



AT&T 234-090-203AC

Issue 1

July 1995

# **4ESS™ SWITCH**

Product Release Document  
4E20 Release 3 Generic

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## About This Document

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### 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 4E20 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 4E20 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, Technology Control

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

## **4. How to Use This Document**

**4.01** The 4E20 Release 3 Generic contains 19 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: *Operator Routing for Advanced Intelligent Network (AIN) Calls Feature (421)*

This Local Exchange Carrier (LEC)-only feature provides the 4ESS switch with the capability to support AIN operator-requested calls received on Integrated Services Digital Network User Part (ISUP) and Equal Access Multifrequency (EAMF) interfaces and routed over ISUP and EAMF interfaces.

Chapter 2: *Centralized Automatic Message Accounting (CAMA) for the Local Exchange Carrier (LEC) Feature (422)*

This feature, which was introduced in the 4E20 Release 2 Generic, provides indicators for Centralized Automatic Message Accounting to replace lamps that were eliminated when the Master Control Console (MCC) panel was replaced with the introduction of the 1B Processor.

Chapter 3: *Carrier Specific Routing for International Switched Transit Service Feature (3819)*

This feature allows the 4ESS switch International Switching Center (ISC) or a gateway switch to route incoming International Switched Transit Service (ISTS) calls to terminating carriers using Carrier Specific Routing (CSR). With CSR, the originating carrier designates the terminating carrier in the country to handle the call. ISTS is an existing service that allows calls that originate in one foreign country to terminate in another foreign country based on the routing treatment.

Chapter 4: *Automatic Speech Recognition on the Service Circuit System Feature (4183)*

This feature provides the hardware platform on which the Automatic Speech Recognition (ASR) on the Service Circuit System (SCS)

capability is based. The new hardware consists of two Custom Data Service Cabinet (CDSC) interface circuit packs that are installed in the Service Circuit Unit (SCU), and a separate CDSC containing the ASR equipment. The CDSC holds up to 5 Custom Data Service Units (CDSUs) (each containing 24 ASR channels).

**Chapter 5: *AT&T Circuit-Switched Architecture Revision Feature (4323)***

This feature makes the following changes to the network architecture that handles data calls:

- A Network Control Point (NCP) is queried for every data call allowing more control over unbillable calls
- Databases that handle data calls are moved from 1NCPs to a 2NCP
- All direct-connect trunks, as well a dedicated trunks from LEC switches, are changed from Domain 82 to the Software Defined Network Access (SDNA) domain.

**Chapter 6: *Recent Change Administration System (RCAS)—Phase 2 Feature (4366)***

This feature was deferred from 4E20 Release 2 and is being reissued in the 4E20 Release 3 PRD with changes. Remove Feature 4366 documentation from the 4E20 Release 2 PRD.

RCAS is a generic capability used to update administrative data in the 4ESS switch. The initial release of Phase 2 is used only for the 1B Processor-based Positive Call Processing Automatic Number Identification (ANI) Recent Change (RC) update capabilities. Full ANI RC is supported for generic retrofits and day-to-day data structure updates.

**Chapter 7: *ABC ANI Trigger Table Feature Processing Data Expansion Feature (4372)***

When the Adjunct Based Capabilities (ABC) Automatic Number Identification (ANI) trigger table was restructured in the 4E20 Release 1 Generic, seven spare bits were made available for identifying features. The capability did not exist, however, to provision these spare bits. This feature provides the Recent Change/Verify interface that allows these spare bits to be provisioned as feature indicators.

**Chapter 8: *Integrated Services Digital Network (ISDN) Operational Improvements Feature (4376)***

This feature provides improvements to the ISDN Primary Rate Interface (PRI) that affect call completion. The improvements should

result in improved reliability and reduced trouble-resolution expense for customer interfaces and services provided by network adjuncts.

Chapter 9: *MEGACOM® 800 Service Interexchange Carrier with ANI Phase III Feature (4506/4753)*

This feature enhances the billing for the *MEGACOM 800 Service* features. With this feature, AT&T's billing of Interexchange Carriers (IXCs) is based on when the IXC accesses the AT&T Switched Network (ASN) rather than when the called party answers the call. The enhanced billing matches the billing of the IXCs with their actual usage of the ASN.

Chapter 10: *Clearback Suppression on International Circuits to Brazil—Phase 2 Feature (4507)*

This feature solves problems with certain calls from analog Private Branch Exchanges (PBXs) in the United States to certain customers in Brazil. Before this feature, the calls involved were disconnected as a result of a discrepancy between Bellcore standards and the standards that apply in some other countries.

Chapter 11: *SS7 Access to Nodal Services for Reseller Carriers Feature (4591)*

This feature allows the AT&T Switched Network to provide Signaling System 7 (SS7) ISUP access to nodal or direct-connect services for Reseller Carriers. A new Reseller Carrier Connect (RCC) trunk type was added to support the interface to switches external to the network using the Network Interconnect (NI) version of SS7 signaling.

Chapter 12: *Continuity OK Test (COT) on ISUP Circuits for Final Handling Code 1877 Feature (4603)*

This feature provides a method to prevent international calls from continuously failing on an outgoing International Telephone and Telegraph Consultative Committee 7 (CCITT7) ISUP circuit when that circuit is unable to carry calls due to a Carrier Group failure.

Chapter 13: *Call Detail Recording Data Tracer Count Modification Feature (4632)*

This feature introduces a new method of calculating Call Detail Recording (CDR) peg counts to prevent the lost of CDR events between the AT&T 1B Processor and the 3B Attached Processor System (APS) from being erroneously reported. The CDR peg counts are used to populate CDR Data Tracer Records which the National Automatic Message Accounting (AMA) Control Center uses to monitor the flow of CDR data from the 4ESS switch to the CDR Platform.

Chapter 14: *Global Software Defined Data Network (GSDDN) Service Feature (4642)*

The GSDDN feature provides international "on-net" to "on-net" switched data service to Global Software Defined Network (GSDN) customers. Having on-net service makes special features such as call screening and a private numbering plan available. Another advantage of on-net service is lower rates than public service rates.

Chapter 15: *Software Defined Network (SDN)—ASTN/SGTT Interworking Feature (4655)*

Currently, during an Alternate Signaling Transport Network (ASTN) condition, if a "helper" switch queries the Universal Global Translator (UGT) NCP or a No. 2 Direct Services ANI-based (2DSA) NCP and the query fails, no error messages are returned to the "victim" switch. Also, there is no attempt made to query the mate UGT NCP or 2DSA NCP. Since no results of the query are returned to the victim switch, the call eventually fails due to time-out and no attempt is made by the victim switch to query the mate NCPs.

When this feature is turned on in the victim switch, the victim switch will wait 4 seconds for a response, and if no response is received, the victim switch will send another request for a query of the mate UGT NCP or 2DSA NCP. The mate UGT NCP or 2DSA NCP may have the information needed to complete the call.

Chapter 16: *Calling Party Number (CPN) Delivery Feature (4659)*

This feature allows AT&T to comply with the Federal Communications Commission (FCC) rules and policies regarding Calling Party Number (CPN) Identification Service (Caller ID) by enforcing the CPN privacy delivery rules at a terminating PRI.

Chapter 17: *Individual Per Call Control Gateway Maintenance Enhancements Feature (4677/4677a)*

The Individual Per Call Control (iPCC) Gateway Maintenance Enhancements feature provides the 4ESS switch the means to improve maintenance of the iPCC Gateway. These enhancements include generating major alarms to the Maintenance/Service Circuit Controller (MTC/SCC) channels and displaying a list of the affected files.

Chapter 18: *Automatic Call Distributor in the Network—Phase 2 Feature (4692)*

Automatic Call Distribution (ACD) in the Network (ACDN) provides telephone customers with automatic call distribution and Management Information Systems functionality with first-in-first-out call distribution queuing. Referred to as Central-Office (CO)-Based

ACDN, this feature allows customers to use PBXs to route calls. A new ACD trunk type has been added to the 4ESS switch to allow the switch to process Billing Update messages.

Chapter 19: *Positive Call Processing (PCP) for Cellular Mobile Carrier (CMC) Service Type Feature (4744)*

This feature allows Cellular Mobile Carrier (CMC) calls to receive Positive Call Processing (PCP) treatment.

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

## **5. Product Safety Labels**

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

## **6. How to Comment on This Document**

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**6.01** AT&T welcomes your comments on this document. Your comments will aid us in improving the quality and usefulness of AT&T documentation. Please use the Feedback Form provided in the front of this document [mail in or fax (1-910-727-3043)] or call the AT&T Documentation Comment Hot-Line Service (1-800-334-0404) to make your comments.

## **7. How to Order Documentation**

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

AT&T Customer Information Center  
Attention: Order Entry Department  
2855 N. Franklin Road  
P. O. Box 19901  
Indianapolis, Indiana 46219-1999

**⇒ NOTE:**

When ordering documentation from the AT&T Customer Information Center, each AT&T Business Unit/Division must be identified and all required billing information must be provided.

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

Within the United States: 1-800-432-6600

From Canada: 1-800-255-1242

Worldwide: Toll 317 322-6577

FAX: 317 322-6484

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

**7.04** Federal Government orders must be processed through CIC.

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# Operator Routing for Advanced Intelligent Network (AIN) Calls Feature (421)

# 1

---

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# Operator Routing for Advanced Intelligent Network (AIN) Calls Feature (421)

# 1

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## 1. Feature Description

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- 1.01** Feature 421 is a Local Exchange Carrier (LEC)-only feature. It is an extension of the Advanced Intelligent Network (AIN) Dialed Number Triggers feature (375), which was introduced for LEC-only applications in the 4E18/19 Release 2 Generic.
- 1.02** Feature 421 is necessary to provide AIN treatment for operator-requested type calls. It provides the 4ESS™ switch with the capability to support AIN operator-requested calls received on Integrated Services Digital Network User Part (ISUP) and Equal Access Multifrequency (EAMF) interfaces and routed over ISUP and EAMF interfaces. AIN operator-requested calls routed over other types of trunks will not be treated as operator-requested calls.
- 1.03** For AIN EAMF 0+ calls, the 4ESS switch Service Switching Point (SSP) detects that the call requires AIN treatment [Analyze Called Party Number (ACPN) from the 0ZZ-XXX[X]]. The SSP deletes the 0 (zero) from the called party number and sets the operator indicator in the message to the database during the third stage of digit collection. The SSP translation results in a Dialed Number Trigger (DNT), and an Info Analyzed query is sent to the Service Control Point (SCP).
- 1.04** The capability of accepting an operator Nature of Number (NON) from the SCP is provided by this feature. When the 4ESS switch receives an operator NON from the SCP, the switch will use the indicator to determine routing and will prefix a leading 0 for EAMF outpulsing.

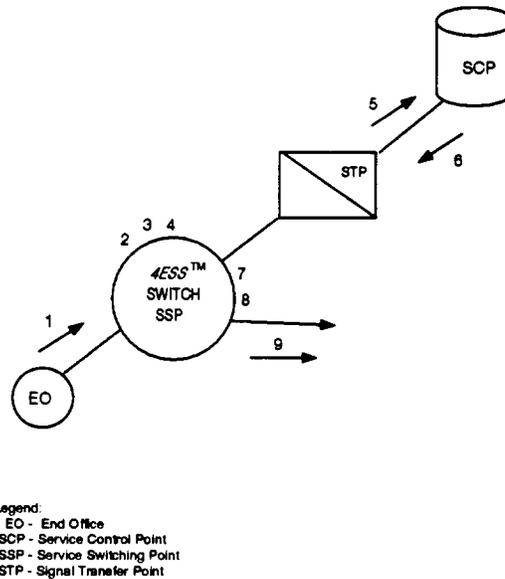
- 1.05** Signaling System 7 (SS7)-ISUP calls require this feature to handle the operator NON indicator sent from the SCP in the Analyze Route message.
- 1.06** AIN SCP responses with a carrier parameter cause the carrier to be translated in the Number Services Routing (NSR) domain. AIN operator calls may be routed differently than non-operator calls as a function of this domain. Refer to the *4ESS™ Switch Translation Guide (TG-4)* for specific information on operator routing in the NSR domain.
- 1.07** The following AIN SCP responses will receive final handling treatment:
- SCP responses with operator nature, with or without a carrier parameter
  - SCP responses with operator nature and with a carrier parameter that indicates Route to POTS.
- 1.08** LECs will have to provision for the new operator routing capability provided by this feature prior to having the SCP return dialed numbers with an Operator Requested indication. Provisioning of the 4ESS switch may also be required, depending on how the calls will be routed.
- 1.09** Currently, the first 4 digits in the NSR domain are the carrier ID of the destination. If special routing is not required for operator calls (that is, for operator or non-operator calls that route to the same destination), 4-digit routing is adequate and no additional provisioning is required. However, if a different destination for operator calls is desired (new routing for the AIN operator calls in the NSR domain), special provisioning is required. Specific details for provisioning the new routing is included in the Recent Change Form 301 (NSR) Codegrouping section of the TG-4.

## **2. Call Flow**

---

- 2.01** The following example describes the call flow for an AIN operator-requested call. Refer to Figure 1-1.
1. An AIN operator-requested call arrives from an End Office (EO). The 4ESS switch SSP message processing recognizes the call as an AIN call by translating the following indicators:
    - SS7-ISUP—Transit Network Selection (TNS) and TNS circuit code
    - EAMF—OZZ and XXX[X].
  2. The translation will indicate the ACPN, and the call progresses to dialed number analyses.

3. The AIN call is recognized as an operator-requested call as follows:
  - SS7-ISUP—The Nature of Address parameter contains an operator value
  - EAMF—The third stage of signaling (dialed number) contains 0+7 digits or 0+10 digits. The 0 prefix is deleted from the dialed number.
4. An AIN operator-requested indicator is set. Translation of the dialed number results in a DNT.
5. An Info Analyzed query is sent to the SCP with the Called Party ID parameter containing the dialed number and the NON containing the value of "operator requested."
6. The SCP returns an Analyze Route response with the Primary Carrier ID parameter containing the ID of the Interexchange Carrier (IXC), the Called Party ID parameter containing the dialed number, the NON containing the value of "operator requested," and, optionally, the billing information.
7. The SSP may generate an AIN billing record at this point.
8. The SSP translates the ID of the IXC in the NSR domain. The translations in the NSR domain can be set up to route operator-requested calls differently from other AIN calls.
9. The SSP routes the call as determined by translations. When EAMF signaling is used to route the call to the IXC, a 0 is prefixed to the dialed number in the second stage of digits (0+NPA+7D).



---

Figure 1-1. Call Flow Example of an AIN Operator-Requested Call

### 3. Provisioning

3.01 LECs will have to provision for the new operator routing capability provided by this feature prior to having the SCP return dialed numbers with an Operator Requested indication.

3.02 Provisioning specific to Feature 421 is not required. However, if specialized routing based on operator indication is desired, provisioning may be required, as described in the "Feature Description" section of this chapter.

### 4. Recording (Not Affected)

### 5. Network Management (Not Affected)

## **6. Maintenance/Troubleshooting (Not Affected)**

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## **7. Transition Considerations**

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### **Turn On/Turn Off Mechanism**

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- 7.01** Secured Feature 375 must be activated prior to the activation of this feature. Provisioning information for Feature 375 is included in AT&T 234-090-019, *4ESS™ Switch, Advanced Intelligent Network (AIN) 4E18/19 Software Release User's Guide*, which is available when Feature 375 is purchased. Contact your AT&T Account Executive for additional information.
- 7.02** The AIN SCP must be provisioned to include information on which 4ESS switches have the capability to route operator-based calls.
- 7.03** LECs will have to provision for the new operator routing capability provided by this feature prior to having the SCP return dialed numbers with an Operator Requested indication.

## **8. Input/Output Manual Pages (Not Affected)**

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# Centralized Automatic Message Accounting (CAMA) for the Local Exchange Carrier (LEC) Feature (422)



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# Centralized Automatic Message Accounting (CAMA) for the Local Exchange Carrier (LEC) Feature (422)



---

## 1. Feature Description

---

**1.01** When the 1B Processor replaced the 1A Processor in the 4E19 generic, the Master Control Console (MCC) panel was replaced by a video display terminal (VDT) and keyboard. The new MCC displays the various processor and switch attributes in color with text on the VDT instead of turning indicator lamps on and off on the panel.

**1.02** On the old MCC, a lamp indicating Operator Number Identification (ONI) Centralized Automatic Message Accounting (CAMA) suspended "ONI CAMA SUSPENDED" would turn on when the CAMA operator was unavailable. Another lamp, indicating "SPECIAL CAMA RECORD" would turn on when calls to information operators from CAMA trunks were being recorded for Automatic Message Accounting (AMA).

**1.03** In the design of the new MCC, many changes were made to individual keys and indicators. Some were added, some were changed, and some were removed. Two of the visual indicators removed were the lamps indicating the "ONI CAMA SUSPENDED" and "SPECIAL CAMA RECORD" functions.

**1.04** Since the LECs still use CAMA and need indicators for these functions to inform them that a change of state has occurred, the current feature introduced the following changes:

- ONI CAMA SUSPENDED—Instead of being warned by an indicator lamp on the MCC when the operator is not available, the user will be informed by the activation of a minor alarm and the printing of a message on the TTY terminal every 15 minutes until the condition is cleared.

Note that the interval between the first and second message may be less than 15 minutes.

- **SPECIAL CAMA RECORD**—Instead of a lamp turning on when AMA recording is taking place and turning off when it is finished, and using ALW:INFCRCD and INH:INFCRCD messages to activate or deactivate AMA recording of calls, the new feature allows the use of the existing Directory Assistance (DA) field on Recent Change (RC) Form 617 to enable or disable AMA recording of calls from CAMA trunks to information operators. There is no indicator to show whether or not AMA recording is occurring.

## **2. Call Flow (Not Affected)**

---

## **3. Provisioning**

---

### **RC Form Affected**

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#### **RC Form 617**

**3.01** The SPECIAL CAMA RECORD portion of this feature is controlled by populating the DA field on RC Form 617 to enable or disable AMA recording of calls from CAMA trunks to information operators. An "R" is entered if AMA records must be made on these calls. An "N" is entered to disable AMA recording for these calls.

## **4. Recording**

---

**4.01** This feature always sets the call code to 9 for 411 CAMA calls and 33 for NPA-555-1212 CAMA calls. For other CAMA calls, the call code is set to 0 (Zero) to indicate no recording.

## **5. Network Management (Not Affected)**

---

## **6. Maintenance/Troubleshooting (Not Affected)**

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## **7. Transition Considerations**

### **Turn On/Turn Off Mechanism**

**7.01** This feature is turned on automatically by software deployment. However, the SPECIAL CAMA RECORD portion is provisioned using RC Form 617. Please refer to "Provisioning" in this chapter.

## **8. Input/Output Manual Pages**

**8.01** Four Input/Output messages have been deleted with the introduction of this feature. They are the following:

- IM ALW:INFCRCD
- OM ALW:INFCRCD
- IM INH:INFCRCD
- OM INH:INFCRCD

# Carrier Specific Routing for International Switched Transit Service Feature (3819)

# 3

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# Carrier Specific Routing for International Switched Transit Service Feature (3819)

# 3

---

## 1. Feature Description

**1.01** This feature provides the capability for the AT&T 4ESS™ switch International Switching Center (ISC) or a gateway switch to route incoming International Switched Transit Service (ISTS) calls to terminating carriers. ISTS is an existing service that allows calls that originate in one foreign country to terminate in another foreign country. ISTS calls are routed through the AT&T Switched Network (ASN). Routing is based on the routing treatment specified by the originating carrier. This routing is referred to as Carrier Specific Routing (CSR). The originating carrier may designate a maximum of seven terminating carriers in a country. A single terminating carrier or a preferred carrier, with overflow to other carriers, may be designated.

**1.02** Basically, CSR for ISTS provides the originating carrier with three options in specifying the routing treatment for calls destined for a terminating country. These options are as follows:

- Option one allows the originating carrier to designate a terminating carrier to receive all calls. Calls that cannot be routed to the designated carrier are final handled.
- Option two allows the originating carrier to assign an order of preference to each of the designated terminating carriers. Routing attempts start with the most preferred carrier. If all of the routes to that carrier are exhausted, routing attempts are moved to the next preferred carrier. These routing attempts continue until the call is either routed successfully or final handled.

- Option three allows the originating carrier to allocate the calls among the designated terminating carriers. Each terminating carrier is assigned a percentage of calls as well as an overflow indicator that directs the calls to the next carrier if all the routes to the designated carrier are exhausted. The percentage of calls range from 1 to 100, and the total for all carriers must be 100 percent.

## **2. Call Flow (Not Affected)**

---

## **3. Provisioning**

---

### **Structures Affected**

---

**3.01** The following structures are affected by this feature:

- HT4TSG
- OD4MCT\_OTCP
- OD4OCTCPNETRY
- HT4OCTCPOFAI

#### **A. HT4TSG**

**3.02** The Far-End Office (XL4TS\_FEOFC) item was originally defined in Generic 4E12 for the Bell Service Switching Point Feature. This item is currently not being populated in AT&T offices. In 4E20 Release 3 Generic, however, the XL4TS\_FEOFC item is used to store the far-end NXX for AT&T offices when required for use with this feature. Data item XL4TS\_FEOFC is used when the Type of Trunk (TOT) is International (INTL) or International World Zone 1 (IWZ1). The FEOFC field should be set to "0" if the Far-End Numbering Plan Area (FENPA) field is populated with a Country Code (CC).

#### **B. OD4MCT\_OTCP**

**3.03** This structure was defined in 4E18 Release 3 Generic to store the Originating Carrier and Terminating Country Pair (OCTCP) to Multiple Carrier Treatment (MCT) assignment. This structure contains a maximum of 255 4-word entries which are packed in binary-sorted order based on the key that is stored in words 0-2. (As part of Feature 3819, the Multiple Carrier Treatment Index (MCTI) was increased from 1-127 to 1-255 in 4E20 Release 1 Generic.) The number of assigned entries for the OD4MCT\_OTCP is stored in the new 1-word structure OD4OCTCPNETRY. All items in the translator are populated using the new Recent Change (RC) Form 662.

**3.04** The first three words of the OD4MCT\_OTCP structure's layout (the sorting/search keys) have been rearranged to improve the efficiency of the binary search. The 1B Processor treats a number with its most significant bit set as a negative number. In processing calls, the most significant bit 0 works more efficiently as binary search keys.

**3.05** Data item OD4OTCPTNXX that was a part of this structure has been deleted for this generic.

### C. OD4OCTCPNETRY

**3.06** This 1-word structure is defined in protected, simplex, disked-backed, Office Data Assembler (ODA) populated and allocated Call Store memory. This structure is used to store the number of assigned entries in the OD4MCT\_OTCP translator. RC Form 662 is used to update this word when an entry is added or removed from the translator. The addresses for this structure are as follows:

- Core Address = 6726231
- Disk Address = 437631

### D. HT4OCTCPOFAI

**3.07** This new 2-level structure is defined in protected, simplex, disked-backed, ODA-populated and allocated Call Store memory. This structure is used to store the Overflow Foreign Administration Identity (OFAI) list for an OCTCP entry.

**3.08** A new constant has been added to this structure. Data item 4XLFAISIZE, which is assigned a value of "2," is used to define the size of a single Foreign Administration Identity (FAI) entry that is included in the OFAI entry. The maximum size for this new structure is 16. RC Form 662 is used to update this new structure when an entry is added or removed from the translator. The addresses for this structure are as follows:

- Core Address = 6726225
- Disk Address = 437625

**RC/Verify Forms Affected**

**A. RC Form 662**

**3.09** A new RC Form 662 is used to populate the OCTCP to FAI assignment table (OD4MCT\_OTCP). This form is used to add, change, and delete OCTCP to MCT assignments. A sample RC Form 662 is shown in Figure 3-1. Table 3-A provides a list of the fields on RC Form 662 and their descriptions.

```

# FORM 662  CHANGE ORIGINATING CARRIER AND TERMINATING CARRIER COUNTRY PAIR
              TO MULTIPLE CARRIER TREATMENT ASSIGNMENT
4E20 Release 3>

RC:OCTCP;CHG;____:

ORNU _____, ACTION __,

OTYP _____, ONPACC _____, ONXX _____, ORGIFAI _____,
TTYP _____, TNPACC _____, TNXX _____, SII _____,

TCSR _____, TEI __,

FAI          PERCENT          OVERFLOW FAI
-/-          -/-            -/- -/- -/- -/- -/-
-/-          -/-            -/- -/- -/- -/- -/-
-/-          -/-            -/- -/- -/- -/- -/-
-/-          -/-            -/- -/- -/- -/- -/-
-/-          -/-            -/- -/- -/- -/- -/-
-/-          -/-            -/- -/- -/- -/- -/-
-/-          -/-            -/- -/- -/- -/- -/-
-/-          -/-            -/- -/- -/- -/- -/-

REMARKS _____
    
```

**Figure 3-1. RC Form 662**

Table 3-A. RC Form 662 Fields and Descriptions

RC/V Field	Description
ACTION	Specifies the specific function to be performed: A = Add C = Change D = Delete
FAI	Foreign Administration Identity—Valid entries are blank or 1-7.
OFAI	Overflow Foreign Administration Identity—Valid entries are blank or 1-7.
ORIGFAI	Originating Foreign Administration Identity—Valid entries are 1-7.
ONPACC	Originating Numbering Plan Area (NPA) or Country Code (CC)—Valid entries are 2-999.
ONXX	Originating NXX—Valid entries are blank or 000-999.
OTYP	Originating Type—Valid entries are NPA or CC.
SII	Service Identity Index—Valid entries are 1-255.
TCSR	Treatment of Carrier Specific Routing indicator setting—Valid entries are NONE (not required), PREF (preferred), and MAND (mandatory).
TEI	Table Entry Index—Valid entries are 0-255.
PERCENT	Percentage of traffic using a particular treatment as the first choice—Valid entries are blank or 1.0-100.0.
TNPACC	Terminating NPA or Terminating CC—Valid entries are 2-299.
TNXX	Terminating NXX—Valid entries are blank or 000-999.
TTYP	Terminating Type—Valid entries are NPA or CC.

## B. Population Rules

- 3.10** If RC Form 662 is entered, OD4OPTCISTS must be set to 4ODOPT\_YES. The following population rules apply:
- If ACTION field is "A" or "C," at least one FAI must be entered.
  - OFAIs must be unique for each FAI. If the FAI is "1," the OFAI cannot be "1."
  - All Table Entry Indexes (TEIs) in OD4MCT\_OTCP must be unique except when the Terminating Type (TTYP) field is "NPA," the Terminating NPA or Terminating CC (TNPACC) field is non-blank, and the Terminating NXX (TNXX) field is non-blank. When the TEI is not unique, the following rules apply:
    - The existing entry with the same TEI must have all of its items identical to the input entry except for the TNXX.
    - The input TNXX and the TNXX of the other entry with the same TEI cannot be binary zero.
  - If the ACTION field is "C," the following steps apply:
    - When the TEI is being changed to a non-unique TEI, all appropriate checks should be followed.
    - When the TEI is not being changed and the input TEI is not unique, RC Form 662 may fail because the FAI, PERCENT, or OFAI field cannot change.
  - When the Treatment of Carrier Specific Routing (TCSR) field is "MAND" for mandatory, only one FAI can be entered. No OFAIs can be entered.
  - When the TCSR field is "PREF" for preferred, only one FAI can be entered. Zero to six OFAIs can be entered.
  - When the TCSR field is "MAND" or "PREF," the PERCENT field must be 100.0 for the FAI that is entered.
  - If the TCSR field is "NONE" for not required, the PERCENT field must be entered for each FAI, and the totals of the PERCENT column must be 100.0. If FAI is blank, the entire line must be left blank.
  - If the TCSR field is "NONE," zero to six OFAIs may be entered for each FAI that is entered. For every OFAI specified, its corresponding FAI must also be entered. For example, an OFAI of "7" cannot be added as an overflow FAI unless an FAI of "7" has also been added for the OCTCP.
  - If the ACTION field is "D," the FAI, TCSR, TEI, PERCENT, and OFAI fields must be blank.

- If the ACTION field is "A," the OCTCP must not already exist. That is, there must not be a matching entry in the following fields:
  - Originating Type (OTYP)
  - Originating Numbering Plan Area or CC (ONPACC)
  - Originating NXX (ONXX)
  - Originating Foreign Administration Identity (ORIGFAI)
  - Terminating Type (TTYP)
  - Terminating Numbering Plan Area or CC (TNPACC)
  - Terminating NXX (TNXX).
  
- If the ACTION field is "C" or "D," the OCTCP must already exist. That is, there must be a matching entry in the OTYP, ONPACC, ONXX, ORIGFAI, TTYP, TNPACC, and TNXX fields. See Table 3-B for additional population rules.

**Table 3-B. RC Form 662 Additional Population Rules**

If...	Then...
ONPACC is 809	ONXX cannot be blank.
ONXX is entered	ONPACC must be 809.
ONXX is entered	OTYP must be NPA.
TNPACC is 809	TNXX cannot be blank.
TNXX is entered	TNPACC must be 809.
TNXX is entered	TTYP must be NPA.

### C. Verify Form 6bf

- 3.11** A new Verify Form 6bf is used to output the OCTCP to FAI assignment for the CSR ISTS. Any OFAI fields must be output as a blank when their corresponding item is binary zero. A sample Verify Form 6bf is shown in Figure 3-2.

```

INPUT:                VERIFY 16ba

VER:VFUNC OCTCP|EOT

OUTPUT:               VERIFY 6bf

VER:MISC;OPT(OCTCP):

OTYP ---, ONPACC ---, ONXX ---, ORGIFAI -,
TTYP ---, TNPACC ---, TNXX ---, SII ---,

TCSR _____, TEI __,

FAI      PERCENT      OVERFLOW FAI
-,       -.-.-.-,     -, -, -, -, -, -,
-,       -.-.-.-,     -, -, -, -, -, -,
-,       -.-.-.-,     -, -, -, -, -, -,
-,       -.-.-.-,     -, -, -, -, -, -,
-,       -.-.-.-,     -, -, -, -, -, -,
-,       -.-.-.-,     -, -, -, -, -, -,
-,       -.-.-.-,     -, -, -, -, -, -
    
```

Figure 3-2. Verify Form 6bf

## 4. Recording

4.01 For ISTS calls, International Call Detail Recording (ICDR) is impacted by this feature. The 4ESS switch records the FAI of the first terminating carrier that is chosen to route the international call. This information is recorded in the Initial FAI (IFAI) field in the ICDR record. The FAI of the terminating carrier where the call was completed is recorded in the Actual FAI (AFAI) field. The AFAI field is also used to record the FAI of the last attempted terminating carrier if the call is final handled. If a call is final handled, the Final Handling Code (FHC) in the ICDR record is populated. The originating ASN ISC or gateway switch provides the IFAI and AFAI data to the Call Detail Recording Platform (CDRP) where the ICDR is generated. The IFAI and AFAI fields can have the same FAI value (0-7). The default value is zero which should be recorded when the CSR-ISTS feature is not used.

## **5. Network Management**

### **Network Management Operations Support System**

**5.01** Two existing Network Management Operations Support System (NEMOS) 5-minute data messages (Message Type 5—MCT Traffic Data and Message Type 112—CSR ISTS Traffic Data) have been modified to support the CSR for ISTS feature. Also, two existing demand data messages (Message Type 49—Call Data and Message Type 53—CSR ISTS Demand Data) have been modified to support this feature.

**5.02** In Message Type 5 for MCT traffic data, the MCTI field has grown from 7 bits to 8 bits. For 4E20 Release 3 Generic, the maximum entries allowed in this message have increased from 889 to 1785 entries.

**5.03** The format of Message Type 112 was modified to give NEMOS a more detailed record of CSR ISTS traffic counts. The new format, which has grown from three words (Words 0-2) to six words (Words 0-5), includes the following counts for the original terminating FAI:

- TEI
- Foreign Administration IDs (maximum 7) for the carrier
- Primary carrier attempt
- Primary carrier overflow
- Final handling
- Attempt counts for each of the overflow carriers (1-7) associated with the original FAI.

**5.04** Message Type 49 is a demand data request to check the translation of a code. However, the number of Telco Binary Coded Digits (BCDs) 1-15 along with the domain and screening must be specified in the data request. Word 3 in this message was modified to delete the following fields from digit translation:

- O—Originating Number Type
- ONPA—Originating Carrier's NPA or Country Code
- ONXX—Originating Carrier's NXX when the ONPA is "809" and the Originating Number Type is "1" to indicate the NPA in the ONPA.

**5.05** A special demand data Message Type 53 is used for ISTS MCT routing translation. This message provides NEMOS with the routing data from the OD4MCT\_OTCP and HT4OCTCPOFAI tables. The format of this message has been replaced with a new 17-word (Words 0-16) format.

## **6. Maintenance/Troubleshooting**

### **Measurement**

- 6.01** The originating 4ESS switch ISC or gateway switch provides a peg count of the overflow attempts for each FAI that is specified in the MCT table's overflow field. Six peg counts are reported per FAI entry. These peg counts are associated with the TEI value which is assigned to the OCTCP that generates these calls. The 4ESS switch must make these peg counts available on an hourly basis.
- 6.02** The originating 4ESS switch ISC or gateway switch also provides a new final-handled peg count per FAI entry. This final-handled count, which is associated with the original FAI, is incremented when either of the following two situations occur:
- No trunk is available to handle the call, or the carrier skip control is triggered on the FAI and the OFAI field on RC Form 662 is not populated.
  - The last overflow FAI has no trunk available to handle the call, or the carrier skip control is triggered on the FAI.
- 6.03** The final-handled peg count is associated with the TEI value which is assigned to the OCTCP that generates these calls.

### **Final Handling Code (FHC) 1010**

- 6.04** A new FHC 1010 (4FHXL\_WXHAUST\_OCTCP\_OVFL\_CARRIER) has been created for use with this feature. FHC 1010 indicates that all the carriers in the OCTCP table have been exhausted. When there are no routes to the primary or overflow FAIs available to handle the call, the 4ESS switch will terminate the call.

## **7. Transition Considerations**

### **Ubiquity**

- 7.01** This feature is required in gateway switches and ISCs only. However, full deployment of 4E20 Release 3 Generic throughout the AT&T 4ESS switch network is not required for the operation of this feature.

### Turn On/Turn Off Mechanism

**7.02** This feature is turned on automatically by software deployment. The incoming trunk subgroup has to populate the FAI value on RC Form 662. Also, RC Form 662 has to be invoked to use this feature.

## 8. Input/Output Manual Pages

**8.01** To support this feature, two Input/Output (I/O) manual pages have been updated to reflect one new Input message and one new Output message. Input message **VER:VFUNC** was added to request specific information based on the verify function keyword input. The valid entry is "OCTCP" which is used to verify the OCTCP to MCT assignment. This message has a variable field that is used to specify the type, format, and characteristics of the output message that needs to be verified.

**8.02** Output message **VER:MISC;OPT** displays the CSR treatments for ISTS to FAI assignments.



ID ..... VER:MISC-OCTCP  
WORK CENTER.. MAC, MOC  
GENERIC ..... 4E20 Rel. 3 and later  
APPLICATION .. 4E  
TYPE ..... Output

1. FORMAT

VER:MISC;OPT(OCTCP)

OTYP a, ONPACC b, ONXX [ccc,] ORIGFAI d,  
TTYP e, TNPACC f, TNXX [ggg,] SII h,

TCSR i, TEI j,

FAI	PERCENT	OVERFLOW	FAI
k,	l.l,	[m,]	[m,] [m,] [m,] [m,] [m,]
.	.	.	.
.	.	.	.
.	.	.	.

2. REASON FOR OUTPUT

3. VARIABLE FIELD DEFINITIONS

- a Originating type:
  - CC — Country code (CC).
  - NPA — Numbering plan area (NPA).
- b Originating NPA or CC number (2 - 999).
- c Originating exchange number (NXX) (000 - 999).
- d Originating foreign administration identity number (1 - 7).
- e Terminating type:
  - CC — Country code (CC).
  - NPA — Numbering plan area (NPA).
- f Terminating NPA or CC number (2 - 999).
- g Terminating exchange number (NXX) (000 - 999).
- h Service identity number (1 - 255).

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i	Treatment of carrier specific routing: MAND — Mandatory routing. NONE — No routing specified. PREF — Preferred routing.
j	Table entry index number (0 - 255).
k	Foreign administration identity number (1 - 7).
l	Percentage (0.0 - 100.0).
m	Overflow foreign administration identity number (1 - 7).

#### 4. ACTION TO BE TAKEN

None.

#### 5. REFERENCES

PIDENTs  
IOCPIMC4  
IOCPMCP4  
IOCPPVR4  
VRFYCNTL  
VRFYINPT  
VRFYMISC  
VRFYOUT

Input Message  
VER:VFUNC

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# Automatic Speech Recognition on the Service Circuit System Feature (4183)

# 4

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# Automatic Speech Recognition on the Service Circuit System Feature (4183)

# 4

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## 1. Feature Description

**1.01** This feature provides the hardware platform on which the Automatic Speech Recognition (ASR) on the Service Circuit System (SCS) capability is based. The new hardware consists of two Custom Data Service Cabinet (CDSC) interface circuit packs that are installed in the Service Circuit Unit (SCU), and a separate CDSC containing the ASR equipment. The CDSC holds up to 5 Custom Data Service Units (CDSUs) (each containing 24 ASR channels).

**1.02** The Service Circuit Controller (SCC) (illustrated in Figure 4-1) serves as an interface (translator) between the 4ESS™ switch and the SCU. Additionally, the SCC provides error detection and fault recovery capabilities for the SCU. The SCU plays the announcements, prompts the caller for the required digits, and collects the digits. The CDSU contained in the CDSC provides the speech recognition capability for the SCS.

**1.03** The first application feature being offered using the ASR SCS platform is Feature 4557 (ASR for Software Defined Network—Network Remote Access). Feature 4557 will be part of the 4E21 Release 1 Generic.

## Physical Description

**1.04** The equipment cabinets used for each SCS are 6 feet high, 2 feet 6 inches wide, and 24 inches deep. The equipment cabinets are shielded with hinged double doors. Each cabinet contains *FASTECH*® circuit packs and backplanes. Most power units are mounted in the same unit in which they are used and are adjacent to the circuit

pack group served. Each circuit pack and power unit is labeled on designation strips to indicate its identity and boundaries. A 1-foot tall, 30-inch wide, and 24-inch deep cable cabinet is mounted on top of each cabinet.

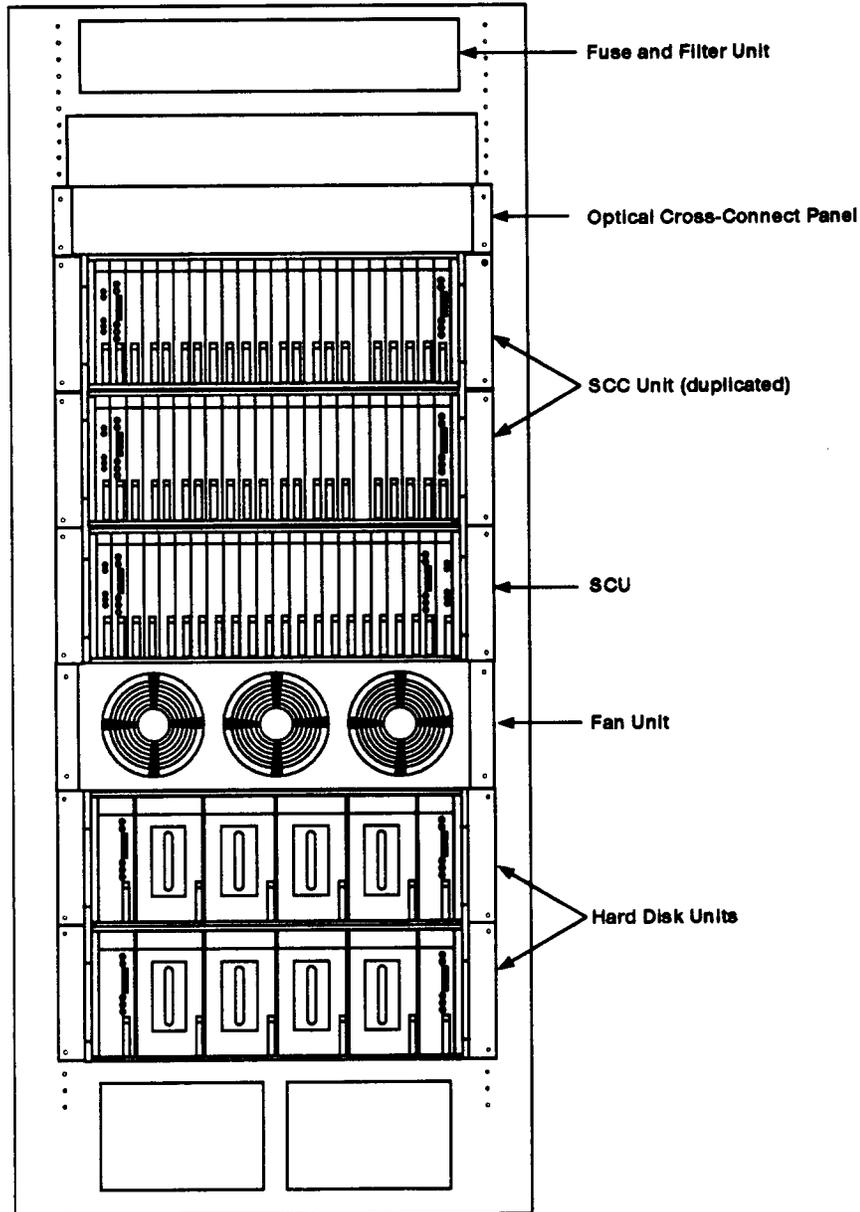


Figure 4-1. SCC Cabinet (J4024A-1)—Equipment Identification

## Equipment Arrangements

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**1.05** Each SCS consists of two or three cabinet types:

- The SCC cabinet (J4A024A-1)
- The SCU cabinet (J4A024B-1)
- The optional CDSC (J4A024C-1).

A 4ESS switch office can support up to eight SCS complexes. One CDSC (with up to 5 CDSUs) can be engineered to each SCU with ASR capability thereby providing a total of 120 ASR channels for the SCU.

### A. The SCC Cabinet (J4A024A-1)

**1.06** The SCC cabinet is the basic cabinet required in each SCS. It is equipped with each of the following units (Figure 4-1):

- One Fuse and Filter Panel (J5D003FJ-1)
- One Optical Cross-Connect Panel (J4A024AD-1)
- One SCC Unit consisting of member numbers 0 and 1 (J4A024AA-1)
- One SCU 0 (J4A024AB-1)
- One Fan Unit (J5D003FH-1)
- At least two Hard Disk Units (J4A024AC-1).

### B. The SCU Growth Cabinet (J4A024B-1)

**1.07** The SCUs in either the SCC cabinet or the SCU Growth Cabinet (Figure 4-2) can be assigned for ASR. The SCU for ASR has to be the Network Services Complex (NSCX) replacement SCU (contains the 4-GB disk TN-4000).

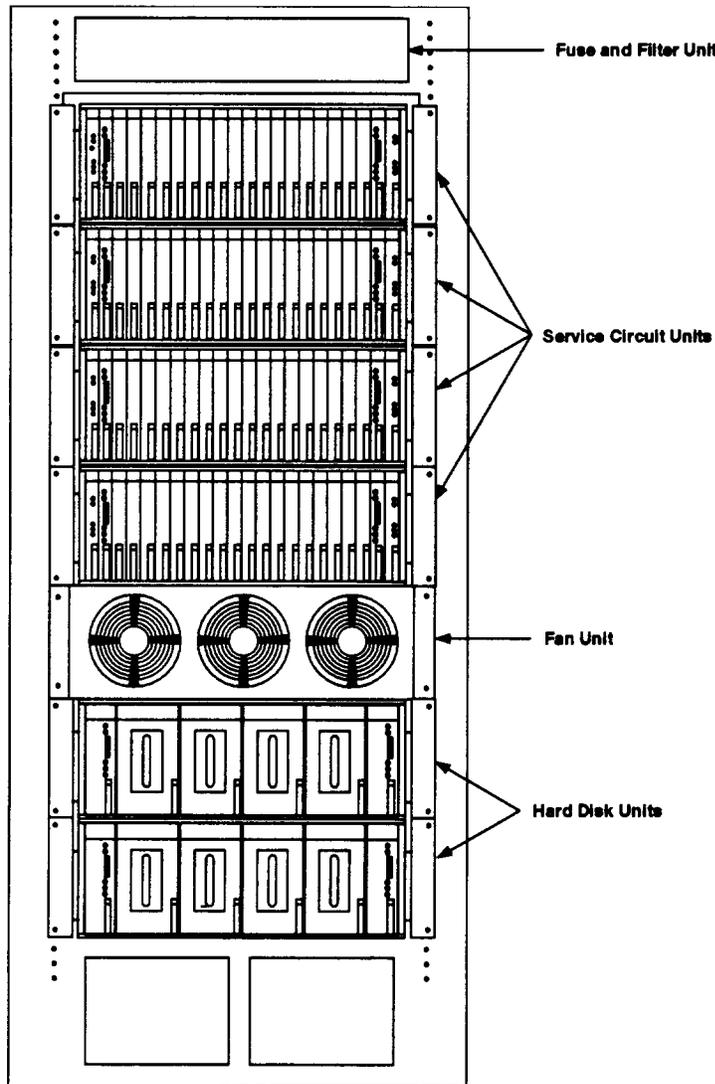
### C. Fuse and Filter Panel (J5D003FJ-1)

**1.08** The fuse and filter panel is arranged to accommodate the particular loads of the SCC cabinet. It has six input feeds from a Power Distribution Frame (PDF). These six input feeds supply the ten 4-position fuse blocks. Three alarm cards are provided, as well as one telephone jack card.

**1.09** Twelve possible inputs are at the rear of the fuse and filter panel. Each input can accept a feed from a PDF. An input (if used) consists of a capacitor, cables, connectors, other hardware, and at least one output fuse block at the front of the panel.

**D. Optical Cross-Connect Panel (J4A024AD-1)**

**1.10** The SCCs and SCUs are interconnected by an optical Extended Bus (EB). Both the SCCs and SCUs have EB circuit packs. The optical cross-connect panel, located in the SCC cabinet, connects the optical fibers of the SCC's EB circuit packs to the optical fibers of the SCU's EB circuit packs.



**Figure 4-2. SCU Growth Cabinet (J4024B-1)—Equipment Identification**

**1.11** SCUs 0 through 7 are connected on row A. SCUs 8 through 15 are connected on row B. Each SCC has two connector appearances (one in row A and one in row B). This allows each SCC to access all SCUs in both rows A and B.

#### **E. SCC Unit 1 (J4A024AA-1)**

**1.12** The SCC is a 2-shelf unit consisting of two identical (duplexed) controllers, each occupying a single shelf of the cabinet. The two controllers are stacked vertically with a common backplane.

**1.13** The SCC has six circuit pack types:

- Peripheral Unit Bus Driver/Receiver (UN349)
- Peripheral Unit Bus Interface (UN350)
- Executive Processor (UN351)
- Global Random Access Memory (RAM) (UN352)
- Extended Bus Interface (KCN3)
- BTL Bus Terminator (UN357).

**1.14** The SCC has three power controller types:

- Integrated Power Controller (TN1671)
- Power Control (TN1984)
- Power Converter (410AA).

#### **F. SCU 0 (J4A024AB-1)**

**1.15** The SCU is a single unit with one shelf of circuit packs. For ASR, the SCU must be set up for NSCX replacement and therefore requires the 4-GB TN4000 disk.

The SCU contains the following circuit pack types:

- DS-120 Exchange and Interface (TN1588)
- Multifaceted Signal Processor (TN1589)
- Enhanced Peripheral Interface Controller (TN1976)
- Microstore (TN1977)
- Small Computer System Interface (SCSI) Host Adaptor (TN1978)
- Voice Processor (TN1979)
- Voice Processor Interface Controller (TN1980)

- Buffer Control (TN1981)
- Buffer Fabric (TN1982)
- Table RAM (TN1983)
- Multifunctional Interface Processor (MIP) (TN4001)
- Extended Bus and Local Area Network (LAN) Interface (KCN4).

**1.16** The SCU has two power controller types:

- Power Control (TN1984)
- Power Converter (410AA).

### **G. Fan Unit (J5D003FH-1)**

**1.17** The bi-directional fan unit contains six fans (three located on the front of the unit and three located on the rear of the unit). The fan unit helps to cool the SCS cabinet.

### **H. Hard Disk Units (J4A024AC-1)**

**1.18** The Hard Disk Unit (HDU) is comprised of two matched HD pairs and two power controllers. Each HDU takes up one shelf in the SCC cabinet. The SCC cabinet may be equipped with up to two HDUs (four matched pairs of hard disk circuit packs, all associated with SCU 0) for a total of two complete shelves. Each HDU uses up to four hard disk circuit packs (two pairs of hard disk circuit packs) and two UN356 disk power controller circuit packs. The hard disk circuit packs available are the TN1672 (420-MB), the TN1972 (2-GB), and the TN4000 (4-GB). The UN356 circuit pack supplies +12 volts and +5 volts to drive the hard disk circuit packs. The SCU assigned for the ASR function requires the TN4000 (4-GB) disks.

### **I. Custom Data Service Cabinet (J4A024C-1)**

**1.19** The CDSUs provide ASR capabilities for the SCS. The CDSUs are located in a separate CDSC. A CDSC (illustrated in Figure 4-3) may contain as many as five CDSUs. One CDSC (with up to five CDSUs) is connected to each SCU with ASR capability. Each CDSU has a T1 Pulse Code Modulation (PCM) voice data interface to the MIP circuit pack. Two T1 circuits exist for each CDSU. The customer's reply and prompt are delivered to the CDSU on adjacent T1 time slots. The prompt data is required by the CDSU to perform local echo cancellation on the The LAN is connected to one CDSU and then daisy-chained to each of the other CDSUs within the CDSC. Two TN4001 (MIP) circuit packs in an SCU terminate the T1 connections to the CDSUs.

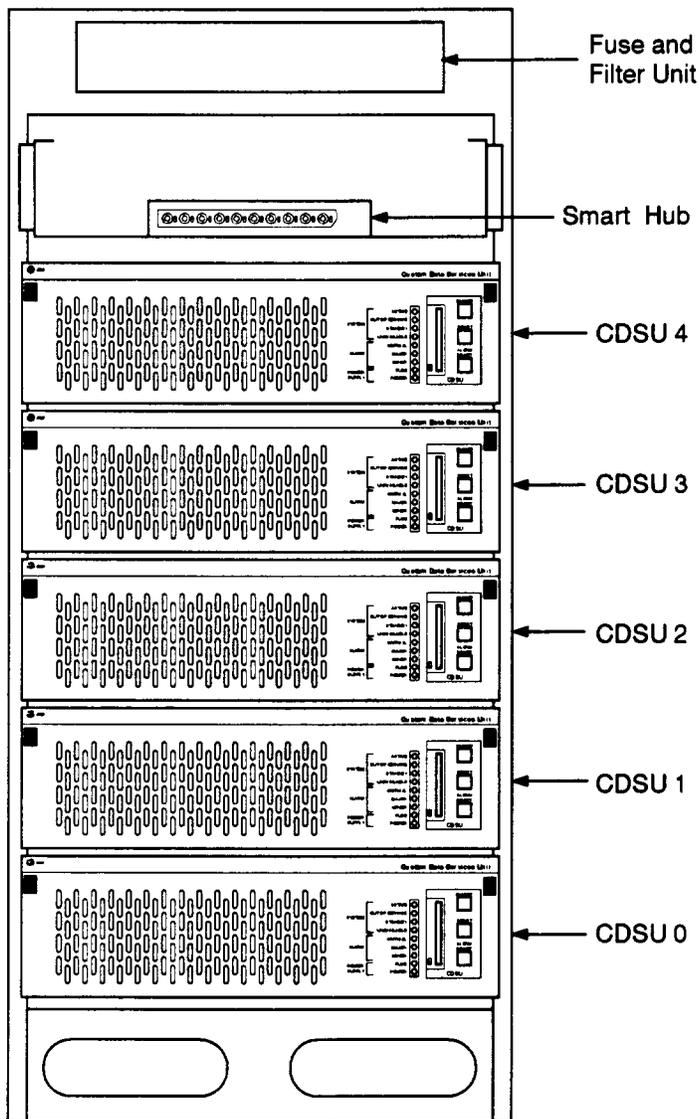


Figure 4-3. CDSC (J4A024C-1)

1.20 A **keyboard and monitor** are required for the CDSU during installation and whenever a software update of the CDSU is necessary. Two 3-½ inch (floppy) diskettes are available for this purpose. The keyboard and monitor are provided by the customer.

## J. Smart Hub

**1.21** The Smart Hub provides Ethernet connection between the Announcement Administration Processor (AAP) and the CDSC CDSUs. The AAP (using a remote login capability) allows access to the CDSU error log files. AC power is required for the Hub equipment. Refer to AT&T 201-525-016AC, *4ESS™ Switching System Announcement Administration Processor—Maintenance, Diagnostics, and Trouble Clearing* for complete details.

## 2. Call Flow (Not Affected)

## 3. Provisioning

### SCS Growth

**3.01** Detailed information to grow the SCS is contained in AT&T 234-153-060AC, *Service Circuit System (SCS) Growth—4ESS™ Switch*.

### Recent Change Forms

**3.02** Table 4-A lists the Recent Change (RC) forms affected by this feature. Also included are the *4ESS™ Switch Translations Guide-4* (TG-4) references where the population rules may be found.

**Table 4-A. Recent Change Forms Affected**

Form No.	Use	TG-4	
		Div.	Sec.
200	Add service trunks to SCU.	7	2a
202	Delete service trunks from SCU.	7	2c
703	Add ASR Unit Type information to the SCU (equip the MIPs and CDSUs).	7	7d
801	Stores the Grid, Lineup, Frame Number (GLF) data word that is used to format and print the Frame Location Number (FLN) for CDSCs.	7	8b

**3.03** The Frame Identification Code (FIC identifies the physical location of equipment. For ASR, however, the equivalent 4ESS switch FIC is an 8-character code referred to as the FLN. The FLN consists of the following elements:

<b>Element</b>	<b>Character Position</b>
Floor	1 and 2
Lineup	3 through 5
Period Only	6
Bay Number	7 and 8

### **Laboratory Design Information**

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**3.04** Refer to the following Laboratory Design Information (LDI) documents for additional provisioning information:

- 1265: ASR (4E20 Release 1 Generic)
- 1336, 1358, and 1361: Recent Changes (4E20 Release 3 Generic)
- 1356: FLN for CDSCs (add full coverage for all CDSCs in the 4E21 Release 1 Generic).

**3.05** The SCU assigned for the ASR function must be of the NSCX replacement type (contains the large 4-GB TN4000 disk).

## **4. Recording (Not Affected)**

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## **5. Network Management (Not Affected)**

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## **6. Maintenance/Troubleshooting**

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### **Diagnostic and Trouble Locating Procedure Requirements**

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**6.01** Since the CDSC is considered part of the SCU, SCS and Trouble Locating Procedure (TLP) software must deal with hardware failures. The SCS diagnostic program contains the appropriate phases to diagnose the ASR circuitry [SCU phase 16 (PH16) and phase 17 (PH17)]. PH16 diagnoses the MIP packs. PH17 diagnoses the MIP/CDSU interface and the CDSU equipment. The TLP for PH17 has also been

enhanced to include the CDSC equipment plus the CDSC FLN. These diagnostics provide at least 95 percent pin fault detection.

**6.02** The TLP for PH17 software reports circuit pack codes within the CDSC. The output contains a list of Field Replaceable Units (FRUs) with the equipment most likely to cause failures high on the list.

**6.03** The AAP is also connected to the CDSUs via the LAN (isolated by a LAN Hub). The AAP provides CDSU log file retrieval and CDSU program updates.

**⇒ NOTE:**

Currently, the AAP does not provide the CDSU program updates. This capability will be available in October 1995.

**6.04** The SCU is connected to the CDSUs via a LAN which is connected between MIP 0 and CDSU 0. CDSU 0 is then multiplexed to other equipped CDSUs, the last one terminating on a Hub LAN port.

**⇒ NOTE:**

The Smart Hub can support up to eight cabinets. For every ninth cabinet added, a new Smart Hub must also be added.

**6.05** Refer to AT&T 201-525-016AC, *4ESS™ Switching System Announcement Administration Processor—Maintenance, Diagnostics, and Trouble Clearing* for complete details.

## **Fault Recovery**

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**6.06** The fault recovery software detects and reacts to ASR-induced errors and faults. If a CDSU-detected fault requires fault recovery action (for example, remove and diagnose an SCU), the code triggers an SCU interject that initiates SCU removal and diagnostics. If diagnostics complete successfully, the SCU is restored to service. Faults not serious enough to require SCU removal cause a Base Level Maintenance (BLM) report to be printed. If a second Interject occurs within 15 minutes of diagnostic completion for the subject SCU, that SCU remains out of service until manual corrective action is taken.

**6.07** Table 4-B contains a list of the ASR miscellaneous error codes.

Table 4-B. ASR Error Codes

Octal/Hex	Description
140/0x60	ASR Miscellaneous Errors
157/0x6F	
160/0x70	ASR LAN MIP0 error
161/0x71	ASR LAN MIP1 error
162/0x72	ASR LAN CDSU0 error
163/0x73	ASR LAN CDSU1 error
164/0x74	ASR LAN CDSU2 error
165/0x75	ASR LAN CDSU3 error
166/0x76	ASR LAN CDSU4 error
170/0x78	ASR T1 MIP0 error
171/0x79	ASR T1 MIP1 error
172/0x7A	ASR T1 CDSU0 error
173/0x7B	ASR T1 CDSU1 error
174/0x7C	ASR T1 CDSU2 error
175/0x7D	ASR T1 CDSU3 error
176/0x7E	ASR T1 CDSU4 error

**6.08** Complete details on the Interject and BLM information are located in AT&T 234-151-077AC, *Service Circuit System (SCS) Maintenance—4ESS™ Switch*.

## 7. Transition Considerations

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### Ubiquity

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**7.01** It is not necessary for all 4ESS switches in the network to be running the 4E20 Release 3 Generic for this feature to be operational.

### Turn On/Turn Off Mechanism

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**7.02** Growth procedures are used to install and grow the ASR hardware. Recent Change forms are used during the growth process. Refer to AT&T 234-153-060AC, *Service Circuit System (SCS) Growth—4ESS™ Switch*.

## **8. Input/Output Manual Pages**

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**8.01** The following Input/Output Manual pages are affected by this feature:



**CAUTION:**

*Improper use of the COPY:SCS input message may interrupt or degrade service.*

- COPY:SCS—There are 14 formats associated with this input message. The basic use of these formats is to copy specific files or an entire disk on an SCU to the same file numbers or different file numbers on another SCU. Formats 9 through 14 are used to copy the MIP files.
- ANALY:TLPF-SUS—Lists the most likely faulty equipment locations. This output message identifies the unit and TLP file used to generate the list. The CDSC FLN is also output when the CDSC/CDSU FRUs are implicated by diagnostic test failures in SCU PH17.

**WARNING**  
**INAPPROPRIATE USE OF THIS**  
**MESSAGE MAY INTERRUPT OR**  
**DEGRADE SERVICE. READ PURPOSE**  
**CAREFULLY.**

ID . . . . . COPY:SCS  
WORK CENTER . . MOC  
GENERIC . . . . . 4E20 and later  
CLASS . . . . . PUMTC  
APPLICATION . . 4E  
TYPE . . . . . Input

**WARNING**

When an announcement administration processor (AAP) is present and active in the office, it is capable of changing the SCU disk contents for the purpose of providing updates to stored announcements. To prevent possible corruption of announcements on the destination disk, it is necessary to suspend AAP updates during the copy. DLP-500 in the *Service Circuit Maintenance* document (AT&T 234-151-077) describes the procedures that must be followed when the COPY:SCS input message is to be used.

**1. PURPOSE**

The purpose of this message is to perform any of the following:

1. an inter-service circuit unit (SCU) file copy:

Format [1] is used to copy a specific file from disk pair 0 on one SCU to a different file number on disk pair 0 in another SCU.

Format [2] is used to copy a specific file from disk pair 0 on one SCU to the same file number on disk pair 0 in another SCU.

2. an intra-SCU file copy:

**NOTE:** For intra-SCU file copy, the file is only copied to the disk that is connected to the opposite of the specified bus number. (e.g., copy input message specifying BUS 0 copies specified file to disk connected to BUS 1.) Since the two disks of any disk pair should always be matched, the same input message but with the opposite bus number, should be used to copy the same file to the other disk of the disk pair.

Format [3] is used to copy a specific file on disk pair 0 to a different file number on the mirrored disk of disk pair 0.

Format [4] is used to copy a specific file on disk pair 0 to the same file number on the mirrored disk of disk pair 0.

3. an intra-SCU raw disk copy:

**NOTE:** **NOTE:** For intra-SCU raw disk copy, the bus parameter specifies the bus to which the disk to be copied from is connected.

Format [5] is used to copy an entire disk to the mirrored disk of another disk pair in the same SCU.

Format [6] is used to copy an entire disk to the mirrored disk of the same disk pair in the same SCU.

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4. an inter-SCU raw disk copy:

**NOTE:** For inter-SCU raw disk copy, the bus parameter specifies the bus to which the disk to be copied from is connected.

Format [7] is used to copy an entire disk from one SCU to another disk pair in another SCU.

Format [8] is used to copy an entire disk from one SCU to the same disk pair in another SCU.

5. an attached processor system (APS) to SCU file copy:

Format [9] is used to copy a specific file from the APS to all in-service SCUs in one service circuit system (SCS).

Format [10] is used to copy a specific file from the APS to all in-service SCUs in all SCSs.

Format [11] is used to copy a specific file from the APS to all SCUs in one SCS, or to the SCUs in a growth SCS.

Format [12] is used to copy a specific file from the APS to all in-service and out-of-service (OOS) SCUs in all SCSs.

Format [13] is used to copy a specific file from the APS to a single in-service SCU.

Format [14] is used to copy a specific file from the APS to a single out-of-service SCU.

## 2. FORMAT

- [1] **COPY:SCS a, SCU b, SFN c, BUS d, DSCU e, DFN f!**
- [2] **COPY:SCS a, SCU b, SFN c, BUS d, DSCU e!**
- [3] **COPY:SCS a, SCU b, SFN c, BUS d, DFN f!**
- [4] **COPY:SCS a, SCU b, SFN c, BUS d!**
- [5] **COPY:SCS a, SCU b, SDP g, BUS d, DDP h!**
- [6] **COPY:SCS a, SCU b, SDP g, BUS d!**
- [7] **COPY:SCS a, SCU b, SDP g, BUS d, DSCU e, DDP h!**
- [8] **COPY:SCS a, SCU b, SDP g, BUS d, DSCU e!**
- [9] **COPY:SCS a, (TONES | SCCSFT | SCUOPR | SCUDGN | MSPROV | MSPFIX | MSP1 | MIPOFIL | MIP1FIL), SVN i, DVN j!**
- [10] **COPY:SCS a, (TONES | SCCSFT | SCUOPR | SCUDGN | MSPROV | MSPFIX | MSP1 | MIPOFIL | MIP1FIL), SVN i, DVN j, ALL!**
- [11] **COPY:SCS a, (TONES | SCCSFT | SCUOPR | SCUDGN | MSPROV | MSPFIX | MSP1 | MIPOFIL | MIP1FIL), SVN i, DVN j; UCL!**

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- [12] **COPY:SCS** a, {**TONES** | **SCCSFT** | **SCUOPR** | **SCUDGN** | **MSPROV** | **MSPFIX** | **MSP1** | **MIPOFIL** | **MIP1FIL**}, **SVN** i, **DVN** j, **ALL**; **UCL**!
- [13] **COPY:SCS** a, **SCU** b, {**TONES** | **SCCSFT** | **SCUOPR** | **SCUDGN** | **MSPROV** | **MSPFIX** | **MSP1** | **MIPOFIL** | **MIP1FIL**}, **SVN** i, **DVN** j!
- [14] **COPY:SCS** a, **SCU** b, {**TONES** | **SCCSFT** | **SCUOPR** | **SCUDGN** | **MSPROV** | **MSPFIX** | **MSP1** | **MIPOFIL** | **MIP1FIL**}, **SVN** i, **DVN** j; **UCL**!

### 3. EXPLANATION OF MESSAGE

- a                    **SCS** member number (0 - 7).
- b                    Source **SCU** member number (0 - 15) for Inter-SCU or Intra-SCU file copy or raw disk copy. It is the destination SCU number for an APS to SCU file copy when copying to a single SCU.
- c                    Source file number (1 - 127).
- d                    Source SCU disk bus number (0 - 1). This selects one disk of the pair.
- e                    Destination SCU member number (0 - 15).
- f                    Destination file number (1 - 127).
- g                    Source SCU disk pair number (0 - 3).
- h                    Destination SCU disk pair number (0 - 3).
- i                    Source file version number of the APS file (0 - 3).
- j                    Destination file version number on the SCU disk (0 - 3).
- TONES**              Class of files containing test tone data.
- SCCSFT**             Class of files containing software for the SCS controller.
- SCUOPR**            Class of files containing operational software for the SCU.
- SCUDGN**            Class of files containing diagnostic software for the SCU.
- MSPROV**            Class of files containing software for the rover multifaceted signal processor (MSP).
- MSPFIX**            Class of files containing software for the fixed MSP.
- MSP1**              Class of files containing software for the AT&T trigger platform (ATP)-AT&T network call redirection (ANCR) MSP.
- MIPOFIL**           Class of files containing software for multifunctional interface processor (MIP) 0.
- MIP1FIL**           Class of files containing software for multifunctional interface processor (MIP) 1.
- ALL**                Indicates that the specified file is to be copied to all SCSs. Cannot be used with the SCU option.
- UCL**                Forces files to be copied to OOS SCUs and to SCSs in the GROW state.

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#### 4. SYSTEM RESPONSE

- |    |  |
|----|--|
| ?D | The copy request has been denied. A required keyword argument is missing.  |
| ?E | The file copy request was rejected. The program was unable to parse the input message.   |
| ?I | The copy request has been denied. A required keyword is missing, a keyword argument is out-of-range, extra keywords or keyword arguments were specified, or the destination SCU member number is same as the source SCU member number. |
| PF | The copy request has been accepted. An output message will follow to indicate the status of the copy request.  |
| RL | Retry later. The copy request has been denied. There are too many tasks in progress.   |

#### 5. REFERENCES

PIDENTs  
SCSCFSCU  
SCSFPUMP

Practice 234-151-077, *Service Circuit Maintenance*

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ID ..... ANALY:TLPF-SUS  
WORK CENTER.. MOC  
GENERIC ..... 4E20 Rel. 3 and later  
APPLICATION .. 4E,1B  
TYPE ..... Output

### 1. FORMAT

ANALY:TLPFILE: [a[,b]] SUSPECTED FAULTY EQUIPMENT  
[TLPFILE c :] [d] [ENTRY TIME e/f/g h:i:j]  
MFNUM: k  
EQPT LOC CODE [(FN)] NOTE WT FS SYM SD HELPER ID  
[[1-]m[?] n [(o)] [p][!]] q r s[M] t [u]]  
. . . . .  
[[1-]m[?] n [(o)] [p][!]] q r s[M] t [u]]  
NEQLS v  
[FLN w [FRM x]]  
[FLN y]

### 2. REASON FOR OUTPUT

To list the most likely faulty equipment locations. The output message identifies the unit and the trouble location procedure (TLP) file which was used to generate the list. The locations are listed one per line with the most highly suspect locations first. The 1B TLP output is split into three parts: equipment in the unit under test, equipment not in the unit under test, and the test of TLP NOTES. Each part has an appropriate sub-title, see variable d.

### 3. VARIABLE FIELD DEFINITIONS

- a The unit type - member number.
- b The subunit type - submember number.
- c The TLP disk queue file number assigned if the TLP summary was enqueued for tape processing.
- d Message subtitle. These include:  
IN UNIT UNDER TEST  
NOT IN UNIT UNDER TEST  
NOTES
- e/f/g h:i:j The date and time the TLP disk queue file was generated. It is used by the following output messages to link the output messages to the time the summary data output message was printed.

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This part discusses those variables printed for each equipment location.

- k The error analysis program (ERAP) file number assigned to the summary data (see OP:ERAPDATA).
- l Frame identity of the equipment. The format of l is a one to seven digit alpha-numeric character sequence:  $l^1 l^2 l^3 l^4 l^5 l^6 l^7$ .
- m[?] Equipment location, where m is the equipment location and is used to uniquely define the piece of equipment. The format of m is  $m^1 m^2 m^3 m^4 m^5 m^6$  where each m is a decimal number 0 through 9. In some cases  $m^4$  maybe an alpha character.

- $m^1$  — The bay location within frame.
- $m^2 m^3$  — The horizontal location in the bay (absolute inches above the floor).
- $m^4 m^5 m^6$  — The vertical location in bay (the slot from the left of the bay).

The [?], which is rarely used, indicates that the particular equipment location (EQL) in question may or may not be equipped. In this case, the schematic drawing (SD) must be consulted to determine if a piece of equipment should be in the particular location.

The EQL is assumed to be in the unit under test unless the HELPER ID field specifies another unit.

- n The code variable which will describe the type of equipment referred to by the EQPT LOC variable. In the case of FA, FB, FC, FE, KLV or UN pack codes, the variable will indicate the specific pack code number. 4ESS™ peripheral unit TLP messages may specify a variety of additional codes in this field. The valid codes for the 1B processor are:

- CABLE — Interframe cabling, for example between time multiplexed switches (TMSs) & time slot interchange frames (TSIFs). (HELPER ID field should further identify).
- CONV — Implicates an individual power converter.
- CP xx — Tape transport pack.
- FAxxxx — FA pack code.
- FBxxxx — FB pack code.
- FCxxxx — FC pack code.
- FExxxx — FE pack code.
- KLWxxx — KLV pack code.
- POWER — Implicates the whole group of power converters for the frame.

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RELAY — Relay pack.

SPAPP — Signaling processor (SP) application point. (See office translation for pulse point address for this frame and the SP.)

UNxxx — UN pack code.

XFMR — Power transformer pack.

[o] Functional name of the suspect equipment. This field is new for the 1B processor.

[p] [!] The note field which refers to a set of notes for the frame under test. A note without the ! indicates general information which may be referred to by the user. A note with the ! indicates critical information in regard to replacement of the associated equipment. In this case the user must refer to the note before proceeding to replace the equipment.

The sets of notes for the various frames are contained in the Task Oriented Practices (TOP) document (see References) associated with the particular unit inferred by variable a.

For most 1B processor units, TLP notes are printed with the pack list.

The sets of TLP notes for 1B Processor units is included. The TLP notes are divided into two parts. Part one is the list of Unit Dependent TLP notes. Part two is the list of Common TLP notes (notes used by many units).

#### PART ONE - UNIT DEPENDENT TLP NOTES

This part contains unit dependent TLP notes for the following 1B Processor units - Central Control (CC), Master Control Complex and Utility Processor (MUP), Data Unit Selector (DUS)/Tape Unit Controller (TUC), Input/Output (IO), Input/Output Processor (IOP).

#### *CC (Central Control) Unit Dependent TLP Notes*

##### NOTE 50:

This test also verifies the KLW16 interface to the KLW21. Better fault isolation can be gained by the following procedure:

- 1 Determine the active MUP (KLW16) (master control complex (MCC) page 106).
- 2 Make the standby MUP active.
- 3 Rerun the failing phase.
- 4 If the phase is some tests failed (STF), the MCC utility interface (MUI) (KLW21) under test is the most likely suspect.

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- 5 If the phase is all tests passed (ATP), the standby (previously active) MUP (KLW16) is the likely suspect. Replace that MUP and conditionally restore the MUP to service. Make the restored MUP active, and rerun the failing CC phase. If the phase is ATP, the fault is cleared. If the phase is STF, replace the MUI (KLW21) under test.

NOTE 51:

Suspect pack is in active CC. You must force standby CC into service before removing power to replace suspect pack.

NOTE 52:

The cable connecting the MIMB0 and MIMB1 output buses from the active maintenance matcher (MM) pack to the MEMB0 and MEMB1 input buses respectively, of the standby MM pack may cause a failure.

NOTE 53:

The cable connecting the MIMB0 and MIMB1 output buses from the standby maintenance matcher (MM) pack to the MEMB0 and MEMB1 input buses respectively, of the active MM pack may cause a failure.

NOTE 54:

The cable connecting the M0OUT and M1OUT outputs from the active MM pack to the MIN0 and MIN1 inputs respectively, of the standby MM pack may cause a failure.

NOTE 55:

The cable connecting the M0OUT and M1OUT outputs from the standby MM pack to the MIN0 and MIN1 inputs respectively, of the active MM pack may cause a failure.

NOTE 56:

The cable connecting the EEI0 and EEI1 outputs from the active MM pack to the EEEI0 and EEEI1 inputs respectively, of the standby MM pack may cause a failure.

*Data Unit Selector (DUS)/Tape Unit Controller (TUC) Unit Dependent TLP Notes*

NOTE 21:

Specified fuse missing or blown.

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NOTE 22:

Specified circuit pack is in the tape transport.

NOTE 23:

The keyword printed in the circuit pack code field indicates a special problem with the tape transport. The keywords are:

<i>Keyword</i>	<i>Explanation</i>
ARMS	Arms not deployed.
DOOR	Tape transport door is open.
LOCAL	Tape transport in the "Local" mode.
NOHDR	Tape is blank, cannot find header block.
NREEL	No tape reel mounted on the transport.
NTAPE	No tape over the heads.
SLAMP	Tape transport arms servo lamp failure.
TEMP	Transport temperature abnormal.
WRING	Write enable ring missing.

NOTE 24:

Specified power converter missing.

*IO (Input/Output) Unit Dependent TLP Notes*

NOTE 20:

For LDI5C and later, the FA453 in input/output unit controller/selector (IOUCS) 5 and 7 will be an FA456, and the FA455 in IOUCS 5 and 7 will be an FA457.

*Input/Output Processor (IOP) Unit Dependent TLP Notes*

NOTE 20:

This pack code is application dependent and may not be an FG19.

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NOTE 21:

For an expanded IOP frame, circuit pack FG90 (MC5A009A1) is used instead of FG85 (MC5A000A1).

NOTE 22:

For an expanded IOP frame, circuit pack FG86 (MC5A010A1) is used instead of FG86 (MC5A000B1).

NOTE 23:

For an expanded IOP frame, circuit pack FG87 (MC5A011A1) is used instead of FG87 (MC5A000C1).

NOTE 24:

This pack code is application dependent and may be either a TN75 or a TN82.

NOTE 25:

For an expanded IOP frame circuit pack FG89 is used instead of FG22.

NOTE 26:

This circuit pack (FC274) is used only in an expanded IOP unit with member number 8 or greater.

*Master Control Complex and Utility Processor (MUP) Unit Dependent TLP Note*

NOTE 140: Check to insure LAN (local area network) is properly terminated. See SD4A-147 for location of LAN termination.

PART TWO - COMMON TLP NOTES

This part contains the "Common" TLP notes which are referenced by many different unit types.

NOTE 1:

Special procedures are required for circuit pack replacement. Refer to associated TOP.

NOTE 2: (Does not apply to 1B processor units)

The following steps should be followed (in order presented) for power monitor test failures using the diagnostic. Refer to TAP 103 for checking power problems using manual techniques.

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Step 1

- 1.1 Determine if a fuse is blown. If there is no trouble indication, proceed to Step 2. Replace the blown fuse(s).
- 1.2 After replacing the blown fuse, rerun\* the complete diagnostic without the TLP option. If the fuse blows again, refer to backup techniques. If the result of the diagnostic is
  - 1.2.1 ATP, the trouble is cleared.
  - 1.2.2 STF, with the same or different power monitor test failure(s), proceed to Step 2.
  - 1.2.3 STF, with the first test failure beyond the power monitor tests\*\*, rerun\* the entire diagnostic with the TLP option, and proceed to use the new TLP equipment list. Do not proceed to Steps 2, 3, 4 and 5.

Step 2

- 2.1 Determine if an LED(s) is lit and note for future reference.
- 2.2 Perform the manual power monitor tests described in Table 1. If there is no trouble indication, and an LED was not lit prior to performing the manual tests, proceed to Step 3. If there is a failure indication during or after the manual tests, replace the unit containing the LED that does not light when it should during the manual tests or remains lit following the manual tests. If the manual tests pass, but an LED was lit prior to executing the manual tests (now extinguished, following the manual tests), rerun\* the complete diagnostic without the TLP option. If the previously lit LED remains off, suspect that the power failure indication is marginal and if this failure

---

\* Via teletypewriter (TTY) request and with the power switch in the "NORM" position since power monitor tests are skipped on frame request or if the power switch is in the "ROS" position.

\*\* Test numbers associated with power monitor test are specified in the diagnostic user's document.

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indication cannot be repeated, restore the unit to service if the diagnostic is ATP.

- 2.3 After making the necessary replacement, rerun\* the complete diagnostic without the TLP option. If the result of the diagnostic is
  - 2.3.1 ATP, the trouble is cleared.
  - 2.3.2 STF, with the same fault signature, return the original power converter (if replaced) to its original position and proceed to Step 3.
  - 2.3.3 STF, with a different power monitor failure(s), proceed to Step 3.
  - 2.3.4 STF, with the first test failure beyond the power monitor tests, rerun\* the entire diagnostic with the TLP option and proceed to use the new TLP equipment list. Do not proceed to Steps 3, 4 and 5.

Step 3

- 3.1 Run\* phase 1 of the diagnostic for approximately 15 iterations using the RPT option on the DGN input message. The object of this test is to check the power monitor sequence circuits for slow response. Look for LED lamps that are noticeably out of step with others. (Normally, the LEDs will not all switch simultaneously.) If there is no trouble indication, proceed to Step 4. Replace the unit containing the LED that is out of step.
- 3.2 After making the necessary replacement, rerun\* the complete diagnostic without the TLP option. If the result of the diagnostic is
  - 3.2.1 ATP, the trouble is cleared.
  - 3.2.2 STF, with the same fault signature, return the original power converter (if replaced) to its original position and proceed to Step 4.

---

\* Via TTY request and with the power switch in the "NORM" position since power monitor tests are skipped on frame request or if the power switch is in the "ROS" position.

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- 3.2.3 STF, with the first test failure beyond the power monitor tests, rerun the entire diagnostic with the TLP option, and proceed to use the new TLP equipment list. Do not proceed to Steps 4 and 5.

Step 4

- 4.1 Replace packs or converters on the current TLP equipment list. Start with the entry second from the top and proceed one at a time.
- 4.2 For each piece of equipment replaced, rerun\* the complete diagnostic without the TLP option. If the result of the diagnostic is
  - 4.2.1 ATP, the trouble is cleared.
  - 4.2.2 STF, with the same fault signature, return the original unit (pack or converter) to its original position and proceed to the next entry on the original equipment list. (If there are no more entries, proceed to Step 5.)
  - 4.2.3 STF, with a different power monitor failure(s), determine if the last replacement unit (from stock) is faulty (try another unit from stock). If not, proceed to the next entry on the original equipment list, proceed to Step 5.
  - 4.2.4 STF, with the first test failure beyond the power monitor tests, rerun the entire diagnostic with the TLP option, and proceed to use the new TLP equipment list. Do not proceed to Step 5.

---

\* Via TTY request and with the power switch in the "NORM" position since power monitor tests are skipped on frame request or if the power switch is in the "ROS" position.

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Step 5

5.1 Refer to backup techniques.

NOTE 3:

Bipolar packs (i.e., B suffix coded packs) are backward compatible and may be substituted for unipolar packs (i.e., same pack code without suffix). However, frames manufactured with bipolar packs cannot accept unipolar pack replacements.

Table 1

Manual Power Monitor Tests

<i>Action</i>	<i>Action Taken By</i>
1. The frame must be powered up (out of service (OS) lamp can be on or off).	USER
2. Rotate the power (PWR) OFF button to the request out of service (ROS) position.	USER
3. The acknowledge (ACK) lamp winks on, then off. The OS lamp should now be on; if it is not, the unit is in service and the manual power monitor tests cannot be continued.	SYSTEM
4. Depress the TEST button for approximately 1 second.	USER
5. All LEDs on the converters (plus the FB153) will light if they pass the tests.	POWER TEST CIRCUIT
6. Rotate the PWR OFF button to the NORMAL position, then momentarily operate the "ON" button.	USER
7. All LEDs should be extinguished.	POWER TEST CIRCUIT

q

The weight field supplied for each item of equipment listed and is a confidence factor ranging from 10 through 1. The equipment is listed in order of confidence with the higher values first. Equipment with equal confidence factors are equally likely to be the faulty equipment. Replacement of equipment should proceed one item of equipment at a time starting at the top of the first list and ending at the last item. A diagnostic should be run in between each replacement. Refer to the

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TOP document for correct pack replacement procedures.

r s [M] t

Three variables which give the functional schematic (FS) number, the symbol (SYM) number, and the unit schematic drawing (SD) number for the associated piece of equipment. Note however that the EQPT LOC in the unit SD may differ from the EQPT LOC printed since the printed location is the absolute location in the frame instead of the absolute location in the unit. The "M" indicates the piece of equipment has more than one SYM or FS number.

[u]

The HELPER ID field which has several forms and either identifies another frame or gives supplementary data about the associated equipment. The forms are described:

HELPER ID  
VARIABLE

MEANING

blank

This is the default case and indicates the equipment is in the frame or unit under test.

a [, b]

This indicates the equipment is actually in a unit other than the unit under test. The unit is identified by its unit type-member number a, and if need be, its subunit type submember number b.

MSN c

SP-ROW-POINT miscellaneous scanner  
number (MSN) of trunk.

SP — 2-digit decimal number  
indicating the SP member  
number, range 00-31.

ROW — 3-digit decimal number  
indicating the SP, range 000-127.

POINT — 2-digit decimal number  
indicating the row, range 00-15.

A note will direct the user to busy-out the representative MSN and its 15 associated MSNs prior to replacing the equipment.

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HELPER ID VARIABLE	MEANING
TSN d	SP-ROW-POINT trunk scanner number (TSN) of trunk.  SP — 2-digit decimal number indicating the SP member number, range 00-31.  ROW — 3-digit decimal number indicating the SP, range 000-255.  POINT — 2-digit decimal number indicating the row, range 00-15.
MDN e	SP-ROW-POINT miscellaneous distributor number of trunk. (Refer to MSN c for values.)
TDN f	SP-ROW-POINT trunk distributor number of trunk. (Refer to TSN d for values.)
SU x SW y REC z SU x SW y XMT z	For interframe cabling between a TMS and a TSIF, the connections at the TMS are identified by the switch unit (SU), switch (SW) and either receive (REC) or transmit (XMT) cables.
FACE x,GP y,CT z FACE x,GP y,HBDG z	For reference to equipment associated with a disk file (DF), the face (FACE) group (GP) and either the center tape (CT) or head block diode group (HBDG) are identified.
v	The number of equipment locations (EQLs) printed by the TLP search program.
w	The floor location number. For those units which do not have a fixed floor assignment, this gives the floor location number of the frame containing the unit defined by the variable a.
x	The frame containing the unit identified by the a variable.
y	The floor location number for associated equipment that is not co-located with the unit defined by variable a.

#### 4. ACTION TO BE TAKEN

Repair the frame by replacing one piece of equipment at a time starting at the top of the first equipment list. NOTES (critical and/or normal) should be observed.

Refer to the TOP manual for a detailed description of the repair process.

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## 5. REFERENCES

PIDENTs  
CCDG01  
M3DG01

Practice 234-010-215, *Trouble Location Procedure - Description*  
Practice 234-280-230, *Trouble Location Procedure Programs - Description*

TOP (Task Oriented Practices) Documents:

Practice 234-151-006, *Master Control Complex and Processor Peripheral Interface Frame*  
Practice 234-151-011, *Time Multiplexed Switching Frame*  
Practice 234-151-013, *Network Clock Frame*  
Practice 234-151-015, *Peripheral Unit Bus System*  
Practice 234-151-022, *Time Slot Interchange System*  
Practice 234-151-031, *Signal Processor 1 - Terminal Interface Equipment*  
Practice 234-151-050, *Echo Suppressor Terminal*  
Practice 234-151-077, *Service Circuit System (SCS) Maintenance*  
Practice 254-251-001, *Central Control Frame*  
Practice 254-251-005, *Call Store/Program Store*  
Practice 254-251-010, *Auxiliary Data System*  
Practice 254-251-015, *File Store Frame*  
Practice 254-251-020, *Input/Output Frame*

### Input Messages

ALW: TLP  
CLR: TLPQUEUE  
INH: TLP  
OP: TLPQUEUE

### Output Messages

CLR: TLPQUEUE  
OP: TLPQUEUE

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# AT&T Circuit-Switched Architecture Revision Feature (4323)

# 5

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# AT&T Circuit-Switched Architecture Revision Feature (4323)

# 5

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## 1. Feature Description

**1.01** The current architecture for Switched Digital Services (SDS) is based on an interface between the 4ESS™ switch and databases on either a No. 1 Network Control Point (1NCP) or a 2NCP. For public SDS, two databases are used and both databases are located on 1NCPs. For Software Defined Data Network (SDDN)/Software Defined Data Network International (SDDNI) calls, the Software Defined Network (SDN) portion of the call queries either a 1NCP database or a 2NCP database. Since the majority of the SDS calls rely on databases in a 1NCP, the existing architecture is considered to be a 1NCP-based architecture.

**1.02** One of the 1NCP databases is used to translate 700 numbers into an Action Point Number (APN), and the other database is used for international outbound calls that are destined for countries with multiple carriers. The second database, which is referred to as the the Switched Digital International (SDI)–Carrier Specific Routing (CSR) database, provides the Foreign Administration Identifier that is used to ensure that the call is routed to the proper carrier.

**1.03** This feature transitions the SDS from a 1NCP-based architecture to a 2NCP-based architecture. When this feature is turned on, data calls arriving at a 4ESS switch will be handled differently than they were prior to this feature. SDS calls will be treated as Automatic Number Identification (ANI)-based calls. Domestic trunks currently in Domain 82 will be transitioned to the Software Defined Network Access (SDNA) domain. The code groups currently in Domain 82 will be opened in the SDNA domain which will result in these calls querying the No. 2 Direct Services ANI-based (2DSA) NCP.

**1.04** International trunks currently in Domain 82 will remain in Domain 82.

**1.05** During the transition period, data calls that arrive in the SDS domain will make either an ANI-based query or a dialed number-based query. The type of query that is done will be determined by an Office Data Assembler (ODA)-defined flag. When the flag is set, the 2NCP will be queried. When the flag is not set, the 1NCP will be queried.

**1.06** There are several reasons why the SDS architecture is being revised:

- To provide additional database capacity
- To reduce the number of unbilled data calls
- To reduce operating expenses associated with SDS
- To provide capabilities for supporting new services.

### **Additional Database Capacity**

---

**1.07** The increasing demand for SDS has outgrown the capacity of the 1NCP databases. At the present time, six 1NCP pairs are required to provide the SDS and SDI-CSR databases. With the current 1NCP architecture, one record (512 bytes) is used to store each assigned 10-digit 700 number and the associated APN. Since a 1NCP can handle only 8,000 records, a different 1NCP is required for each of the following groups of 700 numbers: 700-560, 700-561, 700-562, 700-737, and 700-730.

**1.08** This feature creates a new centralized SDS Master Record database in a 2NCP. (The entire database can be stored in a single 2NCP pair.) Both the SDS and SDI-CSR databases will be moved to this new database. In the new architecture, a single ANI-based customer record in a 2NCP pair can be used to identify the APN routing number associated with each 700 number that has been assigned to a customer. The new SDS Master Record database will contain an entry for every 700 number that is currently stored in an individual dialed-number-based record in a 1NCP.

### **Unbilled Data Calls**

---

**1.09** Depending on the type of service and the type of access, some calls require a query of an NCP database and some calls do not with the existing architecture. Because not all calls query an NCP database, some data calls were being completed, but the callers were not always billed because their identity was unknown. When this feature is incorporated, all data calls will require an NCP query which will correct this problem.

## **Reduced Operating Expenses**

---

**1.10** As SDN and other services are transitioned from 1NCPs to 2NCPs, the cost of retaining SDS databases and SDI CSR databases on 1NCPs will increase dramatically. Costs will increase because there will be fewer services with which to share the expenses associated with operating and maintaining a 1NCP.

## **New Services**

---

**1.11** With the existing 1NCP-based architecture, the SDI CSR capability cannot be used for the SDI 384-kbps service and SDDNI cannot access any 384-kbps routing. These capabilities, however, will be supported by a 2NCP-based architecture.

## **2. Call Flow**

---

- 2.01** The following changes will be made to the way the 4ESS switch handles digital calls after this feature is incorporated:
- SDS/SDI calls will be received in the SDNA domain, and a query will be made to the SDS Master Record in the 2NCP.
  - SDS Automatic Message Accounting (AMA) records will be generated based on instructions from the 2NCP.
  - Integrated Services Digital Network (ISDN) processing of SDS/SDI calls received over ISDN Primary Rate Interface (PRI) trunks will be modified.
  - The Signaling Service Type (SST) component will be set to SDS based on instructions from the 2NCP.
  - ANI-based queries can originate from Domain 82 using a pseudo ANI.
  - International 384-kbps calls will be processed in the SDNA domain.

### **Call Flow for SDS and SDI Calls (Digital Switched Access)**

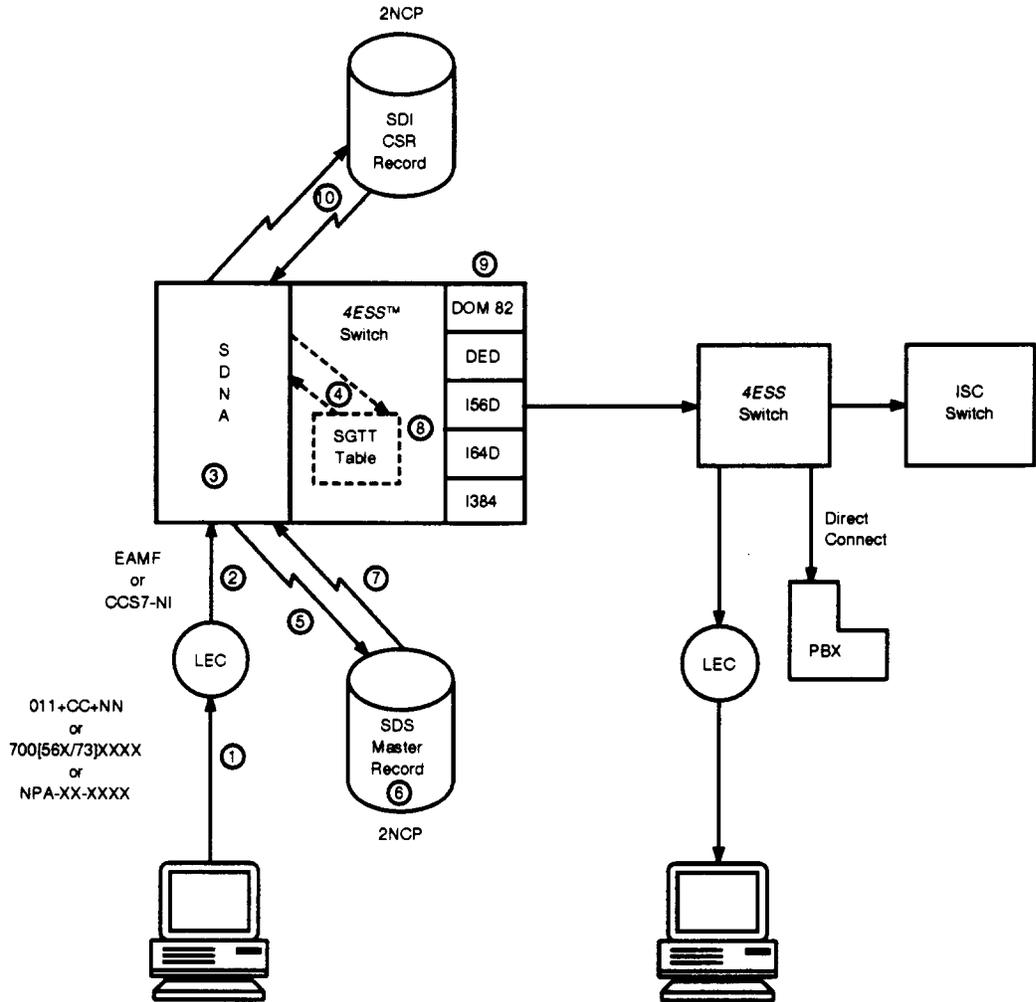
---

**2.02** The call flow for all switched data calls will be affected by the new architecture, for example, digital switched access SDDN/SDDNI calls, ISDN access direct-connect SDS calls, ISDN access direct-connect SDDN calls, non-ISDN direct-connect SDS calls, etc. The following call flow (along with Figure 5-1) describes the steps that take place for digital switched access SDS and SDI calls. This call flow is provided as a representative example of how a data call is handled in the revised architecture.

1. The customer sends a digit string to a Local Exchange Carrier (LEC) switch.

<b>If the dialed digits are...</b>	<b>The call is...</b>
011+CC-NN	An SDI call to a non-World Zone 1 (WZ1) destination
700-[56X/73X]-XXXX	An SDS call to an AT&T direct-connect station
NPA-NXX-XXXX	An SDS call to a digital switched access destination or an SDI call to a WZ1 destination.

2. From the Carrier Access Code (CAC), the LEC switch determines that the digital call should be routed to the AT&T Switched Network (ASN).
3. An AT&T 4ESS switch receives the signaling message [this could be either Equal Access Multifrequency (EAMF) or Signaling System 7 (SS7) Network Interconnect (NI)] and determines that the call should be translated in the SDNA domain. From the signaling message, the switch also determines the following information:
  - Data rate—56-kbps, 64-kbps Clear/Restricted, or 384-kbps Clear
  - Routing Number—CC-NN (Country Code and National Number), 700+7D, or North American Numbering Plan (NANP)
  - Nature of Routing Number—International or National
  - Customer's ANI.
4. The 4ESS switch determines that a query needs to be made to an ANI-based 2NCP. Using the customer's ANI, the Self-Provisioning Global Title Translation (SGTT) table is accessed to determine the point code/subsystem number of the 2NCP that contains the Master Record for the SDS.
5. From the information derived from the SGTT table, the 4ESS switch prepares a Transaction Capabilities Application Part (TCAP) BEGIN message that it sends to the 2NCP. The message includes the following information:
  - Customer's ANI
  - Customer ID for the SDS Master Record
  - Dialed digits
  - Data rate.



Legend:

- |      |                                |      |  |
|------|--------------------------------|------|--|
| CSR  | Carrier Specific Routing       | NI   | Network Interconnect                       |
| DED  | Dedicated Egress Data          | PBX  | Private Branch Exchange                    |
| DOM  | Domain                         | SDI  | Switched Digital International             |
| EAMF | Equal Access Multifrequency    | SDNA | Software Defined Network Access            |
| ISC  | International Switching Center | SDS  | Switched Digital Service                   |
| LEC  | Local Exchange Carrier         | SGTT | Self-Provisioning Global Title Translation |
| NCP  | Network Control Point          |      |  |

tpa 786784/01

Figure 5-1. SDS/SDI Digital Switched Access Call Flow

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6. The dialed digits are analyzed by the SDS Master Record, and a determination is made whether or not to do a number translation. If a 700 number was dialed, the SDS Master Record attempts to translate that number to an APN routing number.

<b>If...</b>	<b>Then...</b>
A translation for the 700 number is found	A routing number in APN format is returned to the 4ESS switch in a TCAP END message
No translation is found for the 700 number	The NCP instructs the switch to final handle the call.

If an NANP or CC-NN number was dialed, the same number is returned to the 4ESS switch in the TCAP END message.

7. The TCAP END message that is returned to the 4ESS switch contains a "Charging-Bill Call" Operation that instructs the switch to generate an AMA record for the call. This is a change from the way SDS queries had been handled in the past. The AMA record that is generated uses Call Code 061 (for SDS/SDI service).
8. Using the data rate, the Generic Routing Information (GRI), and the Routing Number nature, the 4ESS switch determines the domain in which the call should be translated.

<b>For...</b>	<b>Calls are translated in...</b>
SDS calls to Digital Switched Access locations	Domain 82
SDS calls to AT&T direct-connect stations	The Dedicated Egress Data (DED) domain
SDI Outbound calls	Either the I56D, I64C, or I384 domain.

9. Subsequent call processing is based on whether the call is an international call or a domestic call.

<b>If...</b>	<b>Then...</b>
The call is a domestic call	The call is translated in Domain 82 or the DED domain. Existing SDS routing procedures are used to process the call.
The call is an international call (SDI)	The switch places the call in the appropriate international routing domain.

10. For an international call, the switch uses the destination country code to determine whether a query needs to be made to the SDI-CSR database.

**If...**

An SDI-CSR query is needed

**Then...**

The switch generates a pseudo ANI value (700-100-111). The pseudo ANI is used to access the SGTT to determine which 2NCP contains the SDI-CSR customer's record and the Customer ID for that record. From this point, existing SDI-CSR call flow applies.

An SDI-CSR query is NOT needed

The call is routed using Real Time Network Routing (RTNR) and the destination country code.

### **3. Provisioning**

#### **Recent Change (RC) Forms Affected**

##### **A. RC Forms 300, 301, 302, 303, and 304**

- 3.01** N64C is now a valid AD1 entry on these RC forms when CALLTYP=DSD and CALldata=RDOM.

##### **B. RC Forms 100, 101, 107, and 108**

- 3.02** On these RC forms, the S5 field is used to specify that the Trunk Subgroup (TSG) supports SDS in the SDNA domain.
- 3.03** On RC Forms 107 and 108, the TSG domain can be changed from 82 to SDNA without having to disable the trunks (CAD.OOSI).

#### **Verify Forms Affected**

##### **A. Verify Forms 1a and 1b**

- 3.04** A "Y" in the S5 field indicates that the TSG supports SDS data in the SDNA domain.

##### **B. Verify Forms 13f and 13m**

- 3.05** N64C is now a valid AD1 input on these verify forms when CALLTYP=DSD and CALldata=RDOM.

## **4. Recording**

---

**4.01** As a result of this feature, existing Call Code 061 and Structure Codes 00190, 00194, 01081, 01083, 01500, and 01501 are now initiated based on instructions received from the NCP.

## **5. Network Management (Not Affected)**

---

## **6. Maintenance/Troubleshooting (Not Affected)**

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## **7. Transition Considerations**

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### **Ubiquity**

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**7.01** It is not necessary for all 4ESS switches in the network to be running the 4E20 Release 3 Generic for this feature to be fully operational.

### **Turn On Preconditions**

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**7.02** Before turning on this feature, the following two tasks have to be completed:

1. The SDS Far End Network (FEN) blocks have to be modified to allow SDN calls.
2. TSGs that are in Domain 82 (the data domain) have to be transitioned to the SDNA domain.

#### **A. Modify SDS FEN Blocks**

**7.03** Before transitioning any trunks from Domain 82 to the SDNA domain, the SDS FEN blocks, PBX/DR5 and ACCESO/DR5, must be modified so that SDN calls are recorded correctly. This modification is done from RC Form 618. Using RC Form 618, change the Service Category, **SDN**, to **N** for both the PBX and ACCESO FENs.

#### **B. Transition TSGs in Domain 82 to SDNA Domain**

**7.04** Using RC Forms 107 and 108, change the applicable TSGs that are currently in Domain 82 to the SDNA domain. (Incoming international trunks will not be changed.)

**7.05** In addition to changing the domain, you also need to set the Call-by-Call (CBC) data bit to **N** and the S5 field to **Y**. After the domains have been changed, ANI-based queries will be sent to the NCP rather than dialed-number-based queries.

**⇒ NOTE:**

If necessary, the TSGs can be changed back to Domain 82. If the change is made, the CBC data bit must be set back to **Y** and the S5 field to **N**.

### Turn On/Turn Off Mechanism

**7.06** The state of this feature is controlled by two ODA data bits: OD4PF5 (CBC Trigger Office Parameter) and OD4PF6 (Pseudo ANI Office Parameter). OD4PF5 is used for trunks with Q.931 signaling, and OD4PF6 is used for trunks that remain in Domain 82, that is, international trunks.

**7.07** The OD4PF5 data bit supports the transition of ISDN customers with CBC service. The setting of the bit determines the domain to use for processing a call and the type of NCP query to make when an *ACCUNET*<sup>®</sup> digital services Network Specific Facility (NSF) Information Element (IE) is received.

<b>If OD4PF5 is...</b>	<b>Calls will be processed in ...</b>	<b>And the NCP query will be...</b>
Off	Domain 82	Dialed number based
On	SDNA domain	ANI based

**7.08** During the transition phase, trunks that are still in Domain 82 will be capable of querying SDS records in either a 1NCP or a 2NCP. The setting of OD4PF6 determines which NCP (1NCP or 2NCP) is queried and the type of query that will be made.

<b>If OD4PF6 is...</b>	<b>The NCP queried is...</b>	<b>And the NCP query is...</b>
Off	A 1NCP	Dialed number based
On	A 2NCP	ANI based

**7.09** ODA bits OD4PF5 and OD4PF6 can be turned on or off using RC Form 809 or by doing an absolute work change.

#### **A. Turn On/Turn Off Using RC Form 809**

**7.10** To turn OD4PF5 on using RC Form 809, enter **PF5** in the FEATURE ITEM field on RC Form 809 and **ON** in the ON OR OFF field. To turn OD4PF5 off, enter **PF5** in the FEATURE ITEM field on RC Form 809 and **OFF** in the ON OR OFF field.

**7.11** To turn OD4PF6 on, enter **PF6** in the FEATURE ITEM field on RC Form 809 and **ON** in the ON OR OFF field. To turn OD4PF6 off, enter **PF6** in the FEATURE ITEM field on RC Form 809 and **OFF** in the ON OR OFF field.

**B. Turn On/Turn Off Using Absolute Word Change**

**7.12** This feature can also be turned on or off by an absolute word change. ODA bits OD4PF5 and OD4PF6 are in ODA structure OD4OFCCOPY.



**CAUTION:**

*The OD4OFCCOPY structure also contains the on/off bits for many other features. Be certain that any changes you make only affect this feature.*

**7.13** The following is the information needed to turn ODA bit OD4PF5 on or off using an absolute word change:

- Structure: OD4OFCCOPY
- Core address in 4E20 Generic: 6731453
- Size of OD4PF5: 1
- Displacement of OD4PF5: 4
- On: 1
- Off: 0

**7.14** The following is the information needed to turn ODA bit OD4PF6 on or off using an absolute word change:

- Structure: OD4OFCCOPY
- Core address in 4E20 Generic: 6731453
- Size of OD4PF6: 1
- Displacement of OD4PF6: 5
- On: 1
- Off: 0

**8. Input/Output Manual Pages (Not Affected)**

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**Recent Change Administration  
System (RCAS)—Phase 2 Feature  
(4366)**

**6**

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# Recent Change Administration System (RCAS)—Phase 2 Feature (4366)

# 6

## 1. Feature Description



### NOTE:

Feature 4366 was deferred from the 4E20 Release 2 Generic to the 4E20 Release 3 Generic. Documentation for this feature, however, was included in AT&T 234-090-202AC, *4ESS™ Switch, Product Release Document, 4E20 Release 2 Generic*. **That documentation must be removed from the 4E20 Release 2 Product Release Document.** Feature 4366 has since then been recommitted for the 4E20 Release 3 Generic, and the documentation has been revised in this PRD.

**1.01** The Recent Change Administration System (RCAS) is a generic capability used to update administrative data in the 4ESS switch. The RCAS platform enhances the office data provisioning throughput into the 4ESS switch by moving Recent Change (RC) functionality into a remotely located processor called RCAS. The RCAS capability allows a provisioning Operating System such as the Integrated Routing Assignment System (IRAS) to send RC data to the RCAS platform for update instead of to the 4ESS switch. This is done to decrease the RC session time from about 6.0 seconds per update (via the 4ESS switch) to about 1.0 second per update (via RCAS). During a typical RC session, RCAS retrieves office data from the switches in the network, updates that data with the changes from IRAS, and then returns the data back to the switches. The initial releases of RCAS only support high-volume AT&T 1B Processor-based Positive Call Processing (PCP)—Automatic Number Identification (ANI)—table updates.

**1.02** The RCAS platform provides faster RC throughput and a more efficient way for provisioning Operating Systems to access and modify office data. The increase in provisioning time is necessary to meet 4ESS switch customer agreements for generic retrofits and RC updates. Prior to RCAS, a lot of time was spent provisioning and maintaining the service data structures in the 4ESS switch using the file transfer method, and there was not enough time to update all the RC data needed for the RC session. If left unchanged, this situation could become worse with the increase in the number of RC orders requiring provisioning. Through RCAS, however, this problem is resolved since RCAS provides a much faster RC interface to the 4ESS switch. The throughput into the switch is improved to about 1.0 second per RC order (versus 6.0 seconds per RC order). RCAS throughput is affected by the call load, the size of the data base (that is, the 1B Processor PCP table), and any other RC activity occurring at the same time. It should be noted that the 1.0 second per ANI average is achieved when the number of ANI changes are greater than 1,200.

**1.03** Since the initial two releases of RCAS are used to support AT&T proprietary features (that is, 1B Processor PCP table), the RCAS application is not available for use in Regional Bell Operating Companies. RCAS is deployed in two phases, Phase 1 and Phase 2.

#### **Phase 1—Feature 4269**

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**1.04** Phase 1 (Feature 4269) was deployed in the fourth quarter of 1994. Phase 1 provides support for generic retrofit-only RC activity via the Attached Processor System (APS) Off-Line Processor (OLP). An RC activity during Phase 1 included updating ANI data relative to the generic retrofit. ANI RC data was loaded into RCAS via a Packet Internal Network (PINET) data link from IRAS, processed with the new generic database, and sent to the OLP. The Dedicated Wide Area Network (DWAN) provides an additional interface by which data is transferred to the OLP. After the data had been verified and tested, it was then downloaded into the retrofit switch. A typical day-to-day RC activity for the ANI data structures was processed from IRAS directly into the 4ESS switches. This allowed IRAS to provide more time toward daily RC activities since RCAS was capable of handling the retrofit load.

#### **Phase 2—Feature 4366**

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**1.05** RCAS Phase 2 (Feature 4366) is scheduled for deployment in the third quarter of 1995. The initial release of RCAS Phase 2 is only used for 1B Processor-based PCP (ANI) table RC. Phase 2 gives RCAS full ANI RC update capabilities both for generic retrofits and for day-to-day data structure updates. In Phase 2, RCAS is connected to AT&T 3B20D computers in individual 4ESS switch offices via DWAN 56-kbps BX.25/Office Data Assembler Datalinking (ODAD) data links. RC data is returned to the switch via the DWAN data links. The DWAN data links allow RCAS to communicate directly with the 4ESS switches in the field in addition to the OLP.

**1.06** An update session between RCAS and any given 4ESS switch office can be scheduled without inhibiting other IRAS-related update activity at the same office. RCAS needs a window of non-interruption for updating the data. If another RC activity (such as IRAS or a RC activity at the 1B terminal) is scheduled during an RCAS session, RCAS will back down and after a period of time, it will reconnect the session and continue where it left off. The downside to this is that RCAS has to re-establish the connection and bear the overhead involved. RCAS will not block other RC activities.

**1.07** The following provisioning flow occurs when data structure administration applications are developed and deployed on the platform:

1. IRAS receives data structure updates (RC orders) from the Outbound Service Management System or Consumer Provisioning System (for example), performs checks, and transmits the RC data to RCAS using file transfer. The RC data includes the Order Number, ANI information, CLLI\* code, and an Operation Code (add, delete, change). The data is stored in RCAS until IRAS sends an activation command to RCAS.
2. When RCAS receives the activation command from IRAS, RCAS starts the RC session. If the number of DWAN connections available for updates is not enough to begin RC sessions with all the switches requiring updates, RCAS will hold the files and continue establishing connections until all switches have been updated.
3. RCAS sends a read request message to the switches to retrieve the data structures that need to be changed. This data is stored in RCAS for as long as the RC session is active.
4. RCAS updates the data in its memory (that is add, change, or delete) and stores it. It then sends a write request message to the switch to indicate the memory location, new data, and any detected errors.
5. When the write request message is received in the 3B20D computer APS, a disk write occurs causing both the 3B APS disk and the 1B Processor core memory to be updated.
6. When the first change transaction is completed successfully, RCAS starts the next change transaction. This continues until all data received from IRAS has been updated in the appropriate switches.

## **2. Call Flow (Not Affected)**

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\* COMMON LANGUAGE is a registered trademark and CLEI, CLLI, CLCI, and CLFI are trademarks of Bell Communications Research, Inc.

### **3. Provisioning**

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**3.01** The existing File Transfer and Activation (FTA) mechanism is used to transmit the RC data to RCAS using file transfer and activation commands. However, the following existing FTA commands need clarification:

- **FILE:EXEC <CLLI code/filename> {;ENTRY <x>}!**—With respect to RCAS, the "x" value can be any value to continue the execution of the command file <filename>. With the original FTA, the provisioning Operations Support System (OSS) must specify a valid "x" value to continue the execution of the command file <filename>. RCAS requires that a CLLI code and a "/" precede the filename to distinguish which switch the updates apply.
- **FILE:RSTAT <CLLI code>!**—With respect to RCAS, this command provides no useful information. This command is intended for use by a provisioning OSS to see the amount of storage left on the 3B20D computer (original FTA mechanism). RCAS requires that a CLLI code be used with this command but without the "/"

**⇒ NOTE:**

The "all fail" option in the transaction is not used when it is included in the command file.

### **4. Recording (Not Affected)**

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### **5. Network Management (Not Affected)**

---

### **6. Maintenance/Troubleshooting (Not Affected)**

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### **7. Transition Considerations**

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#### **Hardware/Software Requirements**

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##### **A. Hardware**

**7.01** RCAS operates within a host system consisting of engineered-size, commercial-grade computer hardware. The hardware is the same hardware used in RCAS Phase 1.

**7.02** An RCAS system will have two RCAS *Sun*\* computer workstations, each connected to a DWAN circuit. An individual RCAS system interfaces to the DWAN using Closed User Group protocol for security purposes. The interface supports a maximum of 48 equivalent 56-kbps channels. As stated previously, the number of RCAS *Sun* computer workstations and the number of DWAN circuits are both engineered quantities.

**7.03** The RCAS feature utilizes the ODAD link (one per office) on the 3B20D computer Input/Output (I/O) port. The ODAD link is shared between this feature (4366) and the Office ODAD feature (4053). Phase 1 of the ODAD feature grew the 56-kbps data link to the Synchronous Data Link No. 24 (SDL-24) I/O port of the APS at all AT&T-owned 4ESS switch offices. The procedure for growing the 56-kbps link is covered in the existing Task Oriented Practice (TOP), AT&T 234-153-025, *4ESS™ Switch, Attached Processor System Growth/Degrowth*.

## **B. Software**

**7.04** The RCAS interface is built upon the existing Next Generation-Office Data Administration (NG-ODA) system architecture to enhance and reduce the cost of 4ESS switch Office Data Assembler retrofits. The NG-ODA is a retrofit tool used to populate office data for retrofit between generic releases. RCAS uses the same base platform software, the Office Database Management System (ODMS) which defines all the data structures in the 4ESS switch, with new application software for Positive Call Processing RC activities.

**7.05** The software needed for RCAS consists of specific application software to drive RC activities, DWAN communication software, Cache protocol software, and I/O software to the provisioning system(s). Additional software is required in the 4ESS switch to interface with RCAS. This includes both 1B Processor and 3B APS I/O interface software.

**7.06** The 3B20D computer is the arbitrator between RCAS and the 1B Processor. It has been updated with new codes to interact with RCAS and perform RC updates that are totally independent of interaction from other systems occurring simultaneously.

## **Other Network Dependencies**

---

**7.07** This feature relies on an OSS that connects to RCAS over either DWAN facilities (Phase 2) or PINET (Phase 1). Presently, IRAS is the only OSS that uses the PINET interface. RCAS, which uses the DWAN interface, has the capability to terminate either interface but only for communication to the ODAD link. File transfer is currently only allowed on the PINET link.

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\* *Sun* is a registered trademark of Sun Microsystems, Inc.

## **Ubiquity**

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- 7.08** Deployment of the 4E20 Release 3 Generic is required throughout the AT&T 4ESS switch network in order for the RCAS Phase 2 feature to be operational.

## **Turn On/Turn Off Mechanism**

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- 7.09** This feature is automatically turned on by software deployment per 4ESS switch office.

## **8. Input/Output Manual Pages**

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**8.01** Five new 4ESS switch 3B20D computer APS Input/Output Manual Pages were created for use with the RCAS Phase 2 feature. These pages are included to provide detailed information about the new I/O messages. The four new 3B20D computer output messages are given in Table 6-A.

**8.02** One new 3B20D computer input message, **OP:RCAS**, has been created for use with this feature. This input message requests the RCAS kernel process to report the status of RCAS tasks, RCAS measurement counts, and RCAS files.

Table 6-A. 3B20D Computer Output Messages

Message	New/ Modified	Description
OP:RCAS-TASKS	New	Reports the status of RCAS tasks.
OP:RCAS-MEAS	New	Reports the status of RCAS measurements. This output message gives the non-zero measurement counts which includes the name of the item and the total value of items processed.
OP:RCAS-FILES	New	Reports the status of RCAS files. The report lists the following information: <ul style="list-style-type: none"> <li>■ Path name</li> <li>■ File status</li> <li>■ Number of reads and writes</li> <li>■ Number of bytes read and written.</li> </ul>
REPT:RCAS	New	Prints out RCAS status and error messages. The output includes the RCAS task that generated the report and the message contents and size. Seek technical assistance if errors occur.

ID . . . . . OP:RCAS  
WORK CENTER. . MOC  
GENERIC . . . . . 4AP13 Rel. 2 and later  
APPLICATION . . 4E  
TYPE . . . . . Input

**1. PURPOSE**

This input message requests the RCAS kernel process to report status of RCAS tasks, RCAS meas, or RCAS files.

**2. FORMAT**

**OP:RCAS,aI**

**3. EXPLANATION OF MESSAGE**

a Report the status of **RCAS** tasks, **RCAS** meas, or RCAS files. Possible values:

- TASKS — **RCAS** tasks.
- MEAS — **RCAS** meas.
- FILES — **RCAS** files.

**4. SYSTEM RESPONSE**

PF Printout follows. Followed by OP:RCAS output message.

NG - BAD OST CALL No good. Operating system trap call to **RCAS** failed.

NG - RCAS UNKNOWN REQUEST No good. **RCAS** received an unknown request.

RL - RCAS IS NOT RUNNING Retry later. The kernel process **RCAS** is not running.

RL - UNKNOWN RESPONSE FROM RCAS Retry later. Unknown response from **RCAS**.

RL - UNABLE TO OPEN TMP FILE Retry later. Unable to open temporary file for output message.

**5. REFERENCES**

- Output Messages
  - OP:RCAS-TASKS
  - OP:RCAS-MEAS
  - OP:RCAS-FILES

SEE PROPRIETARY NOTICE ON COVER PAGE

ID ..... OP:RCAS-TASKS  
WORK CENTER.. MOC  
GENERIC ..... 4AP13 Rel. 2 and later  
APPLICATION .. 4E  
TYPE ..... Output

**1. FORMAT**

OP RCAS TASKS COMPLETED

TASK CONTROL BLOCK (TCB) STATUS

TCB	STATUS	PROCID	NAME	STACK	SWITCHES
a	X'b	X'c	X'd	X'e	f

**2. REASON FOR OUTPUT**

To report the status of RCAS tasks.

**3. VARIABLE FIELD DEFINITIONS**

a Task control block (tcb) number. Possible values: 0 through 15.

b Task status. Representation of bits:

- 0x0 — tcb slot is available.
- 0x1 — tcb slot is in use.
- 0x2 — tcb is ready to run.
- 0x4 — tcb is currently running.
- 0x8 — tcb is to be torn down.
- 0x10 — tcb is timing.
- 0x20 — tcb is starting.
- 0x40 — tcb is expecting an RTR msg stimulus.
- 0x80 — tcb is expecting an INT msg stimulus.
- 0x100 — tcb is expecting an ACK msg stimulus.
- 0x200 — tcb is expecting WAKEUP event
- 0x400 — tcb is expecting SHUTDOWN event
- 0x800 — tcb is expecting user event 1.
- 0x1000 — tcb is expecting user event 2.
- 0x2000 — tcb is expecting user event 3.
- 0x4000 — tcb is waiting for an audit to be dispatched.

c Procedure ID. Byte representation:

- First byte (leftmost) — Zero value.
- Second byte — Procedure number.
- Third byte — tcb number.
- Fourth byte (rightmost) — Incarnation bit.

Procedure ID equal to zero implies null procedure.

SEE PROPRIETARY NOTICE ON COVER PAGE

- d Procedure name.
- e Stack address.
- f Number of switches made by the process.

**4. ACTION TO BE TAKEN**

None.

**5. REFERENCES**

Input Message  
OP: RCAS

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ID . . . . . OP:RCAS-MEAS  
WORK CENTER . . MOC  
GENERIC . . . . . 4AP13 Rel. 2 and later  
APPLICATION . . 4E  
TYPE . . . . . Output

**1. FORMAT**

OP RCAS MEAS COMPLETED

RCAS MEAS REPORT

NAME	VALUE
a	b

**2. REASON FOR OUTPUT**

To report the status of RCAS meas .

**3. VARIABLE FIELD DEFINITIONS**

a	Name of the measurement.
b	Value of the measurement.

**4. ACTION TO BE TAKEN**

None.

**5. REFERENCES**

Input Message  
OP : RCAS

SEE PROPRIETARY NOTICE ON COVER PAGE

ID ..... OP:RCAS-FILES  
WORK CENTER.. MOC  
GENERIC ..... 4AP13 Rel. 2 and later  
APPLICATION .. 4E  
TYPE ..... Output

**1. FORMAT**

OP RCAS FILES COMPLETED

RCAS FILES STATUS

PATHNAME	STATUS	READS/BYTES	WRITES/BYTES
a	b	c/d	e/f

**2. REASON FOR OUTPUT**

To report the status of RCAS files.

**3. VARIABLE FIELD DEFINITIONS**

- a Pathname of the file. Possible values: /dev/1afile0|1, and /dev/odad.
- b File status.
- c Number of reads.
- d Number of bytes read.
- e Number of writes.
- f Number of bytes written.

**4. ACTION TO BE TAKEN**

None.

**5. REFERENCES**

Input Message  
OP:RCAS

SEE PROPRIETARY NOTICE ON COVER PAGE

ID . . . . . REPT:RCAS  
WORK CENTER . . MOC  
GENERIC . . . . . 4AP13 Rel. 2 and later  
APPLICATION . . 4E  
TYPE . . . . . Output

**1. FORMAT**

REPT RCAS PROC (task): msg

**2. REASON FOR OUTPUT**

To report RCAS status and errors.

**3. VARIABLE FIELD DEFINITIONS**

task                    The RCAS task generating the report:

task	function
Init	RCAS application initialization handler
In_rcas	Incoming RCAS packet handler
Out_rcas	Outgoing RCAS packet handler
In_1b	Incoming 1B packet handler
Out_1b	Outgoing 1B packet handler
Rd_disk	Read disk request handler
Wt_disk	Write disk request handler
Audit_mgr	RCAS audit handler
Hb_rcas	RCAS heartbeat handler
Hb_1b	1B heartbeat handler
Hb_req	Heartbeat request handler

msg                    Message contents. The RCAS status and error messages are listed.

DATA LINK (SDL24) CONNECTED  
  
TIMEOUT WAITING FOR SETUP MSG  
  
TIMEOUT WAITING FOR SETUP RESP MSG  
  
RD-DISK KILLED!  
  
WT-DISK KILLED!  
  
RCVD ABORT MSG  
  
UNEXPECTED MSG RCVD IN IDLE STATE  
  
FAILED TO START HB-1B TASK

SEE PROPRIETARY NOTICE ON COVER PAGE

FAILED TO START HB-RCAS TASK  
SESSION STARTED  
UNEXPECTED MSG RCVD IN W\_SETUP\_RESP STATE  
SESSION DISCONNECTED  
UNEXPECTED MSG RCVD IN CONNECTED STATE  
FAILED TO OPEN DATA LINK (SDL24)  
FAILED TO SEND I\_AM\_HERE MSG  
FAILED TO START IN-1B TASK  
FAILED TO START OUT-1B TASK  
FAILED TO START IN-RCAS TASK  
FAILED TO START OUT-RCAS TASK  
FAILED TO START HB-REQ TASK  
FAILED TO START RD-DISK TASK  
FAILED TO START WT-DISK TASK  
FAILED TO START AUDIT TASK  
FAILED TO SND EVENT  
EXIT  
alocmsg (size) FAILED  
queuemn (rcode) FAILED  
TIMEOUT  
RCVD UNEXPECTED EVENT type  
STATE VAR BAD (state)  
UNEXPECTED REQUEST RCVD  
UNEXPECTED RESPONSE RCVD

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UNEXPECTED MSG RCVD  
UNEXPECTED SUPERVISOR MSG RCVD  
ERROR: Taskerr() CALLED FROM KERNEL STACK  
f\_devid(): UNABLE TO ATTACH TO ECD  
f\_devid(): INVALID LOGDEV FOR name  
SMSG OWNED BY UNKNOWN TASK name  
OLD SMSG msg=msg task=name  
LMSG OWNED BY UNKNOWN TASK name  
OLD LMSG msg, time  
OLD LMSG msg=msg task=name  
type LIST: LINKED TO BUSY SMSG  
type LIST: LINKED TO BUSY LMSG  
type LIST: MSG INDEX NOT FOUND  
type MSG QUEUE SIZE MISMATCH  
free\_int\_msg(): BAD MSG POINTER (0xmsg)  
kfault(): NON-TASK FAULT X'type  
AT X' addr REG0 X'addr REG8 X'addr  
FAILED TO START name TASK  
FAILED TO SEND EVENT rcode  
teardown(): BAD TCB POINTER tcbp  
TASK TEARDOWN: task, ERR CODE: errcode  
TASK TEARDOWN: task INTER STAT  
TEARDOWN TASK task STACK OVFL SP=X'addr  
FAILED TO RESTART TASK (task)  
RESTARTING TASK (task)

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FLT\_QMSAUD OLD MSG: TYPE=type  
BAD FAULT TYPE type  
AUDIT ERR CODE X'errcode  
UNEXPECTED EVENT TYPE RCVD type  
FAILED TO START num TASK  
FAILED TO FIND TASK FOR ACK  
FAILED TO ATTACH ACK MSG rcode  
FAILED TO ATTACH AP\_MSG MSG rcode  
SETUP RCVD  
SHUTDOWN  
INACTIVITY TIMEOUT  
HEARTBEAT TIMEOUT  
HEARTBEAT SUCCESS  
DATA LINK WRITE FAILED  
DATA LINK READ FAILED

size	Size of the msg.
rcode	Return code value.
state	State value returned.
name	Name of record or task.
msg	Msg in case.
time	Timestamp returned.
type	Type of list, msg, event or, fault.
addr	Address in hex.
tcbp	Tcb pointer value.
task	Name of the running task.
errcode	Error code generated by the system.

SEE PROPRIETARY NOTICE ON COVER PAGE

**4. ACTION TO BE TAKEN**

Seek technical assistance if errors occur.

**5. REFERENCES**

None.

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# ABC ANI Trigger Table Feature Processing Data Expansion Feature (4372)



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# ABC ANI Trigger Table Feature Processing Data Expansion Feature (4372)



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## 1. Feature Description

---

**1.01** As a result of restructuring the Adjunct Based Capabilities (ABC) Automatic Number Identification (ANI) Trigger Table in the 4E20 Release 1 Generic (Feature 384b), seven spare bits became available for identifying features. The capability, however, for provisioning these spare bits did not exist in the 4E20 Release 1 Generic.

**1.02** This feature provides the "platform" for defining the provisioning capabilities that are needed to use the seven spare bits as feature indicators. Although the feature provides the provisioning capabilities, it does not define their specific use. Their use will be defined by future feature-specific requirements.

## 2. Call Flow (Not Affected)

---

### 3. Provisioning

#### Data Structures Affected

**3.01** The Common Platform Adjunct (CPA) layout in the HT4ANI\_IJLKP data structure was modified to support the seven spare feature indicator bits. The four existing spare items (SPX1, SPX2, SPX3, and SPX4) in this structure have been deleted and replaced with the following feature indicator items: FI1, FI2, FI3, FI4, FI5, FI6, and FI7. In addition, two new state assignments have been defined for use with each of the new items: 4XLANI\_FI\_OFF = 0 and 4XLANI\_FI\_ON = 1. The default state for each of the new indicators is "off."

#### Population and Retrieval

##### A. Recent Change (RC) Forms Affected

**3.02** RC Forms 650 and 658 were modified to support this feature. A new field FIA (Feature Indicator All) was added to RC Form 650. (See Figure 7-1.)

RC:CPA;CHG:OPT(ORIG), \_\_\_\_: CANI\_\_\_\_, TOA \_\_, TSVC \_\_, NUMPL \_\_,  
 ORNU \_\_, ACTION \_\_,  
 ALA \_\_, FPDT \_\_, FIA \_\_\_\_\_,  
 REMARKS \_\_\_\_\_

Figure 7-1. RC Form 650—Change CPA Access Trigger Table

**3.03** An eighth field was added to RC Form 658 to handle the FIA. (See Figure 7-2.)

The diagram shows the layout of RC Form 658. At the top, it specifies the message format: `RC:CPA:CHG:OPT (STRG) , _____ : _____ ,`. Below this, there are 20 rows of a 3-string message format, represented as `_____/_____/_____/_____/_____/_____/_____/_____`. The eighth field in each row is shaded with a stippled pattern, indicating the new field for FIA. At the bottom of the form, there is a section labeled `REMARKS :`.

**Figure 7-2. RC Form 658—Positive Call Processing (PCP) Release 3-String Message**

**B. Verify Forms Affected**

**3.04** A new form of the VER:CPA input message containing the optional keyword FIR (Feature Indicator Request) was added to the 16aq Verify Input message. The format of the message that contains FIR is as follows:

`VER:CPA:ORIGLIST[,FIR c].`

**3.05** The Verify Output Form 6ax was modified to add an FIA column. (See Figure 7-3.)



#### **4. Recording (Not Affected)**

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#### **5. Network Management (Not Affected)**

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#### **6. Maintenance/Troubleshooting (Not Affected)**

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#### **7. Transition Considerations**

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##### **Ubiquity**

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- 7.01** It is not necessary for all 4ESS switches in the network to be running the 4E20 Release 3 Generic for this feature to be fully operational.

##### **Turn On/Turn Off Mechanism**

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- 7.02** This feature is turned on automatically by software deployment.

#### **8. Input/Output Manual Pages**

---

##### **Input Manual Pages**

---

- 8.01** The following new format, which includes the optional key word FIR, was added to the VER:CPA-C-OR input manual page:

VER:CPA:ORIGLIST,FIR *m*

**Output Manual Pages**

---

**8.02** The output manual pages impacted by this feature are identified in Table 7-A.

**Table 7-A. Output Manual Pages**

<b>Message</b>	<b>New/ Modified</b>	<b>Description</b>
VER:CPA-CANI	Modified	The ID of this manual page was changed from VER:CPA-ORIG to VER:CPA-CANI for the sake of clarity. In addition to changing the ID, an FIA column was added to the output format.
VER:CPA-CANI-L	Modified	The ID of this manual page was changed from VER:CPA-ORIG-L to VER:CPA-CANI-L for the sake of clarity.
VER:CPA-CANI-FIR	New	This output message was created to list the entries in the CPA trigger table whose FIA field includes the value of the input FIR.

ID . . . . . VER:CPA-C-OR  
WORK CENTER. . . . . MAC, MOC  
GENERIC . . . . . 4E20 Rel. 3 and later  
CLASS . . . . . VER  
APPLICATION . . . . . 4E  
TYPE . . . . . Input

1. PURPOSE

Request information on the customer automatic number identifications (CANIs) that are contained in the common platform adjunct (CPA) database.

2. FORMAT

- [1] **VER:CPA:CANI** a[,TOA b][,TSVC c][,NUMPL d][,RDB]!
- [2] **VER:CPA:ORIGLIST** [,L e[,FID f]]!
- [3] **VER:CPA;STD,OPT X** g:ORIGLIST!
- [4] **VER:CPA:ORIGLIST,FIR** h!

3. EXPLANATION OF MESSAGE

- a Customer automatic numbering identification (3, 6, or 9 digits).
- b Type of access:
  - DC — Direct connect.
  - SA — Switch access.
- c Type of service:
  - LDS — Long distance service.
  - OMEG — Outward wide area telephone service (OUTWATS) or Megacom® Telecommunications Service.
- d Numbering plan:
  - APN — Action point numbering.
  - NANP — North American numbering plan.
- ORIGLIST** Origination list.
- RDB** Routing data block.
- e Adjunct logical address, single entry only (0 to 15).
- f Feature processing data type (FPDT) indicator:
  - ALA — Adjunct logical address.
  - FI — Feature indicator.
- g X indicator:
  - N — No.
  - Y — Yes.

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h Feature indicator request (FIR), single entry only (0-127).

#### 4. SYSTEM RESPONSE

NA Not accepted.  
PF Printout follows.

#### 5. REFERENCES

PIDENTs  
IOCPIMC4  
IOCPMCP4  
IOCPPVR4  
IOCPVRT4  
VRFYCNTL  
VRFYINPT  
VRFYOUT  
VRFYPCP

*Translation Guide, 4ESS™, TG-4, Division 8, Section 16aq*

Output Message  
VER:CPA-CANI

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ID . . . . . VER:CPA-CANI  
WORK CENTER . . . . . MAC, MOC  
GENERIC . . . . . 4E20 Rel. 3 and later  
APPLICATION . . . . . 4E  
TYPE . . . . . Output

**1. FORMAT**

VER:CPA:

CANI	TOA	TSVC	NUMPL	ALA	FPDT	X	FIA
aaaaaaaaaa,	bb,	cccc,	dddd,	ee,	fff,	g,	hhh,
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.
.	.	.	.	.	.	.	.

**2. REASON FOR OUTPUT**

To display information on the customer automatic number identifications (CANIs) contained in the common platform adjunct (CPA) database.

**3. VARIABLE FIELD DEFINITIONS**

- a Customer automatic number identification (10 digits).
- b Type of access:
  - DC — Direct connect.
  - SA — Switch access.
- c Type of service:
  - LDS — Long distance service.
  - OMEG — Outward wide area telephone service (OUTWATS)/Megacom® Telecommunications Service.
- d Numbering plan:
  - APN — Action point numbering.
  - NANP — North American numbering plan.
- e Adjunct logical address (0 to 15).
- f Feature processing data type (FPDT) indicator:
  - ALA — Adjunct logical address.
  - FI — Feature indicator.
- g X indicator:
  - N — No.
  - Y — Yes.
- h Feature indicator all (FIA) (0-127).

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4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs  
IOCPIMC4  
IOCPMCP4  
IOCPPVR4  
IOCPVRT4  
VRFYCNTL  
VRFYINPT  
VRFYOUT  
VRFYPCP

*Translation Guide, 4ESS™, Division 8, Section 6ax*

Input Message

VER:CPA-C-OR

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5. REFERENCES

PIDENTs  
IOCPIMC4  
IOCPMCP4  
IOCPPVR4  
VRFYCNTL  
VRFYINPT  
VRFYOUT  
VRFYPCP

*Translation Guide, 4ESS™, Division 8, Section 6be*

Input Message  
VER:CPA-C-OR

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IOCPPVR4  
IOCPVRT4  
VRFYCNTL  
VRFYINPT  
VRFYOUT  
VRFYPCP

*Translation Guide, 4ESS™, Division 8, Section 6bj*

Input Message

VER:CPA-C-OR

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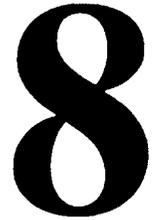
# Integrated Services Digital Network (ISDN) Operational Improvements Feature (4376)

# 8

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# Integrated Services Digital Network (ISDN) Operational Improvements Feature (4376)



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## 1. Feature Description

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- 1.01** This feature provides improvements to the Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI) that affect call completion. It gives the 4ESS™ switch the capability to improve call completions in certain call failure situations. This should result in improved reliability and reduced trouble-resolution expense for customer interfaces and services provided by network adjuncts.
- 1.02** The specific improvements provided by this feature affect the following call failure situations:
- Call clearing after D-channel node failure
  - Channel state mismatch due to an undetected failure
  - Channel service status changes while the D-channel is unavailable.
- 1.03** The improvements provided by this feature apply to both commercial and adjunct PRIs, as appropriate.

## Feature Capabilities

---

- 1.04** The capabilities provided by this feature are listed as follows:
1. When the D-channel node is unable to send a message for an active or an in-progress call to the Customer Premises Equipment (CPE) due to a missing call reference, the D-channel will return a Release Complete message with Cause 81 (Invalid Call Reference Value) to the 1B Processor.

2. When the D-channel node is unable to forward a message for an active or an in-progress call to the 1B Processor due to a missing call reference, the D-channel will return a Release Complete message with Cause 81 to the CPE.
3. When the 1B Processor receives a Release Complete message with Cause 81, the 4ESS switch will place the B-channel (trunk) associated with the message in a maintenance condition. This initiates Restart procedures on that channel.
4. When the 1B Processor receives a Release Complete message with Cause 44 (Requested Circuit or Channel Not Available) as the first response to a Setup message, the 4ESS switch will attempt to rehunt to a new B-channel and resend the Setup message.
5. If the 1B Processor receives a Setup message with a valid (unallocated) call reference, but for a B-channel which it believes to be busy, the 4ESS switch will respond with a Release Complete message with Cause 44. This places the indicated B-channel in a maintenance condition and initiates Restart procedures. This also initiates clearing of the network connection associated with the indicated (busy) B-channel.

**⇒ NOTE:**

All of the capabilities listed above are provided with software deployment. Recent Change (RC) Form 809 can be used to turn off Items 4 through 5, but Items 1, 2 and 3 will always remain active. When Items 4 and 5 are turned off, the 4ESS switch will handle the conditions specified in Items 4 and 5 as if this feature were not applied to the switch.

### **Call Clearing After D-Channel Node Failure**

**1.05** A call clearing problem occurs following a D-channel node failure when the D-channel node is unable to send the Disconnect message. Currently, the D-channel node sends a Restart message to the 1B Processor to clear the network connection. However, the connection is not cleared in the CPE. Although a temporary solution for this problem has helped in normal circumstances, the problem continued in certain cases. Specifically, if the D-channel link to the CPE is unavailable or if the CPE fails to successfully process the Restart message, the 4ESS switch would again believe the B-channel to be successfully idled at the same time the CPE believes it to be busy.

**1.06** This feature addresses this problem in the following way. If the D-channel node is unable to send the Disconnect message because it has lost the Call Reference Value of the call to be disconnected, it will return an indication to the 1B Processor. On receipt of the indication, the 1B Processor will clear the network connection and initiate Restart procedures on the B-channel.

- 1.07** The solution provided by this feature has the following advantages:
- The Restart procedures are controlled by the 1B Processor (using currently implemented procedures), not the D-channel.
  - If the Restart message does not reach the CPE, the 1B Processor will not receive a Restart Acknowledge message and will, therefore, place the B-channel in a maintenance condition. As a result, the B-channel will be unavailable for calls. This prevents the 4ESS switch from attempting to deliver calls to a channel the CPE believes is busy.

### **Channel State Mismatch Due to Undetected Failure**

---

- 1.08** There are situations where the network and the CPE are not synchronized with each other with regard to the perceived trunk busy/idle state of a B-channel. When this occurs, the 4ESS switch may attempt to set up a call to an idle B-channel which the CPE believes to be busy. Or, the CPE may attempt to set up a call to an idle B-channel which the 4ESS switch believes to be busy.
- 1.09** When the 4ESS switch attempts to set up a call to a B-channel which the CPE believes to be busy, it is recommended that the CPE respond by negotiating to an idle channel and sending a Status Enquiry message for the Call Reference on the channel believed to be busy. If channel negotiation is not supported, the CPE should clear the call with a Release Complete message, Cause 44 (Requested Circuit of Channel Not Available).
- 1.10** The Status Enquiry message will cause the 4ESS switch to respond with a Status message indicating that the specified Call Reference is idle and that the CPE can idle the channel. If the CPE is unable to send a Status Enquiry message for the appropriate Call Reference, it is recommended that the CPE initiate Restart procedures for the identified channel after negotiating the incoming call to a new channel or clearing the call.
- 1.11** This feature provides new capabilities that address the situations described above and which will enable more calls to be successfully completed. With this feature, when a Release Complete message with Cause 44 is received as the first response to a Setup message, the 4ESS switch will attempt to hunt for a new B-channel and resend the Setup message.

**1.12** For situations where the CPE attempts to set up a call to a B-channel which the 4ESS switch believes to be busy, this feature provides the following improvements:

- If the 4ESS switch receives a Setup message requesting a B-channel which is marked as busy, the 4ESS switch will clear the incoming call with a Release Complete message, Cause 44.
- The 4ESS switch will initiate Restart procedures for the identified channel.
- The 4ESS switch will clear the network connection.

### **Service Status Change While D-Channel Unavailable**

---

**1.13** This feature provides improvements to service status when a D-channel is unavailable, as described in the following two sections.

#### **A. Out-of-Service/Maintenance B-Channel Placed In Service**

**1.14** When a CPE or the 4ESS switch attempt to restore a B-channel to a more available state (for example, moving a B-channel from Maintenance to In Service) while the D-channel is unavailable, the service state will not change. This occurs because a Service Acknowledge message cannot be received by the CPE. However, the substate will change from near end to far end if the substate was originally near end. Both the CPE and the network will, therefore, consider the B-channel to be Out of Service/Maintenance-Far End, and normal service status audit procedures will return the B-channel to an In-Service state.

#### **B. In-Service B-Channel Placed in Out of Service/Maintenance**

**1.15** When a CPE attempts to move a B-channel to a less available state (for example, moving a B-channel from In Service to Maintenance) while the D-channel is unavailable, the change in service state will not be communicated to the network. The 4ESS switch will believe a given B-channel to be In Service, while the CPE will believe it is Out of Service/Maintenance-Near End.

**1.16** When the D-channel returns to service and the CPE does not immediately notify the 4ESS switch of the state change, the 4ESS switch may attempt to set up a call to the Out-of-Service/Maintenance B-channel. If channel negotiation is supported, the CPE should negotiate the call to a new B-channel. If not, it should clear the call by sending a Release Complete message with Cause 44. The CPE should then follow established service status procedures to communicate the Out-of-Service/Maintenance status to the network.

- 1.17 As previously described, this feature will allow the 4ESS switch to rehunt to a new B-channel and resend the Setup message after receiving a Release Complete message with Cause 44. This will enable more calls to be successfully completed.

## **2. Call Flow**

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- 2.01 Refer to "Feature Description" in this chapter for a description of how this feature affects message and call flows.

## **3. Provisioning**

---

- 3.01 All of the capabilities of this feature are provided with software deployment, and only certain capabilities can be turned off using RC Form 809. Refer to the feature capability listing in the "Feature Description" of this chapter. Items 1, 2 and 3 in this listing are the capabilities that cannot be turned off. Only Items 4 and 5 can be turned off using RC Form 809.

- 3.02 RC Form 809 is used to determine if the 4ESS switch will turn feature capability Items 4 and 5 (noted above) off. Feature Item F9 is used on RC Form 809 to specify ON, which means that the 4ESS switch will turn Items 4 and 5 off. The default is OFF, which means that all capabilities of this feature (Items 1 through 5 noted above) are active.

- 3.03 Verify Forms 16az and 8j are associated with the ON/OFF selection that is populated on RC Form 809.

## **4. Recording (Not Affected)**

---

## **5. Network Management (Not Affected)**

---

## **6. Maintenance/Troubleshooting**

---

### **New Final Handling Codes**

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- 6.01 There are ten new Final Handling Codes associated with this feature. These codes are listed in Table 8-A.

Table 8-A. Final Handling Codes

Code Number	Description
1576	<p><b>Last Normal Condition</b>—Incoming Setup message was processed, and a Call Proceeding message sent.</p> <p><b>Irregular Condition</b>—The D-Channel Node (DCN) responded to a 1B Processor message with a Release Complete message with Cause 81 (Invalid Call Reference Value), indicating a 1B/DCN state mismatch.</p> <p><b>Handling</b>—The 4ESS™ switch will place the incoming trunk HW.</p>
1577	<p><b>Last Normal Condition</b>—The call reached the stable state.</p> <p><b>Irregular Condition</b>—A Release Complete message with Cause 81 (Invalid Call Reference Value) was received, probably in response to a message sent by the 1B Processor.</p> <p><b>Handling</b>—The 4ESS switch will place the incoming trunk HW.</p>
1578	<p><b>Last Normal Condition</b>—A Setup message was sent.</p> <p><b>Irregular Condition</b>—A Release Complete message with Cause 81 (Invalid Call Reference Value) was received.</p> <p><b>Handling</b>—The 4ESS switch will place the outgoing trunk HW.</p>
1579	<p><b>Last Normal Condition</b>—Call reached the outgoing stable state.</p> <p><b>Irregular Condition</b>—A Release Complete message with Cause 81 (Invalid Call Reference Value) was received.</p> <p><b>Handling</b>—The 4ESS switch will place the outgoing trunk HW.</p>
1580	<p><b>Last Normal Condition</b>—The call started clearing procedures.</p> <p><b>Irregular Condition</b>—A Release Complete message with Cause 81 (Invalid Call Reference Value) was received.</p> <p><b>Handling</b>—The 4ESS switch will place the associated trunk HW.</p>
1581	<p><b>Last Normal Condition</b>—A Setup message was successfully processed.</p> <p><b>Irregular Condition</b>—A second Setup message arrived.</p> <p><b>Handling</b>—The 4ESS switch will send a Release Complete message on the incoming trunk and idle the outgoing trunk.</p>
1582	<p><b>Last Normal Condition</b>—The call reached the incoming stable state.</p> <p><b>Irregular Condition</b>—Another Setup message was received.</p> <p><b>Handling</b>—The 4ESS switch will send a Release Complete message.</p>

Table 8-A. Final Handling Codes (Contd)

Code Number	Description
1583	<p><b>Last Normal Condition</b>—The call reached the outgoing stable state.</p> <p><b>Irregular Condition</b>—A second Setup message was received.</p> <p><b>Handling</b>—The 4ESS will send a Release Complete message on the outgoing trunk and idle the incoming trunk.</p>
1584	<p><b>Last Normal Condition</b>—A Setup message was sent.</p> <p><b>Irregular Condition</b>—A Release Complete message with a Cause 44 (Requested Circuit or Channel Not Available) was received on the second rehunt.</p> <p><b>Handling</b>—The 4ESS switch will idle the incoming trunk.</p>
1585	<p><b>Last Normal Condition</b>—A Call Processing, Progress or Alert message was received.</p> <p><b>Irregular Condition</b>—A Setup message was received.</p> <p><b>Handling</b>—The 4ESS switch will send a Release Complete message on the outgoing trunk and idle the incoming trunk.</p>

## 7. Transition Considerations

### Ubiquity

- 7.01** It is not necessary for all 4ESS switches in the network to be running 4E20 Release 3 software for this feature to be fully operational.

### Turn On/Turn Off Mechanism

- 7.02** As described in "Provisioning", there is no turn on mechanism for this feature. There is no complete turn off mechanism for this feature, either, as only certain capabilities can be turned off while others remain active.
- 7.03** All Items (1 through 5) in the feature capability listing shown in the "Feature Description" section of this chapter are turned on automatically with software deployment to provide improved processing.
- 7.04** Feature Item F9 on RC Form 809 can be used to turn feature capability Items 4 and 5 (noted above) off when it is ON. The default is OFF (which means that all feature capabilities are active and that improved processing will be performed).

**7.05** Feature capability Items 4 and 5 (noted above) can also be turned on or off by an absolute word change using parameter OD4F9 in the Office Data Assembler (ODA) structure OD40FCCOPY.



**CAUTION:**

*The OD40FCCOPY structure contains on/off bits for many features. Be certain that any change you make will affect only this feature.*

**7.06** The following is the information needed to turn Items 4 and 5 on or off:

- Structure: OD40FCCOPY
- Core address in the structure: 4E20 Generic 6731452
- Size: 1
- Displacement: 8
- On (Feature capability Items 4 and 5 are off): 1
- Off (Feature capability Items 4 and 5 are active): 0

## **8. Input/Output Manual Pages (Not Affected)**

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**MEGACOM® 800 Service  
Interexchange Carrier with ANI  
Phase III Feature (4506/4753)**

**9**

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**MEGACOM<sup>®</sup> 800 Service  
Interexchange Carrier with ANI  
Phase III Feature (4506/4753)**

**9**

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**1. Feature Description**

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**1.01** The first two phases of this feature were *MEGACOM<sup>®</sup> 800 Service* to an Interexchange Carrier (IXC) with Automatic Number Identification (ANI) (4388) and *MEGACOM 800 Service* to an IXC with ANI Phase 2 Inband ANI/Dialed Number (DN) Delivery via MF (4401). Those features addressed the Signaling System 7 (SS7) Integrated Services Digital Network User Part (ISUP) (4388) and the MF (4401) interfaces with an IXC, and related call logic.

**1.02** The current feature enhances the billing for the *MEGACOM 800 Service* features. It does so for two reasons: to match the billing of IXCs with the actual usage of the AT&T Switched Network (ASN) and to reduce the possibility of fraud.

**1.03** The fundamental difference between billing an IXC customer and an AT&T customer is that the IXC should be billed for any usage of the ASN, not just for conversation. To prevent fraud and to charge for the IXCs' usage of the ASN, the billing of an IXC for *MEGACOM 800 Service* is triggered by an EXIT message rather than by an ANSWER message. Thus the IXC is charged for use of the ASN when it begins using network resources rather than when the called party answers.

**1.04** Currently, the Service IDs (SIs) used for this feature are Classic *MEGACOM 800 Service* (39) and 1800 Inbound Lite (51), allowing the IXC to receive calls from the Local Exchange Carriers (LECs) and Canada, respectively. However, other SI values can also be provisioned for this feature if there is a need to expand the service.

## **2. Call Flow**

---

**2.01** The call flow and call processing for this feature are basically the same as for the existing *MEGACOM 800 Service*. The only difference is that with this feature the calls egress to an IXC using *MEGACOM 800 Service* dedicated trunks. These trunks are 2-way trunks that are provisioned to allow only outgoing calls to the IXC network. Incoming calls from the IXC are disallowed to protect the ASN from being used as a transit network without contractual agreements.

**2.02** If an EXIT message is received by an AT&T or Unitel *4ESS*<sup>™</sup> switch at a network boundary, the message will be dropped. (It is only used to trigger billing.) Also, an AT&T or Unitel *4ESS* switch will not send an EXIT message across a network boundary or to a non-AT&T *4ESS* switch.

## **3. Provisioning**

---

**3.01** This feature is only applied to *MEGACOM 800 Service* calls that go out to an IXC, and only for Service Index Indicator values populated to "yes" in Recent Change (RC) Form 653. As mentioned in "Feature Description," the current Service Index Indicator values this feature relates to are 39 and 51.

## **4. Recording**

---

**4.01** With this feature, as with Phase I and II of this service, the IXCs are billed as Classic *MEGACOM 800 Service* customers. ANI delivery is free of charge. However, calculation of the elapsed time for the calls is modified as described in this section.

**4.02** For this feature, the originating AT&T switch (OAS) is defined as the *4ESS* switch that processes a call, does a database dip, and creates an Automatic Message Accounting (AMA) record. In cases involving handoff, the handoff AT&T switch (HAS) is considered the OAS. The terminating AT&T switch (TAS) is the *4ESS* switch that interfaces with the IXC.

**4.03** Elapsed timing for AMA recording purposes normally starts when a call is answered. For calls affected by this feature, answer for billing purposes is simulated when the recording switch receives the Exit trigger. The Exit trigger used for recording is generated if one of the following is true:

- The recording switch receives an EXIT message from the TAS.
- The OAS and the TAS are the same switch, and the Initial Address Message (IAM) is sent for a trunk connected to an IXC.

- The OAS and the TAS are the same switch, and a wink is received after seizure of an outgoing trunk.

**4.04** The above information is detailed in Table 9-A for SS7 ISUP and MF signaling.

**Table 9-A. Activation of Time Recording**

OAS/TAS	Egress Signaling	Action
Single 4ESS™ Switch	SS7 ISUP	Time recording activated on sending of the IAM to IXC.
Single 4ESS Switch	MF	Time recording activated after trunk seizure and receipt of wink from IXC.
Multiple 4ESS Switches	SS7 ISUP	The TAS sends SS7 ISUP EXIT message in the backward direction on sending IAM to the IXC. Include only the End-of-Optional parameter. The OAS (or HAS) activates time recording on receipt of the EXIT message. The Optional parameter will be included, but the Outgoing Trunk Number will not be included.
Multiple 4ESS Switches	MF	The TAS sends SS7 ISUP EXIT message in the backward direction on sending IAM to the IXC. Include only the End-of-Optional parameter. The OAS (or HAS) activates time recording on receipt of the EXIT message. The Optional parameter will be included, but the Outgoing Trunk Number will not be included.

**4.05** If the 4ESS recording switch receives an Exit trigger or indication that an Exit trigger was generated, it must append Module 132 to the AMA record which will contain the real answer time. The switch populates AMA Table 9 in Extended Bellcore AMA Format (EBAF) Module 132 to indicate if the call was answered. If real answer occurs on the call, the answer indicator in the AMA record is populated with "0." If the call is unanswered, the answer indicator is populated with "1."

**4.06** The information populated in Module 132 is shown in Table 9-B. The following are the structure codes that will have EBAF Module 132 appended to them for calls affected by this feature:

- 1144-1147
- 1350-1353

Table 9-B. EBAF Module 132

Information	Table Number	Number of Characters
Module Code	88	4
Connect Date	6	6
Connect Time	18	8
Answer Indicator	9	2

## 5. Network Management (Not Affected)

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## 6. Maintenance/Troubleshooting (Not Affected)

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## 7. Transition Considerations

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### Feature Dependencies

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**7.01** This feature depends on a 4E18 Release 4 feature, Alternate Signaling Transport Network (ASTN) Enhanced ISUP feature (4129). If that feature is not activated, a *MEGACOM* 800 Service call going to an IXC fails. The reason is that ASTN without the enhancement in Feature 4129 scrubs the dialed number in the IAM, and the call is killed as a result.

### Ubiquity

---

**7.02** Ubiquity of the release throughout the network is not required for the operation of this feature. However, Phase I and Phase II must already be deployed in the ASN for this feature to work.

### Turn On/Turn Off Mechanism

---

**7.03** This feature is turned on and off by a feature bit added by Feature 4753. To turn the feature on, enter **PF12** in the FEATURE ITEM field on RC Form 809 and **OFF** in the ON OR OFF field. To turn the feature off, enter **PF12** in the FEATURE ITEM field on RC Form 809 and **ON** in the ON OR OFF field.

**7.04** This feature can also be turned on or off by an absolute word change. Item OD4PF12 in Office Data Assembler (ODA) structure OD4OFCCOPY is the office parameter that dictates whether or not to have billing started by the Exit trigger rather than by an answer message.



**CAUTION:**

*The OD4OFCCOPY structure also contains the on/off bits for many other features. Be certain that the change you make affects only this feature.*

**7.05** The following is the information needed to turn the feature on or off using an absolute word change:

- Structure: OFCCOPY
- Core address in 4E20 Generic: 6731453
- Size of OD4PF12: 1
- Displacement of OD4PF12: 11
- On: 0
- Off: 1



**NOTE:**

In this case, when the indicator is set to 0, an EXIT message is sent in the backward direction to the OAS. When the indicator is set to 1, no EXIT message is sent and billing begins when the call is actually answered.

**7.06** See "Provisioning" in this chapter for further information.

## **8. Input/Output Manual Pages (Not Affected)**

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## Clearback Suppression on International Circuits to Brazil— Phase 2 Feature (4507)

# 10

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## Clearback Suppression on International Circuits to Brazil— Phase 2 Feature (4507)

# 10

---

### 1. Feature Description

**1.01** AT&T's Business International Long Distance (BILD) Strategic Business Unit (SBU) has experienced problems with some international calls from analog Private Branch Exchange (PBX) customers to certain stations in Brazil. When those stations answered the calls, the connection would be dropped immediately. The cause was identified as a "black box" attached to a 2-wire line by customers in Brazil who wished to disable a local feature for automated collect calling from coin phones in Brazil.

**1.02** The calls that failed to complete were calls from a non-Primary Rate Interface (PRI) PBX in the United States to Brazilian stations having such a black box. In the case of the affected calls, the Brazilian station with the black box would generate a 1-second long clearback (on-hook) signal about one second after a call was received. This on-hook signal was in turn propagated through the Brazilian and AT&T networks to the originating PBX in the United States.

**1.03** Consequently, non-PRI PBXs that have their disconnect timing set to 500 milliseconds based on Bellcore recommendations would misinterpret this 1-second flash as a valid disconnect and release the call.

**1.04** The problem just described was eliminated for the short term by Feature 4448, which was released late in 1994 and documented in AT&T 234-090-201AC, *4ESS™ Switch, Product Release Document, 4E20 Release 1 Generic*. However, that feature (as was known at the time) could adversely affect other features as well as call billing, and that is why the current feature is needed.

**1.05** This feature provides special timing on affected calls to suppress passing of a clearback-reanswer signal within 5 seconds of receiving an answer indication. The special timing treatment is triggered based on the digit analysis of the Country Code (CC) at the AT&T International Switching Center (ISC).

**1.06** The feature applies to calls placed to certain countries, based on the dialed CC. The country or countries the feature applies to are provisioned by Recent Change at the 4ESS™ switch. At the present time, this feature is only applied to calls destined for Brazil. However, the switch can be provisioned to apply the same treatment to calls destined for other countries if a similar problem arises.

**1.07** This feature can coexist with Feature 4448 in the switch. Either version can suppress clearback, although the negative effects of Feature 4448 referred to above still take place.

## **2. Call Flow**

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### **Call Flow Description**

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**2.01** The existing international call flows, as defined by each international service, apply to calls using this feature. Calls destined for countries whose CC has not been marked for special timing treatment complete as normal international calls.

**2.02** This feature also applies to transit calls, which are calls originated outside the United States and destined for a country for which the special timing treatment applies.

**2.03** The following call flow description assumes that the switch has determined, during CC analysis, that the special timing treatment applies. For International Telephone and Telegraph Consultative Committee 7 (CCITT7), Integrated Services Digital Network User Part (ISUP), and Telephone User Part (TUP), it also assumes the Address Complete Message (ACM) has completed successfully.

1. When an answer indication is received by the 4ESS switch ISC, the switch starts a 5-second timer.

If a clearback indication is received by the switch while 5-second timing is being done, that timer is removed and a 2-second timer is started. No clearback indication is signaled toward the originating party. Continue with Step 2.

If a clearback indication is received by the switch after the 5-second timer has expired, the clearback indication is signaled toward the originating party.

2. The 2-second timer started in Step 1 runs.

If a reanswer indication is received by the switch while 2-second timing is being done, the timer is removed and the call continues as though no clearback-reanswer sequence had occurred.

If the 2-second timer expires, a clearback indication is signaled toward the originating party.

If a reanswer indication is received by the switch after the 2-second timer has expired, the reanswer indication is signaled toward the originating party.

### **3. Provisioning**

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#### **Structures Affected**

---

- 3.01** To support this feature, a new 1-bit field is added to the Country Code Conversion Translator to indicate whether or not clearback suppression applies for a given CC. The affected structure is HT4CCCONV.

#### **Recent Change (RC) Form Affected**

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##### **RC Form 317**

- 3.02** A new field, SCLB, has been added to RC Form 317 to indicate whether clearback suppression applies for a given country. Valid entries are **Y** (1), **N** (0), and blank. Blank defaults to **N**. The form with this new field is shown in Figure 10-1.

RC:CODEGRP;NEW;OPT(CCDCONV),____: CCD ___, LD ___, CBONLY ___, FAXPR ___,			
SCLB __,			
ORNU _____,			
ABC	ABC	ABC	ABC
___/	___/	___/	___/
___/	___/	___/	___/
___/	___/	___/	___/
___/	___/	___/	___/
REMARKS _____!			

Figure 10-1. Recent Change Form 317

**⇒ NOTE:**  
The SCLB field can only be changed for an existing CC entry by deleting the CC entry using RC Form 318 and then creating a new CC entry using RC Form 317.

### Verify Forms Affected

---

#### Verify Form 13e

**3.03** The input message to verify the status of the clearback suppression is  
**VER:CCDCONV:ABC a!**

### 4. Recording

---

**4.01** Clearback and reanswer signaling indications are recorded as usual if they are not suppressed. However, no recording is done for suppressed clearback and reanswer indications.

## **5. Network Management (Not Affected)**

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## **6. Maintenance/Troubleshooting (Not Affected)**

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## **7. Transition Considerations**

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### **Ubiquity**

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- 7.01** Ubiquity of the release throughout the network is not required for the operation of this feature.

### **Turn On/Turn Off Mechanism**

---

- 7.02** This feature is turned on by Recent Change. Refer to "Provisioning" in this chapter.

## **8. Input/Output Manual Pages**

---

- 8.01** The following Output manual page is affected by this feature:
- VER:CODEGRP-CCD

ID ..... VER:CODEGRP-CCD  
WORK CENTER . . MAC, MOC  
GENERIC ..... 4E20 Rel. 3 and later  
APPLICATION . . 4E  
TYPE ..... Output

### 1. FORMAT

VER:CODEGRP;OPT(CCDCONV);a:  
ABC CCD LD CBONLY FAXPR CCID CCCNT SCLB  
b c d e f g h i

### 2. REASON FOR OUTPUT

To list the entries in table HT4CCONV that are indexed by the specified ABC digits. This message also displays data for the assigned country code or pseudo country code digits.

### 3. VARIABLE FIELD DEFINITIONS

- a Status of ABC digit:
  - CUR — Current.
  - INA — Inactive.
- b ABC digit entry from 000 to 999.
- c One, two, or three-digit number from 1 to 999. A one or two-digit number will contain leading zeroes.
- d Language digit from 0 to 9.
- e Routing restriction:
  - Y — Cable only.
  - N — Not cable only.
- f Facsimile preferred routing (FPR) indicator:
  - Y — If FPR is available to the pseudo country code.
  - N — If FPR is not available.
- g Type of country code:
  - CCD — Country code.
  - PCCD — Pseudo-country code.
- h Country code count 1, 2, or 3.
- i Suppress clear-back indicator:
  - Y — Suppress clear-back.
  - N — Does not suppress clear-back.

SEE PROPRIETARY NOTICE ON COVER PAGE

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENT  
VRFYOUT

*Translation Guide, 4ESS™, TG-4, Division 8, Section 2*

SEE PROPRIETARY NOTICE ON COVER PAGE

## SS7 Access to Nodal Services for Reseller Carriers Feature (4591)

# 11

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## SS7 Access to Nodal Services for Reseller Carriers Feature (4591)

# 11

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### 1. Feature Description

**1.01** Feature 4591 allows the AT&T Switched Network (ASN) to provide Signaling System 7 (SS7) Integrated Services Digital Network (ISDN) User Part (ISUP) access to nodal or direct-connect services for Reseller Carriers. This feature is the basis from which to grow nodal service capabilities using SS7 signaling. However, this feature does not change the capabilities that already exist for nodal services, nor does it impact downstream billing systems. Only the signaling on the trunks is changed.

**1.02** Phase 1 of SS7 signaling supports *MEGACOM*<sup>®</sup> telecommunications services direct-connect customers. The *MEGACOM* services that are supported are 1-way outbound only services from the Customer Premises Equipment (CPE) to the ASN. With these services,

- Only outbound inter-LATA and intra-LATA calls are allowed on the Trunk Subgroups (TSGs) that are assigned.
- 500, 700, 800, 900, and 0+ calls are not allowed.
- Customers get volume discounts for use.
- Billing for the calls is based on the customer billing number which is part of the TSG data.

**1.03** Feature 4591 evolved from the result of a strong growth in the existing long distance service resale market. With the Reseller Carriers being permitted to resell services (such as inter-LATA minutes) to their subscribers, the growth trend in the resale market is expected to continue. For example, a Reseller Carrier can purchase a service such as *MEGACOM* service from AT&T and use this service to offer 1+ long

distance service to its customers under its own brand name. In order for AT&T to acquire additional market share in this growth market and to meet the needs of the wired and wireless (cellular) markets, changes had to be made to the existing nodal service offerings.

**1.04** The changes made in the nodal service offerings support SS7 trunk arrangements to the Reseller Carriers. The new arrangement provides an interface to switches that are external to the network via the Network Interconnect (NI) version of SS7 signaling. A new Type of Trunk (TOT), which was developed in the TSG data for this feature, is used to combine existing switched-access signaling capabilities with existing nodal service capabilities. This new TOT is called Reseller Carrier Connect (RCC). Changing the trunk signaling improves call performance and trunk efficiencies.

## **2. Call Flow (Not Affected)**

## **3. Provisioning**

### **Office Data Administration**

#### **A. Structures Affected**

##### **HT4TSDT\_SII**

**3.01** An existing spare Signaling Service Type (SST) value has been assigned to this structure. SST12 populates data item XL4SST with 4XLSST12 for RCC.

##### **HT4TBNCORE**

**3.02** A new TOT in the TSG data has been defined as "RCC" to indicate that the trunk is handling a Reseller Carrier connection. RCC populates data item XL4TB\_TOT with 4XLTOTRCC in this structure.

##### **HT4TSG**

**3.03** A new state for data item XL4TS\_CCODE in this structure is set when TOT is input with "RCC." This data item is populated with 4XLTS\_CCRCC for Reseller Carrier Connect.

#### **B. Recent Change/Verify (RC/V) Forms Affected**

##### **RC Forms 100, 101, 107, and 108**

**3.04** These RC forms are used to add or change TSG data characteristics. A new input, RCC, has been defined for the TOT field on these RC forms. The RCC

input indicates that the trunks in this TSG allow SS7 signaling access for nodal services. The field requirements that are necessary when TOT=RCC are specified in Table 11-A. The requirements in this table are applicable for AT&T offices only.

**Table 11-A. Data Input Requirements When TOT=RCC**

Field	Description
FENCLASS	Far-End Network Class—This field must be populated with "OWATS" to indicate Outward Wide Area Telecommunication Service.
MEGC	This field is proprietary. It must be populated with a "Y" to indicate a <i>MEGACOM</i> <sup>®</sup> telecommunications service direct-connect customer. When "Y" is entered, the following (services) fields must be either blank or "N": <ul style="list-style-type: none"> <li>■ CBC (Call-By-Call)</li> <li>■ SDNA (Software Defined Network Access)</li> <li>■ OWAT (Direct-Connect Outward Wide Area Telecommunication Service)</li> <li>■ DATA (for data service)</li> <li>■ DDD (Direct Distance Dialing)</li> <li>■ IDDD (International Direct Distance Dialing)</li> </ul>
ISC/OSC	Incoming Signaling Characteristics and Outgoing Signaling Characteristics—must be ISUP.
DOM	Domain—must be a Plain Old Telephone Service (POTS) domain.
WATSBN	WATS Billing Number—must be populated with a valid 10-digit number. This field <b>cannot</b> be left blank.
IWZ1	International World Zone 1—must be blank or "N" for No.
TFG	Type of Feature Group—must be blank.
PBXESGD	Private Branch Exchange Expect Station Group Designation—must be blank or "N" for No.
RFA	Ring Free Allowed—must be "N" for No.
FAR4E	Far-End <i>4ESS</i> <sup>™</sup> switch—must be "N" for No.
ACD	Automatic Call Distributor—must be blank or "N" for No.
PBXNWW	PBX No Wait for Wink—must be blank or "N" for No.
CODSC	Customer Premises Equipment (CPE) Outgoing Disconnect—must be blank or "N" for No.
PSBN	Prohibit Sending Billing Number—must be blank.
SDNPLAN	Software Defined Network Dialing Plan—must be blank.
SINDEX	Access Charge Verification Sampling Rate Index—must be blank or "0."
PSCPN	Prohibit Sending Calling Party Number—can be "Y" for Yes, "N" for No, or blank.
PSUUI	Prohibit Sending User-to-User Information—can be "Y" for Yes, "N" for No, or blank.
PSOLI	Prohibit Sending Originating Line Identity—must be "Y" for Yes or "N" for No. This field <b>cannot</b> be blank.
BN	Billing Number—must be blank.

### **RC Forms 338, 640, and 642**

- 3.05** RC Form 338 is used to change Service Identity Index (SII) related information. The **SST** field on this form is affected by this feature. SST12 has been defined as the signaling type for Reseller Carrier Connect.
- 3.06** RC Form 640 is a miscellaneous proprietary RC form. This form is used to map the Market Segment Indicator (MSI) to the SST. The **SST** field on this RC form is affected by this feature. SST12 has been defined as the signaling type for Reseller Carrier Connect.
- 3.07** RC Form 642 is also a miscellaneous proprietary RC form. This form defines the SII that is to be used for a particular SST. The **SST** field on this RC form is affected by this feature. SST12 has been defined as the signaling type for Reseller Carrier Connect.

### **Verify Forms 1a and 1b**

- 3.08** Verify Form 1a is used to verify the characteristics of a 2-way TSG. Verify Form 1b is used to verify the characteristics of a 1-way incoming TSG. These forms verify that RCC is a valid entry. A new output of "RCC" has been defined for the **TOT** field on these forms.

### **Verify Form 11d**

- 3.09** Verify Form 11d is used to request verification of all TSGs that have similar characteristics. If there are no characteristics specified, this form will list all the TSGs in an office. This form verifies that RCC is a valid entry. A new output of "RCC" has been defined for the **TOT** field on this form.

### **Verify Forms 3ah, 6ba, and 6ap**

- 3.10** Verify Form 3ah is used to verify SII-related information that is input on RC Form 338. Verify Form 6ba is used to verify the mapping of MSI to SST. The mapping occurs when the valid data is input on RC Form 640. Verify Form 6ap is used to verify the SII for a specified SST. RC Form 642 is used to input the data. SST12 has been defined as the signaling type for Reseller Carrier Connect and is output on these form.

## **4. Recording**

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### **Automatic Message Accounting (AMA)**

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- 4.01** A new Call Code has been applied to identify *MEGACOM* service calls that use SS7 signaling. Call Code 824 is recorded when the AMA record is generated for the call. There are no changes in the call recording formats. The existing recording

structures 000200/00120 and 01084/01087 remain applicable for these calls. The new Call Code 824 will trigger these structures similar to the way Call Code 309 triggers these structures.

## **5. Network Management (Not Affected)**

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## **6. Maintenance/Troubleshooting (Not Affected)**

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## **7. Transition Considerations**

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### **Ubiquity**

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- 7.01** Full deployment of 4E20 Release 3 Generic throughout the AT&T 4ESS switch network is not required for the operation of this feature.

### **Turn On/Turn Off Mechanism**

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- 7.02** This feature is turned on automatically by software deployment.

## **8. Input/Output Manual Pages (Not Affected)**

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# Continuity OK Test (COT) on ISUP Circuits for Final Handling Code 1877 Feature (4603)

# 12

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## Continuity OK Test (COT) on ISUP Circuits for Final Handling Code 1877 Feature (4603)

# 12

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### 1. Feature Description

**1.01** Feature 4603, which was introduced in 4E18, provides a method to prevent international calls from continuously failing on an outgoing International Telephone and Telegraph Consultative Committee 7 (CCITT7) Integrated Services Digital Network User Part (ISUP) circuit when that circuit is unable to carry calls due to a Carrier Group failure. When a Carrier Group fails, a number of International Switching Centers (ISCs) release the call in the backward direction with a Release (REL) message with Cause 31 immediately following the Initial Address Message (IAM). This results in the issuance of Final Handling Code (FHC) 1877.

**1.02** Prior to this feature, when a Carrier Group failed, certain circuits acted as "killer" trunks, which are circuits that go into the idle state, ready for selection, even though they have failed and will not operate properly when selected. This cycle would continue for the duration of the Carrier Group failure. The specific cause of this problem is related to AT&T's mapping of 32 channel carriers into 24 channel carriers.

**1.03** This feature helps to correct this problem by placing the killer trunks into a test state where they are bypassed. Repeated continuity checking (Continuity Check Request) occurs about once every 2 minutes or until the failure has disappeared. This prevents the selection of the failed circuit for subsequent calls for the duration of the failure. The continuity checking occurs even if a possible continuity check requested in the IAM was successful.

**1.04** If a REL message with Cause 31 was sent for reasons other than a Carrier Group failure, the circuit will be held for the continuity recheck, which would probably be successful.

## **2. Call Flow (Not Affected)**

## **3. Provisioning (Not Affected)**

## **4. Recording (Not Affected)**

## **5. Network Management**

5.01 Refer to "Feature Description" in this chapter.

## **6. Maintenance/Troubleshooting**

6.01 Refer to "Feature Description" in this chapter.

## **7. Transition Considerations**

### **Turn On/Turn Off Mechanism**

7.01 This feature is turned on automatically with software deployment.

## **8. Input/Output Manual Pages (Not Affected)**

**Call Detail Recording Data Tracer  
Count Modification Feature  
(4632)**

# 13

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# Call Detail Recording Data Tracer Count Modification Feature (4632)

# 13

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## 1. Feature Description

**1.01** This feature is the result of a Modification Request from the Call Detail Recording Infrastructure (CDRI) Project, Release 1.1. The CDRI refers to the *4ESS*<sup>™</sup> switch, Call Detail Recording Platform (CDRP), and *Billdats*<sup>®</sup> Collector systems, their interfaces and associated operations support systems. These systems were deployed in the AT&T network to support Call Detail Recording (CDR). The Modification Request asked for changes to be made in the way some CDR peg counts are calculated. Changing the method of calculating CDR peg counts is necessary in order to minimize the number of lost CDR Data Tracer events.

**1.02** In the CDRI architecture, a count is done on the number of CDR events that are created by the *4ESS* switch and transmitted to the CDR. A CDR event is a fixed field binary packet of call detail data that is used in constructing call detail records. A packet is a group of data that is transmitted in a well-defined format which includes headers and size information. Events are generated by the AT&T *4ESS* switch 1B Processor only if recording has been triggered by the *4ESS* switch. The events are generated shortly following a specific stage of a call (for example, the answer stage). These events are then sent to the CDRP. The CDRP is an AT&T *StarServer*<sup>®</sup> symmetrical multiprocessor computer that is used to build Automatic Message Accounting (AMA) and International CDR (ICDR) records.

**1.03** This feature introduces a new method of calculating CDR peg counts to prevent the lost of CDR events between the 1B Processor and the AT&T 3B Attached Processor System (APS) from being erroneously reported. The CDR peg counts are used to populate CDR Data Tracer Records which are used primarily for audit purposes.

The CDR peg counts and a description of each count are shown in Table 13-A. The CDR peg counts are used to determine the following data:

- Number of CDR events lost between the 1B Processor and the 3B APS
- Number of CDR events lost between the 3B APS and the Small Computer Systems Interface (SCSI) Node (SIN)
- Number of CDR events lost between the SIN and the CDRP.

**Table 13-A. CDR Peg Counts**

<b>Peg Count</b>	<b>Description</b>
1B CDR Event	Counts the number of CDR events generated by the 1B Processor.
24_3B CDR Event	Counts the number of CDR events received by the 3B APS in the last hour.
32_3B CDR Event	Counts the number of CDR events received by the 3B APS since midnight.
3B D-Channel Event	Counts the number of D-Channel events created by the 3B APS.
SIN CDR Event	Counts the number of CDR events received by the SIN.
Events Received TR	Counts the number of CDR events received by the CDRP.

## **2. Call Flow (Not Affected)**

## **3. Provisioning (Not Affected)**

## **4. Recording**

### **CDR Data Tracer Record**

**4.01** The CDR Data Tracer Record is contained in Structure Code 09919 in the CDRP. CDR Data Tracer Records are simply AMA Data Tracer Records that are placed as markers in the stream of AMA records on an hourly basis to provide aggregate counts of the number of records transmitted between successive markers. The National

AMA Control Center uses the data in the CDR Data Tracer Record to monitor the flow of CDR data from the 4ESS switch to the CDRP. The following actions occur:

1. The CDRP generates CDR Data Tracer Records and transmits these records to the *Billdats II*<sup>®</sup> data collection unit.
2. The *Billdats II* data collection unit makes a copy of the CDR Data Tracer Record and transmits the record to the Call Detail Recording Monitor (CDRM) system.
3. The CDRM generates an alarm if anomalous conditions are detected in the 4ESS switch and/or CDRP processes.

**4.02** The anomaly that previously occurred with the reporting of lost CDR events caused the CDRM to generate false alarms. Today, if an anomaly is detected, this feature fixes that anomaly and stops the CDRM from generating false alarms.

### Resynchronizing Peg Counts

**4.03** The 3B APS counts the total number of CDR Data Tracer events it receives from the 1B Processor. The problem occurs in the number of events lost between the 1B Processor and 3B APS. The following text is included here to show the comparison between the old method of calculating CDR peg counts and the new methodology.

**4.04** In the past, the methodology used to reset and resynchronize peg counts caused the number of lost events to be reported incorrectly. Table 13-B provides a summary of the old resynchronization methodology.

**Table 13-B. Resynchronizing Peg Counts—Old Methodology**

Peg Count		Time				
Name	Abbreviation	X:00	X:15	X:30	X:45	00:00
1B CDR Event	A	A=0	N/A	N/A	N/A	A=0
24_3B CDR Event	B	B=0	B=A	B=A	B=A	B=0
32_3B CDR Event	C	C=C1+A	C=C1+A	C=C1+A	C=C1+A	C=0
3B D-Channel Event	D	N/A	N/A	N/A	N/A	D=0
SIN CDR Event	E	E=C+D	E=C+D	E=C+D	E=C+D	E=0
Events Received TR	F	F=E	F=E	F=E	F=E	F=0

**⇒ NOTE:**

In Table 13-B Time column headings, X = 1, 2, 3, ..., 22, 23 to indicate the hour. C1 = C(X-1) means the value of C from the previous hour.

**4.05** The following is a brief description of the old methodology used in Table 13-B and the anomaly that occurred:

- The 1B CDR Event peg count is reset to "0" hourly.
- The 24\_3B CDR Event peg count is reset to "0" hourly and resynchronized to the 1B CDR Event peg count at 15 minutes, 30 minutes, and 45 minutes after the hour.
- The 32\_3B CDR Event peg count is reset to "0" at midnight. It is resynchronized to the sum of the 32\_3B CDR Event peg count from the previous hour [that is, C(X-1)] and the 1B CDR Event peg count on the hour (except midnight) and at 15 minutes, 30 minutes, and 45 minutes after the hour.
- The 3B D-Channel Event peg count is reset to "0" at midnight.
- The SIN CDR Event peg count is reset to "0" at midnight. It is resynchronized to the sum of the 32\_3B CDR Event peg count and 3B D-Channel Event peg count on the hour (except midnight) and at 15 minutes, 30 minutes, and 45 minutes after the hour.
- The Events Received TR peg count is reset to "0" at midnight and resynchronized to the SIN CDR Event peg count on the hour (except midnight) and at 15 minutes, 30 minutes, and 45 minutes after the hour.

**4.06** This old methodology of resynchronizing peg counts caused the number of CDR events to be reported incorrectly. Table 13-C and Table 13-D depict how the problem occurred. For example:

The 1B Processor generates 1,000 CDR events every 15 minutes, and the 3B APS creates 10 D-Channel events every 15 minutes. From 01:00 to 01:15, 500 CDR events were lost between the 1B Processor and the 3B APS. Table 13-C shows the peg counts from 01:00 to 01:45. The Pre-reset columns show the values of the peg counts before they were resynchronized. During the Pre-reset, the number of lost events between the 1B Processor and the 3B APS, the 3B APS and the SIN, and the SIN and the CDRP were determined. The Reset columns show the values of the peg counts after they had been resynchronized using the old methodology in Table 13-B. Table 13-D shows the value of the lost events recorded using the old methodology. This table also shows that the value of lost CDR events was erroneously propagated.

**Table 13-C. CDR Peg Counts—Old Methodology**

Count	Time						
	01:00	01:00	01:15	01:15	01:30	01:30	01:45
	Pre-reset	Reset	Pre-reset	Reset	Pre-reset	Reset	Pre-reset
1B CDR Event	1,000	0	1,000	1,000	2,000	2,000	3,000
24_3B CDR Event	1,000	0	500	1,000	2,000	2,000	3,000
32_3B CDR Event	1,000	1,000	1,500	2,000	3,000	3,000	4,000
3B D-Channel Event	10	10	20	20	30	30	40
SIN CDR Event	1,010	1,010	1,520	1,520	2,530	3,030	4,040
Events Received TR	1,010	1,010	1,520	1,520	2,530	2,530	3,540

**Table 13-D. CDR Lost Events—Old Methodology**

Events Lost	Time			
	01:00	01:15	01:30	01:45
Between 1B and 3B APS	0	500	0	0
Between 3B and SIN	0	0	500	0
Between SIN and CDRP	0	0	0	500

**4.07** To correct the problem, a new resynchronizing methodology is used which prevents the propagation of errors. Table 13-E provides a summary of the new resynchronization methodology. The following is a brief description of the new methodology:

- The 1B CDR Event peg count is reset to "0" hourly.
- The 24\_3B CDR Event peg count is reset to "0" hourly and resynchronized to the 1B CDR Event peg count at 15 minutes, 30 minutes, and 45 minutes after the hour.
- The 32\_3B CDR Event peg count is reset to "0" at midnight.
- The 3B D-Channel Event peg count is reset to "0" at midnight.
- The SIN CDR Event peg count is reset to "0" at midnight. It is resynchronized to the sum of the 32\_3B CDR Event peg count and 3B D-Channel Event peg count on the hour (except midnight) and at 15 minutes, 30 minutes, and 45 minutes after the hour.
- The Events Received TR peg count is reset to "0" at midnight. It is resynchronized to the sum of the 32\_3B CDR Event peg count and the 3B D-Channel Event peg count on the hour (except midnight) and at 15 minutes, 30 minutes, and 45 minutes after the hour.

**Table 13-E. Resynchronizing Peg Counts—New Methodology**

Peg Count		Time				
Name	Abbreviation	X:00	X:15	X:30	X:45	00:00
1B CDR Event	A	A=0	N/A	N/A	N/A	A=0
24_3B CDR Event	B	B=0	B=A	B=A	B=A	B=0
32_3B CDR Event	C	N/A	N/A	N/A	N/A	C=0
3B D-Channel Event	D	N/A	N/A	N/A	N/A	D=0
SIN CDR Event	E	E=C+D	E=C+D	E=C+D	E=C+D	E=0
Events Received TR	F	F=C+D	F=C+D	F=C+D	F=C+D	F=0

**4.08** Table 13-F and Table 13-G show the peg counts from the previous example and the result of the CDR events. The number of lost CDR events reported is 500 and that occurs between the 1B Processor and the 3B APS. No other lost CDR events are reported.

**Table 13-F. CDR Peg Counts—New Methodology**

Count	Time						
	01:00	01:00	01:15	01:15	01:30	01:30	01:45
	Pre-reset	Reset	Pre-reset	Reset	Pre-reset	Reset	Pre-reset
1B CDR Event	1,000	0	1,000	1,000	2,000	2,000	3,000
24_3B CDR Event	1,000	0	500	1,000	2,000	2,000	3,000
32_3B CDR Event	1,000	1,000	1,500	1,500	2,500	2,500	3,500
3B D-Channel Event	10	10	20	20	30	30	40
SIN CDR Event	1,010	1,010	1,520	1,520	2,530	2,530	3,540
Events Received TR	1,010	1,010	1,520	1,520	2,530	2,530	3,540

**Table 13-G. CDR Lost Events—New Methodology**

Events Lost	Time			
	01:00	01:15	01:30	01:45
Between 1B and 3B APS	0	500	0	0
Between 3B and SIN	0	0	0	0
Between SIN and CDRP	0	0	0	0

## **5. Network Management (Not Affected)**

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## **6. Maintenance/Troubleshooting (Not Affected)**

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## **7. Transition Considerations**

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### **Ubiquity**

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- 7.01** It is not necessary for all 4ESS switches in the network to be running the 4E20 Release 3 Generic for this feature to be fully operational.

### **Turn On/Turn Off Mechanism**

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- 7.02** This feature is turned on automatically by software deployment.

## **8. Input/Output Manual Pages (Not Affected)**

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**Global Software Defined Data  
Network (GSDDN) Service  
Feature (4642)**

**14**

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# Global Software Defined Data Network (GSDDN) Service Feature (4642)

# 14

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## 1. Feature Description

**1.01** Currently, AT&T offers its customers a domestic "on-net" to "on-net" switched data service called the Software Defined Data Network (SDDN). SDDN customers who need to send data internationally use a service called SDDN International (SDDNI). SDDNI allows a customer to originate calls using a private numbering plan; however, the private number the customer dials is translated into a public routing number by the originating database. After the number is translated to a public routing number, the SDDNI call is treated the same as a Switched Digital International (SDI) off-net call. (SDI is AT&T's international public switched digital service.)

**1.02** The Global Software Defined Data Network (GSDDN) feature provides international "on-net" to "on-net" switched data service. This feature was developed to satisfy a request from several Telecommunications Administrations for this type of data service. One of the reasons customers want on-net service is because the rates are lower than public service rates. In addition, on-net service can provide special features such as call screening and a private numbering plan. These are features that are not available with existing off-net services.

**1.03** The GSDDN feature will be available to all GSDN customers who have been provisioned for switched digital access and/or egress. GSDDN will be deployed to those countries where AT&T has implemented both GSDN and SDI services. Initially, GSDDN traffic will share the international Integrated Services Digital Network User Part (ISUP) digital trunk subgroups used by the SDI service. Eventually, GSDDN traffic may be carried on trunks that carry GSDN and Public Switched Telephone Network (PSTN) traffic.

## 2. Call Flow

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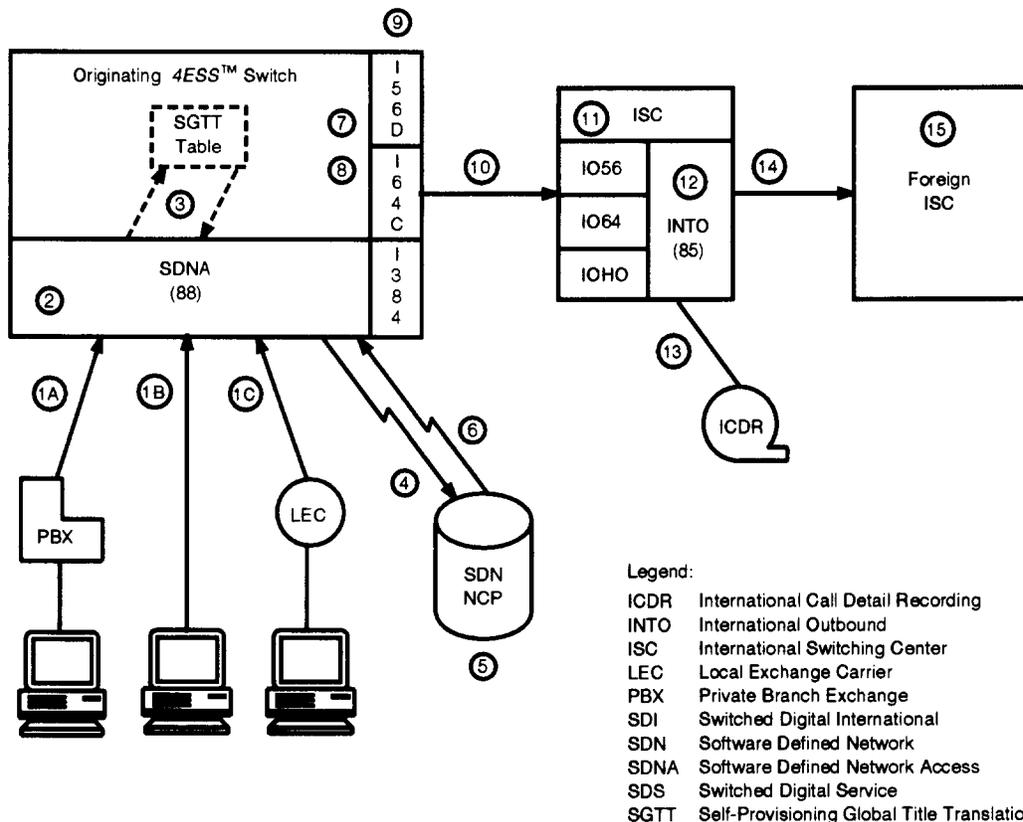
### Outbound Calls

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**2.01** The following call flow (along with Figure 14-1) describes the steps that take place for an outbound GSDDN call.

1. A GSDDN customer dials a 7-digit private number or a Forced On-Net Number (FON) of the form CC+NN. The outbound call could originate from one of the following types of access:
  - An Integrated Services Digital Network (ISDN) direct-connect access with a data rate of 56 kbps, 64-kbps Unrestricted, or 384 kbps
  - A non-ISDN direct-connect access with a data rate of 56 kbps
  - A non-ISDN and ISDN Local Exchange Carrier (LEC) Digital Switched Access.
2. The originating 4ESS™ switch receives the call and does digit translation in the Software Defined Network Access (SDNA) domain (Domain 88).
3. Digit translation indicates that a Software Defined Network (SDN) Network Control Point (NCP) query is required so the Self-Provisioning Global Title Translation (SGTT) table is accessed to determine the identity of the SDN NCP to query.
4. After identifying the SDN NCP, the 4ESS switch sends a Transaction Capabilities Application Part (TCAP) BEGIN message to that NCP.
5. Using the information contained in the TCAP BEGIN message, the SDN NCP maps the dialed number to a standard routing number, which has the following form:

PCC + Cus\_Id + 7-Digit Private Number
6. The SDN NCP then prepares a TCAP END message that it sends back to the originating 4ESS switch.
7. If the call is to proceed, the 4ESS switch prepares an Automatic Message Accounting (AMA) recording using Call Code 129.
8. Based on the information received in the TCAP END message, the 4ESS switch resets the Signaling Service Type (SST) from "SDN" to "GSDDN."



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Figure 14-1. Call Flow For Outbound GSDDN Calls

9. After determining which SDI outbound domain should be used (I56D, I64C, or I384), routing translation is done to identify the International Switching Center (ISC) to use to route the call.
10. The 4ESS switch prepares an Initial Address Message (IAM) and sends it to the ISC.
11. The ISC receives the call, interprets the IAM, and does routing translations on the Pseudo Country Code (PCC) digits in either the I56D, I64C, or I384 domain.
12. Digit translations result in the call being placed in the International Outbound (INTO) domain (85). The translation process identifies an international Routing Data Block Index (RDBI), and the PCC is replaced with the Svc\_Id that is expected by the Telecommunications Administration in the destination country.
13. An International Call Detail Recording (ICDR) is generated that shows the type of service (GSDDN) and the data that is used.
14. An International Telephone and Telegraph Consultative Committee (CCITT) 7 ISUP IAM is prepared and sent to the foreign ISC.
15. When the foreign ISC receives the call, the 7-digit number is translated to a national routing number that is used to route the call to its destination.

## **Inbound Calls**

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**2.02** Inbound GSDDN traffic arrives on the same digital trunk subgroups that are used for SDI traffic. These trunk groups are provisioned with a Billing Number in the following form:

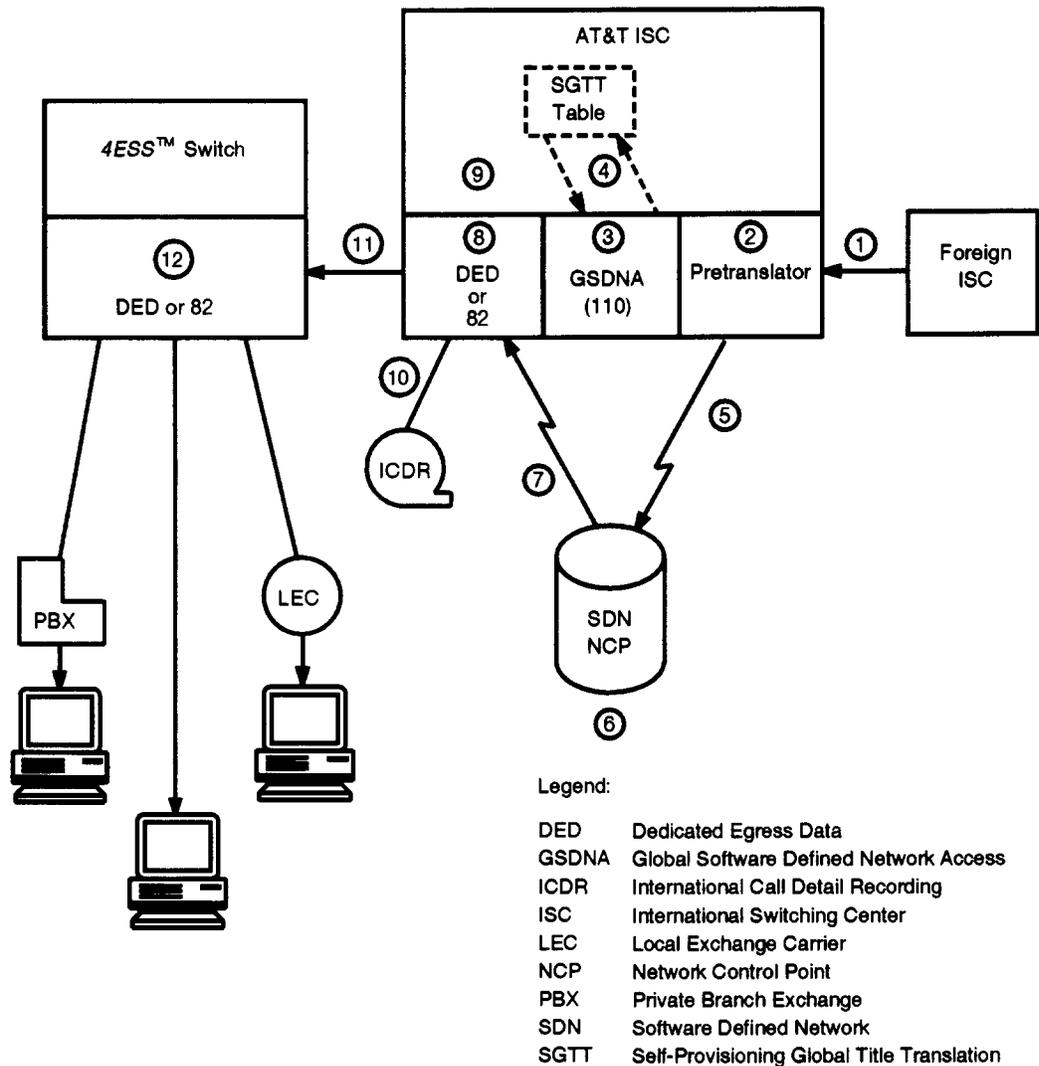
198+000+0CCC

**2.03** The following call flow (along with Figure 14-2) describes the steps that take place for processing an Inbound GSDDN call.

1. The ISC 4ESS switch receives a CCITT 7 ISUP IAM for a call arriving on an SDI trunk subgroup.
2. The SDI trunk subgroup accesses either a "pretranslator" or places the call in Domain 82.

<b>If...</b>	<b>Then...</b>
13 digits were dialed	A pretranslator is accessed
10 digits were dialed	The call is placed in Domain 82 and standard ISUP call processing is applied.

3. Before transferring the call to the Global Software Defined Network Access (GSDNA) Domain (110), the data rate is determined, the 198 is deleted from the routing number, and an Automatic Number Identification (ANI) is generated.



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Figure 14-2. Call Flow For Inbound GSDDN Calls

4. Digit translation in the GSDNA Domain indicates that an SDN NCP query is required so the SGTT table is accessed to determine the identity of the SDN NCP to query.
5. Using the point code/subsystem number obtained from the SGTT table, the 4ESS switch sends a TCAP BEGIN message to the proper SDN NCP.
6. Using information contained in the TCAP BEGIN message, the SDN NCP determines the routing number.
7. A TCAP END message containing the following information is returned to the 4ESS switch:
  - Data rate
  - Routing number
  - Generic Routing Information (GRI)
  - Supplementary routing information.
8. From the information contained in the TCAP END message, the 4ESS switch determines the proper routing domain. [All data rates are routed in either the Dedicated Egress Data (DED) or Domain 82.]
 

<b>If the egress is...</b>	<b>Then the domain is...</b>
Dedicated	DED
Switched	Domain 82
9. In addition to determining the routing domain, the 4ESS switch resets the SST to GSDDN.
10. An ICDR is generated that includes the GSDDN Inbound Service Identity value.
11. The 4ESS switch formulates and sends a Common Channel Signaling System 7 (CCS7) ISUP IAM that is needed to route the call to the terminating 4ESS switch.
12. Finally, the terminating 4ESS switch performs 6-digit translations to determine the trunk subgroup to use for routing the call.

<b>If the call is to...</b>	<b>Then the call is routed in...</b>
A dedicated egress station	The DED domain
A switched egress station	Domain 82.

### **3. Provisioning**

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#### **Data Structure Affected**

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- 3.01** Data structure HT4TSDT\_II is affected by this feature. Signaling service type GSDDN will be assigned to SST10 in Item XL4SST.

### **4. Recording (Not Affected)**

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### **5. Network Management (Not Affected)**

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### **6. Maintenance/Troubleshooting (Not Affected)**

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### **7. Transition Considerations**

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- 7.01** In order to support inbound GSDDN traffic, the SDI trunks to be used to carry GSDDN traffic must be provisioned with a trunk subgroup billing number in the form of "198 + 000 +0CCC."
- 7.02** In order to support outbound GSDDN traffic, the necessary PCCs have to be opened in the SDI-Outbound domains.

#### **Ubiquity**

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- 7.03** It is not necessary for all 4ESS switches in the network to be running the 4E20 Release 3 Generic for this feature to be fully operational.

#### **Turn On/Turn Off Mechanism**

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- 7.04** This feature is turned on automatically by software deployment.

### **8. Input/Output Manual Pages (Not Affected)**

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**Software Defined Network  
(SDN)—ASTN/SGTT  
Interworking Feature (4655)**

# 15

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# Software Defined Network (SDN)—ASTN/SGTT Interworking Feature (4655)

# 15

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## 1. Feature Description

**1.01** Currently, no attempt is made to query the alternate Universal Global Translator (UGT) Network Control Point (NCP) or the secondary Number 2 Direct Services Automatic Number Identification Based (2DSA) NCP for a Software Defined Network (SDN) call during Alternate Signaling Transport Network (ASTN) conditions. If a query of the UGT NCP or the 2DSA NCP fails during an ASTN condition, the "helper" switch does not pass any error messages back to the "victim" switch. If the 2DSA application is out of service, the NCP-based application returns the query in the Unit Data Service (UDS) message and a SubSystem Prohibit (SSP) message to the helper switch. If the 2DSA NCP cannot be accessed, the Number 2 Signal Transfer Point (2STP) drops the message and returns a Transfer Prohibit (TFP) message to the helper switch. The helper switch, however, does not pass either the UDS message, the SSP message, or the TFP message back to the victim switch.

**1.02** The victim switch will eventually fail the call if it does not receive a response to its query. When the initial query fails, no attempt is made to query the secondary 2DSA NCP or the alternate 1UGT NCP even though a route may be available to these NCPs and they could both be in service.

**1.03** The SDN—ASTN/Self-Provisioning Global Title Translation (SGTT) Interworking feature corrects this situation. If a victim switch queries a 1UGT NCP or a 2DSA NCP via the helper switch and no response is received within 4 seconds, the victim switch will send a second request for a query of the alternate UGT or secondary DSA NCP. In addition to attempting a second query of the NCPs, this feature will also place

the 1UGT NCP under Automatic Code Gapping (ACG) control if the first query of the 1UGT NCP times out. The following ACG controls will be set:

- Gap = Stop All Calls
- Duration = 8 Seconds
- Control Cause Indication = Database Overload.

While the ACG control is in effect on the 1UGT NCP, the victim switch will send all UGT queries to the alternate 1UGT NCP without waiting for 4 seconds to elapse.

**⇒ NOTE:**

If the ASTN condition is caused by the A-links being down, the victim switch will not attempt a second query of the 2DSA NCP.

## **2. Call Flow**

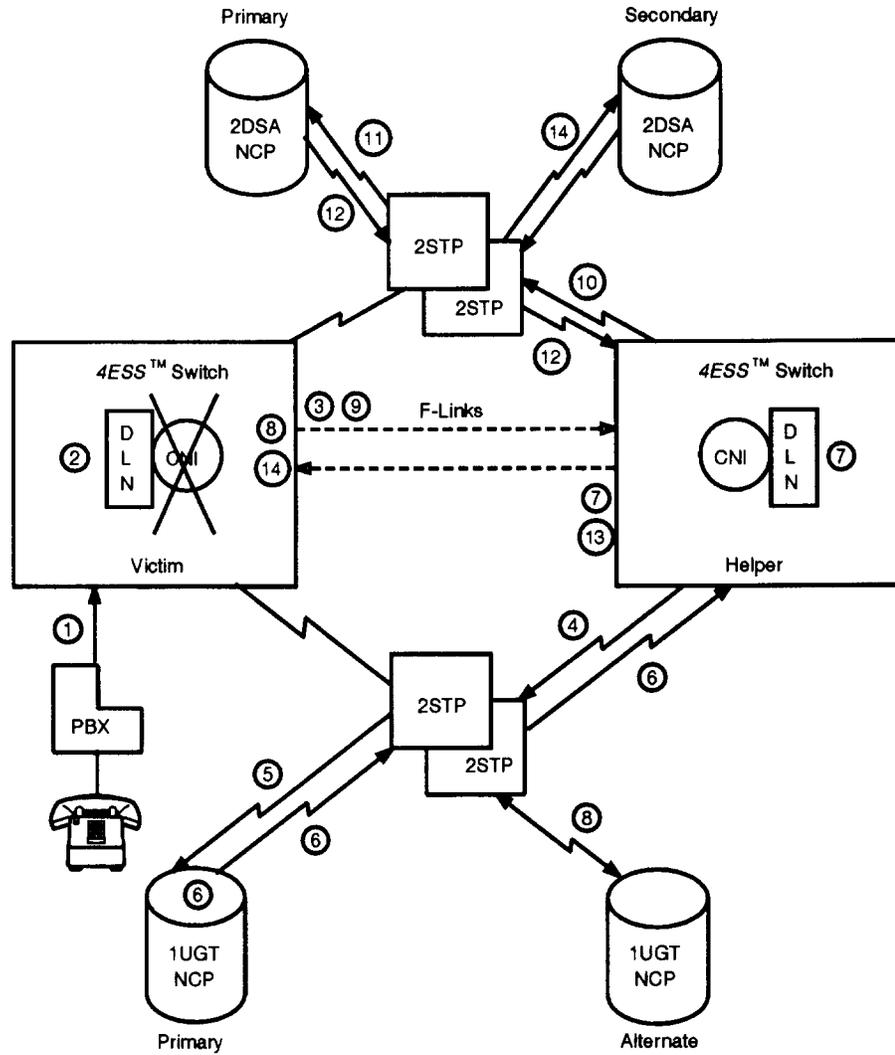
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**2.01** This section describes the new call flow for an SDN call when the following two ASTN conditions exist: the Common Network Interface (CNI) ring is down and the A-links are down.

### **New SDN Call Flow When CNI Ring Is Down**

**2.02** The following call flow (along with Figure 15-1) describes the actions that will occur when a 4ESS™ switch receives an SDN call and the CNI ring is down.

1. A 4ESS switch receives a request to route an SDN call. (This could be a direct-connect or a switched-access call.)
2. The 4ESS switch attempts to access Global Title Translation (GTT) information from the Direct Link Node (DLN), but it cannot because the CNI ring is down. Since the CNI ring is down, the 4ESS switch cannot access the signaling network either and the switch becomes a "victim" switch. As a victim switch, the 4ESS switch has to use the ASTN for signaling.
3. To get the GTT information it needs to route the call, the victim switch has to rely on a helper switch to access the 1UGT NCP database. The victim switch creates a UGT NCP query and routes it to a helper switch over F-links.
4. When the helper switch receives the request for a UGT query from the victim switch, it forwards the query to a 2STP.



Legend:

- |     |                           |     |                             |
|-----|---------------------------|-----|-----------------------------|
| CNI | Common Network Interface  | PBX | Private Branch Exchange     |
| DLN | Direct Link Node          | STP | Signal Transfer Point       |
| DSA | Direct Services ANI-based | UGT | Universal Global Translator |
| NCP | Network Control Point     |     |                             |

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Figure 15-1. New SDN Call Flow When CNI Ring Is Down

AT&T — PROPRIETARY  
Use pursuant to Company instructions

5. The 2STP attempts to route the query to the 1UGT NCP.

**If the route is... Then the 2STP...**

Available Successfully routes the query

Prohibited Cannot route the query and returns a TFP to the helper switch. (Go to Step 7.)

6. The 1NCP that contains the 1UGT subsystem receives the query and attempts to forward the message to the 1UGT subsystem.

**If the 1UGT subsystem is... And if... Then the...**

In service An entry is found in the master GTT database for the ANI 1UGT returns the GT information for that ANI to the helper switch

In service An entry for the ANI is not found 1UGT returns an invalid ANI message and updates the Vacant Code error report

Out of service 1NCP returns the query in a UDS message and sends an SSP to the helper switch.

7. The helper switch receives a response to the 1UGT query.

**If the response is... Then the helper switch will...**

Valid GT information (See Note.) Add the GT information to its DLN and then pass the GT information on to the victim switch

An SSP Mark the subsystem prohibited, but it will not return any messages to the victim switch

A TFP Mark the point code of the 1UGT inaccessible, but it will not return any messages to the victim switch.

**⇒ NOTE:**

Valid information is the ANI range, the Point Code (PC)/Subsystem Number (SSN) of the primary and secondary NCPs containing the customer's record, and the Customer Identification (ID).

8. The victim switch waits for a response to its request for a UGT query.

<b>If the victim switch...</b>	<b>And if this is...</b>	<b>Then the victim switch will...</b>
Receives a response	Valid information	Prepare a query for the primary 2DSA NCP (Go to Step 9.)
Receives a response	Invalid information	Query the primary 2DSA NCP, but the call will eventually be terminated
Does not receive a response from the helper switch in 4 seconds	The first attempt to query the 1UGT NCP	Generate a new Final Handling Code (FHC) (424) without terminating the call, place the PC/SSN just queried under ACG for 8 seconds, and attempt to query the alternate 1UGT NCP (Go to Step 3.)
Does not receive a response from the helper switch in 4 seconds	The second attempt to query the 1UGT NCP	Generate a FHC of 1613, place the PC/SSN just queried under ACG for 8 seconds, and terminate the call.

**⇒ NOTE:**

Prior to the incorporation of this feature, the victim switch would not have made an attempt to query the alternate 1UGT NCP. The call would have been terminated if the query of the 1UGT NCP was not successful.

9. Using the GTT information it received from the helper switch, the victim switch sends a request for a query of the primary 2DSA NCP to the helper switch.
10. When the helper switch receives the request for a 2DSA NCP query from the victim switch, it forwards the query to a 2STP.
11. The 2STP attempts to route the query to the primary 2DSA NCP.

<b>If the route is...</b>	<b>Then the 2STP...</b>
Available	Successfully routes the query
Prohibited	Cannot route the query and returns a TFP to the helper switch. (Go to Step 13.)

12. The 2NCP receives the query from the helper switch and attempts to forward the message to the primary 2DSA subsystem.

**If the 2DSA**

**subsystem is...**

**And if...**

**Then the 2NCP...**

In service	A Customer Record is found	Returns the Customer Record to the helper switch
In service	A Customer Record is not found	Executes the vacant code function and returns instructions to the helper switch
Out of service		Returns the query in a UDS message and sends a SSP to the helper switch.

13. The helper switch receives a response to the 2DSA NCP query.

**If the response is ...**

**Then the helper switch will...**

Valid instructions from the Customer Record	Pass the instructions to the victim switch (Go to Step 14.)
An SSP	Mark the subsystem prohibited, but it will not return any messages to the victim switch
A TFP	Mark the point code of the 2DSA NCP inaccessible, but it will not pass any messages to the victim switch.

14. The victim switch waits for a response from the helper switch.

**If the victim switch...**

**And if this...**

**Then the victim switch will...**

Receives a valid response from the 2DSA NCP	Response contains instructions from the Customer Record	Execute the instructions that were returned
Does not receive a response from the helper switch in 4 seconds	Is the first attempt to query a 2DSA NCP	Generate a FHC of 424 without terminating the call and attempt to query the secondary 2DSA NCP. (Go to Step 9 and use the secondary 2DSA NCP in place of the primary 2DSA NCP.) (See Note.)
Does not receive a response from the helper switch in 4 seconds	The second attempt to query a 2DSA NCP	Generate a FHC of 1613 and terminate the call.

**⇒ NOTE:**

Prior to the incorporation of this feature, the victim switch would not have made an attempt to query the secondary 2DSA NCP. The call would have been terminated if the query of the primary 2DSA NCP was not successful.

**New SDN Call Flow When A-Links Are Down**

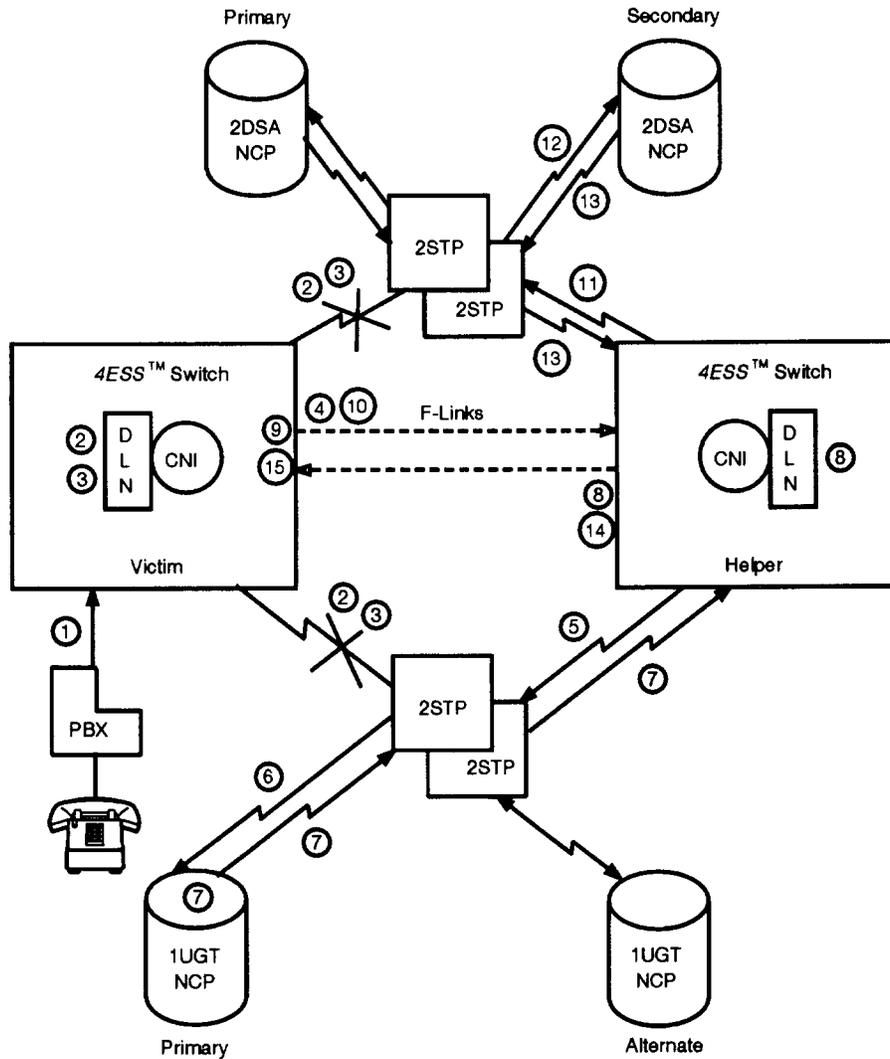
**2.03** The following call flow (along with Figure 15-2) describes the actions that will occur when a 4ESS switch receives an SDN call and the 4ESS switch cannot access the signaling network because the A-links are down. The 4ESS switch, however, is still able to access GTT information in the DLN.

1. A 4ESS switch receives a request to route an SDN call. (This could be a direct-connect or a switched-access call.)
2. The 4ESS switch accesses the GTT information in the DLN and attempts to route a query to the primary 2DSA NCP over the A-links. Because the A-links are down, the query fails.
3. The 4ESS switch again accesses the GTT information in the DLN and attempts to route a query to the secondary 2DSA NCP over the A-links. The query fails again because the A-links are down.
4. Since the 4ESS switch cannot access the signaling network, it becomes a "victim" switch. The first action the switch takes after becoming a victim switch is to route a request for a UGT query to a helper switch over F-links.
5. When the helper switch receives the request for a UGT query from the victim switch, it sends the query to the 2STP.
6. The 2STP attempts to route the query to the 1UGT NCP.

**If the route is...    Then the 2STP...**

Available                      Successfully routes the query

Prohibited                      Cannot route the query and returns a TFP to the helper switch. (Go to Step 8.)



Legend:

- |     |                           |     |                             |
|-----|---------------------------|-----|-----------------------------|
| CNI | Common Network Interface  | PBX | Private Branch Exchange     |
| DLN | Direct Link Node          | STP | Signal Transfer Point       |
| DSA | Direct Services ANI-based | UGT | Universal Global Translator |
| NCP | Network Control Point     |     |                             |

tpa 786789/01

Figure 15-2. New SDN Call Flow When A-Links Are Down

AT&T — PROPRIETARY  
Use pursuant to Company instructions

7. The 1NCP that contains the 1UGT subsystem receives the query and attempts to forward the message to the 1UGT subsystem.

**If the 1UGT****subsystem is...****And if...****Then the...**

In service

An entry is found in the master GTT database for the ANI

1UGT returns the GT information for that ANI to the helper switch

In service

An entry for the ANI is not found

1UGT returns an invalid ANI message and updates the Vacant Code error report

Out of service

1NCP returns the query in a UDS message and sends an SSP to the helper switch.

8. The helper switch receives a response to the 1UGT query.

**If the response is...****Then the helper switch will...**

Valid GT information (See Note.)

Add the GT information to its DLN and then pass the GT information on to the victim switch

An SSP

Mark the subsystem prohibited, but it will not return any messages to the victim switch.

A TFP

Mark the point code of the 1UGT inaccessible, but it will not return any messages to the victim switch.

**NOTE:**

Valid information is the ANI range, the PC/SSN of the primary and secondary NCPs containing the customer's record, and the Customer ID.

9. The victim switch waits for a response to its request for GT information from the helper switch.

<b>If the victim switch...</b>	<b>And if this is...</b>	<b>Then the victim switch will...</b>
Receives a response	Valid information	Prepare a query for the secondary 2DSA NCP (Go to Step 10.)
Receives a response	Invalid information	Query the secondary 2DSA NCP, but the call will eventually be terminated
Does not receive a response from the helper switch in 4 seconds	The first attempt to query the 1UGT NCP	Generate a new FHC 424 call without terminating the call, place the PC/SSN just queried under ACG for 8 seconds, and attempt to query the alternate 1UGT NCP (Go to Step 5.)
Does not receive a response from the helper switch in 4 seconds	The second attempt to query the 1UGT NCP	Generate a FHC of 1613 and terminate the call.

**⇒ NOTE:**

Prior to the incorporation of this feature, the victim switch would not have made an attempt to query the alternate 1UGT NCP. The call would have been terminated if the query of the 1UGT NCP was not successful.

10. Using the GTT information it received from the helper switch, the victim switch prepares a query for the secondary 2DSA NCP and sends the request to the helper switch.
11. When the helper switch receives the request for a query of the secondary 2DSA NCP from the victim switch, it forwards the query to a 2STP.
12. The 2STP attempts to route the query to the secondary 2DSA NCP.

<b>If the route is...</b>	<b>Then the 2STP...</b>
Available	Successfully routes the query
Prohibited	Cannot route the query and returns a TFP to the helper switch. (Go to Step 14.)

13. The 2NCP receives the query from the helper switch and attempts to forward the message to the secondary 2DSA subsystem.

**If the 2DSA**

**subsystem is...**

**And if...**

**Then the 2NCP...**

In service

A Customer Record  
is found

Returns the Customer Record  
to the helper switch

In service

A Customer Record  
is not found

Executes the vacant code  
function and returns instructions  
to the helper switch

Out of service

Returns the query in a UDS  
message and sends a SSP  
to the helper switch.

14. The helper switch receives a response to the 2DSA NCP query.

**If the response is ...**

**Then the helper switch will...**

Valid instructions from the  
Customer Record

Pass the instructions to the victim switch  
(Go to Step 15.)

An SSP

Mark the subsystem prohibited, but it will  
not return any messages to the victim switch

A TFP

Mark the point code of the 2DSA NCP  
inaccessible, but it will not return any  
messages to the victim switch.

15. The victim switch waits for a response to its request from the helper switch.

**If the victim switch...**

**The victim switch will...**

Receives a valid response  
from the 2DSA NCP

Execute the instructions that  
were returned

Does not receive a response  
from the helper switch

Generate a FHC of 1613 and  
terminate the call.

### **3. Provisioning**

---

#### **Structures Affected**

---

- 3.01** Item OD4PF13 in data structure OD4OFCCOPY has been assigned as the office parameter to indicate whether this feature is active or not active.

### **4. Recording (Not Affected)**

---

### **5. Network Management (Not Affected)**

---

### **6. Maintenance/Troubleshooting**

---

- 6.01** A new FHC has been defined to indicate that the victim switch did not receive a response to its initial query of the 1UGT NCP or the 2DSA NCP. The name of the new FHC is 4FHSDC\_ASTN\_TIMEOUT, and the number is 424.
- 6.02** Two new exception codes are associated with FHC 424:
- 4D7EX\_ASTN\_UGTT\_TO (176)—Indicates that the initial query to the 1UGT NCP has timed out.
  - 4D7EX\_ASTN\_2NCP\_TO (177)—Indicates that the initial query to the 2DSA NCP has timed out.
- 6.03** Prior to the incorporation of this feature, if the UGT default record was not populated in the 4ESS switch, the call would fail with a FHC of 1613. When this feature is activated, if the default record is not populated, the call fails with FHCs 424 and 1613. If the feature is off, the call fails with FHC 1613.

## 7. Transition Considerations

### Ubiquity

**7.01** It is not necessary for all 4ESS switches in the network to be running the 4E20 Release 3 Generic for this feature to be fully operational. However, the following circumstances apply during the transition period between generic releases.

<b>If the victim switch...</b>	<b>And the helper switch ...</b>	<b>Then the...</b>
Has NOT been upgraded to 4E20 Release 3 Generic	Has been upgraded to 4E20 Release 3 Generic	Existing call flow, as described in Sections 1.01–1.03, applies
Has been upgraded to 4E20 Release 3 Generic	Has NOT been upgraded to 4E20 Release 3 Generic	New call flow applies.

### Turn On/Turn Off Mechanism

**7.02** This feature is turned on automatically by software deployment.

**7.03** The feature can be turned off using Recent Change (RC) Form 809, which is provided to activate or deactivate features. Most features are not active when the new software generic is deployed, and the on/off flag that controls the state of the feature is "Off." In the case of this feature, however, the feature is active when the new software generic is deployed, but the state of the on/off flag is also "Off." Therefore, to turn this feature off, or deactivate it, you need to change the state of the on/off flag to "On."

**7.04** To change the state of the on/off flag to "On," enter **PF13** in the FEATURE ITEM field on RC Form 809 and **ON** in the ON OR OFF field. This will deactivate the feature.

**7.05** To change the state of the on/off flag to "Off," enter **PF13** in the FEATURE ITEM field on RC Form 809 and **OFF** in the ON OR OFF field. This will activate the feature.

**7.06** The state of the on/off flag can also be changed by an absolute word change. Item OD4PF13 in Office Data Assembler (ODA) structure OD4OFCCOPY is the office parameter that dictates whether or not the SDN—ASTN/SGTT Interworking feature will be applied during an ASTN condition.



#### **CAUTION:**

*The OD4OFCCOPY structure also contains the on/off bits for many other features. Be certain that the change you make affects only this feature.*

**7.07** The following is the information needed to turn the feature on or off using an absolute word change:

- Structure: OD4OFCCOPY
- Core address in 4E20 Generic: 6731453
- Size of OD4PF13: 1
- Displacement of OD4PF13: 12
- On: 0
- Off: 1

## **8. Input/Output Manual Pages (Not Affected)**

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**Calling Party Number (CPN)  
Delivery Feature (4659)**

# 16

---

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## Calling Party Number (CPN) Delivery Feature (4659)

# 16

---

### 1. Feature Description

- 1.01** This feature allows AT&T to comply with the Federal Communications Commission (FCC) rules and policies regarding Calling Party Number Identification Service (Caller ID). Feature 4659 enforces the Calling Party Number (CPN) privacy delivery rules at a terminating Primary Rate Interface (PRI), as specified in FCC Docket 91-281.
- 1.02** The FCC requirements change the way AT&T delivers the CPN and the Billing Number (BN) in the AT&T Switched Network (ASN). To comply with the FCC order, this feature will be fully deployed in the ASN by April 12, 1995.
- 1.03** Prior to this feature, the 4ESS™ switch would deliver the CPN or BN to an Integrated Services Digital Network (ISDN) PRI, if subscribed, if the presentation was indicated as restricted or allowed. With this feature, this operation will be changed to deliver the CPN to an ISDN PRI only when the presentation is allowed and to deliver the BN (either 3 or 10 digits) on a per Service Identity Indicator (SII) basis. The CPN will not be delivered if the presentation is restricted. Privacy will be honored for all services for which terminating traffic egresses the network via a commercial ISDN PRI.
- 1.04** BN delivery will be applicable only for SII values associated with the services shown in Table 16-A. Subscription and presentation screening determine if delivery will be allowed.

Table 16-A. Services and Current SII Values

Service	Current SII Values
Software Defined Network	1, 19, 70, 71, 77
MEGACOM <sup>®</sup> 800 Service	2, 8, 37 to 42, 49 to 54, 82
Multiquest <sup>®</sup> Telecommunications Service	12

## 2. Call Flow

**2.01** The following example describes the capabilities of this feature as indicated in the call flow of a call in the ASN:

1. A call is received at the originating 4ESS switch.
2. The call is routed through the ASN to the terminating 4ESS switch per existing procedures.
3. At the terminating 4ESS switch, if the termination is a commercial ISDN PRI, one of the following applies:

**⇒ NOTE:**

In the following description of operation, the use of "BN allowed" means that the BN passed SII and Presentation/Restriction screening. The use of "CPN allowed" means that the CPN passed Presentation/Restriction screening.

- If the trunk subgroup (TSG) is not subscribed to the delivery of CPN, the 4ESS switch will not include a CPN Information Element in the Call Setup message, and it will ignore the CPN.
- If the TSG is subscribed to the delivery of CPN and the CPN is marked "presentation restricted," the 4ESS switch will not include a CPN Information Element in the Call Setup message and will ignore the CPN. If the CPN is marked "presentation allowed," the 4ESS switch will include a CPN Information Element in the Call Setup message and will include the CPN.
- If the TSG is subscribed to the delivery of CPN Preferred, and the CPN is available and marked "presentation allowed," the 4ESS switch will deliver the CPN with the Call Setup message. If the CPN is not available or is available but marked "presentation restricted," and the BN is available and allowed, the 4ESS switch will deliver the BN in the Call Setup message. If the CPN is not available or is available and marked "presentation restricted," and the BN is not available or is not allowed, the 4ESS switch will not deliver the CPN Information Element.

- If a per-call request via a Facility (FACility) message for CPN Only is received, and the requested CPN is available and marked "presentation restricted," the 4ESS switch will not deliver the CPN and will send a Facility Reject (FACility REJect) message rejecting the request. If the CPN is marked "presentation allowed," the 4ESS switch will deliver the requested CPN in the CPN Information Element of the Facility Acknowledge (FACility ACKnowledge) message.
- If a per-call request via a Facility message for CPN Preferred is received, and the CPN is available and marked "presentation allowed," the 4ESS switch will deliver the CPN in the CPN Information Element of the Facility Acknowledge message. If the CPN is not available or is available but marked "presentation restricted," and the BN is available and allowed, the 4ESS switch will deliver the BN in the CPN Information Element of the Facility Acknowledge message. If the CPN is not available or is available but marked "presentation restricted," and the BN is not available or is not allowed, the 4ESS switch will send a Facility Reject message rejecting the request.
- If the TSG is subscribed to the delivery of the BN, the 4ESS switch will determine if BN Delivery is allowed. If it is allowed, it will be delivered in the CPN Information Element; if it is not allowed, it will not be included in the Call Setup message.
- If the TSG is subscribed to the delivery of the BN Preferred on a per-call basis, and the BN is available and is allowed, the 4ESS switch will deliver the BN in the Call Setup message. If the BN is not available or is not allowed, and the CPN is available and is marked "presentation allowed," the 4ESS switch will deliver the CPN in the Call Setup message. If the BN is not available or is not allowed, and the CPN is available and is marked "presentation restricted," the 4ESS switch will not deliver the Information Element in the Call Setup message.
- If a per-call request via a Facility message for BN Only is received, and the requested BN is available but is not allowed, the 4ESS switch will not deliver the BN and will send a Facility Reject message to reject the request. If the BN is allowed, the 4ESS switch will deliver the requested BN in the CPN Information Element of the Facility Acknowledge message.
- If a per-call request via a Facility message for BN Preferred is received, and the BN is available and is allowed, the 4ESS switch will deliver the BN in the CPN Information Element of the Facility Acknowledge message. If the BN is not available or is not allowed, and the CPN is available and is marked "presentation allowed," the 4ESS switch will deliver the CPN in the CPN Information Element of the Facility Acknowledge message. If the BN is not available or is not allowed, and the CPN is available but is marked "presentation restricted," the 4ESS switch will send a Facility Reject message rejecting the request.

⇒ **NOTE:**

If the TSG uses MF signaling, the Automatic Number Identification (ANI) included in the outgoing Equal Access Multifrequency (EAMF) signaling will be the BN and not the CPN, per existing procedures. Because the value of the privacy indicator cannot be included in the EAMF signaling, only the BN will be signaled as the ANI. Per current procedures, when a terminating 4ESS switch delivers a call to a commercial ISDN PRI, and the Calling Party Subaddress is to be delivered with the Call Setup message, the 4ESS switch will deliver the Calling Party Subaddress, whether the presentation status of the CPN is restricted or allowed.

4. The call proceeds per existing procedures following call setup.

### **3. Provisioning**

---

**3.01** Recent Change (RC) Form 653 is used to allow delivery of the BN. The fields on RC Form 653 include SII, QUESTION and ANSWER. The SII entry can be any current value for the applicable service as shown in Table 16-A. The entry for the QUESTION field is 6 (Should the Billing Number be sent with this SII?). The entry for the ANSWER field is Y (for yes).

### **4. Recording (Not Affected)**

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### **5. Network Management (Not Affected)**

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### **6. Maintenance/Troubleshooting (Not Affected)**

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### **7. Transition Considerations**

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#### **Ubiquity**

---

**7.01** It is not necessary for all 4ESS switches in the network to be running 4E20 Release 3 software for this feature to be operational.

**Turn On/Turn Off Mechanism**

---

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

**8. Input/Output Manual Pages (Not Affected)**

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**Individual Per Call Control  
Gateway Maintenance  
Enhancements Feature  
(4677/4677a)**

**17**

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**Individual Per Call Control  
Gateway Maintenance  
Enhancements Feature  
(4677/4677a)**

**17**

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**1. Feature Description**

**1.01** The Individual Per Call Control (iPCC) Gateway Maintenance Enhancements feature provides the 4ESS™ switch the means to improve maintenance of the iPCC Gateway. These enhancements include generating major alarms to the Maintenance/Service Circuit Controller (MTC/SCC) channels and displaying a list of the affected files. Affected items include the Gateway-to-Gateway File Copy, Gateway Maintenance, and File Audits.

**1.02** The iPCC Primary and Secondary Gateways are commonly referred to as one unit. In actuality, Gateway 1 is the Primary unit and Gateway 2 is the Secondary unit. These units operate independently of each other.

**2. Call Flow (Not Affected)**

**3. Provisioning (Not Affected)**

**4. Recording (Not Affected)**

**5. Network Management (Not Affected)**

## **6. Maintenance/Troubleshooting**

---

### **Gateway-to-Gateway File Copy**

---

- 6.01** In today's environment, the Gateway system is delivered with all the hardware installed in its frame and all the software installed on the disks. Subsequent software releases are downloaded from the 4ESS switch to each Gateway system via Special Access Data Channel (SADC) links.
- 6.02** When a Gateway system disk crashes or the Central Processor Unit (CPU) is out of service, the current procedure is to remove the bad CPU module and install a spare. However, there is a risk that the software release in the spare CPU may be outdated.
- 6.03** To solve this problem, the *GWCOPY* operation provides the means to copy critical files from one Gateway unit to another whenever a spare CPU module needs to be replaced or critical files need to be updated. The *GWCOPY* operation copies and verifies critical files from the originating (active) Gateway unit to the destination (inactive) Gateway unit. This operation is performed from the Gateway Maintenance Screen of the active Gateway unit.

### **Gateway Maintenance**

---

- 6.04** Currently, the Gateway system status and maintenance information are executed using separate commands. When this feature (4677/4677a) is activated, the Gateway System Status Menu screen (Figure 17-1) will allow craft personnel to execute status and maintenance information commands during one session using the following procedures.

```
IPCC GATEWAY SYSTEM STATUS MENU
-----

CMD>                                     HIT 'Q' TO QUIT

1 - CURRENT PROCESS STATUS PAGE
2 - LINK IDENTIFICATION PAGE
3 - MANAGEMENT TOOLS PAGE
```

**Figure 17-1. Gateway System Status Menu Screen**

1. Using a 730 terminal, enter the login **oswf**.
2. When the screen appears, enter **1** (CURRENT PROCESS STATUS PAGE) at the CMD> prompt to display the Current Process Status Page (Figure 17-2). This screen shows the status of the following items:
  - Gateway role (Primary or Secondary unit) and state (active or inactive)
  - Universal Services Echo Canceler (USEC), Interlink, and SADC link states
  - Software Version Number
  - Current Time.

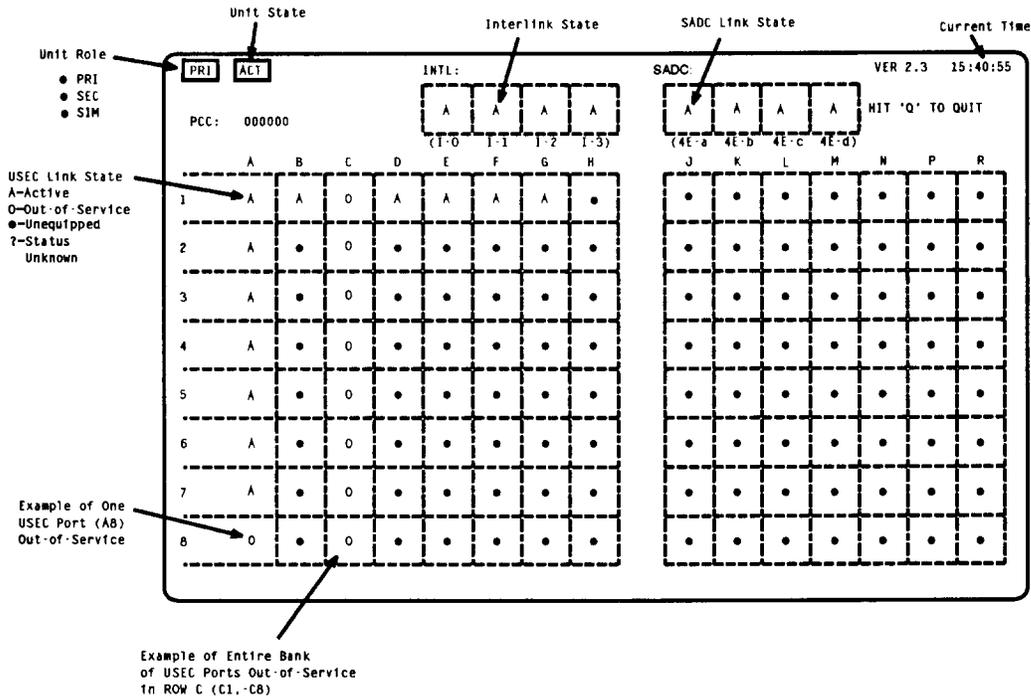


Figure 17-2. Current Process Status Page

3. After reviewing the information, enter **Q** (Quit) to redisplay the Gateway System Status Menu screen.
4. To access the Gateway System Management Menu Screen (Figure 17-3), enter **3** (MANAGEMENT TOOLS PAGE) at the CMD> prompt. This command displays the menu screen from which the appropriate option(s) is selected to complete the task.

```
IPCC GATEWAY SYSTEM MANAGEMENT MENU
-----
HIT 'Q' TO QUIT

CMD>

01 - TOGGLE FORCE
10 - RESTART GWROUTE
20 - STOP GWROUTE / START GWUPDAT
30 - FAST REBOOT
40 - COMPLETE REBOOT
51 - HALT SYSTEM
55 - INSTALL REPLICA FILES
60 - INSTALL BWM
65 - INSTALL MATE COPY
70 - SEND FILES TO MATE
75 - AUDIT CRITICAL FILES
80 - RESET AUDIT
```

**Figure 17-3. Gateway System Management Menu**

5. Display the Intergateway Copy Menu (Figure 17-4) to access the following operations:
  - ALL FILE SYSTEMS (28) to copy all file systems. This option is used after a troubleshooting session determines that corrupted files need to be replaced.
  - ALL FILES (23) to copy the files listed in options 24 through 27. Option 23 is used to update the software on the spare CPU after replacing a bad CPU module.

```

                                INTERGATEWAY COPY MENU
                                -----

                                HIT 'Q' TO QUIT
                                HIT 'C' TO COPY
                                HIT 'A' TO ABORT

CMD>

SELECT CRITICAL FILES:          SELECT FILE SYSTEMS:

11 ROUTE                        24 ROOT FILE SYSTEM
12 UPDAT                        25 VAR FILE SYSTEM
13 MON                          26 USR FILE SYSTEM
14 SCREEN                       27 HOME FILE SYSTEM
15 MANAGE                       28 ALL FILE SYSTEMS
16 DBADMIN
17 GWQUERY
18 GWCOPY
19 VMUNIX.IPCCALL
20 VMUNIX.X25ONLY
21 AUDSYS
22 AUDMSG
23 ALL FILES

```

**Figure 17-4. Intergateway Copy Menu Screen**

**6.05** Detailed procedures to access and use these display pages are contained in Task Oriented Practice (TOP) AT&T 234-151-082AC, *iPCC Gateway Acceptance, Growth, and Trouble Clearing Procedures*.

**1B Processor System Integrity (File Audit)**

---

**6.06** Each day at 3:45 a.m., the Gateway system audits the critical files to detect any corruptions. If the audit fails, the Gateway system informs the 4ESS switch with a REGISTER message which includes a list of the critical files that failed checksum.

**6.07** When the 4ESS switch receives the audit failure REGISTER message, the switch generates a major alarm to the MTC/SCC channels. The Technology Control Center (TCC) is then notified of any corrupted files. The Gateway system resends the audit failure message to the switch every hour on the hour until corrective action is taken.

**6.08** Refer to TOP, AT&T 234-110-082AC, *iPCC Gateway System Description*.

## Measurements

---

- 6.09** The Gateway system collects the following set of Enhanced USEC Measurements (EUMs) on a per-USEC frame basis:
- Total number of PCC orders the Gateway sends to the USEC frame
  - Total number of packets the Gateway sends to the USEC frame
  - Total number of packets with USEC port Cyclic Redundancy Check (CRC) 6 errors
  - Total number of packets with USEC Universal Asynchronous Receiver Transmitter (UART) port errors
  - Total number of good packets received by the USEC frame
  - Total number of bad packets received by the USEC frame
  - Total number of command error packets received by the USEC frame
  - Total number of PCC orders that overflowed the queue in the Gateway
  - Total number of PCC orders placed in the Gateway queue
  - Total number of discarded PCC orders due to link failure
  - Maintenance occupancy of each link based on a 15-second scan.
- 6.10** These measurements are generated in the Gateway unit and stored on disk. To access these reports, enter the UNIX\* shell command **gwquery**.

## 7. Transition Considerations

---

### Ubiquity

---

- 7.01** It is not necessary for all 4ESS switches in the network to be running the 4E20 Release 3 Generic for this feature to be operational.

### Turn On/Turn Off Mechanism

---

- 7.02** This feature is turned on automatically by software deployment.

---

\* UNIX® is a registered trademark of Novell, Inc.

## **8. Input/Output Manual Pages**

---

**8.01** The Output manual page **REPT:IPCC-CRIT** is related to this feature. Based on the Gateway audit of critical files, the system automatically prints the names of all corrupted files. The message is issued once each hour until the problem is corrected.

ID ..... REPT:IPCC-CRIT  
WORK CENTER.. MOC, TEC, TOC  
GENERIC ..... 4E20 and later  
APPLICATION .. 4E  
TYPE ..... Output

**1. FORMAT**

REPT:IPCC GW a CRITICAL FILE CORRUPTION

FILES:  
{b|INV}  
.  
.  
.

**2. REASON FOR OUTPUT**

The output will occur following the individual per call control (iPCC) gateway audit of critical files. This audit occurs daily at 03:45 am. If any files are corrupted, then a major alarmed message will be sent to the maintenance (MTC) terminal. The names of all corrupted files will be output. The message will be issued at hourly intervals until the problem has been corrected.

**3. VARIABLE FIELD DEFINITIONS**

- a Gateway identity:
  - 1 — Primary.
  - 2 — Secondary.
- b Name of corrupted file, from 1 to 10 names of corrupted files may be output.
- INV Prints in place of a file name if the file data received from the gateway is invalid.

**4. ACTION TO BE TAKEN**

When the message is observed, action is required. The iPCC Gateway "syslog" file should be examined. The following actions should then be taken at the iPCC Gateway:

1. Remove the affected Gateway;
2. Install the Replicas of the critical files in "/var/files/frep";
3. Run the Gateway Critical Files Audit: "/var/files/bin/fsaud";

**5. REFERENCES**

PIDENTs  
IPCC

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Practice 234-110-083AC, *Individual Per-Call Control (iPCC) Connectivity and Maintenance Guidelines*

Input Messages  
OP : PCCGW

SEE PROPRIETARY NOTICE ON COVER PAGE

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## Automatic Call Distributor in the Network—Phase 2 Feature (4692)

# 18

---

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## Automatic Call Distributor in the Network—Phase 2 Feature (4692)

# 18

---

### 1. Feature Description

**1.01** The Automatic Call Distributor (ACD) in the Network (ACDN)—Phase 2 feature provides telephone customers with automatic call distribution and Management Information Systems functionality with First-In-First-Out (FIFO) call distribution queuing. The ACD is a feature in a Private Branch Exchange (PBX) that evenly distributes large volumes of incoming calls. A PBX is served by businesses (such as airlines) and government agencies and is usually located on the customer's premises. The ACDN provides customers with services that are traditionally provided by one or more premises-based ACDs. The ACDN allows customers' Call Centers nationwide to function as if they were one large site.

**1.02** Phase 1 of ACDN was the first offering of automatic call distribution service. Phase 1 provided nationwide distribution of ACD calls among AT&T's initial customer's (United Airlines) eight Call Centers where their agents answer calls. Phase 1 used Intelligent Call Processing (ICP) to determine routing, with calls being routed to a Call Center with the most idle agent or with the least expected wait time. ICP is a Business Communications Service (BCS) that allows a database, which is external to the Network Control Point (NCP), to be queried for call routing instructions. Phase 1 ACDN did not meet the customer's requirement for single-queue FIFO call distribution service. In preparing to meet this requirement, AT&T implemented Central Office (CO)-Based ACDN. CO-Based ACDN allows customers to use private switching systems (PBXs) to route calls. The applications that are used on these PBXs provide for FIFO call distribution.

**1.03** CO-Based ACDN (Phase 2 of ACDN) provides an enhancement to Phase 1 ACDN by allowing PBXs to handle calls on a FIFO basis. Additionally, CO-Based ACDN supports multiple customer sites that want to function as one large site being served by one large ACD.

**1.04** For CO-Based ACDN, a new ACD trunk type has been added to the 4ESS™ switch. This new ACD trunk type is proprietary to AT&T and must not become operative in Local Exchange Carriers' machines. The ACD trunk type allows the 4ESS switch to do the following:

- Accept and process Billing Update messages.
- Perform all functions that are associated with commercial Integrated Services Digital Network (ISDN) trunk subgroups, which supports Primary Rate Interface (PRI) customers.

## **2. Call Flow (Not Affected)**

---

## **3. Provisioning**

---

**3.01** The PBXs that are used in Phase 2 ACDN are connected to the agents' station sets in customers' Call Centers by T1/T45 private lines. A Point of Presence (POP) separates AT&T network facilities from customer facilities. (A POP is the physical location where the Exchange Carrier's facilities meet the Interexchange Carrier's facilities.) For CO-Based ACDN, the POP is located between the PBX and the customer's Call Center. The Terminating Number associated with the POP near the Call Center must be provisioned in the 4ESS switch. Also, the Terminating Number must be translated to an Action Point Number (APN) before the call can be billed. If the Terminating Number is not in the APN format, errors will result and the bill will be sent to a downstream billing system such as the Recorded Information Collection System (RICS). The correct format of an APN is as follows:

SSS-TTT-XXXX

Where,

SSS = AT&T switch identifier  
TTT = Trunk Subgroup (TSG) unique identification  
XXXX = Line number designation

## **Office Data Assembler Structure Affected**

---

**3.02** This feature affects the Primary Rate Interface Type (PRIT) which is contained in data structure HT4TBNCORE and data item XL4TB\_PRIT in the AT&T 1B Processor. Word 5 in the trunk block has been assigned a new value of "6" (for

TSGACD) to support ACD interfaces. Table 18-A gives the values and a description of all the valid entries for the **PRIT** field. The highlighted text in the body of the table indicates that this item has been added to support ACD interfaces.

**Table 18-A. PRIT Field Valid Entries**

<b>PRIT Entry</b>	<b>Value</b>	<b>Description</b>
Blank	0	Incoming Signaling Characteristic (ISC) and/or Outgoing Signaling Characteristic (OSC) is not Q.931
NOQ931	0	ISC and/or OSC is not Q.931
TSGPBX	1	Normal PBX TSG
TSGCPA	2	TSG is to the Common Platform Adjunct
CONV	3	CONVERSANT® Interactive Voice Information System Sequence Dialing Unit
SSA	4	TSG for the Small Scale Adjunct
ATP	5	AT&T Trigger Platform
<b>TSGACD</b>	<b>6</b>	<b>Automatic Call Distributor</b>

### Recent Change (RC) Forms Affected

**3.03** RC Forms 100, 101, 102, 107, 108, and 109, which are used to establish the translations for TSGs, are affected by this feature. These forms contain the **PRIT** field in which "TSGACD" has been established as one of the valid entries. (The PRIT is proprietary to AT&T.) Table 18-B gives a list of these RC forms, the type of TSG supported, and the action to be performed.

**Table 18-B. Add/Change TSG Characteristics RC Forms**

<b>Form</b>	<b>Description</b>
100	Add A New Two-Way Trunk Subgroup
101	Add A New One-Way Incoming Trunk Subgroup
102	Add A New One-Way Outgoing Trunk Subgroup
107	Change A Two-Way Trunk Subgroup
108	Change A One-Way Incoming Trunk Subgroup
109	Change A One-Way Outgoing Trunk Subgroup

**3.04** In order for the ACDN feature to work properly, the **PRIT** field on RC Forms 100, 101, 102, 107, 108, and 109 must be populated in accordance with the constraints given in Table 18-C. Additionally, the Dialed Number Preferred (DNP) field should be set to "Y" on RC Forms 100, 102, 107, and 109.

**Table 18-C. ACDN Feature Constraints**

<b>If...</b>	<b>Then...</b>
<b>PRIT</b> field is TSGPBX, TSGCPA, CONV, SSA, or TSGACD	Incoming Signaling Characteristic (ISC) field on RC Forms 100, 101, 107, and 108 must be populated with "Q931."
	PBX Answer Withheld (PBXAW) field on RC Forms 100, 101, 107, and 108 must be blank or populated with "N" for No.
	Outgoing Signaling Characteristic (OSC) field on RC Forms 100, 102, 107, and 109 must be populated with "Q931."
<b>PRIT</b> field is TSGACD	Office must be an AT&T office (OD40PTPRIT EQ 40DOPT_YES).
ISC and/or OSC field on RC Forms 100, 101, 102, 107, 108, and 109 is not Q931	Leave the <b>PRIT</b> field blank or enter NOQ931.

**Verify Forms Affected**

**3.05** Four Verify forms are affected by the ACDN feature. Verify Forms 1a, 1b, and 1c are used to show that the new output, "TSGACD", is a valid entry in the **PRIT** field. Verify Form 11d allows "TSGACD" to be used as a valid search value for the **PRIT** field.

**4. Recording and Billing**

**Billing Update Capability**

**4.01** The CO-Based ACDN meets the customer's requirement for FIFO call distribution, but it does not meet certain regulatory requirements. For example, CO-Based ACDN does not provide on the customer's bill the location of the Call Center that handled the call. The Automatic Message Accounting (AMA) record shows the location of the PBX system, but it does not show the location of the Call Center. Therefore, the Billing Update capability is used to record the final termination of calls.

- 4.02** The Billing Update capability allows a Billing Update message to be sent to the Originating AT&T Switch (OAS). When a call is connected to an agent, the existing Billing Update message will be used to send the correct Terminating Number to the OAS. As normal, the ICP Network Control Point (NCP) instructs the OAS to start AMA recording for ACDN calls via the Transaction Capabilities Application Part (TCAP) Charging-Bill Call operation. The Charging-Bill Call operation will include the customer's Service Identification Code (SIC) and the Call Code (CC).
- 4.03** Currently, recording at the OAS is based on AMA Structures 01144-01147 and 01350-01357. If the Calling Party Number (CPN)/Billing Number (BN) is delivered, AMA Structures 01350-01357 are used for recording.
- 4.04** When the Terminating AT&T Switch (TAS) delivers calls on an ACD TSG, the TAS delivers the data in the Setup message the same as it does for commercial PRI customers. This applies to current and future commercial PRI customers. The Setup message includes the CPN/BN, as well as the Called Party Number (CdPN).
- 4.05** If an agent is available when the call is routed to a PBX, the call is delivered to that agent. The PBX will send an Alerting message to the TAS. If an agent is not available when the call is routed to a PBX, the call is placed in queue until an agent becomes available or the caller disconnects. The PBX will send an Alerting message to the TAS and place the call in queue. Additional actions that take place when an agent is available and when an agent is not available are described in this chapter.

### **Call Routed Directly to Available Agent**

---

- 4.06** If the caller's CPN or the BN is available, the caller's CPN or the BN is delivered to the TAS in an ISDN Q.931 Setup message. The TAS will send an ISDN User Part (ISUP) Station Identification (SID)/Automatic Number Identification (ANI) Increment message to the OAS. The SID/ANI Increment message records the CPN/BN delivery in the billing record. The TAS will also send the CdPN (the dialed 800 number), which is included in the ISDN Setup message, to the OAS.
- 4.07** When the call is connected to the agent's station, the PBX will send a Q.931 Connect message to the TAS. The Connect message triggers the start of elapsed time recording for the call. After the Q.931 Connect message is sent to the TAS, the PBX will send a Q.931 Billing Update message to the TAS. This Billing Update message contains the Terminating Number associated with the Call Center of the agent that is selected to receive the call and the Terminating Numbering Plan Indicator. The Billing Update message is then sent to the OAS where the corresponding field in the AMA record is overwritten.
- 4.08** If the TAS receives a Q.931 Billing Update message associated with a call established on an ACD TSG, and the TAS is NOT the same 4ESS switch as the OAS, the TAS will send an ISUP Facility Request (FAR) message to the OAS. This FAR message contains the Terminating Number and the Terminating Number Plan

Indicator. When the OAS receives the FAR message with the billing update, the OAS overwrites the contents of the AMA Tables as specified in Table 18-D.

**4.09** If the TAS receives a Q.931 Billing Update message associated with a call established on an ACD TSG, and the TAS is the same 4ESS switch as the OAS, the TAS will use the data in the Billing Update to overwrite the contents of the AMA Tables as specified in Table 18-D.

**Table 18-D. Billing Update Mapping**

AMA Data	AMA Table	Number of Digits	Q.931 Facility (FAC) Message	ISUP FAR Message
Service Feature	12	3	Generic Billing Data (Service Feature)	Generic Operation Parameter (Service Feature)
SIC	133	3	Generic Billing Data (SIC)	Generic Operation Parameter (SIC)
Call Code	1	3	Generic Billing Data (CC)	Generic Operation Parameter (CC)
Terminating Number	16, 17	10	Generic Billing Data (Terminating Number)	Generic Operation Parameter (Terminating Number)
Terminating Numbering Plan Indicator	—	1	Generic Billing Data (Terminating Numbering Plan Indicator)	Generic Operation Parameter (Terminating Numbering Plan Indicator)



**NOTE:**

For Phase 2 ACDN calls, only the Terminating Number and the Terminating Numbering Plan Indicator fields are sent. The other three existing AMA fields in Table 18-D will not be sent for Phase 2 ACDN calls.

### Call Queued Before Routing to Agent

**4.10** If the caller's CPN or BN is available, the caller's CPN or BN is delivered in the Q.931 Setup message. The TAS will send an ISUP SID/ANI Increment message to the OAS.

**4.11** If an agent is not available when the call is being routed, the PBX will send an Alerting message to the TAS and place the call in queue.

**4.12** When the PBX begins to play the first announcement or music in queue, the PBX will send a Q.931 Connect message to the TAS. The Connect message triggers the start of elapsed time recording for the call. When the call is taken out of queue (that is, when an agent becomes available), the PBX selects the oldest call that is waiting in queue and connects that call to the agent. This is referred to as FIFO call distribution queuing, which is an ACD capability.

**4.13** On a FIFO basis, the PBX connects the call to the agent that is alerted for the call. After connecting the call to the agent, the PBX will then send a Q.931 Billing Update message to the TAS. This Billing Update message contains the Terminating Number of the POP that serves the agent along with the Terminating Numbering Plan Indicator that is associated with the alerted agent's Call Center.

**4.14** The TAS will send an ISUP FAR message to the OAS. When the OAS receives the FAR message with the billing update, the OAS overwrites the Terminating Number and the Terminating Number Plan Indicator fields in the AMA record.

### **AMA Recording**

---

**4.15** The AMA record for a completed call contains the time the call was spent in queue and the time from when the agent answered the call until the time the agent disconnected the call. A completed call in this case is a call that has been placed in queue and then delivered. The elapsed time is recorded in the AMA record's Elapsed Time field. The AMA record does not distinguish between the time a call is spent in queue and the time from answer to disconnect. Nor does the Elapsed Time field in the AMA record reflect the time the agent spends listening to a ringback or the time the call spends in queue before an announcement is played. Typically, an announcement is played shortly after ringback.

## **5. Network Management**

---

**5.01** The 4ESS switch sends the new PRIT value of "6" for TSGs to the Network Management Operations Support System (NEMOS) in Message Type 48. The value of "6" indicates that the TSG's PRIT is an ACD. Message Type 48 gives the identification of TSGs along with reference data.

## **6. Maintenance/Troubleshooting (Not Affected)**

---

## **7. Transition Considerations**

---

**7.01** When the CO-Based ACDN feature is initially deployed, no TSGs will be set to ACD. The appropriate TSGs will be set to ACD via RC Forms 100, 101, 102, 107, 108, and 109 as part of the CO-Based ACDN transition.

### **Ubiquity**

---

**7.02** The two 4ESS switches currently identified to support CO-Based ACDN are Chicago 59 (Canal Street) and Madison, Wisconsin. Full deployment is required at these two switches. However, full deployment of 4E20 Release 3 Generic throughout the AT&T 4ESS switch network is not required for the operation of this feature.

### **Turn On/Turn Off Mechanism**

---

**7.03** This feature is turned on by populating the PRIT field on RC Forms 100, 101, 102, 107, 108, and 109 with "TSGACD" for a Q.931 TSG. To turn this feature off, enter a blank, "NOQ931", or "TSGPBX" in the PRIT field. See Table 18-A.

## **8. Input/Output Manual Pages**

---

**8.01** To support this feature, two Input/Output (I/O) manual pages have been updated to reflect one changed Input message and one changed Output message. Input message **VER:TSGLIST** was changed to include "TSGACD" as a legal value for the PRIT search key. This input message requests a printout of all TSGs that have a specified set of characteristics.

**8.02** Output message **VER:TSG-LIST** prints out a list of all TSGs that contain the values of the search keys. This output message was changed to include support for the ACD interface. The TSG list verifies that "TSGACD" has been entered as a legal value for the PRIT search key.

ID ..... VER:TSGLIST  
WORK CENTER.. MAC, MOC  
GENERIC ..... 4E20 Rel. 2 and later  
CLASS ..... VER  
APPLICATION .. 4E  
TYPE ..... Input

### 1. PURPOSE

Lists all trunk subgroups with a specified set of characteristics.

### 2. FORMAT

- [1] **VER:TSGLIST!**
- [2] **VER:TSGLIST:FD1 a,DT1 b[,FD2 c,DT2 d[,FD3 e,DT3 f[,FD4 g,DT4 h]]]!**
- [3] **VER:TSGLIST:FD1 a,DT1 b[,DT2 d[,DT3 f[,DT4 h]]]!**

### 3. EXPLANATION OF MESSAGE

a,c,e,g            Search keys (See Table 1).  
b,d,f,h            Values of search keys (See Table 1).

### 4. SYSTEM RESPONSE

PF                Printout follows.  
RL                Retry later.

### 5. REFERENCES

PIDENTs  
IOCPIMC4  
VRFYCNTL  
VRFYINPT  
VRFYOUT  
VRFYTSG

Output Message  
VER:TSG-RDBLIST

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Table 1

a, c, e, g	b, d, f, h				
ACCID	1..255				
ACD	Y,N or T				
ADIG	2..9				
ANCR	Y or N				
ANI	0..255				
ANISID	NONE REQ	ANI SID	PANI *	PSID	
APS	Y or N				
AOPC	*				
BFTIS	ANN	REL			
BFTNI	ANN	REL			
BN	3 digits	4 digits	10 digits	*	
BNPT	NANP	APN			
BRL	L	S			
CAREA	0..9				
CBC	Y or N				
CBNPR	PA	PR	APR		
CCIF	Y or N				
CCIS2WRE	Y or N				
CCODE	CCNO CCCMC CCINT CCPBX	CCACI CCCPA CCMEG CCSDN	CCACO CCFGB CCMGC CCPOTS	CCAM2 CCFD CCOWC	CCAMA CCICR CCOWT
CID	0000..9999				
CHNEG	Y or N				
CLU	0..255				
CMERGE	Y or N				
CMTYP	1	2			
CODSC	Y or N				
CPOS	0..9				
CREG	0..31				
CSCSET	1..16383				
CTYP	0..7				
D3DBN	Y or N				
DATA	Y or N				

\* Any legal value except blank

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Table 1 (continued)

a, c, e, g	b, d, f, h				
DATAF	C	R			
DDD	Y or N				
DELAY	20 210	80 280	220	70	140
DNHR	Y OR N				
DNP	Y or N				
DOFP	Y or N				
DOM	HNPA SNPA1 SNPA3NAC SNPA6 INTLO DED DEC1 LSI ATNS I56D 1384	HNPANAC SNPA1NAC SNPA4 SNPA6NAC INTT DEC6 DER1 INCD IVT GSDN	AC SNPA2 SNPA4NAC SNPA7 VRFY DER6 DEVP IO56 N64C DAVT	IT SNPA2NAC SNPA5 SNPA7NAC SDNA DEC0 DEDP IO64 N64R 1.83	ITNAC SNPA3 SNPA5NAC INTL DEV DER0 NSR ITD I64C POTS
DPSTOP	Y or N				
EAS	N	A	E		
EXSEQ	N,T or B				
FAI	1..7				
FAR4E	Y or N				
FEAREA	1 to 12 alphanumeric characters				
FELATA	000..999				
FENCLASS	ACCESA PBX CAMA	ACCESI POTS CMC	ACCESO ITS *	INTL	OWATS
FENID	1 to 6 chars				
FENPA	200..999	2..9	20..99		
FE OFC	000..999				
FEPTY	Y or N				
FESC6	Y or N				
FESWID	1 to 12 alphanumeric characters				

\* Any legal value except blank

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Table 1 (continued)

a, c, e, g	b, d, f, h				
FLDSPR	Y or N				
FOSPS	Y or N				
GEOSEP	0.31				
GLARE	A	E	O	N	
GNSC	0.3				
GSDN	Y or N				
GSDNPHE	1	2			
HYBRD	Y or N				
IDDD	Y or N				
INCID	3	4	B		
INSEP	0.255				
ISC	MFWINK	MFDDSD	DPDDSD	DPIMMED	CCITT5
	CCITT6	DOMCCIS	1WAYOUT	DPIMADG	DPIMPSW
	Q931	DTS	ISUP	DTMFWK	
	DPPLS	MFCCLS	DCHAN		
	TUP	INUP	ICCS	TESTATP	MIOPNOP
	TOLLMFD	TSPSMFW	TSPSMFD	CAMAKEY	CAMACW
	RPACU	RPACS	MFOPWK		
IT	Y or N				
ITC	0.3				
ITELCO	Y or N				
IWZ1	Y or N				
LSST	2 chars				
MEGC	Y or N				
MEM	Y or N				
MEMBER	1..255				
MFSPEED	7	10			
MTSC	0.63				
MULAW	Y or N				
NEOTR	Y or N				
NET	0.255				
NPARINH	Y or N				
ONCID	3	4			

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Table 1 (continued)

a, c, e, g	b, d, f, h				
OSC	MFWINK	MFDDSD	DPWINK	DPDDSD	DPIMMED
	CCITT5	CCITT6	DOMCCIS	1WAYIN	MASMNTR
	MASRECT	MASPLBK	MASBIPB	AART	DTMFWK
	TONE	MWATT	ANN	TERM	
	VFL	XCVRT	DATATAT	DATALPC	SOA
	SOB	MFRCVR	MFXMTR	MFRCVRT	MFXMTR
	TONEDT	105T	TESTATP		
	XCVR	TWOPDPI	TWOPDPD	TWOPMFW	TWOPDPW
	MIOPNOP	SIOPNOP	ICOPNOP	SIOPMFW	CAMAKEY
	CAMATLK	CAMACW	ROTLCA0	ROTLTA0	ROTLCA1
	ROTLTA1	ATMEDA	ATMERA	MWDWN10	104T
	DPPLS	EMFCIXC	EMFCOXC	DTMFRCR	
	DTMFXMR	109T	104D	105D	Q931
	ISUP	DCHAN	TUP	RESD	RESV
	INUP	ICCS	NSCX	MSFH	
OTMTN	000..9999999				
OTMTT	N	ATMC	CTX2	CTX3	SXS
	SYNC	T103	*		
OTSTN	000..9999999				
OTSTT	N	ATMB	CTX2	CTX3	
	SXS	SYNC	T103	*	
OVL	Y or N				
OWAT	Y or N				
PBXAW	Y or N				
PBXESGD	Y or N				
PBXNWW	Y or N				
PCF	ATT	ANSI®	ISPC		
PRIT	NOQ931	TSGPBX	TSGCPA	CONV	SSA
	ATP	TSGACD			
PSATP	Y or N				
PSBN	Y or N				
PSCPN	Y or N				
PSES	Y or N				
PSOLI	Y or N				
PSTNG	Y or N				
PSUUI	Y or N				

\* Any legal value except blank.

SEE PROPRIETARY NOTICE ON COVER PAGE

Table 1 (continued)

a, c, e, g	b, d, f, h				
REV	Y or N				
RFA	Y or N				
RFMP	Y or N				
S5DIG	Y or N				
SAT	Y or N				
SBRIV	Y or N				
SCFN	Y or N				
SDNA	Y or N				
SDNPLAN	ORIG	PLUS	NXX	OPEN	
SINDEX	0	1	2	4	
	8	16	32	64	
SKSP	Y or N				
SPID	0..7				
TD	TWOWAY	IN1WAY	OUT1WAY	NONMSG	
TFG	B	C	D		
TOT	TOLLC	CAMAA	CAMAO	TSPS	SECIT
	TAND	ITAND	MISC	ITOLL	INTL
	INTLO	ITOPA	ITOPB	ITOP	
	NSDSD	PBX	ITS	STC	
	LCC	ETC	OCC	ATP	
TRIDX	1..31				
TSGBBC	0..6				
VDCAP	VOICE	DATA	BOTH		
WANISID	NONE	ANI	PANI	PSID	
	REQ	SID	*		
WATSBN	10 digits				
WBNPT	NANP	APN			
WGZ	1..7				
XCPA	0..3				
XTMTN	000..9999999				
XTMTT	N	T100	T102		
	T105	*			
XTSTN	000..9999999				
XTSTT	N	ATMA	T100		
	T102	T105	*		

\* Any legal value except blank.

SEE PROPRIETARY NOTICE ON COVER PAGE

ID . . . . . VER:TSG-LIST  
WORK CENTER . . . . . MAC, MOC  
GENERIC . . . . . 4E20 Rel. 2 and later  
APPLICATION . . . . . 4E  
TYPE . . . . . Output

**1. FORMAT**

VER:TSG;OPT(LIST)  
a        b  
c        d  
e        f  
g        h  
BTFN    TOWN    ST    BL    FBS    NBS    TSGN  
iiii    jjjj    kk    ll    mmm    nnn,    oooo,  
.        .        .        .        .        .        .  
.        .        .        .        .        .        .  
.        .        .        .        .        .        .

**2. REASON FOR OUTPUT**

To list all trunk subgroups (TSGs) that contain the given values for the given search keys. Refer to the VER:TSGLIST input message for more information.

**3. VARIABLE FIELD DEFINITIONS**

- a, c, e, g        Search keys (see Table 1).
- b, d, f, h        Values of search keys (see Table 1).
- i                Base traffic number of the trunk subgroup.
- j                Town.
- k                State.
- l                Building.
- m                Far building subdivision.
- n                Near building subdivision.
- o                Trunk subgroup number (TSGN).

**4. ACTION TO BE TAKEN**

None.

SEE PROPRIETARY NOTICE ON COVER PAGE

**5. REFERENCES**

PIDENTs  
IOCPIMC4  
VRFYCNTL  
VRFYINPT  
VRFYOUT  
VRFYTSG

**Input Message**  
VER : TSGLIST

SEE PROPRIETARY NOTICE ON COVER PAGE

Table 1

a, c, e, g	b, d, f, h				
ACCID	1..255				
ACD	Y,N or T				
ADIG	2..9				
ANCR	Y or N				
ANI	0..255				
ANISID	NONE REQ	ANI SID	PANI *	PSID	
APS	Y or N				
AOPC	*				
BFTIS	ANN	REL			
BFTNI	ANN	REL			
BN	3 digits	4 digits	10 digits	*	
BNPT	NANP	APN			
BRL	L	S			
CAREA	0..9				
CBC	Y or N				
CBNPR	PA	PR	APR		
CCIF	Y or N				
CCIS2WRE	Y or N				
CCODE	CCNO CCCMC CCINT CCPBX	CCACI CCCPA CCMEG CCSDN	CCACO CCFGB CCMGC CCPOTS	CCAM2 CCFD CCOWC	CCAMA CCICR CCOWT
CID	0000..9999				
CHNEG	Y or N				
CLU	0..255				
CMERGE	Y or N				
CMTYP	1	2			
CODSC	Y or N				
CPOS	0..9				
CREG	0..31				
CSCSET	1..16383				
CTYP	0..7				
D3DBN	Y or N				
DATA	Y or N				

\* Any legal value except blank

SEE PROPRIETARY NOTICE ON COVER PAGE

Table 1 (continued)

a, c, e, g	b, d, f, h				
DATAF	C	R			
DDD	Y or N				
DELAY	20 210	80 280	220	70	140
DNHR	Y OR N				
DNP	Y or N				
DOFP	Y or N				
DOM	HNPA SNPA1 SNPA3NAC SNPA6 INTLO DED DEC1 LSI ATNS I56D 1384	HNPANAC SNPA1NAC SNPA4 SNPA6NAC INTT DEC6 DER1 INCD IVT GSDN	AC SNPA2 SNPA4NAC SNPA7 VRFY DER6 DEVP IO56 N64C DAVT	IT SNPA2NAC SNPA5 SNPA7NAC SDNA DEC0 DEDP IO64 N64R 1..83	ITNAC SNPA3 SNPA5NAC INTL DEV DER0 NSR ITD I64C POTS
DPSTOP	Y or N				
EAS	N	A	E		
EXSEQ	N,T or B				
FAI	1..7				
FAR4E	Y or N				
FEAREA	1 to 12 alphanumeric characters				
FELATA	000..999				
FENCLASS	ACCESA PBX CAMA	ACCESI POTS CMC	ACCESO ITS *	INTL	OWATS
FENID	1 to 6 chars				
FENPA	200..999	2..9	20..99		
FE OFC	000..999				
FEPTY	Y or N				
FESC6	Y or N				
FESWID	1 to 12 alphanumeric characters				

\* Any legal value except blank

SEE PROPRIETARY NOTICE ON COVER PAGE

Table 1 (continued)

a, c, e, g	b, d, f, h				
FLDSPR	Y or N				
FOSPS	Y or N				
GEOSEP	0.31				
GLARE	A	E	O	N	
GNSC	0..3				
GSDN	Y or N				
GSDNPHSE	1	2			
HYBRD	Y or N				
IDDD	Y or N				
INCID	3	4	B		
INSEP	0.255				
ISC	MFWINK	MFDDSD	DPDDSD	DPIMMED	CCITT5
	CCITT6	DOMCCIS	1WAYOUT	DPIMADG	DPIMPSW
	Q931	DTS	ISUP	DTMFWK	
	DPPLS	MFCCLS	DCHAN		
	TUP	INUP	ICCS	TESTATP	MIOPNOP
	TOLLMFD	TSPSMFW	TSPSMFD	CAMAKEY	CAMACW
	RPACU	RPACS	MFOPWK		
IT	Y or N				
ITC	0.3				
ITELCO	Y or N				
IWZ1	Y or N				
LSST	2 chars				
MEGC	Y or N				
MEM	Y or N				
MEMBER	1..255				
MFSPEED	7	10			
MTSC	0..63				
MULAW	Y or N				
NEOTR	Y or N				
NET	0..255				
NPARINH	Y or N				
ONCID	3	4			

SEE PROPRIETARY NOTICE ON COVER PAGE

Table 1 (continued)

a, c, e, g	b, d, f, h				
OSC	MFWINK	MFDDSD	DPWINK	DPDDSD	DPIMMED
	CCITT5	CCITT6	DOMCCIS	1WAYIN	MASMNTR
	MASRECT	MASPLBK	MASBIPB	AART	DTMFWK
	TONE	MWATT	ANN	TERM	
	VFL	XCVRT	DATATAT	DATALPC	SOA
	SOB	MFRCVR	MFXMTR	MFRCVRT	MFXMTR
	TONEDT	105T	TESTATP		
	XCVR	TWOPDPI	TWOPDPD	TWOPMFW	TWOPDPW
	MIOPNOP	SIOPNOP	ICOPNOP	SIOPMFW	CAMAKEY
	CAMATLK	CAMACW	ROTLCOA0	ROTLTA0	ROTLCA1
	ROTLTA1	ATMEDA	ATMERA	MWDWN10	104T
	DPPLS	EMFCIXC	EMFCOXC	DTMFRCR	
	DTMFXMR	109T	104D	105D	Q931
	ISUP	DCHAN	TUP	RESD	RESV
	INUP	ICCS	NSCX	MSFH	
OTMTN	000..9999999				
OTMTT	N	ATMC	CTX2	CTX3	SXS
	SYNC	T103	*		
OTSTN	000..9999999				
OTSTT	N	ATMB	CTX2	CTX3	
	SXS	SYNC	T103	*	
OVLP	Y or N				
OWAT	Y or N				
PBXAW	Y or N				
PBXESGD	Y or N				
PBXNWW	Y or N				
PCF	ATT	ANSI@	ISPC		
PRIT	NOQ931	TSGPBX	TSGCPA	CONV	SSA
	ATP	TSGACD			
PSATP	Y or N				
PSBN	Y or N				
PSCPN	Y or N				
PSES	Y or N				
PSOLI	Y or N				
PSTNG	Y or N				
PSUUI	Y or N				

\* Any legal value except blank.

SEE PROPRIETARY NOTICE ON COVER PAGE

Table 1 (continued)

a, c, e, g	b, d, f, h				
REV	Y or N				
RFA	Y or N				
RFMP	Y or N				
S5DIG	Y or N				
SAT	Y or N				
SBRIV	Y or N				
SCFN	Y or N				
SDNA	Y or N				
SDNPLAN	ORIG	PLUS	NXX	OPEN	
SINDEX	0	1	2	4	
	8	16	32	64	
SKSP	Y or N				
SPID	0.7				
TD	TWOWAY	IN1WAY	OUT1WAY	NONMSG	
TFG	B	C	D		
TOT	TOLLC	CAMAA	CAMAO	TSPS	SECIT
	TAND	ITAND	MISC	ITOLL	INTL
	INTLO	ITOPA	ITOPB	ITOP	
	NSDSD	PBX	ITS	STC	
	LCC	ETC	OCC	ATP	
TRIDX	1.31				
TSGBBC	0.6				
VDCAP	VOICE	DATA	BOTH		
WANISID	NONE	ANI	PANI	PSID	
	REQ	SID	*		
WATSBN	10 digits				
WBNPT	NANP	APN			
WGZ	1..7				
XCPA	0.3				
XTMTN	000..9999999				
XTMTT	N	T100	T102		
	T105	*			
XTSTN	000..9999999				
XTSTT	N	ATMA	T100		
	T102	T105	*		

\* Any legal value except blank.

SEE PROPRIETARY NOTICE ON COVER PAGE

## Positive Call Processing (PCP) for Cellular Mobile Carrier (CMC) Service Type Feature (4744)

# 19

---

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## Positive Call Processing (PCP) for Cellular Mobile Carrier (CMC) Service Type Feature (4744)

# 19

---

### 1. Feature Description

**1.01** This feature allows Cellular Mobile Carrier (CMC) calls to receive Positive Call Processing (PCP) treatment. Prior to this feature, the 4ESS™ switch would map the Information Indicator (II)/Original Line Indicator (OLI) digits (61, 62, 63) to the CMC Service type, and PCP services would not be provided for these calls. Feature 4744 removes this restriction.

**1.02** Feature 4744 is proprietary to AT&T.

### 2. Call Flow

**2.01** When a call arrives at the originating AT&T switch, the Automatic Number Identification (ANI) Trigger Table is searched. If a match is found and the PCP/2 Network Control Point (2NCP) field is enabled, PCP treatment, using existing capabilities, is allowed. This includes PCP application screening for PCP/2NCP and Common Platform Adjunct (CPA) calls.

**2.02** In a future 4E software release, the application screening for PCP/2NCP and the CPA will be separated so that the CMC calls are allowed to receive PCP/2NCP features but not CPA features.

### **3. Provisioning (Not Affected)**

---

### **4. Recording**

---

**4.01** This feature does not change the Automatic Message Accounting (AMA) record. The existing Extended Bellcore AMA Format (EBAF) Module Code 900 will be appended to the AMA record. In addition, PCP EBAF modules will be appended if the CMC call receives PCP on 2NCP treatment.

### **5. Network Management (Not Affected)**

---

### **6. Maintenance/Troubleshooting (Not Affected)**

---

### **7. Transition Considerations**

---

#### **Ubiquity**

---

**7.01** It is not necessary for all 4ESS switches in the network to be running 4E20 Release 3 software for this feature to be operational.

#### **Turn On/Turn Off Mechanism**

---

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

### **8. Input/Output Manual Pages (Not Affected)**

---

## Abbreviations and Acronyms

---

### A

**ABC**  
Adjunct Based Capabilities

**ACD**  
Automatic Call Distributor

**ACDN**  
Automatic Call Distributor in the Network

**ACG**  
Automatic Call Gapping

**ACPN**  
Analyze Called Party Number

**AIN**  
Advanced Intelligent Network

**ALA**  
Adjunct Logical Address

**AMA**  
Automatic Message Accounting

**ANI**  
Automatic Number Identification

**APN**  
Action Point Number

**APS**  
Attached Processor System

**ASN**  
AT&T Switched Network

**ASR**  
Automatic Speech Recognition

**ASTN**  
Alternate Signaling Transport Network

---

### B

**BCS**  
Business Communications Service

**BILD**  
Business International Long Distance

**BLM**  
Base Level Maintenance

**BN**  
Billing Number

---

### C

**CAC**  
Carrier Access Code

**CAMA**  
Centralized Automatic Message Accounting

**CANI**  
Customer Automatic Number Identification

**CBC**  
Call-by-Call

**CC**  
Call Code

**CC**  
Country Code

**CCITT**  
International Telephone and Telegraph Consultative Committee

**CCS7**  
Common Channel Signaling System 7

**CdPN**

Called Party Number

**CDR**

Call Detail Recording

**CDRM**

Call Detail Recording Monitor

**CDRP**

Call Detail Recording Platform

**CDSC**

Custom Data Service Cabinet

**CDSU**

Custom Data Service Unit

**CMC**

Cellular Mobile Carrier

**CNI**

Common Network Interface

**CO**

Central Office

**COT**

Continuity OK Test

**CPA**

Common Platform Adjunct

**CPE**

Customer Premises Equipment

**CPN**

Calling Party Number

**CPU**

Central Processor Unit

**CRC**

Cyclic Redundancy Check

**CRDI**

Call Detail Recording Infrastructure

**CSR**

Carrier Specific Routing

---

**D**

**DA**

Directory Assistance

**DED**

Dedicated Egress Data

**DLN**

Direct Link Node

**DN**

Dialed Number

**DNT**

Dialed Number Trigger

**DSA**

Direct Services Automatic Number  
Identification

**DWAN**

Dedicated Wide Area Network

---

**E**

**EAMF**

Equal Access Multifrequency

**EB**

Extended Bus

**EBAF**

Extended Bellcore AMA Format

**EO**

End Office

**EUM**

Enhanced USEC Measurement

---

**F**

**FAI**  
Foreign Administration Identity

**FCC**  
Federal Communications Commission

**FEN**  
Far End Network

**FENPA**  
Far-End Numbering Plan Area

**FHC**  
Final Handling Code

**FIA**  
Feature Indicator All

**FIC**  
Frame Identification Code

**FIFO**  
First-In-First-Out

**FIR**  
Feature Indicator Request

**FON**  
Forced On-Net Number

**FRU**  
Field Replaceable Unit

**FTA**  
File Transfer and Activation

---

**G**

**GLF**  
Grid, Lineup, Frame Number

**GRI**  
Generic Routing Information

**GSDDN**  
Global Software Defined Data Network

**GSDNA**  
Global Software Defined Network  
Access

**GTT**  
Global Title Translation

---

**H**

**HDU**  
Hard Disk Unit

**HW**  
High and Wet

---

**I**

**I/O**  
Input/Output

**IAM**  
Initial Address Message

**ICDR**  
International Call Detail Recording

**ICP**  
Intelligent Call Processing

**IE**  
Information Element

**II**  
Information Indicator

**INTL**  
International

**INTO**  
International Outbound

**iPCC**  
Individual Per Call Control

**IRAS**  
Integrated Routing Assignment System

**ISC**  
International Switching Center

**ISDN**  
Integrated Services Digital Network

**ISTS**  
International Switched Transit Service

**ISUP**  
Integrated Services Digital Network  
User Part

**ITN**  
Integrated Test Network

**IWZ1**  
International World Zone 1

**IXC**  
Interexchange Carrier

---

**L**

**LAN**  
Local Area Network

**LATA**  
Local Access Transport Area

**LDI**  
Laboratory Design Information

**LEC**  
Local Exchange Carrier

---

**M**

**MCC**  
Master Control Console

**MCT**  
Multiple Carrier Treatment

**MCTI**  
Multiple Carrier Treatment Index

**MIP**  
Multifunctional Interface Processor

**MTC/SCC**  
Maintenance/Service Circuit Controller

---

**N**

**NCP**  
Network Control Point

**NEMOS**  
Network Management Operations  
Support System

**NESAC**  
National Electronic Switching  
Assistance Center

**NG-ODA**  
Next Generation-Office Data  
Administration

**NI**  
Network Interconnect

**NN**  
National Number

**NON**  
Nature of Number

**NPT**  
Numbering Plan Type

NSCX  
Network Services Complex

NSF  
Network Specific Facility

NSR  
Number Services Routing

---

## O

OAS  
Originating AT&T Switch

OCTCP  
Originating Carrier and Terminating  
Country Pair

ODA  
Office Data Assembler

ODAD  
Office Data Assembler Datalinking

ODMS  
Office Database Management System

OFAI  
Overflow Foreign Administration  
Identity

OLI  
Original Line Indicator

OLP  
Off-Line Processor

ONI  
Operator Number Identification

OSS  
Operations Support System

OTYP  
Originating Type

---

## P

PBX  
Private Branch Exchange

PC  
Point Code

PCC  
Pseudo Country Code

PCM  
Pulse Code Modulation

PCP  
Positive Call Processing

PDF  
Power Distribution Frame

PECC  
Product Engineering Control Center

PINET  
Packet Internal Network

POTS  
Plain Old Telephone Service

PRD  
Product Release Document

PRI  
Primary Rate Interface

PSTN  
Public Switched Telephone Network

---

## R

RAM  
Random Access Memory

RC  
Recent Change

<b>RC/V</b> Recent Change/Verify	<b>SDI</b> Switched Digital International
<b>RCAS</b> Recent Change Administration System	<b>SDL-24</b> Synchronous Data Link No. 24
<b>RCC</b> Reseller Carrier Connect	<b>SDN</b> Software Defined Network
<b>RDBI</b> Routing Data Block Index	<b>SDNA</b> Software Defined Network Access
<b>REL</b> Release	<b>SDS</b> Switched Digital Services
<b>RICS</b> Recorded Information Collection System	<b>SGTT</b> Self-Provisioning Global Title Translation
<b>RTNR</b> Real Time Network Routing	<b>SI</b> Service Identification
	<b>SIC</b> Service Identification Code
<hr/> <b>S</b>	<b>SID</b> Station Identification
<b>SADC</b> Special Access Data Channel	<b>SII</b> Service Identity Index
<b>SBU</b> Strategic Business Unit	<b>SIN</b> Small Computer Systems Interface Node
<b>SCC</b> Service Circuit Controller	<b>SS7</b> Signaling System 7
<b>SCP</b> Service Control Point	<b>SSN</b> Subsystem Number
<b>SCS</b> Service Circuit System	<b>SSP</b> Service Switching Point
<b>SCSI</b> Small Computer Systems Interface	<b>SSP</b> SubSystem Prohibit
<b>SCU</b> Service Circuit Unit	<b>SST</b> Signaling Service Type
<b>SDDN</b> Software Defined Data Network	<b>STP</b> Signal Transfer Point
<b>SDDNI</b> Software Defined Data Network International	

---

**T****TAS**

Terminating AT&amp;T Switch

**TCAP**Transaction Capabilities Application  
Part**TCC**

Technology Control Center

**TCSR**

Treatment of Carrier Specific Routing

**TEI**

Table Entry Index

**TFP**

Transfer Prohibit

**TLP**

Trouble Locating Procedure

**TNS**

Transit Network Selection

**TOP**

Task Oriented Practice

**TOT**

Type of Trunk

**TSG**

Trunk Subgroup

**TTYP**

Terminating Type

---

**U****UART**Universal Asynchronous Receiver  
Transmitter**UDS**

Unit Data Service

**UGT**

Universal Global Translator

**USEC**

Universal Services Echo Canceler

---

**V****VDT**

Video Display Terminal