract the IDDD Country Code and Carrier ID from call records received from DCDs and 2DSDs ■ Translate an IDDD Country Code and Carrier ID to the appropriate country label for delivery to customers ■ Simultaneously support call records with CC and FAI during the transition period.
On-Line Call Detail Data/Real Time (OCDD/RT)	800 Service-specific collection system	Must have the capability to handle the FSIT format of the received DN.

6. Maintenance/Troubleshooting

Operations, Administration, and Maintenance

6.01 The feature bits **I800P1, I800P2**, and **F4** (indicates the current, Phase 1, or Phase 2 capability sets) are used by the *4ESS* switch to process I800 service calls. These feature bits are recent changeable.

7. Transition Considerations

Interaction with Other Features

7.01 The Alternate Destination Routing 2 (ADR2) feature permits all 800 service customers to specify primary and secondary routing numbers. If the call is connected to the secondary number, the ISC sends a UNIdirectional (UNI) message to the NCP.

7.02 The UNI message contains the IDDD CC, FAI parameters, ANI of the originating call, and the secondary number to which the call was redirected. The NCP uses the data to perform the following tasks:

- Update network management counters
- Generate data collection reports for the UNI message.

Ubiquity

7.03 Before the I800 Service Overseas Access feature can be activated, the generic must be ubiquitous across the network.

Dependencies

7.04 This feature depends on Feature 3957, Inbound I800 Service Separation of Country Code from NRN, which must be activated before this feature (Inbound I800 Service Overseas Access) is turned on. Feature 4170 reuses the feature bit indicators required for Feature 3957. Both features ***must*** be in the same phase at the same time (that is, Feature 3957 cannot be in Phase 2 and Feature 4170 in Phase 1).

Turn On/Turn Off Mechanism

7.05 This feature is turned on by ODA bit **OD4OFCCOPY**. RC Form 809 is used to enable and disable the feature bits.

8. Input/Output Manual Pages (Not Affected)

Universal Global Translator (UGT) Fall-Out Report Feature (4186)

12

Contents Page

Universal Global Translator (UGT) Fall-Out Report Feature (4186)

12

1. Feature Description

1.01 The Universal Global Translator (UGT) Fall-Out Report feature provides enhancements to the Self-Provisioning Global Title Translation (SPGTT) feature, a Generic 4E18 Release 2 feature.

1.02 The SPGTT feature introduced a new method for provisioning Software Defined Network (SDN) customer records in the Direct Link Node (DLN) Global Title Translation (GTT) tables in each *4ESS*™ switch. Provisioning is done by first updating the master database in the UGT Network Control Point (NCP). [An update in this application refers to a customer move, a customer delete, or an Automatic Number Identification (ANI) range delete.] After the master database is updated, the UGT NCP determines which *4ESS* switches need the update(s) and sends the information to those *4ESS* switches over the Common Channel Signaling (CCS) network. Since the UGT NCP sends update messages to *4ESS* switches via the CCS network, the possibility exists that the UGT NCP may be attempting to send an update message to a *4ESS* switch that is isolated from the CCS network. This feature provides work centers with a way of determining whether an update request from the UGT NCP to a *4ESS* switch was successful.

1.03 Another enhancement provided by this feature is the ability to delete entries in the *4ESS* switch GTT table based on the Customer ID.

2. Call Flow

2.01 An SDN customer's records can be stored in more than one location in the same NCP as well as in another NCP. If the records are not retrieved when the initial query is made, a feature exists that will either redirect the NCP query to a default customer record on the same NCP or it will redirect the query to another NCP. This feature is the SDN Emergency Redirect feature.

2.02 Prior to the introduction of the SPGTT feature, if another query was required, the Emergency Redirect feature sent the function number of the NCP and the Customer ID back to the *4ESS* switch. The function number and the Customer ID were available in the NCP. With the introduction of the SPGTT feature, however, the Customer ID is no longer in the NCP.

2.03 The SPGTT feature reduced the need for certain data to be stored in the NCPs. For example, the ANI to Customer ID mapping was removed from the ANI translation table. This mapping is now done in the UGT and DLN GTT table.

2.04 In order to retain the SDN Emergency Redirect capability, the following change is included in this feature:

- When a *4ESS* switch receives a response from an NCP indicating that an NCP transfer is required, the *4ESS* switch will query the GTT table in the DLN again. This time the Customer ID associated with the ANI will be retrieved.
- Using the Customer ID and the NCP function number, which was retrieved from the first NCP query, the *4ESS* switch can now query another NCP that has the customer's records.

3. Provisioning

3.01 This section describes the provisioning flow for updating SDN GTT records and what happens when an update request does not make it to a *4ESS* switch.

1. Since all provisioning is initially performed at the UGT NCP, the Software Defined Network—Service Management System (SDN-SMS) sends update commands to the UGT NCP.
2. The UGT NCP updates the Global Title (GT) records in the master database and creates update requests to send out to the *4ESS* switches.
3. After determining which *4ESS* switches are to receive the update requests, the UGT NCP attempts to send update messages to the appropriate *4ESS* switches.

4. If the *4ESS* switch receives the update request message, the GT records in the GTT table are updated. However, if the UGT NCP sends an update request to an isolated *4ESS* switch, the update message is redirected in the CCS network to the Alternate Signaling Transport Network (ASTN) gateway *4ESS* switch.
5. The gateway switch returns the update request to the UGT NCP and sends a subsystem prohibit message that stops updates from being sent until the isolated switch recovers.
6. The UGT NCP puts these requests in a "fall-out" report that can be retrieved by the Network Control Point Administration System (NCPAS). (Requests that do not make it to a *4ESS* switch are said to "fall out" of the normal provisioning process.)
7. The NCPAS sends the report to the Engineering Network Administration Center (ENAC) which can manually apply [via the Integrated Routing Assignment System (IRAS)] the update requests that did not get to the switch.

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)

Enhanced I800 Service Using *USADirect*® Telecommunications Service Feature (4189)

13

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Contents

Enhanced I800 Service Using *USADirect*® Telecommunications Service Feature (4189)

13

1. Feature Description

1.01 The Enhanced International 800 (I800) Using *USADirect*® Telecommunications Service feature satisfies both the AT&T business customer and the consumer customer by providing an international origination toll-free capability to existing domestic toll-free 800 numbers. The AT&T 800 business customer benefits by having a ubiquitous 800 number that can be marketed and dialed from overseas points of origination. The consumer customer, that is, overseas U.S. traveler and/or *AT&T Teleticket*® international long distance calling customer, benefits by having toll-free international access service from overseas locations.

1.02 AT&T has been offering, and continues to offer, International 800 Service to subscribers who want to provide toll-free service to their customers reaching them from overseas. This is done by provisioning the 800 subscriber with an international 800 number that is routed inbound in the AT&T network in the format of a 196 Network Routing Number (NRN). However, because of the different toll-free dialing formats overseas and the acceptance of 800 numbers as the toll-free dialing format by the U.S. traveler, overseas call attempts have been made to the AT&T Network with the 800 dialing format. The caller can access the U.S. network via the *USADirect* Service and pay for the international portion of a call, whether it is a Plain Old Telephone Service (POTS) number or a toll-free 800 number. If the call completes, the overseas caller pays for the international access portion; the domestic 800 subscriber pays for the domestic egress completion portion of the call.

1.03 With this new Enhanced I800 feature, AT&T introduces a capability where international originated calls can be terminated on their existing domestic 800 access facilities, using existing toll-free database records as a billing vehicle. Overseas

callers are now able to reach domestic 800 numbers through the *USADirect* Service without paying for the international portion of the call. The domestic 800 subscriber, if subscribed to this enhanced feature, pays for the international and domestic portions of the call, which for billing purposes, are treated as one call.

1.04 This service offering is made available from all countries served by *USADirect* Service. The Enhanced I800 feature is made available to all AT&T domestic 800 subscribers. Ideally, the subscribers have the following three options to offer for their international toll-free calling capability:

- The 800 subscriber pays for the entire international call. This is referred to as the Toll-Free Option.
- The 800 subscriber pays for the domestic portion of the call. The caller is required to pay for the international access portion. This includes the two cases: (a) the countries where the 800 subscriber does not want to pay, and (b) the 800 subscriber's number is not subscribed to the enhanced feature offering. This is referred to as the Caller Paid Option.
- The 800 subscriber can also request that *USADirect* Service calls to its 800 number be blocked/denied. This is called the Block/Deny Option.

Functional Overview

1.05 The high level functional layout for the units that implement this feature are shown in Figure 13-1. These units perform the following functions:

- *5ESS*® switch Operator Services Position System (OSPS): The *5ESS* switch OSPS handles the processing of *USADirect* Service calls received from the International Switching Center (ISC) *4ESS*™ switch. The OSPSs Integrated Services Digital Network User Part (ISUP) Initial Address Message (IAM) charge number parameter identifies calls that originate over *USADirect* Service to 800 numbers. The *5ESS* switch OSPS also has an ISUP parameter that identifies caller-paid versus subscriber-paid calls. The *5ESS* switch contains the Eight Hundred Number Screening (ENS) Table.
- *4ESS* Switch (New Haven)*: The *4ESS* switch receives 800 dialed number calls and the Common Channel Signaling System 7 (CCS7) ISUP Initial Address Message from the *5ESS* switch OSPS identifying the call from *USADirect* Service. The received information is made available to the databases and the Automatic Message Accounting (AMA) recording modules. The *4ESS* switch receives the ISUP paid flag indicator within the existing Forward Network Specific Information parameter and, when necessary, appends the parameter to the AMA record module. Double dip calls are processed, as before.

* The current Network Service Division (NSD) plans are to remove the New Haven switch from the AT&T switch network. If this occurs, any *4ESS* switch should be able to perform the Enhanced I800 capabilities.

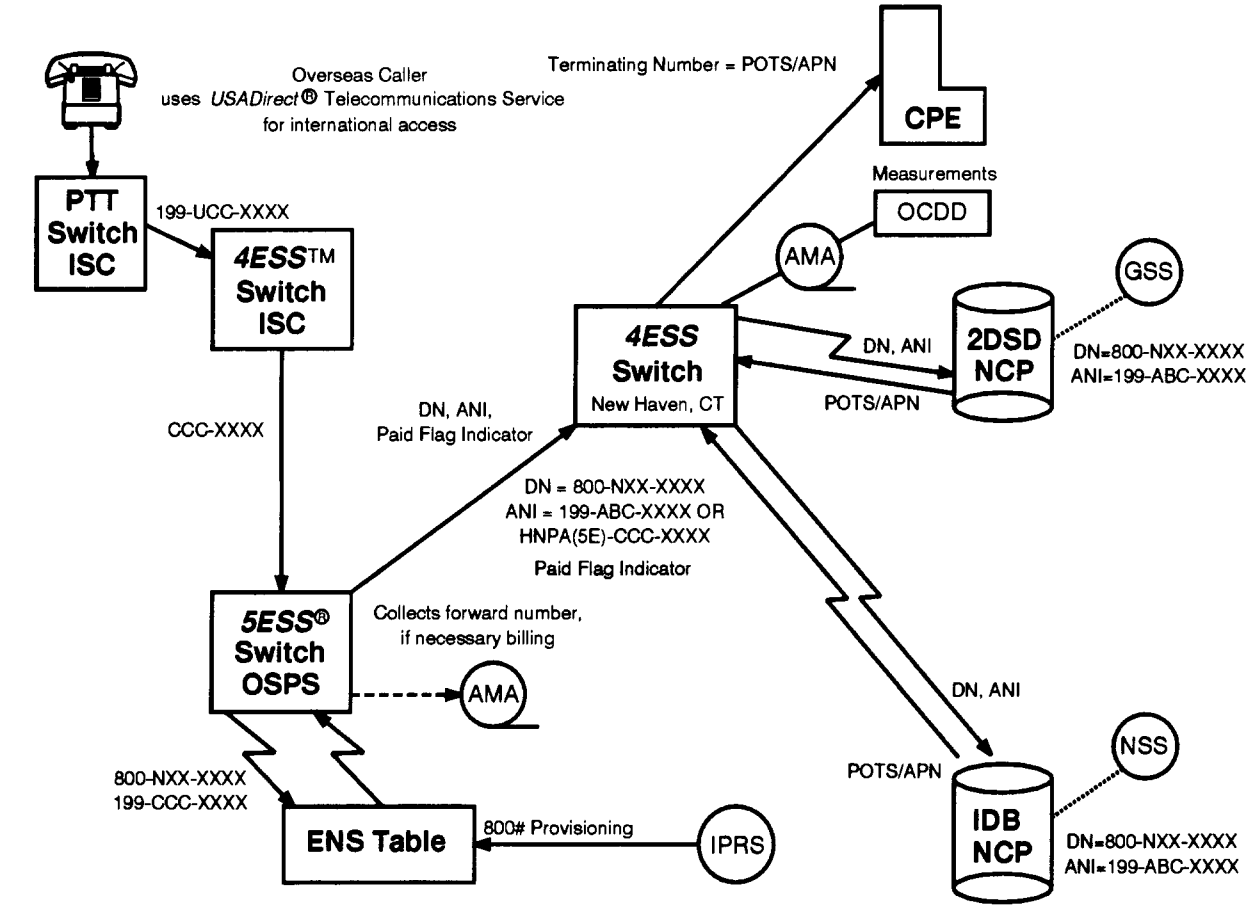
- Eight Hundred Number Screening (ENS) Table: The ENS provides storage of the toll-free 800 number and any restrictions. The ENS Table contains all the front end screening and validation functionality for the Enhanced I800 feature. The ENS Table does not have any voice, digit collection, or announcement functionality for this application.
- Network Control Points (NCPs): The INWATS Database (IDB) NCP and the No. 2 Direct Services Dialing (2DSD) NCP receive the 199 Automatic Number Identification (ANI) and make it available to the customer record for processing.
- Service Support Systems (SSSs): The Network Support System (NSS) and the Global Transaction Network Support System (GSS) receive and process 800 dialed number calls, using 199 ANI, as international calls. The International Provisioning Reporting System (IPRS) supports sending the 800 provisioning data to the ENS Table.
- Data Collection and Reporting Capabilities: Data collection includes capturing data on *USADirect* Service calls to 800 numbers with either the 199 ANI or the Home Numbering Plan Area (HNPA) OSPS format and the paid flag indicator and generating reports for use by the I800 Service Product Management and the *USADirect* Service Product Management teams. This function is provided by Online Call Detail Data (OCDD). The Centralized Automatic Data Collection System (CADCS) accepts the 199 data for *USADirect* Service calls to 800 numbers and processes them to create real time traffic records.
- Downstream Billers: These units accept and process billing on the domestic 800 number and the 199 ANI. The downstream billers also recognize the paid flag indicator. Billing Management requirements are coordinated by the I800 Billing Management Functional Area Team Leader (FATL).

2. Call Flow

2.01 The call flow for the Enhanced I800 Service Using *USADirect* Service feature is described in the following four scenarios:

- 800 Number is not in the ENS Table
- 800 Number is in the ENS Table with no country code restrictions
- 800 Number is in the ENS Table with country code restrictions
- 800 Number is in the ENS Table with a block or deny indicator.

For each of these call flow scenarios, refer to Figure 13-1 for the feature architecture.



Legend:

AMA - Automatic Message Accounting
ANI - Automatic Number Identification
APN - Action Point Number
CPE - Customer Premise Equipment
DN - Dialed Number
ENS - Eight Hundred Number Screening
GSS - Global Transaction Network Support System
HNPA - Home Numbering Plan Area
IDB - INWATS Data Base
IPRS - International Provisioning Reporting System
ISC - International Switching Center
2DSD - No. 2 Direct Services Dialing
NCP - Network Control Point
NSS - Network Support System
OCDD - Online Call Detail data
OSPS - Operating Services Positioning System
PTT - Post Telephone and Telegraph

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Figure 13-1. Enhanced I800 Service Using *USADirect* Service Architecture

Scenario 1: 800 Number is not in ENS Table

1. The overseas caller uses the *USADirect* Service country-specific international access number to reach a United States OSPS. The call is routed from the foreign International Switching Center (ISC) Post Telephone and Telegraph (PTT) switch to the ISC AT&T *4ESS* switch in the format of 199-UCC-XXXX, where:
   - 199 = the *USADirect* Service special service code
   - UCC = the *USADirect* Service operator (DIOR) 3-digit country code
   - XXXX = the marketing tracking number.
2. The ISC *4ESS* switch routes the call to the *5ESS* switch/OSPS in the format of CCC-XXXX. CCC is usually the International Direct Distance Dialing country code. The *5ESS* switch/OSPS prompts the overseas call for the forward (dialed) number.
3. The overseas caller inputs or provides to the operator the forward number as 800-NXX-XXXX.
4. The OSPS queries the ENS Table with the dialed 800 number and 199-CCC-XXXX.
5. If the 800 number is not in the ENS table, then the ENS Table returns a response to the OSPS to collect billing information from the caller.
6. The OSPS collects the billing information from the caller. The OSPS forwards to the New Haven *4ESS* switch in the AT&T CCS7 ISUP IAM the following parameters:
   - Charge number parameter: HNPA of the OSPS-CCC-XXXX
   - Dialed number parameter: 800-NXX-XXXX
   - Paid flag indicator set to Caller Paid (000001): The six bits indicate that the caller paid for the call.

   The paid flag indicator (new) is populated in the CCS7 ISUP Forward Network Specific Information parameter and is sent to the *4ESS* switch for all *USADirect* Service 800 calls.
7. The *4ESS* switch constructs the Transactions Capabilities Applications Part (TCAP) BEGIN message for the database (NCP) populating the dialed number and ANI fields with the dialed number and charge number parameters received from the *5ESS* switch/OSPS, respectively. The *4ESS* switch populates the AMA record with the dialed number, ANI, and appends the paid flag indicator with the six assigned bits (000001).
8. If the call completes, the OSPS makes an AMA record for the caller. The caller pays for the international portion of the call. The *4ESS* switch makes an AMA record for the domestic 800 subscriber. The domestic 800 subscriber pays for

the domestic portion of the call. The downstream billers process the call. The caller paid flag indicator is used for data collection and reports generated by the data collection systems.

Scenario 2: 800 Number is in ENS Table with no Country Code Restrictions

1. The call flow for the first four steps of this scenario is identical to Scenario 1. The ENS Table has performed the front end screening and validation.
2. If the dialed 800 number is in the ENS Table and has NO country code restrictions, the ENS Table returns a reply indicating the call is toll free. The reply also contains the dialed 800 number for routing and the 199-ABC-XXXX (ANI) for billing, where 199 = *USADirect* Service special service code, ABC = 3-digit International Direct Distance Dialing (IDDD) country code, and XXXX = filler digits.
3. The *5ESS* switch/OSPS does not prompt the caller for billing information. The OSPS forwards to the New Haven *4ESS* switch, in the AT&T CCS7 ISUP IAM, the following parameters:
   - Charge number parameter: 199-ABC-XXXX*
   - Dialed number parameter: 800-NXX-XXXX
   - Paid flag indicator set to Toll Free (000010): The six bits indicate that the domestic 800 subscriber paid for the call.
4. The *4ESS* switch constructs the TCAP BEGIN message for the database (NCP) populating the dialed number and ANI fields with the dialed number and charge number parameters received from the *5ESS* switch/OSPS, respectively. The *4ESS* populates the AMA record with the dialed number, ANI, and appends the paid flag indicator with the six assigned bits (000010).
5. If the call completes, the *4ESS* switch makes an AMA record for the entire international call. An AMA record is made at the *5ESS* switch OSPS with call type **AUTO COLLECT** for administrative purposes only. The domestic 800 subscriber pays for the international and domestic portions of the call. The downstream billers process the call, using the dialed number and the Originating Numbering Plan Area (ONPA) = 199-ABC information. The ANI = 199-ABC-XXXX is also used by the data collection and reporting systems. The CCS7 ISUP paid flag indicator is sent to the downstream data systems for collection and reporting.

* For Caribbean calls, ANI = 199-809-NXX0.

Scenario 3: 800 Number is in ENS Table with Country Code Restriction(s)

1. The call flow for the first four steps of this scenario is identical to Scenario 1. The ENS Table has performed the front end screening and validation.
2. If the dialed 800 number is in the ENS Table and has country code restrictions, then the ENS Table returns a response to the *5ESS* switch/OSPS to collect billing information from the caller.
3. The call flow for steps 6 through 8 of this scenario is identical to steps 6 through 8 of Scenario 1.

Scenario 4: 800 Number is in ENS Table with Block or Deny Indicator

2.02 If the dialed 800 number is in the ENS table and has a block or deny flag set, then the call is given final handling treatment. The ENS Table returns a deny response to the *5ESS* switch/OSPS. The *5ESS* switch/OSPS plays an announcement and blocks the call. An AMA record is made for sampling purposes only.

3. Provisioning

4ESS™ Switch Requirements

3.01 For all calls from the *5ESS* switch/OSPS to the *4ESS* switch, the dialed number (DN) in the CCS7 ISUP IAM is in the 800-NXX-XXXX format. For this new enhanced I800 feature, the charged number parameter in the ISUP IAM is in the 199-ABC-XXXX* format. In this format, 199 = *USADirect* Service type indicator; ABC = the 3-digit IDDD country code; and XXXX = filler digits. The *4ESS* switch populates both the TCAP BEGIN message for the NCP and the AMA record with this information. As a new requirement for this feature, the *4ESS* switch appends to the AMA module the paid flag indicator received in the CCS7 ISUP IAM Forward Network Specific Information (FNSI) parameter, when the six bits (ONMLKJ) in octet 2 are equal to 000001 or 000010.

3.02 When the caller has paid for the international access portion of a call, the *5ESS* switch/OSPS sends the *4ESS* switch the dialed number, the HNPA code of the *5ESS* switch/OSPS, and a paid flag indicator. This flag indicator is used for data collection and reporting only. The indicator is populated in the AMA record and is not sent to the NCP databases.

* For Caribbean calls, ANI = 199-809-NXX0.

3.03 The *4ESS* switch also makes certain the *USADirect* Service 800 calls with a 199 ANI do not fail the bad NPA checks. Double dip calls are processed as in previous generics.

Office Data Administration (ODA) Forms

3.04 In the OD4 D7 ODA form, item OD4PF3 is supported across retrofits to enable or disable the I800 Service via the *USADirect* Service Feature Bit.

Recent Change (RC) Forms

3.05 For *USADirect* Service, the Enhanced I800 service now allows overseas callers to reach domestic 800 numbers without paying for the international portion of the call. The domestic 800 subscriber, if subscribed to this enhanced feature, pays for the international and domestic portions of the call.

3.06 To initiate this service, RC Form 809 FEATURE ITEM entry PF3 must be set to ON indicating Enhanced I800 service is available via *USADirect* Service. See Figure 13-2.

```
#  FORM 809 CHANGE FEATURE BITS

   4E18

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

ORNU  _____'

 FEATURE ITEM _____'        ON OR OFF____'

REMARKS  _____________________________________________________!
```

Figure 13-2. Recent Change Form 809—Enhanced I800 Service

4. Recording

4.01 For the *4ESS* switch, there are two cases for inbound calls that affect how AMA must be handled. The two cases are as follows:

a. Caller pays

b. Toll Free (Non-handoff and handoff).

Table 13-A summarizes the number parameters returned by the IDB 2DSD NCP and how the call types are handled.

Case 1: Caller Pays

4.02 The *4ESS* switch receives a DN=800-NXX-XXXX/ANI=NPA-CCC-XXXX (*USADirect* Service Country Code) from the OSPS (HNPA of the OSPS) and the ISUP Forward Network Specific Information parameter. Upon receipt of the ISUP Forward Network Specific Information parameter with bits ONMLKJ (000001 for handoff and non-handoff), the *4ESS* switch instructs the 3B/CDRP to append the routing module (set the RRI & FAST flags) and to populate the "Bill to Indicator" (AMA table 132) with 6 (caller billed).

Case 2: Toll Free

A. Non-Handoff

4.03 Upon receipt of the call from OSPS, with DN=800-NXX-XXXX and ANI=199-ABC-XXXX, the *4ESS* switch instructs the 3B/CDRP to populate the ONPA/Number with 199-ABC-XXXX*. The Originating Numbering Plan type is set to pots-E.164. Upon receipt of the ISUP Forward Network Specific Information parameter with bits ONMLKJ (000010), the *4ESS* switch instructs the 3B/CDRP to append the Routing Module (set the RRI & FAST flags) and to populate the "Bill to Indicator" (AMA table 132) with 0 (default).

B. Handoff

4.04 Upon receipt of the Digits parameter ANI=199-ABC-XXXX, the *4ESS* switch instructs the 3B/CDRP to populate the ONPA number with 199-ABC-XXXX*. The Originating Numbering Plan type is set to "pots-E.164". Upon the receipt of the ISUP Forward Network Specific Information parameter with bits ONMLKJ (000010), the Handoff *4ESS* switch instructs the 3B/CDRP to append the Routing Module (set the RRI & FAST flags), and to populate the "Bill to Indicator" (AMA table 132) with 0 (default).

---

* For Caribbean calls, ANI = 199-809-NXX0.

Table 13-A. Summary of AMA Billing Parameter Values

Call Type	Toll Free w/ Handoff	Toll Free w/o Handoff	Caller Pays w/ Handoff	Caller Pays w/o Handoff
TCAP Messages				
TCAP Begin Parameter ANI Parameter DN	 199-ABC-XXXX* 800-NXX-XXXX	 199-ABC-XXXX* 800-NXX-XXXX	 HNPA-CCC-XXXX 800-NXX-XXXX	 HNPA-CCC-XXXX 800-NXX-XXXX
TCAP END/Cont. (2DSD) parameter ANI parameter DN	 199-ABC-XXXX* 800-NXX-XXXX	 	 HNPA-CCC-XXXX 800-NXX-XXXX	
AMA				
Orig. NPA/No. Dialed NPA/No.	199-ABC-XXXX* 800-NXX-XXXX	199-ABC-XXXX* 800-NXX-XXXX	HNPA-CCC-XXXX 800-NXX-XXXX	HNPA-CCC-XXXX 800-NXX-XXXX
Orig. NPT	POTS	POTS	POTS	POTS
Call Code (2dsd/idb)	 324/n/a	 324/360	 Domestic/n/a	 Domestic/360
Bill To Indicator	0 Default	0 Default	6 Caller Billed	6 Caller Billed
Routing Module	Appended	Appended	Appended	Appended

5. Network Management

Network Management Display System

A. Interface With *5ESS*® Switch/OSPS

5.01 The *4ESS* switch must be able to receive the CCS7 ISUP Forward Network Specific Information parameter from the *5ESS* switch/OSPS that contains the paid flag indicator.

5.02 A 6-bit field in the Forward Network Specific Information parameter has been assigned and reserved for use by the Enhanced 1800 Service using *USADirect* and *USADirect* Service projects. The default for the 6 bits is 000000. For Enhanced 1800 via *USADirect* Service, the presence of 000001 or 000010 in these fields is the trigger for the *4ESS* switch to populate the AMA record.

* For Caribbean calls, ANI = 199-809-NXX0.

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Dependencies on Other Network Components

7.01 All *USADirect* Service calls are sent to one *4ESS* switch. The *4ESS* switch is able to receive the new indicator within the existing CCS7 ISUP IAM Forward Network Specific Information parameter from the *5ESS* switch/OSPS. The *4ESS* switch Enhanced I800 capabilities feature bit indicator must be turned on. Refer to "Turn On/Off Mechanism in this chapter".

Ubiquity

7.02 The *4ESS* switch software release for this feature must be fully deployed before the *5ESS* switch/OSPS.

7.03 The NCP must contain the software release for the Enhanced I800 Feature before the *4ESS* switch sends the new ANI = 199 for this capability.

Turn On/Turn Off Mechanism

7.04 The enhanced I800 service now allows overseas callers to reach domestic 800 numbers via *USADirect* Service without paying for the international portion of the call. The domestic 800 subscriber, if subscribed to this enhanced feature, pays for the international and domestic portions of the call.

7.05 To initiate this service, RC Form 809 FEATURE ITEM entry PF3 must be set to ON indicating Enhanced I800 service is available via *USADirect* Service.

8. Input/Output Manual Pages (Not Affected)

UNITEL Network Identification (NID) Code Feature (4215)

14

Contents Page

UNITEL Network Identification (NID) Code Feature (4215)

14

1. Feature Description

1.01 This feature is used to change the Network Identification (NID) code for *4ESS*™ switches in the UNITEL network. The new UNITEL NID code is NID 236. UNITEL switches have been using the same NID code that is used in AT&T network switches (NID 254). The new UNITEL NID code will be used to support Common Channel Signaling (CCS) traffic.

1.02 This feature also allows UNITEL switches to use the same features and services that are used in the AT&T Switched Network (ASN), although they do not use the AT&T NID code. Therefore, UNITEL switches will behave exactly like AT&T switches in the ASN.

2. Call Flow

2.01 Call processing has been enhanced to allow switches with an NID code of 236 to use all AT&T enhanced services.

3. Provisioning (Not Affected)

4. Recording

4.01 Billing processes have been enhanced to allow switches with an NID code of 236 to use all AT&T Enhanced services.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Hardware Dependencies

7.01 A-Links will be used between the UNITEL network and the AT&T network Signaling Transfer Points (STPs).

7.02 In order to provide the same functionality as an AT&T switch, it is required that UNITEL trunks be provisioned with the same trunk classes used by AT&T switches. Other trunk classes might not work with an office that has an NID of 236.

Dependencies on Other Network Components

7.03 Changing the UNITEL NID code will require that some changes be made to AT&T network elements, so that they can support AT&T Transaction Capabilities Application Part (TCAP) protocol messages between AT&T and UNITEL *4ESS* switches.

Turn On/Turn Off Mechanism

7.04 This feature is turned on automatically by software deployment. See the UNITEL NID Transition—Operations Plan for precautions before turning this feature on.

8. Input/Output Manual Pages

8.01 Input/Output messages used to update CCS and CNI data structures have been modified to support the NID code of 236 in the Point Code (PC). Switches with an NID code of 236 will use the AT&T point code layout.

Multiple *4ESS*™ Switch Network Announcements Feature (4232)

15

Contents

Multiple *4ESS*™ Switch Network Announcements Feature (4232)

15

1. Feature Description

1.01 The Multiple *4ESS*™ Switch Announcements feature enables the switch to give final handling treatments and service terminating announcements in different languages based on the location of the caller. This capability is required for all services being offered in Canada on the *4ESS* switch platform. The first application of this capability is for UNITEL switches, and four versions of each announcement are available: English only, English followed by French, French followed by English, and French only.

1.02 The version of a final handling announcement selected for any call will be based on the caller's billing number Numbering Plan Area (NPA). An office parameter is also defined to specify a default announcement group to be used by any Trunk Subgroup (TSG) without a billing number.

1.03 Since the Phased Announcement System (PAS) frame cannot handle announcements that are longer than 12 seconds, the Service Circuit System (SCS) frame is required to support this feature. With Expanded Final Handling Treatment capability, the number of final handling treatments has been expanded to 128 (0 to 127).

2. Call Flow (Not Affected)

3. Provisioning

3.01 Four announcement groups are defined for this feature. For UNITEL, the first user of the feature, the following are the four announcement groups:

- Group 0 English only
- Group 1 English/French
- Group 2 French/English
- Group 3 French only.

3.02 These announcement groups will be administered as new Digit Types, and they are recent changeable and verifiable. In 4E18/19 and 4E20R1, these new Digit Types must be populated using Recent Change Form 800. Any data populated in 4E18/19 will be maintained across Office Data Administration (ODA) retrofit.

3.03 Three items are provisioned in the switch—the feature activation bit, the default announcement group, and the selected announcement group.

Recent Change (RC) Forms Affected

A. RC Form 809

3.04 The feature activation bit used as an on/off switch for SCS Multiple Announcements in 4E18R3 and later generics is Item OD4F3. RC Form 809 is used to set this bit. The Item/State Assignments are the following:

- 4ODFB_OFF (0) Feature Bit Off (default)
- 4ODBF_ON (1) Feature Bit On.

B. RC Form 800

3.05 An office parameter is defined for selecting a default announcement group to be used by any TSG without a billing number, as well as when the feature activation bit is off. This parameter is initially set to 0, meaning the announcements will be in English only. RC Form 800 must be used to set this parameter to another announcement group. The data populated in this office parameter will be maintained across generics.

3.06 In 4E18R3, a new on/off Recent Changeable parameter, OD4OFC_AG, is defined to set the default announcement group for this feature. This parameter, which is initially set to 0, is populated using RC Form 800.

3.07 Please be aware that announcements may be played at the terminating office, depending on the entries on the AT&T ISUP Releasability (AIR) and Common Channel Signal Voice Calls and Old Announcements (CIVO) fields on RC Form 634. The AIR and CIVO settings at the terminating switch may cause a different set of announcements to be played to the customer than the announcements associated with this feature.

4. Recording (Not Affected)

5. Network Management

5.01 Before this feature is used for groups 1, 2, or 3, the announcements must be recorded and stored on the Service Circuit Unit (SCU) disks. The base offset values for the SCS announcements are the following:

- Group 0 English only 1000
- Group 1 English/French 3000
- Group 2 French/English 5000
- Group 3 French only 7000.

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 Refer to "Provisioning" in this chapter for information about turning this feature on and off.

8. Input/Output Manual Pages (Not Affected)

Foreign-Billed 800 Service Feature (4322)

16

Contents

Foreign-Billed 800 Service Feature (4322)

16

1. Feature Description

1.01 The Foreign-Billed 800 Service feature was released to the field in the first quarter of 1994. This feature has two main purposes:

- To allow foreign-dialed calls to all 800 numbers (AT&T and non-AT&T)
- To expand the Foreign-Billed 800 service to as many World Zone 1 (WZ1) and non-World Zone 1 countries as possible.

Prior to this feature, the AT&T Switched Network (ASN) blocked foreign-dialed calls to non-AT&T 800 numbers.

1.02 With this feature, the foreign Post Telephone and Telegraph (PTT) bills the caller for the overseas portion of the call, and AT&T or the Other Common Carrier (OCC) provides 800 service features and bills the 800 subscriber in the United States.

2. Call Flow

Call Flow Description

2.01 The foreign-billed 800 call comes from overseas to an AT&T International Switching Center (ISC)/Gateway switch, which then routes the call to the New Haven *4ESS*™ switch using Real Time Network Routing (RTNR). The ASN processes

calls to AT&T 800 numbers the same way it always has, but other 800 calls are routed to Southern New England Telephone (SNET) for completion through the appropriate carrier.

2.02 The call flow for Foreign-Billed 800 Service calls is as follows:

1. The overseas caller dials the U.S. 800 number.
2. The Telecommunication Administration in the originating country screens the call to determine if it is an International 800 (I800) call. If not, the call is forwarded to an announcement housed in the PTT network informing the caller that the call is not toll free. The caller must then take some action to complete the call, perhaps redialing an alternate number or entering a short code to acknowledge willingness to pay for the call. The form of this action will be the decision of the particular PTT.
3. The PTT routes the foreign-billed call to an AT&T facility with a called number in the form "197-NXX-XXXX", where "197" identifies foreign-billed traffic and "NXX-XXXX" are the last seven digits of the 800 number as dialed by the caller. The call is routed to the AT&T ISC/Gateway *4ESS* switch that normally receives inbound foreign traffic from that country.
4. The AT&T ISC/Gateway *4ESS* switch that receives the incoming call routes it to the New Haven *4ESS* switch using RTNR. The call is sent with the called number "197-NXX-XXXX", where "NXX-XXXX" consists of the original digits received by the *4ESS* switch ISC. An International Call Detail Recording (ICDR) record is generated with the dialed number 197-NXX-XXXX.
5. The New Haven *4ESS* switch formulates an Inward Wide Area Telephone Service (INWATS) Database (IDB) Network Control Point (NCP) query. Based on the first three digits (197) and INWATS call treatment, the switch sets the "Backhaul Screening Indicator" to "1" (potential backhaul).
6. The NCP Transaction Capabilities Application Part (TCAP) query will have the following key parameters in the BEGIN message:
   - Dialed Digits=800-NXX-XXXX
   - Automatic Number Identification (ANI) Digits=NPA-NXX-XXXX (for example, 203-959-9999). The ANI will be the same for all Foreign-Billed 800 calls where the Numbering Plan Area (NPA) is populated from the INWATS call data information [provisioned with the Home Numbering Plan Area (HNPA) of the switch] and the NXX-XXXX is populated from the office data information (provisionable by Recent Change (RC) Form 800).
7. The New Haven *4ESS* switch queries the IDB NCP through the Signal Transfer Point (STP) over the signaling network using the above key parameters. The STP translates the 800 number using the first six digits (800-NXX) to determine the IDB NCP pair in which the customer record is resident.

8. If an NCP address corresponds to the 800 number, the STP queries the appropriate IDB NCP. Using the 800 number and the Foreign-Billed 800 ANI digits (for example, 203-959-9999, as above), the IDB NCP accesses and executes the 800-subscriber record.
9. The IDB NCP performs NPA screening to prevent calls from areas that the 800 subscriber has not purchased from being routed to the Direct Services Dialing (DSD) NCP. If the call passes NPA screening, the IDB returns either a Plain Old Telephone Service (POTS) number or a 195 Network Routing Number (NRN) to the *4ESS* switch as follows:
   - If a POTS number is returned by the IDB, the *4ESS* switch uses this number to route the call.
   - If a 195 NRN is returned by the IDB, the switch uses the 195 NRN plus the ANI to query the DSD NCP for further routing information. The DSD NCP accesses the 800-subscriber record and determines the destination for the call. The DSD NCP returns either a POTS number or an Action Point Number (APN) to the *4ESS* switch for routing.
10. The New Haven *4ESS* switch routes the call using the ASN. If the call is completed, an Automatic Message Accounting (AMA) record generated at the *4ESS* switch is used to bill the 800 subscriber for the domestic portion of the call. The calling party will be billed by the foreign PTT for the international portion of the call. An ICDR record will be generated at the ISC as in the past.
11. If there is no NCP address for the 800 number or if the NCP returns a "Missing Customer Record," "Vacant Line Number," "Vacant NXX," or "Miscellaneous Error" message, a check is made of the Inbound Service Emergency Table (ISET). If there is a match, the routing number in the ISET table is used to route the call, and the rest of the call flow does not apply.
12. If there is no match in the ISET table for this 800 number, the *4ESS* switch uses a new Foreign-Billed 800 Multiple Treatment Screening Class (MTSC)—provisioned in office data—to determine the Routing Data Block (RDB) and route the call over the existing Feature Group C (FGC) "delivery" facilities specified by the RDB to the SNET End Office (EO) (NWHNCT03G1). SNET routes the call to the proper carrier as in the past on *USADirect*® telecommunications service Other Common Carrier 800 (OCC800) calls. No record is generated by the New Haven *4ESS* switch, and the caller is billed by the foreign PTT. As in the past, an ICDR record is generated at the ISC.

3. Provisioning

Recent Change Form Affected

A. RC Form 800

3.01 The Office Data Administration (ODA) data in the following table (Table 16-A) must be populated using RC Form 800 or IN:OWBUF at the New Haven *4ESS* switch to allow this feature to work (addresses are for 4E18).

Table 16-A. ODA Data for Foreign-Billed 800 Service

Field	Address	New Data	Old Data	Value Meaning
OD4PAY800_1NX	7542024	627	0	bcd '197' = o(627) right adjusted
OD4PAY800_NXX	7542025	4531	0	bcd '959' = o(4531) right adjusted (in ANI)
OD4PAY800_XXXX	7542026	114631	0	bcd '9999' = o(114631) right adjusted (in ANI)

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 population of data in the OD4PAY800_1NX field on RC Form 800 activates this feature. Refer to "Provisioning" in this chapter.

7.02 Ubiquity of the generic release throughout the network is **not** required for the activation of this feature.

8. Input/Output Manual Pages (Not Affected)

Abbreviations and Acronyms

A

A800
Advanced 800

ACI
Action Control Interface

ACM
Address Complete Message

ACP
Action Control Point

ADR2
Alternate Destination Routing 2

AIR
AT&T ISUP Releasability

ALA
Adjunct Logical Address

AMA
Automatic Message Accounting

ANI
Automatic Number Identification

APN
Action Point Number

ASIT
Additional Special Identifying Telephone

ASN
AT&T Switched Network

ASTN
Alternate Signaling Transport Network

AT
Access Tandem

ATNS
Access Tandem Transit Network Selection

B

BBC
Broadband Count

BCD
Binary Coded Decimal

BLDS
Business Long Distance Services

C

CADCR
Centralized Alternate Destination Call Redirection

CADCS
Centralized Automated Data Collection System

CC
Country Code

CCITT7
International Telephone and Telegraph Consultative Committee 7

CCS
Common Channel Signaling

CCS-BU
Communications Service Business Unit

CCS7
Common Channel Signaling System 7

CDRP
Call Detail Record Platform

CgPN
Calling Party Number

CID
Carrier Identification

CIVO
Common Channel Signal Voice Calls and Old Announcements

CLI
Calling Line Identification

CMC
Cellular Mobile Carrier

CNI
Common Network Interface

CNRDB
Common Network Routing Database

CPDL
Call Processing Data Link

CPE
Customer Premises Equipment

CPR
Call Processing Record

CRN
Customer Record Number

D

DCDS
Data Collection and Distribution System

DDD
Direct Distance Dialing

DEV
Dedicated Egress Voice

DLN
Direct Link Node

DN
Destination Number

DN
Dialed Number

DNTT
Dialed Number Translation Table

DRSS
Digit Routing Support System

DRTC
Data Rate Transfer Capability

DS0
Digital Signal Zero

DSAS
Direct Signaling Assignment System

DSD
Direct Services Dialing

E

ENAC
Engineering Network Administration Center

ENS
Eight Hundred Number Screening

EO
End Office

ETC
End Office or Tandem Connecting

F

FAI
Foreign Administration Identifier

FATL
Functional Area Team Leader

FENPA
Far End Numbering Plan Area

FEOFC
Far End Office

FGC
Feature Group C

FNSI
Forward Network Specific Information

FSIT
Foreign Subscriber Identification Telephone Number

G

GB
Gigabyte

GRI
Generic Routing Information

GSS
Global Transaction Network Support System

GT
Global Title

GTT
Global Title Translation

H

HAS
Hand-off AT&T Switch

HNPA
Home Numbering Plan Area

HRB
Holding Register Block

I

I800
International 800

IAM
Initial Address Message

ICDR
International Call Detail Recording

IDB
INWATS DataBase

IDDD
International Direct Distance Dialing

INC
International Carrier

INTL
International

INWATS
Inward Wide Area Telephone Service

IPA
Internet Protocol Address

iPCC
Individual Per Call Control

IPRS
International Provisioning Reporting System

IRAS
Integrated Routing Assignment System

ISAIC
Improved Service Announcement and Information Collection

ISC
Incoming Signaling Characteristic

ISC
International Switching Center

ISDN
Integrated Services Digital Network

ISET
Inbound Service Emergency Table

ISIN
Inbound Services Intelligent Network

ISUP
Integrated Services Digital Network User Part

ITC
Information Transfer Capability

ITN
Integrated Test Network

IWZ1
International World Zone 1

IXC
Interexchange carrier

L

LAN
Local Area Network

LAPB
Link Access Procedure Balanced

LATA
Local Access Transport Area

LDS
Long Distance

LEC
Local Exchange Carrier

M

MAC-OSS
Machine Administration Center-Operations Support Center

MB
Megabyte

MRVR
MTP Route Verification Result

MRVT
Message Transfer Part Route Verification Testing

MSC
Measurement Subclass

MSC/OMS
Measurement Subclass/Output Measurement Set

MTP
Message Transfer Part

MTSC
Multiple Treatment Screening Class

N

NANP
North American Numbering Plan

NCP
Network Control Point

NCPAS
Network Control Point Administration System

NCPDS
Network Control Point Data Collection System

NESAC
National Electronics System Assistance Center

NI
Network Interconnect

NID
Network Identification

NPA
Numbering Plan Area

NPC
Network Point Code

NPT
Numbering Plan Type

NRA
Network Routing Automator

NRN
Network Routing Number

NSA
Network Services Automator

NSF
Network Specific Facilities

NSN
Network Switch Number

NSS
Network Support System

O

OAS
Originating AT&T Switch

OCC800
Other Common Carrier 800

OCDD
Online Call Detail Data

OCDD/RT
On-Line Call Detail Data/Real Time

ODA
Office Data Administration

ODA
Office Data Assembler

OFAI
Originating FAI

OMS
Output Measurement Set

ONPA
Originating Numbering Plan Area

OSC
Outgoing Signaling Characteristic

OSPS
Operator Services Position System

OSS
Operations Support System

P

PAS
Phased Announcement System

PBX
Private Branch Exchange

PCC
Per Call Control

PCC
Pseudo Country Code

PECC
Product Engineering Control Center

POTS
Plain Old Telephone Service

PRD
Product Release Document

PRI
Primary Rate Interface

PTG
Proprietary Translation Guide

PTT
Post Telephone and Telegraph

R

RC
Recent Change

RDB
Routing Data Block

RN
Routing Number

RTNR
Real Time Network Routing

S

SAC
Special Area Code

SADC
Special Access Data Channel

SCCP
Signaling Connection Control Part

SCS
Service Circuit System

SCU
Service Circuit Unit

SDN
Software Defined Network

SDN-SMS
Software Defined Network—Service Management System

SI
Service Identity

SIC
Service Indicator Code

SID
Subscriber Identification

SNET
Southern New England Telephone

SPGTT
Self-Provisioning Global Title Translation

SRVA
SCCP Route Verification Acknowledgment

SRVT
Signaling Connection Control Part Route Verification Testing

SS7
Signaling System 7

SSA
Small Scale Adjunct

SSC
Service Select Code

SSC
Special Service Code

SSP
Service Switching Point

SSP
SubSystem Prohibit

SSS
Service Support System

STP
Signal Transfer Point

T

TA
Telecommunications Administration

TAS
Terminating AT&T Switch

TCAP
Transaction Capabilities Application Part

TCC
Technical Control Center

TFP
Transfer Prohibit

TIRM
Technical Information Resource Management

TNS
Transit Network Selection

TOP
Task Oriented Practices

TOPAS
Testing Operations Provisioning Administration System

TOPAS-AP
TOPAS-Administration Processor

TOT
Type of Trunk

TR
Technical Requirements

TSG
Trunk Subgroup

U

UGT
Universal Global Translator

UNI
UNIdirectional

USEC
Universal Services Echo Canceler

USI
User Service Information