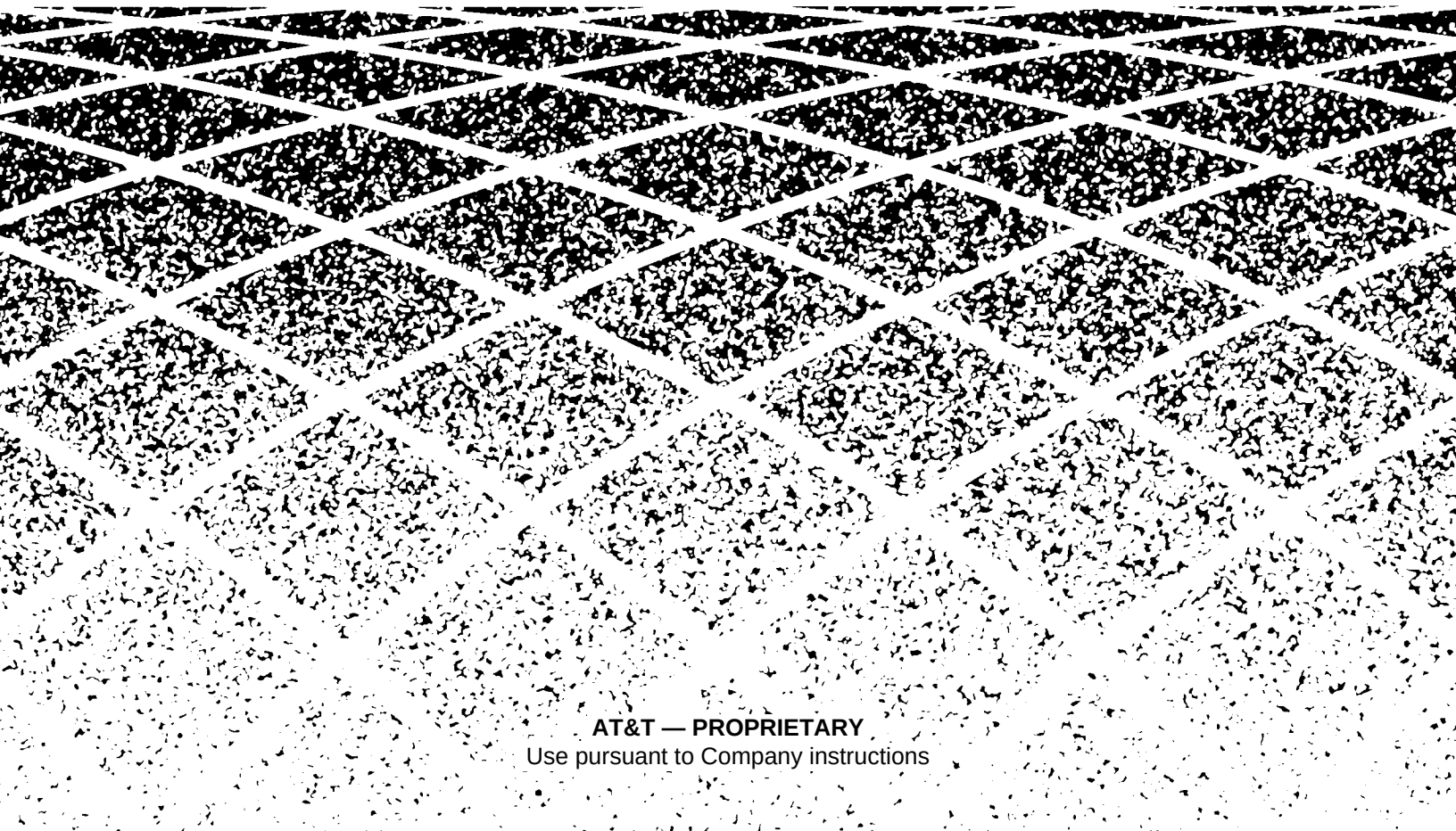
AT&T 234-090-213AC
Issue 1
June 1996

4ESS™ SWITCH

Product Release Document
4E21 Release 3 Generic



AT&T — PROPRIETARY
Use pursuant to Company instructions

Copyright © 1996 AT&T
All Rights Reserved
Printed in U.S.A.

This material is protected by the copyright laws of the United States and other countries. It may not be reproduced, distributed or altered in any fashion by any entity, including other AT&T Business Units or Divisions, without the expressed written consent of the AT&T Network Systems Customer Education & Training Organization.

For permission to reproduce or distribute, please contact:

4ESS™ Switch Product Development Manager — 1-800-334-0404

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.
AT&T True Connections is a registered trademark of AT&T.
AT&T Easy Reach is a registered trademark of AT&T.
DATAPHONE is a registered trademark of AT&T.
TrueVoice is a registered trademark of AT&T.
InfoWorx is a registered trademark of AT&T.
USADirect is a registered trademark of AT&T.

Ordering Information

The ordering number for this document is AT&T 234-090-213AC. 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 (1-800-334-0404) for you to use to report errors or to ask questions about the information in this document.

Developed by AT&T Network Systems Customer Education & Training.

How Are We Doing?

Document Title: ***4ESS*™ SWITCH Product Release Document Generic** **4E21 Release 3**

Document No.: AT&T 234-090-213AC Issue 1 Date: June 1996

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: 910-727-3043.

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**

Figures

Contents **Page**

Contents **Page**

Contents **Page**

Tables

Contents **Page**

About This Document

1. Purpose

1.01 The purpose of the Product Release Document (PRD) is to provide customers with information pertaining to the new features that are introduced in the *4ESS*™ switch. A PRD is written to cover the features introduced in full generic releases and quarterly generic releases. This particular PRD provides information pertaining to the new features included in the 4E21 Release 3 Generic.

2. Scope

2.01 The Product Release Document provides customers with information not covered in other *4ESS* switch documentation. It is not a replacement for other documentation such as Standard AT&T Practices, Task Oriented Practices (TOP), Maintenance Reference Handbooks, etc., that support the *4ESS* switch. The information in this document is intended only for the introduction of the new 4E21 Release 3 features, not the long-term maintenance. Since other documentation is used for the operation and maintenance of features after their introduction into the *4ESS* switch, this PRD will not be reissued.

3. Intended Audience

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

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

4. How to Use This Document

4.01 The 4E21 Release 3 Generic contains 14 new features. Each chapter in this document provides information about these features. The chapters are in numerical order according to feature number. The chapter titles are also the feature names.

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

Chapter 1: *4ESS*™ Switch 3500-Type Ringing, Tone and Interrupter Plant Feature (448)

The *4ESS*™ Switch 3500-Type Ringing, Tone and Interrupter Plant is the replacement for the AT&T 820A Ringing, Tone and Interrupter Plant which now has a Discontinued Availability (DA) status. The 820A plant is no longer available as a replacement or for installation in new *4ESS* switches. The new 3500-type Plant is functionally equivalent to the 820A plant and provides 0.25 amperes of continuous ringing current, continuous and interrupted call-progress tones, and signaling interruption loops required by the *4ESS* switch. Existing *4ESS* switch internal interfaces continue to be supported, and no changes have been made to existing input and output messages.

Chapter 2: *Data Management System D Channel Circuit Identifier Names Feature (449)*

This internal feature corrects a problem in which the 3B Data Management System (DMS) Recent Change program populates the Circuit Identifier Name (CIN) for the secondary D channels incorrectly.

Chapter 3: *Service Circuit System UN351 Circuit Pack Replacement Feature (456)*

A component on the UN351 circuit pack has been discontinued. With no replacement parts available a new circuit pack has been designed. The new circuit pack is UN591 and will replace circuit pack UN351 in the Service Circuit System (SCS). This is an internal feature, but the new hardware will also be needed by the Local Exchange Carrier (LEC).

Chapter 4: *Switched Digital Screening by Bandwidth Feature (4364)*

The Switched Digital Screening by Bandwidth feature prevents switched digital calls from completing to egress facilities that cannot support the data rate of the call.

Chapter 5: *SDN Customer Outage Protection Feature (4673)*

The Software Defined Network (SDN) Customer Outage Protection feature increases the call completion rate for SDN customers. It does this by not blocking calls caused by any internal problems. If a call is caused by an internal problem, the call is routed as a Plain Old Telephone Service (POTS) call instead of being blocked.

Chapter 6: *Expanded Time Slot Interchange Feature (4754)*

The Expanded Time Slot Interchange (XTSI) Feature enhances the *4ESS* switch 2000 fabric. The XTSI performs most of the switching functions previously performed by the Digital Interface Frame and the Time Slot Interchange-B. The XTSI feature increases the maximum number of possible terminations in the *4ESS* switch from 107,520 to 129,024, an increase of 20%.

Chapter 7: *RDB List Verify Tool Feature (4866)*

This feature provides a tool for doing searches of Routing Data Block (RDB) lists based on either Numbering Plan Area (NPA) prefix digits or Final Handling Treatment (FHT) codes.

Chapter 8: *800 Services Transfer Connect Service (TCS) 3.0 Feature (4867)*

This feature connects the two Network Adjunct Platforms, InfoWorx® and Transfer Connect, to deliver integrated applications. This capability allows more complex redirection services to be delivered to customers, and therefore, allows AT&T to be innovative and competitive in the marketplace.

Chapter 9: *Transfer Connect on AT&T Trigger Platform Out-Of-Band Enhancements for Voice Response Unit Blind Trigger Feature (4875)*

The Transfer Connect (TC) on AT&T Trigger Platform (ATP) Out-Of-Band (OOB) Enhancements for Voice Response Unit (VRU) Blind Trigger (BT) feature adds the capability to add out-of-band trigger data to the existing VRU-BT feature, Post Answer Call Redirection (PACR) on the ATP Jr.

Chapter 10: *Signaling Transport Footprint Standardization Feature (4903)*

This feature provides the standard footprint design for a number of new signaling transport elements by updating the standard application drawings for the *4ESS* switch. This will allow the signaling transport equipment to be included in a new frame, the

Signaling Transport Frame (STF), which will be placed in a standard location per technology footprint.

Chapter 11: *Calling Party Pays Airtime (CALIPER) Feature (4923)*

This feature allows cellular subscribers to designate that the caller should pay for airtime on calls they receive. This feature uses numbers from the 500 Numbering Plan Area (NPA) and forwards calls dialed to the 500 number to a domestic cellular Mobile Identification Number (MIN). As part of the service, AT&T plays an announcement notifying the calling party that the bill from AT&T will include airtime charges incurred in the cellular carrier's network and collects a positive acknowledgement from the caller before the call can proceed to its destination.

Chapter 12: *Foreign Billed 800 Service - Phase 4 Feature (4924)*

This feature expands the network capability to provide an announcement to the foreign Pay 800 callers informing them that the call is not a "free" call. The announcement is played for all Pay 800 digit combinations sent to AT&T ISC by the foreign PTT.

Chapter 13: *Government Emergency Telecommunications Services Initial Operational Capability Feature (4940)*

This feature provides the United States government worldwide ubiquitous access to the AT&T Switched Network in the event of a national emergency and/or natural or man-made disaster.

Chapter 14: *LYNX Software Upgrade Feature (5051)*

This feature enhances the existing LYNX software to allow the downloading of 1B file information within the required 3-hour window during switch retrofits.

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

5. Product Safety Labels

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

6. How to Comment on This Document

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

7. How to Order Documentation

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

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

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

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

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

From Canada: 1-800-255-1242

Worldwide: Toll 317 322-6577

FAX: 317 322-6484

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

7.04 Federal Government orders must be processed through CIC.

4ESS™ Switch 3500-Type Ringing, Tone and Interrupter Plant Feature (448)

1

Contents

Contents **Page**

4ESS™ Switch 3500-Type Ringing, Tone and Interrupter Plant Feature (448)

1

1. Feature Description

1.01 The *4ESS*™ switch 3500-Type Ringing Tone and Interrupter Plant is the replacement for the AT&T 820A Ringing, Tone and Interrupter Plant which now has a Discontinued Availability (DA) status. The 820A plant is no longer available as a replacement or for installation in new *4ESS* switches. The new 3500-type plant is functionally equivalent to the 820A plant and provides 0.25 amperes of continuous ringing current, continuous and interrupted call-progress tones, and signaling interruption loops required by the *4ESS* switch. Existing *4ESS* switch internal interfaces continue to be supported, and no changes have been made to existing input and output messages.

1.02 The new 3500-Type Plant is hard wired into the switching fabric of the *4ESS* switch, and the plant external interfaces are shown in Figure 1-1. The scan and signal distribution point interface provides system control and monitoring of the plant by the *4ESS* switch signal processor. The alarm grid interface provides ringing current to the *4ESS* switch alarm grid. The trunk interface supplies the required tones to the Time Division Network (TDN) by way of analog-to-digital conversion in the D4 channel bank. Copies of these digitized tones in an analog format are returned to the plant for monitoring.

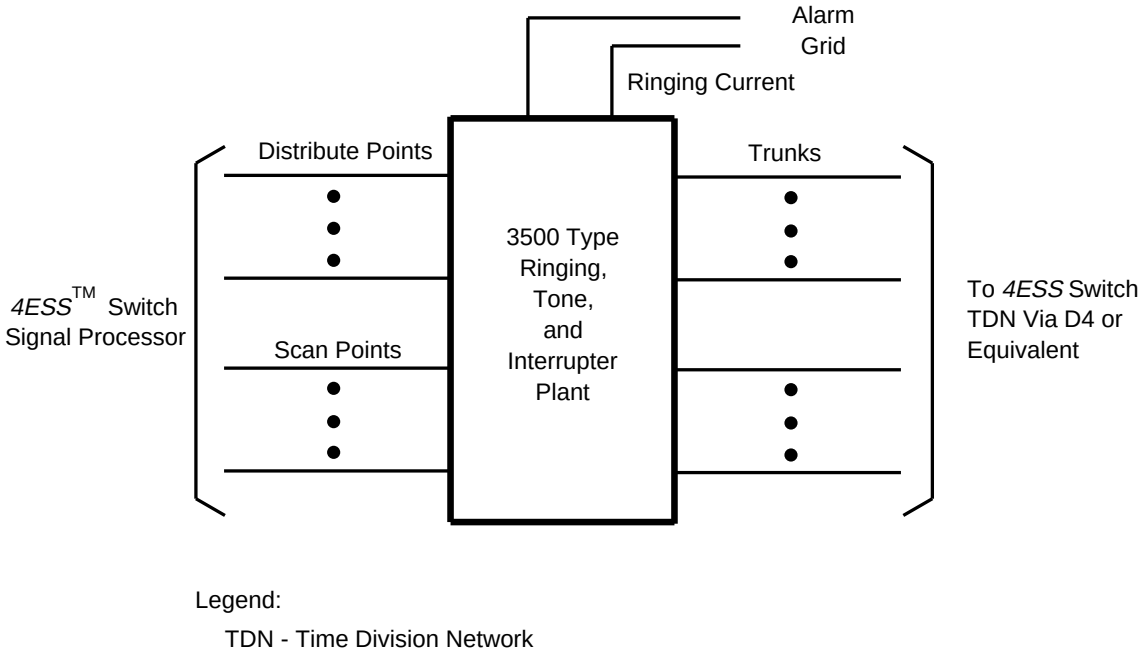


Figure 1-1. *4ESS* Switch 3500-type Ringing, Tone and Interrupter Plant, External Interface

Physical Description

1.03 The new plant is housed in a standard switching system cabinet which is 1,892 millimeters high, 762 millimeters wide, and 1,892 millimeters deep. The cabinet has standard *4ESS* switch indicators, and the cabinet and cabling meet the latest Network Equipment Development Standards. The plant provides an interframe communication capability and uses type 310 jacks. The cabinet can be cabled from either the top or bottom and if deployed on a raised floor, it does not require an overhead cable rack. The location and function of the plant switches and indicators are shown in Table 1-A.

Table 1-A. 4ESS Ringing Tone and Interrupter Plant, Switches and Indicators

Switch/Indicator	Location/Function
OFF-0/NOR/OFF-1 switch	Removes power from one side of the plant or the other; switch prevents power from being removed from both sides of plant simultaneously. With switch in NOR position, restores power to side of plant that was powered off. When one side of plant is powered down, the transfer of tones, interrupted loops, or ringing to that side is locked out. An interlock feature prevents powering down the plant side supplying ringing loads.
OFF/NOR indicator	Lights yellow when the **NOR** switch is not in the **NOR** position.
GEN TRFR switch indicator	When operated, transfers ringing loads to the "1" side of the plant. A yellow indicator within the switch indicates when ringing loads are transferred to the "1" side.
GEN RESET switch	When operated, transfers ringing loads to the "0" side of the plant.
OS-O OS-1 indicators	Lights yellow when power has been removed from the "0" side (**OS-0** lit) or "1" side (**OS-1** lit) of the plant.
PWR OFF indicator	Lights red if either side of the plant has blown a fuse or if either side is powered down.

Functional Description

1.04 The new plant supplies the following telephony signals:

- Audible ring signal
- Low tone reorders, busy signals, and maintenance
- High tone for use as "zip" tone for Centralized Automatic Message Accounting (CAMA) operators
- Test Progress Tones (2225 Hz) for maintenance
- 20 Hz continuous ringing for office alarms and maintenance station sets.

In addition, interrupter loops for flashing lamps at test boards are provided with standard cadences of 60 and 120 Interruptions Per-Minute (IPM). The plant is fully duplicated for reliability required for telephony applications. It consists of a 20 Hz generator, various tone supplies, interrupter logic, follower relays, monitors, test capabilities and control of activity status. The internal plant functions are shown in Figure 1-2 and the internal functions are described in the following paragraphs.

A. Ring Generators

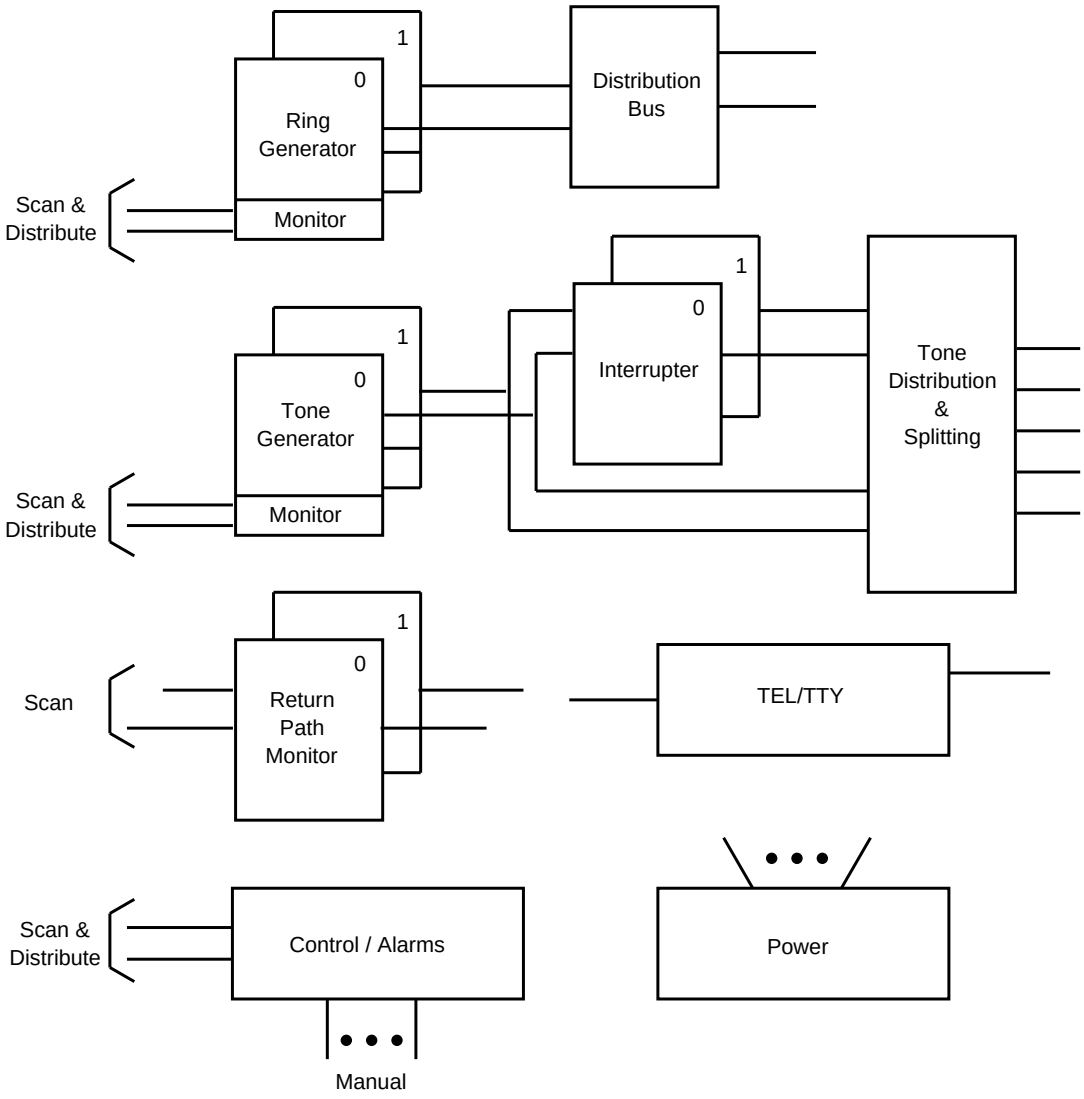
1.05 The electrical characteristics of the ring generator are as follows:

- Both the current and the voltage are sinusoidal wave forms.
- The fundamental frequency is in the range of 19.8 to 20.2 Hz.
- The voltage is from 84 to 88 volts RMS while supplying current from 0.0 to 0.25 amps RMS.
- The generator has four termination pairs appearing on the input/output terminal assembly.

1.06 The ring generator is duplicated for reliability. One ring generator is designated as active while the other ring generator is the standby, and the active ring generator has its output available on the ring bus. The active/standby status of each ring generator is selectable. A typical use for ring generator output is to provide ringing current to the alarm grid.

B. Ring Generator Monitor

1.07 The ring generator monitor circuits are used in conjunction with scan points to detect no-voltage conditions at the ring generator output. The ring bus also has a monitor circuit to detect a no-voltage condition on the ring bus output. If voltage is present, the monitor circuits provide a short circuit to the appropriate scan point. If the monitor detects a no-voltage condition, the monitor causes an open circuit on the scan point. The no voltage condition can be simulated by activating a signal distribution point that also tests the tone monitors on either side of the plant.



Legend:

TEL - Telephone
TTY - Teletypewriter

tpa 786801/01

Figure 1-2. *4ESS* Switch 3500-Type Ringing, Tone and Interrupter Plant, Functional Block Diagram

C. Tone Generators

1.08 Each tone generator is connected to a specific number of tone splitting resistor pairs. The circuit provides the following sinusoidal output tones:

- Test Progress Tone (2225 Hz nominal frequency)
  - — Within the 2214 - 2236 Hz frequency range
  - — Within the 366 - 506 millivolt RMS voltage range
  - — Driving (voltage adjustable) resistive loads from 3 ohms to open circuit
  - — Voltages are adjustable within these ranges.
- High Tone (480 Hz nominal frequency)
  - — Within the 478 - 482 Hz frequency range
  - — Within the 131 - 181 millivolt RMS voltage range
  - — Driving resistive loads from 1 ohm to open circuit
  - — Voltages are adjustable within these ranges.
- Busy Tone nominal frequencies: 480 Hz
  - — 480 Hz
    - (a) Within the 478 - 482 Hz frequency range
    - (b) Within the 59 - 79 millivolts RMS voltage range.
  - — 620 Hz
    - (a) Within the 617 - 623 Hz frequency range
    - (b) Within the 59 - 79 millivolts RMS voltage range.
  - — Combined 480 Hz and 620 Hz
    - (a) Within the 80 - 114 millivolt RMS voltage range
    - (b) Driving resistive loads from 1 ohm to open circuit
    - (c) Voltage is adjustable within this range.
- Audible Ringing (nominal frequencies of 440 Hz + 480 Hz)
  - — 440 Hz
    - (a) Within the 438 - 442 Hz frequency range
    - (b) Within the 105 - 141 millivolt RMS voltage range.

— 480 Hz

(a) Within the 478 - 482 Hz frequency range

(b) Within the 105 - 141 millivolt RMS voltage range.

— Combined 440 and 480 Hz

(a) Within 146 - 202 millivolt RMS voltage range

(b) Driving resistive loads from 1 ohm to open circuit

(c) Voltage is adjustable within this range.

1.09 Each tone generator is connected to the appropriate number of tone splitting resistor pairs.

D. Tone Monitors

1.10 The voltage available at the ports of each tone generator is monitored and tested to ensure proper operation of each Tone Generator. Each tone monitor is manually adjustable through analog or digital means over the normal voltage range of 50 to 500 mv. This adjustment compensates for the differences in the normal level which the tone monitor sees. The tone monitors provide the following:

- The monitor checks the output voltage of each tone generator, and if a generator output drops 3 db or more below a normal level, an open circuit is provided at the tone monitor scan terminals. If the output is normal, a short circuit is provided at the scan terminals.
- Each monitor can be tested by simulating a 3 db drop in voltage to the monitor. The 3 db voltage drop is initiated by a distribution point relay closure at the signal processor frame. The testing of the "0" side and "1" side of the plant is done independently.
- Each tone generator has return path monitors for monitoring tones coming back from the network. There are monitors for each of the four tones on both the "0" and "1" side of the plant.
- The return path monitors are capable of monitoring the network tones with the same characteristics as the continuous and interrupted tones that the plant provides.
- If the return path tone falls 3 db or more below its normal level, the return path monitor provides an open circuit to its scan terminals. If the output is normal, a short circuit is provided to the scan terminals.

1.11 The return path monitors are actually monitoring the analog version of the digitized tones present in the *4ESS* switch TDN that are supplied by the 3500-Type Plant.

E. Interrupters/followers Relays

This system provides interrupted tones and loops. The interrupters are monitored for failure and separate monitors are provided for the "0" side and the "1" side of the 3500-Type Plant. A failure is indicated by an open circuit on the appropriate scan leads. Under normal conditions, the scan leads have a short circuit across them. The Interrupter/followers Relays provide the following:

- An audible ringing tone (440 Hz+ 480 Hz) is interrupted at ten interruptions per minute with the tone being on for 2 seconds and off for 4 seconds. During the off period the "tip" and "ring" are shorted together.
- The Busy Tone (480 Hz + 620 Hz) is interrupted at sixty 60 interruptions per minute with the tone being on for 0.5 seconds and off for 0.5 seconds. During the off period the "tip" and "ring" are shorted together.
- The Busy Tone (480 Hz + 620 Hz) is interrupted at one hundred twenty 120 interruptions per minute with the tone being on for 0.25 seconds and off for 0.25 seconds. During the off period the "tip" and "ring" are shorted together.
- Ten interrupted loops operating at sixty 60 interruptions per minute are provided. The loop has a 100 ohm, one percent resistor in it. The interrupted loops are available at the input/output terminal assembly.
- Ten interrupted loops operating at one hundred twenty 120 interruptions per minute are provided. The loop has a 100 ohm, one percent resistor in it. The interrupted loops are available at the input/output terminal assembly.
- Tolerance on all interruption timing is plus or minus 2.5 percent.
- Each type of output from the plant is supplied in duplicate for distribution to the network.

1.12 The interrupters are monitored for failure. Separate monitors are provided for the "0" side and the "1" side of the plant. A failure is indicated by an open circuit on the appropriate scan leads. Under normal conditions, the scan leads have a short circuit across them. An interrupter failure can be simulated by activating the same signal distribute point used to test the tone monitors.

F. Tone splitting Resistor Pairs

- Balanced distribution of all tones is provided through 300 ohm plus or minus 1 percent balancing resistors in both the "tip" and "ring" leads.
- The number of "tip" and "ring" pairs provided in the basic 3500-Type Plant for each tone is as follows:
  - — Audible Ringing - 4 pairs
  - — Busy Tone (60 IPM) - 10 pairs

— Busy Tone (120 IPM) - 14 pairs

— Busy Tone (continuous) - 14 pairs

— High Tone (continuous) - 28 pairs

— Test Progress Tone (continuous) - 14 pairs.

- There is a provision for doubling the number of tone splitting resistor pairs.

G. Duplex Features

1.13 To ensure high reliability, the 3500-Type Plant provides the following:

- Duplicated ring generators, tone generators, interrupters, follower relays, and tone monitors.
- One set of duplicated components make up the "0" side of the plant, and the other set of duplicated components make up the "1" side of the plant.
- Transfer relays are provided to switch the loads from one side of the plant to the other without interrupting service or switch operations.
- In normal operation, both sides of the plant are continuously powered.
- In the absence of ringing voltage from the "Active" side of the plant, the plant autonomously (no *4ESS* switch system intervention) switches the loads to the "Standby" side of the plant.
- Transfer of tones and interrupted loops is controlled by the *4ESS* switch by way of an isolated contact closure. Manual switches provide the capability to transfer the ringing loads to either the "0" or the "1" side of the 3500-Type Plant. A signal distribution point is provided which only transfers ringing loads to the "0" side of the plant.

1.14 A signal distribution point is provided to transfer tone loads to either the "0" or "1" side of the plant. No manual switch is provided to transfer tone loads; however, turning one side of the plant off automatically transfers tone loads to the other side of the plant.

H. Power

1.15 The following are power standards for the 3500-Type Plant.

- The 3500-Type Plant operates from nominal -48 Volts Direct Current power. The plant operates in the range from -60 to -40V as measured at power input terminals at the plant. No AC power is required.
- The current drain, within the operating voltage of the 3500-Type Plant, does not exceed 4.5 amps.

- The plant can operate with transients of down to -75 volts with a duration of no more than 10 milliseconds and at a rise and fall rate of no more than 10 volts per millisecond.
- The plant is able to return to service without damage and without operator intervention in the presence of a maximum transient of 0.0 volt with a duration of no more than 5 milliseconds, a rise rate of no more than 50 volts per millisecond, and a fall rate of no more than 12.5 volts per millisecond.
- Approved AT&T power connectors are used for the -48V inputs.
- Dual, independent -48V inputs designated -48VA and -48VB are provided. The -48VA powers the "0" side of the plant, and -48VB powers the "1" side of the plant. As viewed from the rear of the cabinet, the -48VA is on the right side and the -48VB is on the left side.
- If any fuse in the plant is blown, a scan point is provided to indicate a major alarm, and a visual indication shows which fuse blew.

I. Alarms

1.16 The alarm indications are provided by the scan points and are identical to those provided by the 820A Ring, Tone and Interrupter Plant.

J. Signal Processor Interface

1.17 System control and monitoring of the 3500-Type Plant is done through the Scan and Distribution interface of the *4ESS* switch signal processor. The signal processor controls the 3500-Type Plant with isolated relay contacts which are called signal distribution points. The monitoring is provided by the scan points which expect an open circuit or a short circuit to indicate the two different states. Access to each signal distribution point or scan point is provided by wire pairs.

K. Signal Distribution Point Functions

1.18 The Following functions are controlled by Signal Distribution points. Each function is controlled by a unique point.

- Tone Transfer and Interrupted Loops—A short circuit will cause the tones and interrupted loops to be sourced from the "1" side of the plant while an open circuit will cause the tones and interrupted loops to be sourced from the "0" side of the plant. This function is locked out if either side of the plant is powered off.
- Zero-side Tone Monitor Testing—A short circuit initiates testing of all tone monitors and interrupter monitor on the "0" side of the plant, and ringing monitor on the ringing bus.
- One-side Tone Monitor Testing—A short circuit initiates testing of all tone monitors and interrupter monitor on the "1" side of the plant, and ringing monitor on the ringing bus.

- Return Path Testing—A short circuit initiates testing of all return path monitors on both the "0" and "1" sides of the plant.
- Ringing Load Transfer—A short circuit causes the ringing loads to be fed from the "0" side of the plant, while an open circuit causes the ringing loads to be fed from the "1" side of the plant. This function is locked out if either side of the plant is powered off.

1.19 There are 28 scan point pairs and 5 signal distribution pairs required by the ring and tone plant.

L. Signal Processor Scan Points

1.20 The following scan points are provided for the signal processor:

- Each tone monitor and return path monitor has a scan point indicating whether or not the voltage of the tone being monitored is more than 3db below its normal value. An open circuit indicates the level has dropped more than 3db below normal. A short circuit indicates that the voltage of the tone being monitored is not more than 3db below its normal level.
- Each ringing generator monitor has a scan point indicating that a no-voltage condition exists on the output of the ringing generator. A short circuit on the scan point indicates voltage is present at the ringing generator output, while an open circuit indicates no voltage is present.
- The ringing bus monitor has a scan point indicating that a no-voltage condition exists on the ringing bus. A short circuit on the scan point indicates voltage is present at the ringing bus while an open circuit indicates no voltage is present.
- Each interrupter monitor has a scan point indicating when an interrupter has failed. A short circuit on the scan point indicates that the interrupter is functioning properly, while an open circuit indicates that the interrupter has failed.
- A scan point indicates which side of the plant is feeding the ringing loads. A short circuit indicates that side "0" is feeding the ringing loads, while an open circuit indicates that side "1" is feeding the ringing loads.
- A scan point indicates that side "0" is providing tones and interruptions. A short circuit indicates that side "0" is providing tones and interruptions while an open circuit indicates that side "0" is not providing tones and interruptions.
- A scan point indicates that side "1" is providing tones and interruptions. A short circuit indicates that side "1" is providing tones and interruptions while an open circuit indicates that side "1" is not providing tones and interruptions.
- A scan point indicates that either a fuse is blown on side "0", or that side "0" is powered down. A short circuit indicates that a fuse is blown or power is off, while an open circuit indicates power is up and no fuses are blown.

- A scan point indicates that either a fuse is blown on side "1", or that side "1" is powered down. A short circuit indicates that a fuse is blown or power is off, while an open circuit indicates power is up and no fuses are blown.
- A scan point to indicate that power is on to side "0" and a fuse is blown on side "0". A short circuit indicates a blown fuse while an open circuit indicates no blown fuses.
- A scan point indicates that power is on to side "1" and a fuse is blown on side "1". A short circuit indicates a blown fuse while an open circuit indicates no blown fuses.

M. TEL/TTY Communications

1.21 Interframe communication is provided with type 310 jacks.

2. Call flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

3500-Type Plant Replacement

6.01 If the 3500-Type Plant is to be replaced in an operating office, procedures to be observed are as follows:

1. The new unit should be powered up and adjustment of ringing generators, tone generators, and tone monitors should be performed. Outputs from the tone splitting resistors should be "looped back" to the return monitors for this procedure.
2. The 3500-Type Plant should be allowed to soak for three days after the adjustments are performed.
3. During the retrofit procedure, all tones must continue to be available to the network. This can be accomplished by removing one appearance of the tones from the old plant, and then connecting tones from the new plant to that

appearance. Then, the other appearances of the tones from the old plant can be removed and connected to the new plant.

7. Transition Considerations

Ubiquity

7.01 This is a hardware only feature. Ubiquity is not required in order to activate this feature.

8. Input/Output Manual Pages (Not Affected)

Data Management System D Channel Circuit Identifier Names Feature (449)

2

Contents **Page**

Data Management System D Channel Circuit Identifier Names Feature (449)

2

1. Feature Description

1.01 This internal feature corrects a problem in which the 3B Data Management System (DMS) Recent Change program populates the Circuit Identifier Name (CIN) for the secondary D channels incorrectly.

1.02 The CINs of secondary D channels are populated separately from primary D channels in 1B. This feature allows the CINs of the secondary D channels to be retrieved from the 1B, and stores them in the Common Network Interface (CNI) data base so that CINs for secondary D channels will be displayed correctly to the 3B Maintenance CRT (MCRT).

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

Ubiquity

7.01 Changes were made to the 3B DMS and the 1B measurements. This feature is not fully operational until both have been upgraded. The 1B to 4E21 Release 3 and the 3B to 4AP14 Release 3.

7.02 Changes were made to the 1B measurements in 4E21 Release 1 so that 3B changes will not effect 1B measurement code during the transitional period where 3B is upgraded and 1B is not.

Turn On/Turn Off Mechanism

7.03 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Service Circuit System UN351 Circuit Pack Replacement Feature (456)

3

Contents **Page**

Service Circuit System UN351 Circuit Pack Replacement Feature (456)

3

1. Feature Description

1.01 A component on the UN351 circuit pack has been discontinued. With no replacement parts available a new circuit pack has been designed.

1.02 The new circuit pack is UN591 and will replace circuit pack UN351 in the Service Circuit System (SCS). This is an internal feature, but the new hardware will be needed by the Local Exchange Carrier (LEC).

1.03 The only software changes are for the SCS to recognize which circuit pack is present and to output appropriate Trouble Locating Procedures (TLP) data on diagnostic failures.

1.04 The UN591 is only sold as part of ED4A290-12, Group 29. It is also sold as spares. The comcode number is 107698664.

2. Call Flow (Not Affected)

3. Provisioning

3.01 This feature will require a new Unit Software load for SCS which resides on the 3B disk in the /SCS file structure.

3.02 The Unit Type Translator (UTT) provides appropriate fields and states to indicate which version of the circuit pack is present in the unit.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

7.01 The UN351 and UN591 packs will not operate together in duplex configuration. When one UN351 pack fails, its mate must also be replaced by a UN591 pack using a Task Oriented Procedure (TOP) to accomplish the transition.

Ubiquity

7.02 It is not necessary for all *4ESS*™ switches in the network to be running the 4E21 Release 3 generic for this feature to be fully operational. To retrofit new packs the switch must be in 4E21 Release 3.

Turn On/Turn Off Mechanism

7.03 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Switched Digital Screening by Bandwidth Feature (4364)

4

Contents **Page**

Contents **Page**

Switched Digital Screening by Bandwidth Feature (4364)

4

1. Feature Description

1.01 The Switched Digital Screening by Bandwidth feature prevents switched digital calls from completing to egress facilities that cannot support the data rate of the call.

1.02 Prior to the incorporation of this feature, the terminating AT&T *4ESS*™ switch did not attempt to verify that the data rate being transmitted could be supported by the egress facility. When digital traffic was switched to an egress facility that could not support the data rate, the result was corrupted data.

1.03 This feature ensures that digital calls are completed only to egress facilities that support the data rate being transmitted. For example, 64-kbps Clear or Restricted calls will not be allowed to complete to facilities limited to a data rate of 56 kbps. Only calls with a data rate of 56 kbps will be sent to facilities limited to 56 kbps.

1.04 Also included in this feature are two enhancements to wide-band switched digital services. One enhancement ensures that the proper Integrated Services Digital Network (ISDN) Cause value is always returned when a wide-band Clear call attempt cannot complete because the terminating egress facilities are not provisioned to accept wide-band calls. The other enhancement ensures that all 384-kbps and 1536-kbps Restricted call attempts are blocked at the originating switch.

2. Call Flow

2.01 This section describes the events that occur when a *4ESS* switch receives a digital call that is destined for an egress-routing arrangement that does not support the data rate of the call. For example, the following routing arrangements can not handle 64-kbps Clear calls: DATAPHONE® Digital Service (DDS), non-ISDN T1.5, or Feature Group D (FGD) Equal Access Multi-Frequency (EAMF). Call flows for a number of different types of data calls are covered.

Clear ISDN PRI to a Restricted ISDN PRI

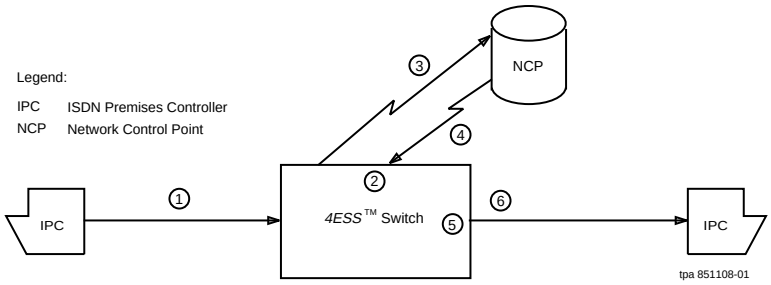


Figure 4-1. Bandwidth Screening of a Restricted ISDN PRI Egress Call

2.02 The following steps (along with Figure 4-1) describe how a *4ESS* switch handles a 64-kbps Clear call intended for a destination that does not support 64 Clear Channel Capable (CCC) ISDN Primary Rate Interface (PRI) access:

1. A *4ESS* switch receives a Q.931 SETUP message from an ISDN Premises Controller (IPC). The SETUP message identifies the call as a 64-kbps Clear call.
2. From the information provided in the SETUP message, the originating *4ESS* switch determines that a database query is needed.
3. A query is sent to a Network Control Point (NCP). Included in the query are the dialed digits and the data rate.
4. After executing the customer's record, the NCP returns a routing number, a Generic Route Indicator (GRI), and a data rate of 64-kbps Clear.
5. Translation of the routing number identifies the Routing Data Block (RDB) associated with the egress facilities and a TSG with an idle member is selected from the RDB.
6. A check is made for data rate compatibility. Since in this case the data rates are not compatible, the *4ESS* switch clears the call with a Cause value of 65 (bearer capability not implemented) and generates a Final-Handling Code (FHC) of 575.

SS7-NI Clear Call to a Restricted Destination

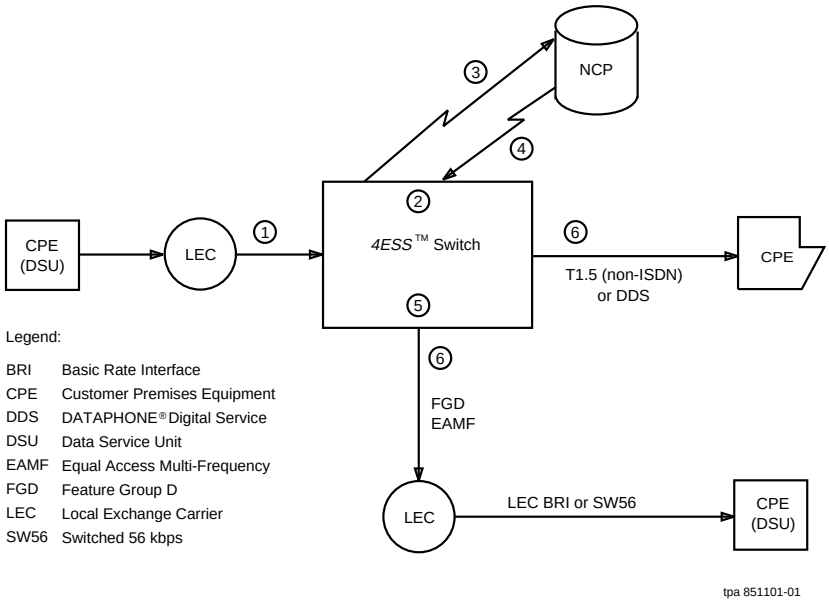


Figure 4-2. Bandwidth Screening of an Incoming SS7-NI Clear Call

2.03 The following steps (along with Figure 4-2) describe the events that occur when a *4ESS* switch receives a Signaling System 7 (SS7)-Network Interconnect (NI) 64-kbps Clear call that is destined for an egress-routing arrangement that can not handle 64-kbps transmissions:

1. A *4ESS* switch receives a SS7-NI Initial Address Message (IAM) from a Local Exchange Carrier (LEC). The IAM identifies the call as a 64-kbps Clear call.
2. From the information provided in the IAM, the originating *4ESS* switch determines that a database query is needed.
3. A query is sent to an NCP. Included in the query are the dialed digits and the data rate.
4. After executing the customer's record, the NCP returns a routing number, a GRI, and a data rate of 64-kbps Clear to the *4ESS* switch.
5. Translation of the routing number identifies the RDB associated with the egress facility and a TSG with an idle member is selected from the RDB.
6. A check is made for data rate compatibility. Since in this case the data rates are not compatible, the *4ESS* switch clears the call with a Cause value of 65 (bearer capability not implemented) and generates a FHC of 575.

SDI Clear Call to a Restricted Destination

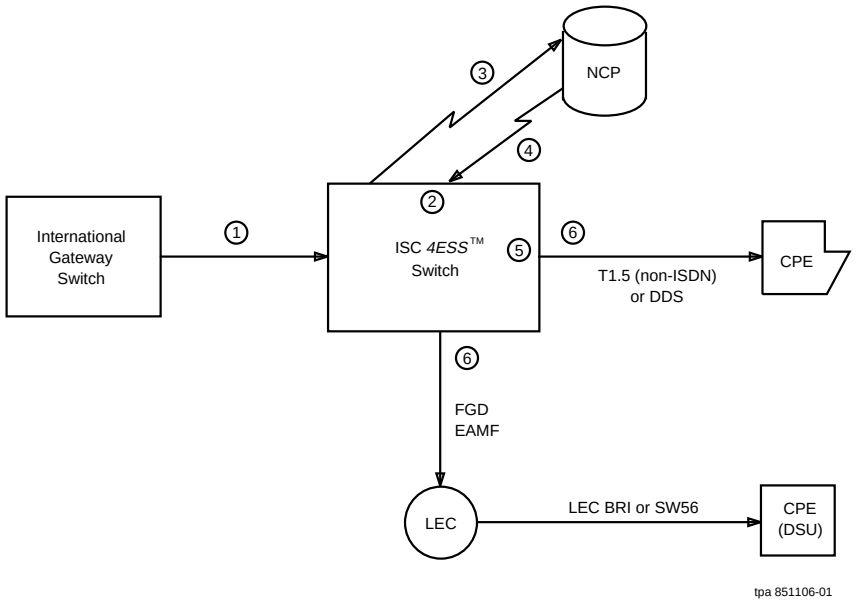


Figure 4-3. Bandwidth Screening of an Inbound SDI Call with INUP Signaling

2.04 The following steps (along with Figure 4-3) describe the events that occur when an International Switching Center (ISC) *4ESS* switch receives a 64-kbps Clear Switched Digital International (SDI) call that is destined for an egress-routing arrangement that can not handle 64-kbps transmissions:

1. An ISC *4ESS* switch receives an ISDN User Part (ISUP) IAM from an International Gateway switch. The IAM identifies the call as a 64-kbps Clear call.
2. From the information provided in the IAM, the originating *4ESS* switch determines that a database query is needed.
3. The query is sent to an NCP. Included in the query are the dialed digits and the data rate.
4. After executing the customer's record, the NCP returns a routing number, a GRI, and a data rate of 64-kbps Clear to the *4ESS* switch.
5. Translation of the routing number identifies the RDB associated with the egress facilities and a TSG with an idle member is selected from the RDB.
6. A check is made for data rate compatibility. Since in this case the data rates are not compatible, the *4ESS* switch clears the call with a Cause value of 65 (bearer capability not implemented) and generates a FHC of 575.

Wide-Band Clear Call to a Restricted Destination

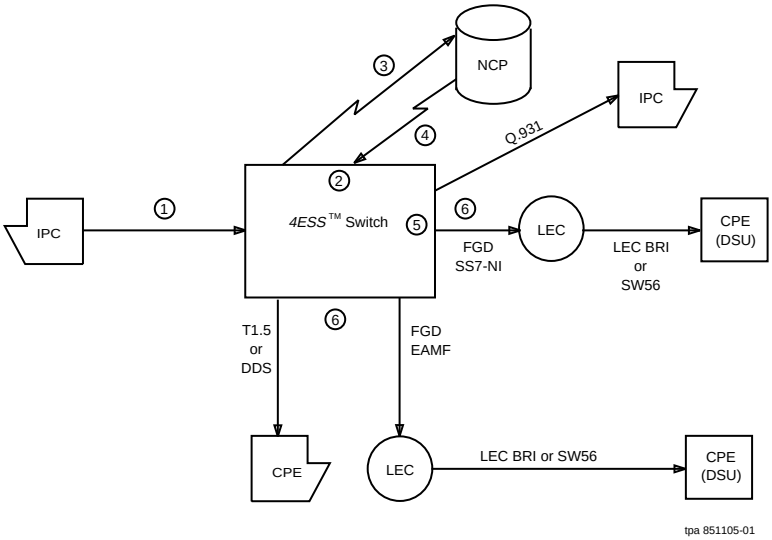


Figure 4-4. Bandwidth Screening of a Wide-Band Clear Call

2.05 The following steps (along with Figure 4-4) describe the events that occur when a *4ESS* switch receives a 384-kbps (or 1536-kbps) data rate call with Clear 64-kbps channels. The final destination of the call is an egress facility that is not provisioned to handle wide-band calls.

1. A *4ESS* switch receives a Q.931 SETUP message from an IPC. The SETUP message identifies the call as a 384-kbps (or 1536-kbps) data rate call with Clear 64-kbps channels.
2. From the information provided in the SETUP message, the originating *4ESS* switch determines that a database query is needed.
3. A query, which includes the dialed digits and the data rate, is sent to an NCP.
4. The NCP executes the customer's record and returns information indicating a data rate of 384-kbps (or 1536-kbps) Clear to the *4ESS* switch.
5. Translation of the routing number identifies the RDB associated with the egress facilities and a TSG with an idle member is selected from the RDB.
6. A check is made to determine if the TSG can support a 384/1536-kbps data call. If the TSG cannot support a 384/1536-kbps data call, other TSGs in the RDB are checked. Since in this case no TSGs are found that can support a 384/1536-kbps data call, the *4ESS* switch clears the call with a Cause value of 65 (bearer capability not implemented) and generates a FHC of 575.

SS7-NI Wide-Band Restricted Call (ISUP Signaling)

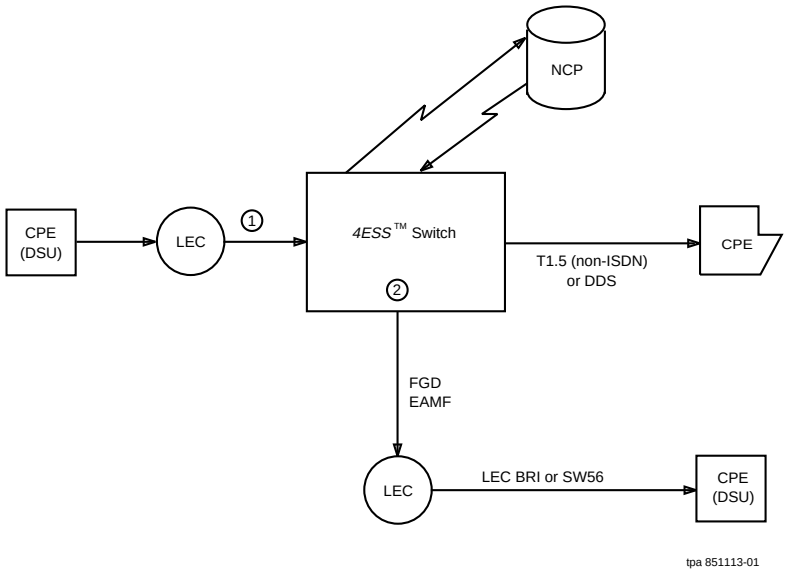


Figure 4-5. Bandwidth Screening of an SS7-NI Wide-Band Restricted Call

2.06 The following steps (along with Figure 4-5) describe the events that occur when a *4ESS* switch receives an SS7-NI wide-band Restricted call.

1. A *4ESS* switch receives a SS7-NI IAM from a LEC. The IAM identifies the call as a wide-band Restricted call.
2. Since the AT&T Switched Network (ASN) does not support 384-kbps or 1536-kbps Restricted calls, the originating *4ESS* switch clears the call with a Cause value of 63 (service or option not available) and a FHC of 502.

Wide-Band Restricted Call Attempt (Q.931 Signaling)

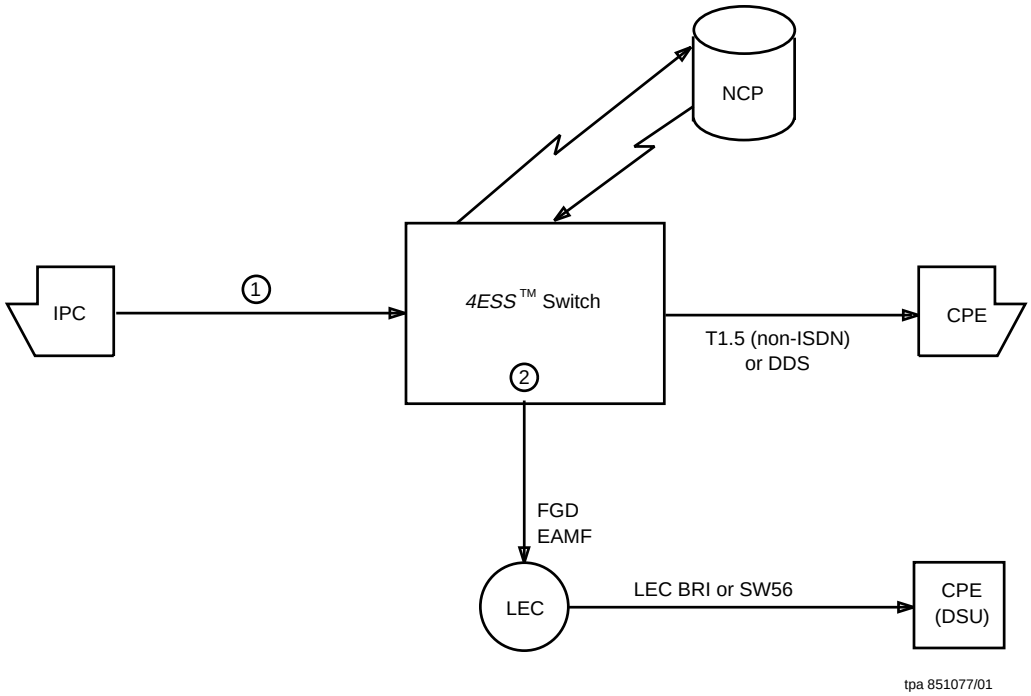


Figure 4-6. Bandwidth Screening of a Wide-Band Restricted Call Attempt

2.07 The following steps (along with Figure 4-6) describe the events that occur when a *4ESS* switch receives a 384-kbps (or 1536-kbps) data rate call with Restricted 64-kbps channels:

1. A *4ESS* switch receives a Q.931 SETUP message from an IPC. The SETUP message identifies the call as a 384-kbps (or 1536-kbps) data rate call with Restricted 64-kbps channels.
2. Since the AT&T Switched Network (ASN) does not support 384-kbps or 1536-kbps Restricted calls, the *4ESS* switch clears the call with a Cause value of 63 (service or option not available) and a FHC of 1071.

3. Provisioning

Affected Data Structures

3.01 In earlier generic releases, the data format indicator for a Trunk Subgroup (TSG) was defined by item XL4DSDATAF in disk structure HT4DISKTSGN. In order to support this feature, a new data format indicator was defined in the 4E21 Release 1 Generic. The name of this new data format indicator is XL4TS_DATAF, and it resides in call store so it can be accessed by call processing.

3.02 In the 4E21 Release 1 and 2 Generics, both data formats were used. Item XL4DSDATAF has been deleted in this generic release.

Recent Change (RC) Forms

3.03 An additional check has been added to the processing of RC Forms 100 and 107 for ISDN PRI trunk subgroups. This check ensures that for these trunk subgroups the only time an **R** (Restricted) can be entered in the DATAF (Data Format) field is when the TSGBBC (TSG Broad Band Capability) field has a value of 0 or blank.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

New Final-Handling Codes (FHCs)

6.01 Two new FHCs (identified in Table 4-A) were created to support this feature.

Table 4-A. New Final-Handling Codes

FHC	Description
502	A 384- or 1536-kbps Restricted data rate call was received on a Network Interconnect boundary. Since these data rates are not supported, a release message with a Cause value of 63 (service or option not available) was sent.
575	This FHC is generated for two different circumstances: • A *4ESS* switch received a 384- or 1536-kbps data call, but it could not find a broadband capable TSG. • Routing selected a 56 kbps egress facility that was incompatible with the 64-kbps rate required by the call. The call is cleared with a Cause value of 65 (bearer capability not implemented) and a location code of "transit network".

Changed Final Handling Code

6.02 Final Handling Code 1071, which is an existing FHC, was expanded to cover an invalid request of a 384-kbps (or 1536-kbps) Restricted data rate over Q.931 signaling.

7. Transition Considerations

Ubiquity

7.01 It is not necessary for all *4ESS* switches in the network to be running the 4E21 Release 3 generic for this feature to be fully operational.

Turn On/Turn Off Mechanism

7.02 This feature is turned on using RC Form 809. To turn the feature on, enter **F11** in the FEATURE ITEM field on RC Form 809 and **ON** in the ON OR OFF field. To

turn the feature off, enter **F11** in the FEATURE ITEM field on RC Form 809 and **OFF** in the ON OR OFF field. Default for this feature is "Off", that is, not active.

7.03 This feature can also be turned on or off by an absolute word change. Item OD4F11 in Office Data Assembler (ODA) structure OD4OFCCOPY is the office parameter that dictates whether or not SDN screening should be applied to an SDN call.

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

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

- Structure: OD4OFCCOPY
- Core address of OD4PF11 in 4E21 Generic: 6731266
- Word: 1
- Size: 1
- Displacement of OD4F11: 10
- On: 1
- Off: 0

8. Input/Output Manual Pages (Not Affected)

SDN Customer Outage Protection Feature (4673)

5

Contents **Page**

SDN Customer Outage Protection Feature (4673)

5

1. Feature Description

1.01 The Software Defined Network (SDN) Customer Outage Protection feature increases the call completion rate for SDN customers.

1.02 Prior to the introduction of this feature, the *4ESS*™ switch was not completing some 10732 access and direct access SDN calls because of internal network problems; for example, software problems, hardware problems, operation problems, or network overloads. If one of these problems occurred while trying to route an SDN call, the call was blocked.

1.03 This feature provides the *4ESS* switch with the capability to recognize internal problems and route the call as a Plain Old Telephone Service (POTS) call instead of blocking it.

1.04 The following are some of the problems that resulted in calls being blocked in the past, but now the *4ESS* switch will route these calls in the POTS domain since they are recognized as internal problems:

- The No. 2 Direct Services ANI (2DSA)/No. 2 Network Control Point (2NCP) returns a TCAP Abort message containing a "U_Abort_Cause" or "P_Abort_Cause" parameter.
- The 2DSA/2NCP returns a TCAP End message containing a "Reject" component type.
- The 2DSA/2NCP returns a TCAP End message containing a "Database Overload" control cause.

- The 2DSA/2NCP returns a TCAP End message with a "Missing Customer Record" error code. The call will only be routed if the customer record is found in the Self-Provisioning Global Title Translation (SPGTT) database or the Universal Global Translator (UGT) database, but not the 2DSA/2NCP.
- The *4ESS* switch returns a TCAP End message to the 2DSA/2NCP with a "Reject" component type.
- The *4ESS* switch returns a TCAP End message to the 2DSA/2NCP with a "Return Error" component type.
- The *4ESS* switch returns a TCAP End message to the 2DSA/2NCP with a "P_Abort_Cause" parameter.
- The *4ESS* switch returns a TCAP End message to the 2DSA/2NCP with a "U_Abort_Cause" parameter.
- The *4ESS* switch times out waiting for a response from the 2DSA/2NCP.

2. Call Flow

2.01 Some call-processing logic had to be modified to support this feature. The logic that handles receipt of certain messages, for example, aborts, rejects, return errors, etc., from the NCP database was modified; The logic that sends certain messages, for example, aborts, rejects, or error codes, to the 2DSA/2NCP was also modified.

2.02 Prior to the incorporation of this feature, the software was designed to final handle the call if one of these messages was sent or received. This feature, however, changed the logic so a new routine is called when one of these messages is sent or received. If the call is eligible for SDN customer outage protection treatment, the new routine routes and records the call.

3. Provisioning (Not Affected)

4. Recording

4.01 If a *4ESS* switch routes an SDN call in the POTS domain, the call will be recorded using a "canned" SDN Automatic Message Accounting (AMA) record. The "canned" AMA record contains a Call Code of 129 and a Structure Code of 01063. The record also contains a Revenue Accounting Office/Regional Processing Center (RAO/RPC) code of 046 to notify downstream billers that the call was routed in the POTS domain.

5. Network Management

5.01 To support this feature, a new 30-second discrete, SDN Error Routing, was created. This new 30-second discrete, which appears in Message Type 1, is sent to the Network Management Operations System (NEMOS) if an SDN call is routed in the POTS domain, because of a failure in the AT&T Switched Network (ASN) in the last 30 seconds.

5.02 A new 5 minute count, SDN_Error_Routing_Cnt, was also created. This new count, which appears in Message Type 8, counts the number of SDN calls routed in the POTS domain due to miscellaneous errors.

6. Maintenance/Troubleshooting

6.01 Even though this feature results in SDN calls being completed as POTS calls, a Final Handling Code (FHC) is still printed as though the call was final handled. The purpose for doing this is to alert support personnel of the condition.

6.02 A new FHC was created to handle this situation: FHC 120, 4fhsdncop_route. FHC 120 reports to support personnel that while routing an SDN call an attempt to query the 2DSA/2NCP database was not successful; however, the call completed anyway as a POTS call.

7. Transition Considerations

Ubiquity

7.01 It is not necessary for all *4ESS* switches in the network to be running the 4E21 Release 3 Generic for this feature to be fully operational.

Turn On/Turn Off Mechanism

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Expanded Time Slot Interchange Release 1 Feature (4754)

6

Contents

Contents **Page**

Expanded Time Slot Interchange Release 1 Feature (4754)

6

1. Feature Description

1.01 The Expanded Time Slot Interchange (XTSI) is an enhancement of the *4ESS*™–2000 switch fabric. The XTSI performs most of the switching functions previously performed by the Digital Interface Frame (DIF) and Time Slot Interchange-B (TSI-B) frames. It does so at a higher data rate in a more reliable, more compact, and less expensive package.

1.02 The XTSI conforms to the same switch interfaces as the TSI-B, including A-Links, Peripheral Unit Bus (PUB), and the network clock. The first release of the XTSI provides a Digital Signal Level 3 (DS3) interface with the *4ESS* switch, supporting 4032 trunks per frame.

1.03 It is expected that XTSI frames will be used for growth only. There are no plans to replace the embedded base of Digital Interface Frames (DIFs) and TSI-B frames with XTSI frames.

Benefits

1.04 The XTSI Release 1 feature offers many benefits when compared to the DIF and TSI-B frames whose functionality the XTSI frame replaces. The following are some of the more important:

- Overall expansion of the number of possible terminations in the *4ESS* switch from 107,520 to 129,024, an increase of 20%

- A significant reduction in capital costs for *4ESS* switch termination growth
- A direct DS3 interface into the *4ESS* switch, eliminating the need for DS1 to DS3 multiplexing/demultiplexing equipment in a wire center
- DS1 performance monitoring similar to that performed by the DIF
- Support of DS1/DS3 near-end loopback testing for testing and maintenance purposes
- Space and power savings, along with reliability improvements resulting from the use of newer technology and architectures.

Documentation

1.05 The XTSI feature is documented in a large number of AT&T Practices and Task Oriented Practices (TOP), as well as in Installation Engineering Handbooks, drawings, and Input/Output messages. A list of indexes and system descriptive documents is included in Table 6-A.

Table 6-A. System Descriptive Information

Number	Issue	Title
234-000-010	9	Generic Retrofit Index
234-090-500	7	*4ESS* Switch LEC Feature Handbook
234-097-020NP	1	Generic Features LEC (Network Planning Letter)
234-097-019NP	1	Generic Features LEC (Network Planning Letter)
234-100-000	16	*4ESS* Switch General Description
234-100-040	6	Office Alarm System
234-310-107	3 App 9A	4E21 Maintenance Reference Handbook

1.06 Table 6-B lists descriptive documents that provide physical, functional, and operational information about frames.

Table 6-B. XTSI Cabinet Descriptive Information

Number	Issue	Title
234-310-034AC	1	XTSI Cabinet Description

2. Call Flow (Not Affected)

3. Provisioning

3.01 Many Recent Change (RC) forms are affected by the XTSI feature. The affected RC forms are discussed here. The use of Recent Change forms 700 and 701 to grow and degrow XTSI frames is detailed in the XTSI-D3U Growth/Degrowth TOP, document 234-353-035, Issue 1. Table 6-C lists the documents dealing with growth and retrofit procedures related to XTSI.

Table 6-C. Growth and Retrofit Procedural Information

Number	Issue	Title
234-160-201AC	1	XTSI Software Update
234-185-022	1	1B Retrofit & ODA Update Plan/Schedule 4E20-4E22
234-353-035	1	XTSI Growth/Degrowth TOP
234-353-045	1 Ad 1	PUB System Growth/Degrowth TOP
234-353-050	7	Miscellaneous Growth TOP
234-355-001	2 Ad 1	Final Verification Tests–Acceptance TOP
234-355-005	2 Ad 1	Operational Readiness Tests–Acceptance TOP
234-355-010	3	Maintenance Function Verification–Acceptance TOP
234-381-000	3	Growth/Degrowth General Description
234-381-001	2	System Performance Prerequisites
234-382-001	2	Final Verification Tests–Acceptance Description
234-382-005	2	Operational Readiness Tests–Acceptance Description

New RC Forms

3.02 Two new RC Forms were created to support the XTSI feature: 704 and 705.

3.03 RC Form 704, DS3 UNIT (D3U) TYPE EQUIPAGE, is used to configure a DS3 unit on an XTSI frame/member number including all DS1 data. (See Figure 6-1.)

```
 RC:UTYPE;CHG;OPT(D3U),____:    TSI MEMN__,  D3UN __,

ORNU ______,

REM ALARM ___,  MAX LBO ____,  DS3 APPL ____,


                    DS1 INFO


EQP01 _,  FRMF01 _,              EQP02 _,  FRMF02 _,
EQP03 _,  FRMF03 _,              EQP04 _,  FRMF04 _,
EQP05 _,  FRMF05 _,              EQP06 _,  FRMF06 _,
EQP07 _,  FRMF07 _,              EQP08 _,  FRMF08 _,
EQP09 _,  FRMF09 _,              EQP10 _,  FRMF10 _,
EQP11 _,  FRMF11 _,              EQP12 _,  FRMF12 _,
EQP13 _,  FRMF13 _,              EQP14 _,  FRMF14 _,
EQP15 _,  FRMF15 _,              EQP16 _,  FRMF16 _,
EQP17 _,  FRMF17 _,              EQP18 _,  FRMF18 _,
EQP19 _,  FRMF19 _,              EQP20 _,  FRMF20 _,
EQP21 _,  FRMF21 _,              EQP22 _,  FRMF22 _,
EQP23 _,  FRMF23 _,              EQP24 _,  FRMF24 _,
EQP25 _,  FRMF25 _,              EQP26 _,  FRMF26 _,
EQP27 _,  FRMF27 _,              EQP28 _,  FRMF28 _,


REMARKS _____________________________________________________!
```

Figure 6-1. RC Form 704—DS3 Unit Type Equipment Data

3.04 RC Form 705, SUB-UNIT XTSI TYPE DATA, is used to set the sub-member XTSI D3U software version in the XTSI D3U Unit Type Translator. (See Figure 6-2.)

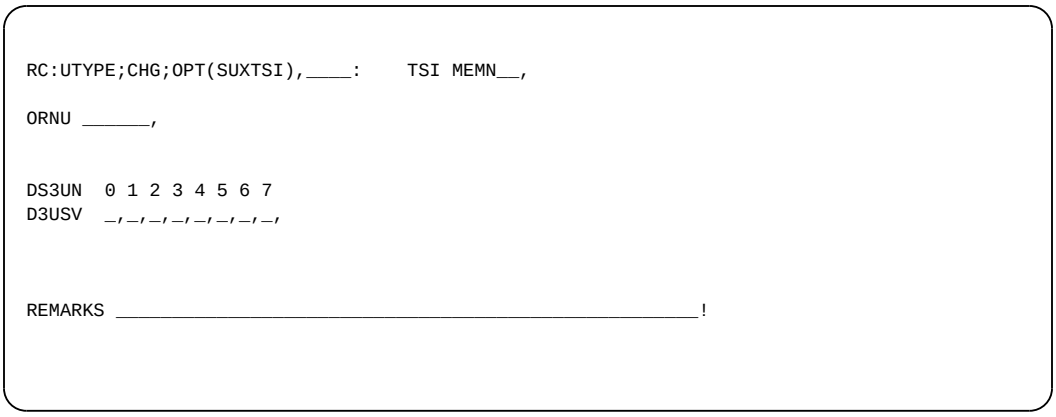


Figure 6-2. RC Form 705—Sub-Unit XTSI Type Data

RC Forms Affected

3.05 Recent change does not support Software Carrier Group Alarms for XTSI D3U applications. The following RC forms are modified by this feature:

A. RC Forms 200, 202, 203, 204, 205, 206, 207, 208, and 620

3.06 These forms are affected as follows:

- D3U XTSI Trunk Appearance Numbers (TANs) cannot be used for dedicated TSI applications.
- All RC forms with a TAN on them must allow for different ranges on the TAN field depending on the application. The following are the allowable ranges for the FTS field in the case of different values in the LVL (level) field:
  - — If LVL=0, FTS must be 1 through 127
  - — If LVL=1 to 6, FTS must be 0 through 127
  - — If LVL=7, FTS must be 0 through 112
- The population rules for trunks on an XTSI used for D3U applications are in the current *4ESS* switch Translation Guide (TG-4).

B. RC Form 210

3.07 Changed population rules for trunks on an XTSI used for D3U applications are in the current *4ESS* switch Translation Guide. This applies to AT&T switches only.

New Verify Forms

3.08 Two new Verify forms were created to support the XTSI feature: 7g and 7h.

3.09 Form 7g is a new verify form that is used to output DS3 and DS1 configuration information for the requested DS3. (See Figure 6-3.)

```
VER:MISC;OPT(XTSID3U):          TSI MEMN --, D3UN -,

REM ALARM ---, MAX LBO ---, DS3 APPL ---

                    DS1 INFO$

EQP01 -,  FRMF01 -,              EQP02 -,  FRMF02 -,
EQP03 -,  FRMF03 -,              EQP04 -,  FRMF04 -,
EQP05 -,  FRMF05 -,              EQP06 -,  FRMF06 -,
EQP07 -,  FRMF07 -,              EQP08 -,  FRMF08 -,
EQP09 -,  FRMF09 -,              EQP10 -,  FRMF10 -,
EQP11 -,  FRMF11 -,              EQP12 -,  FRMF12 -,
EQP13 -,  FRMF13 -,              EQP14 -,  FRMF14 -,
EQP15 -,  FRMF15 -,              EQP16 -,  FRMF16 -,
EQP17 -,  FRMF17 -,              EQP18 -,  FRMF18 -,
EQP19 -,  FRMF19 -,              EQP20 -,  FRMF20 -,
EQP21 -,  FRMF21 -,              EQP22 -,  FRMF22 -,
EQP23 -,  FRMF23 -,              EQP24 -,  FRMF24 -,
EQP25 -,  FRMF25 -,              EQP26 -,  FRMF26 -,
EQP27 -,  FRMF27 -,              EQP28 -,  FRMF28 -,
```

Figure 6-3. Verify Output #7g—DS3 Unit Type Equipment Information Data

3.10 Form 7h is a new verify form that is used to output the SUB-UNIT XTSI Type data for the requested XTSI. Currently this consists of the D3U software data. (See Figure 6-4.)

```
VER:MISC;OPT(SUXTSI):          TSI  MEMN --,


DS3UN  0 1 2 3 4 5 6 7
D3USV  _,_,_,_,_,_,_,_,
```

Figure 6-4. Verify Output #7h—Sub-Unit XTSI Type Data

Verify Forms Affected

3.11 Several groups of Verify forms were modified as a result of the XTSI feature.

A. 2a, 2b, 2c, 2d, 2e, 2f, 2g, 2h, 2i, 2j, 2k, 2l, and 2m

3.12 These verify forms have been modified to allow Universal Services Echo Canceler XTSI Per Call Control (UXPC) to be entered in the Echo Suppressor (ES) field. That designation is used for International Integrated Services Digital Network (ISDN) User Part (INUP), ISDN User Part (ISUP), and Telephone User Part (TUP) trunks that terminate on an XTSI.

B. 1d, 2a, 2b, 2c, 2e, 2f, 2g, 2h, 2i, 2k, 2l, 2m, 2n, 2o, 2p, 2s, 2t, 6w, and 6x

3.13 These verify forms have been modified to allow the FTS of a TAN to be in a range of 0 to 127 and the LVL to be in a range of 0 to 7 when the TANs are used for a D3U application.

C. 12a, 12c, 12d, 12e, 12h, and 16q

3.14 These forms have been modified to change the way ranges are input to allow for a larger number of consecutive TANs and Trunk Scanner Numbers (TSNs). For population rules, refer to the current issue of the TG-4.

D. 16ba

3.15 This form adds the ability to verify XTSI D3U information associated with the new RC Form 704. For population rules, refer to the current issue of the TG-4.

E. 7b and 17a

3.16 Verify forms 7b and 17a have modified population rules that can be found in the current issue of the TG-4.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

6.01 The documents in Table 6-D detail the procedures for clearing troubles in the XTSI and related frames.

Table 6-D. Trouble Clearing Procedural Information

Number	Issue	Title
234-010-215	4	Trouble Locating Procedure Description
234-010-315	12	Domestic Call Irregularity Maintenance Handbook
234-010-316	12	ISC Call Irregularity Maintenance Handbook
234-351-015	6	Peripheral Unit Bus Trouble Clearing TOP
234-351-011AC	1	XTSI Frame Trouble Clearing TOP
234-351-002	3	1B Processor Maintenance Operations Center Trouble Clearing TOP
234-351-003	4	*4ESS* switch 1B Processor Output Message Analysis TOP
234-351-003	5	*4ESS* switch 1B Processor Output Message Analysis TOP (XTSI2)

7. Transition Considerations

Dependencies

7.01 While the introduction of the XTSI hardware is not tied to a specific software release for the *4ESS* switch, the 4E21 Release 3 Generic is required to support the XTSI. The CONNECTVU-TRUNK XTSI feature package Release 5.0 is also required to support XTSI.

7.02 XTSI frames cannot be connected to a 2-wire office.

Ubiquity

7.03 It is not necessary for all *4ESS* switches in the network to be running the 4E21 Release 3 Generic for this feature to be fully operational.

Turn On/Turn Off Mechanism

7.04 This feature is turned on and off by growth and degrowth of frames and associated trunks.

8. Input/Output Manual Pages

8.01 Many messages are affected by the XTSI Release 1 feature. Table 6-E lists the affected messages, along with information about the time of release of each message; and whether the message is unchanged, new, modified, or reformatted.

8.02 The listed Input/Output Manual pages identified with the 4E21 Release 2 and Release 3 Generic are included at the end of this document. Those identified with the 4E21 Release 1 Generic are in the Input/Output Message Manual for the 4E21 Release 1 Generic.

Table 6-E. Input and Output Messages Related to XTSI

(1) **TYPE** = Indicates Type of Message (TSI - XTSI Only - Both).

(2) **GEN REL** = Indicates the 4E Generic Load the software went into (4E21R1, 21R2, 21R3).

(3) **CHG** = Indicates if there was No-Change to Message, New Message, Modified Message.

(4) **FORMAT CHG** = Indicates if there was a change to the Message format (wording of the message may have changed and that's OK. If the Output or Input has changed, that fact is indicated.)

I/O	Message	Type (TSI/XTSI)	GEN. REL.	NO CHG	NEW MSG	MOD. MSG	FORMAT CHG
IM	ALW:TSI	both	21R1			X	X
IM	ALW:USGMEAS:TSI	both	21R1	X			
IM	ANALY:TSI	both	21R2		X		
IM	AUD:PUSTAT	both	21R1			X	X
IM	CLR:TSIBP:TSI	xtsi-only	21R1		X		
IM	COPY:TSI	xtsi-only	21R1		X		
IM	COPY:TSIFILE:TSI	xtsi-only	21R1		X		
IM	DGN:TMSP:PH.8/9	both	21R2	X			
IM	DGN:TSI	both	21R1			X	X
IM	DGN:TSI,D3U	both	21R1		X		X
IM	DUMP:TMSP	both	21R1	X			
IM	DUMP:TSI:CREG	both	21R2	X			
IM	DUMP:TSI-D3U	xtsi-only	21R2		X		
IM	DUMP:TSI-IREG	xtsi-both	21R2			X	X
IM	DUMP:TSIFILE:TSI	xtsi-only	21R1		X		
IM	DUMP:TSIMEM:TSI	xtsi-only	21R1		X		
IM	EX:TMSP	both	21R1	X			
IM	EX:TSI	both	21R1			X	X
IM	EX:TSI,D3U	both	21R1		X		X
IM	INH:TSI	both	21R1		X		X
IM	INH:USGMEAS:TSIF	both	21R1	X			

I/O	Message	Type (TSI/XTSI)	GEN. REL.	NO CHG	NEW MSG	MOD. MSG	FORMAT CHG
IM	INIT:DGSTAT:TSI:D3U	xtsi-only,unique	21R1			X	
IM	INIT:PMOS-UTIL	both	21R2			X	X
IM	LOAD:TSI-CREG	both	21R1			X	X
IM	LOAD:TSI:D3U	xtsi-only	21R2		X		
IM	LOAD:TSI:IREG	xtsi-only	21R3			X	
IM	LOAD:TSIFILE:TSI	xtsi-only	21R1		X		
IM	LOAD:TSIMEM:TSI	xtsi-only	21R1		X		
IM	OP:DGSTAT:TSI:D3U	xtsi-only,unique	21R1			X	
IM	OP:MEASTSI	both	21R1	X			
IM	OP:OOSUNITS:TSI	both	21R1	X			
IM	OP:TSIBP:TSI	xtsi-only	21R1		X		
IM	ORD:DS1LOOP	xtsi-only	21R1		X		
IM	ORD:DS3LOOP	xtsi-only	21R1		X		
IM	RMV:TSI	both	21R1			X	X
IM	RMV:TSI,D3U	both	21R1		X		
IM	RST:TSI	both	21R1			X	X
IM	RST:TSI,D3U	both	21R1		X		
IM	SET:DIGROUP,TSI,D3U	xtsi-only,unique	21R1			X	
IM	SET:NETROUT	both	21R1			X	X
IM	SET:TSIBP:TSI	xtsi-only	21R1		X		
IM	STOP:ANALY-TSI	both	21R1		X		
IM	SW:TSI	both	21R3			X	
IM	UPD:TSI	xtsi-only	21R1		X		
IM	UPD:TSI	xtsi-only	21R3		X		
IM	VER:TRK	both,unique	21R1			X	
IM	VER:TRKNAME,TSI,D3U	xtsi-only,unique	21R1			X	
IM	VER:UTYPE	both	21R1			X	X
IM	VER:VFUNC	xtsi	21R3			x	
IM	VER:VFUNC XTSID3U	xtsi-only,unique	21R2		X		
IM	VER:VFUNC SUXTSI	xtsi-only,unique	21R2		X		
IM	VER:TRK-USEC	both, unique	21R1			X	

I/O	Message	Type (TSI/XTSI)	GEN. REL.	NO CHG	NEW MSG	MOD. MSG	FORMAT CHG
OM	ALW:USGMEAS:TSI	both	21R1	X			
OM	AUD:PUSTAT	both	21R1			X	X
OM	CLR:TSIBP:TSI	xtsi-only	21R1		X		
OM	COPY:TSI	xtsi-only	21R1		X		
OM	COPY:TSIFILE:TSI	xtsi-only	21R1		X		
OM	DGN:TMSP:PH.8/9	both	21R2	X			
OM	DGN:TSI	both	21R1			X	X
OM	DGN:TSI,D3U	xtsi-only	21R1		X		
OM	DGN:TSI-ILL	both	21R1			X	X
OM	DGN:TSI-NOT	both	21R1			X	X
OM	DGN:TSI-PUB	both	21R3			X	X
OM	DGN:TSI-TERM	both	21R1			X	X
OM	DGN:TSI-TEST	both	21R3			X	X
OM	DUMP:TSI-CREG	both	21R2	X			
OM	DUMP:TSI-CREG-X	xtsi-only	21R2		X		
OM	DUMP:TSI-D3U	xtsi-only	21R2		X		
OM	DUMP:TSI:IREG	xtsi-only	21R1			X	X
OM	DUMP:TSIFILE:TSI	xtsi-only	21R1		X		
OM	DUMP:TSIMEM:TSI	xtsi-only	21R1		X		
OM	EX:TSI	both	21R1			X	X
OM	EX:TSI,D3U	xtsi-only	21R1		X		
OM	EX:TSI-ADDR	both	21R2			X	X
OM	EX:TSI-ILL	both	21R1			X	X
OM	EX:TSI-LOOP	both	21R1			X	X
OM	EX:TSI-NOT	both	21R1			X	X
OM	EX:TSI-PUB	both	21R3			X	X
OM	EX:TSI-SUSP	both	21R1			X	X
OM	EX:TSI-TERM	both	21R1			X	X
OM	EX:TSI-TEST	both	21R3			X	X
OM	INH:USGMEAS:TSIF	both	21R1	X			
OM	INIT:DGSTAT	both	21R1			X	
OM	LOAD:TSI-CREG	both	21R2			X	X
OM	LOAD:TSI-D3U	xtsi-only	21R2		X		
OM	LOAD:TSI-IREG	xtsi-only	21R1			X	X
OM	LOAD:TSIFILE:TSI	xtsi-only	21R1		X		
OM	LOAD:TSIMEM:TSI	xtsi-only	21R1		X		
OM	OP:DGSTAT	xtsi-only	21R1			X	

I/O	Message	Type (TSI/XTSI)	GEN. REL.	NO CHG	NEW MSG	MOD. MSG	FORMAT CHG
OM	OP:MEASTSI	both	21R1	X			
OM	OP:OOSUNITS:TSI	both	21R1	X			
OM	OP:PERIFINH	both	21R1			X	X
OM	OP:PMOS	both	21R2			X	X
OM	OP:TRKSTAT	both	21R1			X	
OM	OP:TSIBP:TSI	xtsi-only	21R1		X		
OM	ORD:DS1LOOP	xtsi-only	21R1		X		
OM	ORD:DS3LOOP	xtsi-only	21R1		X		
OM	REPT:0:Data:Aux	both,autonomous	21R2			X	X
OM	REPT:FAN-AIR-FLOW:TSI	xtsi-only,autonomous	21R2			X	X
OM	REPT:FAN-FUSEALRM	xtsi-only,autonomous	21R2		X		
OM	REPT:FAN-ST	both,autonomous	21R2			X	X
OM	REPT:PA	both,autonomous	21R2			X	X
OM	REPT:PMOS-TSKID	both,autonomous	21R2			X	X
OM	REPT:SDU:TSI	both	21R1			X	X
OM	REPT:TSIBP	xtsi-only	21R1		X		
OM	REPT:CIN	both	21R1			X	
OM	REPT:OTAN	both	21R1			X	
OM	RMV:TSI	both	21R3			X	X
OM	RMV:TSI,D3U	xtsi-only	21R1		X		
OM	RPT:TSI-D3U	xtsi-only,autonomous	21R2		X		
OM	RPT:TSI	xtsi-only,autonomous	21R2		X		
OM	RST:TSI	both	21R1			X	X
OM	RST:TSI,D3U	xtsi-only	21R1		X		
OM	SET:DIGROUP	both	21R1			X	
OM	SET:TRKSTAT	both	21R1			X	
OM	SET:TSIBP:TSI	xtsi-only	21R1		X		
OM	SW:TSI	both	21R3			X	
OM	TEST:PUSYS	both	21R2			X	X
OM	UPD:TSI	xtsi-only	21R1		X		
OM	VER:MISC-SUXTSI	xtsi-only	21R2		X		
OM	VER:MISC:XTSID3U	xtsi-only	21R2		X		
OM	VER:NAILUP	both	21R2			X	
OM	VER:TRK-CCS	both	21R2			X	
OM	VER:TRK-SCGA	both	21R2			X	

I/O	Message	Type (TSI/XTSI)	GEN. REL.	NO CHG	NEW MSG	MOD. MSG	FORMAT CHG
OM	VER:TRK-TSN	both	21R2			X	
OM	VER:TRKNAME	both	21R1			X	
OM	VER:UTMN	both	21R2			X	

MESSAGE ID	LOAD:TSI-IREG
WORK CENTER	MOC, TEC
GENERIC	4E21 and later
CLASS	PUMTC MESSAGE
APPLICATION	4E
TYPE	Input

1. **PURPOSE**

   Loads the specified Expanded Time Slot Interchange (XTSI) Internal Register (**IREG**), or Critical Register (**CREG**).

   Format [1] is used to load registers other than hardware status registers. Controller defaults to the in-service controller.

   Format [2] is used to load hardware status registers only. Register numbers must be *0* or *1*. The controller defaults to the in-service controller. Controller default is both controllers.

2. **FORMAT**

   [1]**LOAD:TSI** *a*,{**IREG**/**CREG**} *b*:*c* [,**MSK** *d*]**!**

   [2]**LOAD:TSI** *a*, [**CONTR** *e*,]{**IREG**/**CREG**} *b*:*c* [,**MSK** *d*]**!**

3. **EXPLANATION OF MESSAGE**

a	XTSI member number (*0-63*).
IREG	Internal Register.
CREG	Critical Register.
b	Register numbers in octal:
	0— STATR - Hardware status register bits12-23.
	1— STATR - Hardware status register bits0-11.
	5— Controller Error Source Register (CESR).
	6— Controller Programmable Error Source Trigger (PEST) register.
	7— Controller Control (CNTL) register.
	22— Maintenance Buffer Pointers (MBPTRs).
	25— Shadow Maintenance Buffer Pointer (SHDWMBPTR).
	32— Time Slot Interchange (**TSI**) Control (TSICTL) register.

20— TSI Exercise 0 (TSIEXR0) register.

21— TSI Exercise 1 (TSIEXR1) register.

25— FBI Status And Control (FBICTL) register.

27— Protection Switched Client (PSC) Error Pest (PSCPEST) register.

51— PSC Pulse Code Modulated (PCM) Cutoff (PSCPCMCO) register.

52— PSC Control Bus Cutoff (PSCCBCO) register.

c Data to be loaded into register, in octal, up to 24 bits.

d 24 bit mask through which data is loaded, expressed in octal. Default mask is all ones.

e Controller number (*0* or *1*). Default is both controllers.

4. **SYSTEM RESPONSE**

PF,CODE091 Printout Follows. Printout will conditionally follow.

5. **REFERENCES**

PIDENT
PULP

234-180-280, *Peripheral Utility Program (PULP) - Description*

Input Message
DUMP:TSI-IREG

Output Message
DUMP:TSI-IREG
LOAD:TSI-IREG

MESSAGE ID	SW:TSI
WORK CENTER	MAC, MOC, TEC, TOC
GENERIC	4E21 and later
CLASS	PUMTC MESSAGE
APPLICATION	4E
TYPE	Input

1. **PURPOSE**

   Switches controller's activity within the specified Time Slot Interchange (**TSI**) frame (Expanded Time Slot Interchange [XTSI] only).

   If the specified **TSI** frame is simplex, the out-of-service controller is restored to service (made active) and the previously in-service controller is removed from service.

   If the specified **TSI** frame is duplex, the current active controller is made standby and the current standby controller is made active. The **TSI** remains duplex.

2. **FORMAT**

   SW:TSI *a* [**,CONTR** *b*]**!**

3. **EXPLANATION OF MESSAGE**

a	**TSI** member number (*0-63*). Companion member numbers (odd numbers) generate Input/Output (I/O) error text.
b	Controller (**CONTR**) member number (*0-1*).

4. **SYSTEM RESPONSE**

NG	No Good. Invalid input combination, invalid member, submember number or companion member.
PF	Printout Follows. Maintenance Control Program (MACP) job requested to perform switch. Disposition of the request will be given by an output message.
RL	Retry Later. MACP job queue full.

5. **REFERENCES**

   PIDENTs
   - FRDI
   - MIRA
   - TOPIC000
   - XTSTOPEX
   - XTSTOPOP

   Output Message

SW:TSI

MESSAGE ID	UPD:TSI
WORK CENTER	MOC
GENERIC	4E21 and later
CLASS	PUMTC MESSAGE
APPLICATION	4E
TYPE	Input

WARNING

The *UCL* option is not recommended for normal usage. Use only as directed when there is a problem making the frame Duplex.

1. **PURPOSE**

This update message replaces the software in an Expanded Time Slot Interchange (XTSI) controller or its subunits with another software version, then makes the controller or its subunits active. When the initial system configuration is Duplex (both controllers in-service) both controllers will be updated with the new software version. This message would normally be used as part of a system-wide generic retrofit or an XTSI software upgrade.

Format [1] is used to update Time Slot Interchange (**TSI**) controllers with a specific program version from the flash memory on the in-service Standby controller of XTSI. The Standby XTSI controller will be updated, then made Active (there will be a controller activity switch). The software version obtained from the flash memory is XTSI Controller (**XTC**) operational software. The configuration state of **TSI** frame must be Duplex.

Format [2] is used to update the **TSI** controller with a specific program version from the flash memory on a controller of XTSI. The software version obtained from the flash memory is XTC operational software. The configuration state of **TSI** frame can be Duplex or Simplex (one controller in-service; other controller Out-Of-Service [OOS]).

— If the **TSI** is a Simplex, the XTC operational software file will be obtained from the flash memory on the Out of Service controller. The **UCL** option for simplex state is not for the OOS controller due to hardware failure. It may be used when a generic software can not bring up a frame to duplex state.

— If the TSI is a Duplex, the XTC operational software file will be obtained from the flash memory on the in-service Standby controller.

Format [3] is used to update an XTSI subunit, Digital Signal Level 3 Unit (**D3U**), with a specific program version from the flash memory on an in-service Active controller of XTSI. The program file obtained from the flash memory is **D3U** operational software. The configuration state of **TSI** frame can be Simplex o

Duplex and the **D3U** must have its spare **D3U** unit available (i.e. not out-of-service). If the **D3U** Protection Switch (PS) spare unit (**D3U 6** or **D3U 7**), it must not be switched in and protecting a **D3U** client.

2. **FORMAT**

[1]**UPD:TSI** *a*,**XTC,SVN** *c*!

[2]**UPD:TSI** *a*,**XTC,SVN** *c*;**UCL!**

[3]**UPD:TSI** *a*,**D3U** *b*,**SVN** *c*!

3. **EXPLANATION OF MESSAGE**

a	XTSI type **TSI** member number (*0-63*).
b	**D3U** member number (*0-7*).
c	Is the Source File Version (**SVN**) number on the flash memory (*0-3*). Only version numbers 0 and 1 are valid field assignments.
UCL	Unconditional.

4. **SYSTEM RESPONSE**

?D	Data field contains an error. The update request has been denied because a required keyword argument is missing.
?E	Syntax Error exists in the message but cannot be resolved to the proper field. The update request was rejected because the program was unable to parse the input message.
?I	Identification field contains an error. The update request has been denied because either a required keyword is missing, a keyword argument is out-of-range, or extra keywords or keyword arguments were specified.
PF	Printout Follows. The update request has been accepted. Output messages will follow to indicate the status of the controller update.
RL	Retry Later. The update request has been denied because there are too many tasks in progress.

5. **REFERENCES**

PIDENT
XTSGNUPD

Output Message
UPD:TSI

MESSAGE ID	VER:VFUNC
WORK CENTER	MAC, MOC
GENERIC	4E20 Rel. 3 and later
CLASS	VER MESSAGE
APPLICATION	4E
TYPE	Input

1. **PURPOSE**

   Requests the verification of miscellaneous data and specific information based upon the input **VFUNC** keyword.

2. **FORMAT**

   [1]**VER:VFUNC OCTCP!**

   [2]**VER:VFUNC SUXTSI** [**:FD1** *a*,**DT1** *b*]**!**

   [3]**VER:VFUNC XTSID3U** [**:FD1** *a*,**DT1** *b*] [**,FD2** *c*,**DT2** *d*]**!**

3. **EXPLANATION OF MESSAGE**

OCTCP	Verify Originating Carrier and Terminating Country Pair (**OCTCP**) to multiple carrier treatment assignment.
SUXTSI	Sub-unit Expanded Time Slot Interchange (XTSI) type data.
XTSID3U	XTSI Digital Signal Level 3 (DS3) unit application.
a	*TSIMEMN*— Time Slot Interchange Member Number (*TSIMEMN*).
b	Time Slot Interchange (TSI) member number (2-62 even numbers only).
c	*D3UN*— DS3 number.
d	DS3 number (0-7). Six is the spare Digital Signal Level 3 Unit (D3U) number for D3U numbers 0, 1 and 2. Seven is the spare D3U number for D3U numbers 3, 4 and 5.

4. **SYSTEM RESPONSE**

NA	Not Accepted.
PF	Printout Follows.

5. **REFERENCES**
   PIDENTs
   IOCPIMC4

VRFYCNTL
VRFYINPT
VRFYMISC

Output Messages
VER:MISC-OCTCP
VER:MISC-SUXTSI
VER:MISC-XTSID3U

MESSAGE ID	DGN:TSI-PUB
WORK CENTER	MOC, TEC
GENERIC	4E21 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

   DGN:TSI a b c:PUB d e f [g]

2. **REASON FOR OUTPUT**

   To specify both the diagnostic results and the termination mode for a Time Slot Interchange (*TSI*). This message is printed at the conclusion of the diagnostic execution.

3. **VARIABLE FIELD DEFINITIONS**

   a The member number of the Time Slot Interchange Frame (TSIF) under diagnosis.

   b The type of subunit for which the diagnostic was requested.

   c The number of the subunit under diagnosis.

   d The helper Peripheral Unit Bus (*PUB*) that was requested.

   e The termination mode for the diagnostic:

   ABORTED
   The diagnostic was abnormally stopped due to an interrupt, error in execution, or due to a *STOP:MACLI* input request.

   COMPLETED
   The diagnostic completed normally.

   STOPPED
   The diagnostic was terminated under program control since further testing would not improve diagnostic resolution.

   f The results of the diagnostic:

   ATP
   All tests passed.

   CATP
   All tests passed; however, some tests were skipped due to the unavailability of a system resource which was needed to perform the test.

NTR
No tests were executed.

STF
Some tests failed.

STF-BOF
The number of failed tests has filled the buffer. Before any more tests are run, the system prints out the contents of the buffer and then clears it.

g An optional field that will appear only if the results are not All Tests Passed (ATP). If *CATP* or *NTR*, this field identifies the reason that the tests were skipped. The reasons are identified by their bit positions in the 16-digit octal number that is printed. For example, if *g* is (20000000 00001000), then tests were skipped for reasons 9 and 47.

The reasons for non XTSI controllers are as follows:

BIT	REASONS FOR TESTS SKIPPED
0	Peripheral Unit Bus (PUB) 0 out-of-service
1	PUB 1 out-of-service
2	Primary Signaling Processor (SP) pulse points out-of-service
3	Secondary SP pulse points out-of-service
4	Mate unit out-of-service
5	Power control switch in Request Out-Of-Service (ROS) position or diagnostic requested from power control switch
8	Clock Interrogate (CI) has other units responding
9	Member Interrogate (MI) has other units responding
10	Group Interrogate (GI) has other units responding
11	PUB not duplex
12	Time Multiplexed Switch Pair (TMSP) out-of-service
13	Voiceband Interface Unit (VIU) / DTU out-of-service
14	Network blockage encountered
15	Time Slot Interchange Frame (TSIF) in growth
16	Echo Suppressor Unit (ESU) out-of-service
24	SP scan/distribute points out-of-service
25	SP bus out-of-service

The reasons for XTSI controllers and Digital Signal Level 3 Units (D3Us) are as follows:

BIT	REASONS FOR TESTS SKIPPED
0	Peripheral Unit Bus (PUB) 0 out-of-service
1	PUB 1 out-of-service
2	Primary Signaling Processor (SP) pulse points out-of-service
3	Secondary SP pulse points out-of-service
4	Mate unit out-of-service
5	Power control switch in Request Out-Of-Service (ROS) position or diagnostic requested from power control switch
6	Power monitor tests skipped on manual ROS test
7	Central Controller (CC) 0 Out Of Service
8	CC 1 Out Of Service
9	Member Interrogate (MI) has other units responding
10	Group Interrogate (GI) has other units responding
11	PUB not duplex
12	Autonomous Peripheral Unit Failure (APUF) CATP flag
13	Autonomous Peripheral Unit Trouble (APUT) CATP flag
14	Network blockage encountered
15	Time Slot Interchange Frame (TSIF) in growth
17	Some other frame responding to Poll High Priority (PHP) polling
18	Some other frame responding to Poll Low Priority (PLP) polling
19	Some other frame responding to Poll Digit (PDG) polling
20	Some other frame responding to Poll Seizure (PSZ) polling
22	Controller 0 Out Of Service
23	Controller 1 Out Of Service
24	SP scan/distribute points out-of-service
25	SP bus out-of-service
26	Some Protection Switch Client (PSC) is protection switched
27	Controller not duplex
28	One or both controller power feeds are not available
30	Some PSC port is pested
31	Network clock 0 Out Of Service
32	Network clock 1 Out Of Service
33	Time Multiplexed Switch (TMS) is Out Of Service
34	A-Link Controller (ALC) is powered down
35	Controller 0 is powered down
36	Controller 1 is powered down
37	Some PSC Power Control Switch is in ROS Position
38	Some PSC Port is not running operational load
39	Digital Signal Level 3 Unit (D3U) not in growth or special growth
40	D3U not protection switched

If subunit type is IPUB:

BIT	REASONS FOR TESTS SKIPPED
6	Central Controller (CC) 0 out-of-service
7	CC 1 out-of-service
12	Helper controller 0 out-of-service
13	Helper controller 1 out-of-service
26	Interface Peripheral Unit Bus (IPUB) out-of-service
27	DTFRIGAL return failed

If *STF*, this field gives the number of failing phases, number of failing tests, trouble number. For example, (2,9,00101545) indicates 2 phases failed, 9 tests failed, and a trouble number of 00101545.

4. **ACTION TO BE TAKEN**

If the results are *CATP*, restore the indicated system resource to service so that all tests may be executed. If *STF*, repair the unit as quickly as possible. Otherwise, no action is needed.

Diagnostics may also be requested via the main frame. When they are, power monitor tests are omitted. This omission causes bit 26 in the *CATP* field to be set. If power monitor tests are desired, the diagnostic must be requested via the Teletypewriter (TTY).

Any problems indicated by *CATP* bits should be cleared before running the diagnostic again.

5. **REFERENCES**

PIDENTs
PUDGTS--, if subunit type is CONTR
PUDGTI--, if subunit type is CONTR
PUDGTI99, if subunit type is IPUB
PUDGXT--, if subunit is CONTR
PUDGXT99, if subunit is IPUB
PUDGDS--, if subunit is D3U

234-180-020, *Diagnostic Language - DIAL*
234-180-260, *4ESS™ Peripheral Diagnostic Program - Description*

Input Messages
DGN:TSI
STOP:MACLI

MESSAGE ID	DGN:TSI-TEST
WORK CENTER	MOC
GENERIC	4E21 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

[1]*DGN:TSI a,b c:d e PH f g* [h]
[TEST MISMATCH SUPPLEMENTARY DATA
i jjjjjjj kkkkkkkk lllllll mmmmmmmm nnnnnnnn ooooooo
ppppppp qqqqqqqq rrrrrrr]

[2]*DGN:TSI a, CONTR s PH f g* [h] MSG STARTED
[TEST MISMATCH SUPPLEMENTARY DATA
i jjjjjjj 00ttttt uuuuvvvv vvvvvvvv wwwwwwww xyza1.a1
0b1c1.c1 00d1..d1 00e1..e1 00f1..f1 00g1..g1
00h1..h1 00i1..i1]

[3]*DGN:TSI a, D3U j1 PH f g* [h] MSG STARTED
[TEST MISMATCH SUPPLEMENTARY DATA
i jjjjjjj 00ttttt uuuuvvvv vvvvvvvv wwwwwwww xyza1.a1
0b1c1.c1 00d1..d1 00e1..e1 00f1..f1 00g1..g1
00h1..h1 00i1..i1]

2. **REASON FOR OUTPUT**

To print out diagnostic results on a phase basis for a Time Slot Interchange (*TSI*). This occurs in the case of a partial diagnosis, a test failure, or whenever *RAW* was requested on the input message.

Format [1] is the general format.

Format [2] is the Controller (*CONTR*) resident format.

Format [3] is the Digital Signal Level 3 Unit (*D3U*) resident format.

3. **VARIABLE FIELD DEFINITIONS**

a	Member number of the *TSI* being diagnosed.
b	Subunit type being diagnosed.
c	Submember number of the subunit being diagnosed.
d	Helper unit type, if specified.
e	Helper member number, if specified.

f Diagnostic phase number for which the results are reported.

g Results of the diagnostic:

ATP
All tests passed.

CATP
All tests passed; however, some tests were skipped because of the unavailability of a system resource which was needed to perform the test.

NTR
No tests were executed.

STF
Some tests failed.

STF-BOF
Some tests failed and the raw data buffer overflowed. Phase has not been completed.

h An optional field that will appear only if the results were not All Tests Passed (*ATP*).

If *CATP* or *NTR*, this field identifies the reason that the tests were skipped in this phase. The reasons are identified by their bit position in the 16-digit octal number that is printed. For example, if *h* is (00000001 00001000) then tests were skipped for reasons 9 and 24. The reasons are listed in Table 1.

If subunit type is *BUS*, see *DGN:PUB* output message for *CATP* reasons.

If *STF*, this field gives the number of test failures, in addition to the reasons that tests were skipped. For example, if *h* is (7,00000001 00001000), seven tests failed, plus tests were skipped for reasons 9 and 24.

The reasons for non XTSI controllers are as follows:

BIT	REASONS FOR TESTS SKIPPED
0	Peripheral Unit Bus (PUB) 0 out-of-service
1	PUB 1 out-of-service
2	Primary Signaling Processor (SP) pulse points out-of-service
3	Secondary SP pulse points out-of-service

4	Mate unit out-of-service
5	Power control switch in Request Out-Of-Service (ROS) position or diagnostic requested from power control switch
8	Clock Interrogate (CI) has other units responding
9	Member Interrogate (MI) has other units responding
10	Group Interrogate (GI) has other units responding
11	PUB not duplex
12	Time Multiplexed Switch Pair (TMSP) out-of-service
13	Voiceband Interface Unit (VIU) / DTU out-of-service
14	Network blockage encountered
15	Time Slot Interchange Frame (TSIF) in growth
16	Echo Suppressor Unit (ESU) out-of-service
24	SP scan/distribute points out-of-service
25	SP bus out-of-service

The reasons for XTSI controllers and Digital Signal Level 3 Units (*D3U*s) are as follows:

BIT	REASONS FOR TESTS SKIPPED
0	Peripheral Unit Bus (PUB) 0 out-of-service
1	PUB 1 out-of-service
2	Primary Signaling Processor (SP) pulse points out-of-service
3	Secondary SP pulse points out-of-service
4	Mate unit out-of-service
5	Power control switch in Request Out-Of-Service (ROS) position or diagnostic requested from power control switch
6	Power monitor tests skipped on manual ROS test
7	Central Controller (CC) 0 Out Of Service
8	CC 1 Out Of Service
9	Member Interrogate (MI) has other units responding
10	Group Interrogate (GI) has other units responding
11	PUB not duplex
12	Autonomous Peripheral Unit Failure (APUF) CATP flag
13	Autonomous Peripheral Unit Trouble (APUT) CATP flag
14	Network blockage encountered
15	Time Slot Interchange Frame (TSIF) in growth
17	Some other frame responding to Poll High Priority (PHP) polling
18	Some other frame responding to Poll Low Priority (PLP) polling
19	Some other frame responding to Poll Digit (PDG) polling
20	Some other frame responding to Poll Seizure (PSZ) polling

22 Controller 0 Out Of Service
23 Controller 1 Out Of Service
24 SP scan/distribute points out-of-service
25 SP bus out-of-service
26 Some Protection Switch Client (PSC) is protection switched
27 Controller not duplex
28 One or both controller power feeds are not available
30 Some PSC port is pested
31 Network clock 0 Out Of Service
32 Network clock 1 Out Of Service
33 Time Multiplexed Switch (TMS) is Out Of Service 34 T{ A-Link Controller (ALC) is powered down
35 Controller 0 is powered down
36 Controller 1 is powered down
37 Some PSC Power Control Switch is in ROS Position
38 Some PSC Port is not running operational load
39 Digital Signal Level 3 Unit (*D3U*) not in growth or special growth
40 D3U not protection switched

If subunit type is IPUB:

BIT	REASONS FOR TESTS SKIPPED
6	Central Controller (CC) 0 out-of-service
7	CC 1 out-of-service
12	Helper controller 0 out-of-service
13	Helper controller 1 out-of-service
26	Interface Peripheral Unit Bus (IPUB) out-of-service
27	DTFRIGAL return failed

If *STF-BOF*, the number of test failures is the number of test failures up to the point of buffer overflow.

The following appear only if the diagnostic was *STF:*

i Test number of the failing test.

j Bits which were in error, that is, a *1* in a bit position indicates that the response from the unit did not match the expected response in that bit.

k *RAW* response from the unit or firmware diagnostic *RAW* response.

l,m Information concerning the test being executed. Details are specified in the diagnostic listing.

n	Address in the phase (or subroutine) of the test that failed.
o	Bits 12-0 contain information for the *TLP* programs. Bits 23-21 contain the count of the number of words of supplementary data that follows. Bits 20-18 contain the count of the number of words of DOLOOP data that follows. Bits 17-15 contain the count of the number of words of subroutine data that follows.
p	Supplementary data words. Repeated *x* times, where *x* is bits 23-21 of variable *o*. This data supplies information about the test being executed. The last supplementary data word specified is printed first.
q	DOLOOP data words. Repeated *y* times, where *y* is bits 20-18 of variable *o*. This data is the value of the DOLOOP variables at the time of the test failure. The value of the innermost DOLOOP is printed first.
r	Subroutine data words. Repeated *z* times, where *z* is bits 17-15 of variable *o*. This data is the address of the callsubs which led up to this point in the diagnostic. The address of the last callsub is printed first.
s	Controller number (*0* or *1*).
t	The least significant 16 bits represent the actual octal data from the half word of LR57, where a mismatch with expected data occurred. The expected data must be derived from the actual and mismatched data fields.
u	Peripheral Unit (PU) address bus bits of the bus order sent to the subunit (12 bits).
v	PU write bus bits of the order sent to the subunit (36 bits). The upper 7 bits are the opcode and the remaining 29 bits are the data for the order. For subunit PUMACRO orders this includes the PUMACRO macro ID, a data expected flag (write only vs. a write/read order), a sub-opcode, and the test group number.
w	DIAL address of the instruction that failed.
x	Number of words of supplementary data.
y	Number of words of do-loop data. Not defined by subunit code.
z	Number of words of subroutine data. Not defined by subunit code.

a1 Trouble Location Procedure (TLP) data. Not defined by subunit code.

b1 Indicates in which half word of the subunit 32 bit word the mismatched data occurred. (0 least significant, 1 most significant)

c1 Subunit microprogram address of the previous function called, i.e., the first function on the stack or the function that called DGFAIL.

d1 Subunit microprogram address of the second function on the stack , i.e., the address of a subroutine call which then called DGFAIL.

e1 The 16 bit field of supplementary data written to the least significant half word of LR58.

NOTE: The upper 8 bits of this and the following octal words will always be zero, i.e., only the lower 16 bits are used.

f1 The 16 bit field of supplementary data written to the most significant half word of LR59.

NOTE: A 32 data word in LR59 is split between the lower 16 bits of two 24 bit supplementary data words.

g1 The 16 bit field of supplementary data written to the least significant half word of LR59.

h1 The 16 bit field of supplementary data written to the most significant half word of LR60.

i1 The 16 bit field of supplementary data written to the least significant half word of LR60.

j1 Digital Signal Level 3 Unit (*D3U*) number.

4. **ACTION TO BE TAKEN**

If the results are *CATP*, restore the indicated system resource to service so that all tests may be executed. If *STF*, repair the unit as quickly as possible. Otherwise, no action is needed.

5. **REFERENCES**

PIDENTs

PUDGTI - if subunit type is *CONTR*
PUDGTS - if subunit type is *CONTR*
PUDGXT - if subunit type is *CONTR*
PUDGDS - if subunit type is *D3U*
PUDGTI99 - if subunit type is *IPUB*
PUDGXT99 - if subunit type is *IPUB*

234-180-020, *Diagnostic Language - DIAL*
234-180-260, *4ESS™ Peripheral Diagnostic Program - Description*

Input Message

DGN:TSI

Output Message

DGN:PUB

MESSAGE ID	EX:TSI-PUB
WORK CENTER	MOC, TEC
GENERIC	4E21 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

   EX:TSI a b c:PUB d e f [g]

2. **REASON FOR OUTPUT**

   To specify both the diagnostics results and the termination mode. This message is printed at the conclusion of the interactive diagnostic execution.

3. **VARIABLE FIELD DEFINITIONS**

   a The member number of the Time Slot Interchange (*TSI*) Frame (TSIF) under diagnosis (*0-63*).

   b The type of subunit for which the diagnostic was requested.

   c The number of the subunit under diagnosis.

   d The helper Peripheral Unit Bus (*PUB*) that was requested.

   e The termination mode for the diagnostic:

   ABORTED
   The diagnostic was abnormally stopped due to an interrupt, error in execution, or due to a *STOP:MACLI* or *STOP:EX* input request.

   COMPLETED
   The diagnostic completed normally.

   STOPPED
   The diagnostic was terminated under program control since further testing would not improve diagnostic resolution.

   f The results of the diagnostic:

   ATP
   All tests passed.

   CATP
   All tests passed; however, some tests were skipped due to the unavailability of a system resource which was needed to perform the test.

NTR
No tests were executed.

STF
Some tests failed.

STF-BOF
The number of failed tests has filled the buffer. Before any more tests are run the system prints out the contents of the buffer and then clears it.

g An optional field that will appear only if the results are not *ATP*. If *CATP* or *NTR*, this field identifies the reason that the tests were skipped. The reasons are identified by their bit position in the 16-digit octal number that is printed. For example, if *g* is (20000000 00001000), then tests were skipped for reasons 9 and 47.

The reasons for non XTSI controllers are as follows:

BIT	REASONS FOR TESTS SKIPPED
0	Peripheral Unit Bus (PUB) 0 out-of-service
1	PUB 1 out-of-service
2	Primary Signaling Processor (SP) pulse points out-of-service
3	Secondary SP pulse points out-of-service
4	Mate unit out-of-service
5	Power control switch in Request Out-Of-Service (ROS) position or diagnostic requested from power control switch
8	Clock Interrogate (CI) has other units responding
9	Member Interrogate (MI) has other units responding
10	Group Interrogate (GI) has other units responding
11	PUB not duplex
12	Time Multiplexed Switch Pair (TMSP) out-of-service
13	Voiceband Interface Unit (VIU) / DTU out-of-service
14	Network blockage encountered
15	Time Slot Interchange Frame (TSIF) in growth
16	Echo Suppressor Unit (ESU) out-of-service
24	SP scan/distribute points out-of-service
25	SP bus out-of-service

The reasons for XTSI controllers and Digital Signal Level 3 Units (D3Us) are as follows:

BIT	REASONS FOR TESTS SKIPPED
0	Peripheral Unit Bus (PUB) 0 out-of-service
1	PUB 1 out-of-service
2	Primary Signaling Processor (SP) pulse points out-of-service
3	Secondary SP pulse points out-of-service
4	Mate unit out-of-service
5	Power control switch in Request Out-Of-Service (ROS) position or diagnostic requested from power control switch
6	Power monitor tests skipped on manual ROS test
7	Central Controller (CC) 0 Out Of Service
8	CC 1 Out Of Service
9	Member Interrogate (MI) has other units responding
10	Group Interrogate (GI) has other units responding
11	PUB not duplex
12	Autonomous Peripheral Unit Failure (APUF) CATP flag
13	Autonomous Peripheral Unit Trouble (APUT) CATP flag
14	Network blockage encountered
15	Time Slot Interchange Frame (TSIF) in growth
17	Some other frame responding to Poll High Priority (PHP) polling
18	Some other frame responding to Poll Low Priority (PLP) polling
19	Some other frame responding to Poll Digit (PDG) polling
20	Some other frame responding to Poll Seizure (PSZ) polling
22	Controller 0 Out Of Service
23	Controller 1 Out Of Service
24	SP scan/distribute points out-of-service
25	SP bus out-of-service
26	Some Protection Switch Client (PSC) is protection switched
27	Controller not duplex
28	One or both controller power feeds are not available
30	Some PSC port is pested
31	Network clock 0 Out Of Service
32	Network clock 1 Out Of Service
33	Time Multiplexed Switch (TMS) is Out Of Service
34	A-Link Controller (ALC) is powered down
35	Controller 0 is powered down
36	Controller 1 is powered down
37	Some PSC Power Control Switch is in Request Out Of Service (ROS) position

38 Some PSC Port is not running operational load
39 Digital Signal Level 3 Units (D3Us) not in growth or special growth
40 D3U not protection switched

If subunit type is IPUB:

BIT	REASONS FOR TESTS SKIPPED
6	Central Controller (CC) 0 out-of-service
7	CC 1 out-of-service
12	Helper controller 0 out-of-service
13	Helper controller 1 out-of-service
26	Interface Peripheral Unit Bus (IPUB) out-of-service
27	DTFRIGAL return failed

If *STF*, this field gives the number of failing phases, number of failing tests, and trouble number. For example, (2,9,00101545) indicates 2 phases failed, 9 tests failed, and a trouble number of 00101545.

4. **ACTION TO BE TAKEN**

If the results are *CATP*, restore the indicated system resource to service so that all tests may be executed. If *STF*, repair the unit as quickly as possible. Otherwise, no action is needed. Diagnostics may also be requested via the main frame. When they are, power monitor tests are omitted. This omission causes bit 26 in the *CATP* field to be set. If power monitor tests are desired, the diagnostic must be requested via the Teletypewriter (TTY).

5. **REFERENCES**

PIDENTs

PUDGTI--, if subunit type is CONTR
PUDGTI99, if subunit type is IPUB
PUDGTS--, if subunit type is CONTR
PUDGXT--, if subunit type is CONTR
PUDGXT99, if subunit type is IPUB
PUDGDS--, if subunit type is D3U

234-180-020, *Diagnostic Language - DIAL*
234-180-260, *4ESS™ Peripheral Diagnostic Program - Description*

Input Messages

EX:TSI
STOP:EX
STOP:MACLI

MESSAGE ID	EX:TSI-TEST
WORK CENTER	MOC, TEC
GENERIC	4E21 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

[1] *EX:TSI a,b c:d e PH f g* [h]
[TEST MISMATCH SUPPLEMENTARY DATA
i jjjjjjj kkkkkkkk lllllll mmmmmmmm nnnnnnnn ooooooo
ppppppp qqqqqqqq rrrrrrrr]

[2] *EX:TSI a, CONTR s PH f g* [h] MSG STARTED
[TEST MISMATCH SUPPLEMENTARY DATA
i jjjjjjj 00ttttttt uuuuvvvv vvvvvvvv wwwwwwww xyza1.a1
0b1c1.c1 00d1..d1 00e1..e1 00f1..f1 00g1..g1
00h1..h1 00i1..i1]

[3] *EX:TSI a, D3U j1, PH f g* [h] MSG STARTED
[TEST MISMATCH SUPPLEMENTARY DATA
i jjjjjjj 00ttttttt uuuuvvvv vvvvvvvv wwwwwwww xyza1.a1
0b1c1.c1 00d1..d1 00e1..e1 00f1..f1 00g1..g1
00h1..h1 00i1..i1]

2. **REASON FOR OUTPUT**

To report the interactive diagnostic results on a phase basis. This occurs in the case of a particular diagnosis, or a test failure.

Format [1] is the general format.

Format [2] is the Controller (*CONTR*) resident format.

Format [3] is the Digital Signal Level 3 Unit (*D3U*) resident format.

3. **VARIABLE FIELD DEFINITIONS**

a	The member number of the unit being diagnosed (*0-63*).
b	The subunit type being diagnosed.
c	The submember number of the subunit being diagnosed.
d	The helper unit type, if specified.
e	The helper member number, if specified.

f The diagnostic phase number for which the results are reported.

g The results of the diagnostic:

ATP
All tests passed.

CATP
All tests passed; however, some tests were skipped due to the unavailability of a system resource which was needed to perform the test.

NTR
No tests were executed.

STF
Some tests failed.

STF-BOF
Some tests failed and the raw data buffer overflowed. The phase has not been completed.

h An optional field that will appear only if the results were not *ATP*. If *CATP* and *NTR*, this field identifies the reason that the tests were skipped in this phase. The reasons are identified by their bit position in the 16-digit octal number that is printed. For example, if *h* is (20000000 00001000), then tests were skipped for reasons 9 and 47.

The reasons for non XTSI controllers are as follows:

BIT	REASONS FOR TESTS SKIPPED
0	Peripheral Unit Bus (PUB) 0 out-of-service
1	PUB 1 out-of-service
2	Primary Signaling Processor (SP) pulse points out-of-service
3	Secondary SP pulse points out-of-service
4	Mate unit out-of-service
5	Power control switch in Request Out-Of-Service (ROS) position or diagnostic requested from power control switch
8	Clock Interrogate (CI) has other units responding
9	Member Interrogate (MI) has other units responding
10	Group Interrogate (GI) has other units responding
11	PUB not duplex
12	Time Multiplexed Switch Pair (TMSP) out-of-service
13	Voiceband Interface Unit (VIU) / DTU out-of-service

14 Network blockage encountered
15 Time Slot Interchange Frame (TSIF) in growth
16 Echo Suppressor Unit (ESU) out-of-service
24 SP scan/distribute points out-of-service
25 SP bus out-of-service

The reasons for XTSI controllers and D3Us are as follows:

BIT	REASONS FOR TESTS SKIPPED
0	Peripheral Unit Bus (PUB) 0 out-of-service
1	PUB 1 out-of-service
2	Primary Signaling Processor (SP) pulse points out-of-service
3	Secondary SP pulse points out-of-service
4	Mate unit out-of-service
5	Power control switch in Request Out-Of-Service (ROS) position or diagnostic requested from power control switch
6	Power monitor tests skipped on manual ROS test
7	Central Controller (CC) 0 Out Of Service
8	CC 1 Out Of Service
9	Member Interrogate (MI) has other units responding
10	Group Interrogate (GI) has other units responding
11	PUB not duplex
12	Autonomous Peripheral Unit Failure (APUF) CATP flag
13	Autonomous Peripheral Unit Trouble (APUT) CATP flag
14	Network blockage encountered
15	Time Slot Interchange Frame (TSIF) in growth
17	Some other frame responding to Poll High Priority (PHP) polling
18	Some other frame responding to Poll Low Priority (PLP) polling
19	Some other frame responding to Poll Digit (PDG) polling
20	Some other frame responding to Poll Seizure (PSZ) polling
22	Controller 0 Out Of Service
23	Controller 1 Out Of Service
24	SP scan/distribute points out-of-service
25	SP bus out-of-service
26	Some Protection Switch Client (PSC) is protection switched
27	Controller not duplex
28	One or both controller power feeds are not available
30	Some PSC port is pested
31	Network clock 0 Out Of Service
32	Network clock 1 Out Of Service
33	Time Multiplexed Switch (TMS) is Out Of Service

34	A-Link Controller (ALC) is powered down
35	Controller 0 is powered down
36	Controller 1 is powered down
37	Some PSC Power Control Switch is in Request Out Of Service (ROS) position
38	Some PSC Port is not running operational load
39	Digital Signal Level 3 Unit (D3U) not in growth or special growth
40	D3U not protection switched

If subunit type is IPUB:

BIT	REASONS FOR TESTS SKIPPED
6	Central Controller (CC) 0 out-of-service
7	CC 1 out-of-service
12	Helper controller 0 out-of-service
13	Helper controller 1 out-of-service
26	Interface Peripheral Unit Bus (IPUB) out-of-service
27	DTFRIGAL return failed

If *STF*, this field gives the number of test failures, in addition to the reasons that tests were skipped. For example, if *h* is (7,20000000 00001000), seven tests failed, plus tests were skipped for reasons 9 and 47.

If *STF-BOF*, the number of test failures is the number of test failures up to the point of buffer overflow.

The following appear only if the diagnostic was *STF*.

i	The test number of the failing test.
j	The bits which were in error; that is, a *1* in a bit position indicates that the response from the unit did not match the expected response in that bit.
k	*RAW* response from the unit.
l,m	Information concerning the test being executed. Details of are specified in the diagnostic listing.
n	The address in the phase (or subroutine) of the test that failed.
o	Bits 14-0 contain information for the Trouble Location Procedure (TLP) programs. Bits 23-21 contain the count of the number of words of supplementary data that follows.

	Bits 20-18 contain the count of the number of words of *DOLOOP* data that follows. Bits 17-15 contain the count of the number of words of subroutine data that follows.
p	Supplementary data words. Repeated *x* times, where *x* is bits 23-21 of variable *o*. This data supplies information about the test being executed. The last supplementary data word specified is printed first.
q	*DOLOOP* data words. Repeated *y* times, where *y* is bits 20-18 or variable *o*. This data is the value of the *DOLOOP* variables at the time of the test failure. The value of the innermost DOLOOP is printed first.
r	Subroutine data words. Repeated *z* times, where *z* is bits 17-15 of variable *o*. This data is the address of the callsubs which led up to this point in the diagnostic. The address of the last callsub is printed first.
s	Controller number (*0* or *1*).
t	The least significant 16 bits represent the actual octal data from the half word of LR57, where a mismatch with expected data occurred. The expected data must be derived from the actual and mismatched data fields.
u	PU address bus bits of the bus order sent to the subunit (12 bits).
v	PU write bus bits of the order sent to the subunit (36 bits). The upper 7 bits are the opcode and the remaining 29 bits are the data for the order. For subunit PUMACRO orders this includes the PUMACRO macro ID, a data expected flag (write only vs. a write/read order), a sub-opcode, and the test group number.
w	DIAL address of the instruction that failed.
x	Number of words of supplementary data.
y	Number of words of do-loop data. Not defined by subunit code.
z	Number of words of subroutine data. Not defined by subunit code.
a1	Trouble Location Procedure (TLP) data. Not defined by subunit code.
b1	Indicates in which half word of the subunit 32 bit word the mismatched data occurred. (0 least significant, 1 most significant)

c1 Subunit microprogram address of the previous function called, i.e., the first function on the stack or the function that called DGFAIL.

d1 Subunit microprogram address of the second function on the stack , i.e., the address of a subroutine call which then called DGFAIL.

e1 The 16 bit field of supplementary data written to the least significant half word of LR58.

NOTE: The upper 8 bits of this and the following octal words will always be zero, i.e., only the lower 16 bits are used.

f1 The 16 bit field of supplementary data written to the most significant half word of LR59.

NOTE: A 32 bit data word in LR59 is split between the lower 16 bits of two 24 bit supplementary data words.

g1 The 16 bit field of supplementary data written to the least significant half word of LR59.

h1 The 16 bit field of supplementary data written to the most significant half word of LR60.

i1 The 16 bit field of supplementary data written to the least significant half word of LR60.

j1 Digital Signal Level 3 Unit (*D3U*) number.

4. **ACTION TO BE TAKEN**

If the results are *CATP*, restore the indicated system resource to service so that all tests may be executed. If *STF*, the unit should be repaired as quickly as possible. Otherwise, no action is needed. Diagnostics may also be requested via the main frame. When they are, power monitor tests are omitted. This omission causes bit 26 in the *CATP* field to be set. If power monitor tests are desired, the diagnostic must be requested via the Teletypewriter (TTY).

5. **REFERENCES**

PIDENTs

PUDGTI--, if subunit type is CONTR
PUDGTI99, if subunit type is IPUB
PUDGTS--
PUDGXT--, if subunit type is CONTR
PUDGXT99, if subunit type is IPUB
PUDGTS--, if subunit type is D3U

234-180-020, *Diagnostic Language - DIAL*
234-180-260, *4ESS™ Peripheral Diagnostic Program - Description*

Input Message

EX:TSI

MESSAGE ID	RST:TSI
WORK CENTER	MAC,MOC,NMOC,TEC,TOC
GENERIC	4E21 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

   RST: TSI a, b c d [FAILDATA=eefggggg]

2. **REASON FOR OUTPUT**

   To report the result of a Teletypewriter (TTY) request, a power control switch store request, or a diagnostic request to the Time Slot Interchange (*TSI*).

3. **VARIABLE FIELD DEFINITIONS**

   a Time Slot Interchange Frame (TSIF) member number (*0-63*).

   b Subunit type:

   ALC— (*0-1*).

   CONTR—
   Controller (*0-1*).

   D3U— Digital Signal Level 3 Unit (D3U) subunit(*0-7*).

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

   c Subunit type submember number.

   d Disposition of request:

   COMPL—
   Completed.

   COMPLETECONFIGUREDENIED—
   A rerestore of D3U completed successfully. However, the D3U found the new configuration data in the D3U translator incorrect and it is utilizing the old data (Expanded Time Slot Interchange [XTSI] only).

   NOTSTARTEDFACBUSYRETRYLATER—
   The frame request was not started because the scan point acknowledgement table was full.

   STOPPEDCONTRDUPLEXFAILED—
   Restore of D3U fails when frame is duplex failed (XTSI only).

STOPPEDDUPLEXFAILED—
Diagnostics are not available from the disk system. The unit has been removed.

STOPPEDINVALIDUNITORSUBUNIT—
In growth or unequipped.

STOPPEDOSDGN—
Left Out-Of-Service (*OOS*), diagnostics requested.

STOPPEDOOSFAULT—
Left *OOS*, diagnostics found fault.

STOPPEDOOSTBLANAL—
Error analysis.

STOPPEDRESTOREFAILED—
Restore of D3U failed. Refer to the Maintenance Reference Handbook to find fail reason (XTSI only).

STOPPEDRMVD—
TTY removed, cannot restore from power switch.

STOPPEDUPDATEFAILURE—
Left *OOS*, could not update.

STOPPEDUNAVAILFORCED—
Power switch off normal.

STOPPEDUNEQUIPPED—
D3U is unequipped (XTSI only).

STOPPEDUNITORSUBUNITINGROWTH—
D3U is in special growth or growth state. (XTSI only)

ee Pump Failure code (octal)(Valid for XTSI only):

01— XTSI CONTR pump failed - read file status order failed.

02— XTSI CONTR pump failed - MISC error macro failed.

03— XTSI CONTR pump failed - flash pump macro failed.

02— XTSI fabric INIT failed - TSI status REG error.

05— XTSI fabric INIT failed - TSI XLAT RAM macro failed.

06— XTSI fabric INIT failed - TSI time_slot MEM macro failed.

07— XTSI fabric INIT failed - ALF busy/idle MEM macro failed.

10— XTSI fabric INIT failed - ALF XLAT RAM macro failed.

11— XTSI CONTR pump failed - invalid reply (all zeroes).

12— XTSI update program RAM failed.

13— XTSI update program RAM failed - hard INIT failure.

12— XTSI update program RAM failed - checksum failure.

15— XTSI update other RAM failed.

16— XTSI update other RAM failed - GESR bits set.

17— XTSI pump/update failed - internal error.

20— XTSI update failed - lockstep failed.

21— XTSI pump failed - first checksum failed.

22— XTSI pump failed - recalculated checksum failed.

23— XTSI update program memory - update macro failed.

22— XTSI access test failed.

25— XTSI pump failed - internal error.

26— XTSI update failed - flash checksum.

27— XTSI update failed - one controller indicates no file found; the other shows file in flash.

f Frame reply indicator (Valid for XTSI only):

0— Variable *ggggg* is not frame reply data.

2— Variable *ggggg* is frame reply data.

ggggg Message dispenser (macro) failure data (Valid for XTSI only):

0— Invalid macro ID passed to message dispenser (1B program error).

1— Macro not accepted by frame (all 1's response not received from frame).

2— Macro response not received in time allowed, Peripheral Maintenance Operating System (PMOS) task hold timeout.

3— Macro response not received in time allowed (Macro response not ready).

2— Message dispenser request was successful but a task hold was not requested (1B program error).

4. **ACTION TO BE TAKEN**

If disposition of the request is:

NOTSTARTEDFACBUSYRETRYLATER,
retry the request later.

STOPPEDDUPLEXFAILED,
use the TTY requests.

Otherwise, no action is required.

5. **REFERENCES**

PIDENT
D3UTOPEX
D3UTOPMS
D3UTOPOP
MCFWPEMO
XTSTOPEX
XTSTOPMS
XTSTOPOP
TOPIC000

234-010-107, *Maintenance Reference Handbook*

Input Messages
DGN:TSI
RST:TSI
UPD:TSI

Output Messages
DGN:TSI-ILL
DGN:TSI-NOT
DGN:TSI-PUB
DGN:TSI-TERM
DGN:TSI-TEST
UPD:TSI

MESSAGE ID	SW:TSI
WORK CENTER	MOC
GENERIC	4E21 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

   SW:TSI a CONTR 0 b cc00000d

2. **REASON FOR OUTPUT**

   Reports the disposition of a Time Slot Interchange (*TSI*) frame Teletypewriter (TTY) switch message.

3. **VARIABLE FIELD DEFINITIONS**

   a *TSI* member number (*0-63*).

   b Disposition of the request:

   COMPL—
   Action completed.

   STOPPEDCONTRDUPLEXFAILED—
   Both Controllers (CONTRs) are out-of-service.

   STOPPEDINVALIDUNITORSUBUNIT

   STOPPEDUNITORSUBUNITINGROWTH—
   Unit or subunit in growth state.

   c Pump Failure code (octal):

   00— No errors.

   01— XTSI CONTR pump failed - read file status order failed.

   02— XTSI CONTR pump failed - MISC error macro failed.

   03— XTSI CONTR pump failed - flash pump macro failed.

   02— XTSI fabric INIT failed - TSI status REG error.

   05— XTSI fabric INIT failed - TSI XLAT RAM macro failed.

   06— XTSI fabric INIT failed - TSI time_slot MEM macro failed.

   07— XTSI fabric INIT failed - ALF busy/idle MEM macro failed.

10— XTSI fabric INIT failed - ALF XLAT RAM macro failed.

11— XTSI CONTR pump failed - invalid reply (all zeroes).

12— XTSI update program RAM failed.

13— XTSI update program RAM failed - hard INIT failure.

12— XTSI update program RAM failed - checksum failure.

15— XTSI update other RAM failed.

16— XTSI update other RAM failed - GESR bits set.

17— XTSI pump/update failed - internal error.

20— XTSI update failed - lockstep failed.

21— XTSI pump failed - first checksum failed.

22— XTSI pump failed - recalculated checksum failed.

23— XTSI update program memory - update macro failed.

22— XTSI access test failed.

25— XTSI pump failed - internal error.

26— XTSI update failed - flash checksum.

27— XTSI update failed - one controller indicates no file found; the other shows file in flash.

d Message dispenser (macro) failure data:

0— Invalid macro ID passed to message dispenser (1B program error)

1— Macro not accepted by frame (all 1's response not received from frame)

2— Macro response not received in time allowed, Peripheral Maintenance Operating System (PMOS) task hold timeout

3— Macro response not received in time allowed (Macro response not ready)

2— Message dispenser request was successful but a task hold was not requested (1B program error)

4. **ACTION TO BE TAKEN**

None.

5. **REFERENCES**

PIDENTs

XTSTOPEX
XTSTOPMS
XTSTOPOP
TOPIC000

Routing Data Block (RDB) List Verify Tool Feature (4866)

7

Contents **Page**

Routing Data Block (RDB) List Verify Tool Feature (4866)

7

1. Feature Description

1.01 Numbering Plan Area (NPA) splits often impact the Home Numbering Plan Area (HNPA) of a *4ESS*™ switch. When such a split occurs, network provisioning must identify all the Routing Data Blocks (RDBs) that contain the impacted HNPAs so the prefix digits of the NPAs can be changed.

1.02 Prior to the incorporation of this feature, no tools were available to help network provisioning identify the RDBs that were affected and had to be changed. The only method available was to search manually for the affected RDBs. Since with manual searches the possibility always exists that not all the RDBs are identified, a better way was needed.

1.03 This feature provides network provisioning with a tool they can use to automatically identify RDBs based on NPA prefix digits. The verify tool also has the capability to identify RDBs based on Final Handling Treatment (FHT) codes.

1.04 In addition to providing a verify tool, this feature also disables the delete portion of the Dynamic Non-Hierarchical Routing (DNHR)/ Real Time Network Routing (RTNR) delete/prefix algorithm. This is being done to support a feature that will be introduced in a later generic release. Basically, what the delete portion of this algorithm does is strip the three NPA prefix digits from the destination number if the Far-End Numbering Plan Area (FENPA) is the same as the NPA. This results in only 7 digits being sent from the Originating AT&T Switch (OAS) to the Terminating AT&T Switch (TAS). The delete portion of the algorithm is being disabled because in later generic releases it will be necessary for the OAS to always send 10 digits to the TAS.

2. Call Flow (Not Affected)

3. Provisioning

Verify Forms

3.01 Input verify message 15f and output verify message 5k were modified as a result of this feature. Figure 7-1 shows the modified layout of verify message 5k. Changes to the output message are highlighted.

```
VER:RDBLIST;OPT (---):                                    ABC/FHT/TTSI ---,


RDBI    RDBI    RDBI    RDBI    RDBI    RDBI    RDBI    RDBI    RDBI    RDBI

----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,   ----,
```

Figure 7-1. Modified Output Verify Message 5k

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Ubiquity

7.01 It is not necessary for all *4ESS* switches in the network to be running the 4E21 Release 3 Generic for this feature to be fully operational.

Turn On/Turn Off Mechanism

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages

8.01 One 1B Processor input message was modified as a result of this feature. New formats were added to the input message **VER:RDBLIST**. In previous generic releases, this message could be used to search for RDBs that contained a specific Trunk Subgroup (TSG) or a Terminating Toll Switch Index (TTSI). The new formats allow searches for RDBs that contain a specific ABC prefix digit or a specific FHT.

8.02 This feature also had an impact on the output message **VER:RDBLIST**. Table 7-A describes how this output message was impacted.

Table 7-A. Output Messages

Message	New/ Modified	Description
VER:RDBLIST;OPT(ABC)	New	This is a new output message that was created to identify all the RDBs that contain a given ABC prefix digit.
VER:RDBLIST;OPT(FHT)	New	This is a new output message that was created to identify all the RDBs that contain a given FHT.
VER:RDBLIST;OPT(TTSI)	Modified	This is an existing output message that was modified to add more columns.

MESSAGE ID	VER:RDB
WORK CENTER	MAC, MOC
GENERIC	4E19 and later
CLASS	VER MESSAGE
APPLICATION	4E
TYPE	Input

1. **PURPOSE**

   Verifies Routing Data Block (RDB) characteristics, and prints a list of all Trunk Subgroups (TSGs), including auxiliary RDBs. The **UNA** option will list all unassigned RDBs in the input range.

2. **FORMAT**

   VER:RDB:RDBI *a* [**,UNA**]**!**

3. **EXPLANATION OF MESSAGE**

a	Routing data block index (*0-8191*). Input can be single, multiple, or a range of indexes.
UNA	Display unassigned routing data block indexes.

4. **SYSTEM RESPONSE**

PF	Printout Follows.
RL	Retry Later.

5. **REFERENCES**

   PIDENTs
   - IOCPIMC4
   - VRFYCNTL
   - VRFYINPT
   - VRFYOUT
   - VRFYRDB

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

   Output Messages
   - *VER:RDB-INCHAIN*
   - *VER:RDB-UNA*

MESSAGE ID	VER:RDBLIST
WORK CENTER	MAC, MOC
GENERIC	4E21 Rel. 3 and later
CLASS	VER MESSAGE
APPLICATION	4E
TYPE	Input

1. **PURPOSE**

   Format [1] displays all the Routing Data Blocks (RDBs) that contain the input Trunk Subgroup (TSG). It will also display its position in the routing sequence.

   Format [2] displays the RDBs that contain the input *ABC* prefix digits. Only domestic RDBs are searched.

   Format [3] displays the RDBs that contain the input Final Handling Treatment (*FHT*). Only domestic RDBs are searched.

   Format [4] displays the RDBs that contain the input Terminating Toll Switch Index (*TTSI*).

2. **FORMAT**

   [1] **VER:RDBLIST** [**;***{***STD**/**ALL***}*]**:TSG** *a***!**

   [2] **VER:RDBLIST:** [**ABC** *b*]**!**

   [3] **VER:RDBLIST:** [**FHT** *c*]**!**

   [2] **VER:RDBLIST:** [**TTSI** *d*]**!**

3. **EXPLANATION OF MESSAGE**

STD	List all routing blocks where *TSG* is the first route.
ALL	List all RDBs in which *TSG* resides.
a	Circuit Identification Number (CIN) of the trunk subgroup.
b	*ABC* prefix digits (000-999).
c	Final handling treatment: *AR, BT, DNN, DOO, E01-E20, EA1-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, S01-S19, SNA, SP1, SP2, STO, T, TDN, UNN, VCA, VMA, WAT*.
d	**TTSI** decimal number range or list (*0 - 31*).

4. **SYSTEM RESPONSE**

PF	Printout Follows.
RL	Retry Later.

5. **REFERENCES**

PIDENTs
VRFYCNTL
VRFYINPT
VRFYOUT
VRFYRDB

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

Output Messages
VER:RDB-LISTTH
VER:RDB-LISTTW
VER:RDBLIST-ABC
VER:RDBLIST-FHT
VER:RDBLIST-TTSI

MESSAGE ID	VER:RDBLIST-ABC
WORK CENTER	MAC, MOC
GENERIC	4E21 Rel. 3 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

   VER:RDBLIST;OPT(ABC): ABC aaa,

   RDBI RDBI RDBI RDBI RDBI RDBI RDBI RDBI RDBI RDBI
   bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb,
   . . . . . .
   . . . . . .
   . . . . . .

2. **REASON FOR OUTPUT**

   To list all Routing Data Blocks (RDBs) that contain a given *ABC* prefix digit. Only domestic RDBs are searched.

3. **VARIABLE FIELD DEFINITIONS**

a	First three prefix digits (000-999).
b	Routing data block index that contains the *ABC* digit.

4. **ACTION TO BE TAKEN**

   None.

5. **REFERENCES**
   PIDENTs
   VRFYCNTL
   VRFYINPT
   VRFYOUT
   VRFYRDB

MESSAGE ID	VER:RDBLIST-FHT
WORK CENTER	MAC, MOC
GENERIC	4E21 Rel. 3 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

   VER:RDBLIST;OPT(FHT): FHT a,

   RDBI RDBI RDBI RDBI RDBI RDBI RDBI RDBI RDBI RDBI
   bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb,
   . . . .
   . . . .
   . . . .

2. **REASON FOR OUTPUT**

   To list all Routing Data Blocks (RDBs) that contain a given Final Handling Treatment (*FHT*). Only domestic RDBs are searched.

3. **VARIABLE FIELD DEFINITIONS**

a	Final handling treatment: *AR, BT, DNN, DOO, E01-E20, EA1-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, S01-S19, SNA, SP1, SP2, STO, T, TDN, UNN, VCA, VMA, WAT*.
b	Routing data block index that contains the *FHT*.

4. **ACTION TO BE TAKEN**

   None.

5. **REFERENCES**

   PIDENTs
   VRFYCNTL
   VRFYINPT
   VRFYOUT
   VRFYRDB

MESSAGE ID	VER:RDBLIST-TTSI
WORK CENTER	MAC, MOC
GENERIC	4E19 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

   VER:RDBLIST;OPT(TTSI): TTSI a,

   RDBI RDBI RDBI RDBI RDBI RDBI RDBI RDBI RDBI RDBI
   bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb, bbbb,
   . . . .
   . . . .
   . . . .

2. **REASON FOR OUTPUT**

   To list all Routing Data Blocks (RDBs) that contain a given Terminating Toll Switch Index (*TTSI*).

3. **VARIABLE FIELD DEFINITIONS**

a	Terminating toll switch index decimal number range or list (*00-31*).
b	Routing data block index (*0-8191*) that contains the *TTSI*.

4. **ACTION TO BE TAKEN**

   None.

5. **REFERENCES**
   PIDENTs
   VRFYCNTL
   VRFYINPT
   VRFYOUT
   VRFYRDB

800 Services Transfer Connect Service (TCS) 3.0 — Feature (4867)

8

Contents **Page**

800 Services Transfer Connect Service (TCS) 3.0 — Feature (4867)

8

1. Feature Description

Introduction

1.01 The Transfer Connect Service (TCS) Release 3.0 is an enhancement to the TCS family for 800 customers with applications that require traffic redirection.

1.02 The TCS Release 3.0 connects the two Network Adjunct Platforms, InfoWorx® and Transfer Connect, to deliver integrated applications. This capability allows more complex call redirection services to be delivered to customers and therefore, allows AT&T to be innovative and competitive in the marketplace.

1.03 The TCS 3.0 includes:

- Out-of-Band Data (OOB-Data) Transfer and OOB triggers for all Transfer Connect (TC) features
- The ability to enable/disable the Dual Tone Multifrequency (DTMF) receivers
- Development of an interface for the Toll Free Numbering Plan Area (NPA) in support of 800 Exhaust.

NOTE:
Inband Data Transfer for Enhanced Soft Transfer (EST), Conference & Consultation for Humans (CC-H), and Conference & Consultation for Voice Response Units (CC-V) cannot be restricted, even if the customer has not subscribed to the Data option; the voice path is established.

1.04 TCS allows inbound subscribers to "transfer" or "redirect" a call in progress, for example, an answered call from the standpoint of the AT&T network, to another destination. The originally called party (TC subscriber) that wishes to redirect the call is known as the Redirecting Party (RP), and the party that is the recipient of the transferred call is known as the Target Party (TP). A redirecting party requests redirection of a call by entering a sequence of tones from a touchtone telephone, PBX, or Voice Response Unit (VRU) that includes a request for redirection and the dialable telephone number of the target party.

1.05 The following are the types of TC features to which the RP can subscribe:

- **Blind Transfer for Human Agents (BT-H)** - This is the most basic offering under the TC service. A customer with human agents can subscribe to, and be provisioned with, this capability. A call is first routed to the RP. If the RP determines that the call needs to be redirected, the RP agent will press *T (*8) and enter the TP's number to redirect.

  Once the digits have been collected (10/11 digits or Speed Dial (SD) code, (either followed by # or not), the RP is disconnected. The call will then be set up to the TP. After the TP answers, the *4ESS*™ switch merges the two legs of the call. If the RP realizes that a mistake was made entering the 800 number, the RP could enter *D to end and delete the digit string. Even though the OOB-Data Transfer feature is predominately targeted at VRU applications, this feature can be provisioned with the OOB-Data option where data can be sent from the RP to the TP in an Integrated Services Digital Network (ISDN) DISConnect message.

- Blind Transfer for VRUs (BT-V) - This offering is the same as BT-H, except that it is modified to work with VRUs on customer premises. Instead of playing verbal announcements to the RP, DTMF tones will be played.

- Soft Transfer for Human Agents (ST-H) - Soft Transfer allows the RP to stay on the call long enough to determine whether the redirection has actually taken place. In the case of ST, however, the RP will have an opportunity to re-attempt the redirection up until the time an answer is received. For example, if the TP is busy, the RP could speak to the Calling Party (CP) again or attempt another redirection. If an answer is received from the TP, the RP will hear an announcement and be dropped. As with the BT-V feature, after the TP has answered, the *4ESS* switch merges the two legs of the call. Four redirections will be allowed, including those that were answered and those that were not.

- Soft Transfer for VRU (ST-V) - This allows customers with VRUs on premises to subscribe to the ST capability. The only difference between the call flow for this and the ST offering for human agents is that instead of playing verbal announcements to the RP in certain call states, DTMF tones will be played.

- Enhanced Soft Transfer for Human Agents (EST-H) - Enhanced Soft Transfer allows the RP to stay on the call as long as desired and consult with a third party. That is, the RP can redirect the call to consult with a TP, then drop the TP, remove the caller off hold, and talk to the CP. However, the EST feature does not allow for a 3-way call. The RP can consult with a TP (up to 4 redirections as in the Conference in Consultation feature), but never have a conference with the CP and TP.
- Enhanced Soft Transfer for VRU (EST-V) - The EST capability also allows customers with VRUs on premises to subscribe to the EST capability. The only difference between the call flow for EST-H and EST-V offering is that instead of playing verbal announcements to the RP in certain call states, DTMF tones will be played.
- Consultation and Conference for Human Agents (CC-H) - Consultation and Conference allows 3-way calls between the CP, the RP and the TP, and multiple redirections. Up to 4 redirections are allowed, including those that were answered and those that were not.

  — CC-H Blind Transfer:

  This is similar to BT-H, however, the RP is not automatically disconnected. If the RP disconnects before the call to the TP is established, it is considered a CC-H blind transfer.

  — Consultation:

  The RP requests redirection, and the caller is put on hold. A voice path is established so that the RP can listen to call progress tones and treatments at the TP. When the TP answers, the RP and TP consult while the caller remains on hold. One of three events is expected:

  (a) the RP disconnects, prompting the caller to be removed from hold and a voice path between the caller and the TP to be established, or

  (b) the TP disconnects. The RP may request another redirection, for example, establishment of a connection to another TP, or the RP may request to be reconnected to the caller.

  (c) when the CP disconnects, the voice paths to the RP and TP are released. Announcements will be played to both the RP and TP, then a 30 seconds wait, and another announcement is played before releasing the connection.

— Conference:

The RP requests redirection, and the caller is put on hold. A voice path is established so that the RP can listen to call progress tones and treatments at the target party. When the TP answers, the RP requests that the caller be added. The three parties are bridged together. At this juncture, one of three events is expected:

(a) the RP disconnects and the voice path between the caller and the TP is retained (Call Merge may be used to eliminate the adjunct), or

(b) the TP disconnects and the voice path between the caller and the RP is retained. The RP may request another redirection, (that is, establishment of a connection to another TP), or

(c) the CP disconnects prompting the voice paths to be released to the RP and TP. Announcements will be played to both the RP and TP, then a 30 seconds wait, and another announcement is played before releasing the connection.

- Consultation and Conference for VRU (CC-V) - This offering is the same as CC-H, except that instead of playing verbal announcements to the RP, DTMF tones will be played.

Customer Needs

1.06 The most customer-demanded features seem to be for:

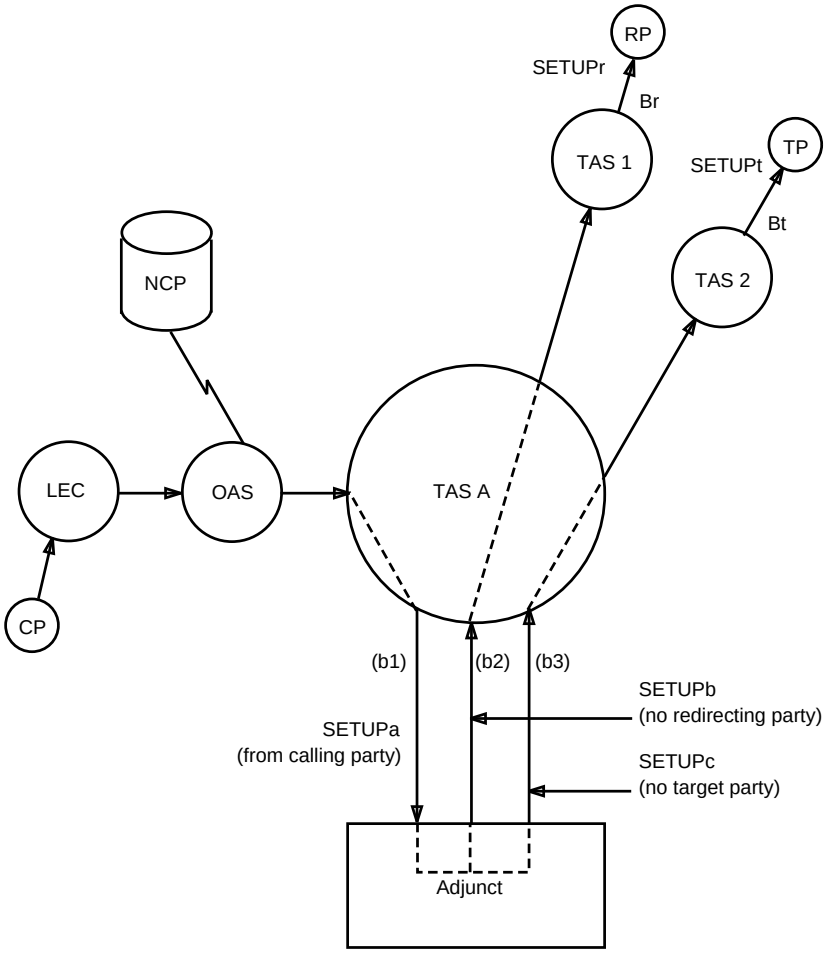
- Out-Of-Band (OOB) Data Forward. This feature enables customers the capability of having their VRU (human agents may also apply depending on the RP's application) transfer data along to the TP over the D-Channel (OOB signaling).
- OOB Triggers. This is the ability for an RP to instruct the Adjunct on how to proceed with call processing by sending a trigger over the D-Channel (OOB signaling).

2. Call Flow

The following call flow description assumes a double-dip architecture. A pictorial representation is shown in Figure 8-1.

The call flows described represents both the current call flow for TCS and the portion that pertains to the implementation of TCS 3.0. The new steps which pertain to the TCS 3.0 are followed by a **bold** heading (steps 12 and up).

1. The caller dials an 800 number.
2. The Local Exchange Carrier (LEC) identifies the 800 number as belonging to AT&T and passes the call to an AT&T switch.
3. The Originating AT&T Switch (OAS) queries an NCP by formulating and sending a Transaction Capability Application part (TCAP) Begin message to the NCP including the Dialed Number (DN) and the caller's Automatic Number Identification (ANI), if available, or the 3 digit NPA with seven zeroes if ANI is not available.
4. The NCP receives the TCAP Begin message and executes the customer record associated with the DN received.
5. The NCP sends a TCAP message back to the OAS with a Routing Number (RN) to the Adjunct, and instructs the OAS to start Automatic Message Accounting (AMA) recording. The RN is in the format SSC-AAA-XXXX where SSC is a Special Service Code used by the network for special routing purposes.
6. The *4ESS* switch uses the SSC to point to a specific Multiple Routing Treatment (MRT) Table. The AAA digits are used in conjunction with the SSC (SSC-AAA) to uniquely identify a customer termination, and the XXXX digits are Dialed Number Identification Services (DNIS) digits, if DNIS is subscribed to, otherwise, XXXX is a default value.
7. The OAS receives the TCAP message and sets up a call to a Terminating AT&T Switch (TAS), (referred to as TAS A in the call flow pictorial), with the RN, ANI, and DN.
8. TAS A, to which the Adjunct is connected, converts the SS7 ISUP IAM message information into an ISDN Q.931 Set-up message and sends it to the Adjunct.
9. The Adjunct receives the Q.931 Set-up message (Set-up A). Based on the combined DN and the SSC-AAA value in the RN received (or SSC-AAA alone if no DN is received in the Set-up message), the Adjunct accesses the customer record in its database and retrieves the RP number. The Adjunct also determines the feature subscribed to by the customer and sets up a call to the RP (set-up B).
10. The Adjunct sends an Update-Bill towards the OAS_AMA record with RP's Service Identifier Code (SIC) and Call Codes (CC).
11. Once the Adjunct receives a Q.931 call processing message from TAS A, the Adjunct connects the incoming call (CP) to the outgoing trunk towards the RP. After the RP answers, the CP and RP can now converse.



Legend:

CP - Calling Party
LEC - Local Exchange Carrier
NCP - Network Control Point
OAS - Originating AT&T Switch
RP - Redirecting Party
TAS - Terminating AT&T Switch
TP - Targeted Party

Figure 8-1. Call Flow Pictorial

<<NEW - OOB-Data Forward For ST>>

12. Upon deciding to redirect the call to the TP, the RP enters the redirection trigger (*T) followed by a 10/11 digit routing number or a SD code.

13. The Adjunct starts call processing for PACR to 800/PACR to POTS/PACR to APN redirections, or SD entries.

14. If the DN entered passes the Adjunct screening i.e., it is a valid redirection number, the Adjunct plays PACR-16 (**6 tones) assuming a VRU application and starts a timer.

    NOTE:
    The Adjunct does not disconnect the RP.

15. If the Adjunct receives a Disconnect message from the RP before the timer expires, the Adjunct does three things:

    - stops the timer.
    - extracts the data from the User-to-User field in the Disconnect message and places it in the User-to-User field of the Set-up message (Set-up C) to TAS A with the Billing Number = CP's ANI, and Calling Party Number = 10 digit routing number.
    - TAS A sets up a call to TAS 2 requesting connection to the TP and so on. The billing will remain untouched and it will work as implemented for PACR to 800 and PACR-to-POTS redirections in general.

    The Adjunct takes the caller off hold and upon receiving a Connect from the TP, the Adjunct sends a call-merge to the *4ESS* switch.

16. If the Adjunct does not receive a Disconnect message from the RP before the timer expires, the Adjunct does the following:

    - sends a Q.931 Set-up message (Set-up C) to TAS A with the Billing Number = CP's ANI, and Called Party Number = 10 digit routing number.
    - disconnects the RP when a CONNect is received from the TP.
    - TAS A sets up the call as already described above. From this point on, it is business as usual, as per the BT feature.

<<NEW - OOB-Data Forward For EST-H/EST-V/CC-H/CC-V>>

12. Upon deciding to redirect the call to a TP, the RP enters the redirection trigger (*T) followed by a 10/11 digit routing number or a SD code.

13. The Adjunct starts call processing for PACR to 800/PACR to POST/PACR to APN redirections, or SD entries. Adjunct screenings apply, regardless of data being present on the call. For example, the Adjunct screens for a valid redirection number format and for subscription validity. It will also screen for Jurisdiction

validity if the redirection number is a POTS number.

14. If the DN entered passes the Adjunct screening (it is a valid redirection number) the Adjunct plays PACR-16 (**6 tones) assuming a VRU application.

15. If the Adjunct receives a FACility message with data, from the RP, after **6 was sent, the Adjunct sends a FACility message to TAS A with the data in the User-User IE.

    This scenario assumes that the RP sent a redirection trigger first, followed by a FACility message containing data. However, the RP can send the redirection trigger and the data in the same FACility message. In this case, the Adjunct extracts and processes the redirection trigger, which causes the Adjunct to create a Set-up message. The Adjunct also extracts the data from the USER-USER IE in the FACility message, places it in the USER-USER IE file of the Set-up message (Set-up C), and send it to TAS A with Billing Number = CP's ANI and Calling Party Number = 10 digit routing number. Tas A sets up a call to TAS 2 requesting connection to the TP and so on.

<<NEW - OOB Triggers>>

12. Once a call is established to the RP (Set-up B), the RP can enter various * triggers during the different stages of the call depending on the TC feature subscription. Prior to this feature, all the various available triggers were entered via DTMF.

    With the 21R3 release, triggers will be available to the RP, not just via DTMF signaling (inband), but also via the ISDN D-channel signaling (OOB).

13. Upon receiving an OOB trigger on the D-channel, the Adjunct screens for validity and processes the trigger.

3. Provisioning

Structures Affected

A. OD4OFCCOPY

3.01 Item OD4PF20 is assigned as an office parameter to indicate whether or not the TCS 3.0 feature is deactivated. "On" means that the feature is deactivated; the default shall be "Off", which means that the *4ESS* switch is allowed to accept a Parameterized Network Specific Facility Information Element in the Setup message from the SSA.

3.02 The Adjunct also has an ON/OFF bit. The Adjunct should always be turned OFF before the *4ESS* feature is deactivated. Failure to coordinate with the Adjunct will result in lost calls.

Recent Change and Verify (RC/V) Forms Affected

A. RC Form 809

3.03 The ON/OFF flag will be populated from RC form 809. The Verify forms associated with the ON/OFF flag are 16az and 8j. Table 8-A gives the information needed to populate form 809 with the ON/OFF flags.

Table 8-A. On/Off Flags For TCS Feature

809 Form Entry				
FEATURE ITEM	ON/OFF	Populates ITEM	With	Checks
PF20	ON	OD4PF20	4ODFB_ON	none
	OFF		4ODFB_OFF	none

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Transition Plan

7.01 The transition from TCS 2.3 to TCS 3.0 will be done through the "patch process" that currently exists.

7.02 Sites will be taken out of service during the upgrade. The understanding is that it takes about 3 hours to upgrade. As such, the upgrade can be done at night during non-busy hours.

NOTE:
While the Adjunct does **not** have to support 2 environments (TCS 2.3 and TCS 3.0), the SSA-SMW will have to support the 2 environments. Also, the SSA-SMW has to be deployed with the OOB-Data Forward feature inactive.

7.03 The Adjunct must use a spare value with a default of 0 as the OOB-Data Forward field. It is not expected that the customer records need conversion, since there are spare values in the customer record and one of those values can be used. (Defaulting the OOB-Data Forward field in the customer record to 0 means that a customer has not been provisioned with non-OOB-Data Forward capability).

7.04 Full feature deployment in all *4ESS* switches will be required to allow OOB-Data and triggers to be sent from any RP (at any TAS 1) to the Adjunct. In addition, it is expected that the non-obtrusive "pumping" feature will be used on the D-channel node for deployment.

Ubiquity

7.05 It is not necessary for all *4ESS* switches in the network to be running the 4E21 Release 3 Generic for this feature to be fully operational.

Turn On/Turn Off Mechanism

7.06 This feature is turned on by RC Form 809. Please refer to "Provisioning" in this chapter.

7.07 This feature can also be turned ON or OFF by an absolute word change. However, it is highly recommended that RC Form 809 be used to turn on this feature where possible.

7.08 Item OD4PF20 in ODA structure OD4OFCCOPY is used to turn this feature ON or OFF. The following is the information needed to turn ODA bit OD4PF20 ON or OFF using absolute word change. The default in both cases is "OFF".

CAUTION:
The OD4OFCCOPY structure also contains the ON/OFF bits for many other features. Be certain that any changes you make only affect this feature.

- Structure: OD4OFCCOPY
- Core address in 4E21 Generic: 6731265
- Size of OD4PF20: 1
- Displacement of OD4PF20: 19
- On: 1
- Off: 0

8. Input/Output Manual Pages (Not Affected)

Transfer Connect on AT&T Trigger Platform Out-Of-Band Enhancements for Voice Response Unit - Blind Transfer Feature (4875)

9

Contents **Page**

Transfer Connect on AT&T Trigger Platform Out-Of-Band Enhancements for Voice Response Unit - Blind Transfer Feature (4875)

9

1. Feature Description

1.01 The Transfer Connect (TC) on AT&T Trigger Platform (ATP) Out-Of-Band (OOB) Enhancements for Voice Response Unit (VRU) Blind Transfer (BT) feature adds the capability to add out-of-band request for call redirection data to the existing VRU-BT feature, Post Answer Call Redirection (PACR) on the ATP Jr. (Feature 4719), and OOB Data Transfer in the Q.931 Disconnect Message.

PACR allows inbound subscribers to transfer (redirect) an in-progress call to another destination. The Redirecting Party (original called party) requests a call transfer by using touch-tones to enter the redirection request and the number of the Target Party (TP).

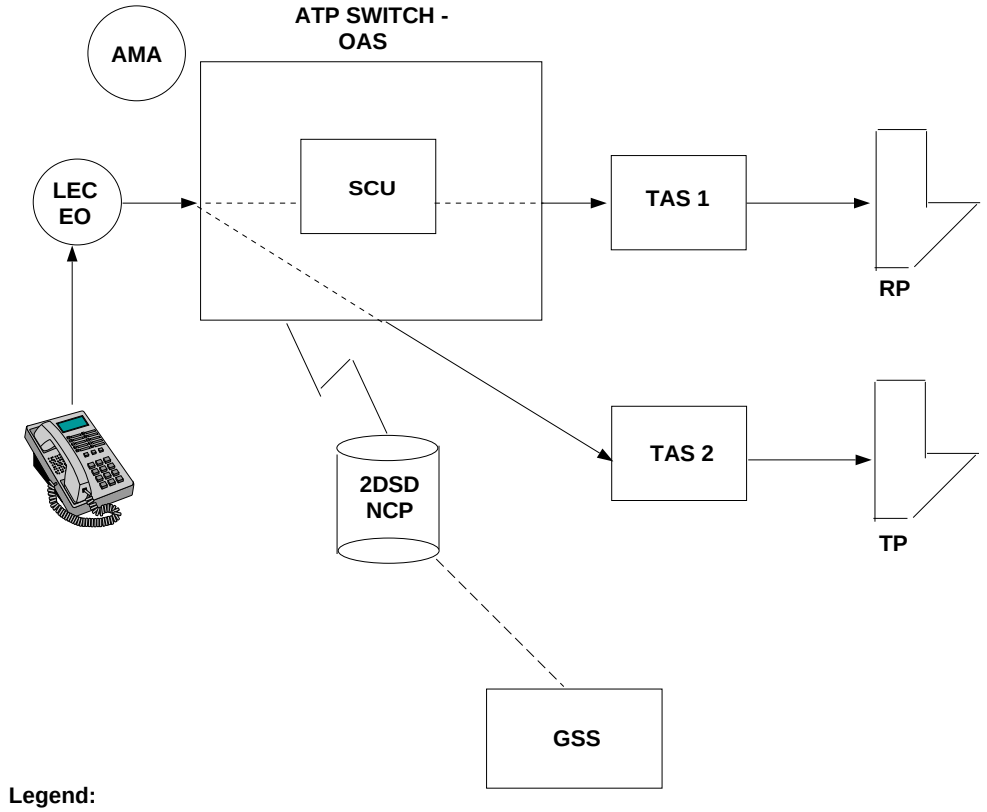
1.02 PACR moves a subset of the Blind Transfer capabilities from the adjunct to the *4ESS*™ switch. PACR capabilities are provided (using ATP, Jr.) to VRU redirecting parties. ATP, Jr. is used to collect and to validate redirection numbers (currently 800, 877, and 888 toll free numbers ***only***).

1.03 In Blind Transfer for VRU (VBT), a call is first routed to the Redirecting Party (RP). If the RP determines that the call needs to be routed to another party, the VRU sends ****T*** (*8), a 10-digit 800/877/888 number, and ***#***. Once the digits are collected, a sequence of tones is played to the RP and the RP is disconnected. The call is then set up to the Target Party (TP). Because VRU is an automated agent rather than a live agent, no command is needed to put the caller on hold or for Help announcements.

1.04 If an invalid number is entered (for instance, a 900 number), the network informs the RP by playing a sequence of tones and allows another chance to enter the correct digits. If invalid digits are entered a second time, error tones are played, the caller hears an announcement, and the call is disconnected.

2. Call Flow

Call Flow Diagrams



Legend:

AMA	**Automatic Message Accounting**
ATP	**AT&T Trigger Platform**
DSD	**Direct Services Dialing**
EO	**End Office**
GSS	**Global Translations Network Support System**
LEC	**Local Exchange Carrier**
NCP	**Network Control Point**
OAS	**Originating AT&T Switch**
RP	**Redirecting Party**
SCU	**Service Circuit Unit**
TAS	**Terminating AT&T Switch**
TP	**Target Party**

user1/ihddoa/4ESS/234-090/234-090-204AC/FG/4719.1

Figure 9-1. PACR–ATP Architecture

Call Flow Narrative

2.01 The TC-ATP OOB Enhancement to VBT 800 call flow is as follows:

1. Caller dials an 800, 877 or 888 number that is routed to the Originating AT&T Switch (OAS) via the Local Exchange Carrier (LEC).
2. The OAS formulates and sends a Transaction Capabilities Application Part (TCAP) BEGIN message to the 2DSD NCP including the dialed number and the calling party's 10 digit BN if available, or 3 digit NPA with seven zeros if BN is not available.
3. Upon receiving the TCAP BEGIN message, the NCP executes the Customer Account Logic (CAL) associated with the dialed number. The termination indicates a subscription to VBT with out-of-band data, and per-call or per-redirection billing.
4. The NCP checks the Node Capabilities for monitor capable SCUs with ports available.
   - If monitor capable SCUs are available at the OAS (Bit A in the Node Capabilities parameter of the TCAP BEGIN message set to 1), the NCP continues to execute the record. Go to Step 9.
   - If monitor capable SCUs are not available (Bit A in the Node Capabilities parameter set to 0), The NCP instructs the OAS to hand off the call to another ATP switch. Go to Step 5.
5. The NCP sends a TCAP CONTINUE message, Operations Connection Control–Connect with the Hand-off Routing Number (HRN), the Signaling Connection Control Part (SCCP) address, and the Transaction ID (NCP) to the OAS. Other call processing information, such as the Automatic Number Identification (ANI), is also sent.
6. The OAS receives the TCAP CONTINUE message, Operations Connection Control–Connect and recognizes that hand-off treatment is required. The OAS hands the call to the HAS, translates the HRN, and launches an Integrated Services Digital Network User Part (ISUP) Initial Address Message (IAM) with the SCCP Address and the Transaction ID (NCP).
7. The OAS Real Time Network Routing (RTNR) sends the call to the HAS. The HAS determines that hand-off treatment is required based on the SCCP Address and Transaction ID included in the ISUP IAM message. Based on digit translation, the HAS queries the NCP with a TCAP BEGIN message, Provide Instruction–Assist (includes the Transaction ID and the SCCP Address).

8. The NCP receives the query (and based on the TCAP BEGIN message, Provide Instruction–Assist), retrieves the CAL, and continues call processing.

NOTE 1: The NCP begins CAL execution from the same spot where it was left at the beginning of the hand-off. See Step 4.

NOTE 2: Because the HAS functions as an OAS after a call is handed off, the term OAS/HAS from this point in the call flow is used to denote either an originating or a hand-off switch.

9. The NCP sends a TCAP CONTINUE or END message to the OAS/HAS. This message includes the Provide Instruction-Operation of invoke ATP with the Redirection Feature Identifier (RFID) of the Redirection Feature parameter indicating VBT to 800 with redirection billing or VBT to 800 with per-call billing, the routing number, dialed number, ANI, and Automatic Message Accounting (AMA) recording instructions. The valid entries for this feature are highlighted.
10. The OAS/HAS receives the TCAP CONTINUE or END message, begins AMA recording, and routes the call to the RP using normal call processing and signaling.
11. The OAS/HAS invokes ATP with the RFID mapped to an internal Feature ID (FI). The following Generic Actions specified in the AT&T Trigger Validation (ATV) table are executed:

    - ***Enable inband monitor:*** The switch establishes a voice path through the SCU monitor and allows monitoring of the call in order to receive inband information. Per-call information is also saved when ATP is invoked.
    - ***Collect trigger:*** The switch recognizes either an inband trigger such as DTMF ***T** from the called party RP or a user entered out-of-band trigger specified within a facility IE operation Value (or on Access Transport Parameter Operation Value within a FAR Message) sent from the RP.

      NOTE: Only one inband trigger is valid to transfer a call—***T**.

    - ***Update bill:*** The Service Feature Indicator (877 for per-call charging or 879 for per-redirection charging) is overwritten on the AMA record. This feature indicator is recorded whether or not the call is redirected.

      NOTE: Update Bill is a new Generic Action for this feature.

12. If the RP subscribes to INFO2 and a Service Identification (SID)/ANI increment message is sent, the AMA record is updated. The AMA record is also updated if one of the following is received:
    - Egress Data Trunk Appearance Number (TAN) and/or Egress Digits
    - Network Switch Number (NSN) and/or Project L Generic Operation Access ID.
13. The RP answers.
14. The Calling Party (CP) and the RP converse.
15. The RP enters DTMF tones (*T) or sends a Q.931 FAC message with OOB trigger.
16. The inband monitor at the OAS detects the trigger if inband triggering occurred or detected by ATP if OOB trigger occurred. The trigger is mapped to a Trigger Index (TI) and sent to the ATP logic. This causes the TI, call state, and direction of the trigger to be mapped to an Action List (the list of actions to be performed).
17. If ***T** is entered or OOB call redirection triggers initiated, the following actions occur:
    - ***Play announcement*** to the calling party. This breaks the call path so that the caller does not hear the DTMF 10 digits being entered. The announcement message is *Please wait*.
    - ***Collect 10 digits (or 11 digits if 1-800-xxx-xxxx is entered*** from the called party. If OOB triggered the redirection number is located in the FAC message.
    - ***Screen Digits for 800*** (1 through 3 of the collected digits against 800, 877, or 888). ATP validates that 10 digits were entered and that the first 3 were 800, 877, or 888. If the first digit entered is a 1 then it is discarded and the remaining 800/877/888 is screened as 10 digits.

      NOTE: Screen 800 is a new Generic Action for this feature.
18. If digit collection and screening is successful on the first try (10 digits followed by # are collected with the first 3 digits being 800, 877, or 888), go to Step 19. If not successful, go to Step 25. Note: the "#" is an optional delimeter to designate the immediate end to the redirection number sequence.
19. The following actions occur when digit collection and screening are successful:
    - ***Update bill*** with Service Feature Indicator=878 for per-call charging (880 for per-redirection charging). The Service Feature Indicator is overwritten on the AMA record for this call.
    - ***Play announcement*** PACR-16 (**6) to the called party. This indicates to the VRU that a valid number was received.

- ***Remove OGT***. The RP is dropped and the RP AMA record is closed. The trunk is not dropped until the announcement completes. The billing closure causes a TERM message (if needed) to be sent to the NCP for the RP termination.
- ***Route call*** with the collected digits as the Dialed Number, along with the Calling Party Number (CPN) BN (ANI), and Class of Service (COS) information from the per-call information. This opens an AMA record for the normal processing of an 800 call.
- ***Disable ATP***.

20. The OAS/HAS sends a TCAP BEGIN message to the NCP (executes the customer record with the TP number and yields a routing number to the TP). The routing and AMA instructions are contained in the TCAP CONTINUE or END message sent by the NCP.
21. If the TP also subscribes to VBT, the call flow repeats from Step 4 for the TP call (the TP is now the RP). Otherwise, the call continues.
22. The OAS/HAS begins AMA recording for the call to the TP.
23. Now acting as the originating switch for the call to the TP, the OAS/HAS routes the call based on normal call processing and signaling.
24. The OAS/HAS receives the answer indication and begins elapsed time recording for the TP leg.

End of call flow for a successful redirection.

25. If the predigit or interdigit timing is exceeded, the RP enters less than 10 digits, or the number entered does not begin with 800, 877, or 888, the following are executed:
    - ***Collect 10 digits*** from the called party or accept OOB trigger retry.
    - ***Screen Digits for 800*** (1 through 3 of the collected digits against 800, 877, or 888). ATP validates that 10 digits were entered and that the first 3 were 800, 877, or 888.
    - ***Reprompt*** RP with zero prompts with PACR-18 (**8).
26. If digit collection and screening is successful (10 digits followed by # are collected with the first 3 digits being 800, 877, or 888), go to Step 19.

27. If the predigit or interdigit timing is exceeded, the RP enters less than 10 digits, or the number entered does not begin with 800, 877, or 888, the following are executed:

    - ***Play announcement*** PACR-15 (**5) to the RP.
    - ***Stop announcement*** being played to the caller.
    - ***Play announcement*** PACR-6 to the caller (*Your call was unable to complete. Please hang up and dial the 800 number again.*).
    - ***Final handle*** with high and wet (silence). The caller hears nothing following the PACR-6 announcement and the call is torn down.

End of call flow for an unsuccessful redirection.

3. Provisioning

This feature is activated/deactivated using Recent Change (RC) Form 809.

- To activate this feature, set PF22 value to "OFF".
- To deactivate this feature, set PF22 value to "ON".

Test 3B ATV Tables for Feature ID's of 1, 2, 5, 6 (Call Redirection).

4. Recording (Not Affected)

5. Network Management

5.01 This feature introduces a 5-minute count report by Feature Identifier for calls invoking ATP. The report name is NEMOS Message Type 122.

6. Maintenance/Troubleshooting

Call Irregularities

6.01 One new Final Handling Code (FHC) is introduced by this feature.

FHC: 2105
FHC Name: 4FHQ9A_ATP_UUI
Error Description: The UUI cannot be stored in the 1B.
Action: Switch drops UUI and continues the call.

7. Transition Considerations

Software Dependencies

7.01 This feature requires the following software:

- ATP Jr. FRF 4306
- Inbound Services PACR on ATP Jr. FRF 4719
- 800 Services-TC Service Release 3.0 FRF 4867

Ubiquity

7.02 It is necessary for all *4ESS* switches in the network to be running the 4E21 Release 3 Generic for this feature to be operational.

Turn On/Turn Off Mechanism

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

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

- Structure: OD4OFCCOPY
- Core address: 6731267
- Word: 1
- Size: 1
- Displacement of OD4PF22: 25
- On: 0
- Off: 1

NOTE:
Before installing this feature, the technician needs to inhibit audits on the ATP node via the 3B. The 3B input command is: **IHH:AUD:ATP 7!** [7 = Inter-node call block audit]. The audits should be allowed (**ALW:AUD:ATP 7!**) after the nodes have been loaded with the new product.

8. Input/Output Manual Pages

8.01 There are no new or modified Input messages. However the following output messages have been modified.

- **REPT:IAOFC**
- **REPT:IATSG**
- **VER:MISC**

MESSAGE ID	REPT:IAOFC
WORK CENTER	MOC, TOC
GENERIC	4E21 Rel. 3 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

REPT:IAOFC, TRAPN a, bbb [c]
[defgh [DEL:i, NEXTDIGITNUM:j, PRE:k] [FINALROUTE: l] [IAID: m] ...
nop q r [TOS: s, CID: t, INTL: u ,ITC: v] [w] [TNSI: x, INTL: u] ...
[CAUS: y DATA: z] [TNSI: a1, INTL: u, CID: t, DRTC: b1] ...
[EAANI: c1 OLIDIG: d1] [ISCAUS: e1 LOC: f1] ...
[SAN: g1 MAN: h1 EXDC: i1] [IIDIG: j1|OLIDIG d1] ...
[TRK GRP: k1, NSN: l1
ORIG: m1, SST: n1, DNST: o1, DEST: p1, TC: q1] ...
[RII: r1, TC: q1] s1 t1 u1 v1 w1 x1 y1 z1 a2 [VALKEY: b2 c2 d2 e2]]
FHCODE: f2,IFHCODE: h2,i2,{TRCODE|SVICT}: j2,{TRSUB|SVOGT|EAS}: k2l2
[** DATA LOST **]
m2

2. **REASON FOR OUTPUT**

To report an event specified on an *MON:IAOFC* input message trap whose schedule is or has occurred. The data relevant to a call irregularity is displayed.

3. **VARIABLE FIELD DEFINITIONS**

a	Trap number (*32-35*) of the trap that caused the output.
b	Three characters describing Ineffective Attempt (IA) type. See Practice 234-103-018 for description.
c	Final Handling Announcement (FHI) override. See COMPOOL encoding of XL4RD_FHI.
d	Incoming Trunk (ICT) identity associated with the trapped event.
e	Outgoing Trunk (OGT) identity, if present, associated with the trapped event.
f	Service Circuit (SVC), if present, associated with the trapped event.
g	Digits (DIG) present when the event was trapped.

h Calling Party Digits (CPDIG), if present, when the event was trapped. May be either a billing number or an Automatic Number Identification (ANI).

i Number of digits that were deleted from the DIG variable.

j The number of the next digit to be outpulsed after deleting and prefixing operations have been applied to DIG data.

k The actual digits to be prefixed prior to outpulsing, blank if none.

NOTE: Example: If *DIG = 6903252*, *DEL = 3*, *PRE = 1*, and *NEXT DIGIT NUM = 2*, then digit 5 will be the next digit to be outpulsed, since it is the fourth digit left after 690 was deleted and the digit 1 was prefixed.

NOTE: Since the 4ESS™ switch gives up to four digits at a time to the Signaling Processor (SP) for Multifrequency (MF) outpulsing, the TRAP can only indicate what the next group of digits to be given to the SP will be, not what digit the SP will actually cause to be outpulsed next.

l Circuit Identification Number (CIN) of trunk subgroup which was the final route hunted in a No Circuit Available (NCA) condition.

m The internal Public Announcement Service (PAS) frame identity for those call irregularities that are associated with PAS calls, either a customer call to listen to a PAS announcement or a call to create or update a PAS announcement. PAS announcement number.

n Domain Incoming (DOMI) from Call Register (CR). See COMPOOL encoding of CR4DOMI.

o Dynamic ^Non-Hierarchical Routing (DNHR) Incoming Class Mark (DNHRICM). See COMPOOL encoding of CR4CIDNHRI.

p DNHR Outgoing Class Mark (DNHROCM). See COMPOOL encoding of CR4CODNHRO.

q Blue Box Digits (BBDIG) collected when event was trapped.

r Previously Stored Number (PSN).

s Type Of Service (*TOS*).

t	Carrier Identification (*CID*).
u	International (*INTL*) flag.
v	Incoming Trunk Class (*ITC*).
w	Service index number (see COMPOOL encoding of CR4CBC_SERV).
x	Transit network selection index.
y	Q931 cause value.
z	Octal data (16 bits).
a1	Integrated Services Digital Network (ISDN) User Part (ISUP) dire translation. Transit network selection index.
b1	Data rate transport capability (XL4DRTC).
c1	Originating Line Information (OLI) Equal access Automatic Number Identification (ANI) type.
d1	OLI digits.
e1	ISUP cause value.
f1	Location data.
g1	Subaccount number.
h1	Mandatory/optional subaccount number.
i1	Expected digit count.
j1	Equal access Information Digits (IIs).
k1	Real Time Network Routing (RTNR) class of service. Trunk Group (*TRK GRP*) circuit identification number.
l1	Network Switch Number (*NSN*).
m1	Class Of Service (COS) Origination (*ORIG*).
n1	COS Signaling Service Type (*SST*).
o1	COS Dial Number Service Type (*DNST*).
p1	COS Destination (*DEST*).
q1	Transport capability (*TC*).
r1	RTNR service routing information.
s1	Service Circuit System (SCS) expanded Final Handling Announcement (FHANN) value.
t1	Byte Length (BLEN) of User To User Information (UUI) / Access Transport (ATP).

u1	Adjunct Logical Address (ALA).
v1	Originating Point Code (OPC).
w1	Invoke (INVK) Identification (ID).
x1	Credit Card Digits (CARD).
y1	Destination Point Code (DPC).
z1	Subsystem Number (SSN).
a2	Operator (OPER) requested call.
b2	Validation Key (*VALKEY*) data. Feature identification.
c2	Trigger identification.
d2	Call state.
e2	Call directionality.
f2	Final Handling Code (*FHCODE*). This is the raw data describing the failure at the level of detail internal to the program. See COMPOOL encoding of FH4FHIDIDEN item.
h2	Input Final Handling Code (*IFHCODE*). Raw data for the final handling code which was input to TMAD0002 program prior to possible clarification into the more detailed *FHCODE* variable.
i2	Q931 or ISUP message pointer. COMPOOL encoding is Q94_MESS_TYPE (Q931) and C74 MSGTYPE (ISUP), respectively.
TRCODE	Trunk register code.
SVICT	State vector, incoming trunk.
j2	Raw data for Call Register (CR) incoming state vector or Trunk Register (TR) code. See COMPOOL encoding for CR4SVICT and TR4CODE, respectively.
TRSUB	Trunk register substate code.
SVOGT	State vector, outgoing trunk.
EAS	Equal Access Signaling (*EAS*).
k2	Raw data for CR outgoing state vector or TR substate code. See COMPOOL encoding of CR4SVOGT and TR4CODE, respectively.

I2	Equal Access Signaling (*EAS*) state.
DATALOST	Possible text stating that data has been lost due to the collection of more data than can be buffered for output. At most, 32 messages can be buffered to all monitoring channels. blank—if no message failed to be buffered prior to the current message and the previous successfully buffered message.
m2	Time of call irregularity occurrence.

4. **ACTION TO BE TAKEN**

None.

5. **REFERENCES**

PIDENTs
IOCPPOM4
TMAD0002
TMAD0005
TMADTRAP

234-103-018, *Trunk Operations Center (TOC) - Call Irregularity Raw Data Trap*

Input Messages
ALW:IAOFC
INH:IAOFC
MON:IAOFC
STOP:MON-IAOFC

MESSAGE ID	REPT:IATSG
WORK CENTER	MOC, TOC
GENERIC	4E21 Rel. 3 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

REPT:IATSG, TRAPN a, bbb [c]
[defgh [DEL:i, NEXTDIGITNUM:j, PRE:k] [FINALROUTE: l] [IAID: m] ...
nop q r [TOS: s, CID: t, INTL: u ,ITC: v] [w] [TNSI: x, INTL: u] ...
[CAUS: y DATA: z] [TNSI: a1, INTL: u, CID: t, DRTC: b1] ...
[EAANI: c1 OLIDIG: d1] [ISCAUS: e1 LOC: f1] ...
[SAN: g1 MAN: h1 EXDC: i1] [IIDIG: j1|OLIDIG d1] ...
[TRK GRP: k1, NSN: l1
ORIG: m1, SST: n1, DNST: o1, DEST: p1, TC: q1] ...
[RII: r1, TC: q1] s1 t1 u1 v1 w1 x1 y1 z1 a2 [VALKEY: b2 c2 d2 e2]]
FHCODE: f2,IFHCODE: h2,i2,{TRCODE|SVICT}: j2,{TRSUB|SVOGT|EAS}: k2l2
[** DATA LOST **]
m2

2. **REASON FOR OUTPUT**

To report an event specified on an *MON:IATSG* input message trap whose schedule is or has occurred. The data relevant to a call irregularity is displayed.

3. **VARIABLE FIELD DEFINITIONS**

a	Trap number (*1-31*) of the trap that caused the output.
b	Three characters describing Ineffective Attempt (IA) type. See Practice 234-103-018 for description.
c	Final Handling Announcement (FHI) override. See COMPOOL encoding of XL4RD_FHI.
d	Incoming Trunk (ICT) identity associated with the trapped event.
e	Outgoing Trunk (OGT) identity, if present, associated with the trapped event.
f	Service Circuit (SVC), if present, associated with the trapped event.
g	Digits (DIG) present when the event was trapped.
h	Calling Party Digits (CPDIG), if present, when the event was trapped. May be either a billing number or an Automatic Number Identification (ANI).

i Number of digits that were deleted from the DIG variable.

j The number of the next digit to be outpulsed after deleting and prefixing operations have been applied to DIG data.

k The actual digits to be prefixed prior to outpulsing, blank if none.

NOTE: Example: If *DIG = 6903252*, *DEL = 3*, *PRE = 1*, and *NEXT DIGIT NUM = 2*, then digit 5 will be the next digit to be outpulsed, since it is the fourth digit left after 690 was deleted and the digit 1 was prefixed.

NOTE: Since the 4ESS™ switch gives up to four digits at a time to the Signaling Processor (SP) for Multifrequency (MF) outpulsing, the TRAP can only indicate what the next group of digits to be given to the SP will be, not what digit the SP will actually cause to be outpulsed next.

l Circuit Identification Number (CIN) of trunk subgroup which was the final route hunted in a No Circuit Available (NCA) condition.

m The internal Public Announcement Service (PAS) frame identity for those call irregularities that are associated with PAS calls, either a customer call to listen to a PAS announcement or a call to create or update a PAS announcement. PAS announcement number.

n Domain Incoming (DOMI) from Call Register (CR). See COMPOOL encoding of CR4DOMI.

o Dynamic ^Non-Hierarchical Routing (DNHR) Incoming Class Mark (DNHRICM). See COMPOOL encoding of CR4CIDNHRI.

p DNHR Outgoing Class Mark (DNHROCM). See COMPOOL encoding of CR4CODNHRO.

q Blue Box Digits (BBDIG) collected when event was trapped.

r Previously Stored Number (PSN).

s Type Of Service (*TOS*).

t Carrier Identification (*CID*).

u International (*INTL*) flag.

v	Incoming Trunk Class (*ITC*).
w	Service index number (see COMPOOL encoding of CR4CBC_SERV).
x	Transit network selection index.
y	Q931 cause value.
z	Octal data (16 bits).
a1	Integrated Services Digital Network (ISDN) User Part (ISUP) dire translation. Transit network selection index.
b1	Data rate transport capability (XL4DRTC).
c1	Originating Line Information (OLI) Equal access Automatic Number Identification (ANI) type.
d1	OLI digits.
e1	ISUP cause value.
f1	Location data.
g1	Subaccount number.
h1	Mandatory/optional subaccount number.
i1	Expected digit count.
j1	Equal access Information Digits (IIs).
k1	Real Time Network Routing (RTNR) class of service. Trunk Group (*TRK GRP*) circuit identification number.
l1	Network Switch Number (*NSN*).
m1	Class Of Service (COS) Origination (*ORIG*).
n1	COS Signaling Service Type (*SST*).
o1	COS Dial Number Service Type (*DNST*).
p1	COS Destination (*DEST*).
q1	Transport capability (*TC*).
r1	RTNR service routing information.
s1	Service Circuit System (SCS) expanded Final Handling Announcement (FHANN) value.
t1	Byte Length (BLEN) of User To User Information (UUI) / Access Transport (ATP).
u1	Adjunct Logical Address (ALA).

v1	Originating Point Code (OPC).
w1	Invoke (INVK) Identification (ID).
x1	Credit Card Digits (CARD).
y1	Destination Point Code (DPC).
z1	Subsystem Number (SSN).
a2	Operator (OPER) requested call.
b2	Validation Key (*VALKEY*) data. Feature identification.
c2	Trigger identification.
d2	Call state.
e2	Call directionality.
f2	Final Handling Code (*FHCODE*). This is the raw data describing the failure at the level of detail internal to the program. See COMPOOL encoding of FH4FHIDIDEN item.
h2	Input Final Handling Code (*IFHCODE*). Raw data for the final handling code which was input to TMAD0002 program prior to possible clarification into the more detailed *FHCODE* variable.
i2	Q931 or ISUP message pointer. COMPOOL encoding is Q94_MESS_TYPE (Q931) and C74 MSGTYPE (ISUP), respectively.
TRCODE	Trunk register code.
SVICT	State vector, incoming trunk.
j2	Raw data for Call Register (CR) incoming state vector or Trunk Register (TR) code. See COMPOOL encoding for CR4SVICT and TR4CODE, respectively.
TRSUB	Trunk register substate code.
SVOGT	State vector, outgoing trunk.
EAS	Equal Access Signaling (*EAS*).
k2	Raw data for CR outgoing state vector or TR substate code. See COMPOOL encoding of CR4SVOGT and TR4CODE, respectively.
l2	Equal Access Signaling (*EAS*) state.

DATALOST Possible text stating that data has been lost due to the collection of more data than can be buffered for output. At most, 32 messages can be buffered to all monitoring channels.

blank—if no message failed to be buffered prior to the current message and the previous successfully buffered message.

m2 Time of call irregularity occurrence.

4. **ACTION TO BE TAKEN**

None.

5. **REFERENCES**

PIDENTs
IOCPPOM4
TMAD0002
TMAD0005
TMADTRAP

234-103-018, *Trunk Operations Center (TOC) - Call Irregularity Raw Data Trap*

Input Messages
ALW:IATSG
INH:IATSG
MON:IATSG
STOP:MON-IATSG

Signaling Transport Footprint Standardization Feature (4903)

10

Contents **Page**

Signaling Transport Footprint Standardization Feature (4903)

10

1. Feature Description

1.01 This feature provides the standard footprint design for a number of new signaling transport elements by updating the standard application drawings for the *4ESS*™ switch. This will allow the signaling transport equipment to be included in a new frame, the Signaling Transport Frame (STF), which will be placed in a standard location per technology footprint. This is the first time that signaling transport facilities will be included as part of the *4ESS* switch footprint.

1.02 When the new signaling transport equipment is deployed, it will replace the following existing equipment:

- Digital Service Unit (DSU)/Channel Service Unit (CSU)
- D4 Channel Bank
- Automated Bit Access Test System (ABATS)
- Digital Access Cross-Connect System (DACS)
- Network Channel Office Equipment (NCOE).

1.03 Feature 4903 is a hardware-only feature that provides a standard footprint for all hardware elements associated with the end points of a signaling transport facility, which includes the following features and project:

- Single Signaling Termination Element (Feature 4455)
- High Speed Links (Features 3317 and 3599)

- High Speed Links Encryption (Feature 4748)
- Golden Path Project.

1.04 Each *4ESS* switch office, except Signaling Point of Interface (SPOI) offices, is scheduled to receive two frames. SPOI offices are scheduled to receive three frames. A typical new frame is shown in Figure 10-1.

Background

1.05 Prior to this feature, the 56 Kbps Common Channel Signaling System 7 (CCS7) signaling link architecture used several different transmission devices before reaching the T3 transport network. These transmission devices (DSU/CSU, D4 Channel Bank, ABATS, DACS, and NCOE) will be replaced by the new Single Signaling Termination Element, which will be housed in a new frame. The older devices use decade-old technology, which affects the reliability and cost of the signaling network, and increases the number of potential failure modes and Operation Support System complexity.

1.06 The new transport architecture associated with this feature simplifies the network/operation support system infrastructure, while improving the overall reliability of the network. Over time, this will reduce the cost of provisioning and maintenance. Deployment of this new architecture, together with the Golden Path project, will help to ensure intra-office diversity in the CCS7 network.

Golden Path Project

1.07 The Golden Path project is an equipment and facility implementation methodology to provide, maintain and track intra-office path diversity (physical separation) within all CCS7 network locations. A major objective for each technology within a CCS7 network location is to assure that a single failure will not cause a service disruption.

1.08 The Golden Path project requires that a Digital Service Cross-Connect (DSX) panel and a fuse panel be placed in a standard location in the *4ESS* switch footprint.

Single Signaling Termination Element

1.09 The Single Signaling Termination Element (SSTE) provides 56 Kbps links for the CCS7 network using modern technology. It simplifies the network/operation support system infrastructure while improving overall network reliability. As noted above, the SSTE replaces the DSU/CSU, D4, ABATS, DACS and NCOE. It incorporates ABATS and NCOE functionality in a single unit which can also be used in SPOI offices.

The SSTE will be supported by a much simpler Operation Support System infrastructure. The potential number of failure modes is also reduced, which is expected to simplify the maintenance process.

1.10 The SSTE (Feature 4455) places one or more Acculink Access Controllers (AAC) in a standard location within the *4ESS* switch footprint and wired to the DSX.

High Speed Links

1.11 The High Speed Links (Feature 3317) allows the two Signaling Transfer Points (STPs) in the AT&T Switched Network (ASN) to support 1.544 Mbs B and C signaling links. This increase in link speed requires the Universal Link Node (ULN), which is a new link node to support the 1.544 Mbps link termination. This will allow larger volumes of CCS7 signaling messages while conserving the number of link terminations, decreasing network complexity, and lowering costs. In addition, Feature 3317 allows the ASN to process Message Signal Units with significantly higher average length without degrading the quality of service. The ULNs will be wired to the DSX.

1.12 The High Speed Links (Feature 3599) allow *4ESS* switches in the ASN to access the CCS7 network via 1.544 Mbps A links. This provides an alternative to the 56 Kbps A links, which is beneficial in a signaling network where the signaling end points generate large volumes of signaling loads. In addition, it also frees-up the two STP link terminations for other features or network growth. This reduces costs and improves performance.

High Speed Links Encryption

1.13 Feature 4748 involves the placement of one shelf of encryption devices to be placed in the *4ESS* switch footprint and wired to the DSX. This equipment will assure that the High Speed Links are secure by encrypting the links at the Digital Services Interface (DSI) facility level.

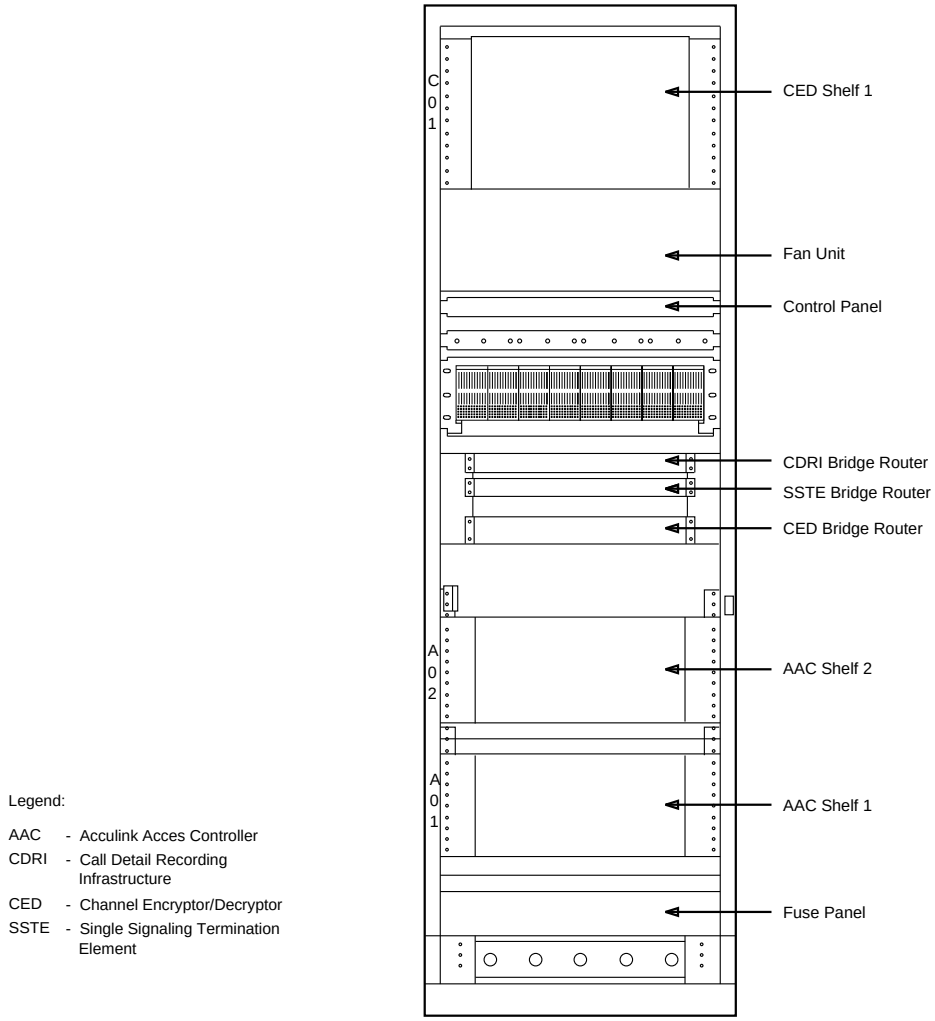


Figure 10-1. Typical Signaling Transport Frame (STF)

2. Call Flow (Not Affected)

3. Provisioning (Not Affected)

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations (Not Affected)

8. Input/Output Manual Pages (Not Affected)

Calling Party Pays Airtime — CALIPER Feature (4923)

11

Contents

Contents **Page**

Calling Party Pays Airtime — CALIPER Feature (4923)

11

1. Feature Description

Background

1.01 Personal numbers of the format 500-NXX-XXXX have mostly been used as "go-anywhere" or "follow-me" numbers. Customers with 500 service are currently able to route their calls anywhere they go, no matter how frequently they move. For example, calls might be routed to an office number, a cellular phone, a distant city or a voice mailbox. A person subscribing to a 500 service could tell business associates, friends and family members to call a single 500 number rather than be concerned with different numbers for home, work or the car. The carrier's network handles the routing in accordance with the customer's schedule and preferences. AT&T True Connections® (TC) Telecommunications Services is the Consumer Communication Services (CCS) name of the AT&T 500 Service. AT&T Easy Reach® (ER) Telecommunications Services is the Business Communication Services (BCS) version of this service. The AT&T 500 service in general will be referred to in this document as ER/TC service.

Description of CALIPER

1.02 Calling Party Pays Airtime (CPPA) is marketed as CALIPER, and will be referred to as CPPA throughout this document. This service allows cellular subscribers to designate that the caller should pay for airtime on calls they receive. CPPA uses numbers from the 500 Numbering Plan Area (NPA) and forwards calls dialed to the 500 number to a domestic cellular Mobile Identification Number (MIN). As part of the service, AT&T plays an announcement notifying the calling party that the bill from AT&T will

include airtime charges incurred in the cellular carrier's network and collects a positive acknowledgement from the caller before the call can proceed to its destination.

1.03 For this service, AT&T buys airtime in bulk from the cellular carriers and retails it to its customers. A Mobil Switching Center (MSC) recognizes a CPPA call by examining the incoming Charge Number parameter or Automatic Number Identification (ANI). The cellular carrier suppresses airtime billing to MIN on incoming calls and uses the incoming Charge Number or ANI to bill for airtime. The Charge Number or ANI received at the MSC is the Quantum Billing Number (QBN) which identifies AT&T as the party to bill for airtime and will not correspond to the calling party.

1.04 A CPPA subscriber can give out their 500 number instead of the cellular number and leave the cellular telephone set on (ready to receive calls) without having to be concerned about airtime charges. Customers will be able to keep the same 500 number if their local telephone number or their cellular mobile identification number changes. After the trial, CPPA subscribers may be able to include options from ER/TC and existing 500 number owners may have the option of adding CPPA to their package.

1.05 CPPA subscribers are expected to give out their 500 number, not the MIN. Until 500 numbers become portable, the 500 number dialing option will force all calls using the CPPA service to come to AT&T. The only way a CPPA subscriber can be reached without the calling party incurring airtime charges is if the caller dials the MIN instead of the 500 number. When the caller dials directly the MIN, whether the call is within the same cellular geographic area or a long distance, the cellular user is expected to pay for airtime on such a call, even if it is carried by AT&T. Calls to CPPA 500 numbers from BCS locations may not be allowed, depending on whether the business has requested the CPPA service not be invoked for calls from their location. Such a request will be indicated by a CPPA indicator in the ANI Trigger Table (ANITT). The CPPA indicator is independent and may co-exist with the other feature indicators in the ANITT.

2. Call Flow

Call Flow Key Points

A. Access

2.01 This feature is available for 1+ and 0+ calls at *4ESS* and *5ESS*® switches that allow 500 dialing. There are no new requirements imposed on the *5ESS* Toll Application switch. 1/0+500 calls from direct connect locations are blocked. Calls to CPPA subscribers from SDN locations or other BCS locations can be denied by using a spare bit in the ANITT. CPPA is primarily targeting CCS BU subscribers. If in the future the BCS BU decides to offer CPPA to its own customers, the Number 2 Direct Services ANI-based/Number 2 Network Control Point (2DSA/2NCP) requirements of the "1+500

Dialing Plan" and "SDN EasyReach" feature will need to be re-examined for the interaction between CPPA and other PCP or SDN features.

2.02 0+CPPA calls are allowed wherever 0+500 calls are allowed but cannot be sent-paid. IBNS and FTS-2000 1+ calls to CPPA subscribers will be blocked by existing network capabilities. 0+ calls using calling cards will be allowed.

B. Numbering and Dialing Plan

2.03 The numbering and dialing plan for CPPA uses the identical numbering and dialing plan used by the 500 Services upon which its access is based. This feature will be offered by the *4ESS* switch to calls dialed in the 1+500-NXX-XXXX format, and by the *5ESS*/Operation Services and Position System (OSPS) to calls dialed in the 0+500-NXX-XXXX format. The 500 number dialing plan is a Service Access Code (SAC) numbering plan allocated to be used by Personal Number Service Providers. The format of the numbers is 500-NXX-XXXX. The 500 numbering plan will be partitioned based on the NXX and allocated to the personal number service providers. Since the 500 number service providers will be identified at the LEC End Office (EO) and/or the Access Tandems (AT), 500 dialing will not be allowed on direct connect access trunks to the AT&T Switched Network (ASN). The 1+500 AT&T calls will be routed to the *4ESS* switch (except for wireless direct access and other special calls, such as from hotel/motel or prison), and 0+500 calls will be routed to *5ESS* OSPS.

Call Flow Narrative for 1+500

2.04 Figure 11-1 shows the architecture for 1+500 support of the CPPA service.

1. The caller dials 1+500-NXX-XXXX. The call arrives at the *4ESS* Originating AT&T Switch (OAS) via the LEC switch.

   This call does not apply to 1+500 dialed calls originated via direct connect trunks or adjuncts. These calls are currently blocked using Far-End Network (FEN) screening.

2. The *4ESS* switch translates the dialed number.

   A. If the 500-NXX code does not exist, vacant code treatment applies.

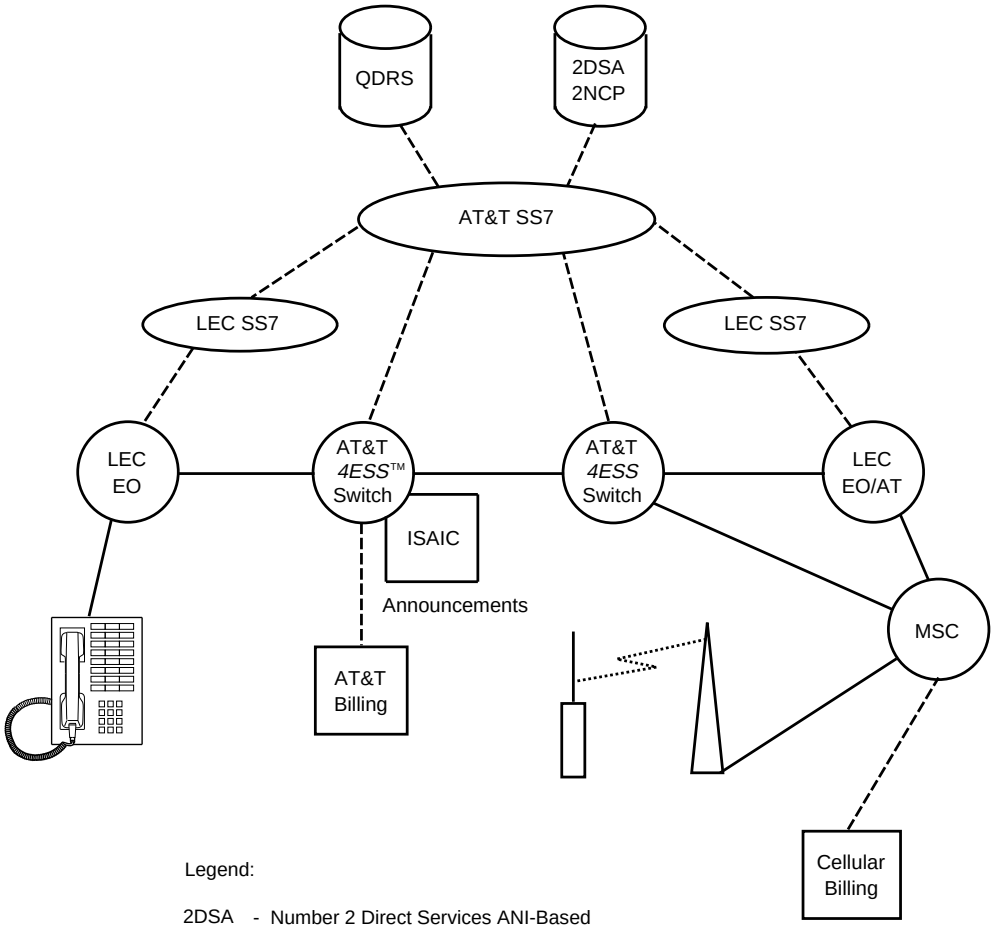
   B. If the 500-NXX of the dialed numbers is a 500 ER/TC number, call processing continues.

3. The *4ESS* switch checks the Adjunct Based Capability (ABC) ANITT and one of the following cases will occur:

   A. If there is no ANI match, the call is treated as a CPPA eligible call and the *4ESS* switch sends a TCAP query to the PCP 2DSA/2NCP per 1+500 dialing plan requirements. The call flow proceeds to step 6.

B. If the *4ESS* switch finds an ANI match, then call flow proceeds to step 4.

Phase 1 Universal SUbscriber Data Structure (USDS) *4ESS* switch requirements state that if the call is USDS query-eligible, the *4ESS* switch should query the USDS "first". Following receipt of the instruction message from USDS, if the *4ESS* switch either found an ALA value in the ABC ANI trigger data or received an ALA value with a Route to ALA instruction from the USDS-QPF, the *4ESS* switch examines the EasyReach Feature Interworking Service Indicator (ERFISI) for Customer Long Distance (CLD) Adjunct to determine whether to query 2DSA or to route the call to the Adjunct. At this stage ERFISI is set so that 2DSA will be queried at this point in the call flow.



Legend:

2DSA - Number 2 Direct Services ANI-Based
2NCP - Number 2 Network Control Point
AT - Access Tandem
EO - End-Office
ISAIC - Improved Service Announcement and Information Collection
LEC - Local Exchange Carrier
MSC - Mobile Switching Carrier
QDRS - Quantum Data and Routing System

Figure 11-1. CPPA 1+500 Architecture

4. One of the following cases will occur depending on the value of the CPPA indicator:

   A. If the CPPA indicator is set to ALLOW (default), and if the Feature Processing Data Type is set to Feature Indicator (FI) and if the FI is set to Network Call Denial (NCD), the call will be terminated as per-existing requirements. If FI is not set to NCD, the call is treated as a CPPA eligible call and the *4ESS* switch sends a TCAP query, per-existing requirements, to the Positive Call Processing (PCP) 2DSA/2NCP or to the SDN 2DSA/2NCP. The call flow proceeds to step 7 if the call is an SDN call and ERFISI for FI=SDN is set to YES, and to step 6 otherwise.

   B. If the CPPA indicator is set to DENY, processing continues to step 5.

5. One of the following cases will occur:

   A. If there are no other indicators in the ANITT, the call is not eligible to reach CPPA subscribers and the *4ESS* switch includes the Originating Restrictions parameter with value 11111110 (new value indicating that calls to CPPA subscribers are not allowed) in the TCAP query to the PCP 2DSA/2NCP. The call flow proceeds to step 6.

   B. If the Feature Processing Data Type (FPDT) is set to FI, and the FI is set to NCD, the call will be terminated as per existing requirements.

   C. If FPDT is set to FI and if FI=SDN, the call receives *4ESS* SDN treatment. The *4ESS* switch determines if the call is an ERFISI call based on the 5aa dialed number.

      - If the call is not an ER call, normal call processing continues as per ABC ANI table.
      - If the call is an ER call, one of the following cases will occur:

        a. If the corresponding ERFISI is set to YES (ERFISI=YES) and FPDT=FI=SDN, the *4ESS* switch uses 10 digit GTT to send a TCAP query to the SDN 2DSA/2NCP (for FPDT=FI=SDN). The TCAP message contains the ANI, Customer ID, the 5aa dialed number, the switch Node Capability, the Point Codes (PC) for Quantum Data and Routing System (QDRS1) (PC1) and for QDRS2 (PC2), and the Originating Restrictions parameter indicating that CPPA is set to DENY. The call flow proceeds to step 7.

        b. If the corresponding ERFISI is set to NO (ERFISI=NO), the *4ESS* switch includes the Originating Restrictions parameter in the TCAP query that it sends to the PCP 2DSA/2NCP. Proceed to step 6.

D. If FPDT is set to FI and if FI is set to BLDS PCP, or if FPDT is set to ALA, the *4ESS* switch determines if the call is an ER call based on the 5aa dialed number:

- If the call is not an ER/TC call, normal call processing continues as per ABC ANI table.
- If the call is an ER/TC call, one of the following cases will occur:

a. If the corresponding ERFISI=NO (for FPDT=FI=PCP=ALA), the *4ESS* switch sends a TCAP query to the PCP 2DSA/2NCP and includes the Originating Restrictions parameter. The Originating Restrictions parameter is coded 11111110 to indicate that the ANI does not have the option to place calls to CPPA subscribers. The details of the TCAP query are described in Section 9. The call flow proceeds to step 6.

b. If the ERFISI=YES for FPDT=FI=BLDS PCP or FPDT=ALA (pointing to an adjunct), the call will be handled by the appropriate application.

E. If the matching ANI record also contains indicators other than the ones description steps B, C and D above, such as 1+DL Deny, the condition will be treated as in step A. The Originating Restrictions parameter will be included in the TCAP message to the PCP 2DSA/2NCP.

6. The PCP 2DSA/2NCP will determine if the call is an ER/TC call based on the 500 dialed number:

A. If the call is not an ER/TC call, normal PCP call processing will continue.

B. If the call is an ER/TC call, the 2DSA/2NCP will query the QDRS via Common Channel Signaling No. 7 (CCS7) TCAP, using the first QDRS point code sent by the *4ESS* switch as the first choice. Included in the TCAP query are the dialed number and the ANI. CPPA calls are not expected to generate a subsequent query due to a Busy/Ring-No-Answer (B/RNA) condition because the *4ESS* switch is not expected to receive a request to detect such a condition.

Node Capability parameter is not required to be included in this query (i.e., BEGIN Message from 2DSA/2NCP to QDRS). The call flow proceeds to step 8.

7. The SDN 2DSA/2NCP receives the query from the *4ESS* switch and the SDN Customer Application Language (CAL) logic determines if the call is an ER call or an SDN/ER call based on the 5aa dialed number:

A. If the call is not an SDN/ER call, normal SDN call processing will continue.

B. If the call is an SDN/ER call, then the CAL logic of the customer account will screen the ER number to determine if such a number is allowed. This screening may be done either on the NPA or all 10 digits of the 5aa-NXX-XXXX dialed number.

- If the ER number is allowed, then the 2DSA/2NCP queries the QDRS via CCS7 TCAP, using the first QDRS point code sent by the *4ESS* switch as the first choice. Included in the TCAP query are the dialed number and the ANI.
- If the ER number is not allowed, then the 2DSA/2NCP sends a TCAP End message to the *4ESS* with an indication to final handle the call.

8. The QDRS process the query:

A. If QDRS cannot find the record for the 500 number dialed, a CCS7 TCAP End message is sent back to the 2DSA/2NCP (PCP or SDN) per existing requirements. The TCAP message will include an indication to final handle the call. The 2DSA/2NCP will, in turn, request the OAS to final handle the call.

B. If QDRS finds a record for the 500 number dialed, the following can happen:

- If the 500 number is not a CPPA subscriber, QDRS checks whether Caller Discretion is enabled or not and the call flow would go to the *5ESS*/OSPS.
- If the 500 number is a CPPA subscriber, Caller Discretion and ER/TC routing features are not applicable. Go to step C.

C. If QDRS determines, based on information in the Originating Restrictions parameter, that the caller is not allowed to place calls to CPPA subscribers, a CCS7 TCAP message is sent back to the 2DSA/2NCP with a CPPA-specific announcement ID and an indication to final handle the call. The 2DSA/2NCP will in turn request the OAS to final handle the call.

D. If QDRS determines that the call is eligible to proceed to the CPPA subscriber, go to step 9.

9. QDRS triggers the CPPA feature. The CPPA logic is similar to the Caller Discretion logic.

- The TCAP response from QDRS to the 2DSA/2NCP will be a CONTINUE message
  - — to play "Branding Announcement", and

— to play "calling party pays airtime announcement and collect one digit (announcement ID determined by QDRS)."

- The 2DSA/2NCP will send a CONTINUE message to the *4ESS* switch to play announcements and collect one digit. Service Assist will be performed if applicable.
- The *4ESS*/Improved Service Announcement and Information Collection (ISAIC) will play announcements and collect one digit. ISAIC may timeout if no digit is entered.
- The *4ESS* switch will send a CONTINUE message with the digit collected to the 2DSA/2NCP. This message could contain "no digit collected" condition if the caller did not enter any digit.
- The 2DSA/2NCP will send a CONTINUE message to the QDRS with the digit collected ("no digit collected" condition is a valid message).
- Depending on the digit entered by the caller, the following will happen:

  a. If the digit entered agrees with what was prompted for, proceed to step 10.

  b. If the digit entered was any other digit different from the one requested in step a above, QDRS will send a CONTINUE message to play announcements, collect a digit and reprompt, or

  c. If the digit was as in step b above, as a result of a reprompt, the QDRS will send an END message to play announcement and disconnect the call.

  For steps b and c above, the 2DSA/2NCP will pass this information along to the *4ESS* switch, the *4ESS*/ISAIC will play the announcement and provide call processing as per TCAP message received.

10. The QDRS will send an END message to the 2DSA/2NCP, providing a routing number which is the MIN of the CPPA subscriber, the "Bill-To Indicator" Digits parameter with a value indicating "Caller paid, including airtime" and the QBN Digits parameter.

    For CPPA calls the following conditions are expected to be true:

    - There is no B/RNA indicator in the query from 2DSA/2NCP to QDRS.
    - The routing number cannot be an international destination.
    - The CPPA subscriber cannot have more than one routing number so there is no request for B/RNA monitoring.
    - The CPPA subscriber cannot have the call sequencing (or messaging) and PIN reminder features which may be available under ER or TC service.

11. The CAL will perform feature interaction in the 2DSA/2NCP (Software Defined Network ((SDN) feature interaction or PCP feature interaction once it is developed) based on the information received from QDRS. If announcements are needed for the call, the 2DSA/2NCP checks the Node Capability of the querying *4ESS* switch and requests a service assist if needed as per existing requirements.

    2DSA/2NCP is not expected to receive on CPPA calls, a request to detect a B/RNA condition. The 2DSA/2NCP retains the ER/TC information (e.g., routing number) when instructing the *4ESS* switch to do a service assist.

    The SDN feature interaction is performed as described in step 6 in the "SDN/ER Interworking" call flow.

    Based on the routing number returned from QDRS, the CAL customer logic will determine if the routing number (treated by CAL as an SDN dialed number) maps to an Action Point Numbering (APN) routing number or requires an authorization/account code.

    If an authorization or account code is needed (and has not already been collected), then collect the authorization code:

    A. The 2DSA/2NCP checks the Node Capability of the querying *4ESS* switch and requests a service assist if needed as per existing requirements.

       The 2DSA/2NCP retains the SDN/ER information (e.g., routing number) when instructing the *4ESS* switch to do a service assist. The 2DSA/2NCP will send a CONTINUE message to the *4ESS* switch to play announcements and collect n digits.

    B. The *4ESS*/ISAIC will play announcements and collect digits. ISAIC may timeout if not enough digits are entered.

    C. The *4ESS* switch will send a CONTINUE message with the digits collected to the 2DSA/2NCP. This message could contain "0 digits collected" condition if the caller did not enter any digits.

    D. Depending on the digits entered by the caller, the following will happen:

       - If digits entered were the valid authorization code, the 2DSA/2NCP will send an END message to play announcements,
       - If digits entered were the invalid authorization code, the 2DSA/2NCP will send a CONTINUE message to play announcements, collect n digits and reprompt, or
       - If digits were as result of a reprompt, the 2DSA/2NCP will send an END message to the *4ESS* switch and the *4ESS* switch will play announcement and final handle the call.

12. The 2DSA/2NCP will pass to the *4ESS* switch the routing number, the announcement(s) to be played, AMA recording information including the "Bill-To Indicator" Digits parameter with a CPPA value and the QBN Digits parameter.

13. When the switch receives a routing instruction from the 2NCP with a POTS (not an 800) routing number, then the switch will launch an ANI query with that destination/routing number, if the call meets all the other conditions under which an ANI query would be generated. The switch will perform any Network Access Interrupt (NAI) processing associated with any instruction received from the 2LAC/2NCP.

14. The switch identifies the call as a CPPA call based on the "Bill-To Indicator" Digits parameter with a value indicating "caller paid, including airtime". The switch puts the QBN in the Generic Operation parameter. The MIN of the CPPA subscriber is expected to be a domestic, non-Special Area Code number, so the switch sets the SST value to "LDS" for routing purposes.

15. At this point, the caller has decided to proceed with the call (i.e., the caller has entered the appropriate digit to indicate willingness to pay for airtime on the call). If the caller hangs up, the call is terminated. The *4ESS* switch routes the call and updates the AMA record as described in the recording section.

    If the call is allowed to continue and the switch is not a Terminating AT&T Switch (TAS):

    - the switch substitutes the QBN received in the TCAP message in the Digits field of the Generic Operation parameter of the outgoing Initial Address Message (IAM).
    - the switch codes the Operation Class field of the Generic Operation parameter in the outgoing IAM as "Wireless Egress" (value=00000101) and the Type of Operation as "Calling Party Pays Airtime" (value=0010011).

    If the call is allowed to continue and the switch is a TAS, the call could go directly to the MSC or go through the Local Exchange Carrier (LEC):

    - if the outgoing egress trunk is Integrated Services Digital Network (ISDN) User Part (ISUP), the switch includes the Charge Number parameter in the outgoing IAM, based on an upcoming Generic Operation parameter that is marked QBN. The address field of the outgoing Charge Number parameter is coded as ANI of the calling party national number.
    - if the outgoing egress trunk uses MF signaling, the TAS will include the ANI in the signaling procedure. If the TAS cannot forward the QBN, it is not expected to send through ISUP in the backward direction, an indication to OSA that the QBN cannot be passed on egress.

16. When the call reaches the cellular carrier, the MSC is expected to determine that the MIN it has received as a Called Party Number is a CPPA subscriber and uses the incoming ANI in billing for airtime. If the CPPA subscriber is roaming, the MSC will route the call based on the roaming information stored.

Call Flow Narrative for 0+500

2.05 The 0+500 CPPA feature will be based on the service network architecture supported by 0+500 ER dialing plan. The scenario for a 0+500 CPPA call is described in this section. Figure 11-2 displays the 0+500 architecture for CPPA service.

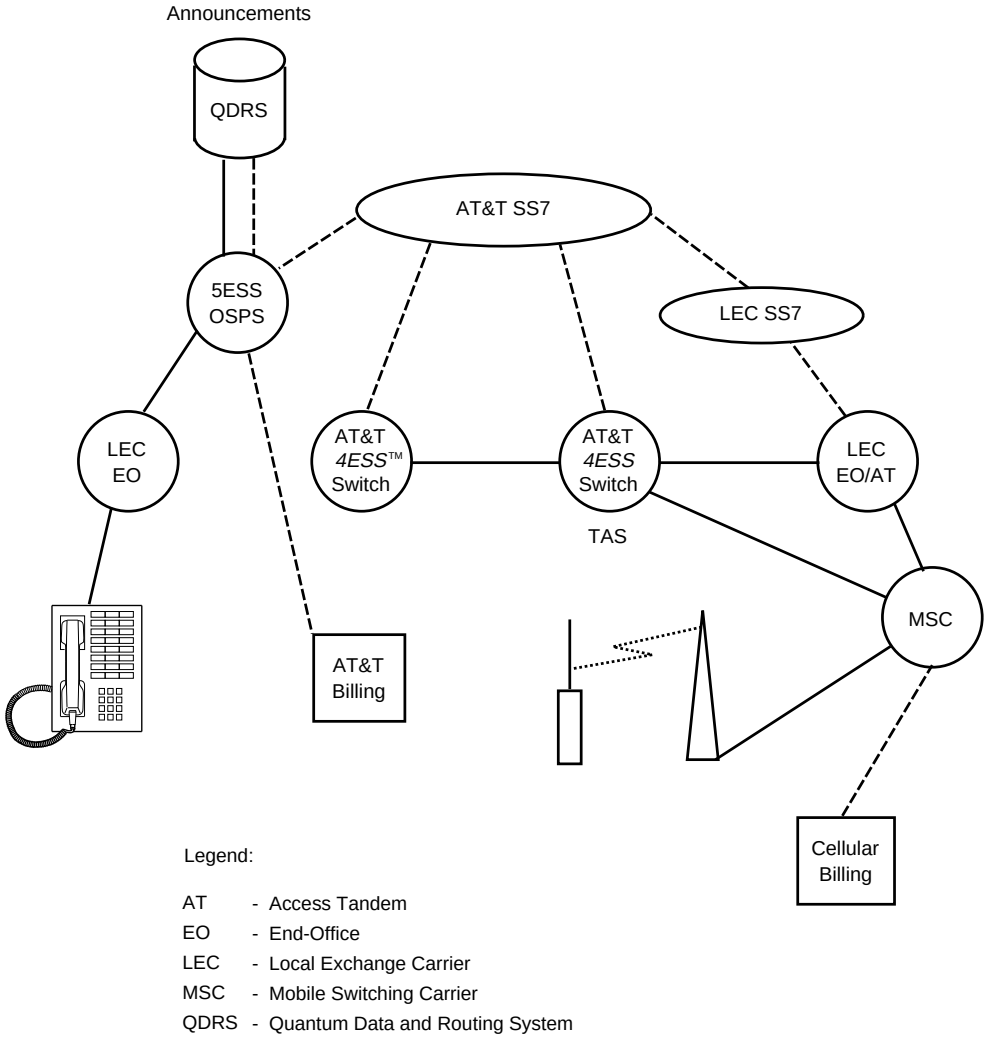


Figure 11-2. CPPA 0+500 Architecture

2.06 If a step in the CPPA call flow is different from the existing 0+500 ER call flow, the statements or phrases will be shown in bold face. The permitted billing option for the CPPA feature via 0+ access will be shown in italics.

1. A caller dials 0+500-NXX-XXXX.
2. The 500 number service provider is identified at the LEC EO and/or the Access Tandem (AT) based on NXX of the dialed 500-NXX-XXXX.

   NOTE:
   Some Regional Bell Operating Companies (RBOCs) have implemented services via the Advanced Intelligent Network (AIN) architecture. In this case, a dip in RBOCs SCP database is performed to translate the dialed 500 number.

3. The call is routed to the AT&T *5ESS*/OSPS switch. The *5ESS*/OSPS switch performs 6 digit translation on the dialed number.
   a. If the 500-NXX code does not exist, vacant code treatment applies.
   b. If the 500-NXX exists, the call is treated as a 500 call.
4. Assuming that the call has no interaction with the current ER features,
   a. The *5ESS* OSPS switch sends a *Request Action message* to the QDRS adjunct.
   b. The Request Action message contains the following information:
      - Reason
      - Calling Number
      - Called number (500-NXX-XXXX)
      - Station class
      - Screen code
      - ANI II digits
5. The QDRS adjunct processes the Request Action message and performs the following:
   a. The QDRS adjunct sends a *Transfer Request message* to the *5ESS*/OSPS switch. The message contains the parameters identifying to which T1/Conversant Voice Information System (CVIS) the call should be delivered.
   b. In parallel, the QDRS/VAX retrieves the customer information associated with the dialed 500 number. This information is forwarded to the QDRS/CVIS.

6. The *5ESS*/OSPS switch processes the Transfer Request message and performs the following:
    a. select a trunk within the specified trunk group which is associated with the CVIS/TI port,
    b. go off-hook to the QDRS/CVIS port, and
    c. connect the caller to the QDRS/CVIS port.
7. The QDRS/CVIS goes off-hook to the *5ESS*/OSPS switch.
8. The *5ESS*/OSPS switch sends a *Call Completion ARU (Audio Response Unit) Select message* to the QDRS/CVIS identifying the trunk connected to the QDRS/CVIS. (The caller is still connected to the QDRS/CIS).
9. Depending on the result of 5(b), the QDRS/CVIS performs the following:
    a. If the QDRS/VAX cannot find a record for the 500 number dialed,
        — The QDRS/CVIS plays the vacant role announcement.
        — The QDRS/CVIS goes on hook to the *5ESS* switch. The QDRS sends a *Disconnect message* to the *5ESS*/OSPS switch.
        — The *5ESS*/OSPS disconnects the caller from the QDRS/CVIS and terminates the call.
    b. If the QDRS/VAX finds a record for the 500 number dialed with ER features, the call is treated as an ER call.
    c. If the QDRS/VAX finds a record for the 500 number dialed with the CPPA feature, the call is treated as a CPPA call. Go to step 10.
10. **The QDRS/CVIS plays CPPA announcements (e.g., AT&T branding and notification of airtime charge applying to the call) and collects a digit for positive confirmation of caller's accepting additional airtime charge.**
11. The QDRS will send a *Complete Call message* to the *5ESS*/OSPS switch, which contains the following information:
    - Call ID
    - Billing Option Selected
    - Routing Number (MIN in the format of NPA-NXX-XXXX)
    - **Bill To Indicator** (a new value indicating calling party pays airtime)
    - **QBN** (in the format of NPA=NXX-XXXX)
12. The QDRS/CVIS goes on-hook to the *5ESS*/OSPS switch.

13. The *5ESS*/OSPS switch goes on-hook to the QDRS/CVIS.
14. The *5ESS*/OSPS switch sends a *Disconnect message* to the QDRS adjunct to end the *5ESS*/QDRS interaction.
15. When the *5ESS*/OSPS switch receives the Complete Call message with "Billing Option Selected=credit card", the *5ESS* switch will validate card number by launching a Transaction Capability Application Part (TCAP) query to the CAS/NCP, LEC Line Information Database (LIDB) or Commercial Credit Card (CCC) database(s). If the card number is valid, the *5ESS* switch will route the call; otherwise, the call will be handled per the instructions coming back from the database.
16. The *5ESS* switch will generate AMA recording for the call as described in the recording section. The call is delivered to a *4ESS* switch with the QBN in the Generic Operation parameter of the IAM message.

3. Provisioning

Structures Affected

A. OD4OFCCOPY2 Structure

3.01 Item OD4PF26 is assigned as an office parameter to indicate whether or not the CPPA feature is active in this switch. "On" means that CPPA is active; the default shall be "Off".

B. HT4ANI_IJKLP Structure

3.02 Item XL4ANI_FI3 is assigned as the "CPPA is denied" indicator in the ANI Trigger Table records. "On" means that the indicator is set, which means that CPPA is not available for this ANI. That is, the called party will pay the airtime charges. The default shall be "Off", which means that CPPA is not denied (i.e., CPPA is available and the calling party will pay airtime charges).

Recent Change (RC) and Verify Forms Affected

A. RC Form 809

3.03 The on/off flag will be populated from RC form 809. The Verify forms associated with the on/off flag are 16az and 8j. Table 11-A gives the information needed to populate form 809 with the on/off flags.

Table 11-A. On/Off Flags For CALIPER Feature

809 Form Entry				
FEATURE ITEM	**ON/OFF**	**Populates ITEM**	**With**	**Checks**
PF26	ON	OD4PF26	4ODFB_ON	none
	OFF		4ODFB_OFF	none

B. RC Form 650

3.04 The FI3 flag will be populated from RC form 650. The associated Verify messages are 16aq, 6ax, and 6be. There are no changes required for the Verify messages.

3.05 The setting of the FI3 indicator is independent of the values of all other feature indicators in the ANI Trigger record.

C. RC Form 658

3.06 The FI3 flag will be populated from RC form 658. The associated Verify messages are 16aq, 6ax, and 6be. There are no changes required for the Verify messages.

3.07 The form 658 is used to store customers ANI Trigger Table. The setting of the FI3 indicator is independent of the values of all other feature indicators in the ANI Trigger record.

4. Recording

4.01 To properly rate and bill for CPPA calls, the 500 number dialed needs to be recorded in the AMA record, and recording needs to identify the calls as calling party pays airtime. Recording capability impacts will be reflected in the *4ESS switch, the 5ESS*/OSPS, QDRS, 2DSA/2NCP, and the CDRP requirements.

4.02 No new Structure Codes are required for this feature. AMA records for CPPA calls are created by appending the Expanded Specialized Handling of 500/700 Number Module (Module code 942) to an existing AMA Structure Code. The format for EBAF Module 942 is shown in Table 11-B.

Table 11-B. EBAF Module 942

Information	Table Number	Number of Characters
Module Code	88	4
Originating NPA (500/700 NPA)	13	4
Originating Number (Last 7-digits of number)	14	8
Expanded Bill-To Indicator	912	4
Special 500/700 PIN Reminder	E10-3	16*

* In Table E10-3, characters 1-16 are populated as 8 EBCDIC spaces.

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

New Final Handling Code

6.01 There is one new Final Handling Code related to this feature. This code 1589 is listed in Table 11-C.

Table 11-C. Final Handling Code 1589

Code Number	Description
1589	**Last Normal Condition**– A query was sent to 2DSA/NCP and received response from database. **Irregular Condition**– Received incorrect data from 2DSA/NCP **Handling**– Terminate the call.

7. Transition Considerations

Transition Planning

7.01 Billing and provisioning systems need to be updated before CPPA can be provided. In order to block calls to CPPA subscribers from SDN locations, it is needed to have the SDN ANI provisioned in the ABC ANI Trigger Table with the CPPA Indicator set to DENY.

Ubiquity

7.02 Since CPPA is a terminating feature, it is necessary to have full network deployment of the 4E21 Release 3 generic before offering the service.

Turn On/Off Mechanism

7.03 This feature is turned on/off by RC/V form 809 and 650. Form 809 uses the on/off feature bit PF26. Form 650 is used to store customers ANI in ANI Trigger Table.

7.04 This feature can also be turned on or off by an absolute word change. Item OD4PF26 in Office Data Assembler (ODA) structure OD4OFCCOPY2 is the office parameter that dictates whether or not SDN screening should be applied to an SDN call.

CAUTION:
The OD4OFCCOPY2 structure also contains the on/off bits for many other features. Be certain that the change you make affects only this feature.

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

- Structure: OD4OFCCOPY2
- Core address of OD4PF26 in 4E21 Generic: 7143405
- Word: 5
- Size: 1
- Displacement of OD4PF26: 1
- On: 1
- Off: 0

8. Input/Output Manual Pages (Not Affected)

Foreign-Billed 800 Service —Phase 4 Feature (4924)

12

Contents **Page**

Foreign-Billed 800 Service —Phase 4 Feature (4924)

12

1. Feature Description

1.01 The Foreign-Billed 800 Service feature was originally introduced into the AT&T Switching Network (ASN) in the 4E18 Release 3 Generic. The initial phase provided the foreign Postal Telecommunications & Telegraph (PTTs) the ability to send Pay 800 calls to AT&T using a 10-digit number in the form of "197-NXX-XXXX". (197 identifies the call as Pay 800 traffic and NXX-XXXX are the last seven digits dialed by the caller.) In the initial phase, the feature only supported 10-digit numbers.

1.02 Phase 2 of this feature, which was introduced in the 4E18 Release 4 Generic, provided the PTTs the ability to send Pay 800 calls to AT&T using a 13-digit number in the form of "197-800-NXX-XXXX". Again, the "197" identifies the call as Pay 800 traffic, and 800-NXX-XXXX are the last 10 digits that are dialed by the caller. In Phase 2, the ASN only accepted Pay 800 traffic in the form of 197-NXX-XXXX or 197-800-NXX-XXXX.

1.03 With phase 3 of this feature introduced in the 4E21 Release 2 Generic, the *4ESS*™ switch was provided the ability to handle foreign-billed toll free calls that use the new toll free number "888". With this feature, International Switching Center (ISC) *4ESS* switches are able to route the following foreign-billed toll free numbers:

197-NXX-XXXX	880-NXX-XXXX	881-NXX-XXXX
197-800-NXX-XXXX	880-800-NXX-XXXX	881-888-NXX-XXXX
800-NXX-XXXX	888-NXX-XXXX	

1.04 Phase 4 expands the network capability to provide an announcement to the foreign Pay 800 callers informing them that the call is not a "free" call. The announcement is played for all Pay 800 digit combinations sent to AT&T ISC by the foreign PTT.

2. Call Flow

2.01 The following call flow is the same as in Phase 3 except for the addition of step 5, which executes an early Address Complete Message (ACM) towards the ISC and plays an announcement to the calling party. When a foreign-billed toll free call arrives at an AT&T ISC switch, the call is handled as follows:

If the call is...	**Then the call is...**
An AT&T toll free call	Handled the same as always
Not an AT&T toll free call	Routed to the New Haven *4ESS* switch which then routes the call to Southern New England Telephone (SNET) for completion by the appropriate carrier.

2.02 The following steps (and Figure 12-1) describe the call flow for a foreign-billed toll free call:

1. An overseas caller dials a U.S. toll free number.
2. Recognizing the call to be a U.S. toll free call, the PTT routes the call to an AT&T ISC. The ISC will attempt to route any foreign-billed toll free calls having the following form:

197-NXX-XXXX	197-800-NXX-XXXX
800-NXX-XXXX	888-NXX-XXXX
880-NXX-XXXX	881-NXX-XXXX
880-800-NXX-XXXX	881-888-NXX-XXXX

3. The AT&T ISC switch that receives the call handles the call as follows:

If the number of digits received is...	And the first 3 digits are...	Then the ISC...
10	197	Makes no changes
10	880	Makes no changes
10	881	Makes no changes
10	800	Changes the first 3 digits to 880 before routing
10	888	Changes the first 3 digits to 881 before routing
13	197	Drops the 4th-6th digits before routing, if these digits are 800
13	880	Drops the 880 before routing if the 4th-6th digits are 800
13	881	Drops the 881 before routing, if the 4th-6th digits are 888.

4. After translating the incoming digits, the ISC generates an International Call Detail Recording (ICDR) record and routes the call to the New Haven *4ESS* switch.

5. On recognizing the special NPAs ("197", "880", "881"), the New Haven *4ESS* switch sends an early ACM message towards the ISC and then plays an announcement informing the caller that the call is not free. The ISC will NOT generate an early Answer Message (ANM)
toward the PTT upon receipt of the early ACM from the New Haven *4ESS* switch. The voice path in the backward direction (from the announcement to the calling party) is cut through and the caller hears the announcement. If the caller hangs-up, the call processing stops and the call is disconnected. Otherwise, the call continues.

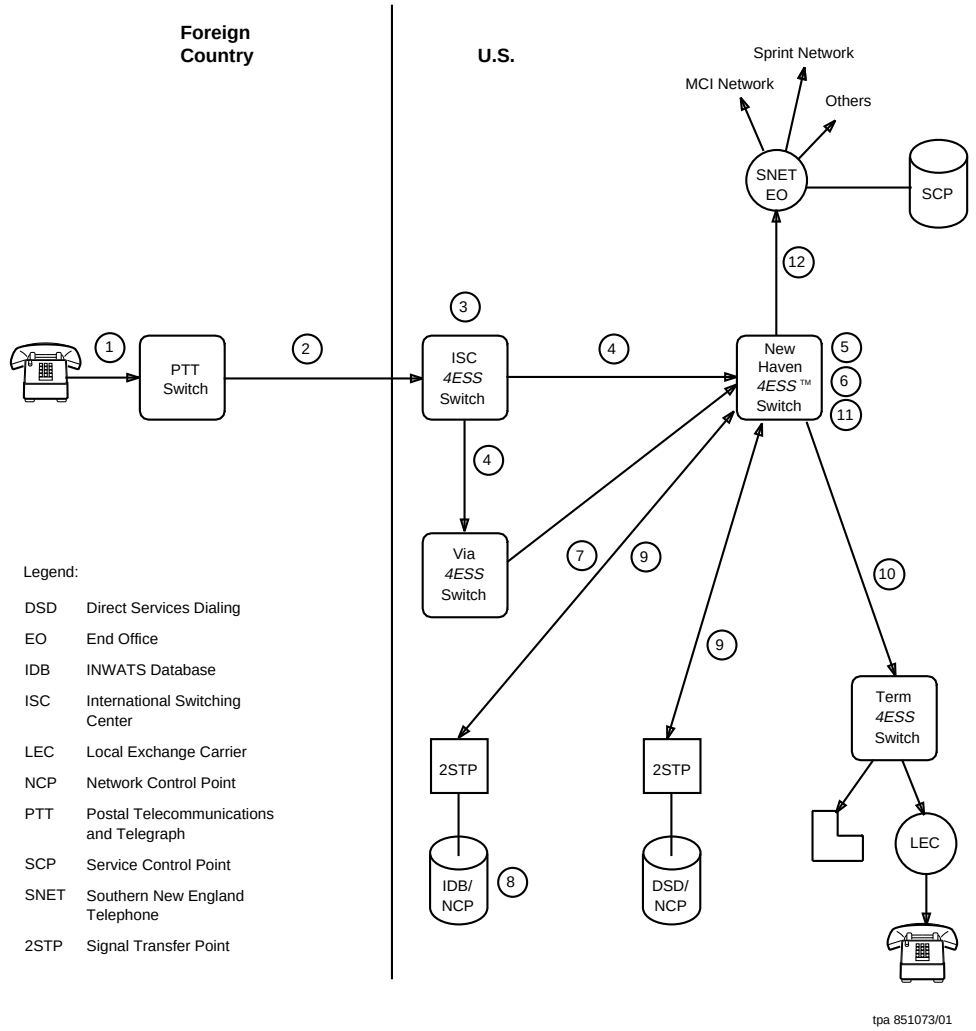


Figure 12-1. Call Flow for a Foreign-Billed Toll Free Call

6. When the New Haven *4ESS* switch receives the call, it does the following:

If the NPA of the number received is...	Then the NPA is changed to...
880	800
881	888

7. After translating the NPA, the New Haven *4ESS* switch formulates a query for an INWATS Database (IDB) Network Control Point (NCP). Based on the first three digits (197/880/881) and the Inward Wide Area Telephone Service (INWATS) call treatment, the switch sets the "Backhaul Screening Indicator" to "1" (potential backhaul).
8. The New Haven *4ESS* switch queries an IDB/NCP using the following key parameters:
   - Dialed Digits=800-NXX-XXXX or 888-NXX-XXXX
   - Automatic Number Identification (ANI) Digits=NPA-NXX-XXXX (for example, 203-959-9999).

NOTE:
The ANI will be the same for all foreign-billed 800 calls where the Numbering Plan Area (NPA) is populated from the INWATS call data information. The INWATS call data information is provisioned with the Home Numbering Plan Area (HNPA) of the switch. The NXX-XXXX is populated from the office data information, which is provisioned by Recent Change (RC) Form 800.

9. The IDB/NCP receiving the query executes the customer's record and performs NPA screening. The screening is done to prevent the routing of calls from areas that the customer has not purchased.
10. If the call passes the NPA screening, the IDB/NCP returns either a Plain Old Telephone Service (POTS) number or a Network Routing Number (NRN) to the *4ESS* switch.

If the IDB returns a...	Then the *4ESS* switch...
POTS number	Uses the POTS number to route the call
NRN	Uses the NRN to query a Direct Services Dialing (DSD) NCP for further routing information. The DSD/NCP returns either a POTS number or an APN to the *4ESS* switch.

11. If the NCP query returns a routing number, the New Haven *4ESS* switch routes the call using the ASN. Billing is handled as follows:
    - An Automatic Message Accounting (AMA) record is generated at the *4ESS* switch. This AMA record is used to bill the subscriber for the domestic portion of the call.
    - The foreign PTT bills the calling party for the international portion of the call.
    - An ICDR record is generated at the ISC.

12. If the NCP query does not return a routing number, the New Haven *4ESS* switch checks the Inbound Service Emergency Table (ISET) for a match.

If a search of the ISET table...	**Then the *4ESS* switch...**
Finds a match	Uses the routing number in the ISET table to route the call
Does not find a match	Uses a new foreign-billed 800 Multiple Treatment Screening Class (MTSC) to determine the Routing Data Block (RDB).

13. If an MTSC is used to determine the RDB, the call is routed over the existing Feature Group C "delivery" facilities specified by the RDB to the SNET End Office. As in the past, SNET routes the call to the proper carrier on *USADirect*® telecommunications service Other Common Carrier (OCC) 800 calls. Billing is handled as follows:
    - No AMA record is generated by the New Haven *4ESS* switch
    - The foreign PTT bills the carrier
    - An ICDR record is generated at the ISC.

3. Provisioning

3.01 There is no customer-specific service provisioning for this feature. To activate the Pay 800 Phase 4 capability, the Network Operations must do the following:

- Insure that each ISC switch is provisioned to route all 197, 880, and 881 numbers to the New Haven *4ESS* switch using the Real Time Network Routing (RTNR) network
- Insure that there are sufficient facilities available between the New Haven *4ESS* switch and SNET End Offices.
- Insure that the NSCX/SCS at the New Haven *4ESS* switch is provisioned to play the new announcement.

ODA Form 406Z

Two new fields are added to this form to specify the Announcement ID and the Announcement Delay Time for Pay 800 calls for SCS. The two new entries are as follows:

```
SCS_PAY800    _____,                          CAD  __
3       12    14 18                                80


SCS_P800_ADT   ____,                           CAD  __
3         14  16 19                                80
```

Recent Change Form 800

By using the RC 800 form, the announcement phrase ID can be set to a zero in office data to turn off the announcement.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting (Not Affected)

7. Transition Considerations

Ubiquity

7.01 It is not necessary for all *4ESS* switches in the network to be running the 4E21 Release 3 Generic for this feature to be fully operational.

Turn On/Turn Off Mechanism

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Government Emergency Telecommunications Services (GETS) Initial Operational Capability (IOC) Feature (4940)

13

Contents **Page**

Government Emergency Telecommunications Services (GETS) Initial Operational Capability (IOC) Feature (4940)

13

1. Feature Description

1.01 The Government Emergency Telecommunications Service (GETS) feature provides the United States government worldwide ubiquitous access to the AT&T Switched Network (ASN) via an universal access number, 710-617-4387. In the event of a national emergency and/or a natural or man-made disaster, GETS allows government-designated officials to access the ASN, 24 hours a day, 7 days a week.

1.02 With the GETS-IOC release, two new capabilities are introduced to the overall GETS feature.

- The High Probability of Call Completion (HPC) identifies a call as a National Security/Emergency Preparedness (NS/EP) call and gives the call a priority level one higher than the normal AT&T commercial traffic to increase the probability of call completion.
- The Repetitive Routing Attempt Procedure (RRAP) allows successive retries to route a call through and out of the ASN.

2. Call Flow

HPC Call Narrative

2.01 GETS service with the HPC capability allows GETS to set, to receive and to transmit NS/EP Calling Party Category (CPC) coding in all Initial Address Messages (IAMs). In addition, GETS with HPC allows GETS calls associated with IAMs to be given a priority level that is one higher than the normal commercial AT&T traffic. The priority level assigned is dependent upon a yes/no indicator resident in the *4ESS* (tm switch.

A GETS HPC call flow is as follows:

1. A caller dials a unique 10-digit number (710-627-4387) from any location worldwide.
2. The Originating AT&T Switch (OAS) performs 6-digit translation on the dialed number to determine the Class of Service (COS).
3. After collecting the Authorization Code and Destination Number, the OAS formats a Transaction Capabilities Application Part (TCAP), sends the information to the GETS 2NCP for evaluation and waits for the response.
4. After receiving direction from the 2NCP to route the call, the OAS sets the CPC parameter of the IAM to the NS/EP code point of 11100010.
5. The OAS checks the GETS Message Transfer Part (MTP) priority level parameter. If the priority level parameter is set to "ON", then the OAS sets the IAM/MTP priority level to one greater than that used for normal commercial traffic. If the priority level is set to "OFF", then the OAS sets the IAM/MTP priority level to the same level used for normal commercial traffic.
6. The OAS sets all other parameters as necessary for a GETS call and sends the IAM to either a Via AT&T Switch (VAS) or to a Terminating AT&T Switch (TAS).
7. The CPC setting of NS/EP is maintained throughout the ASN and down to the egress network.

The elevated MTP priority level is maintained through the ASN. When routing the call to the egress network, TAS first checks the GETS Egress MTP parameter. If this parameter is set to "ON", then the IAM/MTP priority level to the egress network is one higher than normal commercial traffic. If this parameter is set to "OFF", then the IAM MTP priority level to the egress network is the same as normal commercial traffic.

RRAP Call Narrative

2.02 GETS service with the RRAP capability provides successive retries to route a GETS call through and out of the ASN, in the event there are no available routes to complete the call. If the call cannot be routed to its destination after all routing attempts have been tried, RRAP is implemented until either the GETS call has been routed to its destination, the caller abandons, or call timeout occurs.

The GETS RRAP capability is built upon the Enhanced Real Time Network Routing (E-RTNR) capability and the initial release of GETS, entitled GETS-Limited Capability (LC).

GETS-LC involves implementing a number of routing path sequences. These path sequences incorporated functionality to allow for the possibility of routing calls using dedicated satellite trunks. The routing sequences deployed for GETS-LC were:

1. Direct path using RTNR trunk between OAS and TAS. (Path sequence 1)
2. Direct path using GETS-dedicated satellite trunk between OAS and TAS. (Path sequence 1)
3. Via path using RTNR trunks between OAS and VAS, and VAS and TAS. (Path sequence 2)
4. Via path using RTNR trunk between OAS and VAS, and GETS-dedicated satellite trunk between VAS and TAS. (Path sequence 3)
5. Via path using GETS-dedicated satellite trunk between OAS and VAS, and RTNR trunk between VAS and TAS. (Path sequence 4)
6. Via path using GETS-dedicated satellite trunks between both the OAS and VAS, and VAS and TAS. (Path sequence 5)

In GETS-LC, GETS calls are final handled if a routing path is not successfully found by the above routing path sequences. GETS-IOC is built upon the GETS-LC functionality. Instead of final handling GETS calls when there are no available routes, the GETS-IOC functionality allows for successive retries over a period of time to find an available route to complete the call.

If there are no available routes to complete the GETS call and the RRAP capability is turned ON, an attempt is made to connect a Dual Tone Multi-Frequency (DTMF) receiver and play a a tone to the caller. This tone is played to inform the caller that the call has not been dropped while call processing is suspended on the call. Call processing is suspended in preparation for another trunk hunt. This suspension lasts approximately 0.6 seconds. If a DTMF receiver is successfully connected, the receiver is disconnected following the 0.6 second interval. Call processing is then resumed on the associated GETS call and a trunk hunt retry is performed to find an available route to complete the call. This cycle continues until an available route is found, the caller abandons, or call timeout occurs.

RRAP is performed at an OAS when there are no routes available to successfully route the call to the TAS. RRAP is performed at a TAS when the call has been routed to the TAS but there are no routes available to successfully route the call out of the ASN. RRAP is performed at an intraswitch (OAS is same as TAS) when there are no routes available to successfully route the call out of the ASN.

If the RRAP capability is turned OFF, the GETS call is given final handling when no available route can be found to route the call.

3. Provisioning

3.01 Recent Change (RC) Forms 809 and 810 are required to activate the RRAP and HPC capabilities respectively.

```
RC:FTR;CHG;OPT (MSC), ----------------:

ORNU -----------------,

FEATURE INFO ---------,   DATA -------,

REMARKS ------------------------------
```

Figure 13-1. Recent Change Form 809

3.02 To activate the RRAP portion of this feature, use RC Form 809 and populate fields as follows:

- Set Feature Info to "PF21"
- Set Data to "ON".

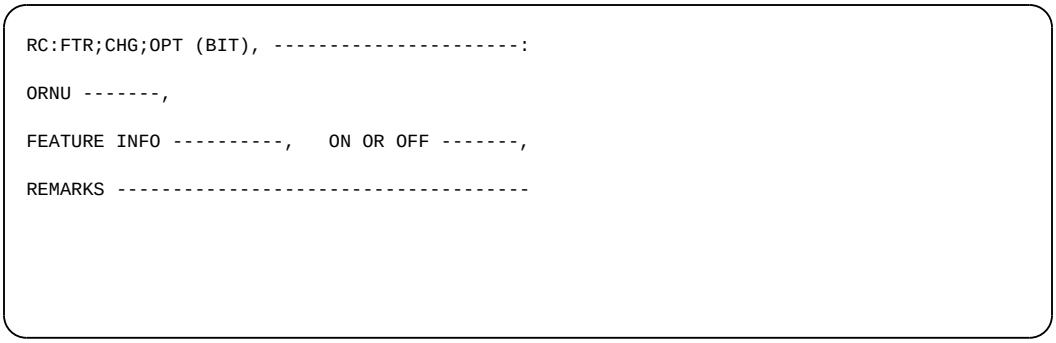


Figure 13-2. Recent Change Form 810

3.03 Use RC Form 810 to set the priority handling status for GETS calls both within the AT&T network and for GETS calls crossing the network interconnect boundary. Populate data fields as indicated below.

- Set Feature Info to:
  - — "GETSMTPA" for calls within the AT&T network,
  - — "GETSMPE" for calls crossing over the network interconnect boundary.
- Set On or Off to:
  - — "ON" when calls within the AT&T network and calls crossing the network interconnect boundary are to be handled with priority status, or one higher than normal commercial traffic.
  - — "OFF" when calls within the AT&T network and calls crossing the network interconnect boundary are to be handled the same as normal commercial traffic and not given preferential treatment.

4. Recording (Not Affected)

5. Network Management (Not Affected)

6. Maintenance/Troubleshooting

Call Irregularities

6.01 The table below indicates the new Final Handling Codes (FHC) introduced by this feature.

FHC	Description
63	XLAT No circuit found by trunk hunt. No action to be taken.
137	Trunk hunt exhausted ll routing possibilities. Switch is to perform final handling treatment specified by original RDB.
143	Trunk hunt exhausted all routing possibilities. Switch is to perform final handling treatment specified by original RDB.
311	Encountered a no-circuit available condition. Given international no-circuit available treatment.
1028	The *4ESS* switch using RTNR routing failed to find an OGT. No action to be taken.
1033	All circuits busy for safer routing via MRTT translations. Call is dropped.

7. Transition Considerations

Ubiquity

7.01 It is necessary for all *4ESS* switches in the network to be running the 4E21 Release 3 Generic for the GETS-IOC feature capabilities to be fully operational.

Turn On/Turn Off Mechanism

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

7.02 The GETS-IOC HPC capability is turned on using RC Form 810. The GETS-IOC RRAP
capability can be turned on by using RC Form 809 or by an absolute word change as follows:

- Structure: OD4OFCCOPY
- Core address of OD4PF21 in 4E21 Generic: 6731267
- Word: 1
- Size: 1
- Displacement of OD4PF21: 20
- On: 1
- Off: 0

8. Input/Output Manual Pages

There are no new input messages applicable for this feature. However, output message, **VER:GETS;OPT(ANN)** has been modified.

The change displays the GETSMTPA and GETSMTPE values resident within the *4ESS* switch. These values determine the priority handling status for GETS calls. See section 3.03.

MESSAGE ID	VER:GETS-ANN
WORK CENTER	MAC, MOC
GENERIC	4E21 Rel. 3 and later
APPLICATION	4E
TYPE	Output

1. **FORMAT**

VER:GETS;OPT(ANN):

GETSINT, a,
GETSDDG, b, GETSDAN, c, GETSMTPA, d,
GETSADG, e, GETSAAT, f, GETSMTPE, g,
GETSRCVL, h, GETSRQLT, i,

AON1 AOF1 AON2 AOF2 AON3 AOF3 AON4 AOF4 AON5 AOF5
j, k, j, k, j, k, j, k, j, k,

DON1 DOF1
l, m,

2. **REASON FOR OUTPUT**

To display miscellaneous announcement data for the government emergency telecommunications service (GETS).

3. **VARIABLE FIELD DEFINITIONS**

a	Interruptible indicator (0or1).
b	Indicator of number of destination digits (0-18).
c	Destination announcement number (0-65535).
d	Indicates whether the outgoing GETS Initial Address Message (IAM) Message Transfer Part (MTP) priority level should be set one higher than normal commercial traffic in the AT&T Switched Network (ASN): *OFF*— Turns the priority level off. *ON*— Turns the priority level on.
e	Indicator of number of authorization digits (0-12).
f	Announcement tone (0-65535).
g	Indicates whether the outgoing GETS IAM MTP priority level from the terminating switch to the Egress Network should be set one higher than normal commercial traffic:

OFF— Turns the priority level off.

ON— Turns the priority level on.

h Maximum number of Dual Tone Multifrequency (DTMF) receiver for GETS usage (0-255).

i Maximum queuing time for GETS call on DTMF receiver (0, 201-1023).

j Length of tone period when collecting authorization digits (0,4-252).

k Length of silence period when collecting authorization digits (0,4-252).

l Length of tone period when collecting destination digits (0,4-252).

m Length of silence period when collecting destination digits (0,4-252).

4. **ACTION TO BE TAKEN**

None.

5. **REFERENCES**

PIDENTs
IOCPIMC4
IOCPMCP4
IOCPPVR4
VRFYCNTL
VRFYINPT
VRFYMISC
VRFYOUT

Input Message
VER:MISC

LYNX Software Upgrade Feature (5051)

14

Contents **Page**

LYNX Software Upgrade Feature (5051)

14

1. Feature Description

1.01 The LYNX Software Upgrade feature allows the downloading of 1B file information from the Off-Line Processor to field *4ESS*™ switches within the *three* hour (+/- 15%) transmission window during switch retrofits.

1.02 The 3B processor controls downloading of the 1B files during switch retrofits. Recent expansion of the 1B file from one (1) segment (32 megabytes) to three (3) segments (100 megabytes) has caused the transmission time to exceed the acceptable three hour (3) time limit. This feature enhances the existing LYNX software within the 3B processor to allow the downloading of 1B file information during the time allotted.

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

Ubiquity

7.01 It is not necessary for all *4ESS* switches in the network to be running the 4E21 Release 3 Generic for this feature to be fully operational.

Turn On/Turn Off Mechanism

7.02 This feature is turned on automatically by software deployment.

8. Input/Output Manual Pages (Not Affected)

Abbreviations and Acronyms

2

2DSA
No. 2 Direct Services ANI

2NCP
No. 2 Network Control Point

2STP
#2 Signal Transfer Point

A

AAC
Acculink Access Controller

ABATS
Automated Bit Access Test System

ABC
Adjunct Based Capability

ACM
Address Complete Message

AIN
Advanced Intelligent Network

AMA
Automatic Message Accounting

ANI
Automatic Number Identification

ANITT
Automatic Numbering Identification Trigger Table

ANM
Answer Message

APN
Action Point Number

ASN
AT&T Switched Network

AT
Access Tandem

ATP
AT&T Trigger Platform

B

B/RNA
Busy/Ring-No-Answer

BCS
Business Communication Services

BN
Billing Number

BT
Blind Transfer

BT-H
Blind Transfer for Human Agents

C

CAL
Customer Account Logic

CAL
Customer Application Language

CAMA
Centralized Automatic Message Accounting

CC
Call Code

CC-H
Conference & Consultation for Humans

CC-V
Conference & Consultation for Voice

CCC
Clear Channel Capable

CCC
Commercial Credit Card

CCS
Consumer Communication Services

CCS7
Common Channel Signaling System 7

CIN
Circuit Identifier Name

CLD
Customer Long Distance

CNI
Common Network Interface

COS
Class of Service

CP
Calling Party

CPN
Calling Party Number

CPPA
Calling Party Pays Airtime

CSU
Channel Service Unit

CVIS
Conversant Voice Information System

D

DA
Discontinued Availability

DACS
Digital Access Cross-Connect System

DDS
DATAPHONE® Digital Service

DIF
Digital Interface Frame

DMS
Data Management System

DN
Dialed Number

DNHR
Dynamic Non-Hierarchical Routing

DNIS
Dialed Number Identification Services

DS3
Digital Signal Level 3

DSD
Direct Services Dialing

DSI
Digital Services Interface

DSU
Digital Service Unit

DSX
Digital Service Cross-connect

DTMF
Dual Tone Multi-Frequency

E

EAMF
Equal Access Multi-Frequency

EO
End Office

ER/TC
EasyReach/True Connection

ERFISI
EasyReach Feature Interworking Service Indicator

ES
Echo Suppressor

EST
Enhanced Soft Transfer

F

FEN
Far-End Network

FENPA
Far End Numbering Plan Area

FGC
Feature Group C

FGD
Feature Group D

FHC
Final Handling Code

FHT
Final Handling Treatment

FI
Feature Indicator

FPDT
Feature Processing Data Type

G

GETS
Government Emergency Telecommunications Services

GRI
Generic Route Indicator

GSS
Global Translations Network Support System

GTN
Global Translations Network

GTT
Global Title Translation

H

HAS
Hand-off AT&T Switch

HNPA
Home Numbering Plan Area

HPC
High Probability of Call Completion

HRN
Hand-off Routing Number

I

IAM
Initial Address Message

ICDR
International Call Detail Recording

IDB
INWATS Database

ILD
International Long Distance

INUP
International ISDN User Part

INWATS
Inward Wide Area Telephone Service

IOC
Initial Operational Capability

IPC
ISDN Premises Controller

IPM
Interruptions Per Minute

ISAIC
Improved Service Announcement Information Collection

ISC
International Switching Center

ISDN
Integrated Services Digit Network

ISET
Inbound Service Emergency Table

ISUP
ISDN User Part

ITN
Integrated Test Network

L

LEC
Local Exchange Carrier

LIDB
Line Information Database

M

MCRT
Maintenance CRT

MIN
Mobile Identification Number

MRT
Multiple Routing Treatment

MSC
Mobile Switching Center

MTP
Message Transfer Part

MTSC
Multiple Treatment Screening Class

N

NAI
Network Access Interrupt

NCD
Network Call Denial

NCOE
Network Channel Office Equipment

NCP
Network Control Point

NEMOS
Network Management Operations System

NESAC
National Electronic Switching Assistance Center

NPA
Numbering Plan Area

NRN
Network Routing Number

NS/EP
National Security/Emergency Preparedness

NSCX
Network Services Complex

O

OAS
Originating AT&T Switch

OCC
Other Common Carrier

OOB
Out of Band

OSPS
Operation Services and Position System

P

PACR
Post Answer Call Redirection

PC
Point Code

PCP
Positive Call Processing

PECC
Product Engineering Control Center

POTS
Plain Old Telephone Service

PRD
Product Release Document

PTT
Postal Telephone and Telegraph

PUB
Peripheral Unit Bus

Q

QBN
Quantum Billing Number

QDRS
Quantum Data and Routing System

R

RAO/RPC
Revenue Accounting Office/Regional Processing Center

RBOC
Regional Bell Operating Company

RC
Recent Change

RC/V
Recent Change/Verify

RDB
Routing Data Block

RP
Redirection Party

RRAP
Repetitive Routing Attempt Procedure

RTNR
Real Time Network Routing

S

SAC
Service Access Code

SCCP
Signaling connection Control Part

SCP
Service Control Point

SCS
Service Circuit System

SCU
Service Circuit Unit

SD
Speed Dial

SDN
Software Defined Network

SIC
Service Identifier Code

SID
Service Identification

SNET
Southern New England Telephone

SPC
Switching and Permuting Circuit

SPGTT
Self-Provisioning Global Title Translation

SSA
Small Scale Adjunct

SSTE
Single Signaling Termination Element

ST-H
Soft Transfer for Human Agents

ST-V
Soft Transfer for Voice

STF
Signaling Transport Frame

STP
Signaling Transfer Point

T

TAN
Trunk Appearance Number

TAS
AT&T Terminating Switch

TAS
Terminating AT&T Switch

TC
Transfer Connect

TCAP
Transaction Capabilities Application Part

TCC
Technical Control Center

TCS
Transfer Connect Service

TDN
Time Division Network

TI
Trigger Index

TLP
Trouble Locating Procedures

TOP
Task Oriented Practice

TP
Target Party

TSG
Trunk Subgroup

TSI-B
Time Slot Interchange-B

TSN
Trunk Scanner Number

TTSI
Terminating Toll Switch Index

TUP
Telephone User Part

U

UGT
Universal Global Translator

ULN
Universal Link Node

USDS
Universal Subscriber Data Structure

UTT
Unit Type Translator

UXPC
Universal Services Echo Canceler
XTSI Per Call Control

V

VAS
Via AT&T Switch

VBT
Blind Transfer for VRU

VRU
Voice Response Unit

X

XTSI
Expanded Time Slot Interchange