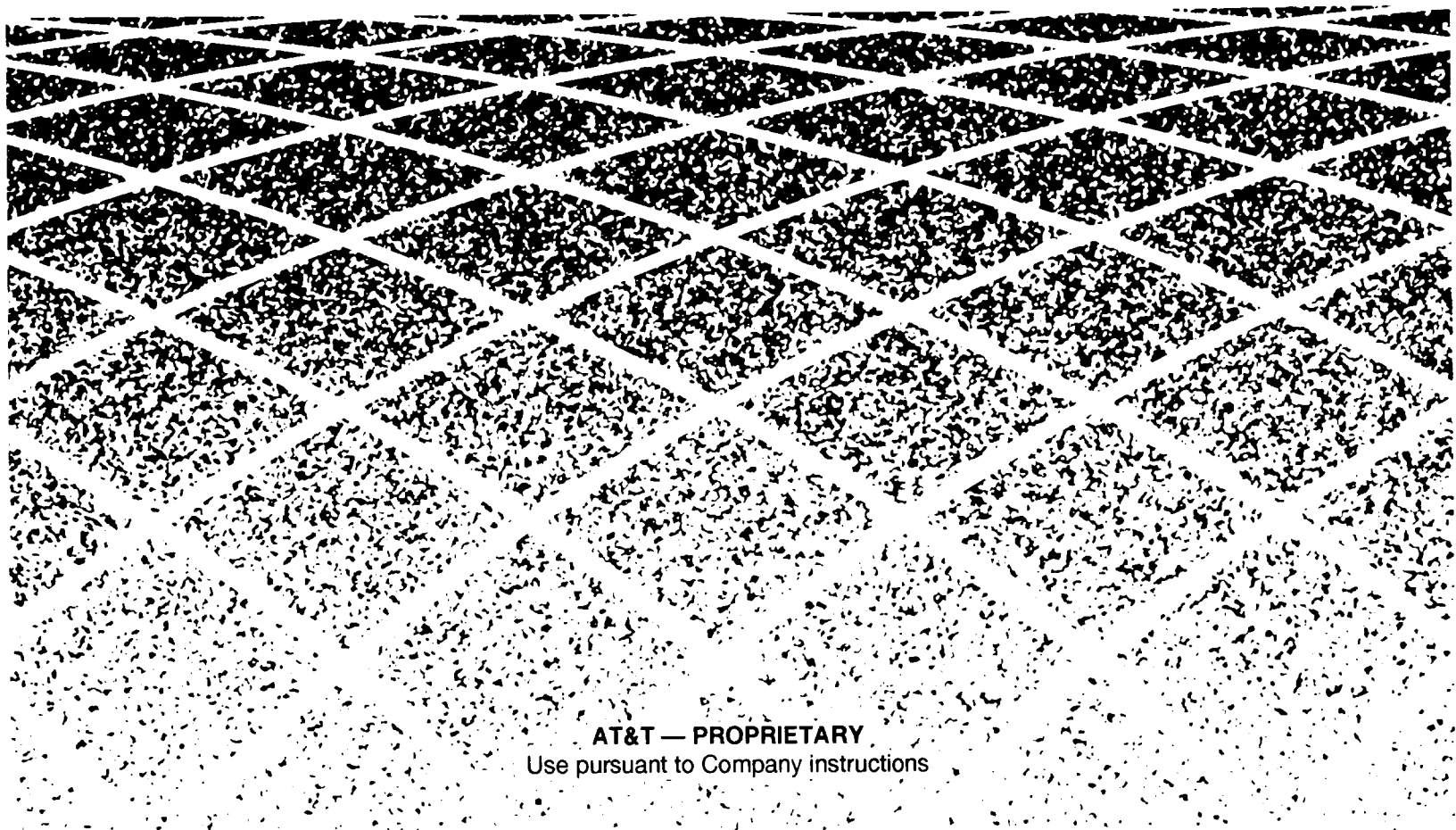
AT&T 234-090-172AC
Issue 1
April 1993

4ESS™ SWITCH

Product Release Document
4E17 Release 2 Generic



Notice

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

Trademarks

4ESS is a trademark of AT&T.
5ESS, *Billdats*, and *VoiceMark* are registered trademarks of AT&T.
Megacom, *MultiQuest*, and *USA Direct* are registered service marks of AT&T.
AT&T NetProtect is a service mark of AT&T.
Seagate is a registered trademark of Seagate Technology, Inc.

Ordering Information

The ordering number for this document is AT&T 234-090-172AC. To order this document, call 1-800-432-6600. For more ordering information, refer to "How to Order Documentation" in the section "About This Document."

Support Telephone Number

AT&T provides a telephone number for you to use to report errors or to ask questions about the information in this document. Within North Carolina, the number is (919) 727-6681. Outside of North Carolina, the number is 1-800-334-0404.

Developed by the AT&T Customer Education and Training Organization.

How Are We Doing?

Document Title: *4ESS*™ Switch - Product Release Document - 4E17 Release 2 Generic

Document No.: AT&T 234-090-172AC Issue Number: 1 Date: April 1993

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

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

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

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

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

Please provide details for the suggested improvement._____

_____

3. What did you like most about this document?

_____

_____

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

_____

_____

_____

_____

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

Name: _____ Telephone Number: (____)_____

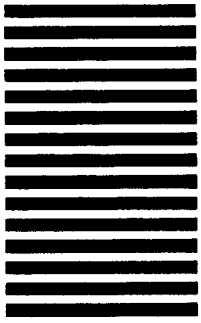
Company/Organization: _____ Date: _____

Address: _____

When you have completed this form, please fold, tape, and return to address on back or Fax to: 919-727-3043.

Do Not Cut—Fold Here And Tape

NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



AT&T

BUSINESS REPLY MAIL

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

POSTAGE WILL BE PAID BY ADDRESSEE

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

How Are We Doing?

Document Title: *4ESS*™ Switch - Product Release Document - 4E17 Release 2 Generic

Document No.: AT&T 234-090-172AC Issue Number: 1 Date: April 1993

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

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

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

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

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

Please provide details for the suggested improvement._____

_____

3. What did you like most about this document?

_____

_____

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

_____

_____

_____

_____

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

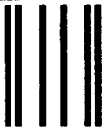
Name: _____ Telephone Number: (____)_____

Company/Organization: _____ Date: _____

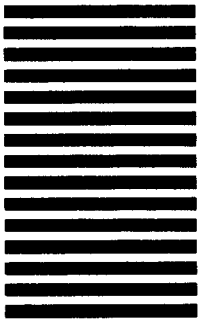
Address: _____

When you have completed this form, please fold, tape, and return to address on back or Fax to: 919-727-3043.

Do Not Cut—Fold Here And Tape



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES



BUSINESS REPLY MAIL

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

POSTAGE WILL BE PAID BY ADDRESSEE

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

Contents Page

Contents Page

Contents Page

Contents Page

Contents Page

Contents Page

Contents Page

Contents Page

Contents Page

Contents

Page

Contents Page

Contents Page

Contents Page

Contents

Page

Contents Page

Contents Page

Contents Page

Contents Page

Figures

Contents Page

Contents Page

Contents Page

Tables

Contents Page

Contents Page

About This Document

1. Purpose

1.01 The purpose of the Product Release Document (PRD) is to provide customers with information pertaining to the new features that are introduced in the *4ESS*™ switch. A PRD is written to cover the features introduced in quarterly generic releases and full generic releases. This particular PRD provides information pertaining to the new features included in the 4E17 Release 2 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 4E17 Release 2 features, not the long-term maintenance. Since other documentation is used for the operation and maintenance of features after their introduction into the *4ESS* switch, this PRD will not be reissued.

3. Intended Audience

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

Center (TCC), Product Engineering Control Center (PECC), and National Electronics 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 4E17 Release 2 generic contains 36 new features. Each chapter in this document provides information on one of these features. The chapters are arranged 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:

Chapter 1: Local Exchange Carrier (LEC) Multiple Trunk Group (TG) Assignment Feature (089)

Chapter 2: International Hard-To-Reach Improvements Feature (150)

Chapter 3: Multiple Trunk Group (TG) Assignment Feature (152)

Chapter 4: *MultiQuest*® Telecommunications Service Automatic Message Accounting Recording for Call Counter Feature (174)

Chapter 5: Positive Call Processing Feature (193a)

Chapter 6: *4ESS*™ Switch Access to Common Platform Adjunct Feature (207)

Chapter 7: Network Management Enhancement for Adjunct-Based Capabilities Feature (207a)

Chapter 8: Trunk Subgroup Interest List for Regional Network Management System Feature (213)

Chapter 9: Call Merge for Adjunct Feature (230)

Chapter 10: *4ESS*™ Switch Input Message TEST:DSIG Parameter Addition Feature (354)

Chapter 11: Generic Update Capability Feature (372)

Chapter 12: Small Computer Systems Interface (SCSI) Firmware Download Feature (374)

Chapter 13: Address Complete Message Time-outs for Study Classes Feature (376)

Chapter 14: Teleconferencing (TC) Network Services Complex (NSCX) Trunk Maintenance Enhancement Feature (381)

Chapter 15: Expanded ETC TOT Capability Feature (383)

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

5. Product Safety Labels

5.01 There are three types of admonishments used in AT&T documentation: DANGER, WARNING, and CAUTION. This document contains an admonishment in the form of a WARNING. A WARNING indicates the presence of a hazard that can cause death or severe personal injury if the hazard is not avoided.

6. How to Comment on This Document

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 (1-919-727-3043)] or call the AT&T Documentation Comment Hot-Line Service (1-800-334-0404 or 919-727-3167 in North Carolina) to make your comments.

7. How to Order Documentation

7.01 Additional copies of this document, and all referenced documentation, may be ordered from the 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

FAX within the United States: Toll 317 322-6484

Australia and All European countries: Toll 317 322-6416

Far East, North America, and others: Toll 317 322-6646

FAX for all international: Toll 317 322-6699

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

7.04 Federal Government orders must be processed through CIC.

Local Exchange Carrier (LEC) Multiple Trunk Group (TG) Assignment Feature (089)

1

Contents Page

Local Exchange Carrier (LEC) Multiple Trunk Group (TG) Assignment Feature (089)

1

1. Feature Description

1.01 This feature will allow the assignment of multiple Trunk Groups (TGs) between two offices to a single Destination Point Code (DPC). Up to eight TGs can be assigned to a DPC. A TG consists of one or more Trunk Subgroups (TSGs), and each TSG can contain up to 1008 trunks that have similar traffic characteristics.

1.02 The new TG assignment capability will allow Local Exchange Carrier (LEC) operations and maintenance personnel to easily identify trunk usage. Each of the TGs represents a particular traffic usage and consists of a group of trunk connections to an InterExchange Carrier (IXC) switch, to a Remote Switch Module (RMS), or to an end office (EO).

1.03 Within multiple TGs between two offices, the same Base Traffic Number (BTFN), Traffic Number (TFN), and Circuit Identification Code (CIC) will continue to be unique for each trunk. The TOWN, State (ST), Building (BL), and Far Building Subdivision (FBS) fields of a TG code can be used administratively to assign and identify the traffic usage associated with a group of trunks.

2. Call Flow (Not Affected)

3. Provisioning

Office Data Administration

3.01 1A Recent Change is used to administer TSGs. The existing Add Trunk Subgroup Forms 100, 101, and 102 are used to populate TSGs that have the same DPC. The existing Change Trunk Subgroup Forms 107, 108, and 109 are used to change the DPC of TSGs. The existing Delete Trunk Subgroup Form 106 is used to delete TSGs.

4. Recording (Not Affected)

5. Network Management

Trunk Subgroup Controls

5.01 User Flow Controls (UFCs) are applied to all TSGs associated with a certain DPC. This is not a new capability. If the UFCs are to be applied, a search is made to determine exactly which TSGs are assigned to a specific DPC.

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages

8.01 The **VER:DPC** input message is used to determine which TGs are assigned to a specific DPC. The **VER:TSGLIST** input message is used to determine which

TSGs in multiple TGs are assigned to a specific DPC. The **VER:DPC** and **VER:TSGLIST** input messages have not changed. However, the output messages have changed. The original output messages only listed one TG. The new messages will list up to eight TGs.

ID . . . . . VER:DPC
WORK CENTER . . MOC, TEC, TOC
GENERIC . . . . . 4E17 Rel. 2 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

[1] VER:DPC

```
TYPE ATT   aaa bb c ddd
TYPE ANSI  aaa eee  ddd
TYPE ISPC   f  ggg  h
TYPE BIN   iiiiiiiiiiiiiiiiiiiiii
TYPE HEX   jjjjjj
TG         kkkkkkkkkkkkk
 .           .
 .           .
 .           .
```

[2] VER:DPC 0, TYPE SEP

```
OLD   DPC     l
NEW   DPC     m
OLD   TG      n
NEW   TG      o
```

2. REASON FOR OUTPUT

To output the various destination point code (DPC) formats.

3. VARIABLE FIELD DEFINITIONS

a	DPC network indicator.
b	DPC region.
c	DPC type.
d	DPC member.
e	DPC cluster.
f	DPC world geographical zone.
g	DPC area/network identification.
h	DPC signaling point identification.
i	DPC in binary.
j	DPC in hexadecimal.
k	Common language location identifier (CLLI) code of first trunk subgroup (TSG) related to this DPC.

l	Old office point code of the rehomed switch.
m	New office point code of the rehomed switch.
n	CLLI code of 1st TSG related to the old point code.
o	CLLI code of 1st TSG related to the new point code.

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs
TMAD0005
TMAD0006
TMAD0007

Input Message
VER:DPC

ID ..... VER:TSG-LIST
WORK CENTER.. MAC, MOC
GENERIC..... 4E17 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 VER:TSGLIST for more information.

3. VARIABLE FIELD DEFINITIONS

a,c,e,g	Search keys (See Table 1 in input VER:TSGLIST message.).
b,d,f,h	Values of search keys (See Table 1 in input VER:TSGLIST message.).
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.

5. REFERENCES

PIDENT
IOCPIMC4
VRFYCNTL
VRFYINPT
VRFYOUT

VRFYTSG

Input Message

```
VER:TSGLIST
```

International Hard-To-Reach Improvements Feature (150)

2

Contents Page

International Hard-To-Reach Improvements Feature (150)

2

1. Feature Description

1.01 The International Hard-To-Reach (HTR) Improvements feature extends the international HTR code determination capability in the *4ESS*™ switch to include one, two, or three digits of the National Number (NN). This feature allows the network manager at the Network Operations Center (NOC) to specify countries to be placed on NN resolution. Extending the international HTR resolution provides the following benefits for international service:

- Identifies those foreign cities that have relatively poor call completion rates and place them on the International HTR List.
- Improves the efficiency of international circuits during peak demand and congestion by limiting circuit usage to calls destined for codes that are not HTR codes.

1.02 The automatic International HTR capability was first introduced in the 4E3 generic. At that time, all international HTR data was collected using the Country Code (CC) only. International HTR codes are CCs that are hard to reach from various International Switching Centers (ISCs). HTR is determined as follows:

- When a call is made, it is counted as a Network Attempt (NA).
- If the call is not answered, the *4ESS* switch will score the call as an Ineffective Network Attempt (INA).
- The *4ESS* switch then calculates the percentage of INAs. If the percentage of INAs [%INA = (INA/NA) x 100] for a CC exceeds the HTR code exception threshold, that CC becomes HTR and is placed on the International HTR List.

1.03 Although Ineffective Machine Attempt (IMA) counts are not used to determine HTR, they are useful for other network management statistics and are reported in the implementation of CC HTR statistics.

1.04 The maximum number of codes that can automatically be determined as HTR is 127. This is the maximum number of codes on the CC+NN "automatic" International HTR List. International network managers can also manually designate codes for the HTR List or exclude codes from the list. The maximum number of codes on the CC+NN "manual" International HTR List is also 127.

1.05 With the 4E17 Release 2 generic HTR improvements, international network managers can assign a maximum of 15 CCs to NN HTR resolution. For each CC specified, the international network manager at the NOC can assign a maximum of sixty-three 1-, 2-, and 3-digit NNs. However, the number of NN digits assigned must be consistent across all NNs for the country specified. For example, if one NN is two digits, they all must be two digits. Also for each CC specified, the network manager can specify a set of HTR thresholds.

1.06 The new international HTR data collection capability is only available at an ISC. The data collected is provided only to the NOC via Network Management Operations System (NEMOS). Prior to this feature, the HTR counts were only sent to NEMOS when the CC was HTR. With this feature, all HTR counts are sent to NEMOS, even when the code is not HTR. This includes both HTR counts for CC only and HTR counts for CC+NN.

Resource Impacts

1.07 Several data structures have been defined to support International HTR for all ISC offices. There are no requirements for non-ISC offices. Duplex Call Store memory and disk memory are needed only at ISCs. The International HTR Improvements feature requires 2176 words of new Call Store, 2048 words of File Store, and about 500 words of Program Store. There is a significant (10 to 40 cycles) real-time impact on international outbound and transit calls at an ISC when the called CC is on NN HTR resolution. The real-time impact is very small when the called CC is not on NN HTR resolution.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management

Network Management Operations Support

5.01 This feature impacts the interface between NEMOS and the *4ESS* switch. The International HTR system has been modified to allow network managers to specify countries to be placed on NN resolution. Country Codes that are placed on NN resolution will have the IMA, INA, NA, and %NA statistics calculated every 5 minutes for each assigned CC+NN combination.

A. 5-Minute Data Message

5.02 A new 5-minute data message has been added for this feature. The maximum number of entries is 945 (that is, 15 CCs x 63 NNs). It includes all specified CC+NN combinations. This message, which is sent to NEMOS, includes the following data:

- Country Code (1 to 3 digits)
- National Number (1 to 3 digits)
- Ineffective Machine Attempt Count (pegged per call)
- Ineffective Network Attempt Count (pegged per call)
- Network Attempt Count (pegged per call)
- Hard-To-Reach Flag (1 indicates CC+NN is HTR).

B. Control Message Type

5.03 A new control message type has been added to allow the network manager to specify a list of NNs and a set of network management thresholds for each CC that is placed on NN resolution. This message includes the following data:

- Action Code (0 or 1)
- Country Code (1 to 3 digits)
- National Number (1 to 3 digits; up to 63 NNs)
- Attempt Threshold (1 to 9999)

- Percent Failure Threshold (1 to 100)
- Delta Attempt Threshold (1 to 10)
- Delta Percent Failure Threshold (1 to 10).

5.04 When the action code is "1", the CC is assigned to NN HTR resolution, and all thresholds must be specified. If the following conditions occur, an error message will be sent to NEMOS, and the new control message will be rejected:

- Any threshold field is "0".
- An attempt is made to assign a new CC to NN HTR resolution, and 15 CCs have already been assigned.
- The first NN field is "0".

5.05 When the action code is "0", the CC is removed from NN HTR resolution, and all fields except the CC become immaterial. If the action code is "0" and the CC is not currently assigned to NN HTR resolution, an error message will be sent to NEMOS, and the new control message will be rejected. When a message is received to assign a CC to NN HTR resolution (action code 1) and the CC is already assigned, the data received by NEMOS for the next 5-minute data collection will be invalid.

5.06 All of the NN fields in the new control message type must have the same number of NN digits (1, 2, or 3). The first NN field determines the number of NN digits for all NN fields.

C. Modified Message Types

5.07 Message Type 7 contains a list of CCs that have been determined as HTR along with the associated IMA, INA, and NA counts. Message Type 7 has been modified to include the HTR indicator. This message can contain a maximum of 1000 entries. If the IMA, INA, and NA counts are non-zero, data will be transmitted to NEMOS for any CC.

5.08 Message Type 255 is the message NEMOS uses to request all of the 5-minute data. This message has been modified to include the new message type for NN HTR data.

6. Maintenance/Troubleshooting

Audits

6.01 Audit 46, the Network Management Database Audit, has been modified to support this feature.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Multiple Trunk Group (TG) Assignment Feature (152)

3

Contents Page

Multiple Trunk Group (TG) Assignment Feature (152)

3

1. Feature Description

1.01 This feature will allow the assignment of multiple International Telegraph and Telephone Consultative Committee No. 7 (CCITT7) Trunk Groups (TGs) between two *4ESS*™ International Switching Centers (ISCs) to a single Destination Point Code (DPC). Up to eight TGs can be assigned to a DPC. A TG consists of one or more Trunk Subgroups (TSGs), and each TSG can contain up to 1008 trunks that have similar traffic characteristics. The new TG assignment capability will allow operations and support personnel to easily identify trunk usage.

1.02 Within multiple TGs between two offices, the same Base Traffic Number (BTFN), Traffic Number (TFN), and Circuit Identification Code (CIC) will continue to be unique for each trunk. The TOWN, State (ST), Building (BL), and Far Building Subdivision (FBS) fields of a TG code can be used administratively to assign and identify the traffic usage associated with a group of trunks.

2. Call Flow (Not Affected)

3. Provisioning

Office Data Administration

3.01 1A Recent Change is used to administer TSGs. The existing Add Trunk Subgroup Forms 100, 101, and 102 are used to populate TSGs that have the

same DPC. The existing Change Trunk Subgroup Forms 107, 108, and 109 are used to change the DPC of TSGs. The existing Delete Trunk Subgroup Form 106 is used to delete TSGs.

4. Recording (Not Affected)

5. Network Management

Trunk Subgroup Controls

5.01 User Flow Controls (UFCs) are applied to all TSGs associated with a certain DPC. This is not a new capability. If the UFCs are to be applied, a search is made to determine exactly which TSGs are assigned to a specific DPC.

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages

8.01 The **VER:DPC** input message is used to determine which TGs are assigned to a specific DPC. The **VER:TSGLIST** input message is used to determine which TSGs in multiple TGs are assigned to a specific DPC. The **VER:DPC** and **VER:TSGLIST** input messages have not changed. However, the output messages have changed. The original output messages only listed one TG. The new messages will list up to eight TGs.

ID ..... VER:DPC
WORK CENTER.. MOC, TEC, TOC
GENERIC..... 4E17 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

[1] VER:DPC

```
TYPE ATT   aaa bb c ddd
TYPE ANSI  aaa eee  ddd
TYPE ISPC   f  ggg  h
TYPE BIN   iiiiiiiiiiiiiiiiiiiiiiii
TYPE HEX   jjjjjj
TG         kkkkkkkkkkkkkk
 .           .
 .           .
 .           .
```

[2] VER:DPC 0, TYPE SEP

```
OLD   DPC     l
NEW   DPC     m
OLD   TG      n
NEW   TG      o
```

2. REASON FOR OUTPUT

To output the various destination point code (DPC) formats.

3. VARIABLE FIELD DEFINITIONS

a	DPC network indicator.
b	DPC region.
c	DPC type.
d	DPC member.
e	DPC cluster.
f	DPC world geographical zone.
g	DPC area/network identification.
h	DPC signaling point identification.
i	DPC in binary.
j	DPC in hexadecimal.
k	Common language location identifier (CLLI) code of first trunk subgroup (TSG) related to this DPC.

l	Old office point code of the rehomed switch.
m	New office point code of the rehomed switch.
n	CLLI code of 1st TSG related to the old point code.
o	CLLI code of 1st TSG related to the new point code.

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs
TMAD0005
TMAD0006
TMAD0007

Input Message
VER:DPC

ID . . . . . VER:TSG-LIST
WORK CENTER . . MAC, MOC
GENERIC . . . . . 4E17 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 VER:TSGLIST for more information.

3. VARIABLE FIELD DEFINITIONS

a,c,e,g	Search keys (See Table 1 in input VER:TSGLIST message.).
b,d,f,h	Values of search keys (See Table 1 in input VER:TSGLIST message.).
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.

5. REFERENCES

PIDENT
IOCPIMC4
VRFYCNTL
VRFYINPT
VRFYOUT

VRFYTSG

Input Message

```
VER:TSGLIST
```

MultiQuest® Telecommunications Service Automatic Message Accounting Recording for Call Counter Feature (174)

4

Contents

MultiQuest® Telecommunications Service Automatic Message Accounting Recording for Call Counter Feature (174)

4

1. Feature Description

1.01 *MultiQuest*® telecommunications services support dialed calls that access value-added information services. Currently, databased *MultiQuest* telecommunications service Automatic Message Accounting (AMA) records are triggered by the database for each call. A Long Distance Service (LDS) record (call code 60) for each call is generated for 1+ non-databased *MultiQuest* telecommunications service calls. However, a *4ESS*™ switch record is not generated for 0+ non-databased calls from an Operator Service Position System (OSPS). Implementation of this feature will create a *MultiQuest* telecommunications service AMA record for both 1+ and 0+ non-databased calls.

1.02 The OSPS no longer creates an AMA record for 0+900 calls. Instead, the OSPS sends the 0+900 call to the *4ESS* switch along with the optional operator information (for example, calling card number). The *4ESS* switch appends the information to the AMA call record if the record is created (administratively activated). If no AMA record is created at the switch, the information sent by the OSPS is discarded and the caller is not billed.

1.03 Non-databased *MultiQuest* telecommunications service calls include only Call Counter. Callers may be billed at premium rates for these types of calls, thus allowing AT&T customers to provide and bill for information services. Call Counter will not be databased and must rely on this feature for AMA call records.

NOTE:
Broadcaster has been converted to a database architecture. Therefore, AMA recording is triggered by the database.

1.04 *MultiQuest* telecommunications service High Capacity Calling (HICAP) and calls handled using Alternate Number Translations (ANT) are treated separately and are not included in this feature.

2. Call Flow

Call Flow Key Points

2.01 Call Counter is provided using the Mass Announcement System (MAS). Calls are either routed to a MAS or forwarded to a customer-specified destination (if the customer purchases the cut-through option). Callers are allowed to vote for one of several choices. Each choice corresponds to a 900 number. Callers are then played a generic announcement thanking them for their call and telling them that their vote has been recorded.

Call Flow Diagram

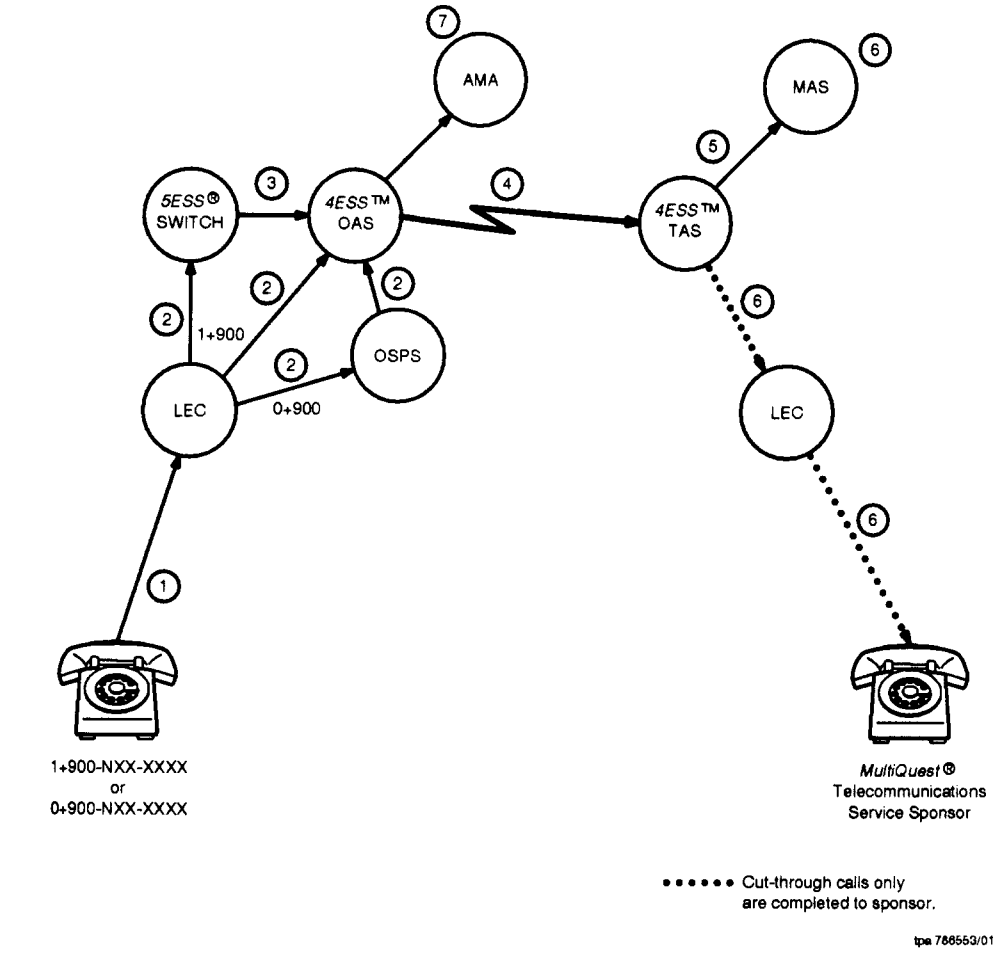


Figure 4-1. *MultiQuest*® Telecommunications Service Call Counter Call Flow

Call Flow Narrative

2.02 Figure 4-1 illustrates the call flow for non-databased *MultiQuest* telecommunications service (domestic Call Counter). The following numbers correspond to the callouts (circled numbers) listed on the call flow diagram:

1 The caller dials 1+900-NXX-XXXX or 0+900-NXX-XXXX.

2 The Local Exchange Carrier (LEC) identifies the call as belonging to AT&T and passes the call to an AT&T switch.

If the call is a...	Then the LEC...
1+900 call	May pass the call to either a *5ESS*® switch or a *4ESS*™ switch [the Originating AT&T Switch (OAS)]. For the *5ESS* switch, the call proceeds from Step 3. For the *4ESS* switch, proceed to Step 4.
0+900 call	Routes the call to an OSPS. After the OSPS handles the call, the OSPS routes the call to a *4ESS* switch. Proceed to Step 4.

3 The toll *5ESS* switch translates the 900-NXX digits, recognizes that the call must be passed to a *4ESS* switch, and routes the call.

4 Based on the 6-digit translation of the dialed number, the OAS routes the call to a *4ESS* Terminating AT&T Switch (TAS) and creates an AMA record provided that recording is administratively enabled (provisioned).

5 Based on the analysis of the 900-NXX-XXX (first nine digits of the dialed number), the TAS determines the appropriate MAS announcement to be played.

If the 900 number is...	Then the call is...
Assigned and currently active	Routed to the appropriate announcement.
Assigned, but not currently active	Final handled with a Final Handling Treatment (FHT) of Service Not Active (SNA).
Not assigned	Final handled with an FHT of Vacant MAS Announcement (VMA).

6 At this point, either:

- The TAS connects the caller to the announcement, increments a per-announcement counter, and returns answer supervision (results in customer billing). If the caller is still connected after 2 seconds, the switch increments the per-dialed number peg count (how the sponsor is charged for call transport).

or

- For the cut-through option (if chosen by the sponsor), the TAS completes the call to the sponsor-designated destination and increments the cut-through counter for that dialed number. The per-dialed number peg count is also incremented.

NOTE:
Cut-through is specified on a dialed number basis.

7 The OAS completes the AMA record after disconnect.

3. Provisioning

3.01 *MultiQuest* telecommunications service Call Counter calls are identified by Far-End Network (FEN) class and Service Category. The items in Table 4-A are used by the OAS to determine if call recording is administratively enabled. Both the FEN Class and Service Category must be present to trigger call recording.

Table 4-A. FEN Class and Service Category Descriptions

FEN Class	Description	Service Category	Description
ACCESO	LEC	DLT	Dial-It
PBX (Private Branch Exchange)	Direct Connect	SC-11	
POTS (Plain Old Telephone Service)	OSPS Calls	SC-12	
CAMA (Centralized AMA)	CAMA and CAMA0 Trunk Groups	SPDI	Sponsor Paid-Dial It

4. Recording

4.01 After the OAS determines that AMA recording is administratively enabled (based on the FEN Class and Service Category), the OAS populates the AMA records. Table 4-B describes the entries populated by the OAS.

Table 4-B. AMA Table Entries

Field	AMA Table	Entry	Description
Answer Indicator	9	0	Answer supervision received from the TAS
		1	Otherwise
Market Segment Indicator	399	0	Default
Call Type Code (CC)	1	900	All non-databased *MultiQuest*® telecommunications service
Service Indicator Code (SIC)	133	23	All non-databased *MultiQuest* telecommunications service
Dialed Numbering Plan Area (NPA)	13		Originally dialed number
Dialed Number	14		Originally dialed number
Overseas Indicator	15	1	NPA not dialed
Terminating NPA	16		Originally dialed number
Terminating Number	17		Originally dialed number
Bill To Indicator	132	1	Indicates all transport charges to sponsor (default)
Service Feature Indicator	134	000	Default
Revenue Accounting Office (RAO) Number	46	999	Default
Customer Feature Available (CFA)	135	00000	Default

Table 4-B. AMA Table Entries (Contd)

Field	AMA Table	Entry	Description
Announcement Before Routing (ABR)	136	000	Default
Call Progress Stopped (CPS)	137	0	Default
Operator Charge Indicator	131	0	Default
Operator Action	11	0	Calls not handled by an OSPS
		9	Calls handled by an OSPS when the 900 OSPS Traffic ID Status feature is active

4.02 The following parameters are applicable to all non-databased *MultiQuest* telecommunications service calls handled by an OSPS. These items appear in the Common Channel Signaling System 7 (CCS7) Integrated Services Digital Network User Part (ISUP) Initial Address Message (IAM).

If the OAS receives the following OSPS parameters...	Then the parameters are used to populate the following Extended Bellcore AMA Format (EBAF) modules...
• Operator Services Handling (0+/0-/1+ and Automated/ Manual) • Indicator to waive card/ operator service charges	Operator System Module (Module 901)
• Card Number (19-digit maximum)—optional • Sequence Call Indicator • Indeterminate Allow Indicator	Card Billing Module (Module 902 if available)
Subaccount Number— optional	Subaccount Billing Module (Module 301 if available)
Commercial Credit Card (CCC) Authorization Code—optional	CCC Authorization Code Module (Module 903 if available)

4.03 The OAS populates the Originating NPA and Originating Number fields with a 3- or 10-digit Automatic Number Identification (ANI). If the ANI is not received or is invalid, the Far-End Network NPA is used instead.

4.04 The "Toll" category of the Call Assembly Tracer Record includes any non-databased *MultiQuest* telecommunications service call for which AMA recording is enabled. Additionally, the Direct Services Dialing Capability (DSDC) Service Count is pegged on the Service Count Tracer Record.

4.05 The OAS directs non-databased *MultiQuest* telecommunications service AMA records to the stream associated with the DSDC stream set in Office Data Administration (ODA) records.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 The *MultiQuest* telecommunications service feature is proprietary to AT&T. Therefore, a new proprietary bit (**OD4OPTMQCC**) is checked to determine if this feature is triggered in AT&T offices.

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Positive Call Processing Feature (193a)

5

Contents

Contents

Positive Call Processing Feature (193a)

5

1. Feature Description

1.01 The Positive Call Processing (PCP) family of features is the first application for the Common Platform Adjunct (CPA) architecture (Feature 207). The adjunct provides a wide range of interactive voice and narrowband switched data service needs. The PCP feature supplies specific application data to the adjunct which, in turn, interacts with the *4ESS*™ switch to process and deliver the data services to the customer.

1.02 Capabilities of the CPA include, but are not limited to, call processing, operations, administration, maintenance, recording, and security. These capabilities are generic in that they are a framework that current and future applications, such as PCP, can use to meet business unit needs. For example, the CPA provides capabilities for announcements, digit collection, and measurements. Individual applications provided by the PCP, however, specify the information contained in the announcement, the digits to be collected, the order in which events occur, and the specific measurements to be reported.

1.03 During generic 4E16, Release 2 and Release 2.1a for PCP, the 1A Processor in the *4ESS* switch maintained PCP subscription information (customer automatic number identification and feature indicators), and the direct link node on the Common Network Interface (CNI) ring maintained the subaccount code for the Subaccount Billing feature. In generic 4E17, for PCP Release 3, the 1A Processor in the *4ESS* switch continues to maintain PCP subscription information, but the corresponding bulky data (PCP feature indicators and related data) is maintained in the CPA. To ensure a smooth transition during the change from generic 4E16 to generic 4E17, the *4ESS* switch continues to support the 4E16 features and data structures.

1.04 In the PCP family of features, the first application of the CPA involves redesigned generic 4E16 PCP Release 2 features as well as newly designed generic 4E17 PCP Release 3 features. These features and their relationship with the adjunct and network call flow are shown in Figure 5-1. Since the PCP features are the only application for the CPA in generic 4E17, the adjunct and PCP are interdependent. A description of the redesigned and newly designed PCP application features are covered in this section.

Redesigned Generic 4E16 Positive Call Processing Features

1.05 Features that have been redesigned and implemented through the new generic 4E17 architecture are as follows:

Subaccount Billing

Subaccount Billing (SAB) is an AT&T feature that allows customers to receive bills that have been segmented according to the customer's specifications.

Customer Specific Recording

AT&T customers may subscribe to Customer Specific Recording (CSR) features that allow for additional usage data to be stored on Automatic Message Accounting (AMA) records. Such data may expedite the teleprocessing of these records in the downstream billing systems.

1+ Spontaneous Access to AT&T *VoiceMark*® Messaging Service

In generic 4E16, this feature was known as 1+Spontaneous Access to Call Delivery Service (1+SACDS). In generic 4E17, the customer, upon placing a call that does not complete to answer, is required to input dual tone multifrequency (DTMF) digits to activate the 1+ Spontaneous Access to AT&T *VoiceMark* Messaging Service. Upon receipt of the proper digits, the *4ESS* switch routes the call to a Voice Messaging Operation Center (VMOC). The VMOC stores the voice message and delivers it to the called party at a later time.

Fax Call ID

Fax Call ID is a feature that gives customers the ability to register their telephone line, based on their automatic number identification (ANI) or billing number (BN), as either a dedicated fax number or a mixed use Voice/Fax number. All calls initiated from dedicated fax lines are identified as fax calls. Mixed use customers identify fax calls to AT&T by inputting DTMF digits on a per-call basis.

Fax Preferred Routing

Customers who subscribe to Fax Preferred Routing are identified in the Fax Preferred Routing indicator associated with the call so that preferred call treatment may be provided for international outbound calls.

Fax Store-and-Forward

The Fax Store-and-Forward (S&F) customer, upon placing a call that does not complete to answer, is required to input DTMF digits to activate the Fax S&F service. Upon receipt of the proper digits, the *4ESS* switch routes the call to a Fax S&F node. The Fax S&F node stores the fax message and delivers it to the called party at a later time.

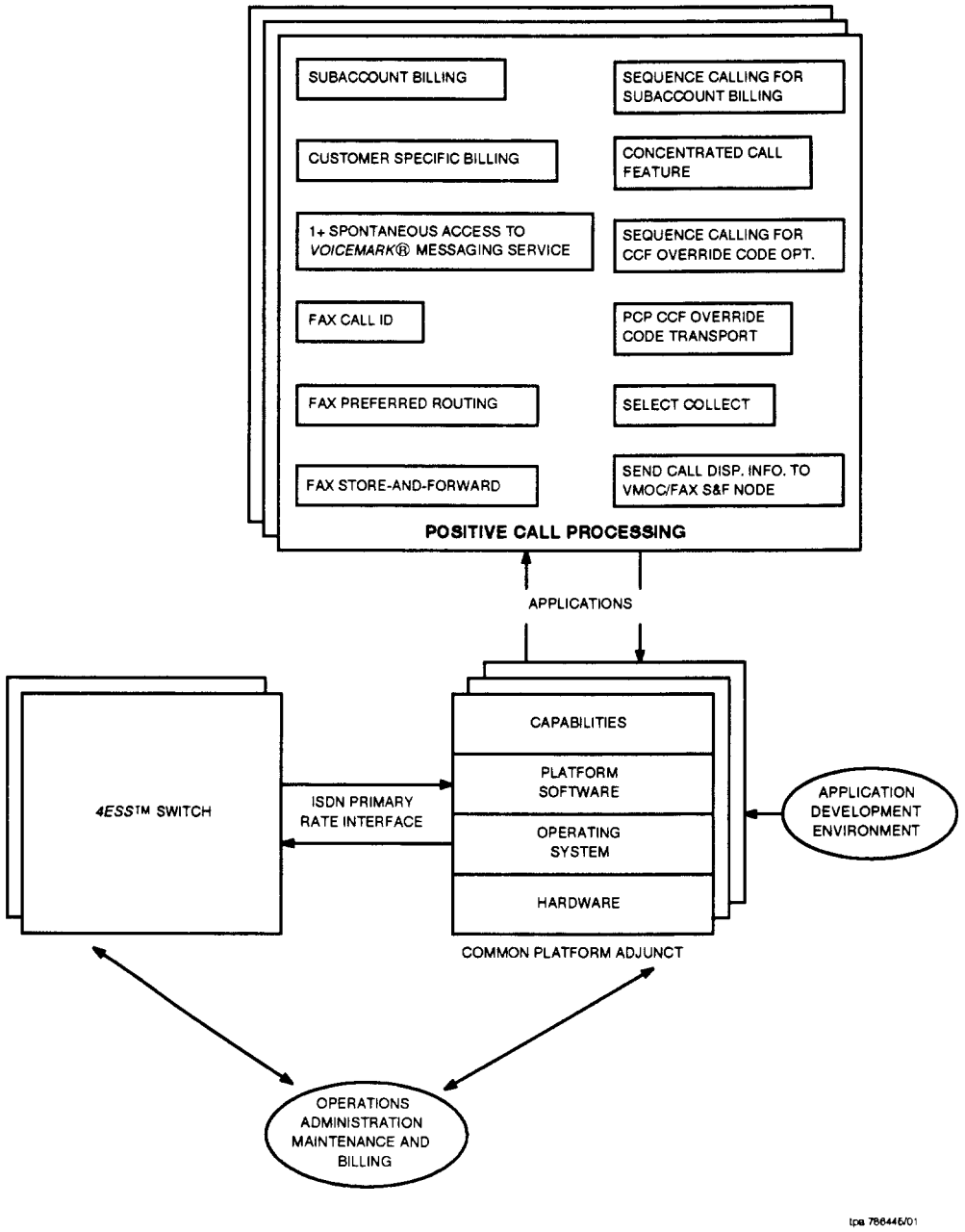


Figure 5-1. Positive Call Processing Relationship With Common Platform Adjunct

Generic 4E17 Positive Call Processing Features

1.06 New features that have been designed for the generic 4E17 architecture are as follows:

Sequence Calling for Subaccount Billing

The Sequence Calling for Subaccount Billing feature enables the customer to input a subaccount code once and apply it to a sequence of calls by pressing a single # key or by entering **9, rather than the actual SAB code, for each subsequent call.

Concentrated Call Feature (CCF)

The Concentrated Call Feature is a service AT&T offers to permit customers greater control of their telecommunications expense. This feature permits customers to specify outgoing calls that are permissible or are not permissible from the customer ANI or calling party number.

Sequence Calling for Concentrated Call Feature Override Code Option

CCF customers can be given an override code option which permits them to override the CCF dialing restrictions. The Sequence Calling for CCF feature enables the customer to input an override code once and to apply it to a sequence of calls by pressing a single # key or by entering **9, rather than the actual override code, for each subsequent call.

PCP CCF Override Code Transport

For customers who enter an override code and who also access either the Fax Store-and-Forward feature or 1+SACDS, these codes are recorded on the Automatic Message Accounting (AMA) records that are created at the Fax S&F node and VMOC.

Select Collect — This feature permits a subscribing customer to designate up to 25 line numbers where 1+ direct-dialed calls from these lines to the Select Collect customer are automatically charged to the Select Collect subscribed account as collect calls. This feature is available only to Long Distance Service (LDS) customers.

Send Call Disposition Information to VMOC/Fax S&F Node

The Integrated Services Digital Network (ISDN) User Part (ISUP) reduction information parameters and Q.931 redirecting number information element should be able to call disposition information to the VMOC/Fax S&F node.

2. Call Flow

2.01 In this generic, a new type of 1-way trunk (CPA trunk) connects the *4ESS* switch and the CPA. Any called party number is always passed to the CPA in a Q.931 protocol message. Bulky data now resides in the CPA instead of the *4ESS* switch, and tones previously played to the caller are now replaced by "prerecorded announcements". The CPA determines the mode of operation (query, interactive, or monitor) on a per-call basis. The three modes of operation are shown in Figures 5-2 through 5-4.

Operating Modes

2.02 The adjunct has three modes of operation. Each call uses one or more of these three modes depending on whether the services or features that apply to the call require inband interaction and at what point the call interaction is required. The three modes are as follows:

(a) **Query Mode:** This mode is used for calls that require access to customer record information stored at the adjunct but that do not require any inband interaction with the caller. See Figure 5-2.

(b) **Interactive Mode:** This mode is used for services/features that require inband interaction with the caller such as prompting for DTMF input during the setup phase of the call. The call is routed to the adjunct initially. After the caller interaction is completed, the adjunct asks the *4ESS* switch to redirect the call to its destination. See Figure 5-3.

(c) **Monitor Mode:** This mode is used for calls that require caller interaction after the initial setup phase of the call. This includes calls that require interaction after the call has been answered as well as any services that allow the caller to spontaneously enter inband DTMF codes. In this mode, a call is routed from the *4ESS* switch to the adjunct; the call is hairpinned through the adjunct until the caller disconnects or until the application logic in the adjunct clears the call. See Figure 5-4.

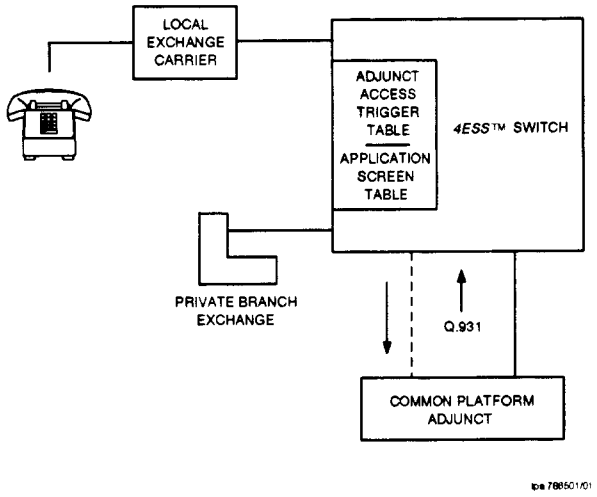


Figure 5-2. Query Mode

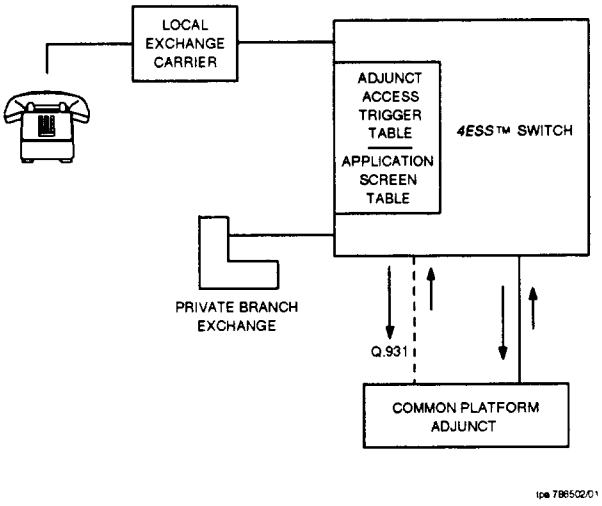


Figure 5-3. Interactive Mode

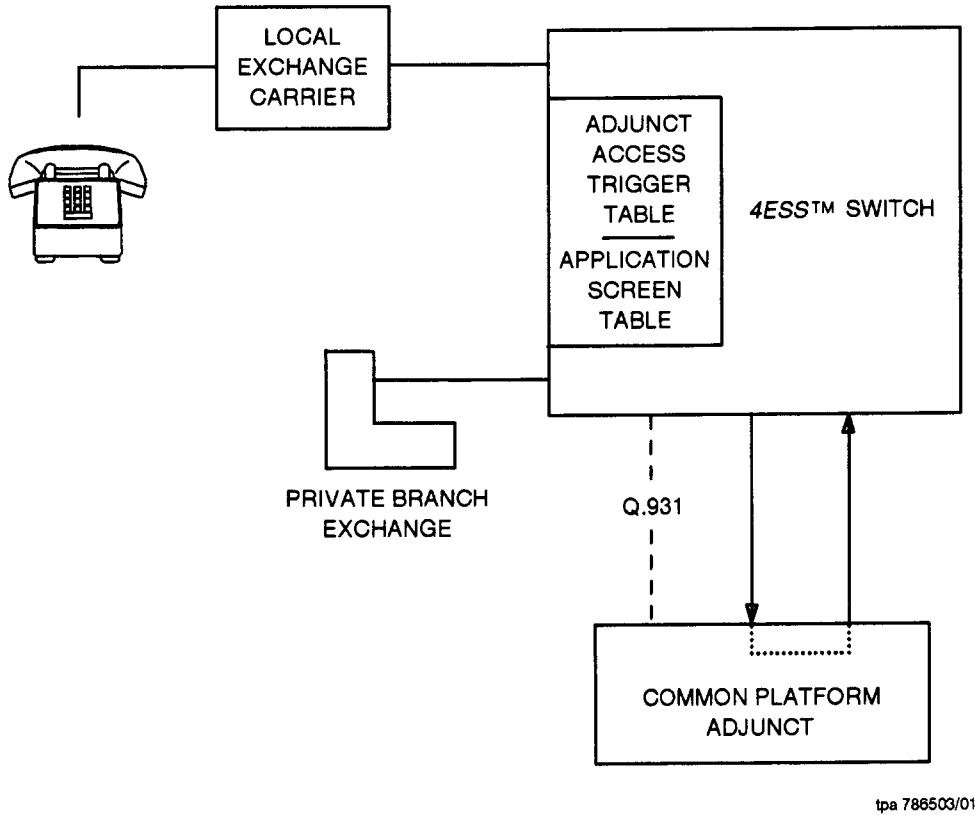


Figure 5-4. Monitor Mode

Subaccount Billing

2.03 Subaccount Billing (SAB) allows customers to receive bills that have been segmented according to customer specifications. Call flow for SAB (Figure 5-5) occurs as follows:

(1) The PCP subscriber dials a number.

(2) The *4ESS* switch receives ANI, determines access and service type, and invokes trigger function.

(3) The *4ESS* switch determines the CPA required and sends the CPA a Q.931 SETUP message.

(4) The CPA receives an ANI and determines from its database that the calling customer is eligible for SAB.

(5) The CPA establishes a voice path with the *4ESS* switch and plays the announcement "Please enter your account code".

(6) The CPA determines when the end of the account code occurs.

(7) The CPA then requests the *4ESS* switch to drop the connection and to route the call. At the end of the call, the *4ESS* switch makes an AMA record for the call.

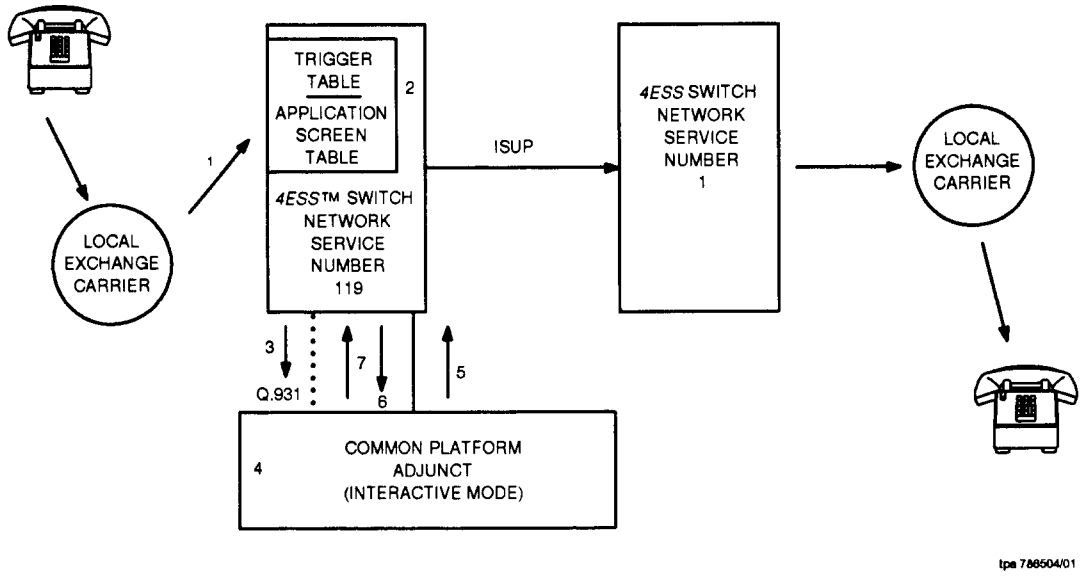


Figure 5-5. Subaccount Billing

Sequence Calling for Subaccount Billing

2.04 The Sequence Calling for Subaccount Billing (SEQSAB) feature enables the customer to input a subaccount code once and apply it to a sequence of calls by pressing a single # key (for unanswered calls) or entering **9 (for answered calls) rather than inputting the actual SAB code for each subsequent call. Call flow for SEQSAB (Figure 5-6) occurs as follows:

(1) The caller dials the called number.

(2) The *4ESS* switch checks tables for ANI, service, and access type.

(3) The *4ESS* switch sends a Q.931 SETUP message containing ANI and other information to CPA.

(4) The CPA checks the database and verifies that the customer subscribes to SAB and SEQSAB.

(5) The CPA requests the *4ESS* switch to establish a voice path with the CPA and then plays an announcement to the customer to "Enter your SAB account code now".

(6) The CPA collects and validates the account code.

(7) The CPA sends a Q.931 SETUP message and has the *4ESS* switch route the call.

(8) The call is unanswered and the caller enters the # key.

(9) The CPA receives destination number digits.

(10) The CPA sends a Q.931 SETUP message to the *4ESS* switch.

(11) The call is answered, the calling party hangs up, and the AMA makes a record at the *4ESS* switch.

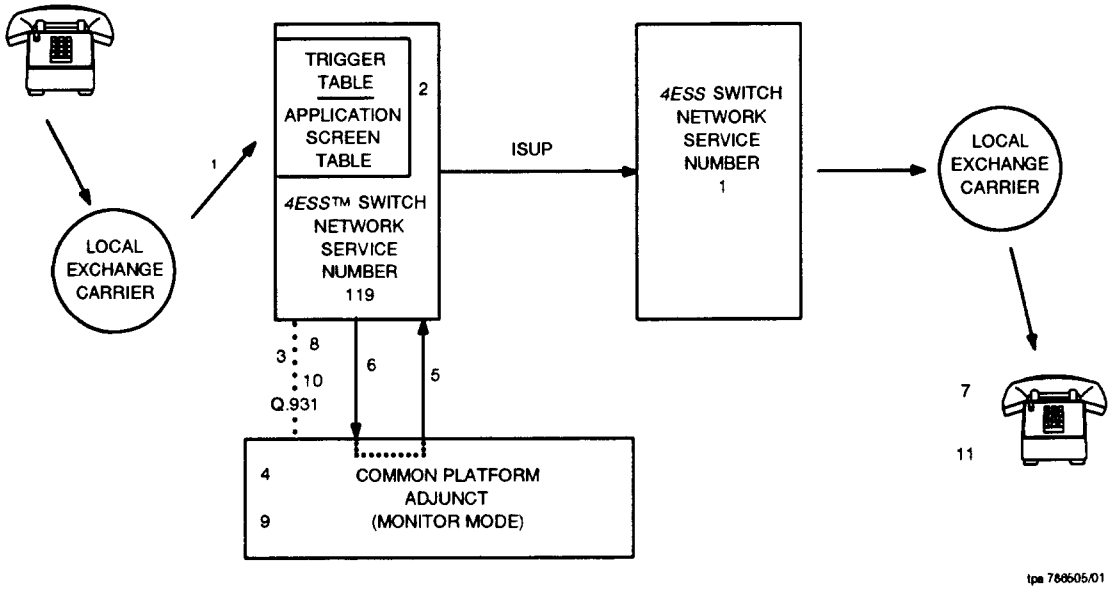


Figure 5-6. Sequence Calling for Subaccount Billing

Concentrated Call

2.05 The Concentrated Call Feature (CCF) is a service AT&T offers to permit customers greater control of their telecommunications expense. This feature permits customers to specify outgoing calls that are permissible or are not permissible from the customer ANI or calling party number. The customer can specify domestic, international, or global restrictions. An override option is also provided that enables customers to complete calls designated as forbidden. Call flow for the CCF (Figure 5-7) occurs as follows:

(1) The caller dials the called number.

(2) The *4ESS* switch receives ANI, determines the access and service type, and invokes the trigger function.

(3) The *4ESS* switch determines that the CPA is needed and sends a Q.931 SETUP message to the CPA.

(4) The destination number is on the *forbidden* list in the CPA database.

(5) A voice path is established with the *4ESS* switch.

(6) The CPA plays an announcement to caller, "We are sorry, the number you dialed is not included in your allowed calling area. If you wish to complete the call, please enter your personal code now".

(7) The CPA verifies that the correct override code is in the database and allows the call to be completed.

(8) The CPA forwards the override code to the *4ESS* switch, and an AMA record is made with the override code.

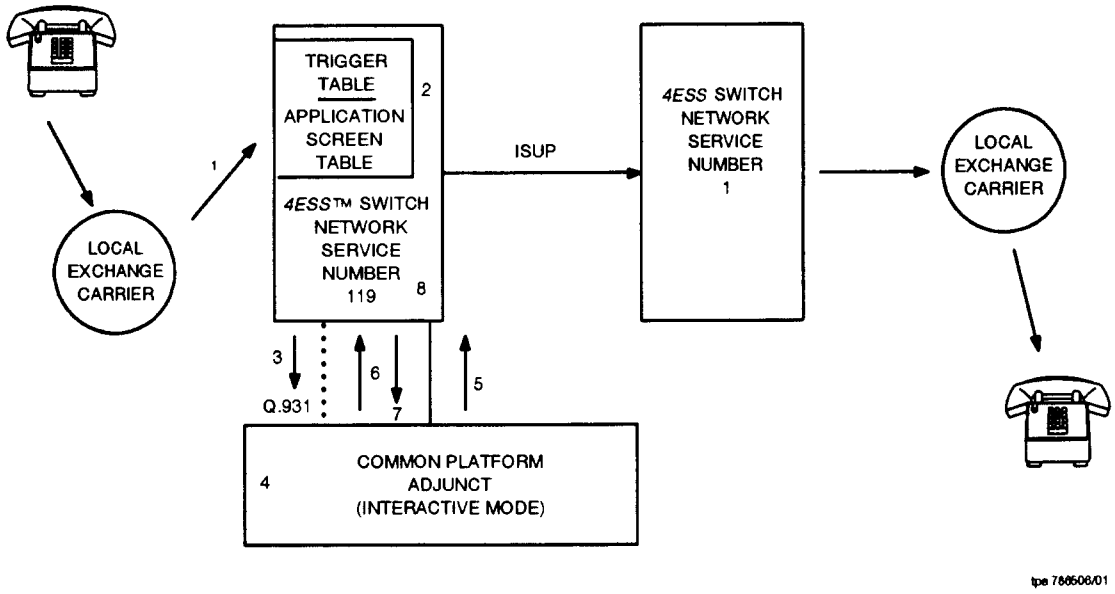


Figure 5-7. Concentrated Calling With Override Option

Sequence Calling for Concentrated Call With Override Option

2.06 CCF customers can be given an override code option that permits them to override the CCF dialing restrictions. The Sequence Calling for the CCF feature enables the customer to input an override code once and to apply it to a sequence of calls by pressing a single # key (if unanswered, busy, or disconnected) or by entering **9 (during an answered call) rather than the actual override code for each subsequent call. Call flow for Sequence Calling for Concentrated Call With Override Option (Figure 5-8) occurs as follows:

(1) The caller dials the called number.

(2) The *4ESS* switch checks the tables for ANI, service, and access type.

(3) The call is placed to disallowed destination.

(4) The CPA asks the *4ESS* switch to set up a voice path.

(5) The CPA plays an announcement to the caller to enter the override code.

(6) The CPA, via messages, tells the *4ESS* switch to route the call.

(7) The call is answered.

(8) The called party disconnects. The caller has 12 seconds to enter **9 plus the new destination number.

(9) The CPA monitors the calling party until he/she hangs up.

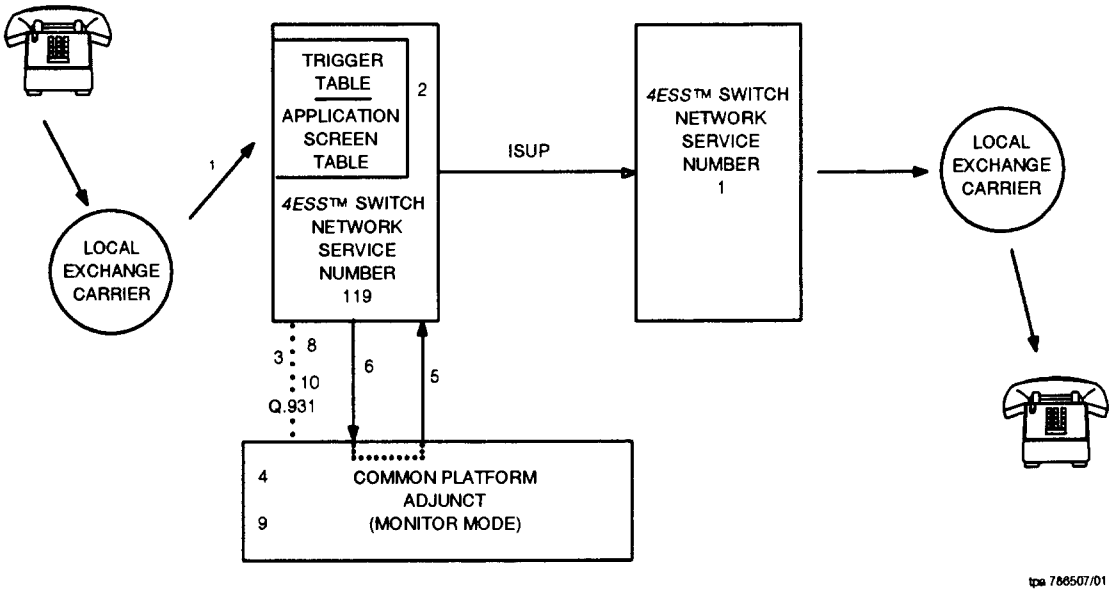


Figure 5-8. Sequence Calling for Concentrated Call With Override Option

1+ Spontaneous Access to AT&T *VoiceMark*® Messaging Service

2.07 The customer, upon placing a call that does not complete to answer, is required to input DTMF digits to activate the 1+ Spontaneous Access to AT&T *VoiceMark* Messaging Service. Upon receipt of the proper digits, the *4ESS* switch routes the call to a Voice Messaging Operation Center (VMOC). The VMOC stores the caller's voice message and delivers it to the called party at a later time. Call flow for 1+ Spontaneous Access to *VoiceMark* Messaging Service (Figure 5-9) occurs as follows:

(1) The caller dials the called number.

(2) The *4ESS* switch receives the called number and the ANI.

(3) The *4ESS* switch sends a Q.931 SETUP message to the CPA.

(4) The CPA checks its database and verifies that the customer has 1+ messaging service.

(5) The CPA forwards a 1+ messaging service indicator back to the *4ESS* switch.

(6) The *4ESS* switch attaches a DTMF receiver to monitor the backward path of the call for service code entry.

(7) The call does not complete to answer.

(8) The caller enters #123 to reach VMOC.

(9) The caller leaves a voice message to be played to the called party at a later time.

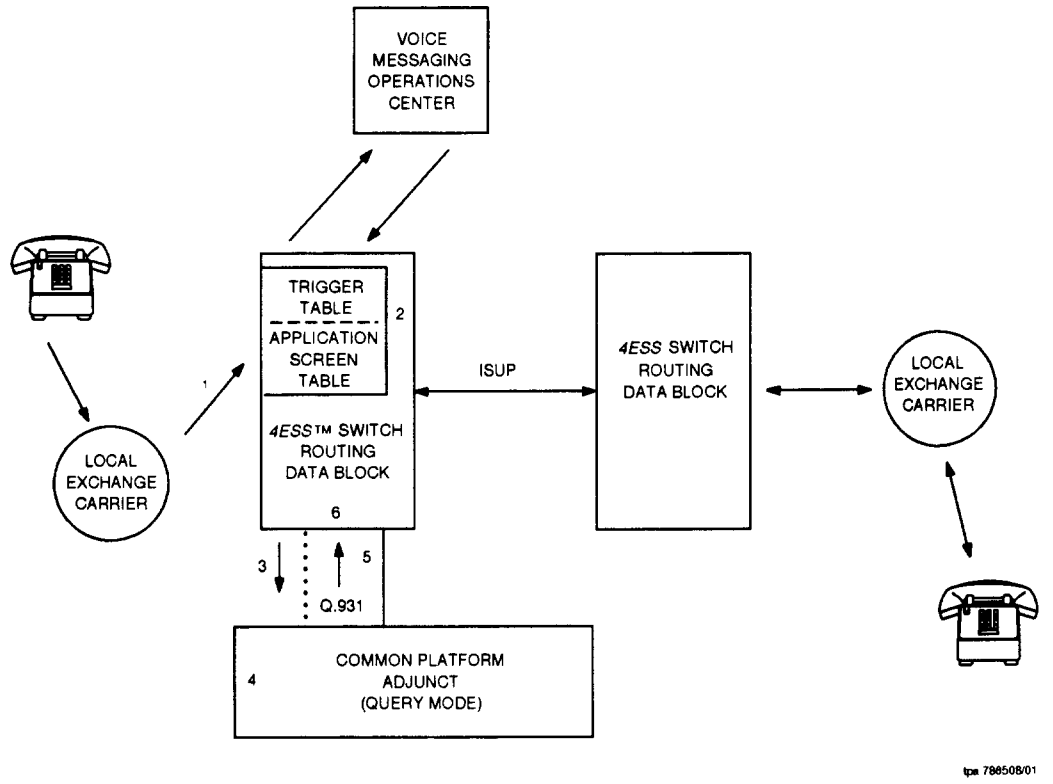


Figure 5-9. 1+ Spontaneous Access to *VoiceMark*® Messaging Service

1+ Sequence Calling With Fax Store-and-Forward and Fax Preferred Routing

2.08 The Fax Store-and-Forward (S&F) customer, upon placing a call that does not complete to answer, inputs DTMF digits to activate the Fax S&F service. The Fax S&F node stores the fax message and delivers it to the original called party at a later time. For Fax S&F customers who subscribe to all PCP features except Sequence Calling for SAB and/or CCF, call monitoring is done at the *4ESS* switch. For Fax S&F customers who subscribe to Sequence Calling for SAB and/or CCF, call monitoring is done at the CPA.

2.09 Fax Preferred Routing (FPR) provides the customer's call with preferred call treatment at the International Switching Center (ISC). During the call setup, if the FPR customer does not subscribe to or does subscribe but does not invoke Sequence Calling for Subaccount Billing and/or CCF, the *4ESS* switch maps the FPR indicator into the Common Channel Signaling System 7 ISUP Initial Address Message (IAM). If the FPR customer does invoke the Sequence Calling for Subaccount Billing and/or CCF, the call is hairpinned through the CPA. This call and all subsequent calls are flagged as FPR calls.

2.10 This feature gives the customer a Mixed-Use Voice/Fax (MUVF) option which provides for voice and fax over one telephone line. An announcement played by the CPA gives the caller the option to enter 3 (F) for fax, 8 (V) for voice. No entry indicates a voice Call Type Indicator. If an invalid Call Type Indicator is entered, the CPA plays a reenter announcement.

Sequence Calling with S&F and FPR (Figure 5-10) occurs as follows:

(1) The caller dials the called number.

(2) The *4ESS* switch checks tables for ANI, service, and access type.

(3) The *4ESS* switch sends a Q.931 SETUP message containing ANI and other information to the CPA.

(4) The CPA checks its database to verify that the customer subscribes to Fax S&F, FPR, and Sequence Calling for Subaccount Billing.

(5) The CPA plays the voice announcement, "If this is a fax call, please enter F or 3. If it is a voice call, please enter V or 8".

(6) The CPA sends a Q.931 SETUP message and has the *4ESS* switch route the call.

(7) The CPA bridges the incoming trunk to monitor the outgoing trunk for Fax S&F service code entry.

(8) A busy condition occurs. The CPA plays the announcement, "The fax machine you are trying to reach is busy. However, for a charge, AT&T Fax Messaging Service will deliver your fax message. If you want to use AT&T Fax Messaging Service, enter 3,2,9 now".

(9) The CPA sends a Q.931 SETUP message to the *4ESS* switch, and the call is routed to Fax S&F node.

(10) The call remains hairpinned until the calling party disconnects or until ten sequence calls have been made.

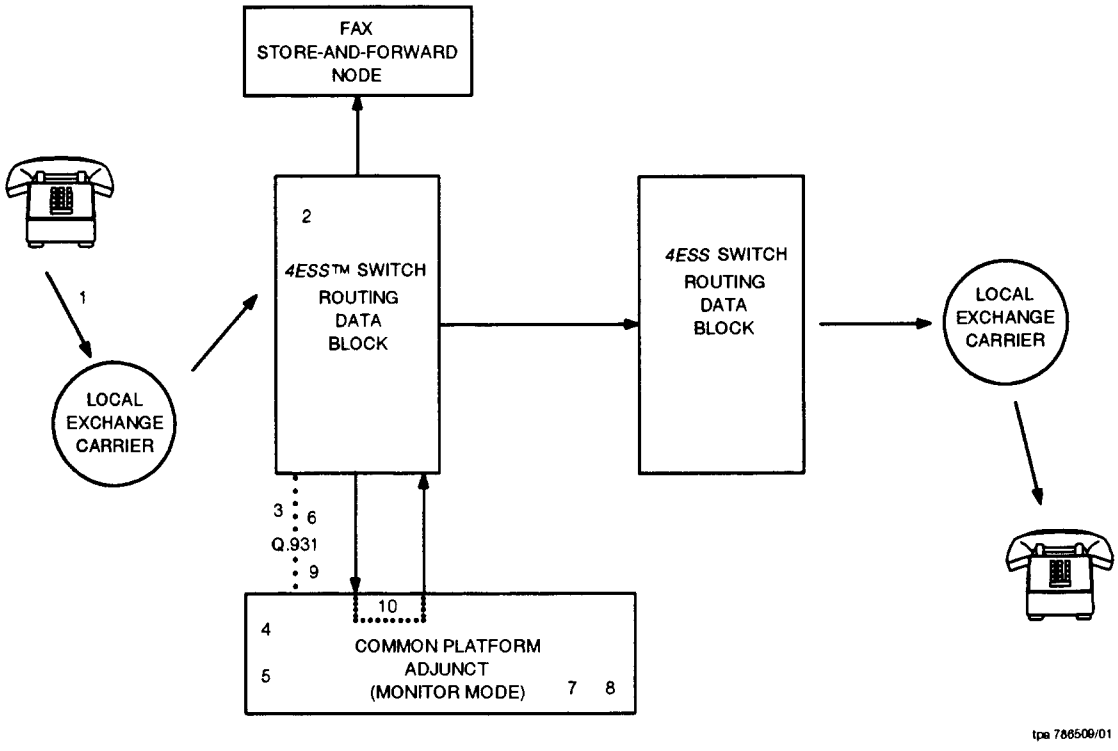


Figure 5-10. 1+ Sequence Calling With Fax Store-and-Forward and Fax Preferred Routing

Select Collect

2.11 This feature permits a subscribing customer to designate up to 25 line numbers in which 1+ direct-dialed calls from these lines to the Select Collect customer are automatically charged to the Select Collect subscribed account as collect calls. This feature is available only to LDS customers. Call flow for the Select Collect feature (Figure 5-11) occurs as follows:

(1) The caller dials the called number.

(2) The *4ESS* switch checks tables for ANI, service, and access type.

(3) The *4ESS* switch sends a Q.931 SETUP message containing ANI and other information to the CPA.

(4) The CPA checks the database and verifies that the calling customer is eligible for Select Collect.

(5) The CPA determines if the called number is a subscribing Select Collect customer.

(6) The CPA sends a Q.931 SETUP message and has the *4ESS* switch route the call.

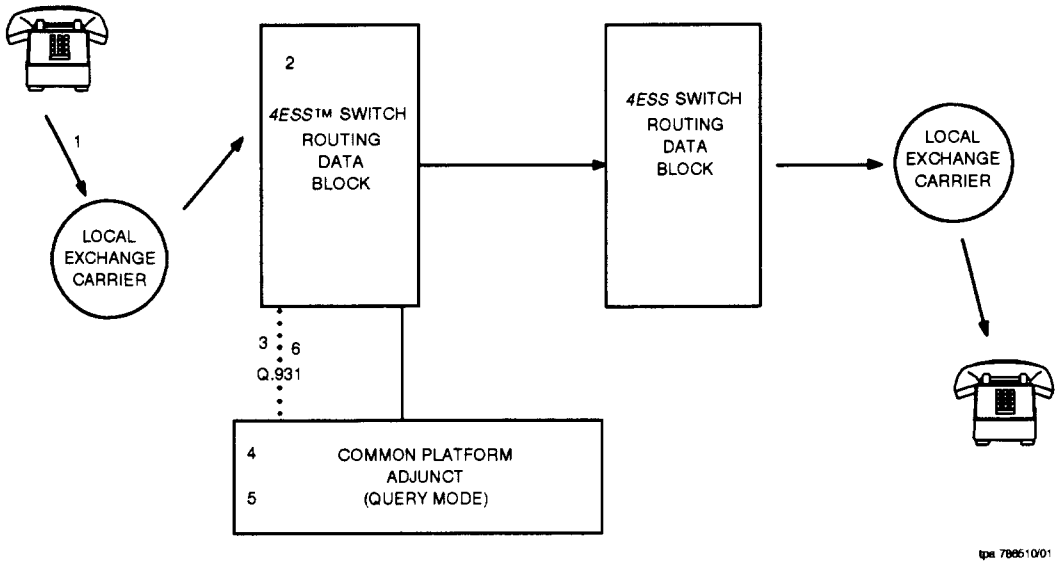


Figure 5-11. Select Collect

Customer Specific Recording

2.12 AT&T customers may subscribe to Customer Specific Recording (CSR) features that allow for additional usage data to be stored on AMA records. This data may expedite teleprocessing of these records in the downstream billing systems. Call flow for CSR (Figure 5-12) occurs as follows:

(1) The caller dials the called number.

(2) The *4ESS* switch checks tables for ANI, service, and access type.

(3) The *4ESS* switch sends a Q.931 SETUP message containing the ANI and other information to the CPA.

(4) The CPA checks the database and verifies that the customer subscribes to CSR.

(5) The CPA identifies which service option flags are set.

(6) The CPA sends a Q.931 SETUP message and has the *4ESS* switch route the call.

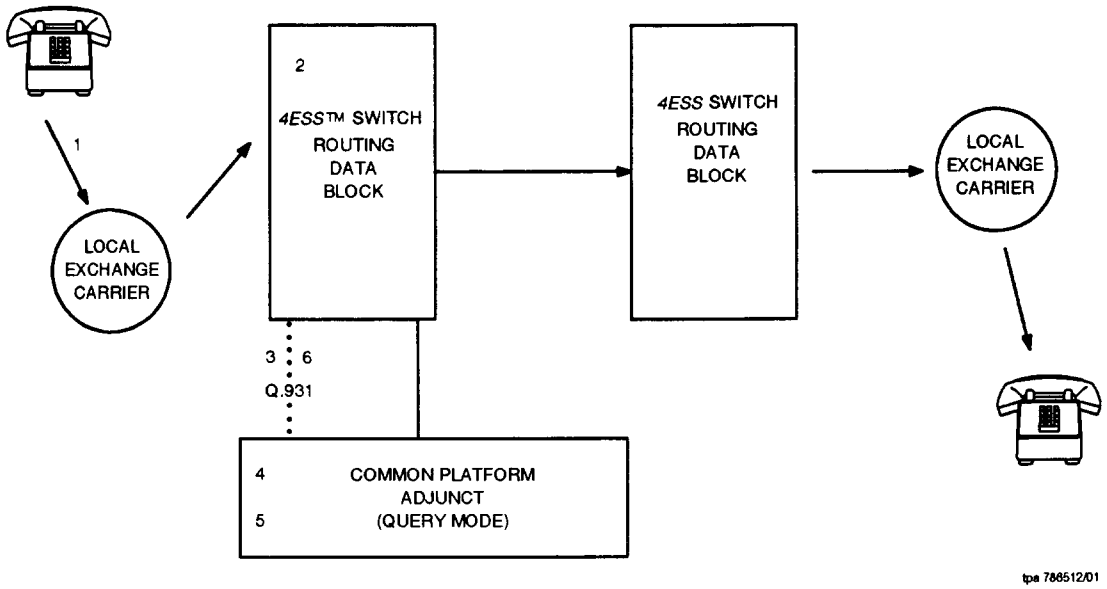


Figure 5-12. Customer Specific Recording

3. Provisioning

Data Administration

3.01 The access to the CPA and PCP application features is turned on with Recent Change Form 652. See Figure 5-13. This new form, available with the 4E17 generic program, is used to change the common data for a specific adjunct. In this form, either ON or OFF is entered in field AI for turning the feature on or off. In field ALA, the adjunct logical address is entered. The ATYP field is used for the application type which is PCP. The AFHT field specifies the announcement to be played for adjunct final handling treatment when the adjunct cannot be accessed. Destination separation entries are put in the DESEP field. Order number entries and routing data block index entries are put in the ORNU and RDBI fields, respectively.

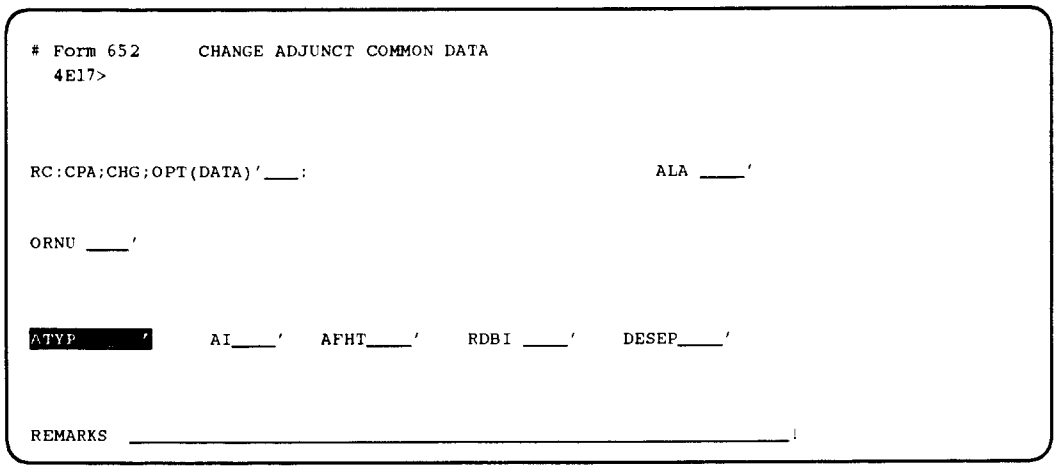


Figure 5-13. Recent Change Form 652

3.02 Recent Change Form 650, available with generic 4E17, is used to add, change, or delete access trigger table information located on an adjunct. The customer ANI, type of access, type of service, and numbering plan fields uniquely identify an adjunct access customer. The fields must be entered to add, change, and delete action. See Figure 5-14. In this form, the meaning of each entry is as follows:

ACTION	Action entries A, C, or D
ALA	Adjunct Logical Address
CANI	Customer ANI
NUMPL	Numbering Plan
ORNU	Order Number Entries
TOA	Type of Access
TRI	Transition Indicator
TSVC	Type of Service

```
# Form 650      CHANGE COMMON PLATFORM ADJUNCT ACCESS TRIGGER TABLE
  4E17>


RC:CPA;CHG;OPT(ORIG)'___:   CANI_________'  TOA___'  TSVC____' NUMPL____'


ORNU ________'     ACTION__'


ALA _____'      TRI __'


REMARKS  ____________________________________________________________!
```

Figure 5-14. Recent Change Form 650

3.03 An adjunct access trigger table at the terminating switch indicates whether an adjunct needs to be accessed for a destination number. One word contains a subtranslator address that points to the start address of 20 contiguous translators. All AT&T offices have a subtranslator address assigned to this word by the Office Data Assembler (ODA). The Local Exchange Carrier (LEC) offices do not have a subtranslator assigned by the ODA, and one cannot be assigned by recent change. This destination trigger table is a new 2-level structure consisting of a 256-word head table with subtranslators allocated as needed. The size of each subtranslator can be up to 1023 entries, for example, a maximum of 1023 NPAXXX per line number.

3.04 Recent Change Form 651, available with generic 4E17, is used to add, change, or delete destination table information located on an adjunct. The 10-digit destination number and numbering plan uniquely identify an adjunct access customer with terminating services. The fields must be entered for the add, change, and delete action. See Figure 5-15. In this form, the meaning of each entry is as follows:

ACTION	Action entries A, C, or D
ALA	Adjunct Logical Address
DNUM	Destination Number
NUMPL	Numbering Plan
ORNU	Order Number Entries

```
# Form 651      CHANGE COMMON PLATFORM ADJUNCT DESTINATION TABLE
  4E17>


RC:CPA;CHG;OPT(DEST)'___:                DNUM__________'      NUMPL____'

ORNU _______'    ACTION__'

ALA _____'

REMARKS _____________________________________________________________!
```

Figure 5-15. Recent Change Form 651

3.05 A new 3-bit indicator in the trunk block for Q.931 identifies the type of primary rate interface with the following:

- Non-Q.931
- Normal PBX TSG
- TSG to the adjunct
- Other.

3.06 A 1-bit indicator has been added to the routing data block and multiple routing treatment call types as an egress indicator. This item can be set by ODA and recent change code group form input for routing data blocks containing any trunk subgroup exiting the AT&T network.

3.07 An adjunct based capabilities (ABC) digits table in an existing translator has been reduced, and a new item has been added for national plan area numbers. The items in the translator are used for handling North American plan entries and national plan area splits.

Changing the PCP Customer Database

3.08 Recent Change Form 645 is used to add, change, or delete information for a PCP customer. The customer ANI, type of access, type of service, and numbering plan fields uniquely identify a PCP customer. The numbering plan field (NUMPL) has been added in generic 4E17 for generic 4E16.

Changing PCP Subaccount Billing Preassigned Account Values

3.09 Recent Change Form 646 is used to add or delete preassigned account codes for a PCP Subaccount Billing customer. The customer ANI, type of access, and type of service fields uniquely identify a PCP customer. The numbering plan field (NUMPL) has been added in generic 4E17 for generic 4E16.

4. Recording

Determining Call Code

4.01 A subroutine maps the access type and service type indicators in the call register to the call code.

Billing Features

4.02 When the formatter builds a record, if any of the following conditions are present:

- Old PCP architecture is required.
- New PCP architecture is required.
- The call is to be charged.
- Sequence calling is required.
- Billing options are required.

Then, the formatter appends a Bill-features module to the record with the following data:

(a) The service feature field is set to the following:

- Fax Preferred Routing if required.
- Fax if required.
- Fill characters if neither fax nor Fax Preferred Routing is required.

(b) The screening code field is "collect only", if applicable; otherwise, it contains fill characters.

(c) The call options are "sequence call", if applicable; otherwise, they contain fill characters.

(d) The billing options are copied from the recording register, if applicable; otherwise, they contain fill characters.

Entering User Codes

4.03 If the *4ESS* switch receives a facility information element under certain conditions, the data is appended to the AMA record in a SAB/CCF module. The conditions are:

- That the data is in either a Q.931 SETUP or DISCONNECT message with an operation value set to "billing"
- That the data has a user-entered code
- That the user-entered code is set to subaccount billing code and/or CCF override code.

4.04 When building a record, the formatter appends a SAB/CCF module with module code 900 (PCP feature set to SAB code 1, significant digits in the next field set to the SAB digit count, and the SAB stored in the SAB/CCF code field).

4.05 When building a record for a CCF call, the formatter appends a SAB/CCF module with module code 900 (PCP feature set to CCF code 2, significant digits in the next field set to the CCF digit count, and the CCF stored in the SAB/CCF code field).

4.06 When a call is redirected, the CPA data is not recorded on the second leg of the call.

5. Network Management

5.01 Early detection methods are in place to prevent congestion and prevent adjunct-related problems in the system. The early detection of such problems can, in many cases, prevent deterioration of the equipment and minimize the negative impact of network congestion. For each adjunct having a direct interface with a *4ESS* switch, the switch collects the following counts and/or information for each trunk subgroup (TSG) connecting the adjunct to the switch. These counts are available for all trunks selected for network management monitoring.

- TSG identification number
- Basic traffic number (BTFN)
- A count indicating the total attempts (attempt peg count) for the TSG to the adjunct
- A count indicating the total overflow (unsuccessful attempts to seize a trunk at the *4ESS* switch side for getting to the adjunct) for the TSG to the adjunct
- Incoming (from the adjunct) seizures peg count

- Maintenance busy count
- Occupancy peg count
- Count of calls affected by automatic controls
- Count of calls affected by manual controls
- Calls rejected by the adjunct.

These counts are accumulated over 5-minute intervals. In addition to the above counts, information is provided for the number of trunks in the TSG, the directionalization of the TSG (1-way or 2-way), and the audit information. This latter information for the adjunct TSGs is provided to the Regional Network Management System (RNMS) and Network Management Operations Support System (NEMOS) in the same form and in the same manner that is provided for all message TSGs. NEMOS and RNMS have the option of designating the trunk cycle to obtain the above data from the switch.

5.02 In addition, the switch collects and sends flag indicators when network management controls affect the traffic on the TSG to the adjunct. These indicators do the following:

- Indicate active selective trunk reservation control
- Indicate selective dynamic overload control
- Indicate active manual TSG cancel control
- Indicate active manual TSG skip control.

These indicators are shown, if applicable, per TSG (to the adjunct) every 5 minutes and are sent to RNMS and NEMOS when the TSG has been scheduled for network management monitoring. The indicators existed previously and are mentioned here for background information. The TSG subgroup trapping mechanism, available for the *4ESS* switch TSGs, also applies to any TSG connecting the adjunct to the switch.

5.03 With R2, a count of final SETUP message time-outs (T303) per adjunct are pegged by TMAD0002. These counts are provided every 5 minutes to NEMOS.

5.04 The switch supports all network management restrictive TSG controls for the TSG connecting the switch to the adjunct. Expansive reroute controls are not supported on the assumption that a call will be routed automatically and sequentially to all adjuncts and associated TSGs that contain the same information. That is, there are no more adjuncts available with the needed information than those in the routing structure.

6. Maintenance/Troubleshooting

6.01 Maintenance information for the PCP is covered in this document under Common Platform Adjunct (Feature 207).

7. Transition Considerations

Dependencies on Other Network Components

7.01 Requirements for other network components are as follows:

- The *4ESS* switch interfacing with a CPA must install a new load.
- A recent change bit in Recent Change Form 652 (Field AI) must be set for customer subscription to the CPA.

Turn On/Off Mechanism

7.02 For the Positive Call Processing application feature to be active, field OD4PCP in ODA Form 406z must be populated.

Recent Change Requirements

7.03 To access the CPA and to change application data, use the Recent Change forms as follows:

- To access the CPA, new Recent Change Form 652 is used.
- To change the PCP customer database, a modified Recent Change Form 645 is used.
- To add or delete preassigned account codes for a PCP Subaccount Billing customer, a modified Recent Change Form 646 is used.
- To add, change, or delete access trigger table information, new Recent Change Form 650 is used.
- To add, change, or delete destination table information, new Recent Change Form 651 is used.

8. Input/Output Manual Pages

8.01 The input and output manual pages listed below are attached. They have been created to support this feature.

Input	**VER:PCP**
Output	**VER:PCP**
Output	**VER:PCP-RSII**

ID . . . . . VER:PCP
WORK CENTER . . MOC,MAC
GENERIC . . . . . 4E17 and later
CLASS . . . . . VER
APPLICATION . . 4E
TYPE . . . . . Input

1. PURPOSE

Requests information on the customer automatic number identifications (CANIs) contained in the positive call processing (PCP) database.

2. FORMAT

This message has three formats.

[1] **VER:PCP:CANI** a [,**TOA** b] [,**TSVC** c] [,**NUMPL** d]!

[2] **VER:PCP;ALL!**

[3] **VER:PCP;STDP!**

3. EXPLANATION OF MESSAGE

a	Customer automatic number identification.
b	Type of access.
c	Type of service.
d	Numbering plan.
ALL	For all CANI with PAV.
STDP	For all CANI without PAV.

4. SYSTEM RESPONSE

NA	Not accepted.
PF	Printout follows.

5. REFERENCES

PIDENTs
IOCPIMC4
VRFYCNTL
VRFYINPT
VRFYPCP

Translation Guide, 4ESS™, TG-4, Division 8

Output Message

```
VER : PCP
```

ID . . . . . VER:PCP
WORK CENTER . . MOC,MAC
GENERIC . . . . . 4E17 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

Format 1 is for all customer automatic number identifications (CANIs) without preassigned account values (PAV).

```
[1]  VER:PCP:

  CANI       TOA TSVC  NUMPL ACI/L CDS  FAX FAXPR FAXSF CDET CDI FAST RRI RPC

aaaaaaaaaa, bb, cccc, dddd,  e/f,  g, hhhh,  i,    j,   k,   l,    m, n, ooo,
 .
 .
 .
 .
```

Format 2 is for all CANIs with preassigned account values (PAV).

```
[2]  VER:PCP:

  CANI       TOA  TSVC  ACI/L   CDS  FAX FAXPR FAXSF CDET CDI FAST RRI RPC
                                                    PAV

aaaaaaaaaa, bb,   cccc,  e/f,    g, hhhh,  i,    j,   k,   l,    m, n, ooo,
            pppppppp, pppppppp, pppppppp, pppppppp, pppppppp,
 .          pppppppp, pppppppp, pppppppp, pppppppp, pppppppp,
 .
 .
 .
```

2. REASON FOR OUTPUT

To display information on the CANIs contained in the positvie call processing (PCP) 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) or Megacom.

d — Numbering plan.

- APN — Action point numbering.
- NANP — North American numbering plan.

e — Account code indicator:

- O — Optional.
- R — Required.

f — Account code length:

- 1 to 8 digits
- blank

g — Call delivery service:

- Y — Customer is subscribed to service.
- N — Customer is not subscribed to service.

h — Facsimile (FAX) service:

- blank — Customer is not subscribed to FAX service.
- DFAX — Customer is subscribed to dedicated FAX service.
- MUVF — Customer is subscribed to mixed-use voice/FAX.
- N — Customer is not subscribed to FAX service.

i — FAX preferred routing:

- N — No
- Y — Yes

j — FAX store and forward:

- N — No
- Y — Yes

k — Call detail data:

- N — No
- Y — Yes

l — Call disposition information:

- N — No
- Y — Yes

m — Teleprocess the call record quickly:

- N — No
- Y — Yes

n	Record routing information: N — No Y — Yes
o	Regional processing center: 3 digits blank
p	Preassigned account values: 1 to 8 digits blank

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs
- IOCPMCP4
- IOCPPVR4
- VRFYINPT
- VRFYOUT
- VRFYPCP

Input Message
- VER:PCP

ID . . . . . VER:PCP-RSII
WORK CENTER . . MAC
GENERIC 4E17
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
VER:PCP;OPT(RSII):

TOA    TSVC    RIIAI    RSII

aa,    bbbb,    cc,     ddd,
.                       .
.                       .
.                       .
aa,    bbbb,    cc,     ddd,
```

2. REASON FOR OUTPUT

Display the service identity and access indicator for all combinations of type of access and type of service value used for PCP.

3. VARIABLE FIELD DEFINITIONS

a — Type of access.
- SA — switch access
- DC — direct connect

b — Type of service.
- LDS — long distance service
- OMEG — outward wide area telephone service (OUTWATS) or Megacom

c — Routing information indicator access indicator.
- SA — switch access
- DC — direct connect

d — Redirect service identity. A range from 0 to 255.

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs
- IOCPOMC4
- IOCPPVR4
- VRFYOUT
- VRFYPCP

Translation Guide, 4ESS™, TG-4, Division 8

Input Message

```
VER:PCP-TTSII
```

4ESS™ Switch Access to Common Platform Adjunct Feature (207)

6

Contents Page

Contents

4ESS™ Switch Access to Common Platform Adjunct Feature (207)

6

1. Core Feature Description

1.01 The Common Platform Adjunct (CPA) is a platform or core capability in the network that can be used by any service to create new features and applications. An Integrated Services Digital Network (ISDN) Primary Rate Interface (PRI), including proprietary extensions, is the interface between the adjunct and the *4ESS*™ switch in the generic 4E17R2 time frame. The CPA maintains both services and customer-specific application data, and the *4ESS* switch interacts with the adjunct to access both originating and terminating application data. The first application using this adjunct architecture is the Positive Call Processing (PCP) family of features.

1.02 A *capability* is a well-defined functional unit residing on the CPA used to design applications. An *application* is a program that defines a sequenced set of desired CPA actions and events along with the circumstances under which the actions and events are performed.

1.03 Capabilities of the adjunct include, but are not limited to, call processing, operations, administration, maintenance, recording, and security. These capabilities are generic in that they are a framework that current and future applications can use to meet business units' needs. For example, the CPA provides capabilities for announcements, digit collection, and measurements. Individual applications, however, specify the information contained in the announcement, the digits to be collected, the order in which events occur, and the specific measurements to be reported.

1.04 Within the AT&T network, the interfaces between the adjunct and other networks include the ISDN interface to the *4ESS* switch and functional interfaces between the operation support systems and the adjunct.

2. Data Definitions

Definition of Terms

2.01 The definitions for some of the terms used in this document are listed below:

Application	A program that defines a sequenced set of desired CPA actions and events along with the circumstances under which the action and events are performed. Applications communicate with the adjunct using well-defined function calls that are defined within the adjunct application interface.
Capability	A well-defined functional unit on the adjunct used to design applications. Capabilities are self-contained within a single element and can be comprised of hardware and/or software functions independent of specific applications.
Service	A tariffed offering to end customers. The underlying capabilities that comprise a service may span multiple network elements. Services do not necessarily map one-to-one to applications.
Feature	A service "building block". Features are part of a tariffed offering. From the service prospective, a feature may span multiple network elements or be self-contained within the adjunct. Within the adjunct, a feature may consist of multiple capabilities and an execution order.
CPA Library	The CPA library consists of a set of often-used, well-defined function calls. The adjunct library resides within the Application Development Environment (ADE). A given function call has a corresponding executable code which resides in the adjunct execution environment.
Macro	A macro is viewed as a logical chain of adjunct functions. Macros are created using the ADE. Once created, the macro may reside within the adjunct library and be made available to other application developers.
User	A person who uses a service provided by the adjunct. Service users include calling and called parties. Adjunct function users include platform developers, application developers, work centers, and craft personnel. Adjunct function users are employed by AT&T, the adjunct development organization, or a selected third-party development organization.

Customer	A person or organization that derives benefit from a service or function. Examples of customers of a service include subscribers. Examples of customers of adjunct functions include AT&T business units.
Subscriber	A term used interchangeably with customers.

3. Functional Design Decomposition

Architectural Environment

3.01 The CPA is deployed and managed as part of the AT&T Switched Network. See Figure 6-1. It supports a range of interactive voice and data needs. Individual services and features are implemented as independent applications on a common hardware and software platform. Multiple services can share the same adjunct. For this feature, new capabilities have been defined for the *4ESS* switch, signaling, and operations support systems.

3.02 From an AT&T Network prospective, multiple adjuncts at multiple sites are required. The number of adjuncts required and their locations is a function of the applications, adjunct reliability, and adjunct capacity. The optimal system configuration depends on the individual business unit's needs and the products used to implement the system.

3.03 At an AT&T office location, the adjunct main components include direct transport and signaling interfaces to one or more *4ESS* switches. The *4ESS* switch is connected to the adjunct via an ISDN PRI. The adjunct consists basically of an operating system, platform software, and an ADE. The core capabilities of the adjunct interface with one or more application features; the first of which is the PCP family of features.

Location

3.04 The adjunct resides in an AT&T office and has direct transport and signaling interfaces to one or more AT&T *4ESS* switches. For generic 4E17, this is identified as the AT&T ISDN PRI with limited enhancements to the Q.931/Q.932 protocols.

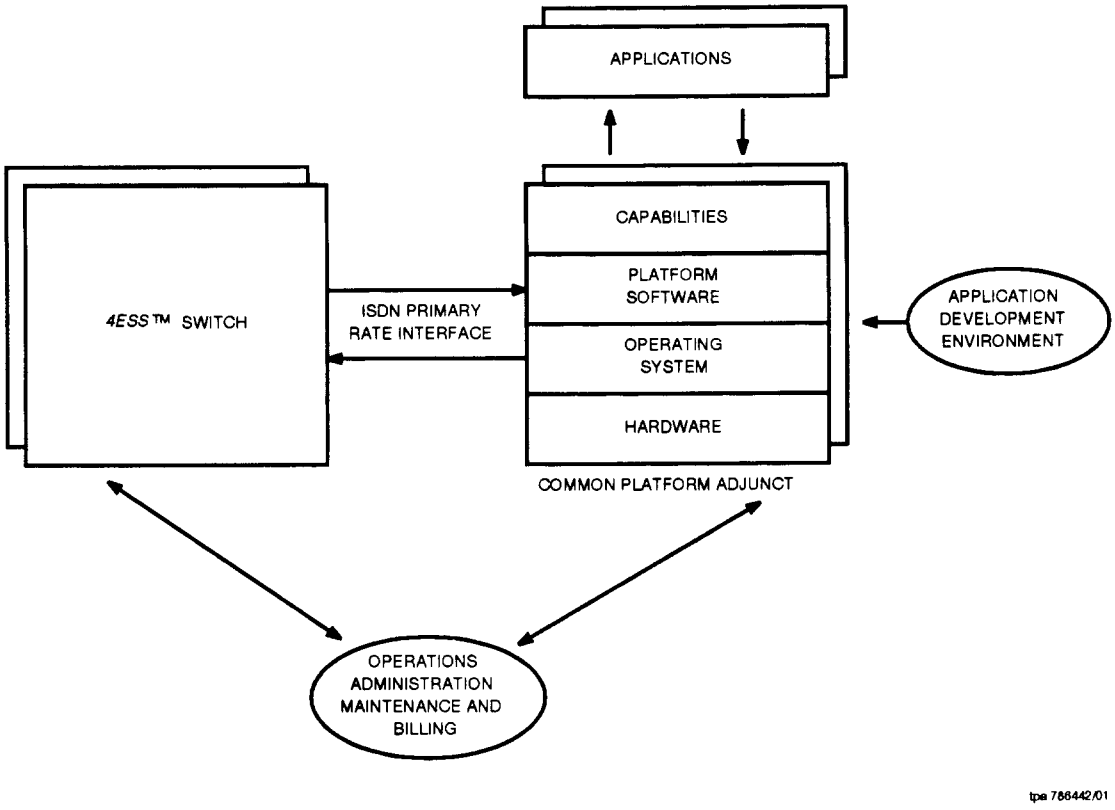


Figure 6-1. Common Platform Adjunct Architectural Environment

Fault Recovery

3.05 Existing *4ESS* switch capabilities are used whenever possible to support the adjunct architecture by using the adjunct unavailable treatment. An "adjunct unavailable" treatment is selected on a per-adjunct logical basis. This allows each application to independently determine how calls should be handled when the adjunct is not available. The "adjunct unavailable" treatment for each logical address is recent changeable. If the *4ESS* switch is unable to successfully access an adjunct, it disposes of the call in one of the following ways:

(a) Route and Record

- Route the call based on call information stored in the *4ESS* switch.
- Mark the Automatic Message Accounting (AMA) record to indicate that the call was eligible for but did not get appropriate adjunct treatment.

(b) Use one of the currently defined "no circuits available" treatments, that is, play reorder and kill the call.

A. Alarms and Reports

3.06 For the *4ESS* switch, no new alarms or reports are available in conjunction with the "adjunct unavailable" treatment. Any problems that cause the adjunct to be unavailable will trigger reports and alarms discussed in the "Network Management" section.

B. Facility or D-Channel Out of Service

3.07 If the Digital Signaling 1 (DS-1) facility or the D-channel is out of service, that is, no communication exists between the *4ESS* switch and the adjunct, the switch provides alarms for the PRI. No new alarms are required for the PRI.

3.08 If the adjunct PRI facility is out of service, the *4ESS* switch sends a facility alarm to the Trunk Operations and Provisioning Administration System (TOPAS). If the adjunct PRI D-channel is out of service, the *4ESS* switch sends a REPT:OTAN message with outage code DCO from the 1A Processor and a CRITICAL EVENT message from the AT&T 3B20D computer Attached Processor System to TOPAS.

C. Failures Within Adjunct

3.09 When the adjunct detects that it is unable to process a call correctly, it sends a RELEASE COMPLETE message to the *4ESS* switch. The contents of this message instruct the switch whether to route the call and mark the AMA record or final handle the call. The adjunct also reports any problems to its operating system. In addition, the adjunct sends the Q.931 SERVICE message to take B-channels in and out of service in response to failures or congestion within the adjunct.

3.10 If the adjunct fails completely but no signaling failure is indicated, the *4ESS* switch waits for a response for a certain time and then applies the "adjunct unavailable" treatment.

Call Processing

3.11 Prior to addressing an adjunct for call processing of customer specific data, the *4ESS* switch, whether originating or terminating, processes information about the call to determine how it should be handled. There are basically four distinct methods of call handling and each method is determined or triggered, as the call progresses, by the type of customer subscription and requirements. The *4ESS* switch determines whether the adjunct is to be used for a call by selecting an adjunct Use Determination Function. In order to make this selection, the *4ESS* switch considers the four functions as follows: See Figure 6-2.

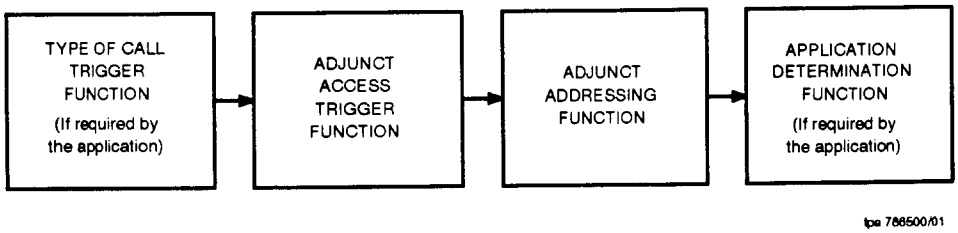


Figure 6-2. Adjunct Use Determination Functions, Logical Flow

A. Type of Call Trigger Function

3.12 The function of the type of call trigger is to determine whether an incoming call to a *4ESS* switch is the type for which an initial database check should be performed. If the type of call trigger function indicates that a call is the type for which an adjunct must be accessed, the adjunct access trigger function is invoked. The type of call trigger function for the adjunct-based capabilities architecture resides in the switch. In the first release, the type of call trigger is performed at terminating switches only.

B. Adjunct Access Trigger Function

3.13 The adjunct access trigger determines whether an adjunct might need to be accessed on a given call pending application-specific screening. If an application defines a type of call trigger for its use, this function is invoked when a call passes the type of call trigger screening function. Otherwise, the adjunct access trigger function is invoked without requiring the type of call trigger function. This adjunct access trigger

function accesses customer-specific data about a call to determine if an adjunct needs to be accessed based on the customer's subscription features.

3.14 The access trigger function is provided in the *4ESS* switch which maintains two trigger tables of customers for which an adjunct must be accessed on a call. One trigger table maintains automatic number identifications (ANIs); the second maintains destination numbers. Adjunct access trigger data for originating numbers is accessed differently than for terminating numbers. The data consists of all ANIs, destination numbers, and associated data for all customers homed onto that switch. Some customers' ANI and destination numbers are included in multiple adjunct access trigger tables if they are homed onto more than one *4ESS* switch.

C. Adjunct Addressing Function

3.15 Upon determining that an adjunct must be accessed for a call, the *4ESS* switch determines which adjunct should be addressed. This selection occurs because multiple adjuncts could exist at one switch.

3.16 A Network Control Point (NCP) may also need to be accessed for the call. For example, a *4ESS* switch may need to access an adjunct and also need to access an NCP for routing information for a 900 call. For the first release, when access is needed for both an adjunct and Direct Services Dialing (DSD) NCP and Inward Wide Area Telephone Service (INWATS) Database (IDB) NCP, the adjunct is accessed first followed by the NCP query. However, this does not apply to Network Call Denial (NCD) NCP queries which are sent from the 4ESS switch prior to accessing an adjunct.

D. Application Determination Function

3.17 The purpose of the application determination function is to determine, based on the adjunct logical address, the application associated with the logical address. Each adjunct logical address has only one application associated with it. However, the same application may have many associated logical addresses.

E. Operating Modes

3.18 The adjunct has three modes of operation. Each call uses one or more of these three modes depending on whether the service or features that apply to the call require inband interaction and at what point the call interaction is required.

The three modes are as follows:

(a) **Query Mode:** This mode is used for calls that require access to customer record information stored at the adjunct but that do not require any inband interaction with the caller.

(b) **Interactive Mode:** This mode is used for services/features that require inband interactions with the caller [such as prompting for Dual Tone Multifrequency (DTMF) input] during the setup phase of the call. The call is routed to the adjunct initially. After the caller interaction is completed, the adjunct asks the *4ESS* switch to redirect the call to its destination.

(c) **Monitor Mode:** This mode is used for calls that require caller interaction after the initial setup phase of the call. This includes calls that require interaction after the call has been answered as well as for any services that allow the caller to spontaneously enter inband DTMF codes. In this mode, a call is routed from the *4ESS* switch to the adjunct; the call is hairpinned through the adjunct until the caller disconnects or until the application logic in the adjunct clears the call.

F. Mode Determination

3.19 A Q.931 message is sent from the *4ESS* switch to the adjunct. When it is determined that adjunct access is required for an incoming call, a Q.931 SETUP message is sent from the *4ESS* switch to the adjunct. The adjunct accesses the customer record through the information contained in the SETUP message, and it locates either the customer ANI (if adjunct is at the originating switch) or the customer destination number (if adjunct is at the terminating switch). If the adjunct serves more than one application, the adjunct determines which application is needed based on the data sent in the SETUP message. While processing this message, the adjunct has the logic, based on customer-specific application data in the adjunct, to determine whether the interactive and/or monitor mode might be needed for the call.

3.20 If the adjunct determines that no additional modes other than the query mode are needed for the call, the adjunct returns the results of the query to the *4ESS* switch, and the switch and adjunct interaction are completed for the call.

3.21 If the adjunct determines that the interactive mode and possibly the monitor mode are required for the call, the adjunct establishes an interactive mode with the switch and stays in the interactive mode until one of the following occurs:

(a) The adjunct determines, based on its processing of data (DTMF digits) entered by the customer and customer-specific application data residing in the adjunct, that no further switch/adjunct interaction is needed. When this occurs, the adjunct returns control of the call to the *4ESS* switch and returns necessary data, which may include a redirection number, from the adjunct to the *4ESS* switch. The switch then sets up the call to the redirection number or the called number.

(b) The adjunct determines, based on its processing of data (DTMF digits) entered by the customer and customer-specific application data residing in the adjunct, that monitor mode is required for the call. At this point, the monitor mode is established. For calls requiring both interactive and monitor mode, monitor mode is not initiated by the adjunct until a point in the call where the monitor is needed; until that point, the interactive mode exists.

(c) The calling party disconnects.

(d) The adjunct determines that the call should be disconnected and initiates clearing of the call.

3.22 If, in processing the initial SETUP message, the adjunct determines that, based on customer-specific application data residing in the adjunct, monitor mode is needed immediately for the call, the monitor mode is initiated. Once the monitor mode is initiated, it exists until the calling party disconnects or the application logic in the adjunct clears the call.

3.23 While in the interactive mode, any features requiring interactive mode and/or query mode are processed. While in the monitor mode, caller interaction permits features requiring monitor, interactive, and/or query modes to be processed. Since the number of voice paths established between the *4ESS* switch and the adjunct is limited, the scheme for mode determination is devised to obtain the least resource-intensive mode.

3.24 The *4ESS* switch does not have knowledge of which mode will be used for a call.

G. Call Flow Narrative

3.25 Because the architecture of the adjunct is designed to support a number of different applications with different functional requirements, the call flow is described in general terms as follows:

(1) An incoming call arrives at the *4ESS* switch (either originating or terminating switch).

(2) The Adjunct Use Determination function determines if an adjunct is required on a call and, if it is, supplies the Adjunct Logical Address (ALA) associated with the adjunct.

(3) The *4ESS* switch sends a Q.931 SETUP message over the ISDN PRI to the adjunct to determine which mode to use between the switch and the adjunct.

(4) The call is processed by the adjunct as directed by service logic within the adjunct. The adjunct uses the information supplied in the initial SETUP message to process the call.

(5) For calls that require caller interaction or services obtained with spontaneously entered DTMF codes, the monitor mode is used.

(6) Ultimately, the adjunct requests the *4ESS* switch to either terminate the call or route the call to its destination. The adjunct uses Q.931 signaling messages and parameters to issue instructions to the switch.

(7) Any downstream *4ESS* switches or other network elements treat the call in a normal manner.

System Integrity

Audits

3.26 An indicator is set or reset to indicate to the audit system whether or not the call register (CR) is being held for the adjunct. Audit 75 has been modified to check this indicator in order to validate the adjunct occupancy count. Whenever the count is found to be incorrect, the release count is corrected. The Audit 75 modification includes a job flag to indicate when the adjunct occupancy count should be audited (1418 in the interactive mode). A new audit implicator index reports inconsistencies in the count.

Trunk Maintenance

Final Handling Codes

3.27 Recent Change Form 652, field AFHT, specifies the announcement to be played in the event that the adjunct cannot be accessed. New final handling codes exist for both the originating and terminating adjunct. B1 refers to the B-channel connection

originating at the *4ESS* switch and terminating at the adjunct, while B2 refers to the B-channel connection originating at the adjunct and terminating at the *4ESS* switch. A new dump code that outputs the adjunct logical address is used for all new failures that occur when an adjunct logical address is in the CR. The new codes are as follows:

- Network Management (NM) reroute received on an adjunct trunk
- Originating PCP failures
- Terminating PCP failures
- Fail when there is no originating or terminating controller
- Terminating redirection number with nonrouting call type
- CPA no circuit
- CPA facility information element on a non-CPA trunk
- Thirty-four codes to alarm T303 and TADJ time-outs for R1. Seventeen additional codes will be added to alarm T303 in R2.
- Adjunct found, but application is not PCP.

3.28 Final handling code numbers and failure summaries are listed in Table 6-A. The handling of these failures is covered in the generic 4E17 version of the AT&T 234-010-315, *Domestic Call-Irregularity Maintenance Reference Handbook 4ESS™ Switch.*

Table 6-A. Final Handling Code Failures

FH Code	Failure
138	CPA destination number was found in destination number trigger table, but an invalid application type was encountered.
140	CPA trunk hunt failed to find an Outgoing Trunk (OGT) to the adjunct.
141	NM returned reroute on to/from hierarchical Trunk SubGroup (TSG) controls. Reroute is not applicable to adjunct trunks.
142	Terminating Toll Switch Index (TTSI) Timed Release Disconnect (TRD) encountered in a CPA Routing Data Block (RDB).
332	Received invalid data in a Q.931 SETUP message from a CPA related to the B1 trunk (*4ESS* switch OGT to CPA).
670	The codeset 6 facility information element (IE) in SETUP message has an improperly formatted or invalid request.
800	Had translation failure for CPA terminating routing number.
997	Integrated Services Digital Network User Part (ISUP) Incoming Trunk (ICT) timed out while waiting for Customer Originated Trace (COT).
1001	COT failed on an ISUP ICT that was waiting for COT.
1035	Time-out occurred while waiting for a message after a CALL PRECEDING message was received on a CPA B1 OGT trunk.
1037	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with no adjunct logical address for both first and second time-out.
1038	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 15 for both first and second time-out.
1039	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 14 for both first and second time-out.

Table 6-A. Final Handling Code Failures (Contd)

FH Code	Failure
1048	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 13 for both first and second time-out.
1049	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 12 for both first and second time-out.
1050	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 10 for both first and second time-out.
1051	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 11 for both first and second time-out.
1063	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 9 for both first and second time-out.
1064	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 8 for both first and second time-out.
1065	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 7 for both first and second time-out.
1066	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 6 for both first and second time-out.
1067	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 5 for both first and second time-out.
1068	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 4 for both first and second time-out.
1069	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 3 for both first and second time-out.

Table 6-A. Final Handling Code Failures (Contd)

FH Code	Failure
1073	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 2 for both first and second time-out.
1074	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 1 for both first and second time-out.
1075	Time-out occurred after sending a SETUP message on a CPA Q.931 OGT with adjunct logical address 0 for both first and second time-out.
1076	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with no adjunct logical address (ALA).
1077	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 15.
1078	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 14.
1079	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 13.
1080	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 12.
1081	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 11.
1082	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 10.
1083	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 9.

Table 6-A. Final Handling Code Failures (Contd)

FH Code	Failure
1084	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 8.
1085	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 7.
1086	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 6.
1087	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 5.
1088	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 4.
1089	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 3.
1090	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 2.
1091	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 1 (ALA1).
1092	Time-out occurred after waiting for a message after a PROGRESS message was received on a CPA Q.931 OGT (B1) with adjunct logical address 0 (ALA0).
1104	Received a DISCONNECT or a RELEASE COMPLETE message with an improperly formatted codeset 6 facility IE with operation value = BILL on a Q.931 OGT (CPA) B1 while busy to a Call Register (CR).
1105	Received a DISCONNECT or a RELEASE COMPLETE message with an improperly formatted codeset 6 facility IE with operation value = REDIRECT on a Q.931 OGT (CPA) B1 while busy to a CR.

Table 6-A. Final Handling Code Failures (Contd)

FH Code	Failure
1725	The final attempt to communicate with the adjunct failed. The CPA data table said to final handle the call.
1725	INVALID CLEARING message received on a Q.931 OGT (CPA B1) while busy to a CR.
1726	An invalid controller was encountered when a DISCONNECT or RELEASE COMPLETE message was received from the CPA B1 trunk.
1727	A logical address from the adjunct billing number trigger table was found but an invalid application type was encountered.

Recording

3.29 The *4ESS* switch creates records for calls that access the CPA. For query and interactive mode calls, recording is activated in the switch through the existing recording screening process based on the incoming trunk characteristics and incoming signaling information. Recording for the B1 and B2 legs in the monitor mode occurs as follows:

(a) For the B1 leg, only an Access Charge Verification (ACV) record is recorded, and only if ACV is triggered by the B1 incoming trunk characteristics. The ACV record covers the entire period that the B1 incoming trunk is active for the call.

(b) For the B2 leg, recording is triggered by the presence of a billing number in the Q.931 SETUP message sent from the CPA to the *4ESS* switch. A B2 record is produced for each B2 call segment in a series of sequence calls from the same B1 trunk.

A. *4ESS* Switch Recording Modifications

3.30 When the *4ESS* switch initiates a call to the adjunct on the B1 trunk, the call is in the query mode by default. In the query mode, there is a signaling path, but no voice path between the *4ESS* switch and the adjunct. The call may subsequently enter the interactive mode (when a voice path is established on the B1 trunk) and monitor mode (when a second, independent signaling and voice path is established on the B2 trunk).

3.31 If the adjunct interaction for a call ends in the query mode or interactive mode with the call being redirected, the call will (or will not) be recorded in the normal manner determined by the incoming trunk characteristics and the service type associated with the new (redirecting) number. This includes (ACV) recording. Billing data provided by the adjunct in the Q.931 Generic Billing Data or Service Billing Data parameters is included in the call record where applicable.

3.32 If the call enters the monitor mode, all recording associated with the B1 incoming trunk is suppressed, with the exception of ACV recording (if it is turned on) for the incoming trunk. New AMA Structure Codes 01093 and 01094 have defined these ACV records (normal and long duration, respectively). These structures contain a new field (AMA Table 802) for the ALA. The normal billing record for the call is generated for the B2 leg, according to the original (B1) incoming trunk characteristics and the service associated with the B2 leg.

3.33 If a call which is eligible for adjunct treatment fails to receive adjunct treatment because of the following, the switch will attempt to route the call normally.

- The adjunct did not respond to the setup within a specified time.
- The adjunct is out of service.
- There are no available circuits to the adjunct.
- The adjunct indicates that no customer record is found for the received ANI, billing number, or destination number.

The AMA record for this call will contain a new value in AMA Table 8 (Study Indicator) indicating that the call was eligible for, but did not receive adjunct treatment. The new values are "7" (answered call) and "8" (unanswered call).

B. AMA Data Provided to the *4ESS* Switch

3.34 When the adjunct originates a call (on the B2 trunk) to the *4ESS* switch, an "access type" indicator and a "service type" indicator are passed in the Q.931 SETUP message sent to the switch. The switch uses these indicators to determine the service and appropriate AMA record structure for the incoming B2 call.

3.35 The following types of data can be received in a generic billing data information element from the CPA:

- Sequence call number (first/subsequent)
- Charge flag
- Call code
- Service indicator code (SIC)
- Alternate billing number
- Call progress stopped
- Study indicator
- Transport tariff/usage sensitive features indicator (TT/USFI)
- Customer ID

- Service option flags
- Downstream destination
- Billing option flags.

3.36 In general, a data item received from the CPA is included in the AMA record only if the AMA structure which is used to record the call contains the AMA table which records that item. The AMA structure used to record the call is determined by the switch according to the call's service type. If the call is processed by an INWATS or Direct Services Dialing (DSD) Network Control Point (NCP) database as well as by the CPA, and the switch receives the same type of data from the NCP and the CPA, the most recent data value is recorded in the AMA record. The older data is discarded.

3.37 The service option flags data item contains the following flags which will be used by the *4ESS* switch to determine an appropriate customer-specific recording treatment, which may include appending modules to the call record:

- FAST (Store and teleprocess in the "fast" stream)
- CDR (Append call detail recording data)
- CDI (Append call disposition information)
- RRI (Append record routing information).

Two other service option flags are currently defined:

- IPR (In progress recording)
- EGR (egress data recording).

They will be recorded (if the service option flags are recorded), but they do not trigger any customer-specific recording action in the switch.

3.38 In addition, the *4ESS* switch may receive the following from the adjunct:

- Complete formatted Extended Bellcore AMA Format (EBAF) modules
- Complete formatted AMA records.

3.39 The switch appends the modules (four maximum) to its own AMA record for the adjunct-based call. The module codes associated with modules provided by the adjunct are restricted to a range of 950 through 990. These modules will generally be last in the set of modules appended to the record (except for the *4ESS* switch-generated routing module, Code 999).

3.40 The *4ESS* switch stores any complete formatted AMA record received from the adjunct (in a Q.931 REGISTER message) in the Interexchange Carrier (IC) file system and teleprocesses them to the host collector along with its own records. The hourly service count tracer record (revised Structure Code 09915) contains a new count of these records.

Network Management

3.41 Early detection methods are in place to prevent congestion and prevent adjunct related problems in the system. The early detection of such problems can, in many cases, prevent deterioration of the equipment and minimize the negative impact of network congestion. For each adjunct having a direct interface with a *4ESS* switch, the switch collects the following counts and/or information for each trunk subgroup (TSG) connecting the adjunct to the switch. These counts are available for all trunks selected for network management monitoring.

- TSG identification number
- Base traffic number (BTFN)
- A count indicating the total attempts (attempt peg count) for the TSG to the adjunct
- A count indicating the total overflow (unsuccessful attempts to seize a trunk at the *4ESS* switch side for getting to the adjunct) for the TSG to the adjunct
- Incoming (from the adjunct) seizures peg count
- Maintenance busy count
- Occupancy peg count
- Count of calls affected by automatic controls
- Count of calls affected by manual controls
- Calls rejected by the adjunct.

These counts are accumulated over 5-minute intervals. In addition to these counts, information is provided for the number of trunks in the TSG, the directionalization of the TSG (1-way or 2-way), and the audit information. This latter information for the adjunct TSGs is provided to Regional Network Management System (RNMS) and Network Management Operations System (NEMOS) in the same form and in the same manner that is provided for all message TSGs. NEMOS and RNMS have the option of designating the trunk cycle to obtain this data from the switch.

3.42 In addition, the switch collects and sends flag indicators when network management controls affect the traffic on the TSG to the adjunct. These indicators do the following:

- Indicate active selective trunk reservation control
- Indicate selective dynamic overload control
- Indicate active manual TSG cancel control
- Indicate active manual TSG skip control.

These indicators are shown, if applicable, per TSG (to the adjunct) every 5 minutes and are sent to RNMS and NEMOS when the TSG has been scheduled for network management monitoring. The indicators existed previously and are mentioned here for background information. The TSG trapping mechanism available for the *4ESS* switch TSGs also applies to any TSG connecting the adjunct to the switch.

3.43 With R2, a count of final SETUP message time-outs (T303) per adjunct are pegged by TMAD0002. These counts are provided every 5 minutes to NEMOS.

3.44 The switch supports all network management restrictive TSG controls for the TSG connecting the switch to the adjunct. Expansive reroute controls are not supported on the assumption that a call will be routed automatically and sequentially to all adjuncts and associated TSGs that contain the same information. That is, there are no more adjuncts available with the needed information than those in the routing structure.

4. Provisioning

Data Administration

4.01 The access to the CPA is turned on with Recent Change Form 652. This new form is used to change the common data for a specific adjunct. See Figure 6-3. In this form, either ON or OFF is entered in field AI for turning the feature on or off. In field ALA, the adjunct logical address is entered. The ATYP field is used for the application type which is PCP. The AFHT field specifies the announcement to be played for Adjunct Final Handling Treatment when the adjunct cannot be accessed. Destination separation entries are put in the DESEP field. Order number entries and routing data block index entries are put in the ORNU and RDBI fields, respectively.

```
# Form 652      CHANGE ADJUNCT COMMON DATA
  4E17>

RC:CPA;CHG;OPT(DATA)'___:                                ALA ____'

ORNU ____'

ATYP _____'     AI    '   AFHT____'    RDBI ____'    DESEP____'

REMARKS _____________________________________________________|
```

Figure 6-3. Recent Change Form 652

4.02 A new CPA table contains common application data on a per-CPA basis. The table is indexed by the adjunct logical address times the entry size and contains a 4-bit item that specifies the application type. In generic 4E17, the only application available is Positive Call Processing. A 1-bit indicator is defined per adjunct logical address as an on/off switch. A final handling treatment is defined to specify the announcement to be played when the adjunct cannot be accessed. A routing data block index (RDBI) is specified that contains one or more trunk subgroups connecting the *4ESS* switch to the adjunct. A destination separations class (DESEP) is specified per adjunct, and this portion of the CPA is recent changeable. A numbering plan type (NPT) is associated with each direct-connect trunk subgroup billing number to specify whether the number is an action point number (APN) or North American Numbering Plan (NANP). For single-trunk customers, the indicators are stored in customer block.

4.03 In discussing the different types of provisioning support needed in the CPA, it is assumed that the service application has already been coded, tested, and installed in the proper adjunct before the provisioning process begins. The standard provisioning process for an external interface requires AT&T personnel to perform pre-

service functions. These functions include gathering customer information, designing the service, establishing account (billing) records, scheduling due dates, tracking service orders, entering specific customer data into the support system, downloading it to the appropriate adjuncts, and verifying that the service works as specified. The customer is notified upon completion.

4.04 Service provisioning concerns both provisioning of specific customer record data and data that is common to all users of the adjunct. An application determination table in the adjunct determines which "service logic program" should be used to process a specific call. The adjunct accepts table or customer record update (add, modify, remove) queries and reloads from a support system in batch and real-time modes.

4.05 The capability to provision an ISDN D-channel backup requires that the D-channel exist in the adjunct. D-channel backup is an application specific option and is not required for every D-channel provisioned. The backup D-channel is presented to the adjunct on a Digital Signaling 1 (DS1) circuit separate from the DS1 circuit conveying the primary D-channel. Just as each D-channel at any instance can be in an in-service or an out-of-service state, each backup D-channel can be in service or out of service.

4.06 An adjunct access trigger table at the originating AT&T switch indicates, for a specific ANI, the type of service, the type of access, the numbering plan, and whether an adjunct needs to be accessed. During the generic 4E17 time frame, the only application using the adjunct is the PCP family of features. The originating access trigger table, which contains a list of subscribed customers, is a new 2-level structure consisting of a 256-word head table with subtranslators allocated as needed. The size of each subtranslator can be up to 1023 entries, for example, a maximum of 1023 NPAXXX per line number. Recent change forms populate the data in this table. Originating and terminating tables combined can have no more than 15 unique NPAs and/or 15 Service Support Systems per switch. The feature is proprietary and is controlled by the allocation of memory in AT&T offices only.

4.07 Recent Change Form 650, available with generic 4E17, is used to add, change, or delete access trigger table information located on an adjunct. The customer ANI, type of access, type of service, and numbering plan fields uniquely identify an adjunct access customer. The fields must be entered to add, change, and delete action. See Figure 6-4. In this form, the meaning of each entry is as follows:

ACTION	Action entries A, C, or D
ALA	Adjunct Logical Address
CANI	Customer ANI (256K table limit)
NUMPL	Numbering Plan
ORNU	Order Number Entries
TOA	Type of Access
TRI	Transition Indicator
TSVC	Type of Service

```
# Form 650      CHANGE COMMON PLATFORM ADJUNCT ACCESS TRIGGER TABLE
  4E17>


RC:CPA;CHG;OPT(ORIG)'___:   CANI_________'  TOA___'  TSVC____' NUMPL____'

ORNU ________'     ACTION__'


ALA ______'      TRI __'


REMARKS  ____________________________________________________________!
```

Figure 6-4. Recent Change Form 650

4.08 An adjunct access trigger table at the terminating switch indicates whether an adjunct needs to be accessed for a destination number. One word contains a subtranslator address that points to the start address of 20 contiguous translators. All AT&T offices have a subtranslator address assigned to this word by the Office Data Assembler (ODA). The Local Exchange Carrier (LEC) offices do not have a subtranslator assigned by the ODA, and one cannot be assigned by recent change. This destination trigger table is a new 2-level structure consisting of a 256-word head table with subtranslators allocated as needed. The size of each subtranslator can be up to 1023 entries, for example, a maximum of 1023 NPAXXX per line number.

4.09 Recent Change Form 651, available with generic 4E17, is used to add, change, or delete destination table information located on an adjunct. The 10-digit destination number and numbering plan uniquely identify an adjunct access customer with terminating services. The fields must be entered for the add, change, and delete action. See Figure 6-5. In this form, the meaning of each entry is as follows:

ACTION	Action entries A, C, or D
ALA	Adjunct Logical Address
DNUM	Destination Number
NUMPL	Numbering Plan
ORNU	Order Number Entries

```
# Form 651     CHANGE COMMON PLATFORM ADJUNCT DESTINATION TABLE
  4E17>


RC:CPA;CHG;OPT(DEST)'___:                DNUM__________'      NUMPL____'

ORNU _______'    ACTION__'


ALA _____'


REMARKS  ____________________________________________________________!
```

Figure 6-5. Recent Change Form 651

4.10 In Recent Change Forms 300 through 303, the dialed number AD1 equals EGRS with RDB or MRT call type. See Figure 6-6.

```
# Form 300      CHANGE 3 DIGIT TRANSLATION
  4E16/4E17>

RC:CODEGRP;CHG;OPT(DIG3),___:                    DNUM____'  NTD 3,   ACL____'
ORNU _______'

      CALLTYP    CALLDATA _____'  AD1      AD2     SC     CHI     DESEP        DNST
                                           ADC

 OLD  ___'   _________________'   ___'    ____'  ____'  ____'   ____'        ___'
```

Figure 6-6. Recent Change Form 300

4.11 A new 3-bit indicator in the trunk block for Q.931 identifies the type of PRI with the following:

- Non-Q.931
- Normal PBX TSG
- TSG to the adjunct
- Other.

4.12 A 1-bit indicator has been added to the routing data block and multiple routing treatment call types as an egress indicator. This item can be set by ODA and recent change code group form input for routing data blocks containing any trunk subgroup exiting the AT&T network.

4.13 An adjunct based capabilities (ABC) digits table in an existing translator has been reduced, and a new item has been added for national plan area numbers. The items in the translator are used for handling North American Plan entries and National Plan Area splits.

5. Maintenance Information

Service Maintenance

5.01 Service maintenance handles the end-to-end maintenance perspective and also the maintenance of equipment not handled in the traditional manner. Typical service maintenance functions for the adjunct involve the following:

- Accumulating various call processing measurements
- Measuring various call redirection attempts
- Measuring several types of merge denials and merge time-outs
- Performing audits of provisioned data, especially ANI screening tables and customer records
- Supporting on-demand enable/disable of entries in adjunct trigger table
- Providing mechanism to ensure correctness and sound quality of announcements
- Providing mechanism to ensure adjunct's ability to collect and recognize DTMF digits
- Providing mechanism to ensure adjunct's bridging function is operating correctly.

Test Calls

5.02 A test call strategy involves both the adjunct and the *4ESS* switch working in concert. In addition, the Generic Service Management System could be involved. Test calls are considered extremely important to support efficient service maintenance for the ABC architecture. The test call feature has two components as follows:

(a) A simulated end-to-end test call

(b) An enhanced verify test to check the basic function of the *4ESS* switch trigger tables.

Test call information is covered separately in this document as Feature 231.

6. Transition Considerations

Dependencies on Other Network Components

6.01 Requirements for other network components are as follows:

(a) The *4ESS* switch interfacing with an adjunct must install the new load (generic 4E17).

(b) To ensure that the PCP features move smoothly from generic 4E16 to 4E17, the *4ESS* switch continues to support generic 4E16 PCP features and maintains generic 4E16 data structures for the transition period.

Turn On/Off Mechanism

6.02 The following indicates how the system components are made active:

(a) The 4ESS switch interfacing with the adjunct must install the new load (generic 4E17).

(b) A recent change bit in RC Form 652 (Field AI) must be set for customer subscription to the CPA.

(c) Recent change capabilities are provided for operating support systems to enter translation information into an adjunct to add, delete, or change the B-channel and D-channel circuit information.

(d) Recent change capabilities are provided for "adjunct unavailable treatment" for each logical address.

(e) Recent change capabilities are provided by Recent Change Form 650 for entering access trigger table information for an originating AT&T switch.

(f) Recent change capabilities are provided for entering customer access data in the access trigger table.

(g) Recent change capabilities are provided by Recent Change Form 652 for entering destination separations class (DESEP) information per adjunct.

(h) Recent change capabilities are provided for entering an egress indicator in the routing data block and multiple routing treatment call types for routing data blocks containing any trunk subgroup exiting the AT&T network.

7. Input/Output Manual Pages

7.01 The input and output manual pages listed below are attached.They have been created to support this feature.

Input	**VER:CPA-C-OR**
Input	**VER:CPA-DATA**
Input	**VER:CPA-DNUM**
Output	**VER:CPA-DATA**
Output	**VER:CPA-DNUM**
Output	**VER:CPA-ORIG**

ID . . . . . VER:CPA-C-OR
WORK CENTER . . MOC,MAC
GENERIC . . . . . 4E17 and later
CLASS . . . . . VER
APPLICATION . . 4E
TYPE . . . . . Input

1. PURPOSE

Request information on the customer automatic numbering identifcations (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**!

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.

d — Numbering plan:

APN — Action point numbering.
NANP — North American numbering plan.

ORIGLIST — Origination list.

4. SYSTEM RESPONSE

PF — Printout follows.

NA — Not accepted.

5. REFERENCES

PIDENTs
IOCPIMC4
VRFYCNTL
VRFYINPT
VRFYOUT
VRFYPCP

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

Output Message
VER:CPA-ORIG

ID . . . . . VER:CPA-DATA
WORK CENTER . . MOC,MAC
GENERIC . . . . . 4E17 and later
CLASS . . . . . VER
APPLICATION . . 4E
TYPE . . . . . Input

1. PURPOSE

Request adjunct common data.

2. FORMAT

VER:CPA:DATA!

3. EXPLANATION OF MESSAGE

DATA	For adjunct common data.

4. SYSTEM RESPONSE

NA	Not accepted.
PF	Printout follows.

5. REFERENCES

PIDENTs
- VRFYINPT
- VRFYCNTL
- VRFYPCP
- IOCPIMC4

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

Output Message
- VER:CPA-DATA

ID . . . . . VER:CPA-DNUM
WORK CENTER . . MOC,MAC
GENERIC . . . . . 4E17 and later
CLASS . . . . . VER
APPLICATION . . 4E
TYPE . . . . . Input

1. PURPOSE

Request information on the destination numbers (DNUMs) contained in the CPA database.

2. FORMAT

This message has two formats,

[1] **VER:CPA:DNUM** a [,**NUMPL** b][,**RDB**]!

[2] **VER:CPA:DESTLIST!**

3. EXPLANATION OF MESSAGE

a	Destination number (3,6, or 9 digits).	
b	Numbering plan:	
	APN	Action point numbering.
	NUMPL	North American numbering plan.
RDB	Routing data block.	
DESTLIST	For all DNUMs.	

4. SYSTEM RESPONSE

NA	Not accepted.
PF	Printout follows.

5. REFERENCES

PIDENTs
- VRFYINPT
- VRFYCNTL
- VRFYPCP
- IOCPIMC4

Translation Guide, 4ESS™, TG-4 Division 8, Section 6ay

Output Message
- VER:CPA-DNUM

ID . . . . . VER:CPA-DATA
WORK CENTER. . MOC,MAC
GENERIC . . . . . 4E17 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
VER:CPA:

ALA    ATYP     AI    AFHT     RDBI    DESEP

aa,    bbbb,  ccc,    ddd,    eeee,     fff,
     .
     .
```

2. REASON FOR OUTPUT

To display the information of adjunct common data.

3. VARIABLE FIELD DEFINITIONS

a	Adjunct logical address (0 to 15).
b	Application type: PCP
c	Adjunct indicator: ON OFF
d	Adjunct final handling treatment. Any of the following: AR,BT,D00,DNN,E01-E20,EAI-EA7,HW,I01-I30,IFF,INC, INF,ISB,IVC,LDV,LOB,LSA,MCA,NCA,NCB,NCC,NCD,NWC, NWN,OOA,OOB,OTS,R01-R10,ROA,SNA,SO1-S19,SP1,SP2, STO,T,TDN,UNN,VCA,VMA,WAT.
e	Routing data block index (1 to 8191).
f	Destination separation (1 to 127).

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs
- IOCPIMC4
- IOCPMCP4
- IOCPPVR4
- VRFYCNTL

VRFYINPT
VRFYOUT
VRFYPCP

Translation Guide, 4ESS™, Division 8, section 6az.

Input Message
VER:CPA-DATA

ID . . . . . VER:CPA-DNUM
WORK CENTER . . MOC,MAC
GENERIC . . . . . 4E17 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
VER:CPA:

   DNUM       NUMPL    ALA

aaaaaaaaaa,   bbbb,    cc,
     .
     .
```

2. REASON FOR OUTPUT

To display information on the destination numbers (DNUMs) contained in the common platform adjunct (CPA) database.

3. VARIABLE FIELD DEFINITIONS

a	Destination number. (10 digits.)
b	Numbering plan:
	APN — Action point numbering.
	NANP — North American numbering plan.
c	Adjunct logical address. (Range 0 to 15.)

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs
- IOCPIMC4
- IOCPMCP4
- IOCPPVR4
- VRFYCNTL
- VRFYINPT
- VRFYOUT
- VRFYPCP

Input Message
- VER:CPA-DNUM

ID . . . . . VER:CPA-ORIG
WORK CENTER . . MOC,MAC
GENERIC . . . . . 4E17 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
VER:CPA:

   CANI       TOA    TSVC    NUMPL   ALA   TRI

aaaaaaaaaa,   bb,    cccc,   dddd,   ee,   fff,
    .
    .
```

2. REASON FOR OUTPUT

To display information on the customer destination numbers (DNUMs) 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) or Megacom.

d — Numbering plan:

- APN — Action point numbering.
- NANP — North American numbering plan.

e — Adjunct logical address (0 to 15).

f — Translation indicator:

- NEW —
- OLD —

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs
IOCPIMC4

IOCPMCP4
IOCPPVR4
VRFYCNTL
VRFYINPT
VRFYOUT
VRFYPCP

Translation Guide, 4ESS™, Division 8, section 6ax.

Input Message

```
VER:CPA-C-OR
```

Network Management Enhancement for Adjunct-Based Capabilities Feature (207a)

7

Contents Page

Network Management Enhancement for Adjunct-Based Capabilities Feature (207a)

7

1. Feature Description

1.01 This feature is an enhancement to *4ESS*™ Switch Access to Common Platform Adjunct (Feature 207) which is also contained in this document. This feature adds new Final Handling Codes (FHCs) and network management measurements that relate to time-outs that occur when the *4ESS* switch is waiting for a response to a SETUP message on a Common Platform Adjunct (CPA) Q.931 B1 Outgoing Trunk (OGT). These enhancements will allow network managers to distinguish initial time-outs from final time-outs.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management

Network Management Support System Interfaces

A. Network Management Operations System (NEMOS)

5.01 The following new information will be sent to NEMOS:

- A 5-minute count indicating the number of final SETUP message time-outs per Trunk Subgroup (TSG). This count will be included in NEMOS Message 3.
- A 30-second discrete indicating that the Call Information Held Threshold has been exceeded. This count will be included in NEMOS Message Type 1.
- A 5-minute count indicating the number of calls denied access to the adjunct because the Call Information Held Threshold was exceeded. This count will be included in NEMOS Message Type 8.

B. Regional Network Management System (RNMS)

5.02 The following new information will be sent to RNMS:

- A 5-minute count indicating the number of final SETUP message time-outs per TSG. This count will be included in Data Block 57.

6. Maintenance/Troubleshooting

Final Handling Codes

6.01 There are seventeen new FHCs associated with this feature. These codes are listed in Table 7-A.

6.02 Prior to the implementation this feature, there were 17 FHCs that were related to time-outs that occurred while the switch was waiting for a response to a SETUP message on CPA Q.931 B1 OGTs. The original FHCs were used for first and second (final) CPA trunk hunts.

6.03 This feature adds 17 new FHCs for time-outs that occur on CPA Q.931 B1 OGTs. The original 17 FHCs will be used for time-outs that occur on a first trunk hunt. The new FHCs will be used for time-outs that occur during the second trunk hunt.

6.04 These additional FHCs allow network managers to distinguish initial time-outs from final time-outs.

Table 7-A. Final Handling Codes

Code	Trunk Type	Adjunct Logical Address	Description
600	CPA Q.931 B1 OGT	None	Second time-out while waiting for a response to the SETUP message
601	CPA Q.931 B1 OGT	0	Second time-out while waiting for a response to the SETUP message
602	CPA Q.931 B1 OGT	1	Second time-out while waiting for a response to the SETUP message
603	CPA Q.931 B1 OGT	2	Second time-out while waiting for a response to the SETUP message
604	CPA Q.931 B1 OGT	3	Second time-out while waiting for a response to the SETUP message
605	CPA Q.931 B1 OGT	4	Second time-out while waiting for a response to the SETUP message
606	CPA Q.931 B1 OGT	5	Second time-out while waiting for a response to the SETUP message
607	CPA Q.931 B1 OGT	6	Second time-out while waiting for a response to the SETUP message
608	CPA Q.931 B1 OGT	7	Second time-out while waiting for a response to the SETUP message
609	CPA Q.931 B1 OGT	8	Second time-out while waiting for a response to the SETUP message
610	CPA Q.931 B1 OGT	9	Second time-out while waiting for a response to the SETUP message
611	CPA Q.931 B1 OGT	10	Second time-out while waiting for a response to the SETUP message
612	CPA Q.931 B1 OGT	11	Second time-out while waiting for a response to the SETUP message
613	CPA Q.931 B1 OGT	12	Second time-out while waiting for a response to the SETUP message
614	CPA Q.931 B1 OGT	13	Second time-out while waiting for a response to the SETUP message
615	CPA Q.931 B1 OGT	14	Second time-out while waiting for a response to the SETUP message
616	CPA Q.931 B1 OGT	15	Second time-out while waiting for a response to the SETUP message

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on/off by 1A Recent Change. The **AI** field on Recent Change Form 652 (Figure 7-1) is used to turn on/turn off this feature.

```
# Form 652      CHANGE ADJUNCT COMMON DATA
  4E17>

RC:CPA;CHG;OPT(DATA)'___:                                  ALA ____'

ORNU ____'

ATYP _____'      AI  '    AFHT____'    RDBI ____'    DESEP____'

REMARKS _____________________________________________________!
```

Figure 7-1. Recent Change Form 652

8. Input/Output Manual Pages (Not Affected)

Trunk Subgroup Interest List for Regional Network Management System Feature (213)

8

Contents

Trunk Subgroup Interest List for Regional Network Management System Feature (213)

8

1. Feature Description

1.01 To improve the administration and operation of Trunk Subgroups (TSGs), network managers are provided with a new and more efficient method of collecting 5-minute traffic data. This new method involves a TSG Interest List that is built and stored in the Regional Network Management System (RNMS). The TSG Interest List allows network managers at the Network Management Center (NMC) to assign TSGs to the TSG Interest List via the *4ESS*™ switch RNMS interface. Traffic data is collected every 5 minutes only for those TSGs that have been identified on the Interest List.

1.02 For the collection of TSG data prior to establishing a TSG Interest List, network managers used the Network Management Display System (NMDS) TG20 page to assign Study Classes to TSGs in the *4ESS* switch. These Study Class assignments, with Adjunct Head Cells (AHCs) attached, provided the data collection for TSGs. The NMDS TG20 page activated the AHC Study Class assignments and stored them in the *4ESS* switch memory. The AHC Study Class assignment method of collecting 5-minute TSG data is error prone and time-consuming. Problems with Study Class assignments occur when the *4ESS* switch NMDS TG20 page is reinitialized manually and when Study Class changes are made to TSGs during a new *4ESS* switch generic load. However, the NMDS will continue to provide Study Classes 1 through 5 as a backup tool for network surveillance and control when an RNMS processor fails or when there is a loss of communication between the RNMS and the *4ESS* switch.

1.03 The TSG Interest List significantly reduces the time and cost associated with Study Class administration. Because the Interest List can be stored in the RNMS, there is no need to repeatedly rebuild the AHC Study Classes on the NMDS to

maintain data collection on the correct TSGs. TSG data can be collected using either Study Class assignments or the TSG Interest List. This data can be collected on 1023 TSGs per *4ESS* switch.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management

5.01 The user is provided with an RNMS display that is used to populate the TSG Interest List. The TSG Interest List, which can be modified as needed, is transmitted from the RNMS to the *4ESS* switch either automatically or manually. The TSG Interest List is transmitted to the switch automatically upon notification that the switch has experienced a Phase 2 or higher level interrupt. It may also be transmitted manually from the RNMS on command by the Network Service Center personnel.

5.02 The RNMS interface must support all messages that are associated with the TSG Interest List. The *4ESS* switch will provide an error message when the RNMS attempts to assign a TSG that is not in the *4ESS* switch database to the Interest List. A new control message, which allows the RNMS to add a maximum of 40 TSGs to the Interest List simultaneously, will be transmitted from the RNMS to the *4ESS* switch. This control message is also used to remove TSGs from the Interest List. A TSG must be removed from the RNMS Interest List before it is removed from the *4ESS* switch database. The TSGs that are assigned or removed from the Interest List are identified by a TSG Number (TSGN). A maximum of 40 TSGNs, including additions and deletions, are allowed in one control message.

5.03 A modification has been made to allow 5-minute TSG data and special AHC status and control data to be transmitted to the RNMS when the TSG is on the RNMS Interest List or the TSG is assigned to a Study Class. An Interest List bit indicates if the TSG is on the Interest List. This bit is transmitted to the RNMS in Data Blocks 47 and 48.

6. Maintenance/Troubleshooting

Audits

6.01 Audit 46, the Network Management Database Audit, has been modified to support this feature.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Call Merge for Adjunct Feature (230)

9

Contents Page

Contents

Call Merge for Adjunct Feature (230)

9

1. Feature Description

1.01 The Call Merge for Adjunct feature supports the core Call Merge capability. A Primary Rate Interface (PRI) connects the *4ESS*™ switch to an adjunct. A call is established via the PRI from the *4ESS* switch to the adjunct. Upon receiving the call, the adjunct establishes another call to the *4ESS* switch and connects the two calls, in effect creating a hairpin connection.

1.02 When this feature is invoked, the two hairpin calls are connected in the *4ESS* switch, resulting in one call as the trunks between the *4ESS* switch and the adjunct are released.

1.03 Previously, a call could remain in the hairpin state for the duration of the call, tying up adjunct and *4ESS* switch resources. Implementation of the Call Merge feature results in the two established call legs (trunks) to and from the adjunct being merged into one call in the *4ESS* switch. Then, the adjunct drops the original call legs. This releases the adjunct and reduces the number of *4ESS* switch/adjunct terminations used.

NOTE:
The Call Merge for Adjunct feature does not apply to calls that require the adjunct to be available for the duration of the call (for example, calls with the Sequence Calling option).

2. Call Flow

Call Flow Key Points

2.01 Table 9-A defines the acceptable Integrated Services Digital Network (ISDN) Address Complete Message (ACM) network call states before Call Merge is invoked. These states are commonly referred to as post-ACM states.

Table 9-A. Acceptable Call States

Combination	*4ESS*™ Switch to Adjunct		Adjunct to *4ESS* Switch	
	State	Description	State	Description
1	Call Received (N7)	Exists when the network receives an indication that the adjunct is alerting, but has not yet received an answer (for example, ALERTING or PROGRESS message received by the *4ESS* switch)	Call Delivered (N4)	Exists when the network indicates that remote user alerting has been initiated (for example, ALERTING or PROGRESS message sent to the adjunct)
2	Active (N10)	Exists when the network awards the call to the adjunct (for example, CONNECT ACKNOWLEDGE message sent to the adjunct)	Active (N10)	Exists when the network indicates that the remote adjunct has answered the call (for example, CONNECT message sent to the adjunct)

2.02 The Call Merge feature can be invoked only if the incoming and outgoing call states belong to the same combination (See Table 9-A.). For example, if the incoming call belongs to combination 1 and the terminating call belongs to combination 2, the Call Merge feature ***cannot*** be invoked.

2.03 The following information applies to Figure 9-1, Figure 9-2, and the narrative:

- The callouts (circled numbers) in Figure 9-1 are cross-referenced to the numbers in the narrative.
- B1 refers to the B-Channel connection originating at the *4ESS* switch and terminating at the adjunct.
- B2 refers to the B-Channel connection originating at the adjunct and terminating at the *4ESS* switch.

- The FACILITY message in which the request to merge is sent may refer to either B1 or B2.
- Call Reference Value (CRV) #1 and CRV #2 refer to the call reference values of call legs B1 and B2, respectively.

Call Flow Diagram

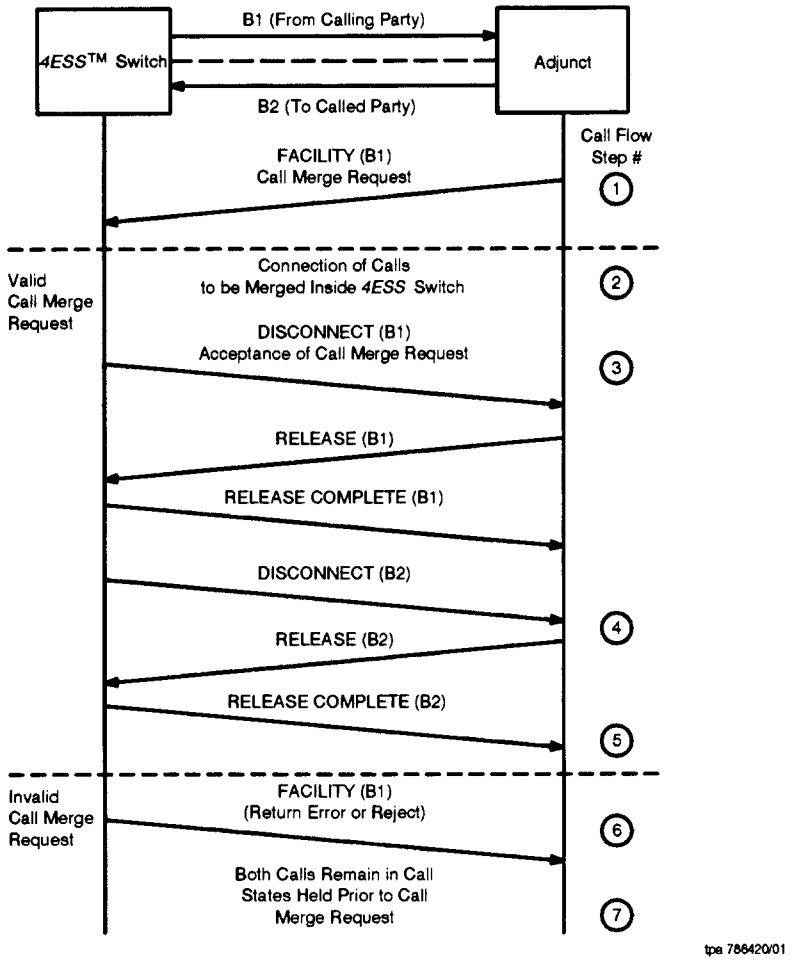


Figure 9-1. Example Call Merge Flow

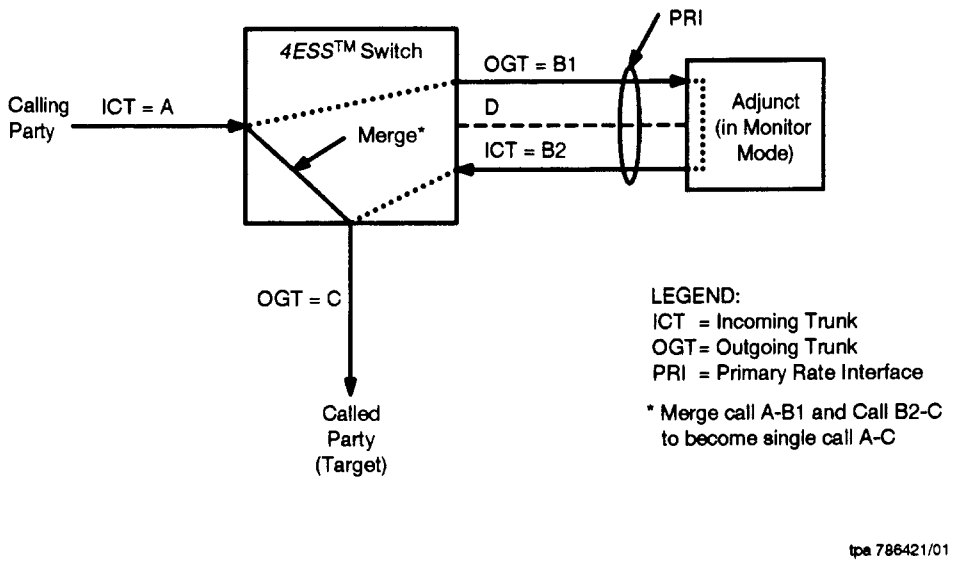


Figure 9-2. *4ESS*™ Switch Call Merge Operation

Call Flow Narrative

A. Call Merge

2.04 The following narrative outlines the call flow of the Call Merge feature:

(1) The adjunct passes a FACILITY message [includes a Call Merge request in a FACILITY Information Element (IE)], along with the channel Identification (ID) of the two calls to be merged, to the *4ESS* switch.

⇒ NOTE:
If the request to merge is valid (see Network Merge), the call proceeds to step 2. If the request is not valid, the call proceeds to step 6.

(2) The *4ESS* switch connects the two calls [B1 (CRV #1) and B2 (CRV #2)]. See Figure 9-2. Billing data is received as part of the Q.931 FACILITY message, and the *4ESS* switch updates the billing information, if necessary.

(3) The *4ESS* switch sends a Q.931 DISCONNECT message to the adjunct (B1) indicating that the Call Merge request has been accepted (conveyed in the FACILITY IE by the component type Return Result).

The adjunct and the *4ESS* switch complete the call-clearing sequence for B1. The adjunct replies with a RELEASE message and accepts a RELEASE COMPLETE message from the *4ESS* switch (clears call leg B1 to the adjunct).

(4) The *4ESS* switch also sends a Q.931 DISCONNECT message to the adjunct to release the call leg B2 from the adjunct.

The adjunct and the *4ESS* switch complete the call-clearing sequence for B2. The adjunct replies with a RELEASE message and accepts a RELEASE COMPLETE message from the *4ESS* switch (clears call leg B2 to the adjunct).

(5) The call continues as a normal call between the calling and called parties.

(6) If the request is not valid, the *4ESS* switch responds with a FACILITY message for call leg B1. The FACILITY message contains a FACILITY IE with a component type of either Return Error or Reject.

(7) After the request is denied or rejected, both calls remain in the call states held before the Call Merge request was received by the *4ESS* switch.

B. Network Merge

2.05 The *4ESS* switch validates the request to merge by verifying the following conditions:

- The interface is allowed to merge calls.
- The calls to be merged are in acceptable call states.
- The channel IDs are active.
- The request to merge is not a duplicate request.
- No other features are invoked in the FACILITY message.
- The Q.931 FACILITY message is complete and contains all the mandatory information.

3. Provisioning

Office Data Administration (ODA)

3.01 The Trunk Subgroup (TSG) bit indicates the subscription to merge. It is stored at **XL4TS_CMERGE** in the AT&T Communications Interface (ACI) translations area (Figure 9-3).

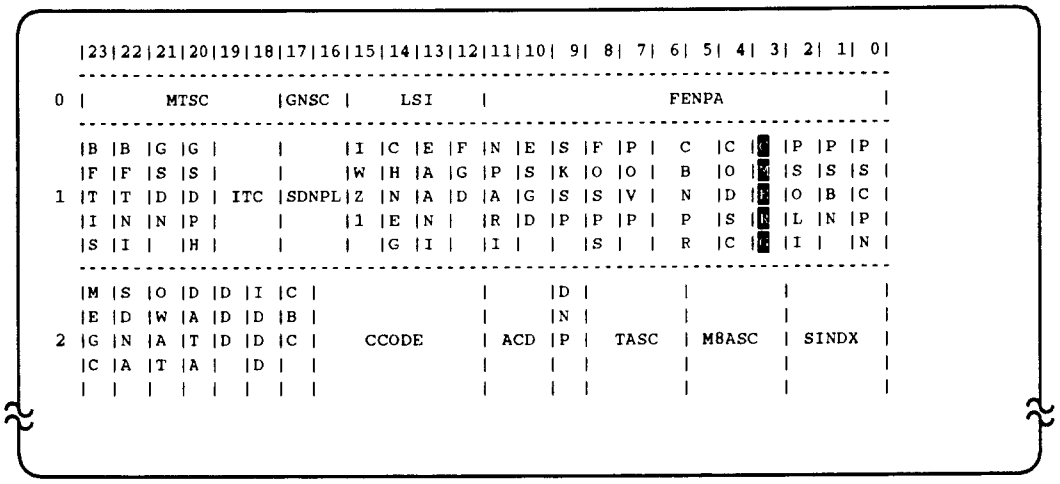


Figure 9-3. ACI Translations Area for Call Merge

Population and Retrofit Rules

3.02 For retrofit, **XL4TS_CMERGE** is set to **4XLTS_NCMER (0)**. In order for the adjunct to invoke Call Merge, the TSG item must be set to **Y**. If the field is left blank or set to **N**, the adjunct cannot invoke Call Merge. Table 9-B contains a description of the values.

Table 9-B. Call Merge Values

CMERGE Field	Compool Symbol	Value	Description
Blank	4XLTS_NCMERG	0	Not subscribed to Call Merge
N	4XLTS_NCMERG	0	Not subscribed to Call Merge
Y	4XLTS_CMERG	1	Subscribed to Call Merge

3.03 If Call Merge is set to **Y**, then the Incoming Signaling Characteristic (ISC) and/or Outgoing Signaling Characteristic (OSC) must be Q.931. Additionally, the ATT_ENH field on T2 must be **Y** (**OD4ATTOFC** = 4ODOPT_YES). If **OD4ATTOFC** = 4ODOPT and Call Merge = 0, then the output is blank. If ISC and/or OSC is not Q.931 and Call Merge = 0, the output is also blank.

Recent Change and Verify

3.04 To subscribe to the Call Merge feature, a 1A Processor recent change is performed using the forms listed in Table 9-C.

Table 9-C. Recent Change Forms

Recent Change Form	Use
100	Add new 2-way Trunk Subgroups (TSGs)
101	Add new 1-way incoming TSGs
102	Add new 1-way outgoing TSGs
106	Delete a TSG
107	Change the characteristics of existing 2-way TSGs
108	Change the characteristics of existing 1-way incoming TSGs
109	Change the characteristics of existing 1-way outgoing TSGs
200	Add trunks to a TSG
208	Change trunk characteristics

Forms Requirements

A. ODA

3.05 The new field CMERGE is being added to ODA Forms 401A, 401B (Figure 9-4), and 401C.

```
ESS 401B TG-4      ONE-WAY INCOMING TRUNK SUBGROUP CHARACTERISTICS
4E17                              4 ESS
                          4E17 AND LATER GENERIC PROGRAMS
                         ESS UNIT _____________________


                                  BTFN    TOWN     ST      BL      FBS     NBS
FORM CODE _1B_                TSG ____    ____    _____   _____   _____   _____
          1  2                      4  7    8 11    12 13   14 15   16 18   19 21


                                                                                CAD
FENCLASS _________,  FENID _____, TFG __, TSGBBC __, PCF _____, DPC _____,      __
22    29 30     35         37 42      50          60      65 68      70 78      80

APOC__ _________,                                                               __
22  25 30     38                                                                80

QTFN__ _______, TOT _____, SAT __, IT __, DOM _____,                            __
22  25 30  32      38  42      45     48      52 55                             80

FENPA _____, FEOFC _____, FELATA _____, FESC6 __, IWZ1 __, LSST _____,         __
22 26 30 32        34 36          38 40        42       44       46 47         80

_MEM_ __,  PSES __,   INSEP _____,   MTSC _____,  GNSC __, GEOSEP _____,       __
22 24 30        38          45 47         59 60        66         70 71        80

_ISC_ _______, RFA __,    ADIG __,   DOCTN _____, CCIS2WRE __, CBNPR _____,    __
22 24 30  36      38          45          52 53           59         62 64      80

_BN__ ________, BRL __, ITC __, GSDN __, GSDNPHSE __, EAS __, CMTYP __, NPARINH __, __
22 23 30    39      45      48      50           52      55        60
          72  80

WATSBN _________,                                                 PSUUI __,     __
22  27 30     39                                                      70        80

BNPT_ _____, CMERGE , SCFN __, OVLP __, PRIT _____,                             __
22 25 30 33         35       45       48       50  55                          80

_APS_ __,  PSATP __,    PBXESGD __, PBXAW __, FAR4E __,                         __
22 24 30        40             47       50        60                           80
```

Figure 9-4. ODA Form 401B

B. Recent Change

3.06 The new field CMERGE is being added to Recent Change Forms 100, 101 (Figure 9-5), 102, 107, 108, and 109. Valid entries are Blank, **Y**, or **N**.

```
# FORM 101              ADD A NEW ONE WAY INCOMING TRUNK SUBGROUP
  4E17

RC:TSG;NEW;OPT(IN1WAY),____:                          BTFN TOWN ST BL FBS NBS

ORNU _____,                                          TSG ____ ____ __ __ ___ ___,
PCF ____,   AOPC _________,                          DPC _________,

FENCLASS _____, FENID ____,              TFG _,      TSGBBC _,

QTFN ___,  TOT _____, SAT _,             DOM ____,          IT _,
FENPA ___, FEOFC ___, FELATA ___,        FESC6 _,   IWZ1 _, LSST __,
MEM _,     PSES _,    INSEP ___,         MTSC __,   GNSC _, GEOSEP __,

ISC _____, RFA _,     ADIG _,            DOCTN __,      CCIS2WRE _, CBNPR ___,

BN _________, BRL _,  ITC _,             GSDNPHSE _,  EAS _, CMTYP _, NPARINH _,
WATSBN _________,                                                    PSUUI _,
BNPT ____,  CMERGE ,  SCFN _,            OVLP _,        PRIT _____,
APS _,          PSATP _, PBXESGD _,      PBXAW _, FAR4E _,
MEGC _, SDNA _, OWAT _, DATA _, CBC _,   DDD _, IDDD _,     FOSPS _,
SDNPLAN ____, BFTIS ___, BFTNI ___,      SKSP _, PBXNWW _,

CAREA _,    CPOS _,   SINDEX __,

SPARE1 _, SPARE2 _, SPARE3 _, SPARE4_

REMARKS _____________________________________________________:
```

Figure 9-5. Recent Change Form 101

C. Verify

3.07 The new field CMERGE is being added to Verify Forms 1a, 1b (Figure 9-6), and 1c.

```
OUTPUT:                  VERIFY 1b


VER:TSG,OPT(INlWAY):                        BTFN     TOWN  ST  BL  FBS  NBS

                                          TSG ----     ----  --  --  ---  ---
PCF ----,   AOPC ----------,              DPC -----------------,

FENCLASS --------, FENID -----, TFG -, TSGBBC -,
QTFN ---,     TOT -----,  SAT -,        DOM ----,          IT -,
FENPA ---,    FEOFC ---,  FELATA ---,   FESC6 -,    IWZ1 -, LSST --,
MEM -,        PSES -,     INSEP ---,    MTSC --,    GNSC -, GEOSEP --,

ISC -------,  RFA -,      ADIG -,       DOCTN --,      CCIS2WRE -, CBNPR ---,

BN ---------,  BRL -, ITC -, GSDN -, GSDNPHSE -, EAS -, CMTYP - NPARINH -,
WATSBN ----------,                                                  PSUUI -,
BNPT ----,    CMERGE -, SCFN -,           OVLP -,       PRIT ------,
APS -,           PSATP -, PBXESGD -,      PBXAW -, FAR4E -,
MEGC -, SDNA -, OWAT -, DATA -, CBC -, DDD -, IDDD -,     FOSPS -,
SDNPLAN ----, BFTIS ---, BFTNI ---,      SKSP -  PBXNWW -,

CAREA -      CPOS -,     SINDEX --,

SPARE1 -,    SPARE2 -,   SPARE3 -,        SPARE4 -,
```

Figure 9-6. Verify Form 1b

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

Measurements

6.01 Table 9-D contains a list of new measurements affected by the Call Merge feature. The counts are accumulated in the database and may be requested on demand via the On-Site Operations Report (OSOR).

Table 9-D. Call Merge Measurements

Measurement	Description
PL4CLMRGRMC18	Number of call merge requests received by the *4ESS*™ switch
PL4CLMRGSMC18	Number of successful merge operations
PL4CLMRGDAJMC18	Number of call merge requests rejected because the adjunct is not subscribed to Call Merge (that is, the TSG bit CMERGE is set to **N**)
PL4CLMRGDCSMC18	Number of merge requests rejected because the calls were in invalid states
PL4CLMRGDMFMC18	Number of call merge requests rejected because the FACILITY message contained multiple feature invocations
PL4CLMRGDCIDMC18	Number of call merge requests rejected because the FACILITY message contained an invalid Channel ID
TF4CLMRGRLMC3	Number of call merge requests rejected because no system resources are available [no network paths are available or the Automatic Message Accounting (AMA) buffer is full]

Error Conditions

6.02 If the request to merge is invalid due to the error conditions listed in Table 9-E, the *4ESS* switch responds with a RETURN ERROR message.

Table 9-E. Summary of Error Conditions

Error Condition	Cause Number	Cause Name
The merge Trunk Scanner Number (TSN) is invalid	6	Channel Unacceptable
Other features/capabilities being invoked	31	Normal, Unspecified
Adjunct not allowed to merge calls	50	Requested Facility Not Subscribed
Calls to be merged not in acceptable states	98	Message Not Compatible With Call State

6.03 If the request to merge is invalid because it is poorly formatted or the *4ESS* switch is unable to comply, the *4ESS* switch responds with a REJECT message. The reasons for the REJECT message are listed in Tables 9-F, 9-G, and 9-H.

Table 9-F. Problem Tag Coding

Problem Type	Coding
General	10000000
Invoke	10000001

Table 9-G. General Problem Coding

Problem	Coding
Unrecognized Component	00000000

Table 9-H. Invoke Problem Coding

Problem	Coding
Duplication	00000000
Unrecognized Operation	00000001
Mistyped Argument	00000010
Resource Limitation	00000011
Unrecognized Link Identifier	00000101

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

4ESS™ Switch Input Message TEST:DSIG Parameter Addition Feature (354)

10

Contents Page

4ESS™ Switch Input Message TEST:DSIG Parameter Addition Feature (354)

10

1. Feature Description

1.01 This feature allows a Local Exchange Carrier (LEC) to test the Common Channel Signaling System 7 (CCS7) direct signaling network using the calling party's 10-digit number in the **TEST:DSIG** input message. Ten digits are required to request a complete Network Services 800 (NS800) test query. A partial NS800 test query can be requested using the Numbering Plan Area (NPA) portion (three digits) of the calling party's number. Before this feature was implemented, a LEC could only enter the 3-digit NPA in the **TEST:DSIG** input message, which limited testing. Now that the calling party's office code and line number can be entered, complete NS800 test queries can be performed.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages

8.01 The **TEST:DSIG** input and **TEST:DSIG;NS800** output manual pages that follow have been updated to support this feature.

ID . . . . . TEST:DSIG
WORK CENTER . . MAC, MOC, NMOC, TOC
GENERIC . . . . . 4E17 Rel. 2 and later
CLASS . . . . . ALL
APPLICATION . . 4E
TYPE . . . . . Input

1. PURPOSE

Requests a test of common channel interoffice signaling (CCIS) direct signaling network.

2. FORMAT

To request inward wide area telecommunications service (INWATS) test call:

[1] **TEST:DSIG;INWATS:DIG** a,**ORIGNPA** b [,**STPNET** c]!

To request direct signaling translation test:

[2] **TEST:DSIG;DSTT:{FNUM** d|**DATABASE** e|**SOFC** f|**SDN** g|**NCD** h}[,**STPNET** c]!

To request a network call denial (NCD) test query:

[3] **TEST:DSIG;NCD:DIG** i[,**STPNET** c]!

To request a number services 800 (NS800) test query:

[4] **TEST:DSIG;NS800:DIG** a{,**ORIGNPA** b|,**ANI** j},**LATA** k,**TOS** l[,**II** m]!

To request an INFO-1 (Dial-A-View) test query:

[5] **TEST:DSIG;DAV:NVID** n,**MODE** o!

3. EXPLANATION OF MESSAGE

a — The **INWATS** number to be tested; a 10-digit number starting with 800. For INWATS OOX codes, enter 800 instead of the OOX and enter the corresponding numbering plan area (NPA) in the **ORIGNPA** field. For example, **DIG 8001234567**.

b — Originating NPA which is the simulated 3-digit NPA for this test. Represents the NPA of an INWATS customer (one who calls an INWATS number). For example, **ORIGNPA 312**.

c — The signal transfer point (STP) network over which the direct signaling test will be sent. If 1, the test will be sent over the 1STP network. If 2, the test will be sent over the 2STP network.

If the **STPNET** keyword is not present, the test will default to the STP network defined in office data (ODA).

d — Function number that specifies the CCIS direct signaling domain of function number. This variable is a 1 to 5-digit number from 0 to 32,767. The direct signaling translation test (DSTT) is sent to the node which is assigned the input function number. For example, **FNUM 11978**.

e — Database address that specifies the CCIS direct signaling domain of **DATABASE**. The address is the 3-digit NPA and 3-digit office code. For INWATS, the address is 800 + XXX. Any 6-digit number may be entered. The DSTT will be sent to the database which handles the input address. For example, **DATABASE 800123**.

f — Switching office address; specifies the CCIS direct signaling domain of the switching office. This variable is the NPA and office code which the switching office terminates. Any 6-digit number may be entered. The DSTT will be sent to the requested switching office. For example, **SOFC 312645**.

Note: Until modifications are added, a 4ESS™ switch does not have a valid address in this switching office domain.

g — Software defined network (SDN) database address. It specifies the CCIS direct signaling domain of **SDN**. The address is the 3-digit NPA and the 3-digit office code. Any 6-digit number may be entered. The DSTT will be sent to the SDN database that handles the input address. For example, **SDN 312979**.

h — The network call denial (NCD) database address. The address specifies the CCIS direct signaling domain of **NCD**. The address is the 3-digit numbering plan area (NPA) and the 3-digit office code. Any 6-digit number may be entered. The DSTT will be sent to the NCD database that handles the input address. For example, **NCD 312979**.

i — The network call denial (NCD) number to be tested. This number can be any ten-digit billing number. For example, **DIG 3129793998**.

j — Customer's ten digit automatic number identification (**ANI**).

k — Originating local access and transport area (**LATA**) which is the simulated 3-digit LATA for this test. It represents the LATA of a number service 800 caller (one who calls an NS800 number). For example, **LATA 120**.

l — The type of service (**TOS**) indicator. A number from 0 to 31 that is assigned as the 800 number service type of service. The TOS is used to obtain the CCS7 subsystem number and translation type to use in sending the query.

m — The automatic number identification (ANI) information digits (II), also called the originating station type, which is the simulated 2-digit **II** for this test. It identifies characteristics of the calling station (e.g., coin, hotel, motel).

If the II keyword is not present, the test will default to 23 which is an identified line (coin or noncoin).

n — National vendor identification number (1-127).

o — Type of query.

MODE=1 — Dial-A-View query to the feature control office (signaling connection control port [SCCP] messages only).

MODE=2 — Dial-A-View query to the vendor (SCCP messages and Q931/service access data channel [SADC] messages).

4. SYSTEM RESPONSE

?D — Data field error: invalid or out of range data was input.

?E — Error: invalid keyword combination.

PF — Printout follows: the test has been initiated and the results will be printed when received.

RL — No teletypewriter (TTY) output buffer or trunk assignment generation (TAG) block.

RL,CODE a — Repeat later: a system resource was not available at this time. Codes are:

2 — Unable to seize a trunk maintenance register (TMR).
3 — Previous test in progress.
4 — Terminal congestion.
5 — Signaling link failure.
6 — Audit condition detected in link security.
7 — Response timing could not be initiated.

5. REFERENCES

PIDENTs
DSIGTEST
IOCPIMC4
TCAPTEST
TMAD0005

Output Messages
TEST:DSIG-DSTT
TEST:DSIG-INWA
TEST:DSIG-NCD
TEST:DSIG-NS800

ID TEST:DSIG-NS800
WORK CENTER . . MAC, MOC, TOC
GENERIC . . . . . 4E17 Rel. 2 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

```
TEST:DSIG;NS800:DIG: a{,ORIGNPA b|,ANI f},LATA c,TOS d,II e,

g

[,RECEIVED ACG]

[,RECEIVED TN]
```

2. REASON FOR OUTPUT

To respond to a `TEST:DSIG;NS800` request to run a number services 800 (NS800) test query which uses common channel signaling version 7 (CCS7) direct signaling. The first line of the message echoes the NS800 number, originating numbering plan area (NPA), local access and transport area (LATA), trunk out of service (TOS), and automatic number identification (ANI) information digits of the input message. The second line indicates failure or success and, optionally, data concerning the reason for failure or the number, carrier identification, and domestic/international indicator returned from the database. The third line of the message indicates that an automatic call gap (ACG) control was returned in the response from the database. The fourth line of the message indicates that a request for the terminating notification (TN) data was received in the response from the database.

3. VARIABLE FIELD DEFINITIONS

a	The NS800 number, with inserted dashes, to mark the NPA and NXX fields. For example, `800-123-4567`.
b	The originating NPA — The NPA which the NS800 database uses as the NS800 caller's NPA when doing the translation on the NS800 number.
c	The originating LATA — The LATA which the NS800 database uses as the NS800 caller's LATA when doing the translation on the NS800 number.
d	Type of service (TOS) — The type of service that is assigned as the 800 number type of service. TOS is used to obtain the subsystem number and translation type to use in sending the query.
e	The ANI information digits (originating station type) which the NS800 database uses to identify the characteristics of the calling station.
f	Customers ten digit automatic number identification (ANI).

g

COMPLETED - SUCCESS: RETURNED DIGITS f, CARRIER g, {DOM|INTL} — The number returned from the database, f, is displayed as NPA-NXX-XXXX; the carrier identification g, returned from the database; and an indicator whether the number returned from the database is domestic or international.

UNABLE TO SEND, FHCODE h — h is the final handling code which indicates the reason for the inability to send the NS800 query.

TEST TIMED OUT — The 3 second timer expired before the reply message was received. See (a) under ACTION TO BE TAKEN.

COMPLETED - FAIL:ANNOUNCEMENT i — i is the announcement code returned from the database. See (b) under ACTION TO BE TAKEN.

COMPLETED - FAILED:BAD DATABASE RESPONSE, FHCODE h, EXCCODE j — h is the final handling code which indicates the reason the response from the database is invalid, and j indicates the specific exception. The exception code is contained in the outgoing trunk state vector (SVOGT) in the final handling code trap printout. See fhcode documentation for exception values.

4. ACTION TO BE TAKEN

(a) Repeat the test; if the same response is received continuously, see item (c) below.

(b) Verify the announcement code returned from the database.

(c) The CCS7 signaling network is unable to correctly route the NS800 query to the NS800 database. Contact the Machine Administration Center (MAC) who will contact the Operational Network Administration Center (ONAC).

5. REFERENCES

PIDENTs
BOSPQARC
DSIGTEST
TCAPTEST

Generic Update Capability Feature (372)

11

Contents Page

Generic Update Capability Feature (372)

11

1. Feature Description

1.01 The Generic Update Capability feature will provide the ability to turn over a new *4ESS*™ switch with the latest generic installed and to retrofit an office with an up-to-date version of the generic.

1.02 This feature changes the current process used to retrofit late retrofit offices, new start offices, and dead start offices. The feature provides a current version of the 1A and 3B Processors' software on tape. This tape includes the base generic, quarterly releases, Broadcast Warning Messages (BWMs), Software Change Packages (SCPs), and BIG GULPS needed for late retrofit and new start offices. Therefore, BWMs, SCPs, and BIG GULPs do not have to be applied using Software Change Administration Notification System (SCANS). This will greatly reduce the time required to retrofit an office.

1.03 This feature should only impact procedures for *4ESS* switches that must be installed/retrofitted after the "base" generic release. Existing procedures for *4ESS* switch installation and retrofit (base release), BIG GULPS, and BWMs downloading, via SCANS, have not changed.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

Internal Transition Issues

7.02 Normal retrofit or new office bring-up procedures should be followed. Refer to Installation Guide (264-385 series) for procedures.

7.03 An office must be on a Release 4 generic prior to upgrading to the next base generic's quarterly release. For example, in order to use the 4E17/4ap11 Release 3 generic update tapes, the office should have been upgraded at least to 4E16 Release 4 generic.

8. Input/Output Manual Pages

8.01 The **VER:OFFICE** output message that follows has been updated to support this feature.

ID ..... VER:OFFICE
WORK CENTER.. MAC, MOC
GENERIC..... 4E17 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

```
VER:OFFICE:

  GENERIC INFO        TOWN   ST   BL   NBS      PCF   OPC   NSN

  a                   b      c    d    e        f     g     h
```

2. REASON FOR OUTPUT

To output the generic of an office, its unique common language location identification (CLLI) code, point code format (PCF), origination point code (OPC), and network switch number (NSN).

3. VARIABLE FIELD DEFINITIONS

a	Generic in format of 4E<*17*>*4A.08 R2*.
b	CLLI office code, TOWN.
c	CLLI office code, state (ST).
d	CLLI office code, builing (BL).
e	CLLI office code, near building subdivision (NBS).
f	Point code format.
g	Origination point code.
h	Network switch number (blank-191).

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs
- VRFYCNTL
- VRFYINPT
- VRFYMISC

Input Message
- VER:OFFICE

Small Computer Systems Interface (SCSI) Firmware Download Feature (374)

12

Contents

Small Computer Systems Interface (SCSI) Firmware Download Feature (374)

12

1. Feature Description

1.01 The purpose of this feature is to provide the capability to update Seagate* Small Computer Systems Interface (SCSI) disk drive firmware in the field. Although it is unlikely that a field update will be required, this feature is being implemented to minimize the need to change disk drive memory chips or to download new firmware from a personal computer (PC) to replace existing firmware. If SCSI disk drive has a firmware failure, *4ESS*™ switch/Real Time Reliable (RTR) development can modify the disk drive firmware via a software update. Firmware is sent to offices using a Broadcast Warning Message (BWM) procedure and loaded on an AT&T 3B20D computer. Firmware is then downloaded onto a Seagate 600 megabyte disk drive using the **LOAD:MHD a:FIRMWARE:FN** "b"! input message.

1.02 This feature only applies to Seagate-supplied SCSI disk drives. Hewlett-Packard disk drive firmware must still be replaced by physically changing the memory chip itself or the board containing the chip.

2. Call Flow (Not Affected)

* Seagate is a registered trademark of Seagate Technology, Inc.

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages

8.01 The **LOAD:MHD a:FIRMWARE:FN** "b"! input manual page and the **LOAD MHD FIRMWARE** output manual page that follow have been created to support this feature.

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

ID ..... LOAD:MHD;FIRM
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E,3B
TYPE ..... Input

1. PURPOSE

Loads vendor-unique, executable microcode and/or control information into the control memory of a SCSI moving head disk (MHD). The downloaded code will be effective after successful completion of this message.

2. FORMAT

LOAD:MHD a:**FIRMWARE,FN** "b"!

3. EXPLANATION OF MESSAGE

a — **MHD** member number (0 - 255).

b — Full pathname of the firmware data specification file.

4. SYSTEM RESPONSE

PF — Printout follows. Followed by LOAD-MHD,FIRM output message.

5. REFERENCES

Output Message
LOAD-MHD,FIRM

WARNING
This command will format the MHD. All existing data on the disk drive will be destroyed.

ID . . . . . LOAD-MHD,FIRM
WORK CENTER. . MOC
GENERIC. . . . . 4AP11 Rel. 2 and later
APPLICATION . . 4E,3B
TYPE . . . . . Output

1. FORMAT

This message has seven formats.

[1] `LOAD MHD a FIRMWARE STARTED`

[2] `LOAD MHD a FIRMWARE NOT STARTED b c`

[3] `LOAD MHD a FIRMWARE STOPPED b c`

[4] `LOAD MHD a FIRMWARE ERROR b c`

[5] `LOAD MHD a FIRMWARE ABORTED b`

[6] `LOAD MHD a FIRMWARE IN PROGRESS`

[7] `LOAD MHD a FIRMWARE COMPLETED`

2. REASON FOR OUTPUT

To report the result of executing a `LOAD:MHD;FIRM` input command.

3. VARIABLE FIELD DEFINITIONS

a — Moving head disk (MHD) member number.

b — Process step or reason code.

f03 — failed to open firmware file
f05 — firmware file is zero bytes in size
f07 — failed to determine size of firmware file
f09 — failed to open ECD
f0b — failed to get UCB by name
f0d — unit must not be ACT
f10 — failed to get UCB of SBUS
f13 — controlling unit is not active
f15 — not a SCSI MHD
f17 — could not reserve MHD UCB
f19 — failed to assign special device filename for `MHD`
f1a — failed to open special device file for `MHD`
f1c — failed to set I/O mode of device file
f1f — failed to enable message reception
f21 — failed to read expected number of blocks
f27 — process timed out
f2a — failed to close special device file

f2c — failed to release special device file
f2f — failed to unreserve UCB
f31 — failed to close ECD
f33 — failed to close firmware file
f37 — failed to read firmware file
f39 — terminated externally with signal
f40 — unable to determine capacity of the drive
f43 — drive capacity must be 600 MB
f46 — failed to get the segment number
f49 — see DKDRV report on ROP
f4b — SCSI "inquiry" command failed
f4d — download not supported on this drive
f50 — failed to get the segment number
f53 — see DKDRV report on the ROP
f56 — SCSI "write buffer" command failed
f59 — failed to get the segment number
f5d — SCSI "format" command failed
f60 — failed to get the segment number
f63 — see DKDRV report on the ROP
f66 — SCSI "read capacity" command failed
f99 — message to port failure
f9c — message reception failure
f9f — see DKDRV report on the ROP
fa9 — failed to get the segment number
fb1 — SCSI "mode sense" command failed
fb2 — data overflow, too many block descriptors
fb5 — failed to get the segment number
fb9 — SCSI "mode select" command failed

c — System error code number. See the System Error Codes output appendix `SYSERR-APP`.

4. ACTION TO BE TAKEN

A termination report that specifies noncompletion provides an error code that usually indicates a system resource was not available or became unavailable to perform the requested task. Clear the problem causing the resource limitation and retry the input request.

A termination report specifying completion indicates that all directives of the input request were done and no failures were encountered. This alarm is a manually-requested report.

5. REFERENCES

OMDB Keys
Formats 1 through 5 have an OMDB key of 694.

Input Message
```
LOAD:MHD;FIRM
```

Address Complete Message Time-outs for Study Classes Feature (376)

13

Contents

Address Complete Message Time-outs for Study Classes Feature (376)

13

1. Feature Description

1.01 The Address Complete Message (ACM) Time-outs for Study Classes feature is a Local Exchange Carrier feature.

1.02 This feature causes an existing per-Trunk Subgroup (TSG) count, NM4ATOPC (No Start Dial), to be scored for Final Handling Code (FHC) 877. This FHC is used for the Integrated Services Digital Network User Part (ISUP) ACM time-outs. The count is defined in the TSG Adjunct Head Cell. The NM4ATOPC count is reported in a Study Class Report that is printed on the Network Management printer. The Network Management Operations System (NEMOS) and the Regional Network Management System (RNMS) receive this report as part of the existing TSG data that they currently receive.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management

5.01 For the NEMOS, the NM4ATOPC count is contained in Data Item 10 in Message Type 3 for ISUP trunk subgroups. For the RNMS, the count is contained in Data Block 36. The count is displayed as "NSD" for No Start Dial on the Network Management Display System pages TG7 and TG9.

6. Maintenance/Troubleshooting

Final Handling Code

6.01 The existing count is pegged for FHC 877 for ACM time-outs.

7. Transition Considerations (Not Affected)

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment. Ubiquity of the generic across the network is not required before the feature can be fully operational.

8. Input/Output Manual Pages (Not Affected)

Teleconferencing (TC) Network Services Complex (NSCX) Trunk Maintenance Enhancement Feature (381)

14

Contents

Teleconferencing (TC) Network Services Complex (NSCX) Trunk Maintenance Enhancement Feature (381)

14

1. Feature Description

1.01 The blocking and unblocking of trunks that are connected to a Teleconferencing (TC) Network Services Complex (NSCX) is a normal event as conference calls are initiated and completed. Presently, a trunk state change maintenance message is reported by the 1A Processor every time one of these trunks changes state. Since all the TC messages are consolidated in four switching centers, the volume of these normal trunk maintenance messages exceeds several hundred per day at each switching center.

1.02 This feature deletes the reporting of these normal trunk state change maintenance messages.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

6.01 This feature eliminates the reporting of the blocking and unblocking messages on trunks that are connected to a teleconferencing NSCX.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Expanded ETC TOT Capability Feature (383)

15

Contents Page

Expanded ETC TOT Capability Feature (383)

15

1. Feature Description

NOTE:
This feature applies only to the GTE Hawaii Telephone Company.

1.01 The Hawaii Telephone Company (HTCO) has a *4ESS*™ switch that functions as an Access Tandem, Tandem, Service Switching Point (SSP), and International Switching Center (ISC). A series of events described below explains the necessity for the current feature.

1.02 When SSP-800 was introduced in generic 4E12, HTCO was told that the ISC function and SSP-800 service could not be provided on the same call until generic 4E16. At that time, HTCO used the Toll Connecting Type of Trunk (TC TOT) for Trunk Blocks to end offices and the Intertoll Type of Trunk (IT TOT) for Trunk Blocks to International Carriers (ICs).

1.03 In generic 4E14, the TC TOT was replaced with the End Office or Tandem Office Connecting (ETC) TOT for Local Exchange Carriers (LECs) and the Local Carrier Connecting (LCC) TOT for ICs. At the same time, the IT TOT was replaced by Other Carrier Connecting Type of Trunk (OCC TOT) for LECs. Subsequently, HTCO discovered that using ETC TOT did not allow them to function as an ISC without using loop-around trunks, although using TOT=LCC met all of their tandem and access tandem requirements at that time.

1.04 After purchasing generic 4E16, and planning to offer the SSP-800 feature in April 1993, HTCO found that LCC TOT would neither allow SSP-800 calls nor interwork to an Integrated Services Digital Network User Part (ISUP) OCC TOT. Furthermore, ETC TOT would still not allow the ISC function.

1.05 As a solution to these problems, the Expanded ETC TOT Capability feature allows a single originating Trunk Subgroup to support the Equal Access traffic for all the functions supported on the *4ESS* switch—Access Tandem, Tandem, SSP-800, and ISC—at the same time.

2. Call Flow (Not Affected)

3. Provisioning

Office Data Administration

3.01 This feature is administered by means of a 1A Recent Change.

3.02 For MF Trunks from End Offices, the Trunk Block TOT parameter must be set to "LCC."

3.03 For ISUP trunks, the Trunk Block TOT parameter must be set to "ETC." In addition, Recent Change Forms 300-303 codegrouping must be completed with appropriate digits that have the INTL and the TSNI parameters in the ATNS domain for the International Routing Action (IRA) calltype. The IRA calltype with CALLDATA=EASXP or EASIN must be set up in the ATNS domain for those digits.

⚠ **WARNING:**
Failure to make the proper settings as described above will result in call failure.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on by means of a 1A Recent Change. For details, refer to "Provisioning" in this chapter.

8. Input/Output Manual Pages (Not Affected)

CCITT7 Integrated Services Digital Network User Part (ISUP)—Phase 4 Feature (1001)

16

Contents Page

CCITT7 Integrated Services Digital Network User Part (ISUP)—Phase 4 Feature (1001)

16

1. Feature Description

1.01 This feature is being introduced so that *4ESS*™ International Switching Center (ISC) International Telegraph and Telephone Consultative Committee No. 7 (CCITT7) Integrated Services Digital Network User Part (ISUP) signaling systems are in compliance with CCITT Recommendation Q.767 (Application of the ISUP CCITT7 for international ISDN interconnections). This recommendation includes the following:

(a) Calling Party Number, not available: A calling party number parameter will not be transmitted if the number is not available.

(b) Calling Party Number, restricted: An outbound restricted calling party number will not be sent across an international boundary. The calling party number will be suppressed in the outgoing *4ESS* ISC. Suppression of restricted calling party numbers is not applied at the *4ESS* ISC for transit calls.

(c) Connected Number, not available: An explicit request for the connected number when sent in the forward direction is responded to by an explicit reply in the backward direction, even if the number is not available. When no connected number is available, the connected number parameter presentation field is set to "number unavailable." When the connected number is present, the connected number parameter can be sent, even if the number was not requested.

(d) Rejection of Implicit Request for User-to-User Service 1: The *4ESS* ISC will accept the new network discard indicator value for rejection of an implicit request for User-to-User Service 1.

(e) Release of Closed User Group (CUG) Calls: CUG calls that encounter interworking limitations or that are not allowed outgoing access [for example, International Telephone User Part (ITUP) outgoing trunk was selected] will be released with cause number 87. Cause number 88 was used previously. Refer to "Maintenance/Troubleshooting" in this chapter for Final Handling (FH) codes that relate to CUG calls.

2. Call Flow

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

Call Irregularities

6.01 This feature uses FH codes 1766, 1888, 1972, and 1973 which are related to the release of CUG calls. Failure summaries for these FH codes are listed in Table 16-A.

Table 16-A. Final Handling Code Failures

FH Code	Failure and Handling Method
1766	**Last Normal Condition:** The mandatory parameters of the Initial Address Message (IAM) were processed. **Irregular Condition:** The IAM had an Optional Forward Call Indicator (OFCI) parameter that indicated that this is a CUG call and outgoing access is not allowed, but it is not a transit call. **Final Handling:** A RELEASE message with cause number 87 (4N7REL_USER_NOT_CUG) is sent out on the incoming trunk. The incoming and outgoing trunks will be idled after a RELEASE COMPLETE message has been received.
1888	**Last Normal Condition:** Outgoing CCITT7 international ISUP (INUP) trunk was selected and call processing started. **Irregular Condition:** The CUG interlock code was not received, and the OFCI indicated CUG outgoing access allowed or CUG outgoing access not allowed. **Final Handling:** A RELEASE message with cause number 87 (4N7REL_USER_NOT_CUG) is sent out on the incoming trunk. The incoming and outgoing trunks will be idled after a RELEASE COMPLETE message has been received.
1972	**Last Normal Condition:** an ISUP outgoing trunk was selected. **Irregular Condition:** The CUG interlock code was not received, and the OFCI indicated CUG outgoing access allowed or CUG outgoing access not allowed. **Final Handling:** A RELEASE message with cause number 87 (4N7REL_USER_NOT_CUG) is sent out on the incoming trunk. The incoming and outgoing trunks will be idled after a RELEASE COMPLETE message has been received.
1973	**Last Normal Condition:** Outgoing trunk was seized and IAM processing started. **Irregular Condition:** An international transit call with CUG and OFCI parameters in the IAM could not be passed via ITUP. **Final Handling:** A RELEASE message with cause number 87 (4N7REL_USER_NOT_CUG) is sent out on the incoming trunk. The outgoing trunk will be idled.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Switched Digital International (SDI) 384-KBPS Service Feature (3066)

17

Contents

Switched Digital International (SDI) 384-KBPS Service Feature (3066)

17

1. Feature Description

1.01 The Switched Digital International (SDI) 384-kbps service provides switched digital customers with the capability to switch data at rates of 384 kbps across the International Integrated Services Digital Network User Part (INUP) network. This capability already exists in the domestic network.

2. Call Flow (Not Affected)

3. Provisioning

3.01 Two new domains, I384 and IOH0, were created to support wideband capabilities on 384-kbps trunks. These domains are entered in the DOM field or the AD1 field of Office Data Assembler (ODA), Recent Change (RC), and Verify forms used to provision trunks. Laboratories Design Information (LDI) documents 1012, 1019, and 1114 list the specific forms that are affected and describe population rules.

4. Recording

4.01 The International Call Detail Record (ICDR) word 16, bits 5,6, and 7 will specify the bearer capability of an SDI 384 call. The pattern of a 384 call is 100.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

New Final Handling Codes

6.01 There are 11 new Final Handling Codes (FHCs) associated with this feature. These codes are listed in Table 17-A.

Table 17-A. Final Handling Codes

Code	Description
139	Invalid international trunk hunt invoked for an H1 (1536 kbps) call
333	Unexpected Release Complete (RLC) message received, relating to a busy H0 circuit for which a Release (REL) message has not been sent
334	Unexpected RLC message received, relating to a busy H0 circuit for which a REL message has not been sent
335	Unexpected RLC message received, relating to a busy H0 circuit for which a REL message has not been sent
1891	INUP Outgoing Trunk (OGT) detected an unsupported 1536 kbps broadband call
1892	INUP OGT received a RLC message during setup of a broadband call
1893	INUP OGT received an unexpected message during setup of a broadband call
1894	INUP OGT received a RLC message during talking (stable) state of a broadband call
1895	INUP OGT's "Wait for Answer (ANS)" timer expires during setup of a broadband call
1896	INUP OGT received a REL message during setup of a broadband call
1897	OGT receives a broadband Initial Address Message (IAM), far-end controls

Measurements

6.02 The existing Broadband Call 6 Trunk Incoming Seizure (BBC-6 INC SZRE) count which appears on the Measurement Subclass/Output Measurement Set (MSC/OMS) and On-Site Operations Report (OSOR), will be incremented when there is an attempt to seize INUP slave circuits for an SDI 384 call. The count is listed under MSC #5 OMS #1 on the report. This count is also used for Q.931 384 and Integrated Services Digital Network User Part (ISUP) 384 calls.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment. However, trunking and routing must be provisioned in order to use this feature.

8. Input/Output Manual Pages

8.01 The **VER:TSI:WIDEBAND!** input message and **VER:TSI;OPT(WIDEBAND):** output message which were created to support this feature are attached. The output message lists Time Slot Interchanges (TSIs) that are wideband capable. This output also lists their associated Switched Permuting Circuits (SPCs) and member Equipage (EQP) information. The **TSI** field specifies the dedicated TSI (0 to 63). The **SPC** field specifies the dedicated SPC (0 or 1). The **EQP** field specifies that the TSI is either F (available for future use) or OP (operational).

ID . . . . . VER:TSI-WIDEBAND
WORK CENTER . . MAC, MOC
GENERIC . . . . . 4E17 Rel. 2 and later
CLASS . . . . . VER
APPLICATION . . 4E
TYPE . . . . . Input

1. PURPOSE

Request time slot interchange (TSI) units that are equipped with wideband.

2. FORMAT

VER:TSI:WIDEBAND!

3. EXPLANATION OF MESSAGE

See Purpose.

4. SYSTEM RESPONSE

NA	Not accepted.
PF	Printout follows.

5. REFERENCES

PIDENTs
- IOCPIMC4
- VRFYCNTL
- VRFYINPT
- VRFYMISC
- VRFYOUT

Translation Guide, 4ESS™, PTG-4, Division 8, Section 12g

Output Message
- VER:TSI-WIDEBAND

ID ..... VER:TSI-WIDEBAND
WORK CENTER.. MAC, MOC
GENERIC..... 4E17 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

```
VER:TSI;OPT(WIDEBAND)

TSI    SPC    EQP

 a,     b,     c
 .      .      .
 .      .      .
 .      .      .
```

2. REASON FOR OUTPUT

To display all the time slot interchanges (TSIs) and switching permuting circuits (SPCs) in the 4ESS switch that are wide-band capable.

3. VARIABLE FIELD DEFINITIONS

a	Time slot interchange number (0 to 63).
b	Switching permuting circuit number (0 or 1).
c	Equipage indicator:
	F Future (growth and special growth).
	OP Operational.

4. ACTION TO BE TAKEN

None.

5. REFERENCES

PIDENTs
IOCPIMC4
IOCPPVR4
VFRYCNTL
VRFYINPT
VFRYMISC
VFRYOUT

Translation Guide, 4ESS™, PTG-4, Division 8, Section 2r

Input Message
VER:TSI-WIDEBAND

Use and Handling of Unequipped Circuit Identification Code (UCIC) Message Feature (3214)

18

Contents

Use and Handling of Unequipped Circuit Identification Code (UCIC) Message Feature (3214)

18

1. Feature Description

1.01 The revised International Telegraph and Telephone Consultative Committee (CCITT) and American National Standards Institute (ANSI) standards allow an increase in the number of messages in which an Unequipped Circuit Identification Code (UCIC) message may be generated. This feature modifies the handling of UCIC messages because of the additional messages in which UCIC messages may be generated.

1.02 In the 4E16 generic, the UCIC message is sent upon receipt of the following messages containing an unequipped circuit identification code:

- Initial Address Message (IAM)
- Circuit Reservation Message (CRM)
- Continuity Check Request (CCR) Message
- Reset Circuit (RSC) Message
- Circuit Group Reset (GSR) Message.

1.03 Starting in the 4E17 generic, the UCIC message will also be sent in response to the following additional messages containing an unequipped circuit identification code:

- Release Message
- Blocking Message
- Unblocking Message
- Circuit Group Blocking
- Circuit Group Unblocking.

1.04 When receiving an UCIC message, this feature requires trunk maintenance to locally block the indicated circuit without sending a Blocking Message to the far-end office and to report the circuit to Maintenance for maintenance action. If an UCIC message is received in response to a group message, the UCIC applies only to the main Circuit Identification Code (CIC) in the message and not to any other CICs in the range.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Provide Cause Information with Tones and Announcements in Call Processing Message Feature (3215)

19

Contents

Provide Cause Information with Tones and Announcements in Call Processing Message Feature (3215)

19

1. Feature Description

1.01 In pre-4E16 generics, the toll switch connected the inband tone or announcement to the transmission path but was not required to send an out-of-band cause indication.

1.02 In 4E16 generic, procedures for providing cause information in the Integrated Services Digital Network (ISDN) User Part (ISUP) Address Complete and Call Progress messages which are interworked to the Q.931 Progress message were committed.

1.03 This feature fulfills the commitment for providing cause information in the ISUP Address Complete and Call Progress messages which are interworked to the Q.931 PROGRESS message. This feature is used when a call setup fails and an inband tone or announcement is returned to the calling party from a toll switch. When this case occurs, a Call Progress (CPG) message will be sent (with cause information) before providing a tone or announcement if the toll switch has already sent an Address Complete Message (ACM).

2. Call Flow

2.01 If an inband tone or announcement is to be returned to the calling party and an ACM has already been returned, a CPG message may be returned containing the Cause Value Indicators parameter coded with the appropriate cause value which indicates the reason for call failure.

2.02 When an ISUP RELEASE or a Q.931 DISCONNECT message is received, the cause value and location are taken from the received RELEASE or DISCONNECT message with appropriate recoding and mapped to the cause value and location in the CPG message. Otherwise, the cause value is coded per existing procedures in *4ESS*™ switching.

2.03 If no procedures exist, the cause value is selected from the entries shown in Table 19-A depending upon the tone or announcement that is to be played. If there is no mapping, then no Cause Value Indicators parameter will be sent. The cause location is coded per the existing procedures in *4ESS* switching.

Table 19-A. Mapping of Tones or Announcement to Cause

Tone	Meaning	Cause Value Mapping
VCA	Unable to complete	Unallocated number (#1)
NWC	No wink from carrier	(No mapping)
NCD	Network call denial screening	(No mapping)
T	Reorder tone (120 IPM)	Normal, unspecified (#31)
BT	Busy tone	User busy (#17)
ROA	Call did not go through	Resource unavailable-unspecified (#47)*
NCA	All circuits busy	No circuit available (#34)
NCC	No circuit to carrier	(No mapping)
OOB	Out of band (INWATS)	(No mapping)
INC	International no circuit	No circuit available (#34)
IVC	International vacant code	Unallocated number (#1)
IFF	International foreign office failure	Destination out of service
EA1	Emergency announcement 1	(No mapping)
EA2	Emergency announcement 2	(No mapping)
EA3	Emergency announcement 3	(No mapping)
EA4	Emergency announcement 4	(No mapping)
EA5	Emergency announcement 5	(No mapping)
EA6	Emergency announcement 6	(No mapping)
EA7	Emergency announcement 7	(No mapping)
SA1	Special announcement 1	(No mapping)
SA2	Special announcement 2	(No mapping)

* Per existing ISUP/Q.931 interworking requirements, these cause values will be mapped to Q.931 cause value #31, "normal unspecified."

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

0+/0– Access to AMS Feature (3300)

20

Contents

0+/0– Access to AMS Feature (3300)

20

1. Feature Description

1.01 This feature provides the 4E17 generic with additional Common Channel Signaling System 7 (CCS7) requirements for the AT&T Message Service (AMS) for prompted spontaneous access on 0+/0– calls and additional Integrated Services Digital Network (ISDN) requirements on the 4E17 generic interface to the AT&T Voice Messaging Operations Center (VMOC).

1.02 The AMS is a voice store-and-forward service that allows a customer to do the following:

- Record a voice message
- Have it delivered to any telephone by specifying the number
- Have the message played back
- Allow the message recipient to record a voice response for delivery back to the sender.

1.03 When dialing a 0+/0– call, AMS allows a customer whose call reaches a no answer condition to enter a special access code. The network automatically reroutes the call to the VMOC where the voice message is recorded for later delivery.

1.04 This feature builds upon a *5ESS*® switch feature defined as 5E8 Software Release (5E8) Operator Service Position System (OSPS).

2. Call Flow

2.01 The call flow for a 0+/0– call is shown in Figure 20-1 and is summerized in the steps below:

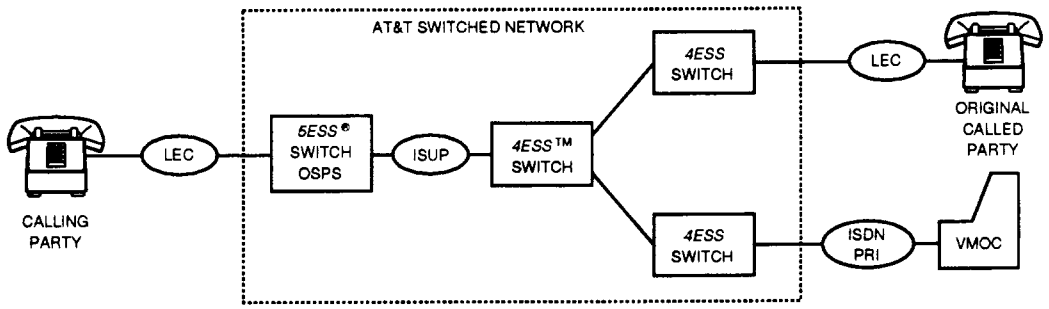


Figure 20-1. 0+/0– Access to AMS Call Flow

(1) The calling party dials a 0+ call, and it is routed to the OSPS.

(2) The OSPS collects and validates the collected billing information from the calling party (for example, credit card number or third party billing number).

(3) The OSPS then constructs and sends the Initial Address Message (IAM) to the originating *4ESS*™ switch.

(4) When the call routes to the original called party, but the called party does not answer the call, the OSPS prompts via an announcement for a service code. If the calling party enters a valid service code, the OSPS clears the call towards the original called party.

(5) The OSPS sends a new IAM (containing billing-related information) to the originating *4ESS* switch which will be routed toward the VMOC using an 800 number. This is a redirected call.

(6) The VMOC is connected to the terminating *4ESS* switch via Primary Rate Interface (PRI). The following additional information is passed to the VMOC (if subscribed) when the OSPS redirects the call:

- Credit card number
- Personal Identification Number (PIN)
- Third party number
- Commercial Credit Card (CCC) authorization code
- New access prefix type (0+ switched-access)
- Billing type (unknown, third party, or sent-paid).

3. Provisioning

3.01 A new Send Billing Related Information to a VMOC (SBRIV) field on the trunk subgroup (TSG) must be set in order for the VMOC to receive the additional information. Otherwise, the information is dropped.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 All *4ESS* switches must be loaded with new 4E17 R2 generic for full feature capability. The "SBRIV" field in the VMOC's trunk subgroup must be set to "Y" in order for the additional data to be delivered to the VMOC.

8. Input/Output Manual Pages (Not Affected)

Dynamic-Automatic Congestion Control, the Final Phase Feature (3349)

21

Contents

Dynamic-Automatic Congestion Control, the Final Phase Feature (3349)

21

1. Feature Description

1.01 The Dynamic-Automatic Congestion Control (D-ACC) provides an automatic mechanism to reduce traffic destined to switch(es) in a congested state. The D-ACC is a 3-phase Network Management feature that provides the AT&T Switch Network with traffic surveillance and control. Phase 1 of the D-ACC, the initial phase, was introduced in generic 4E15. Phase 2, which provided an interim automatic mechanism to reduce traffic, was introduced in generic 4E16. Phase 3, called the Final Phase (generic 4E17), completes the 3-phase transition to a D-ACC based on the Network Switch Number of the congested switch. The D-ACC, the Final Phase, is used in the Real Time Network Routing (RTNR) network to reduce traffic and by the RTNR switches to control RTNR traffic.

1.02 The major impact of the Final Phase at the AT&T Switch Network is that D-ACC is only applied at the RTNR originating AT&T switch. With the D-ACC, selective traffic is canceled or skipped based on whether the congestion is at a via AT&T switch or a terminating AT&T switch.

1.03 The D-ACC has two Automatic Congestion Control Levels (ACCLs): Level 1 and Level 2. The traffic controlled by each level is determined by the following:

- Routing Pattern Identity (RPI)
- Hard-To-Reach (HTR) and non-HTR code destinations
- Split Access Flexible Egress Routing (SAFER) status of the call (first, intermediate, or last).

NOTE:
Without the Network Management Operations System (NEMOS) control Message Type 166, traffic in the D-ACC Final Phase will be affected in the same way as it was in the D-ACC Phase 2.

1.04 The NEMOS is responsible for assigning control percentages for the D-ACC. This is done via the new control message (Message Type 166). Once the percentages are assigned, the data is stored in two 64-word tables. The tables are indexed by RPIs. Each table consists of eight fields (**a** through **h**). (See Table 21-A and Table 21-B for sample layout.) The total number of separate control percentages allowed for D-ACC is 496 and is calculated as follows:

31 (RPIs) x 2 (ACCLs) x 8 (fields) = 496 separate control percentages

Table 21-A. Automatic Congestion Control Level 1 (NM4ACCL1PCT)

RPI 1							
Non-HTR				HTR			
SAFER			Non-SAFER	SAFER			Non-SAFER
FIRST	INTER-MEDIATE	LAST		FIRST	INTER-MEDIATE	LAST	
a1%	b1%	c1%	d1%	e1%	f1%	g1%	h1%

Table 21-B. Automatic Congestion Control Level 2 (NM4ACCL2PCT)

RPI 1							
Non-HTR				HTR			
SAFER			Non-SAFER	SAFER			Non-SAFER
FIRST	INTER-MEDIATE	LAST		FIRST	INTER-MEDIATE	LAST	
a2%	b2%	c2%	d2%	e2%	f2%	g2%	h2%

1.05 The following values apply to all eight fields:

Value	Percentage
0	0
1	25
2	37.5
3	50
4	62.5
5	75
6	87.5
7	100
8	12.5

2. Call Flow (Not Affected)

3. Provisioning

3.01 This feature impacts the AT&T 1A Processor. The D-ACC requires 128 words of new call store and about 200 words of program store. There is no per-call real-time impact on calls that are not subjected to the D-ACC. Also, there is no impact on the AT&T 3B20D computer resources.

3.02 Two new 64-word tables, NM4ACCL1PCT and NM4ACCL2PCT, have been defined. These tables, which are indexed by RPIs, are used to store control percentages for the D-ACC. (Refer to Table 21-A and Table 21-B.)

4. Recording (Not Affected)

5. Network Management

Major Deviations from D-ACC, Phase 2 (4E16)

5.01 Network Management requirements for the Final Phase of the D-ACC are as follows:

- The Switch Congestion Status List is used at the originating AT&T switch only.
- The D-ACC control actions have been removed from the via AT&T switch. Thus, the control actions are no longer applied at the via AT&T switch for via RTNR calls.

- The RTNR via AT&T switch, upon receiving an ACCL parameter in a Release (REL) Message or an Address Complete Message from a terminating AT&T switch, should pass the parameter (intact) to the originating AT&T switch.
- The Dynamic Nonhierarchical Routing (DNHR) Selective Dynamic Overload Control cancel indicator, coded in bit G in the HTR indicator parameter, has been returned to **SPARE**.

Network Management Operations System

5.02 The NEMOS is responsible for assigning control percentages to the *4ESS*™ switch network traffic. Also, a new user interface has been provided by NEMOS. This user interface allows network managers to modify traffic control percentages.

5.03 Two new control message types have been defined for use by NEMOS. One control message (Message Type 166) is used to assign values to the NM4ACCL1PCT and NM4ACCL2PCT tables. The other control message (Message Type 71) provides NEMOS with the values that are currently assigned to the tables.

6. Maintenance/Troubleshooting

6.01 Audit 46, the Network Management Database Audit, has been modified to support this feature. This audit is performed on the two 64-word tables (NM4ACCL1PCT and NM4ACCL2PCT).

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment. Ubiquity of the generic across the network is not required before the feature can be fully operational.

8. Input/Output Manual Pages (Not Affected)

Increased Number of Links in Link Set Feature (3433)

22

Contents

Increased Number of Links in Link Set Feature (3433)

22

1. Feature Description

1.01 This feature increases the maximum number of A-links in a direct A-link set between a *4ESS*™ switch and a No. 2 Signal Transfer Point (STP) from 8 to 16. This feature also increases the maximum number of links in a combined A-link set between a *4ESS* switch and a mated pair of No. 2 STPs from 16 to 32.

1.02 This feature does not increase the memory in the *4ESS* switch. Therefore, to compensate for doubling the number of A-links in a set, the maximum number of A-link sets has been reduced from 256 to 128.

2. Call Flow (Not Affected)

3. Provisioning

3.01 The Signaling Link Selection (SLS) field in the Message Transfer Part (MTP) routing label defines the number of links in a link set. The SLS field is currently limited to 5 bits by *4ESS* switch standards. These 5 bits can represent up to 32 values. These values correspond to the number of links in the combined link set. The number of links in a direct link set is limited to 16. Given the traffic load sharing mechanism using the 5-bit SLS field, relief beyond 8 links in a direct link set requires the provisioning of all 16 links in the direct link set. This doubles the capacity of the direct link set. The capacity obtained from a given number of provisioned A-links in a direct link set is listed in Table 22-A.

Table 22-A. Capacity of A-Links Based on Provisioning

Number of Provisioned Links	5-Bit SLS Capacity (Normalized)
1	1.00
2	2.00
3	2.67
4	4.00
5	4.00
6	5.33
7	5.33
8	8.00
9	8.00
10	8.00
11	8.00
12	8.00
13	8.00
14	8.00
15	8.00
16	16.0

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Dependencies on Other Network Components

7.01 There are associated changes in the No. 2 STP. It is required that both the *4ESS* switch and the No. 2 STP have the capacity to allow for 16 links in a direct link set. Therefore, when the *4ESS* switch is upgraded, the No. 2 STP must be upgraded also.

Turn On/Turn Off Mechanism

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Global Software Defined Network CCS7 ISUP Network Interconnect Interface Feature (3590)

23

Contents

Global Software Defined Network CCS7 ISUP Network Interconnect Interface Feature (3590)

23

1. Feature Description

1.01 The Global Software Defined Network (GSDN) Common Channel Signaling System 7 (CCS7) Integrated Services Digital Network User Part (ISUP) Network Interconnect (NI) Interface feature is designed to interconnect with International World Zone 1 (IWZ1) Virtual Private Network (VPN) carriers that support CCS7 ISUP.

1.02 Today's GSDN features and capabilities were designed to be offered to VPN carriers that:

- Are located outside World Zone 1 (WZ1)
- Adhere to international VPN signaling agreements
- Interconnect with international signaling trunks from AT&T International Switching Centers (ISCs)
- Use the international E.164 (or public) numbering plan.

1.03 As the service grew, it became increasingly important to interconnect with the VPN carriers in Canada. However, the Canadian carriers could not meet all of the above criteria. As an interim solution, GSDN Phase 1 service was extended to Canadian carriers by treating each carrier as a single Software Defined Network (SDN) direct-connect Private Branch Exchange (PBX) using domestic signaling trunks. A major drawback of GSDN Phase 1 service is that the number of customers that can be supported is severely limited because all customers must share a single customer record. The service is also restricted to on-net voice and voice band data (VBD) calls.

1.04 Today there is a growing need to provide full GSDN features and capabilities to VPN carriers within IWZ1*; especially those carriers in Canada and the Caribbean†. To provide full GSDN features and capabilities to these IWZ1 VPN carriers, this feature supports carriers that:

- Are located within IWZ1
- Adhere to domestic VPN signaling agreements
- Interconnect with domestic signaling trunks from AT&T Gateway Switches
- Use the international E.164 (or public) numbering plan.

1.05 This feature is designed to interconnect with IWZ1 VPN carriers that support Common Channel Signaling System 7 ISUP NI facilities. Initially, only GSDN voice and voice band data features and capabilities will be supported. It is expected that the interface will be extended to support other GSDN data features and capabilities [for example, Global Software Defined Data Network (GSDDN) and Software Defined Data Network International (SDDN-I) data calls] in the future.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

* International World Zone 1 excludes the United States and its territories.

† Caribbean refers to the international portions of Numbering Plan Area (NPA) 809, which excludes Puerto Rico and the U.S. Virgin Islands.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Positive Call Processing (PCP) Release 3 List Transaction Feature (3595)

24

Contents

Positive Call Processing (PCP) Release 3 List Transaction Feature (3595)

24

1. Feature Description

1.01 The Automatic Number Identification (ANI) table serves as a universal user director. It contains the information required to determine call processing treatments. The ANI table allows the *4ESS*™ switch to direct a large number of customers to different call processing treatments. Call direction is based on the customer's ANI and other service related parameters.

1.02 This feature adds a new tool for provisioning the ANI table, which will speed up the provisioning process. Customer information in the ANI table can be inserted/deleted/changed using Recent Change (RC) Form 900. Up to 25 customers can be provisioned on each RC form.

2. Call Flow (Not Affected)

3. Provisioning

Office Data Administration

A. Recent Change Form 900

3.01 Recent Change Form 900 (See Figure 24-1.) is used to add, change, or delete customer records located on an adjunct. This form is administered by 1A Recent Change. This form can be used to change up to 25 customer records.

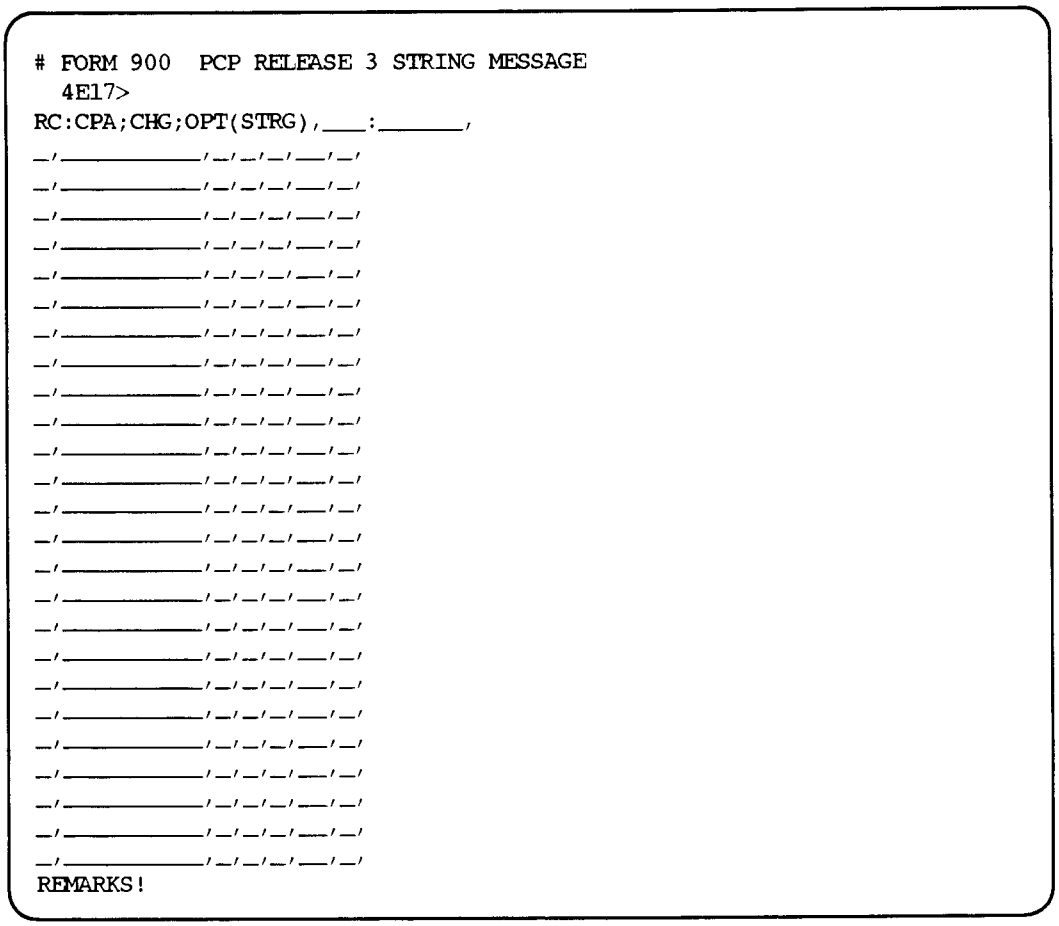


Figure 24-1. Recent Change Form 900

B. Population Rules for Recent Change Form 900

3.02 The following information describes population rules for RC Form 900:

a. Form Header:

(1) First Field - Activation
Entries:

- Blank.
- BUF (Buffer) places the message in the buffer after performing only form checks.
- TST (Test) indicates that all defensive checks are to be performed before buffering the message.
- ACT (Activate) indicates that the message is to be immediately activated following all defensive checks. It is not buffered.
- FTA (Fast Activate) is a special form of ACT action which limits output text during the processing of the action to a success or a failure message.
- FTB (Fast Buffer) is a special form of BUF action which limits output text during the processing of the action to a success or a failure message.
- FTT (Fast Test) is a special form of TST action which limits output text during the processing of the action to a success or a failure message.

(2) Second Field - Order Number
Entries: 1 to 999999.

b. Repeating Data:

(1) First Field - Action
Entries: A (Add), C (Change), D (Delete), and U (Unconditional).

(2) Second Field - Customer ANI
Entries: 10-Digit Number.

(3) Third Field - Type of Access (TOA)
Entries: S (Switched-Access), and D (Direct-Access).

(4) Fourth Field - Type of Service (TSVC)
Entries: L (Long Distance Service), and O (OUTWATS/*Megacom*® Telecommunications Service).

(5) Fifth Field - Numbering Plan Type (NUMPL)
Entries: A (Action Point Numbering) and N (North American Numbering Plan).

(6) Sixth Field - Adjunct Logical Address (ALA)
Entries: 0 to 15.

(7) Seventh Field - Transition Indicator (TRI)
Entries: O (Old) and N (New).

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Carrier Screening for 800 Number Portability Feature (3606)

25

Contents

Carrier Screening for 800 Number Portability Feature (3606)

25

1. Feature Description

1.01 The FCC has ordered 800 number portability to be implemented by May 1, 1993. At that time, the 800-NXX plan of allocating 800 numbers to carriers will be eliminated, and any carrier will be able to transport any assignable 800 number. The Bell Operating Companies (BOCs) will continue to screen 800 calls for carrier identification. But rather than screening based on 800-NXX, the screening will now require a query to their 800 Service Control Point (SCP) database, that will map the full 10-digit number to the carrier. The SCPs receive their data from the Service Management System 800 (SMS/800) database which, in the 800 number portability environment, will be the master provisioning system for 800 service.

1.02 This feature provides functionality so that the 800 number calls arriving at an AT&T *4ESS*™ switch, without having been screened at a BOC SCP, will either be routed normally if they are AT&T calls or backhauled to a BOC. The BOC will then screen the calls at an SCP and send them to the appropriate carrier.

1.03 This feature allows the following types of calls:

- The 800 number calls received directly from an Independent Telephone Company (ITC) with which AT&T has negotiated an agreement to provide screening. These ITC calls are currently screened on the basis of 800-NXX at the *4ESS* switch.
- The 800 number calls received directly from an Operator Services Position System (OSPS). These calls include *USA Direct*® Telecommunications Service calls placed by overseas callers, operator calls placed by domestic callers, and 1+800 calls sent from an ITC to an OSPS.

1.04 The 800 calls that are received on trunks that are not marked as being from an ITC are not subject to this feature.

2. Call Flow

2.01 The following is the call flow for this feature:

(1) The *4ESS* switch receives a dialed 800 number in one of the following ways:

(a) A caller in an area served by an ITC dials an 800 number, and the ITC sends all its 800 traffic to the AT&T *4ESS* switch. [This call flow will also apply to 900 calls placed from ITC areas only if the call type is Inward Wide Area Telephone Service (INWATS). If the 900-NXX is not AT&T's, the AT&T switch will block the call. If it is an AT&T 900-NXX, the call flow will continue.]

(b) An OSPS routes an 800 call to the *4ESS* switch. The call will be either a *USA Direct* service call placed by an overseas caller, an operator call placed by a domestic caller, or a 1+800 call sent from an ITC directly to the OSPS.

(2) The High Capacity (HICAP) Originating Treatment table is searched for a match on the dialed number. If there is a match, the associated routing number will be found in the table, and the Network Control Point (NCP) is not queried. The call is routed based on the table entry.

(3) When formulating the query to the NCP, the *4ESS* switch will set an indicator specifying that this call has the potential to be backhauled. The switch will do this based on the Trunk Subgroup (TSG) parameter (for ITC calls) that indicates the call has the potential to be backhauled or based on the fact that the 800 call came from an OSPS.

(4) The 10-digit Global Title Translation (GTT) table will be searched for a match on the dialed number. There are three possibilities at this stage:

(a) If there is a match in the 10-digit GTT table (either a 10-digit or a 6-digit entry), the query will be routed to the NCP indicated.

(b) If there is no match in the 10-digit GTT table and the 6-digit GTT feature is turned off, the call will be routed using the Alternate Signaling Transport Network (ASTN). The Carrier Screening feature will not be invoked, and the rest of the call flow will not apply.

(c) If there is no match in the 10-digit GTT table and the 6-digit feature is turned on, routing will default to the Signal Transfer Points (STPs). Either the query will be routed to the NCP indicated or, if there is no NCP indicated, the Inbound Services Emergency Translations (ISET) table [also called Alternate Number Translations (ANT)] will be searched. If there is a match, the routing number in the ISET table will be used. If there is no match in the ISET table, the call will be backhauled. Go to Step 7.

NOTE:
Only calls of the two types listed in Step 1 will be backhauled. All other calls will be final handled at this point.

(5) If the call is routed to an INWATS DataBase (IDB) NCP, then the IDB will look for the customer record. If the customer record is found, call processing will proceed normally. However, if the customer record is not found, the IDB NCP will return the appropriate error message to the *4ESS* switch and will check the new indicator in the query message. If the indicator is set to "1" , indicating that the call is a potential backhaul call, the NCP will not perform vacant line or vacant code network management functions.

If the call is routed to a Direct Service Dialing (DSD) NCP, then the call processing will proceed as is done currently. The DSD NCP will ignore the contents of the new indicator in the query message.

(6) When the switch receives one of several possible responses from the NCP that indicates the call is not an AT&T call, it will backhaul the call to a BOC.

(7) If the call is an 800 call, the BOC will query its SCP to determine the carrier. If the call is a 900 call, the BOC will determine the carrier based on the 900-NXX. The BOC will then pass the call to the appropriate carrier.

(8) If the BOC determines that the carrier is AT&T, the call will be sent back to AT&T. However, the call will not be backhauled again because the second time the switch receives the call from the BOC, the call will be killed. This feature applies only to calls identified as being received from an ITC or OSPS.

NOTE:
Due to feature implementation, 900 calls will not be backhauled. If in the future 900 calls again become INWATS call type, 900 calls will be backhauled per this feature. However, only 900 calls in NXXs assigned to AT&T have the potential to be backhauled; the rest would have been blocked at the switch. Backhauled 900 calls should always be AT&T calls and, therefore, will always be sent back to AT&T and this time killed.

In most cases when an 800 number is backhauled, the BOC will determine that the carrier is not AT&T. However, it is possible that the SCP shows an 800 number as belonging to AT&T, even though the customer record was not found in the NCP destination indicated. This discrepancy could result from BOC or AT&T error. In such a case, the backhauled call will be sent back to AT&T and this time killed.

3. Provisioning

Overview

3.01 A new TSG characteristic, S2, identifies the trunks that have calls arriving from an ITC.

Office Data Administration (ODA) Forms Affected

A. 401A

3.02 The S2 field on ODA Form 401A is used to identify trunks that have calls arriving from an ITC.

B. 401B

3.03 The S2 field on ODA Form 401B is used to identify trunks that have calls arriving from an ITC.

Recent Change Forms Affected

A. 800

3.04 Recent Change (RC) Form 800 is used to activate and deactivate this feature. For this feature to actually route traffic to a BOC, a Multiple Treatment Screening (MTS) table must be defined in order for the switch to route translations using existing procedures. The number of this MTS table must be entered in RC Form 800. See Figure 25-1.

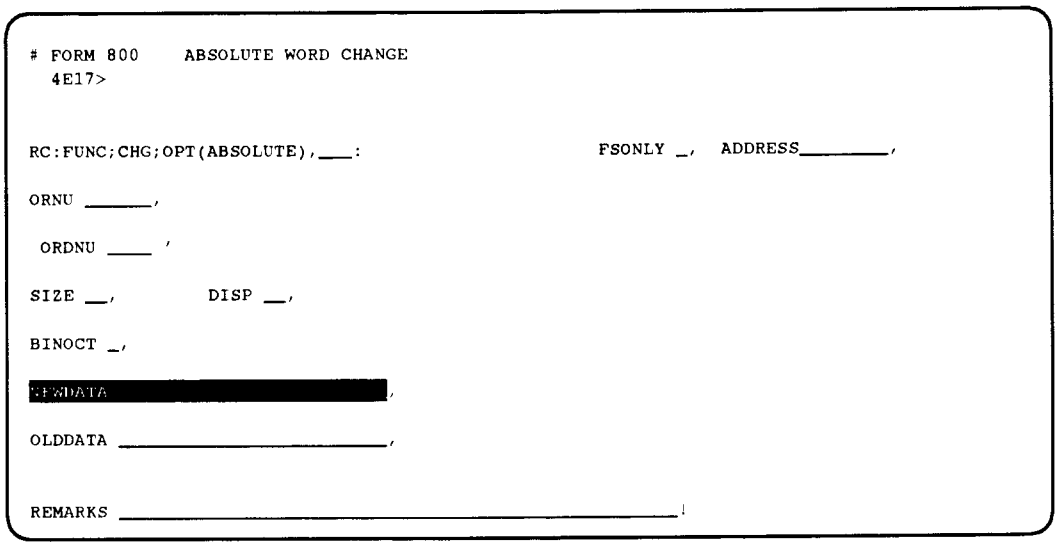


Figure 25-1. Recent Change Form 800

B. 100, 101, 107, and 108

3.05 The marking in the TSG which indicates that traffic originating from this location is for backhauling (for example, is an ITC) must be administered as appropriate using RC Forms 100, 101, 107, and 108. In 4E17, these forms will use the S2 value to provision the TSG indicator.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Dependencies on Other Network Components

7.01 This feature must be fully deployed in all DSD NCPs prior to activation at any *4ESS* switch. Once the DSD NCP deployment is complete and all *4ESS* switches are sending the Backhaul Screening Parameter/Indicator, the IDB NCPs may begin deploying this feature. IDB deployment must not begin until all AT&T *4ESS* switches have this feature activated.

Turn On/Turn Off Mechanism

7.02 RC Form 800 is used to activate and deactivate this feature.

8. Input/Output Manual Pages (Not Affected)

Domestic Hard-To-Reach Modification for *USA Direct*® Telecommunications Service Feature (3607)

26

Contents

Domestic Hard-To-Reach Modification for *USA Direct*® Telecommunications Service Feature (3607)

26

1. Feature Description

1.01 The Domestic Hard-To-Reach (HTR) Modification for *USA Direct*® Telecommunications Service feature provides the Network Management Operations Support System (NEMOS) with call completion statistics on *USA Direct* service traffic. These calls are identified by the ABC digits 199. This service gives users in foreign countries direct access to AT&T operators who assist in placing AT&T Calling Card or collect calls. It requires that any *USA Direct* service call received by an AT&T International Switching Center (ISC) or gateway on its international trunks be routed to one of ten destination Operator Service Position Systems (OSPS) that are assigned to handle these calls.

1.02 Prior to this feature, there were no traffic measurements gathered specifically for *USA Direct* service traffic. To examine the HTR status of this traffic, the international network managers assigned Numbering Plan Area (NPA) 199 (the *USA Direct* service code) as a Foreign Area Code for Office Code HTR Resolution at each ISC. For those NPAs that are placed on the Foreign Area Code for Office Code HTR Resolution, the *4ESS*™ switch collects HTR statistics such as Ineffective Machine Attempt (IMA), Network Attempt (NA), and Ineffective Network Attempt (INA) of all NXXs. If the HTR statistics (IMA, NA, and INA) for an NPA+XXX combination exceed the network management's specified threshold, the NPA+NXX combination is placed on the Domestic HTR Automatic Source List. The HTR statistics is then sent to NEMOS on a 6-digit basis.

1.03 This feature provides the country base surveillance data for *USA Direct* service traffic without extensive *4ESS* switch/NEMOS development. Modification to this feature allows the *4ESS* switch to send HTR statistics to NEMOS on all "199" plus

Pseudo Country Code (PCC) combinations. The HTR statistics of NPA+NXX combinations were the only available traffic measurements for *USA Direct* service traffic in the *4ESS* switch prior to this feature.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management

5.01 This feature impacts the interface between the *4ESS* switch and NEMOS. The Domestic HTR Automatic Source List interface Message Type 6 has been modified to report IMA, NA, and INA for all NXX (*USA Direct* service PCC) of NPA 199 (*USA Direct* service code) when 199 is assigned as a Foreign Area Code for Office Code HTR Resolution. The maximum number of entries for this message is 512, the same as previously. However, only entries with non-zero values are sent to NEMOS.

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Total Office Blocking Status Exchange Feature (3662)

27

Contents

Total Office Blocking Status Exchange Feature (3662)

27

1. Feature Description

1.01 Under the current Real Time Network Routing (RTNR) switch routing logic, the Originating AT&T Switch (OAS) uses its Total Office Blocking (TOB) level and the Node-to-Node (NN) blocking level to determine depth factors which govern the use of heavily loaded and reserved trunk groups for routing calls over two link paths. Under certain conditions, the blocking performance of the Terminating AT&T Switch (TAS) is increased over that of the OAS because high level and/or reserved trunk groups are seized by the OAS that would otherwise be used by the TAS for direct-routed traffic. Under these situations, calling out of a problem region is usually more difficult than calling into that region. This condition is not desirable.

1.02 This feature allows RTNR to adapt its alternate routing strategy for focused overloads to make network blocking performance more uniform for customers calling into and out of the overloaded switch. The feature modifications will help balance the blocking from and to a switch with focused overload without increasing overall network blocking.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

CCITT5 Proceed To Send (PTS) Signal Feature (3776)

28

Contents

CCITT5 Proceed To Send (PTS) Signal Feature (3776)

28

1. Feature Description

1.01 This feature provides an optional, minimum duration Proceed To Send (PTS) signal, which will assist in eliminating fraudulent calls via incoming International Telegraph and Telephone Consultative Committee No. 5 (CCITT5) signaling trunks.

1.02 This feature allows a modification to CCITT5 signaling which will make it more resistant to incoming fraudulent calls. The minimum duration of the PTS signal can be set to 700 ms for incoming CCITT5 call setup attempts. If an incoming F1 signal is present after the PTS signal has been sent, the call will be final handled using Final Handling Code 356. This feature also causes Clear Back (CLB) signals to be acknowledged by a CLB acknowledgement signal on outgoing call setup.

2. Call Flow

3. Provisioning

3.01 Recent Change (RC) Form 800 is used to set the minimum duration of the PTS signal in International Switching Center (ISC) offices. Entering 70 will provide a PTS minimum duration of 700 ms. Setting the minimum duration to 0 will turn this feature off. Values greater than 70 will be multiplied by 10 to provide timer values up to 1270 ms. Values from 1 through 69 are invalid.

4. Recording

5. Network Management

6. Maintenance/Troubleshooting

6.01 Final Handling Code 356, Persistent Seizure, will be used to indicate calls that fail due to the PTS signal timer.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature can be turned on or off using RC Form 800. Refer to "Provisioning" in this chapter.

8. Input/Output Manual Pages

GSDN Phase 2 International World Zone 1 (IWZ1) Dedicated Access Feature (3800)

29

Contents

GSDN Phase 2 International World Zone 1 (IWZ1) Dedicated Access Feature (3800)

29

1. Feature Description

1.01 This feature is necessary to effectively support the overwhelming demand for Global Software Defined Network (GSDN) dedicated voice access service in Canada.

1.02 The current architecture for GSDN voice service used with Canadian administrations is similar to the Software Defined Network (SDN) direct-connect architecture. Southbound calls from Canadian administrations arrive at the AT&T Canadian Gateways via a direct-connect trunk interface using domestic signaling. Calls are then directed to a standard SDN customer record, reserved for that administration, for further processing. The number of southbound locations that AT&T can support is limited to less than 800 by the SDN customer record. There is also excessive coordination and duplication required by the AT&T and Canadian work centers to provision the SDN customer records. Limitations within the Canadian networks limit northbound locations to less than 1000.

1.03 Due to unprecedented demand for GSDN service with Canadian administrations, the above limitations must be addressed. The dedicated GSDN Phase 2 voice access architecture is required to provide GSDN service with the IWZ1 administrations until another interface is available.

1.04 The dedicated GSDN Phase 2 voice service architecture is currently only available over international signaling facilities that terminate at International Switching Centers (ISCs). Several fields on the *4ESS*™ switch Trunk Subgroup (TSG) forms are administered to enable this service. For example, the DOM field is set to POTS, the GSDN field is set to Y, and GSDNPHSE field is set to Phase 1. Also, the BN

field is set to a 10-digit number in the form 198-000-ACCC, where "198" indicates GSDN service, "000" is a filler, "A" identifies the far-end foreign administration, and "CCC" identifies the country of the far-end administration. The single digit "A" that identifies the far-end foreign administration is referred to as the Foreign Administration Identification (FAI). An FAI can be set to any value from 1 through 9. The three digits that identify the IWZ1 country of the far-end administration are referred to as the Routing Code (RC). A IWZ1 RC can be set to any value from 000 to 199.

2. Call Flow (Not Affected)

3. Provisioning

Office Data Administration

3.01 Recent Change forms relating to populating data in the TSG 100 series will allow the item XL4TS_GSDN to be set for domestic signaling types as well as international. Also, a 10-digit billing number must be assigned to the TSG if bit 20 in word 1 of XL4TGBLOCK is set to 1.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

SDN NRA—Inclusion of ANI in AMA Record Feature (3843)

30

Contents

SDN NRA—Inclusion of ANI in AMA Record Feature (3843)

30

1. Feature Description

1.01 This feature standardizes recording for Software Defined Network (SDN) Network Remote Access (NRA) calls by adding the Automatic Number Identification (ANI) and the dialed 800 number on the Automatic Message Accounting (AMA) record of Express, Nonsequential Dialing and Sequential Dialing SDN NRA calls.

1.02 Prior to this feature, SDN NRA used four series of AMA structure codes to record AMA information for AMA calls. The first two series, x1063 and x1430, were used to record Express, Nonsequential Dialing and Sequential Dialing SDN NRA calls. Neither the calling party's ANI nor the 800 number were recorded for these calls. The second series, x1452 and x1456, were used for Improved Sequence Dialing (ISD) SDN NRA calls. For these calls, the *4ESS*™ switch recorded the ANI in the Originating Number field and the 800 number in the 800 Dialed Number field of the AMA structure codes.

1.03 With this feature, the *4ESS* switch uses the x1452 and the x1456 series of AMA structure codes for all SDN NRA calls. The net effect of this method is uniform recording of all SDN calls.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording

4.01 This feature has no impact on the way SDN NRA call records are processed by downstream systems.

4.02 Prior to this feature, Improved Sequence Dialing SDN NRA calls generated AMA structure codes x1452-5 and x1456-9, and other SDN NRA calls (Express, Nonsequential Dialing and Sequential Dialing) used AMA structure codes x1063-9 and x1430-3. With this feature, AMA structure codes x1452-5 and x1456-9 will be used for all SDN NRA calls.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment in the 3B Processor.

Internal Transition Issues

7.02 This feature can be loaded in the following generics: 4E16R4/4AP10, 4E16/4AP11 and 4E17R1/4AP11.

8. Input/Output Manual Pages (Not Affected)

Force Time-Critical Calls for *AT&T NetProtect*℠ Service into IC File Feature (3867)

31

Contents Page

Force Time-Critical Calls for *AT&T NetProtect*℠ Service into IC File Feature (3867)

31

1. Feature Description

1.01 This feature, which is proprietary to the AT&T inbound and outbound Business Units, forces Automatic Message Accounting (AMA) records that are needed by the *AT&T NetProtect*℠ Service to be routed to downstream systems within 1 hour after the call has terminated. All other switch customers will continue to have outbound international AMA records routed as designated on Office Data Assembler (ODA) Form 406M.

1.02 The *4ESS*™ switch AMA records are stored in one of two files on the AT&T 3B20D computer before being sent to the host collector or written to tape. The Network Services Division has designated the IC file for "time-critical" records and the OC file for "delay-tolerant" records. The AMA records stored in the IC file are transmitted to the host collector approximately 1 minute after they are created to ensure that Online Call Detail Data (OCDD) customers receive their call detail data in near real time. The AMA records stored in the OC file are not expected to reach the downstream systems as quickly. Thus, formatting may be deferred for several hours. This feature causes AMA records for all outbound international calls (as well as World Zone 1 calls that route to Numbering Plan Area 809) at *4ESS* switch toll offices to be stored in the IC file.

1.03 The *AT&T NetProtect* Service, an AT&T security offering, requires that AMA records for all outbound international calls be delivered to downstream systems within 1 hour after the call has terminated. To ensure that the records are delivered soon enough to meet the latency objective of *AT&T NetProtect* Service, AMA records for outbound international calls must be forced into the IC (time-critical) file. The purpose of this feature is to accomplish forcing the records needed by this service into the IC file.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording

Measurements

4.01 This feature impacts existing tracer counts by increasing counts for the fast file and decreasing counts for the slow file. These counts appear in the Call Assembly and Service Count Tracer records for IC and OC files.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

7.01 Before the software is loaded, sufficient 3B20D computer AMA disk partitions must be equipped for the stream designated "FAST" on ODA Form 406M. This is necessary to meet the anticipated load of outbound international AMA records at a specific *4ESS* switch office and to ensure that AMA records are not lost.

Turn On/Turn Off Mechanism

7.02 This feature is turned on automatically by software deployment. Ubiquity of the generic across the network is not required before the feature can be activated.

8. Input/Output Manual Pages (Not Affected)

Prefix Numbering Plan Area Digits for Reroute Control Feature (3868)

32

Contents

Prefix Numbering Plan Area Digits for Reroute Control Feature (3868)

32

1. Feature Description

1.01 This feature gives the *4ESS*™ switch the capability to prefix a 3-digit Numbering Plan Area (NPA) code to a 7-digit routing number. The 7-digit numbers to be prefixed are for calls that are rerouted to an access tandem switch by the Network Management Trunk Subgroup (TSG) reroute control. The capability to add the 3-digit NPA is invoked by new parameters that have been defined for the TSG reroute control. The Regional Network Management System (RNMS) is the only support system allowed to input the new reroute parameters. The RNMS specifies the option of prefixing digits in a reroute control message to the *4ESS* switch.

1.02 Because of interchangeable central office codes and interchangeable NPAs, certain Local Exchange Carriers (LEC) require that AT&T send the 10 digits when rerouting traffic to the LEC access tandems. Prior to this feature, the *4ESS* switch could only send a 7-digit number to an access tandem when rerouting a call where the access tandem was in the same NPA as the final destination of the call. As a result, calls that were rerouted to these access tandems failed during periods of heavy traffic. To solve this problem, a 3-digit NPA is prefixed to a 7-digit number to allow the *4ESS* switch to send a 10-digit number when rerouting traffic to those access tandems that require 10 digits.

1.03 This feature requires about 1400 words of AT&T 1A Processor program store. There is no impact on the AT&T 3B20D computer resources. For those calls that encounter a TSG reroute, there is a small impact on per-call real-time processing.

2. Call Flow

2.01 As requested by Network Management, a Trunk Hunting program will check the number of digits for a call rerouted to a specific via TSG. If the call has 7 digits, the Trunk Hunting will prefix the 3-digit NPA (passed from Network Management) to the 7 digits. If the call has 10 digits, the Trunk Hunting will not delete or prefix any digits regardless of the instructions specified in the Routing Data Block.

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management

Regional Network Management System

5.01 The following TSG control messages have been enhanced to allow the prefix option and the 3-digit NPA to be entered:

- Regular Reroute Control (Message 16)
- Code Specific Reroute Control (Message 17)
- Routing Data Block Specific Reroute Control (Message 18).

5.02 When the prefix option is requested, a maximum of six via TSGs may be used for rerouting. For these six via TSGs, the prefix option can be turned on or off by reroute control.

5.03 The demand messages (Data Blocks 49, 50, and 51) for the three reroute controls have also been enhanced to allow the NPA prefix information to be transmitted back to the RNMS.

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on automatically by software deployment. Ubiquity of the generic across the network is not required before the feature can be fully operational.

8. Input/Output Manual Pages (Not Affected)

Software Defined Data Network (SDDN) 700 Number Outward Dialing Feature (3883)

33

Contents Page

Software Defined Data Network (SDDN) 700 Number Outward Dialing Feature (3883)

33

1. Feature Description

1.01 The Software Defined Data Network (SDDN) 700 Number Outward Dialing feature provides SDDN customers with the capability of making calls from a SDDN direct-connect location to a domestic Switched Digital Services (SDS) direct-connect location.

1.02 This capability is currently provided by the SDDN Virtual On-Net (VON) feature. VON provides a 7- or 10-digit translation of the dialed number at the Software Defined Network (SDN) Network Control Point (NCP), so that SDDN customers can call from their direct-connect location to a SDS direct-connect location. With the VON approach, the Action Point Number (APN) of the terminating SDS location is provisioned into the SDN NCP for each customer that uses the service. In addition to provisioning, the VON approach involves maintenance efforts and costs, as well as a waiting period due to the provisioning interval, each time a customer wants to call a new SDS location.

1.03 The SDDN 700 Number Outward Dialing feature is not intended to replace the VON feature. It does, however, allow SDDN customers to call any domestic SDS location spontaneously, without the need to provision the SDN NCP with the APN of the terminating SDS location. The provisioning interval delay and associated maintenance efforts and costs are not incurred.

1.04 This feature utilizes the double dip (two database queries) scenario. In the first dip, the SDN NCP is queried for call screening and billing. In the second dip, the SDS NCP is queried to find the routing number.

1.05 This feature is available to all customers who have been provisioned to dial off-net data calls. This feature is also available for calls originating at any SDDN on-net locations defined within the customer's SDN private network.

1.06 The usage charge will be billed under SDN. The SDN NCP instructs the *4ESS*™ switch to place the dialed 700 number in the terminating number field of the Automatic Message Accounting (AMA) record. The SDN billing process will utilize the SDS 700 number database to assist in the rating of the calls according to a new per-minute rate schedule.

2. Call Flow

2.01 With this feature, SDDN customers can use the Software Defined Network Access (SDNA) domain to make calls to a SDS direct-connect location by dialing the 700 number assigned to the domestic SDS locations. The dialed number is in the format 700-56X-XXXX for non-Integrated Services Digital Network (ISDN) locations (56 kbps only) and 700-73X-XXXX for ISDN locations (56 kbps, 64 kbps clear, 64 kbps restricted, 384 kbps clear and 1536 kbps clear).

2.02 This feature affects call processing in that a second dip (or query) to the NCP occurs. The first dip is to the SDN NCP for call screening and SDN AMA billing treatment. The second dip is to the SDS NCP to obtain the desired routing number for the SDS destination. The second dip occurs for data calls having 700 as the first three dialed digits and a Direct Services Dialing (DSD) subtype of IN10.

3. Provisioning

3.01 There will no longer be a need to provision SDS locations in the SDN NCP.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Turn On/Off Mechanism

7.01 This feature is turned on automatically by software deployment.

Internal Transition Issues

7.02 If Routing According to Bearer Capability (Feature 62) is installed in the *4ESS* switch, it must be removed before the SDDN 700 Number Outward Dialing feature is deployed. Feature 282, Removal of Routing According to Bearer Capability, is used to remove Feature 62 and, if required, must be activated before the SDDN 700 feature is deployed. Feature 282 is activated as described in the AT&T 234-090-162AC, *4ESS™ Switch, Product Release Document, 4E16 Release 2 Generic.*

8. Input/Output Manual Pages (Not Affected)

AT&T 3B20D Computer/Direct Link Node Recent Change Inhibit Enhancements Feature (3898)

34

Contents Page

AT&T 3B20D Computer/Direct Link Node Recent Change Inhibit Enhancements Feature (3898)

34

1. Feature Description

1.01 Introduced in the 4E16 Release 1 Generic, 10-digit Global Title Translation (GTT) recent changes are entered on the *4ESS*™ switch via the AT&T 3B20D computer. Recent changes are updated on the Direct Link Node (DLN) on the Common Network Interface (CNI) ring to perform call processing. All DLNs in a *4ESS* switch, and for some services, all switches in the AT&T Switched Network (ASN), are updated at the same time. Because of the mass update, the possibility exists for one recent change to remove all equipped DLNs from service.

1.02 With the introduction of the 3B20D Computer/DLN Recent Change enhancement, an automatic recent change inhibit is activated if the *4ESS* switch determines that the DLNs have been removed from service. This inhibit will not allow additional updates to take place. The in-progress order is removed from the disk database, and the requester is notified that the order has been removed. Once the inhibit is activated and every 15 minutes thereafter, a message is sent to the 3B20D computer Read-Only Printer (ROP) and the Switching Control Center System (SCCS) channel indicating the active status of the inhibit. The initial message (denoting the inhibit) will carry a major alarm status. All subsequent messages will carry a minor alarm status.

1.03 Along with alarms, new craft commands are provided that allow the Technology Control Center (TCC) and the National Electronic Switching Assistance Center (NESAC) to obtain additional information when the 3B20D Computer/DLN Recent Change Inhibit has found a problem and has turned off recent changes. One craft command gives the fault recovery escalation status and the time left before the fault recovery escalation status will be reset. Another craft command allows the DLN fault recovery escalation to be reset manually.

2. Call Flow (Not Affected)

3. Provisioning

3.01 With the inhibit set, the Integrated Routing Assignment System (IRAS) cannot perform 10-digit GTT recent changes. If the trouble is not resolved in a timely manner, inbound services' DMOQs may be negatively affected.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

6.01 The DLN Inhibit feature stops 10-digit recent change activity in the event where a recent change is the probable cause of a loss in all DLNs (that is, all DLNs being removed from service by software) in a *4ESS* switch.

6.02 When the DLN Inhibit feature triggers, the currently active 10-digit recent change command is backed out of the database. Also, further 10-digit recent changes are not allowed until the **ALW:RCV:APPDB** Input Message is entered to the *4ESS* switch. When this condition occurs, the trouble requires immediate attention and should be reported to the NESAC as soon as possible.

6.03 The **ALW:RCV:APPDB** Input Message will enable the 10-digit GTT recent change capability. The action should ***not*** be taken until the problem causing the DLN Inhibit feature to trigger has been found, and it has been determined that it is safe to allow new recent change activity.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is available automatically by software deployment. It will be invoked (turned on) either automatically by software or manually by command. It can be deactivated (turned off) manually only by command.

8. Input/Output Manual Pages

8.01 The following Input/Output messages are affected:

Input:	Output:
CLR:DLNESC	**RC:MISC, FHT,FTA**
OP:DLNESC	**OP DNLESC**
INH:RCV:APPDB	**CLR DLNESC**
ALW:RCV:APPDB	**INH RCV APPDB**
OP:INH:APPDB	**ALW RCV APPDB**
	REPT INH RCV APPDB
	OP INH APPDB

See the attached manual pages for detailed explanations.

ID ..... CLR:DLNESC
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Input

1. PURPOSE

Clears the DLN Recovery Escalation parameters.

This input command requests that the "DLN Recovery Escalation parameters" (i.e., the number of DLN initializations performed since the last diagnostic and the time designation of the last diagnostic activity) for ALL DLNs be reset.

This action will prolong the interval of time before any DLN is automatically removed from service by the RING INIT process for diagnostic testing.

2. FORMAT

CLR:DLNESC!

3. EXPLANATION OF MESSAGE

None.

4. SYSTEM RESPONSE

`PF` Message accepted and `CLR-DLNESC` output message follows.

`RL DLNCM DOES NOT EXIST` DLN Driver does not exist. This condition is valid only during 3B initialization (retry later). Otherwise, TCC and NESAC should be notified.

`RL CANNOT GET DLN STATUS` DLN Driver not responding to DLN status requests by this process. This condition is valid only during 3B initialization (retry later). Otherwise, TCC and NESAC should be notified.

`RL CANNOT ATTACH TO ECD` System conditions do not allow this process to read the Equipment Configuration Database (retry later).

`RL UNABLE TO OPEN TMP FILE` System conditions do not allow this process to create a temp file for spooling output (retry later).

5. REFERENCES

Input Message
`OP:DLNESC`

Output Messages
`CLR-DLNESC`
`OP-DLNESC`

ID ..... OP:DLNESC
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Input

1. PURPOSE

Requests DLN Recovery Escalation parameters.

This command will output the current "DLN Recovery Escalation parameters" (i.e., the number of DLN initializations performed since the last diagnostic and the time designation of the last diagnostic activity) for ALL DLNs.

See the `OP-DLNESC` output message manual page for details on the output resulting from this command.

2. FORMAT

`OP:DLNESC!`

3. EXPLANATION OF MESSAGE

None.

4. SYSTEM RESPONSE

`PF` Message accepted and `OP-DLNESC` output message follows.

`RL DLNCM DOES NOT EXIST` DLN Driver does not exist, probably initializing (retry later or recover DLNCM).

`RL CANNOT GET DLN STATUS` DLN Driver not responding to DLN status requests by this process, probably initializing (retry later or recover DLNCM).

`RL CANNOT ATTACH TO ECD` System conditions do not allow this process to read the Equipment Configuration Database (retry later).

`RL UNABLE TO OPEN TMP FILE` System conditions do not allow this process to create a temp file for spooling output (retry later).

5. REFERENCES

Input Message
`CLR:DLNESC`

Output Messages
`CLR-DLNESC`
`OP-DLNESC`

ID ..... INH:RCV:APPDB
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Input

1. PURPOSE

Invoke "DLN Inhibit" feature. This will inhibit the ability to perform recent changes to the GTT10D Database (for both 252 and 253 translations) until the inhibit is turned "off" with the `ALW:RCV:APPDB` command.

2. FORMAT

`INH:RCV:APPDB!`

3. EXPLANATION OF MESSAGE

None.

4. SYSTEM RESPONSE

`PF`	Message accepted and printout will follow.
`NG-INHIBIT ALREADY ACTIVE`	GTT10D RCV already disallowed.

5. REFERENCES

Input Messages
- `ALW:RCV:APPDB`
- `OP:INH:APPDB`

Output Messages
- `ALW-RCV-APPDB`
- `INH-RCV-APPDB`
- `OP-INH-APPDB`
- `REPT-INH-RCV`
- `RC:MISC-FHT-FTA`

ID ..... ALW:RCV:APPDB
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Input

1. PURPOSE

Deactivates "DLN Inhibit" feature. This will allow the ability to perform recent changes to the GTT10D Database (for both 252 and 253 translations) until the inhibit is activated with the `INH:RCV:APPDB` command or via the "DLN Inhibit" trigger in the `RC:MISC;FHT,FTA` command.

2. FORMAT

`ALW:RCV:APPDB!`

3. EXPLANATION OF MESSAGE

None.

4. SYSTEM RESPONSE

`OK` Message accepted.

5. REFERENCES

Input Messages
`INH:RCV:APPDB`
`OP:INH:APPDB`

Output Messages
`ALW-RCV-APPDB`
`INH-RCV-APPDB`
`OP-INH-APPDB`
`REPT-INH-RCV`
`RC:MISC-FHT-FTA`

ID ..... OP:INH:APPDB
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Input

1. PURPOSE

Outputs the status of the "DLN Inhibit" feature.

2. FORMAT

OP:INH:APPDB!

3. EXPLANATION OF MESSAGE

None.

4. SYSTEM RESPONSE

PF	Message accepted and OP-RCV-APPDB output message follows.

5. REFERENCES

Input Messages

ALW:RCV:APPDB
INH:RCV:APPDB

Output Messages

ALW-DLNAUD
INH-DLNAUD
OP-DLNAUD
REPT-INH-RCV
RC:MISC-FHT-FTA

ID . . . . . RC:MISC-FHT-FTA
WORK CENTER . . MOC
GENERIC . . . . . 4AP11 Rel. 2 and later
APPLICATION . . 4E
TYPE . . . . . Output

1. FORMAT

The following variations of the format given below describe the ways in which information can be represented in the output message.

For messages preceded by ?I (invalid) or RL (retry later) the output will be as follows:

[1]
```
M 18 RC MISC FHT FTA GTT10Daaa bbbbbbbbb COMPLETE
[ERROR MESSAGE]
```

where [ERROR MESSAGE] can be one of the following:

```
USER ERRORS:
(1) ?I - MESSAGE FORMAT = RC:MISC;FHT,FTA
(2) ?I - INVALID FUNCTION AND TT TYPE
(3) RL - ANOTHER RC or VER IS ACTIVE

PROGRAM ERRORS:
(1) RL - CAN'T ATTACH CNIPAS
```

For messages produced by invalid user syntax the output will be as follows:

[2]
```
M 46 RC MISC FHT FTA GTT10Daaa bbbbbbbbb COMPLETE
[ERROR MESSAGE]
```

[11]
```
M 46 RC MISC FHT FTA GTT10Daaa bbbbbbbbb COMPLETE
RC FOR ORDER bbbbbbbbb REJECTED
```

where [ERROR MESSAGE] can be one of the following:

```
(1)  NG - MUST SUPPLY AN ORDER NUMBER
(2)  NG - ORDER NUMBER LONGER THAN 9
(3)  NG - FIRST 4 CHARS OF ORDER# MUST BE ALPHABETIC
(4)  NG - MISSING DATA: COMMAND
(5)  NG - INVALID COMMAND
(6)  NG - ERROR ON COMMAND SPECIFICATION
(7)  NG - MISSING DATA: PROCESSING FLAG
(8)  NG - INVALID PROCESSING FLAG
(9)  NG - MISSING KEYWORD NUM
(10) NG - MISSING DATA: RC RELATION
(11) NG - RELATION 4 NOT USED FOR DELETE
(12) NG - RELATION 4 NOT USED FOR CHANGE
(13) NG - INVALID RC/VER RELATION
```

```
(14) NG - MISSING DATA: CUSTID
(15) NG - MISSING DATA: OLD CUSTID
(16) NG - CUSTID OUT OF RANGE
(17) NG - CUSTID IS NOT 10 BYTES
(18) NG - CUSTID CONTAINS LETTERS
(19) NG - CUSTID MUST BE ZERO
(20) NG - OLD/NEW CUSTID CAN'T EQUAL
(21) NG - MISSING DATA: PRIM SSN
(22) NG - PRIM SSNPC CONTAINS LETTERS
(23) NG - PRIM SSNPC NOT 12 BYTES
(24) NG - PRIM SSN OUT OF RANGE
(25) NG - PRIM PC OUT OF RANGE
(26) NG - CNI UNROUTABLE FOR PRIM NCP INFO
(27) NG - MISSING DATA: SEC SSNPC
(28) NG - SEC SSNPC CONTAINS LETTERS
(29) NG - SEC SSNPC NOT 12 BYTES
(30) NG - SEC SSN OUT OF RANGE
(31) NG - SEC PC OUT OF RANGE
(32) NG - CNI UNROUTABLE FOR SEC NCP INFO
(33) NG - RECKEY HAS INVALID LENGTH
(34) NG - RECKEY MUST BE 10 OR 6 DIGITS FOR APN ANIs
(35) NG - RECORD KEY CONTAINS LETTERS
(36) NG - RECKEY MIXES LENGTH
(37) NG - TOO MANY RECKEYS: MAX OF 10 ALLOWED
(38) NG - INVALID RANGE SPECIFIED
(39) NG - RECORD KEY MUST BE ZERO
(40) NG - ONLY ONE RECORD KEY ALLOWED
(41) NG - MUST USE RELATION 3 FOR THIS CHANGE
(42) NG - OLD CUSTID MUST EQUAL NEW CUSTID FOR RELATION 3
(43) NG - POINT CODE HAS INVALID NETWORK ID
(44) NG - POINT CODE HAS INVALID CLUSTER ID
(45) NG - POINT CODE HAS INVALID REGION
(46) NG - POINT CODE HAS INVALID MEMBER
(47) NG - NO ROUTING DATA EXISTS FOR POINT CODE
```

For messages produced by errors while performing database searching or database actions (add, delete, change) before any data has been written to the database, the output will be as follows with the following output being displayed:

[3]
```
M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
[ERROR MESSAGE]
```

[4]
```
M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
ERR xxx ADDING RECKEY ccccccccc
```

[5]
```
M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb COMPLETE
RC FOR ORDER bbbbbbbbb COMPLETE - DLN UNCHANGED
```

where [ERROR MESSAGE] can be one of the following:

```
USER ERRORS:
(1)  NG - ANIs EXIST IN THIS RANGE
(2)  NG - RANGE INVALID WHEN STARTED WITH LIST
(3)  NG - USER DATA DOES NOT REFLECT CHANGE
(4)  NG - NO CUST DATA FOUND
(5)  NG - NO NCP DATA FOUND
(6)  NG - CANNOT SPLIT RANGE ON CHANGE
(7)  NG - ANI DATA PREVIOUSLY EXISTS
(8)  NG - NO ANI DATA FOUND
(9)  NG - TT 252 NOT VALID WITH 3 DIGIT ANIs
(10) NG - RECKEYS STILL POINT TO THIS CUSTID
(11) NG - NO AVAILABLE NCP ENTRIES
(12) NG - CUST DATA PREVIOUSLY EXISTS
(13) NG - CANNOT HAVE ONE CUSTID POINTING TO TWO NCPs

PROGRAM ERRORS:
(1)  DB - ERROR ACCESSING DATA TABLE
(2)  DB - ERROR ALLOCATING HEAD TABLE
(3)  DB - ERROR POPULATING DLN UPD ARRAY
(4)  DB - ERROR LSEEKING TO BINK ZERO
(5)  DB - ERROR READING BINK ZERO
(6)  DB - ERROR LSEEKING TO DATA TABLE
(7)  DB - ERROR ALLOCATING HEAD TABLE
(8)  DB - ERROR DEALLOCATING DATA TABLE
(9)  DB - ERROR WRITING BINK ZERO
(10) DB - ERROR OPENING DATABASE
(11) DB - ERROR CLOSING DATABASE
(12) DB - ERROR WRITING DATA TABLE
(13) DB - ERROR SORTING DATA TABLE
(14) DB - INVALID ANI TABLE POINTER
(15) DB - ERROR SENDING RC MESSAGE TO ARTS
(16) DB - ERROR GETTING ARTS PORT
(17) DB - ERROR CREATING ROLLBACK FILE
(18) DB - ERROR ALLOCATING RC STRUCTURE
```

For messages produced by errors while performing database adding, deleting, or changing after data has been written to the database, the output will be as follows with the following output being displayed:

[3] `M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS [ERROR MESSAGE]`

[6] `M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS ROLLING BACK DATABASE`

[7] `M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS ORDER HAS BEEN ROLLED BACK`

[4] M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
ERR xxx ADDING RECKEY ccccccccc

[5] M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb COMPLETE
RC FOR ORDER bbbbbbbbb COMPLETE - DLN UNCHANGED
DLN ERROR CODE = X'dddddddd

For messages produced by errors while performing database adding, deleting, or changing after data has been written to the database and the rollback function was not successful, the output will be as follows:

[3] M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
[ERROR MESSAGE]

[6] M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
ROLLING BACK DATABASE

[8] M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
[ERROR MESSAGE1]

[9] M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
AUTOMATIC ROLLBACK FAILED

[4] M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
ERR xxx ADDING RECKEY ccccccccc

[5] M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb COMPLETE
RC FOR ORDER bbbbbbbbb COMPLETE - DLN UNCHANGED
DLN ERROR CODE = X'dddddddd

and where [ERROR MESSAGE1] can be one of the following:

PROGRAM ERRORS:
(1) DB - ERROR UNLOCKING DATABASE
(2) DB - ERROR OPENING ROLLBACK FILE
(3) DB - ERROR CLOSING ROLLBACK FILE
(4) DB - ROLLBACK FILE DOES NOT EXIST
(5) DB - ERROR READING DATABASE
(6) DB - ERROR WRITING DATABASE
(7) DB - ERROR LSEEKING DATABASE

On a successful recent change the following output will be produced:

[10] M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb COMPLETE
RC FOR ORDER bbbbbbbbb COMPLETE UPD CODE = X'dddddddd

On a successful recent change, but the DLN is not updated, the following output will be produced:

```
[5]   M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
      RC FOR ORDER bbbbbbbbb COMPLETE - DLN UNCHANGED
      DLN ERROR CODE = X'dddddddd
```

On a successful recent change, but catastrophic (i.e., a recent change causing all DLNs to be removed from service) errors resulted during DLN update, the following output will be produced for a four DLN office:

```
[12]  M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
      RC FOR ORDER bbbbbbbbb COMPLETE - DLN UNCHANGED
      DLN ERROR CODE = X'44444444
```

or, for a two DLN office:

```
[12]  M 32 RC MISC FHT FTA GTT10Daaa bbbbbbbbb IN PROGRESS
      RC FOR ORDER bbbbbbbbb COMPLETE - DLN UNCHANGED
      DLN ERROR CODE = X'44440707
```

In either case, the recent change causing this error message will be backed out (via rollback) and the "DLN Inhibit" trigger will be activated. This trigger will disallow any RCV activity (except VERIFYs) to the database until manual action (see ALW:RCV:APPDB) is taken to correct the trouble. The entire RC:MISC-FHT-FTA message will be echoed to the ROP.

2. REASON FOR OUTPUT

To request the user to add, delete, verify, or change all record keys that are specified in the input message.

To verify the correctness of a message, acknowledge receipt of a message, to communicate with the user technician, and to perform the database routine specified in the message.

3. VARIABLE FIELD DEFINITIONS

aaa	Translation type: may have a value of 252 for SDN services or 253 for 800 services.
bbbbbbbbb	Order number: the first four characters signify where the RC originated; the last five characters signify a unique number for the recent change.
cccccccccc	Record key: indicates which record in the list or range was in error.
dddddddd	32-bit update code for DLNs which represents errors or success for 4 DLNs.

Each byte is a positive 7-bit update return code:

0 — SUCCESS.
1 — appdb pump in progress.
2 — aci pump in progress.
3 — aci update in progress.
4 — dln is OOS.
5 — no TCB resources for child task.
6 — appdb update timeout (> 15 seconds).
7 — dln is UNEQUIPPED.
10 — Udlnappdb() failed to open the database.
30 — _updappdb() # elements out of range.
31 — _updappdb() dlnid out of range.
32 — _updappdb() failed to send dln update start command.
33 — _updappdb() bad dln response to update start command.
34 — _updappdb() unable to Lseek() to appdb changed area.
35 — _updappdb() unable to Read() to appdb changed area.
36 — _updappdb() failed to send dln read start command.
37 — _updappdb() bad dln response to read start command.
38 — _updappdb() failed to send dln update complete command.
39 — _updappdb() bad dln response to update complete command.

xxx — Error number. See Error Codes at the end of this message.

4. ACTION TO BE TAKEN

Format 1: These are responses that are out of the user's control. The user should retry the message.

Format 2: These are normal responses to format errors of the RC:MISC;FHT,FTA input message. The user should check the message typed on the screen against rules given in the input manual page.

Formats 3, 6, 7, 8, and 9: These are error responses encountered from programs that are initiated by the recent change message. The user should check the correctness of the data entered in the message and the error code returned.

Format 4: Error message with a code indicating recent change error.

Format 5: Complete message on a failure.

Format 10: Represents success. No action taken.

Format 12: There was a problem with the DLNs.

5. REFERENCES

Input Messages

```
ALW:RCV:APPDB
CLR:DLNESC
INH:RCV:APPDB
OP:DLNESC
OP:INH:APPDB
RC:MISC;FHT,FTA
```

Output Messages

```
ALW-RCV-APPDB
CLR-DLNESC
INH-RCV-APPDB
OP-DLNESC
OP-INH-APPDB
REPT:INH-RCV-APPD
```

Error Codes for GTT Data Applications

Error Codes for GTSEARCH

Errno	Definition
200	Invalid translation type on input
201	Invalid command specified from RC
202	Database is locked by another process
203	Invalid bink accessed by offset
204	Invalid popflag found in database
205	Invalid NCP index found in CUSTID table
206	Could not find a space to search
207	Translator has not been equipped
208	Data already exists for an add
209	Data not exist for del, chg, or ver
210	Search was successful for data
211	Invalid bytes specified for widget

Error Codes for GTADD

Errno	Definition
220	NCP data does not exist
221	No slot to add data in SAPA or SAPC
222	Accessed invalid defflag for add level
223	Level is not valid for adding
224	Level is out of range 1 to 7
225	Invalid RC update relation
226	Cust record does not point to correct NCP
227	NCP index exists at CUST table
228	NCP data exists at NCP table
229	Cust record does not point to an NCP
230	Error accessing head tables
231	Error performing OST to DLN for updates
232	Error in the length of record key
233	DLN update array exceeded its boundary
234	Split of ranges not allowed for change
235	Cannot have one custid pointing to two NCPs
236	Flag to tell level 3 of `sapa` range function
237	Flag to tell level 3 of `sapb` range function

Error Codes for GTROLLBK

Errno	Definition
240	Rollback file already created
241	Error accessing or writing rollback file
242	Rollback file is full of orders
243	No rollback file name supplied on input
244	Invalid number of orders on input
245	Not enough memory for rollback file

Error Codes for GTDEL

Errno	Definition
250	There was no DEF entry found for table
251	There was no populated entry in table

Error Codes for GTGETROLL

Errno	Definition
255	Order number not found in rollback file

ID ..... OP-DLNESC
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

[1]
```
OP DLNESC COMPLETE
[MESSAGE]
[MESSAGE]
```

[2]
```
OP DLNESC COMPLETE
[MESSAGE]
[MESSAGE]
[MESSAGE]
[MESSAGE]
```

where `[MESSAGE]` is one of:

```
-DLN LNxx yy: COUNT=aaaa, TIME=bbbbbbbb
-CANNOT GET UCB FOR DLN LNxx yy - ERR=eee
-CANNOT FIND UCB FOR DLN LNxx yy
```

2. REASON FOR OUTPUT

This output is the result of an `OP:DLNESC` input command.

In an office with four DLNs, the normal response for the `OP-DLNESC` output will be Format 2, with each `[MESSAGE]` indicating the COUNT and TIME escalation parameters for one of the four DLNs. In offices with two DLNs, Format 2 will print. Other output is printed only as abnormal conditions are encountered during program execution.

3. VARIABLE FIELD DEFINITIONS

`LNxx`	Group number of DLN.
`yy`	Member number of DLN.
`eee`	System error indication. See Output Appendix SYSERR-APP.

4. ACTION TO BE TAKEN

None.

5. REFERENCES

Input Messages
`CLR:DLNESC`
`OP:DLNESC`

Output Message
CLR-DLNESC

ID ..... CLR-DLNESC
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

[1]
```
CLR DLNESC COMPLETE
DLN LNxx yy ESCALATION PARAMS CLEARED
```

[2]
```
CLR DLNESC COMPLETE
[MESSAGE]
   .
   .
   .
```

where [MESSAGE] is one of:

```
-CANNOT GET UCB FOR DLN LNxx yy - ERR=eee
-CANNOT FIND UCB FOR DLN LNxx yy
-CANNOT CLR RCCNT FOR DLN LNxx yy- ERR=eee
-CANNOT CLR RCCNT FOR DLN LNxx yy- ERR=eee
```

2. REASON FOR OUTPUT

This output is the result of a CLR:DLNESC input command.

Format 1 is the "normal case", indicating that the CLR:DLNESC command executed with no errors.

Format 2 is output when errors occur during execution of the CLR:DLNESC command. [MESSAGE] indicates the exact error encountered.

3. VARIABLE FIELD DEFINITIONS

LNxx	Group number of DLN.
yy	Member number of DLN.
eee	System error indication.

4. ACTION TO BE TAKEN

None.

5. REFERENCES

Input Messages
CLR:DLNESC
OP:DLNESC

Output Message
OP-DLNESC

ID ..... INH-RCV-APPDB
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

[1] `INH RCV APPDB ACTIVE`

[2] `INH RCV APPDB CANNOT SET LOCK - REASON a`

2. REASON FOR OUTPUT

These output messages are printed as a direct result of the `INH:RCV:APPDB` input message. Format 1 prints if the "DLN Inhibit" feature has been activated with no problems. GTT10D RCV is inhibited.

Format 2 prints if a system error is encountered while trying to activate the inhibit. The DLN Inhibit feature is NOT activated.

3. VARIABLE FIELD DEFINITIONS

a	System error code. See Output Appendix SYSERR-APP.

4. ACTION TO BE TAKEN

No action required for Format 1.

If Format 2 prints, determine if system conditions indicate that trouble with 3B disk access is expected. NESAC should be notified if this trouble is not expected.

Also, CNAC should be notified that the "DLN Inhibit" feature could not be activated.

5. REFERENCES

Input Messages
- `ALW:RCV:APPDB`
- `INH:RCV:APPDB`
- `OP:INH:APPDB`

Output Messages
- `ALW-RCV-APPDB`
- `OP-INH-APPDB`

ID ..... REPT:INH-RCV-APPD
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

```
REPT INH RCV APPDB ACTIVE
```

2. REASON FOR OUTPUT

During the intervals when the "DLN Inhibit" feature is active (i.e., GTT10D RCV is inhibited due to potential RCV software problems that are causing total DLN outages), this 4ESS output message will print on the system ROP on a 15-minute basis. The output message prints with a MINOR alarm status.

The message is also output when the trigger in RC:MISC initially activates the "DLN Inhibit" feature. In this case, the output message is printed with a MAJOR alarm status.

The "DLN Inhibit" feature can be deactivated via the `ALW:RCV:APPDB` input command. HOWEVER, it is HIGHLY recommended that the cause of the inhibit activation be studied and determined before it is deemed "safe" to allow GTT10D recent change.

3. VARIABLE FIELD DEFINITIONS

None.

4. ACTION TO BE TAKEN

Call CNAC. The problem will be escalated to NESAC and 4ESS Field Support if necessary.

5. REFERENCES

Input Messages

```
ALW:RCV:APPDB
INH:RCV:APPDB
OP:INH:APPDB
```

Output Messages

```
ALW-RCV-APPDB
INH-RCV-APPDB
OP-INH-APPDB
```

ID ..... OP-INH-APPDB
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

[1] `OP INH APPDB ACTIVE`

[2] `OP INH APPDB INACTIVE`

2. REASON FOR OUTPUT

These output messages are printed in response to the `OP:INH:APPDB` input message.

Format 1 indicates that the "DLN Inhibit" feature is active. GTT10D RCV is NOT allowed.

Format 2 indicates that the "DLN Inhibit" feature is NOT active. GTT10D RCV is allowed.

3. VARIABLE FIELD DEFINITIONS

None.

4. ACTION TO BE TAKEN

None.

5. REFERENCES

Input Messages
`ALW:RCV:APPDB`
`INH:RCV:APPDB`
`OP:INH:APPDB`

Output Messages
`ALW-RCV-APPDB`
`INH-RCV-APPDB`

ID ..... ALW-RCV-APPDB
WORK CENTER.. MOC
GENERIC..... 4AP11 Rel. 2 and later
APPLICATION .. 4E
TYPE ..... Output

1. FORMAT

[1] `ALW RCV APPDB ACTIVE`

[2] `ALW RCV APPDB CANNOT CLEAR LOCK - REASON a`

2. REASON FOR OUTPUT

These output messages are printed as a direct result of the `ALW:RCV:APPDB` input message. Format 1 prints if the "DLN Inhibit" feature has been deactivated with no problems. GTT10D RCV is now allowed.

Format 2 prints if a system error is encountered while trying to deactivate the inhibit. The "DLN Inhibit" is STILL in effect.

3. VARIABLE FIELD DEFINITIONS

a System error code. See Output Appendix SYSERR-APP.

4. ACTION TO BE TAKEN

No action required for Format 1.

If Format 2 prints, determine if system conditions indicate that trouble with 3B disk access is expected. If such trouble is NOT expected, notify NESAC.

Also, CNAC should be notified that the "DLN Inhibit" feature cannot be deactivated.

5. REFERENCES

Input Messages
`ALW:RCV:APPDB`
`INH:RCV:APPDB`
`OP:INH:APPDB`

Output Messages
`INH-RCV-APPDB`
`OP-INH-APPDB`

Call Complete with Dual Tone Multifrequency Congestion Feature (3904)

35

Contents

Call Complete with Dual Tone Multifrequency Congestion Feature (3904)

35

1. Feature Description

1.01 The Call Complete with Dual Tone Multifrequency (DTMF) Congestion feature allows calls to complete whenever a DTMF receiver is unavailable to:

- Collect a Subaccount Billing (SAB) code from a subscriber
- Collect a Call Type Indicator (CTI) code from a Mixed-Use Voice/Facsimile (FAX) subscriber
- Indicate on the Automatic Message Accounting (AMA) record that the call was processed without providing a DTMF receiver to collect the preceding information.

1.02 If the Automatic Number Identification (ANI) data indicates that the caller is an SAB subscriber, the *4ESS*™ switch connects a DTMF receiver to the call. If no receiver is available, the call is placed in queue. If the caller waits for 5 seconds (+0.25 seconds), the call is removed from queue and the connection is made without collecting an SAB code.

1.03 If no DTMF receiver is available to collect the CTI code from a Mixed-Use Voice/FAX subscriber, the call is also placed in queue. The *4ESS* switch handles the call the same as for an SAB subscriber. Once the connection is made, however, the call is treated as a Voice call.

1.04 This feature is an enhancement to Positive Call Processing (Feature 193a) and is proprietary to AT&T.

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording

4.01 The Answer Indicator (Table 9) in the AMA record is set to **7** if an AMA record is required for a call that is eligible for, but not provided with, DTMF processing (collecting the SAB or CTI code), and the call is answered. The Answer indicator is set to **8** if the call is not answered.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

6.01 The DTMF receiver queue overload count, **TS4PCPDTMFOVLDMC3**, is pegged if no DTMF receiver is available.

7. Transition Considerations

Turn On/Turn Off Mechanism

7.01 This feature is turned on by a 1A Recent Change [by populating Office Data Administration (ODA) Form 406Z, Field OD4PCP].

8. Input/Output Manual Pages (Not Affected)

A-Law/Mu-Law Modification Requirement for CCITT No. 7 Feature (3931)

36

Contents Page

A-Law/Mu-Law Modification Requirement for CCITT No. 7 Feature (3931)

36

1. Feature Description

1.01 This feature modifies the coding of the User Service Information (USI) parameter in the Initial Address Message (IAM) to provide the third octet for use by foreign switching administrations. In order to align AT&T's International Integrated Services Digital Network User Part (ISUP) implementation with the International Telegraph and Telephone Consultative Committee (CCITT) No. 7 standards, a modification was necessary. The modification specifies user information protocol layer 1 identification (ID) and either "A-law" or "Mu-law" in octet 3 for speech and 3.1-kHz audio calls. Octet 3 information is sent in the USI parameter in the IAM for all outbound and outgoing transit calls for both speech and 3.1-kHz calls.

1.02 The setting of A-law or Mu-law (that is, speech encoding laws) is determined by trunk subgroup data which is recent changeable and which reflects the coding law of the country receiving the call. The default setting for the trunk subgroup characteristics is A-law.

1.03 Under the previous AT&T International ISUP implementation, the USI parameter in the IAM was populated at the outgoing trunk for *all* International ISUP outbound and outgoing transit calls. However, the layer ID and the layer 1 protocol ID (octet 3) of the USI parameter were omitted for speech and 3.1-kHz calls. The CCITT standards specify that for speech and 3.1-kHz audio calls, the layer ID and layer 1 protocol ID fields must be present. The layer 1 protocol ID is a fixed code which always indicates user information layer 1, while the layer 1 protocol ID for speech or 3.1 kHz may indicate A-law or Mu-law.

2. Call Flow (Not Affected)

3. Provisioning

3.01 If a trunk subgroup is recent changed to indicate Mu-law encoding, it is important to remember to reenter the field value when performing a subsequent change to *another* field on the Recent Change form. Failure to do so would result in the default (A-law encoding) being set.

3.02 The Recent Change forms affected by this feature are those used to add and change International ISUP outgoing trunk subgroup characteristics. They are as follows:

- 102—Add a new 1-way outgoing trunk subgroup
- 109—Change a 1-way outgoing trunk subgroup
- 100—Add a new 2-way trunk subgroup
- 107—Change a 2-way trunk subgroup.

3.03 For generic 4E17 Release 1, the **S3** field on the Recent Change forms is used to enter and verify the outgoing layer 1 protocol ID value. The default value is "0" or "blank" which is interpreted as A-law. (The initialized value in memory is "0".) When **S3** is set to "1", it is interpreted as Mu-law. When a change request is processed for **S3**, an error check is performed to ensure that the trunk subgroup is International ISUP.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

7.01 A generic 4E17 overwrite is needed at retrofit at three east coast International Switching Centers (ISC) to send the A-law value in octet 3. The 4E17 overwrite will use a trunk subgroup indicator to determine whether to send A-law or Mu-law in

octet 3. To transition without recent changing the trunk subgroup data at retrofit, generic 4E17 overwrite will enable a spare bit to be checked for all International ISUP trunk subgroups. An unused spare bit (S3) is used in generic 4E17.

7.02 Two west coast ISCs will also need the 4E17 overwrite but not coincident with their retrofits. They will need to recent change the spare bit of their Mu-law country International ISUP trunk subgroups to "1", so that Mu-law is sent in octet 3. After the spare bit is recent changed, the overwrite should be installed.

Turn On/Turn Off Mechanism

7.03 This feature is turned on automatically by software deployment. Ubiquity of the generic across the network is required before the feature can be fully operational.

8. Input/Output Manual Pages (Not Affected)

Abbreviations and Acronyms

A

ABC
Adjunct Based Capabilities

ABR
Announcement Before Routing

ACCL
Automatic Congestion Control Level

ACI
AT&T Communications Interface

ACM
Address Complete Message

ACT
Activate

ACV
Access Charge Verification

ADE
Application Development Environment

AHC
Adjunct Head Cell

AMA
Automatic Message Accounting

AMS
AT&T Message Service

ANI
Automatic Number Identification

ANS
Answer

ANSI
American National Standards Institute

ANT
Alternate Number Translations

APN
Action Point Number

ASN
AT&T Switched Network

ASTN
Alternate Signaling Transport Network

B

BL
Building

BN
Billing Number

BOC
Bell Operating Company

BTFN
Base Traffic Number

BUF
Buffer

BWM
Broadcast Warning Message

C

CAMA
Centralized AMA

CANI
Customer ANI

CC
Call Type

CC
Country Code

CCC
Commercial Credit Card

CCF
Concentrated Call Feature

CCITT
International Telegraph and Telephone Consultative Committee

CCR
Continuity Check Request

CCS
Common Channel Signaling

CCS7
Common Channel Signaling System 7

CDI
Call Disposition Information

CDR
Call Detail Recording

CFA
Customer Feature Available

CIC
Circuit Identification Code

CLB
Clear Back

CNI
Common Network Interface

CPA
Common Platform Adjunct

CPG
Call Progress

CPS
Call Progress Stopped

CRM
Circuit Reservation Message

CRV
Call Reference Value

CSR
Customer Specific Recording

CTI
Call Type Indicator

CUG
Closed User Group

D

D-ACC
Dynamic-Automatic Congestion Control

DLN
Direct Link Node

DLT
Dial-It

DMOQ
Direct Measure of Quality

DNHR
Dynamic Nonhierarchical Routing

DPC
Destination Point Code

DSD
Direct Service Dialing

DSDC
Direct Services Dialing Capability

DTMF
Dual Tone Multifrequency

E

EBAF
Extended Bellcore AMA Format

EGR
Egress Data Recording

EQP
Equipage

ETC
End Office or Tandem Office Connecting

F

FAI
Foreign Administration Identification

FAST
Fast teleprocessing of the call

FAX
Facsimile

FBS
Far Building Subdivision

FEN
Far-End Network

FH
Final Handling

FHC
Final Handling Code

FHT
Final Handling Treatment

FTA
Fast Activate

FTB
Fast Buffer

FTT
Fast Test

G

GSDDN
Global Software Defined Data Network

GSDN
Global Software Defined Network

GSR
Circuit Group Reset

GTT
Global Title Translation

H

HICAP
High Capacity

HTCO
Hawaii Telephone Company

HTR
Hard-To-Reach

I

IAM
Initial Address Message

IC
International Carrier

ICDR
International Call Detail Record

ICT
Incoming Trunk

IDB
INWATS DataBase

IE
Information Element

IMA
Ineffective Machine Attempt

INA
Ineffective Network Attempt

INUP
International Integrated Services Digital Network User Part

INWATS
Inward Wide Area Telephone Service

IPR
In Progress Recording

IRAS
Integrated Routing Assignment System

ISC
Incoming Signaling Characteristic

ISC
International Switching Center

ISD
Improved Sequence Dialing

ISDN
Integrated Services Digital Network

ISET
Inbound Services Emergency Translations

ISUP
Integrated Services Digital Network User Part

IT
Intertoll

ITC
Independent Telephone Company

ITN
Integrated Test Network

ITUP
International Telephone User Part

IWZ
International World Zone

L

LCC
Local Carrier Connecting

LDI
Laboratories Design Information

LDS
Long Distance Service

LEC
Local Exchange Carrier

M

MAS
Mass Announcement System

MRT
Multiple Routing Treatment

MSC
Measurement Subclass

MTP
Message Transfer Part

MTS
Multiple Treatment Screening

N

NA
Network Attempt

NANP
North American Numbering Plan

NCP
Network Control Point

NEMOS
Network Management Operations System

NESAC
National Electronic Switching Assistance Center

NI
Network Interconnect

NM
Network Management

NMC
Network Management Center

NMDS
Network Management Display System

NN
National Number

NN
Node-to-Node

NOC
Network Operations Center

NPA
Numbering Plan Area

NPT
Numbering Plan Type

NRA
Network Remote Access

NS800
Network Services 800

NSCX
Network Services Complex

O

OAS
Originating AT&T Switch

OCC
Other Carrier Connecting

OCDD
Online Call Detail Data

ODA
Office Data Administration

ODA
Office Data Assembler

OFCI
Optional Forward Call Indicator

OGT
Outgoing Trunk

OMS
Output Measurement Set

OSC
Outgoing Signaling Characteristic

OSOR
On-Site Operations Report

OSPS
Operator Service Position System

P

PBX
Private Branch Exchange

PCC
Pseudo Country Code

PCP
Positive Call Processing

PECC
Product Engineering Control Center

PIN
Personal Identification Number

POTS
Plain Old Telephone Service

PRI
Primary Rate Interface

PTS
Proceed To Send

R

RAO
Revenue Accounting Office

RC
Recent Change

RDBI
Routing Data Block Index

REL
Release

RLC
Release Complete

RNMOS
Regional Network Management Operations System

RNMS
Regional Network Management System

ROP
Read-Only Printer

RPI
Routing Pattern Identity

RRI
Record Routing Information

RSC
Reset Circuit

RTNR
Real Time Network Routing

RTR
Real Time Reliable

S

S&F
Store-and-Forward

SAB
Subaccount Billing

SAFER
Split Access Flexible Egress Routing

SBRIV
Send Billing Related Information to a VMOC

SCCS
Switching Control Center System

SCP
Service Control Point

SCP
Switched Permuting Circuit

SCSI
Small Computer Systems Interface

SDDN
Software Defined Data Network

SDDN-I
Software Defined Data Network International

SDI
Switched Digital International

SDN
Software Defined Network

SDNA
Software Defined Network Access

SDS
Switched Digital Services

SEQSAB
Sequence Calling for Subaccount Billing

SIC
Service Indicator Code

SMS
Service Management System

SNA
Service Not Active

SPDI
Sponsor Paid-Dial It

SSP
Service Switching Point

STP
Signal Transfer Point

T

TAS
Terminating AT&T Switch

TC
Teleconferencing

TC
Toll Connecting

TCC
Technical Control Center

TFN
Traffic Number

TG
Trunk Group

TOB
Total Office Blocking

TOPAS
Trunk Operations Provisioning Administration System

TOT
Type of Trunk

TSG
Trunk Subgroup

TSGN
Trunk Subgroup Number

TSI
Time Slot Interchange

TST
Test

U

UCIC
Unequipped Circuit Identification Code

UFC
User Flow Control

V

VBD
Voice-Band Data

VMA
Vacant MAS Announcement

VMOC
Voice Messaging Operation Center

VON
Virtual On-Net

VPN
Virtual Private Network

W

WZ1
World Zone 1