# NETWORK INTERCONNECT PHASE 2
# COMMON CHANNEL SIGNALING NUMBER 7
# INTEGRATED SERVICES DIGITAL NETWORK - USER PART
# FEATURE DOCUMENT
# 4 *ESS*™ SWITCH

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## 1. GENERAL

### INTRODUCTION

**1.01** This practice provides information on the Common Channeling Signaling Number 7 (CCS7) Network Interconnect Phase 2 (NI2) feature for the 4 ESS Switch application in the AT&T Network.

**1.02** The CCS7 network interconnect phase 2 feature consists of five major enhanced capabilities. These capabilities are:

- Integrated Services Digital Network User Part (ISUP) basic call control enhancements
- Selective Calling Party Number/Billing Number (CPN/BN) Delivery
- Q.931 Information Elements (IE) Transport
- User-to-User Signaling (UUS)
- Service Identification On Egress (Toll offices only).

**1.03** The CCS7 NI2 is an updated feature being implemented in the 4E15 generic. Included in this practice are the following:

- Overview
- Call processing
- Network interconnect engineering
- Operations
- Implementation
- Network interconnect example - trunk translations
- Supplementary information.

**1.04** Integrated Services Digital Network (ISDN) capabilities.

**1.05** Whenever this practice is reissued, the reason(s) for reissue are listed in this paragraph.

**1.06** This practice does not contain admonishments.

**1.07** AT&T welcomes your comments on this practice. Your comments aid us in improving the quality and usefulness of AT&T documentation. Please use the Feedback Form provided in this practice or call the AT&T Documentation Comment Hot-Line Service (800-334-0404 or 919-727-3167 in North Carolina).

**1.08** Additional copies of this practice, associated appendixes, and all referenced practices may be ordered from the AT&T Customer Information Center. One of the following methods should be used:

(a) *AT&T Employees:* AT&T employees should mail Form IND 1-80.80, available from the AT&T Customer Information Center, to:

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

or

Call 800-432-6600

*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.

(b) *Local Exchange Carrier (LEC):* Orders should be processed through your Technical Information Resource Management (TIRM) coordinator. If you are unsure who your TIRM coordinator is, call 800-432-6600.

(c) *Federal Government:* These orders should be processed through:

AT&T
P. O. Box 20046
Greensboro, N. C. 27420

or

Call 919-279-7424

(d) *All Others:* Call 800-432-6600.

**DEFINITIONS**

**1.09** The following terms are defined for this practice.

(a) **4 ESS Switch** — An electronic switch that can be used as either a toll office or an Access Tandem (AT) office.

(b) **Toll Office (TO)** — Any switch within IC [inter-LATA (-Local Access and Transport Area) carrier] or International Carrier (INC) network [IC or INC collectively means an Interexchange Carrier (IXC)].

The *originating toll office* is the first IXC switch that receives a call from an originating LATA.

The *terminating toll office* is the last IXC switch that routes the call to the terminating LATA.

A *tandem toll office* is any IXC switch between the originating and the terminating toll offices.

(c) **End Office (EO)** — A Local Exchange Carrier (LEC) switch that directly connects to the customer. The end office must support lines from the customer and also trunks that go directly to an IXC toll office or to an AT office.

The *originating end office* is the office serving the calling party.

The *terminating end office* is the office serving the called party.

An *Equal Access End Office (EAEO)* supports equal access arrangements (Feature Group D) to IXCs.

A *Non-Conforming End Office (NCEO)* only supports non-equal access arrangements (Feature Group C).

(d) **Access Tandem (AT)** — A LEC switch that allows calls from several end offices to be consolidated for transport to an IXC. An AT also allows calls from an IXC to be distributed to the appropriate end office. The *originating AT* serves the originating end office while the *terminating AT* serves the terminating end office. An AT can also be an end office for a customer that calls another customer that is directly connected to the same AT.

(e) **Service Switching Point (SSP)** — An end office or AT with access to a Service Control Point (SCP) for the processing of a number services call.

(f) **Domestic Call** — A call that originates and ends within World Zone 1 (WZ1). Domestic calls are also calls to and from Hawaii, Alaska, Canada, and some parts of Mexico (International Region Call).

(g) **NANP Call** — A Domestic Call that originates and ends within World Zone 1 (WZ1) under the North American Numbering Plan (NANP). There is an additional division of NANP calls within the Continental United States and international region Calls.

(h) **International Region Call** — A Domestic Call between the Continental United States and a region within WZ1 outside the continental United States (Hawaii, Alaska, Canada, and some parts of Mexico).

(i) **International Call** — A call that originates in the continental United States and ends via the international network outside World Zone 1 or a call that originates outside World Zone 1 and ends within World Zone 1.

(j) **Inter-LATA Carrier (IC)** — A carrier that only handles NANP calls between LATAs.

(k) **International Carrier (INC)** — A carrier that handles international calls. Some INCs can also handle NANP calls to international regions within World Zone 1 that are outside the continental United States, but cannot handle NANP calls within the continental United States.

(l) **Interexchange Carrier (IXC)** — A carrier that handles interLATA, International, or consolidated calls.

(m) **Local Exchange Carrier (LEC)** — A Bell Operating Company (BOC) or Independent Telephone Company (ITC) which handles interLATA calls and provides customers with access to Interexchange carriers.

(n) **Consolidated Carrier** — A carrier that handles any mix of NANP calls and international calls. AT&T is a consolidated carrier.

(o) **In-band Signaling** — Any signaling protocol that sends signaling information on the same trunk as the transmission path. This includes Multifrequency (MF) and Dial Pulse (DP) signaling. Exchange access in-band signaling uses MF signaling that supports equal access arrangements. Traditional in-band signaling supports non-equal access and all egress arrangements.

(p) **CCS7 ISDN-UP** — A common channel signaling protocol that sends signaling information through channels separate from those used for the voice/data transmission path.

**1.10** Under equal access arrangements, there are two types of signaling information that are used for NANP and international calls: InterLATA signaling and international signaling. The type of signaling used is dependent both on the type of call (NANP or international) and the type of carrier (interLATA, international, or consolidated).

**1.11** The following defined signaling terms are for calls originating within a LEC network. Traditional inband signaling or CCS7/ISDN-UP intra-network signaling applies to NANP and international calls terminating to a LEC network.

(a) **Equal Access (EA)/MF InterLATA Signaling** — This signaling includes both identification [II+Automatic Number Identification (ANI)] and address (called number) fields. In addition, a first inband sequence including a circuit code (0ZZ) and the carrier identification code (XXX) is sent for calls using an AT but is not forwarded on any circuits to the carrier.

(b) **CCS7 InterLATA Signaling** — This is the CCS7 ISDN-UP signaling which includes parameters for identification [(Originating Line Information (OLI) and charge numbers)] and address (called party number) information. In addition, a circuit code (0ZZ) and the carrier identification code (XXX) are encoded in the transit Network Selection Parameter (TNS) for calls using an AT but is not forwarded to the carrier.

(c) **EA/MF International Carrier Signaling** — This signaling is similar to EA/MF interLATA signaling with the exception of a first inband sequence consisting of a circuit code (1N/N'X), carrier identification code (XXX), and country/region code (CCC/01R). This sequence is always forwarded to the carrier.

(d) **CCS7 International Carrier Signaling** — The CCS7 ISDN-UP signaling is similar to CCS7 interLATA signaling in which a circuit code (1N/N'X) and carrier identification code (XXX) are encoded in the TNS for all calls, either direct or via an AT. The TNS parameter is always forwarded to the carrier (The EA/MF equivalent country/region code is derived from the called party number).

## 2. OVERVIEW

### BACKGROUND

**2.01** Before equal access, the 4 ESS switch could only access other carriers using MF signaling.

**2.02** When equal access was implemented, the Local Access and Transport Area (LATA) concept was developed. Inter-LATA signaling soon followed when MF signaling was modified to allow call set-up routing to an Interexchange Carrier (IXC) for inter-LATA calls. This modified form of MF signaling is known as Equal Access MF (EAMF) signaling.

**2.03** The EAMF signaling is a multistage in-band signaling protocol that sends signaling information on the same trunk as the voice path. Multi-stage EAMF signaling is slow and is limited in the signaling information sent.

**2.04** In the 4E11 generic, CCS7 ISUP protocol was introduced. It provided basic intranetwork signaling, but was not capable of crossing network boundaries. The EAMF signaling was still required for inter-LATA calls. The CCS7 ISUP protocol gave greater flexibility and capacity that was required to support the Integrated Services Digital Network (ISDN) feature.

**2.05** The CCS7 is a single stage out-of-band signaling protocol that sends signaling information over signaling links that are separate from the voice path.

**2.06** Only small service-specific additions were made in the 4E12 and 4E13 generics.

**2.07** In the 4E14 generic, CCS7 ISUP protocol was expanded to allow internetwork CCS7 ISUP signaling. This feature was the CCS7 ISUP Network Interconnect Phase 1.

### FEATURE DESCRIPTION

**2.08** The CCS7 ISUP NI Phase 2 feature provides an enhanced phase 1 CCS7 ISUP interface between Local Exchange Carriers (LECs) and the Interexchange Carrier (IXC). The LECs consist of BOCs and ITCs. The IXCs consist of ICs, INCs, and Consolidated Carriers.

**2.09** This interface supports interLATA and international call setup and call-associated services. This Network interconnect allows ISUP signaling to cross network boundaries and provides the interworking of MF to ISUP and ISUP to MF at the Access Tandem (AT) offices. This capability will eventually replace existing MF and EAMF signaling for communication between carriers.

#### A. Phase 2 Feature Upgrades

**2.10** The Phase 2 upgrades to support the 4E15 generic are as follows:

- ISUP Basic Call Control Enhancements
- Selective Calling Party Number/Billing Number (CPN/BN) Delivery
- Q.931 Information Elements Transport
- User-to-User Signaling
- Service Identification On Egress (Toll offices only).

### B. Basic Call Control Enhancements

**2.11** This feature includes the upgrades and enhancements required to meet the changes in national (ANSI) and international ISDN-UP standards and specifications.

**2.12** The Integrated Services Digital Network User Part (ISUP) protocol upgrade portion of this feature contains changes to the protocol to further align with new standards, formats, and procedures.

**2.13** These call control enhancements are:

- Internetwork message and parameter screening
- Call progress message
- Access charge verification
- Cause indicators parameter location value recoding.

### C. Q.931 Information Elements Transport

**2.14** The Access Transport Parameter (ATP) allows ISDN customers to exchange access protocol (Q.931) elements transparently through the network during call set-up and call clearing.

**2.15** Current AT&T implementation couples the ATP and User-to-User Information (UUI) parameter and provides the interswitch transport a combined maximum of 133 octets, including user data and ISDN-UP parameter identifier and length octets.

**2.16** This feature decouples the ATP from the UUI parameter, giving higher priority to ATP. This feature still allows a maximum of 133 octets for UUI and ATP. The number of octets may contain up to 129 octets of data plus the name and length of each of the ATP and/or the UUI parameter. If only one of the parameters, either ATP or UUI, is present, the maximum number of octets is 131 (129 octets of data and the name and length of the ATP or UUI parameter).

**2.17** In order to maintain backward compatibility, the use of the Facility Reject Message (FRJ) is not supported across network boundaries but is used within the toll network.

### D. User-to-User Signaling

**2.18** The UUS service 1 is a basic ISDN capability defined by domestic and international standards. Service 1 allows the transfer of UUI during call setup and clearing phases with the UUI embedded within call control messages.

**2.19** This feature provides signaling support for implicit service 1 which provides a maximum of 129 octets, if no ATP, of user data (including the protocol discriminator) within the UUI parameter in appropriate ISDN-UP call control messages. The combined length of ATP and UUI may not exceed 133 octets.

### E. Selective Calling Party Number/Billing Number Delivery

**2.20** The selective Calling Party Number/Billing Number (CPN/BN) delivery feature provides the transport of the CPN/BN from the calling party to the called party. Per-service screening is performed at the TTO and per customer for 800 customers at the ACP.

(a) **A Network Validated Number:** A CPN either provided by the network or by the originating user and passed network screening.

(b) **A Nonvalidated Number:** A CPN provided by the user and either failed network screening or was not screened.

**2.21** The BNs are provided in addition to the CPNS.

**2.22** This feature is only available to AT&T switched egress 800 customers with Direct Services Dialing (DSD) features and has the following restrictions:

- It does not apply to inbound I800 calls routed to direct connect locations, to northbound or outbound I800 calls, or to MEGACOM 800 calls.
- Other DSD related services [For example: Software Defined Network (SDN)] are not affected.
- If only one CPN is transported, it must be a network validated number.
- CCS7 network interconnect does not support ISUP INFO/INFO request procedures for retrieving CPN/BN.
- Subscription and billing arrangements for CPN/BN to direct egress PRI customers are unchanged.

### F. Service Identification On Egress (Toll Offices)

**2.23** This capability identifies the type of service associated with an egress call from the AT&T network to a terminating LEC network. This information may be provided to the called party by the terminating end office. Service information is provided for the following types of calls:

- 800
- I800
- SDN
- GSDN
- MEGACOM
- WATS
- INWATS.

**2.24** This service is identified within the AT&T network by the Routing Information Indicators (RII) parameter and is passed to the terminating LEC on a Recent changeable per-trunk subgroup basis in the Originating Line Information (OLI) parameter.

## NETWORK INTERCONNECT

**2.25** Network interconnect is independent of signaling network architecture and supports all types of subscriber interfaces. These include analog, ISDN, Primary Rate Interface (PRI), and Basic Rate Interface (BRI).

**2.26** Call connections from LEC end offices to IXCs may be made directly and/or using AT. The ISUP protocol layer uses the CCS7 signaling network for message transport via the Message Transfer Part (MTP) protocol layer. The architecture for a typical network interconnect is shown in Figure 1.

## FEATURE COMPLIANCE

**2.27** This feature is compatible with the ISUP standard set by the American National Standards Institute, Inc. (ANSI). Changes made to ANSI documents may result in changes to this feature which, if made, will be addressed through the change control process.

**2.28** The minimum set of ISUP messages and their parameters are contained in Table A. These messages must be supported across network boundaries for internetwork call control and circuit supervision. Messages and their parameters that are received from another network that are not listed in Table A are discarded by AT&T toll offices.

## 3. INTEGRATED SERVICES DIGITAL NETWORK USER PART CALL CONTROL OPERATIONS

**3.01** The NI phase 2 is an upgrade to the basic call control procedures implemented in phase 1 due to changes made in the national (ANSI) and international (CCITT) ISUP specifications.

**3.02** The following procedures supplement and/or modify those contained in the NI phase 1 Feature Document (AT&T 234-090-001, Issue 1).

## ORIGINATING TOLL OFFICE

### A. Initial Address Message (IAM)

When an originating Toll Office (TO) receives an IAM from an EO or AT, the TO screens the parameters to determine if the parameters are required to be recognized across network boundaries. These parameters are listed in Table A.

**3.03** All AT&T network specific parameters are discarded from messages received or sent across ASN boundaries using the same screening requirements as in NI phase 1.

**3.04** A Carrier Selection Information (CSI) parameter received in the IAM is discarded without further action.

### B. Call Handling

**3.05** The only message added to NI phase 1 is the Call Progress Message (CPG).

**3.06** When the TO receives a CPG message from a succeeding office, it is passed back to the originating office without further action. The TO may be required to generate a CPG on receipt of an Address Complete Message (ACM), if user-network interaction has occurred.

**3.07** A TO (Toll Office) must recode the cause-location value that is received from a LEC contained in a forward REL message, before forwarding the message to the succeeding office.

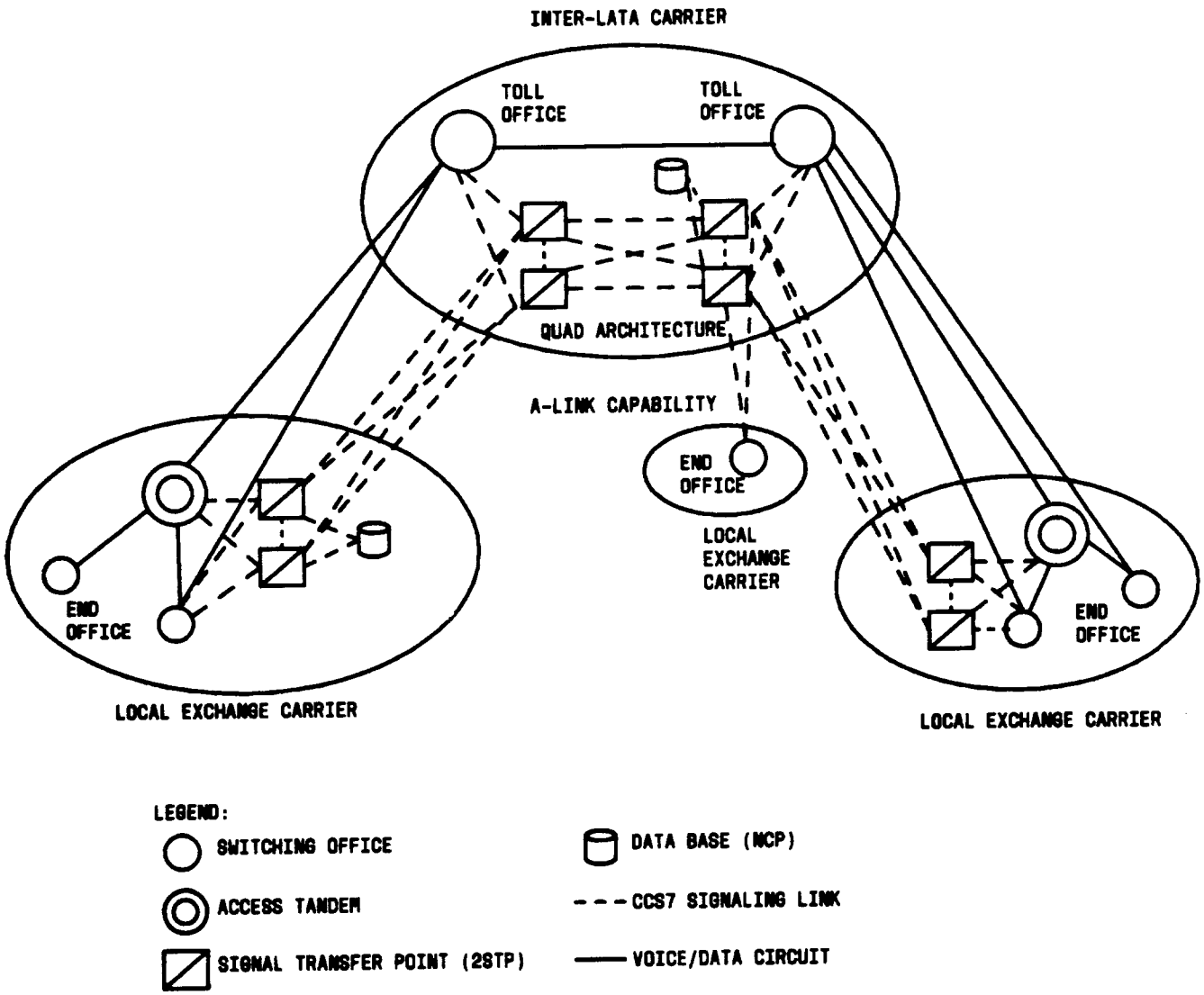


**Figure 1—Typical Network Interconnect Architecture**

**3.08** The REL cause location value is recoded as listed in Table B.

**TERMINATING TOLL OFFICE**

**A. Initial Address Message**

**3.09** When a Terminating (TO) sends an IAM to an LEC, the TO screens the call to determine if:

- The UUI parameter contained in received messages should be removed
- The ATP parameter contained in received messages should be removed.

**3.10** The determination is made on Recent Change (RC) items on a per trunk subgroup basis.

**3.11** All AT&T network specific parameters are discarded from messages received or sent across AT&T Switched Network (ASN) boundaries using the same screening requirements as in NI phase 1.

**B. Call Handling**

**3.12** When the TO receives a Call Progress (CPG) message from the terminating LEC, it is passed back to the preceding office without further action.

**3.13** When a terminating TO receives a REL, ACM, or CPG message containing a cause indicator parameter from a terminating LEC, the TO must

recode the cause-location value before transmitting the message to the preceding office.

**3.14** The REL, ACM, and CPG cause-location values are recoded as listed in Table C.

### C. Signaling Interworking

**3.15** This feature does not require any new inband-to-CCS7 or CCS7-to-inband interworking procedures in local switching systems. The new message, (CPG) introduced in NI2, does not have a supported inband counterpart.

**3.16** This message is **discarded** if there is interworking **to** inband signaling and is **not generated** if there is interworking **from** inband signaling.

## 4. SELECTIVE CALLING PARTY NUMBER/BILLING NUMBER DELIVERY

**4.01** The selective Calling Party Number/Billing Number (CPN/BN) feature is functionally divided into two parts for screening purposes. These functions are:

- **Per-service screening:** Performed at the terminating toll office
- **Per-customer screening:** Performed at the Action Point (ACP).

**4.02** The per-service screening function determines whether the CPN/BN delivery feature is offered for each type of service. For example, the terminating toll office passes the CPN/BN received on calls for switched egress 800 calls with DSD features and blocks the CPN/BN on INWATS calls.

**4.03** The per-customer screening function determines whether the terminating 800 customer subscribes to the CPN/BN delivery feature. Customer subscription information is received by the ACP from the DSD NCP.

### A. Selective Call Party Number/Billing Number Restrictions

**4.04** The CPN/BN feature impacts AT&T switches as follows:

- This feature only impacts toll switches in the AT&T network.
- The OSOs (Originating Screening Offices) are NOT impacted.
- The originating 4ESS ACP must drop or include the CPN/BN in the IAM sent to the subsequent switch. This is based on a new instruction in the response received from the DSD Network Control Point (NCP). This instruction will come in the form of a new Transaction Capabilities Application Part (TCAP) parameter that indicates customer subscription to CPN/BN delivery
- The originating 4ESS ACP, must reset the Service Identification Indicator (SII) with DSD features when the new TCAP parameter is received
- The terminating toll switch must pass/block CPN/BN on a per service basis
- The terminating toll switch must send an ISUP SID/ANI increment message to the originating ACP when CPN or BN is received from the terminating LEC (Local Exchange Carrier). These calls are recorded at the originating ACP for 800 customers with DSD.

### B. Selective Call Party Number/Billing Number Overview

**4.05** When the receipt of an IAM results in a DSD/800 query for the call, the DSD response information, contained in the TCAP ISDN feature information parameter, is examined to determine if the CPN and/or CHG parameters will be included in the outgoing IAM.

**4.06** When a DSD/800 query is not performed, the CPN parameter, if received, and the CHG parameter is included in the outgoing IAM.

**4.07** The CPN/BN are treated independently and are based on one of three recent changeable options to determine if either feature selectively includes the CPN/BN parameter in the outgoing IAM by the terminating AT&T toll office. The delivery options are:

- Pass CPN or BN independent of trunk group mark (based on service ID)
- Block CPN or BN independent of trunk group mark (based on service ID)
- Treatment of CPN or BN is dependent on trunk group mark only.

## 5. Q.931 INFORMATION ELEMENTS TRANSPORT OVERVIEW

**5.01** Additional information is provided in the feature document, AT&T 234-090-004AC, Issue 1, AT&T Practices—*International Services and Capabilities* for the Q.931 Information Elements (IE) Signaling.

### Q.931 INFORMATION ELEMENTS TRANSPORT DESCRIPTION

**5.02** The Access Transport Parameter (ATP) allows ISDN customers to exchange access protocol (Q.931) Information Elements (IEs) transparently through the network during call set-up and call clearing.

**5.03** The current AT&T implementation couples the ISDN-User Part (ISUP) ATP and User-to-User Information (UUI) parameter and provides the interswitch transport a combined maximum of 133 octets including user data and ISUP parameter identifier and length octets.

**5.04** This feature decouples the ATP from the UUI parameter, giving a higher priority to the ATP. Each parameter may be up to a maximum of 131 octets, including parameter name and length octets. However, a combined maximum of 133 octets may not be exceeded at toll offices.

**5.05** The use of the Facility Reject Message (FRJ) is not supported across network boundaries but continues to be supported within the AT&T network when user data or UUI is lost due to signaling interworking, interworking screening, etc.

### Q.931 NORMAL OPERATIONS

**5.06** Signaling for the Q.931 Information Element (IE) transport capability is performed by the TO and requires transporting the ATP parameter internetwork in the CCS7 ISUP ACM, CPG, IAM, or REL message.

**5.07** The ATP parameter may only be included in the REL message when clearing a stable call—never during a call failure.

**5.08** The following describes the normal operation signaling capabilities in the 4E15 generic when activated by the Q.931/ISUP interworking. Additional information is provided in the feature document AT&T 234-090-004AC, AT&T Practices—*International Services and Capabilities* for the Q.931 Information Elements (IE) Signaling capability.

(a) **Originating Toll Office — Forward Messages:** An ATP parameter may be present in an Initial Address Message (IAM) or a REL that is received from the originating LEC. The ATP parameter is passed without modification to the succeeding office; unless it is discarded because of rejection or loss as described in paragraph 5.10.

(b) **Originating Toll Office — Backward Messages:** An ATP parameter may be present in an ACM, CPG, ANM, or REL that is received from the succeeding office. The ATP parameter is passed without modification to the originating LEC, unless it is dropped because of rejection or loss as described in paragraph 5.11.

(c) **Terminating Toll Office — Forward Messages:** An ATP parameter may be present in an IAM or REL that is received from the preceding office. The ATP parameter is passed without modification to the originating LEC, unless it is discarded because of rejection or loss as described in paragraph 5.10.

(d) **Terminating Toll Office — Backward Messages:** An ATP parameter may be present in an ACM, CPG, ANM, or REL that is received from the terminating LEC. The ATP parameter is passed without modification to the terminating LEC, unless it is dropped because of rejection or loss as described in paragraph 5.11..

**5.09** The called party may return Q.931 IEs in the Q.931 alerting, the Q.931 connect, or the first Q.931 call clearing message per Q.931/CCS7 interwork requirements. The Q.931 IEs may be dropped because of rejection or loss.

### REJECTION OR LOSS OF ATP IN FORWARD MESSAGES

**5.10** The reasons for rejection or loss of forward messages IAM and REL are as follows:

- **Not allowed for service** — This case is based on the service associated with the call, per phase 1. The ATP is supported for all services except the 800 services.

- **Internetwork screening** — This case is based on per-circuit group indicators. The single indicator used for both UUI and ATP in phase 1 now consists of two separate indicators; one for ATP and one for UUI.

- **Interworking encountered** — This case is based on a non-CCS7 circuit encountered between calling and called parties.

- **ATP parameter > 131 octets** — This case is based on the total octets including parameter identifier and length octets.

- **UUI parameter plus ATP > 133 octets** — This case is based on the total octets including parameter identifier and length octets. If both ATP and UUI are included in the message and ATP alone does not cause the message to exceed 272 octets, then ATP is included and UUI is discarded. However, the ATP must not exceed 131 by itself.

- **ISDN-UP message > 272 octets** — This case is based on the total length of the message

- **Internal loss** — This case is based on call processing limitations (For example: not enough memory).

**REJECTION OR LOSS OF ATP IN BACKWARD MESSAGES**

**5.11** The reasons for rejection or loss of backward messages ACM, CPG, ANM, or REL are defined as follows:

- **Internetwork screening** — This case is based on per-circuit group indicators. The single indicator used for both UUI and ATP in phase 1 now consists of two separate indicators; one for ATP and one for UUI.

- **Interworking encountered** — This case is based on a non-CCS7 circuit encountered between calling and called parties.

- **ATP parameter > 131 octets** — This case is based on the total octets, including parameter identifier and length octets.

- **UUI parameter plus ATP > 133 octets** — This case is based on the total octets including parameter identifier and length octets. If both ATP and UUI are included in the message and ATP alone does not cause the message to exceed 272 octets, then ATP is included and UUI is discarded. However, the ATP must not exceed 131 octets by itself.

- **ISDN-UP message > 272 octets** — This case is based on the total length of the message. If both ATP and UUI are included in the message and ATP alone does not cause the message to exceed 272 octets, ATP is included and UUI is discarded. However, the ATP must not exceed 131 octets by itself.

- **Internal loss** — This case is based on call processing limitations (For example: not enough memory).

**SIGNALING INTERWORKING**

**5.12** The ATP is dropped when ISUP is interworked with a non-CCS7 signaling system, such as MF.

## 6. USER-TO-USER SIGNALING OVERVIEW

**6.01** Additional information is provided in the feature document AT&T 234-090-004AC, AT&T Practices—*International Services and Capabilities for the Q.931 Information Elements (IE) Signaling capability.*

**USER-TO-USER SIGNALING DESCRIPTION**

**6.02** User-to-User Signaling (UUS) service 1 is a basic ISDN capability defined by domestic and international standards. Service 1 transfers UUI during call set-up and clearing phases with the UUI embedded within call control messages. The AT&T ISDN feature supports the transport of ATP as part of Message Associated User-to-User Information (MA-UUI).

**6.03** This feature provides signaling support for implicit service 1 and is the only service supported in the 4E15 generic.

**6.04** The implicit service supports a maximum of 129 octets of user data, including the protocol discriminator, within the UUI parameter in appropriate ISUP call control messages.

**6.05** Other UUS services, such as **explicit** service 1, service 2, service 3, and essential services that are requested through the User-to-User Indicators parameter (UUP), are not supported, and the UUP is

discarded by AT&T originating TOs when received in an IAM.

**6.06** When a TO receives a UUI parameter, the user data is transported as implicit service 1, and to support international ISDN, AT&T TOs pass the UUP in backward messages.

**6.07** As specified in phase 1, TOs do not pass any Facility Reject Message (FRJ) to another network nor accept FRJ from another network.

**6.08** A TO generates a FRJ towards the AT&T office that is serving the ISDN customer. This occurs when an originating or terminating TO discards all user data in a message, except the REL message, that is received from another TO. The FRJ contains a facility indicator parameter coded "message associated UUI" (10000000) and a cause indicator parameter coded "user information discarded" (0101011) with location code "transit network" (0011).

**USER-TO-USER NORMAL OPERATIONS**

(a) **Originating Toll Office - Forward Messages:** The UUI may be present in an IAM or REL that is received from the originating LEC. The UUI is passed without modification to the succeeding office unless dropped because of rejection or loss as described in paragraph 6.09.

(b) **Originating Toll Office - Backward Messages:** The UUI may be present in an ACM, CPG, ANM, or REL that is received from the succeeding office. The UUI is passed without modification to the preceding office unless it is dropped because of rejection or loss, as described in paragraph 6.10.

(c) **Terminating Toll Office - Forward Messages:** The UUI may be present in an IAM or REL that is received from a preceding office. The UUI is passed without modification to the calling party; unless it is dropped because of rejection or loss as described in 6.09.

(d) **Terminating Toll Office - Backward Messages:** The UUI may be present in an ACM, CPG, ANM, or REL that is received from the terminating LEC. The UUI is passed without modification to the preceding office; unless it is dropped because of rejection or loss as described in paragraph 6.10.

**REJECTION OR LOSS OF UUI IN FORWARD MESSAGES**

**6.09** The reasons for rejection or loss of the UUI in forward messages, IAM and REL are described as follows:

- **Not allowed for service** — This case is based on the service associated with the call (per phase 1). The UUI provides all services except the 800 services.

- **Internetwork screening** — This case is based on per-circuit group indicators. The single indicator, used for both UUI and ATP in phase 1, now consist of two separate indicators; one for ATP and one for UUI.

- **Interworking encountered** — This case is based on a non-CCS7 circuit encountered between calling and called parties.

- **UUI IE or parameter > 131 octets** — This case is based on the total octets, including parameter identifier and length octets.

- **UUI parameter plus ATP > 133 octets** — This case is based on the total octets, including parameter identifier and length octets. If both ATP and UUI are included in the message and ATP alone does not cause the message to exceed 272 octets, then ATP is included and UUI is discarded. However, the ATP must not exceed 131 by itself.

- **ISDN-UP message > 272 octets** — This case is based on the total length of the message.

- **Internal loss** — This case is based on call processing limitations (For example: not enough memory).

**REJECTION OR LOSS OF UUI BACKWARD MESSAGES**

**6.10** The reasons for rejection or loss of backward messages ACM, CPG, ANM, or REL are defined as follows:

- **UUI not delivered to called party** — The UUI IE was not included in the Q.931 SETUP message sent to the called party.

- **Internetwork screening** — This case is based on per-circuit group indicators. The single indicator, used for both UUI and ATP in phase 1, now consists of two separate indicators; one for ATP and one for UUI.

- **Interworking encountered** — This case is based on a non-CCS7 circuit encountered between calling and called parties.

- **UUI parameter > 131 octets** — This case is based on the total octets including parameter identifier and length octets.

- **UUI parameter plus ATP > 133 octets** — This case is based on the total octets including parameter identifier and length octets. If both ATP and UUI are included in the message and ATP alone does not cause the message to exceed 272 octets, then ATP is included and UUI is discarded. However, the ATP must not exceed 131 octets by itself.

- **ISDN-UP message > 272 octets** — This case is based on the total length of the message.

- **Internal loss** — This case is based on call processing limitations (For example: not enough memory).

### USER-TO-USER INDICATOR PARAMETER

**6.11** If an originating TO receives a UUP in an IAM, it discards the UUP without further action. If the UUI parameter is also contained in the IAM, it is passed, without modification, to the succeeding office or rejected.

**6.12** An originating or terminating TO passes a received UUP in an ACM, CPG, or ANM message.

### SERVICE IDENTIFICATION ON EGRESS (TOLL OFFICES ONLY)

**6.13** The terminating TO includes an Originating Line Information (OLI) parameter in the IAM that is sent to the terminating LEC, if the Service Identification Indicator (SII) in the routing information indicators parameter contains one of the values listed in Table D. For such calls, the OLI is included only if specified by the OLI parameter restriction indicator for the outgoing trunk subgroup.

## 7. INTERNAL CALL PROCESSING CONTROLS

### TOLL SWITCH REQUIREMENTS

**7.01** The following paragraphs describe the internal call processing controls for the Originating Toll Office (OTO) and the Terminating TO (TTO) for NI2.

#### A. Originating/Terminating Toll Switch - Connections

**7.02** All incoming and outgoing ISUP circuits are supported. All ISUP NI incoming inter-machine trunks and all ISUP NI outgoing trunks are supported in the 4E15 generic.

#### B. Screening - Originating/Terminating Toll Switch

**7.03** The only new message that is added to NI Phase 1, for the 4E15 generic, is the Call Progress message.

#### C. Originating Toll Office (OTO)

**7.04** The OTO discards any unrecognized messages received from an LEC.

**7.05** Based on mutual bilateral agreements, optional parameters are accepted/transmitted between OTOs and LECs. These optional parameters are:

(a) ***User-to-User Parameter (UUP):***

- If received in an IAM, the UUP is discarded.
- Passed in backward direction to support international agreements for the following messages:

  **Domestic - CPG and ANM**

  **International - ACM, CPG, and ANM.**

(b) ***User-to-User Information (UUI) and Access Transport Parameters (ATP):***

- Accepted/sent based on trunk group screening
- Accepted in forward direction in IAM and REL
- Sent in backward direction in ACM, CPG, ANM, and REL
- Must not exceed 131 octets each or 133 octets combined
- Must not cause total message length to exceed 272 octets.

### D. Terminating Toll Office (TTO)

**7.06** The TTO discards any unrecognized messages received from an LEC.

### E. Optional Parameters

**7.07** Optional parameters are transmitted between TTOs and LECs.

- UUI and ATP passed (based on NI phase 1 requirements)
- CHG
- CPN
- OLI (generated by the TTO).

### F. Selective Calling Party Number/Billing Number Delivery—Screening

**7.08** The selective Calling Party Number/Billing Number (CPN/BN) delivery feature is functionally divided into two parts for screening purposes. These functions are:

- **Per-service screening**: performed at the terminating toll office
- **Per-customer screening**: performed at the ACP.

**7.09** The per-service screening function determines whether the CPN/BN delivery feature is offered for each type of service. For example, the terminating toll office passes CPN/BN that is received on calls for switched egress 800 with DSD features and blocks CPN/BN on INWATS calls.

**7.10** The per-customer screening function determines whether the terminating 800 customer subscribes to the CPN/BN delivery feature. Customer subscription information is received by the ACP from the DSD NCP.

**7.11** The CPN/BN feature impacts AT&T switches as follows:

- This feature only impacts toll switches in the AT&T network.
- The OSOs (Originating Screening Offices) are **NOT** impacted.
- The originating 4ESS ACP must drop/include CPN/BN in the IAM sent to the subsequent switch based on a new instruction in the response received from the DSD NCP. This instruction comes in the form of a new TCAP parameter that indicates customer subscription to CPN/BN delivery.
- The originating 4ESS ACP must reset the Service Identification Indicator (SII) to "800 with DSD features" when the new TCAP parameter is received.
- The terminating toll switch must pass/block CPN/BN on a per-service basis.
- The terminating toll switch must send an ISUP SID/ANI increment message to the originating ACP when CPN or BN is sent to the terminating LEC. These calls are recorded at the originating ACP for 800 customers with DSD.

**7.12** When a DSD/800 query is not performed, the CPN parameter, if received, and the CHG parameter are included in the outgoing IAM.

**7.13** The CPN/BN are treated independently and are based on one of three recent changeable options to determine if either feature will or will not selectively include the CPN/BN parameter in the outgoing IAM by the terminating AT&T toll office. The delivery options are:

- Pass CPN or BN independent of trunk group mark (based on service ID)
- Block CPN or BN independent of trunk group mark (based on service ID)
- Treatment of CPN or BN is dependent on trunk group mark only.

**7.14** The TTO screens the SII in the Routing Information Indicators Parameter (RIIP) to determine if the CPN/BN, on a per-service basis, should be passed or blocked.

**7.15** The TTO screens the SII in the RII to determine if the CPN should be passed, blocked, or treated based on existing phase 1 indicators. Corresponding indicators are set for BN delivery for each service. If the indicators directs the TTO to base CPN/BN treatment on trunk group indicators, processing remains the same as specified in phase 1.

### G. Integrated Services Digital Network Preference Indicator Routing

**7.16** Routing requirements, based on the ISUP Preference indicator, apply only to circuit switched calls in the 4 ESS Switch and is set to one of three conditions. These settings are:

(1) **ISUP Required**—The call must be routed on an ISUP circuit. If an ISUP circuit is not available, the call is killed.

(2) **ISUP Preferred**—An attempt is made to route the call on an ISUP circuit first. If an ISUP circuit is not available, the call is routed on any available circuit.

(3) **ISUP Not Required**—An attempt is made to route the call on a non-ISUP circuit. If an ISUP circuit is not available, the call is routed on the first available circuit.

### H. Excessive Delay Notification

**7.17** When a Terminating Toll Office (TTO) receives an Address Complete Message (ACM) with the Backward Call Indicator (BCI) coded "**excessive delay at the terminating ISDN access,**" an Address Complete Message is returned to the preceding office "with the excessive delay notification" message coded in the BCI parameter.

**7.18** The other fields of the received BCI parameter are unchanged except the protocol control indicators are updated.

**7.19** A TTO for direct-connect customers will not generate a notification of excessive delay nor be received at an International Switching Center (ISC) from a foreign network.

### I. Connected Number

**7.20** The Connected Number Identification (CNI) service provides the calling user with the capability to identify the final connected user. The connected number is transferred in the connected number parameter in the ANswer Message (ANM).

#### Terminating Toll Office

**7.21** During call set-up, the TTO, (either direct access or ISC) may send a connected number in the connected number parameter of the ANM to the preceding office.

#### Transit Toll Office

**7.22** A transit TO passes a received connected number transparently to the preceding office within an ANM.

#### Originating Toll Office

**7.23** An OTO passes a received connected number parameter within the ANM to the ISDN access side, to the international network.

## ACCESS CHARGE VERIFICATION

**7.24** Automatic Message Accounting (AMA) records are generated by the OTO for customer billing and/or access charge verification. AMA records are also generated by the TTO for the purpose of access charge verification.

**7.25** The AMA records are modified to identify when CPN/BN is not received from the originating LEC or not forwarded to the terminating LEC. These modifications are to Table "8" and all call codes and structure codes using Table "8" are affected. Table "8" is listed in this document as Table E.

### A. Originating Toll Office

**7.26** If the OTO office generates an AMA record for an incoming CCS7 call from the Originating LEC, the codes for BCD character "6" will be coded as listed in Table F.

### B. Terminating Toll Office

**7.27** If the OTO office generates an AMA record for access charge verification for an outgoing CCS7 call to the terminating LEC, the codes for BCD character "6" will be coded as listed in Table G.

**7.28** The NI2 new toll office data requirements are listed in Table H.

## 8. SUPPLEMENTARY INFORMATION

### ABBREVIATIONS AND ACRONYMS

**8.01** This part defines the abbreviations and acronyms used in this practice.

| | |
|---|---|
| ACM | Address Complete Message |
| ACP | Action Point |
| AMA | Automatic Message Accounting |
| ANI | Automatic Number Identification |
| ANM | Answer Message |
| ANSI | American National Standards Institute |
| ASN | AT&T Switched Network |
| AT | Access Tandem |
| ATP | Access Transport Parameter |
| BCD | Binary Coded Decimal |
| BCI | Backward Call Indicator |
| BN | Billing Number |
| BOC | Bell Operating Company |
| BRI | Basic Rate Interface |
| CCITT | International Telephone and Telegraph Consultative Committee |
| CCS7 | Common Channeling Signaling Number 7 |
| CLI | Calling Line Identification |
| CNI | Connected Number Identification |
| CPE | Customer Premises Equipment |
| CPG | Call Progress Message |
| CPN | Calling Party Number |
| CSI | Carrier Selection Information |
| DP | Dial Pulse |
| DSD | Direct Services Dialing |
| EAEO | Equal Access End Office |
| EAMF | Equal Access Multifrequency |
| EO | End Office |
| EXM | Exit Message |
| FRJ | Facility Reject Message |
| GSDN | Global Software Defined Network |
| IAM | Initial Address Message |
| IC | Inter-LATA Carrier |
| ICLID | Individual Calling Line Identification |
| IE | Information Element |
| INC | International Carrier |
| ISC | International Service Complex |
| ISDN | Integrated Services Digital Network |
| ISUP | Integrated Services Digital Network User Part |
| ITC | Independent Telephone Company |
| IXC | Interexchange Carrier |
| LASS | Local Area Signaling Services |
| LEC | Local Exchange Carrier |
| MA-UUI | Message Associated User-to-User Information |
| MF | Multifrequency |
| MTP | Message Transport Part |
| NANP | North American Numbering Plan |
| NCEO | Non-Conforming End Office |

| | |
|---|---|
| NI2 | Network Interconnect Phase 2 |
| OAT | Originating Access Tandem |
| OEO | Originating End Office |
| OLI | Originating Line Information |
| OSO | Originating Screening Office |
| OTO | Originating Toll Office |
| PNP | Private Numbering Plan |
| PRI | Primary Rate Interface |
| RC | Recent Change |
| REL | Release Message |
| RII | Information Indicators |
| SCP | Service Control Point |
| SDN | Software Defined Network |
| SII | Service Identification Indicator |
| SSP | Service Switching Point |
| TAR | Terminating Access Record |
| TAT | Terminating Access Tandem |
| TCAP | Transaction Capabilities Application Part |
| TGN | Trunk Group Number |
| TIRM | Technical Information Resource Management |
| TNS | Transit Network Selection |
| TNS | Transit Network Selection Parameter |
| TO | Toll Office |
| TTO | Terminating Toll Office |
| UP | User Part |
| UUI | User-to-User Information |
| UUP | User-to-User Information Indicator Parameter |
| UUS | User-to-User Signaling |
| WZ1 | World Zone 1 |

**REFERENCES**

**8.02** The following documents contain information related to the network interconnect feature.

(1) Attached Processor System Input Manual IM- 4A001

(2) Attached Processor System Output Manual OM- 4A001

(3) AT&T 234-010-315, AT&T Practice — *Domestic Call Irregularity Handbook*

(4) AT&T 234-010-316, AT&T Practice — *International Call Irregularity Handbook*

(5) AT&T 234-100-000, AT&T Practice — *4 ESS Switch General Description*

(6) AT&T 234-152-157, AT&T Practice — *CCIS Circuit Order Recent Changes (Trunk Conversion)*

(7) AT&T 234-152-159, AT&T Practice — *Non-CCIS Circuit Order Recent Changes (Trunk Conversion)*

(8) AT&T 234-153-050, AT&T Practice — *CCT Growth*

(9) AT&T 234-153-055, AT&T Practice — *CNI Ring Growth (LEC Version)*

(10) AT&T 234-153-055AC, AT&T Practice — *CNI Ring Growth*

(11) AT&T 234-160-015, AT&T Practice — *4 ESS Switch 4E14 to 4E15 Generic Retrofit*

(12) AT&T 234-160-307, AT&T Practice — *AT&T 3B Computer 4AP<7> to 4AP<8> Retrofit*

(13) Bell Communications Research Technical Reference TR-TSY-000317

(14) Bell Communications Research Technical Reference TR-TSY-000394

(15) Bell Communications Research Technical Reference TR-TSY-000444

(16) Translation Guide TG-4

(17) 4 ESS Switch Input Manual IM-4A000

(18) 4 ESS Switch Output Manual OM-4A000.

## 9. ISSUING ORGANIZATION

Published by
The AT&T Documentation Development Organization.

## TABLE A

## MINIMUM SET OF ISDN-UP MESSAGES AND PARAMETERS FOR INTERNETWORK USE

| PARAMETER | MESSAGE | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | CRA | CRM | IAM | COT | ACM | EXM * | ANM | CPG | REL | CVR | CVT | RLC | CCR | RSC | LPA | BLO | UBL | UCIC | BLA | UBA | SUS | RES | CGB | CGU | CGBA | CGUA | GRS | GRA | CQM | CQR |
| Message type | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M | M |
| End of optional parameter † | | | O | | O | O | O | O | O | O | | | | | | | | | | | O | O | | | | | | | | |
| Access transport | | | O | | O | | O | O | O | | | | | | | | | | | | | | | | | | | | | |
| Automatic congestion level | | | | | | | | | O | | | | | | | | | | | | | | | | | | | | | |
| Backward call indicators | | | | | M | | O | O | | | | | | | | | | | | | | | | | | | | | | |
| Called party number | | | M | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Calling party number | | | O | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Calling party's category | | | M | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Carrier selection information | | | O | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Cause indicators | | | | | O | | | O | M | | | | | | | | | | | | | | | | | | | | | |
| Charge number | | | O | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Circuit group char. ind. | | | | | | | | | | M | | | | | | | | | | | | | | | | | | | | |
| Circuit group sup. msg. type | | | | | | | | | | | | | | | | | | | | | | | M | M | M | M | | | | |
| Circuit identification name | | | | | | | | | | O | | | | | | | | | | | | | | | | | | | | |
| Circuit state indicator | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Circuit validation resp. ind. | | | | | | | | | | M | | | | | | | | | | | | | | | | | | | | M |
| Common language location ID | | | | | | | | | | O | | | | | | | | | | | | | | | | | | | | |
| Continuity indicators | | | | M | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Event information | | | | | | | | M | | | | | | | | | | | | | | | | | | | | | | |
| Forward call indicators | | | M | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Nature of connection ind. | | M | M | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Optional backward call ind. | | | | | O | | | O | | | | | | | | | | | | | | | | | | | | | | |
| Originating line information | | | O | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Outgoing trunk group number | | | | | | O | | | | | | | | | | | | | | | | | | | | | | | | |
| Range and status | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Suspend/resume indicators | | | | | | | | | | | | | | | | | | | | | | | M | M | M | M | M | M | M | M |
| Transit network selection | | | O | | | | | | | | | | | | | | | | | M | M | | | | | | | | | |
| User service information | | | M | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| User-to-user information | | | O | | O | | O | O | O | | | | | | | | | | | | | | | | | | | | | |

M = mandatory O = optional

CRA Circuit reservation ack.
CRM Circuit reservation
IAM Initial address
COT Continuity
ACM Address complete
EXM Exit
ANM Answer
CPG Call progress
REL Release
CVR Circuit validation test resp.
CVT Circuit validation test

RLC Release complete
CCR Continuity check request
RSC Reset circuit
LPA Loop-back ack.
BLO Blocking
UBL Unblocking
UCIC Unequipped circuit ID code
BLA Blocking ack.
UBA Unblocking ack.
SUS Suspend

RES Resume
CGB Circuit group blocking
CGU Circuit group unblocking
CGBA Circuit group blocking ack.
CGUA Circuit group unblocking ack.
GRS Circuit group reset
GRA Circuit group reset ack.
CQM Circuit group query
CQR Circuit group query resp.

(*) Used for internetwork calls but only sent within local network.
(†) Acceptable for all messages allowing optional parameters although none may be supported internetwork.

**TABLE B**

**OTO REL CODING**

| CODE FROM IXC | | | RECODED TO | |
|---|---|---|---|---|
| user | (0000) | --> | user | (0000) |
| local private network | (0001) | --> | remote private network | (0001) |
| local local network | (0010) | --> | remote local network | (0100) |
| transit network | (0011) | --> | remote local network | (0100) |
| remote local network | (0100) | --> | remote local network | (0100) |
| remote private network | (0101) | --> | remote private network | (0101) |
| local interface ... | (0110) | --> | remote local network | (0100) |
| international network | (0111) | --> | remote local network | (0100) |
| unknown | (1010) | --> | unknown | (1010) |
| spare | (other) | --> | unknown | (1010) |

**TABLE C**

**TTO, REL, ACM, CPG RECODING**

| CODE FROM LEC | | | RECODED TO | |
|---|---|---|---|---|
| user | (0000) | --> | user | (0000) |
| local private network | (0001) | --> | remote private network | (0001) |
| local local network | (0010) | --> | remote local network | (0100) |
| transit network | (0011) | --> | remote local network | (0100) (*) |
| remote local network | (0100) | --> | remote local network | (0100) |
| remote private network | (0101) | --> | remote private network | (0101) |
| local interface ... | (0110) | --> | remote local network | (0100) (*) |
| international network | (0111) | --> | remote local network | (0100) (*) |
| unknown | (1010) | --> | unknown | (1010) |
| spare | (other) | --> | unknown | (1010) |

(*) change to the recoding requirement for REL in Phase 1.

**TABLE D**

**SSI TO OLI MAPPING**

| SERVICE | SII CODE | | OLI CODE | | |
|---|---|---|---|---|---|
| I800 Inbound | 0000 | 1000 | 0001 | 1000 | (24) |
| 800 w/DSD Features | 0000 | 1110 | 0001 | 1000 | (24) |
| WWATS | 0000 | 0101 | 0011 | 0100 | (52) |
| MEAGCOM | 0000 | 0011 | 0011 | 0100 | (52) |
| SDN | 0000 | 0001 | 0101 | 1101 | (93) |
| GSDN | 0000 | 1001 | 0101 | 1101 | (93) |

**TABLE E**

**STUDY INDICATOR**

| BCD CHARS | MEANING |
|---|---|
| 1 | 0 = No indication in this character |
| 2 | 0 = No indication in this character |
| | 2 = Unanswered Call Recording |
| 3 | 0 = No indication in this character |
| 4 | 0 = No indication in this character |
| | 1 = Test Call |
| | X = Denied by NCD |
| 5 | 0 = No indication in this character |
| 6 | 0 = No indication in this character |
| | 1 = No calling number and no calling party identification |
| | 2 = No calling party identification |
| | 3 = No called number and no calling party identification |
| | 4 = No calling number and no called number and no calling party identification |
| | 5 = No calling number and no called number |
| | 6 = No calling number |
| | 7 = No called number |
| 7 | 0 = No indication in this character |
| | 3 = ETFCC recording turned on |
| 8 | SIGN (hex C) |

**TABLE F**

**INCOMING CCS7 BCD BIT 6 CODES**

| ISDN-UP PARAMETERS† | | | | BCD CHAR 6 |
|---|---|---|---|---|
| C'dPN | OLI | CHG | CPN | |
| yes | yes | yes | yes | 0 |
| yes | yes | no‡ | yes | 0 |
| yes | yes | yes | no | 2 |
| yes | no | no | yes | 6 |
| yes | no | no | no | 1 |
| no†† | yes | yes | yes | 7 |
| no | yes | yes | no | 3 |
| no | no | no | yes | 5 |
| no | no | no | no | 4 |

† "no" indicates that the parameter was not received or was received but contained no digits (nature of address coded "no number present," "not available," etc.).

‡ Receipt of OLI and CPN implies that billing number (ANI) and the calling party number are identical and is equivalent to receiving CHG with the same digits as contained in CPN. (Table 8 does not specify OLI recording.)

†† Note that while lack of a called number will result in termination of call set-up, an AMA record may or may not be generated for the call. NI Phase 2 does not require any change in recording procedures for the case when the called number is not available.

**TABLE G**

**OUTGOING CCS7 BCD BIT 6 CODES**

| ISDN-UP PARAMETERS† | | | BCD CHAR 6 |
|---|---|---|---|
| C'dPN | CHG | CPN | |
| yes | yes | yes | 0 |
| yes | yes | no | 2 |
| yes | no | yes | 6 |
| yes | no | no | 1 |
| no†† | yes | yes | 7 |
| no | yes | no | 3 |
| no | no | yes | 5 |
| no | no | no | 4 |

† "no" indicates that the parameter was not sent or was sent but contained no digits (nature of address coded: "no number present," "not available," etc.).

†† It is not expected that the Toll Office will forward a call to a LEC without a called number. Such cases are shown only for completeness.

**TABLE H**

**TOLL OFFICE DATA**

| INDICATOR | DEFAULT SETTING | PROVISIONING BASIS | OFFICES | RELATIONSHIP TO PHASE 1 |
|---|---|---|---|---|
| OLI Restriction | Do not send | outgoing NI CG | TTO | Existing OLI Restriction |
| CPN Service Restriction | Use CG indicator | service | TTO | Has precedence over existing CPN Restriction |
| CHG Service Restriction | Use CG indicator | service | TTO | Has precedence over existing CHG Restriction |
| DOT Accepted Via CCS7 + | Not permitted | office | OTO | New indicator |

\+ - not required to be recent changeable.

# FEEDBACK FORM

**Document Title:** Network Interconnect Phase 2 Common Channel Signaling Number 7 Integrated Services Digital Network — User Part Feature Document 4 *ESS* Switch

**Document Number:** AT&T 234-090-005AC

**Issue Number:** 1

**Issue Date:** November 1990

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