INTERNATIONAL SERVICES AND CAPABILITIES

FEATURE DOCUMENT

4 *ESS*™ SWITCH

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1. OVERVIEW

DEFINITION

1.01 The International Services and Capabilities (ISAC) 4E15 generic feature package includes the following:

- Originating Foreign Calling Line Identification (CLI)

- International Telephone and Telegraph Consultative Committee (CCITT) No. 7 Integrated Services Digital Network (ISDN) User Part (UP)

- Global Software Defined Network (GSDN).

1.02 These features provide the customer enhanced signal protocol features and Integrated Services Digital Network (ISDN) capabilities.

1.03 Whenever this practice is reissued, the reason(s) for reissue will be listed in this paragraph.

1.04 This practice does not contain admonishments.

1.05 AT&T welcomes your comments on this practice. Your comments will 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).

1.06 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) *Federal Government:* These orders should be processed through:

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

> or

> Call 919-279-7424

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

ECONOMIC WORTH

1.07 The Originating Foreign CLI feature provides AT&T customers with the following:

- Enhanced call routing capabilities

- Expanded interaction between subscriber premises equipment and the AT&T network

- Advanced ISDN Primary Rate Interface (PRI) features.

1.08 The GSDN phase 3 feature provides the following capabilities:

- Open dialing plan

- ISDN features

- Transaction Capabilities Application Part (TCAP) signaling architecture.

1.09 The international CCITT No. 7 (CCITT7) ISDN User Part (ISUP) feature provides the following:

- Protocol upgrade

- Enhancements to existing features

- New feature additions.

1.10 The ISAC feature group is applicable for International 800 (I800) service, International Long Distance Service (ILDS)/World Connect, GSDN, and International Switched Digital Service (ISD).

AVAILABILITY

1.11 The ISAC feature group is included in the 4E15 Generic release and is dependent on the subscriber having Customer Premises Equipment (CPE) with ISDN PRI capabilities.

FEATURE GROUPS

1.12 The ISAC feature group requires the availability of Common Channel Signaling Number · 7 (CCS7), ISDN PRI, Direct Services Dialing (DSD), ILDS/World Connect, GSDN, and ISD service.

FEATURE ASSIGNMENT

1.13 The ISAC feature is provided to subscribers with CCS7/CCITT7 ISUP capabilities on a per-call or flat-rate basis, depending on the feature or options desired by the customer.

INCOMPATIBILITIES

1.14 The ISAC feature group is compatible with any subscriber having CPE with ISDN PRI capabilities.

2. USER PERSPECTIVE

USER PROFILE

2.01 The ISAC feature is provided to subscribers with CCITT7 ISUP capabilities, ILDS/World Connect, and ISD users on a flat-rate subscription basis.

CUSTOMER PREMISES EQUIPMENT

2.02 The ISAC feature requires customer premises equipment with ISDN PRI capabilities at a dedicated egress (subscriber provides own facilities from the customer's premise equipment to an AT&T service node) location capable of supporting the Q.931 signaling protocol.

ORIGINATING FOREIGN CLI FEATURE DESCRIPTION

2.03 The delivery of the line number of the originating (foreign) caller's station (that is, the Country code plus the national number) to I800 subscribers having an ISDN PRI capability provides significant advances in meeting subscriber needs.

2.04 The delivery of Originating Foreign CLI feature provides subscribers with the following capabilities:

- Improved DSD Network Control Point (NCP) routing features

- Expanded interactions between the AT&T network and subscriber premises equipment

- Billing Number (BN)/Calling Party Number (CgPN) forwarding.

A. Improved Routing Features

2.05 The I800 phase 2 provides DSD NCP features to subscribers of I800 service. Additionally, I800 phase 2 allows a subscriber of inbound I800, outbound I800, and domestic 800 services to maintain a single customer record for these services out of a DSD NCP.

2.06 The NCP routing features, like time-of-day and day-of-week routing, provide subscribers with increased flexibility in planning, route assignment, and maintenance.

B. Billing Number/Calling Party Number Forwarding

2.07 The CgPN is provided by the originating network CPE or the Billing Number (BN) provided by the originating network switch.

C. Expanded AT&T/Foreign Network Interactions

2.08 An inbound I800 call originates in a foreign country when the caller dials a toll free access code designated by the Post Telephone and Telegraph (PTT) plus the digits identifying the domestic AT&T subscriber.

2.09 Each country is identified by a unique code (for example, 05 for France, 0800 for U. K., etc.), using the Dialed Number Identification Service (DNIS) Figure 1, and when the foreign network recognizes the call as an international toll free call destined to AT&T, the digits are converted to a domestic network routing number.

2.10 The conversion, Table A, takes the form 196-WXY-VCCZ where "V" is "0". The 196 digits are a special service code, "CC" is a 2-digit real or I800 pseudo country code identifying the country of origin and "VWXYZ" identifies the AT&T subscriber.
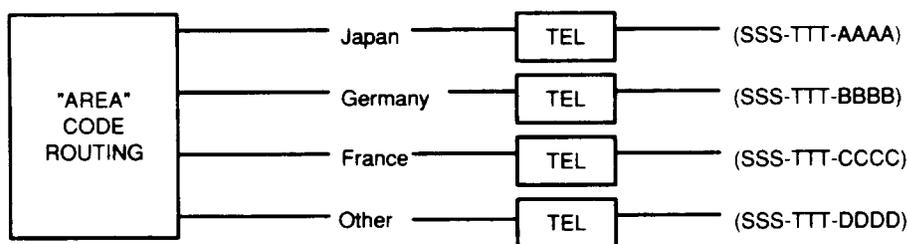
Figure 1—Example of Foreign Country Code Assignments

2.11   The foreign network's ISC forwards the inbound 1800 to an AT&T ISC using either CCITT5, CCITT6, or CCITT7 international trunk signaling protocol. The call flow for inbound 1800 calls is depicted in Figure 2.

D.   Inbound 1800 CCITT7 ISUP Call Routing

2.12   The CCITT7 ISUP Initial Address Message (IAM) contains the CgPN parameter when an inbound 1800 call is routed over a CCITT7 ISUP trunk. If the address digits are available, they are placed in the address digits field of the CgPN parameter. If the address digits are not available, the CgPN parameter is two octets and the presentation indicator in the CgPN parameter is coded "address digits not available".

2.13   The ISC functions as an ACP for these calls and sends a BEGIN message to the DSD NCP by the signaling network. The BEGIN message contains an Invoke component with a Provide Instruction-Start operation based on the first six digits of the network routing number (196-WXY). The Signal Transfer Point(s) (STP) in the signaling network determines which DSD NCP should receive the operation.

2.14   The CLI information is placed in the Digits (ANI) parameter of the Provide Instruction-Start operation.

E.   Inbound 1800 CCITT5/CCITT6 Call Routing

2.15   An inbound 1800 call routed over a CCITT5/CCITT6 trunk is ten digits in length. Three of the digits are used to identify the call as an 1800 inbound call, and five of these digits are used to identify the subscriber. The remaining two digits identify the originating country.

F.   Destination Call Routing

2.16   The inbound 1800 call is routed based on two components received by the ISC ACP from the DSD NCP. The first component contains the charging-bill call operation information and the second component contains the connection control-connect operation data.

2.17   The call is routed to the terminating 4 ESS switch by the ISC ACP using either CCIS6 or CCS7 ISUP trunks. The ISC ACP must use CCS7 trunks to forward CLI to the terminating 4 ESS switch. If CCS7 connectivity does not exist at any point along the call path, the call is routed without CLI.

G.   CLI Subscriber Requests

2.18   There are two types of CLI subscriber requests that must be transferred to the Private Branch
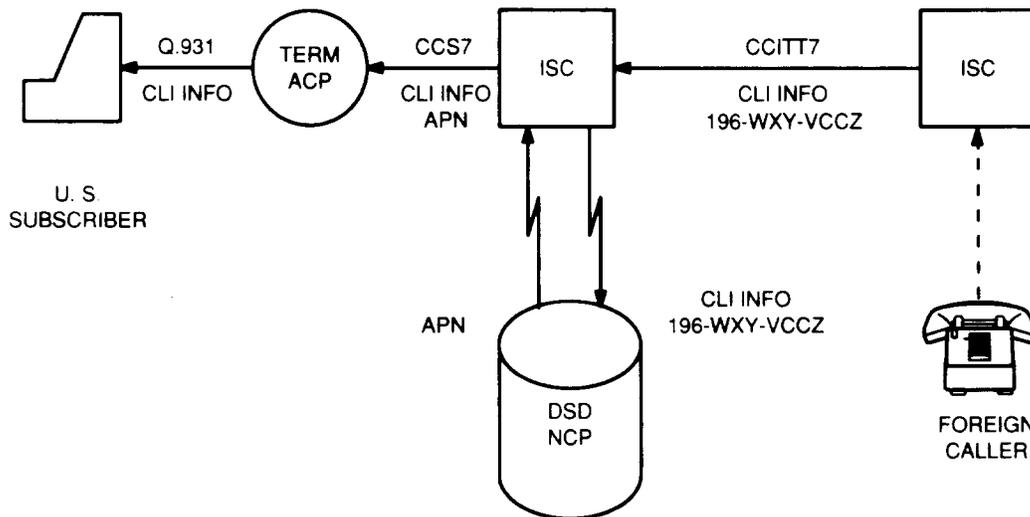
NOTE:
For inbound 1800 calls, the DSD NCP records CLI information (if available) as the CPR ANI, since ANI will never be received from overseas.

Figure 2—Inbound 1800 Call Flow Diagram

Exchange (PBX) by the terminating 4 ESS switch. The first type is when the subscriber requests CLI with every inbound I800 call; the second type is when the subscriber requests CLI on a per-call basis.

INTERNATIONAL CCITT No. 7 ISUP FEATURE DESCRIP-TION

2.19 The International CCITT7 ISUP (phase 3) consists of three additions to the CCITT7 ISUP (phase 2). These additions are:

- Protocol upgrade
- Enhancements to existing features
- New feature additions.

A. Protocol Upgrade

2.20 The ISUP protocol upgrade is made in order to be in alignment with CCITT ISUP standards and includes the following:

- The addition of the Call ProGress (CPG) message
- The addition of the CONnect (CON) message
- The interworking of the "speech" and "3.1 Khz" indicator at ISCs.

Call Progress Message

2.21 The CPG message is a new message sent from an exchange in the backward direction. The CPG message is sent after the Address Complete Message (ACM); otherwise, the CPG message is discarded. The CPG message may have three events. These events are:

- Outbound Call (Incoming CPG Message)
- Incoming Call (Outbound CPG Message)
- Transit Call (Transit CPG Message)

2.22 Outbound Call (Incoming CPG Message) — The event information parameter is a new mandatory parameter supported by CCITT7 ISUP. The parameter name code is 0010100. The interworking for the event information parameter is listed in Table B.

2.23 Incoming Call (Outbound CPG Message) — The interworking for the event information parameter is listed in Table C.

2.24 Transit Call (Transit CPG Message) — The interworking for the event information parameter is listed in Table D.

2.25 There are no new networking requirements for the other parameters.

Connect Message

2.26 The CON message is a new message sent from international network. The CON message is sent in the backward direction indicating that all required address signals necessary to route the call to the called party have been received and the call has been answered.

2.27 The 4 ESS switch can receive the CON message but is not required to generate or pass the CON message.

2.28 The CON message type is 00000111 and, for outbound calls where a fast connect may occur, the ISC (on receiving the CCITT7 CON message) will map it to the CCS7 ACM and CCS7 ANswer Message (ANM). The mapping of the parameters from CON to ACM/ANM is listed in Table E.

2.29 When the CON message is received from an international network, the 4 ESS ISCs generate the ACM and the ANM. The message flow using CON for an outbound call is depicted in Figure 3.

Speech/3.1 Khz Indicator

2.30 The "Speech/3.1 Khz" indicator is added to change the bearer setting from "speech" to "3.1 Khz" in the User Service Information (USI) parameter. This addition is required to resolve a coding incompatibility and to conform to CCITT standards for domestic Public Switch Telephone Network (PSTN) calls coded "speech" and international PSTN calls coded "3.1 Khz".

2.31 This incompatibility is due to foreign administrators using this setting to distinguish voice-band data calls from speech calls. Therefore, in foreign networks, "3.1 Khz" will be interpreted as a voice-band data call and "speech" will be interpreted as a voice call. The incompatibility is removed by recording this indicator at the ISC.
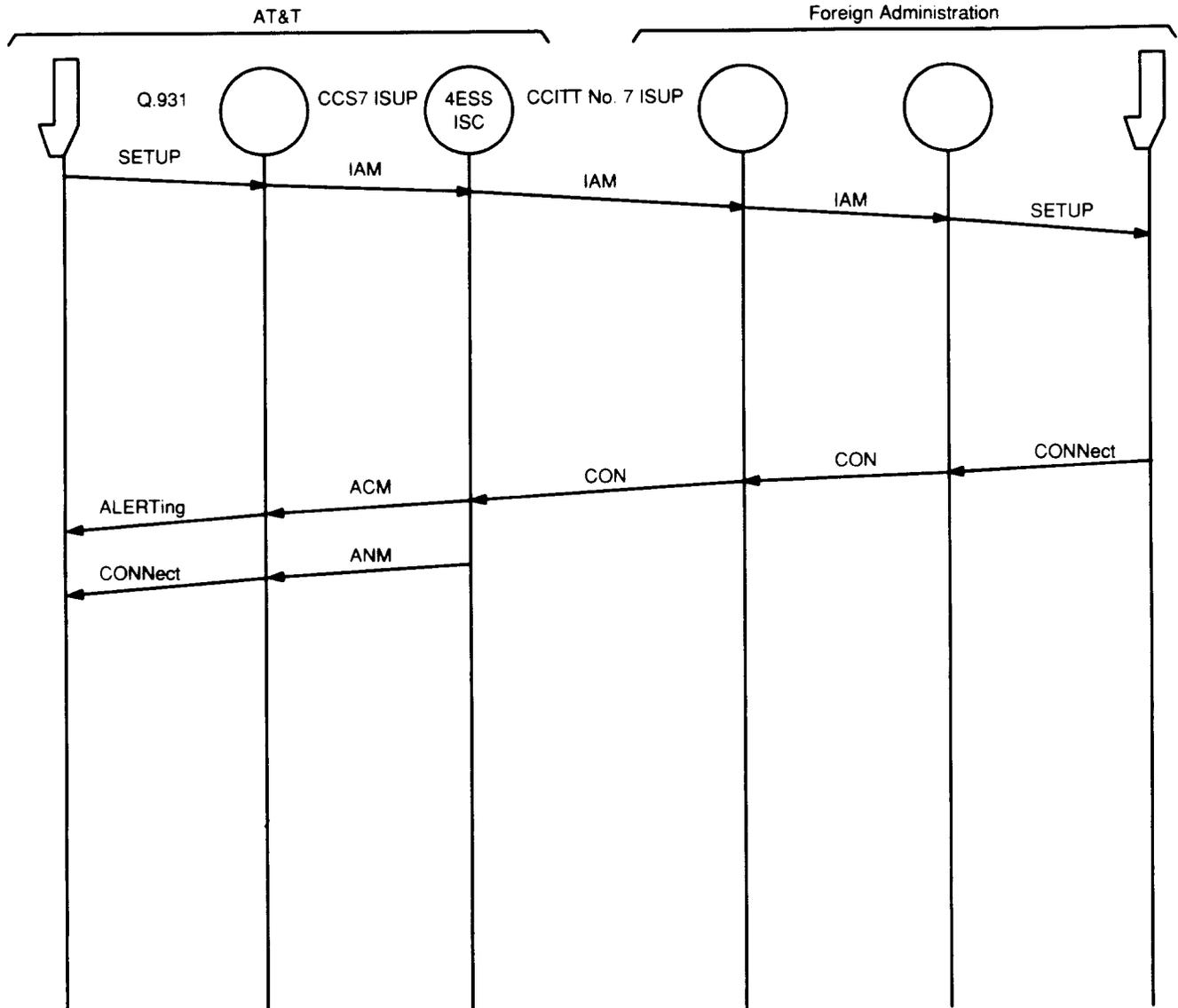
NOTE: For an Outbound Call, the CON message is mapped to the ACM and ANM messages at the 4 ESS-ISC.

Figure 3—Call Flow Using CON For Outbound Call

2.32 The AT&T Switched Network (ASN) does not support the CON message for an inbound call.

2.33 When the ASN receives a CCS7 IAM message, the forward call indicator (bit D) is checked. If interworking is encountered with non-ISUP signaling, the ISC changes the (USI) parameter setting from "Speech" to "3.1 kHz" and generates the TMR parameter with a setting of "3.1kHz".

2.34 For an outgoing IAM, the TMR parameter is generated as a fixed mandatory part and the USI parameter is changed to an optional part. The "Speech" to "3.1kHz" parameters are listed in Table F.

B. Enhancements to Existing Features

2.35 A number of existing features have been modified in order to be compatible with foreign administrations and/or be in compliance with CCITT7 ISUP standards.

2.36 The modified features are as follows:

- User-to-User Signaling (UUS) service

- ISUP preference indicator

- Closed User Group (CUG) for transit calls.

User-to-User Signaling Service

2.37 The UUS service 1 permits the transfer of User-to-User Information (UUI) during the call setup and call clearing phases. The transfer is done by embedding the UUI in the call control message.

2.38 The feature name of the corresponding AT&T domestic service is the Message-Associated User-to-User Information (MA-UUI).

2.39 Additional modifications to existing UUS service 1 features are made in order to improve consistency between the international and domestic interfaces to AT&T and to conform to CCITT standards. These additional modifications are:

- The UUS service 1 UUI parameter will transport 129 octets of UUI and the ATP parameter will independently transport up to 129 octets of user-provided access protocol information

- The UUI parameter will allow a combined ATP and UUI length of 129 octets, not including the parameter names and length indicators

- The addition of the CPG provides an additional call control message to transport the UUI parameter in the backward direction.

International Services Digital Network User Part Preference Indicator

2.40 The ISUP preference indicator is located in the forward call indicators parameter and uses three setting and circuit selection values. The three ISUP values are:

- Required all the way

- Preferred all the way

- Not required all the way.

Closed User Group

2.41 The CUG modifications are made to bring the handling of transit CUG call into alignment with the service description as defined in the CCITT standards.

C. New Feature Additions

2.42 The new supplementary services contained in the CCITT7 ISUP feature package further enhance the signaling capabilities now available to AT&T customers. These feature enhancements are the Connected Number (Co'dN) consisting of two parts in the COnnected Line Identification (COLI) feature group. These parts are:

- COnnected Line identification Presentation (COLP)

- COnnected Line identification Restriction (COLR).

Connected Line Identification Presentation

2.43 The COLP is a supplementary service offered to the calling party which provides the connected party's number to the calling party.

2.44 The AT&T network supports the ISUP Co'dN parameter by transporting the Co'dN information in the ANM contained in the Co'dN parameter and duplicates the Co'dN information in the All Tests Pass (ATP) parameter within the ASN.

Connected Line Identification Restriction

2.45 The COLR is a supplementary service offered to the calling party which restricts presentation of the connected party's number to the calling party.

Connected Line Identification

2.46 The connected party's number is transported using the Co'dN parameter in the ISUP ANM and the CON message. If the Co'dN parameter is transported within any other message (that is, ACM), then the Co'dN parameter is discarded at the ISC and the call proceeds. The connected number is not provided to the calling party at the access side if the connected party restricts presentation by subscribing to COLR. The numbering plan indicator field with the coding "101", indicating a "private numbering plan", is

a negotiated bit between AT&T and international customers (that is, for GSDN calls).

Inbound Calls (Co'dN Carried in Outbound Backward Message)

2.47 If the Co'dN arriving at the ISCs is carried in the Co'dN parameter in the CCS7 ANM and the Co'dN is a private number indicated by a "private numbering plan" in the numbering plan indicator, then the numbering plan and a maximum of 15 digits are passed without modification, and the nature of address indicator is changed to "1111000", indicating a private number.

2.48 If the Co'dN is not a private number, the ISC will screen the address digits. If the length of the address is not equal to 10, the address will not be transmitted and the Co'dN parameter discarded at the ISC. If the address in the Co'dN passes the screen, the country code "1" for world zone 1 is prefixed to the address digits. The "1" prefix thus makes the length of the address eleven digits in the format **1NPANXXXXX.**

2.49 If the Co'dN is received at the ISC from the CCS7 network with the screening indicator coded "10", indicating "user provided, verified and failed", then the Co'dN parameter is discarded. The Co'dN parameters for inbound calls are listed in Table G.

Outbound Calls (Co'dN Carried in Incoming Backward Message)

2.50 Connected numbers delivered from foreign networks are only transported within the Co'dN parameter in either the ANM or the CON message. If the Co'dN arriving at the ISCs from the foreign networks is a private number indicated by a "private numbering plan" in the numbering plan indicator, then the numbering plan and a maximum of 15 digits of the address plan are passed without modification and the nature of address indicator is changed to "0000001", indicating a subscriber number.

2.51 If the Co'dN indicates the address is not available, then the Co'dN parameter is discarded and no Co'dN parameters will be included in the CCS7 ANM message. The Co'dN parameters for inbound calls are listed in Table H.

Transit Calls

2.52 The Co'dN, with a maximum of 15 digits are passed without modification for transit calls. If the Co'dN arriving at the ISCs from the foreign networks is a private number indicated by a "private numbering plan" in the numbering plan indicator, the nature of address indicator is changed from "private number" to "subscriber number" in the CCS7 network, and then changed back to "private number" in the CCITT7 network.

2.53 If the CCITT7 Co'dN parameter indicates the address is not available, the Co'dN parameter is discarded. No Co'dN parameter is generated when the ANM leaves the ASN. The Co'dN parameters for transit calls are listed in Table I.

D.   International Call Detail Recording

2.54 The new supplementary service COLI is recorded in the International Call Detail Recording (ICDR) for all inbound, outbound, and transit calls. Word 9, bit 7, is set to "1" when COLI is received in the Co'dN parameter in an ANM or CON message.

2.55 The ICDR requirements are needed for maintenance purposes such as monitoring call completions and for monitoring or billing of transit traffic on international ISDN call and supplementary services. The ICDR formats are shown in Figure 4.

GSDN FEATURE DESCRIPTION

2.56 The GSDN open dialing plan capability and ISDN features are important steps in providing an international Virtual Private Network (VPN) service to meet the needs of multinational customers.

2.57 The GSDN architecture arrangement provides for interconnecting with CCITT7 ISUP, dedicated shared trunk groups (for countries not supporting CCITT7 ISUP), and direct communication using CCITT7 TCAP signaling.

A.   GSDN Open Dialing Plan

2.58 The GSDN open dialing plan provides the customer a variable numbering plan for both on-net and virtual on-net locations. Variable length numbers may be five to twelve digits, inclusive, with the exception that 10-digit private numbers cannot overlap the North American Numbering Plan (NANP).

Byte	7	6	5	4	3	2	1	0
0		•	ATME	COS	TRANS		TIME	PHASE
1	GSDN		INCOMING TRAFFIC NUMBER (13-8)					
2	INCOMING TRAFFIC NUMBER (7-0)							
3	CLI	ATP	UUI	CUG	INCOMING TSG NUMBER (11-8)			
4	INCOMING TSG NUMBER (7-0)							
5	UUI REJ		OUTGOING TRAFFIC NUMBER (13-8)					
6	OUTGOING TRAFFIC NUMBER (7-0)							
7	FWD INT	BWD INT	ORIG ISDN	TERM ISDN	OUTGOING TSG NUMBER (11-8)			
8	OUTGOING TSG NUMBER (7-0)							
9	COLI	DISC	BUF	REG	LANGUAGE DIGIT			
10	DIGIT 1				DIGIT 2			
11	DIGIT 3				DIGIT 4			
12	DIGIT 5				DIGIT 6			
13	DIGIT 7				DIGIT 8			
14	DIGIT 9				DIGIT 10			
15	DIGIT 11				DIGIT 12			
16	BEARER CAPABILITY			FHC	FINAL HANDLING CODE (11-8)			
17	FINAL HANDLING CODE (7-0)							
					Failure Code (4-0)			
18				TOS	DAY OF WEEK			D (2)
19	D (1-0)		C(2-0)			B(5-3)		
20	B (2-0)			A(4-0)				
21				TOA	DAY OF WEEK			D (2)
22	D (1-0)		C(2-0)			B(5-3)		
23	B (2-0)			A(4-0)				
24				TOT	DAY OF WEEK			D (2)
25	D (1-0)		C(2-0)			B(5-3)		
26	B (2-0)			A(4-0)				

Figure 4—ICDR Format

2.59 The open dialing plan permits the customer to include international public numbers as a part of their variable dialing plan for on-net locations.

SDN Dialing Plan Enhancements

2.60 This capability allows AT&T GSDN customers two additional dialing plan options to the standard dialing plan options. The new dialing plan options are:

- The 1 + dialing plan

- The NXX dialing plan.

2.61 The dialing plan options for SDN/GSDN service are listed in Table J. The customer should dial a prefix before all public numbers. The prefix is either "1" or "011" + NANP or Country Code (CC) + the National Number (NN) as shown below.

[GSDN Prefix] + 5 to 12-digit private number + [#]
[GSDN Prefix] + "011" + CC + NN + [#]
[GSDN Prefix] + "1" + NANP

NOTE: The optional digit represented by the "#" is provided to allow customers with Dual Tone Multi-Frequency (DTMF) signaling to the ACP to

indicate end-of-dialing for variable length numbers. It is also provided for customers that use the Station Group Designator (SGD). The ACP must receive the SGD digit after the dialed number and before the "#".

2.62 Calls received by the ACP from an ISDN location must contain the type of number and the numbering plan ID specified in the Called Party Number IE in the Q.931 SETUP message. The ACP mapping from the Called Party Number IE in the Q.931 SETUP message to the TCAP Digits_(Dialed) parameter for the open dialing plan is listed in Table K.

2.63 The 4 ESS switch must set to the appropriate values in the "Nature of Number" and "Numbering Plan" fields for each dialed number in the Digits_(Dialed) parameter in the "Begin" message to the DSD NCP. These values are listed in Table L.

2.64 The optional GSDN prefix is a code, dialed by the caller, that indicates the call is a GSDN call to the customer's PBX. If a customer has SDN and GSDN, the code should be the same. (The digit "8" is recommended for the SDN/GSDN prefix.)

B. ISDN Features

2.65 The international ISDN feature consists of modifications to two previously defined features and the addition of one new feature. These features are:

- Enhancement of International CLI Restriction

- Unbundle MA-UUI/separation of User-to-User Information Element (IE)

- The COLI.

C. Enhancement of International CLI Restriction

2.66 This feature verifies that the CLI restriction capabilities apply to the calling party subaddress, which may be a public or private number.

D. Unbundle Message/Information Element Separation

2.67 This capability of the GSDN feature package permits the separation of other user IEs from the UUI IE. This capability allows the UUI IE to be dropped (if necessary) without affecting the transport of the other user data IEs.

E. Connected Line Identification

2.68 The COLI feature permits a connected number to be transmitted across the network and presented to the caller. The connected number can be "user provided, not screened" or "network provided".

2.69 The COLI is delivered to the network and calling party using the Q.931 connect message format. The network transports the COLI in CCS7 ISUP domestically and CCITT7 ISUP internationally.

2.70 A COLI call received at the originating 4 ESS switch is indicated in the Automatic Message Accounting (AMA) record. The GSDN billing system then accepts and processes the AMA records with the Software Defined Network (SDN) call code and the COLI indication.

ACTIVATION

2.71 The various components of The ISAC feature package are activated uniquely and independently. Therefore, the activation sequence of each component is discussed separately.

A. Originating Foreign Calling Line Identification Activation

2.72 The Originating Foreign CLI is activated when the last four digits of the Action Point Number (APN) is outpulsed to the subscriber's location using the existing DNIS capability.

B. International CCITT No. 7 ISUP Activation

2.73 The CCITT7 ISUP activation and call sequence for an outbound call is shown in Figure 3.

C. GSDN Activation

2.74 By definition, the GSDN feature is activated when customer-dialed digits are received at a CPE that identifies a foreign station. However, there are a number of actions that must be performed in order to activate the GSDN feature.

2.75 The GSDN is activated in one of two ways; outbound (U.S. to a foreign customer) and inbound.

GSDN Outbound Activation

2.76 The GSDN feature activation and call sequence for an outbound call is described in the following paragraphs with the call flow sequence number keyed to the equipment shown in Figure 5. The call sequence steps are listed as follows:

- Step 1 — Dialed digits are received at CPE from the user.

- Step 2 — The customer's switching system forwards the dialed digits from the CPE to the ACP.

- Step 3 — The ACP then queries the SDN NCP and sends ANI node capabilities of the ACP and dialed digits. The message may also include the data rate (required if a data call), Station Group Designator (SGD), SID, and the announcement capabilities of the switch (required if the ACP has a Network Services Complex (NSCX)).

- Step 4 — The SDN NCP locates the customer's Call Process Record (CPR) using the ANI information.

- Step 5 — The SDN NCP makes the ANI (or the Hybrid ANI (HANI)) if SID was included in the original message.

- Step 6 — The CPR assigns the caller to a station group based on ANI (or HANI if one was created). The caller may be required to enter an authorization code by the station group or because of the type call (International). If an authorization code is not required, then Steps 7 through 11 are ignored.

- Step 7 — The SDN NCP sends an authorization code message to the ACP which forwards the authorization request to the NSCX. The request specifies which announcement to play and the number of digits to collect.

- Step 8 — The NSCX plays the announcement to the caller, collects the digits, and returns the collected digits to the ACP.

- Step 9 — The ACP forwards the collected digits to the SDN NCP.

- Step 10 — The SDN NCP passes the collected digits to the CPR which checks for valid authorization code.

- Step 11 — If the authorization code is valid, the CPR assigns the caller to a new code group which replaces the original assigned station group.

- Step 12 — Screening is done to determine if the caller is allowed to call the dialed number.

- Step 13 — Blocked call treatment.

2.77 Screening determines one of three possible actions to take depending on the authorization code. These actions are:

    a. The call is blocked

    b. The call requires additional information

    c. The call is allowed.

2.78 **The call is blocked** — When a call is blocked, the CPR instructs the SDN NCP to send a play announcement message to the ACP, make a billing record, and disconnect the call.

2.79 **Play announcement message** — The ACP either plays a standard 4 ESS switch announcement message or the request is passed to the NSCX to play the announcement message. In either case, the SDN NCP must identify the announcement to be played.

2.80 **Make a billing record** — In the request for the ACP to make an AMA billing record, the SDN NCP must include generic billing data. If the call is a data call, the data rate must be included, and if an authorization code was collected, it must be included. When all billing information is collected, the ACP creates an AMA billing record.

2.81 **Disconnect the call** — After the billing record is created, the ACP disconnects the call.

2.82 **The call requires additional information** — When a call requires additional information, the CPR instructs the SDN NCP to send a **Begin** message to a data base in the destination foreign country.

2.83 **The call is allowed** — When a call is allowed, the CPR instructs the SDN NCP to send a **Begin** message to a data base in the destination foreign country.

- Step 14 — Customer Identification Dialed Digits are sent to Foreign Data Base. The SDN NCP determines the routing address for the message using the customer Identification (ID) and destination foreign administration ID provided address table provided by the Centralized Administration Operations Support System (CAOSS). Included in the "Begin" message must be the customer ID and the dialed digits (including numbering plan type).

- Step 15 — The SDN NCP sends a message to the ACP instructing it to increase the amount of waiting time for a response from the SDN ACP (current t3 timer value is 35 seconds). The SDN NCP also sets the new foreign data base.

- Step 16 — The SDN NCP makes a data base query record for the call which records both the "Begin" message and the response message (if any) received from the foreign data base.

- Step 17 — The foreign data base accesses the proper customer record using the customer ID, translates the dialed number to a routing number, and determines whether the call is destined for an On/Off-net location.

- Step 18 — The foreign data base sends a message to the SDN NCP which contains the routing number and On/Off-net indicator.

- Step 19 — The SDN NCP receives the message from the foreign data base and passes the routing number and On/Off-net indicator to the CPR.

- Step 20 — The CPR performs additional screening (if necessary) to determine if the caller is allowed to make an Off-net call. If it determined that the caller is not authorized, the call is blocked.

- Step 21 — If the call is allowed, the CPR instructs the SDN NCP to send a message to the ACP directing the ACP to make a billing record and to connect the call.

2.84 When the SDN NCP instructs the ACP to make a billing record, the SDN NCP must send the generic billing data, service specific data, and the destination number. If the call is a data call, the data rate and authorization code (if one was collected) must be sent.

2.85 When the SDN NCP instructs the ACP to connect the call, the SDN NCP must include the international routing number, the generic routing information, and the supplemental routing information. The generic routing information indicates non-dedicated egress. The supplemental routing indicated that the call is GSDN and whether it is On-net or Off-net. In addition, if the call is a data call, the data rate must be included.

- Step 22 — The ACP creates an AMA billing record.

- Step 23 — The ACP translates the routing number, received from the SDN NCP, and routes the call with a GSDN/VPN indicator and as On/Off-net indicator to the foreign switch.

Note: GSDN is used domestically, VPN is used internationally.

- Step 24 — The International Switching Center (ISC) receives the routing number and retranslates the digits. Outbound GSDN calls with the GSDN SID are routed to the foreign administration with the VPN SID and the On/Off-net indicator in the IAM, using an international PSTN Trunk SubGroup (TSG) that supports CCITT7 ISUP.

Note: If a CCITT7 ISUP PSTN TSG is not available, the call overflows to another ISC that has CCITT7 ISUP PSTN TSGs to the destination country, if such an ISC exists. If such an ISC does not exist, the original ISC provides final handling treatment.

- Step 25 — The foreign ISC translates the received digits, recognizes the VPN call indicator, and routes the call to the appropriate GSDN station or PBX.

GSDN Inbound Activation

2.86 The GSDN feature activation and call sequence for an inbound call is described in the following

U. S.   **FOREIGN**

(7-11) Authorization Code Collection

(13) Blocked Call Treatment

(4-6, 12) Screening

(16) Data Base Query Record

(19-20) Additional Screening

(17) Number Translation
On/Off-Net Determination

Routing Number
Billing Info
GSDN Indicator
On/Off Indicator

SDN
NCP

Customer Indentification
Dialed Digits

(14)

Routing Number
On/Off Indicator

Data
Base

(18)

(12)

ACP
Timer
Increase

(15)

(3)

CCS7

STP1

CCITT #7

Out of Band
Signaling

ANI
Dialed Digits

NSCX

ACP

(23)

ISC

Switch

(25) Digits

(2)

Routing Number
GSDN Indicator
On/Off Indicator

(24)

Routing Number
VPN Indicator
On/Off Indicator

Dialed
Digits

AMA

(22) Billing Record

CPE

CPE

(1) Dialed Digits

Figure 5—GSDN Outbound Call Flow (Unblocked)

paragraphs and the call flow sequence is shown in Figure 6. The call sequence steps are listed as follows:

- Step 1 — A foreign caller dials a digit sequence that enables the serving switching system to identify the call as a VPN call

- Step 2 — The foreign administration switching system queries the data base that houses the customer record of the calling party.

- Step 3 — The data base may indicate an authorization code is to be collected.

- Step 4 — The data base determines whether the caller is allowed to call the dialed number.

- Step 5 — Blocked call treatment.

2.87 Screening determines one of three possible actions, depending on the authorization code. These actions are:

a. The call is blocked.

b. The call requires additional information.

c. The call is allowed.

2.88 **The call is blocked** — When a call is blocked, the foreign data base makes a billing record, plays an announcement message, and disconnects the call.

- Step 6 — When a call is allowed, the foreign data base sends a **Begin** message to the SDN NCP. The message must also contain the customer ID and the dialed digits.

- Step 7 — The SDN NCP receives the message from the foreign data base and makes a data base query record for the call. This records both the **Begin** message from the foreign data base and the SDN NCP response message.

- Step 8 — The SDN NCP accesses the proper customer record (using the customer ID provided by the foreign data base).

- Step 9 — The SDN NCP creates and sets to predetermined values the type of call indicator, the screening status indicator, and the type of numbering plan for the dialed number.

- Step 10 — The SDN NCP passes the dialed number, the number plan type, an inbound type of call indicator, and a screened status to the CPR.

- Step 11 — The CPR translates the dialed number to a routing number and determines if the dialed station is On-net or Off-net

- Step 12 — The CPR instructs the SDN NCP to send a message to the foreign data base. This message must include the routing number and an On/Off-net indication.

- Step 13 — The foreign data base sends the routing number, the On/Off-net indication, and billing information to the serving switching center.

- Step 14 — The serving switching center makes a billing record.

- Step 15 — The serving switching center routes the call to the foreign ISC with the VPN service identification and the On/Off-net indication.

- Step 16 — The foreign administration's ISC formulates a CCITT7 IAM with the VPN service identification and the On/Off-net indication.

- Step 17 — The AT&T ISC recognizes inbound GSDN calls based on the VPN service identification. The AT&T ISC distinguishes between GSDN calls based on the VPN call indicator set to **10**. The call is routed if the incoming Trunk SubGroup (TSG) is set to "phase 2". If the TSG is not set to "phase 2", a query is made to the SDN NCP. Off-net calls are routed within the AT&T Switch Network (ASN) as either Long Distance Service (LDS) or Switched Digital International (SDI) calls, depending on their bearer capability. On-net calls are routed within the ASN as GSDN calls, regardless of the bearer capability.

- Steps 18 — The terminating AT&T 4 ESS switch routes the call to the called customer using either a direct egress TSG, the Local Exchange Carrier (LEC), Equal Access Tandem End Office (EAEO), or Access Tandem (AT), depending on the routing number.

- Step 19 — If CLI is present, the terminating 4 ESS switch makes an aggregate billing record

for direct connect customers on a per-TSG/per-service basis. For calls routed to a LEC EAEO (or AT), the 4 ESS switch determines if CLI is passed to the EAEO using the TSG characteristics to the EAEO.

- Step 20 — The terminating switch outpulses as many digits as required to the CPE or the LEC EAEO that identifies the called station.

ABNORMAL OPERATIONS

2.89 The conditions that may cause abnormal operation of an ISAC capability is discussed in the following paragraphs:

A. Originating Foreign Calling Line Interactions

2.90 Proper interworking is required between the CCITT7 and CCS7 ISUP protocols when CLI is supported on inbound I800 calls. If CCS7 connectivity does not exist at any point along the call path, the call is routed without CLI.

B. International CCITT No. 7 ISUP Operations

2.91 Proper interworking is required between the CCITT7 and CCS7 ISUP protocols for outbound/inbound I800 calls. If CCS7 connectivity does not exist at any point along the call path, the call is routed without the International CCITT No. 7 ISUP feature.

C. GSDN Operations

2.92 There are a number of possible GSDN error conditions that may occur. These possible error conditions are depicted in Figures 7 through 16.

INTERACTIONS

A. Originating Foreign Calling Line Identification Interactions

2.93 When the customer subscribes to the CLI feature, the subscriber must specify if CLI is to be delivered with each inbound I800 call or on a per-call basis.

2.94 There are no new requirements to support CLI other than CCS7 connectivity.

B. Originating Foreign Calling Line Identification Limitations

2.95 The "A Digits", Automatic Number Identification (ANI), parameter is sent from the ISC/ACP to the DSD NCP in the **provide Instruction-Start** operation only if the inbound I800 call is routed over a CCITT7 ISUP trunk.

RESTRICTION CAPABILITY

2.96 The only restrictions to the ISAC feature package are for the subscriber to request a change in billing methods or to change feature options.

2.97 The only restriction to the GSDN capability is when the caller is connected to a switched access location. The 5 to 12-digit private numbers cannot be dialed except for 7-digit private numbers that are currently allowed as the last seven digits of a 700 number (that is, 700 + 7 digits).

HARDWARE

2.98 There are no hardware additions or modifications required at this time to support the ISAC feature package.

SOFTWARE

2.99 There are no software additions or modifications required at this time to support the ISAC feature package.

3. ADMINISTRATION

IMPLEMENTATION

3.01 The ISAC feature package is implemented when the subscriber provides CPE facilities with CCS7 ISUP capabilities.

NEW AMA FIELDS

3.02 The AMA recording is done at the ISC/ACP for every inbound I800 call. There are four new call structure codes needed for inbound I800 calls using any of the ISAC features contained in the supplemental A800 billing data parameter.
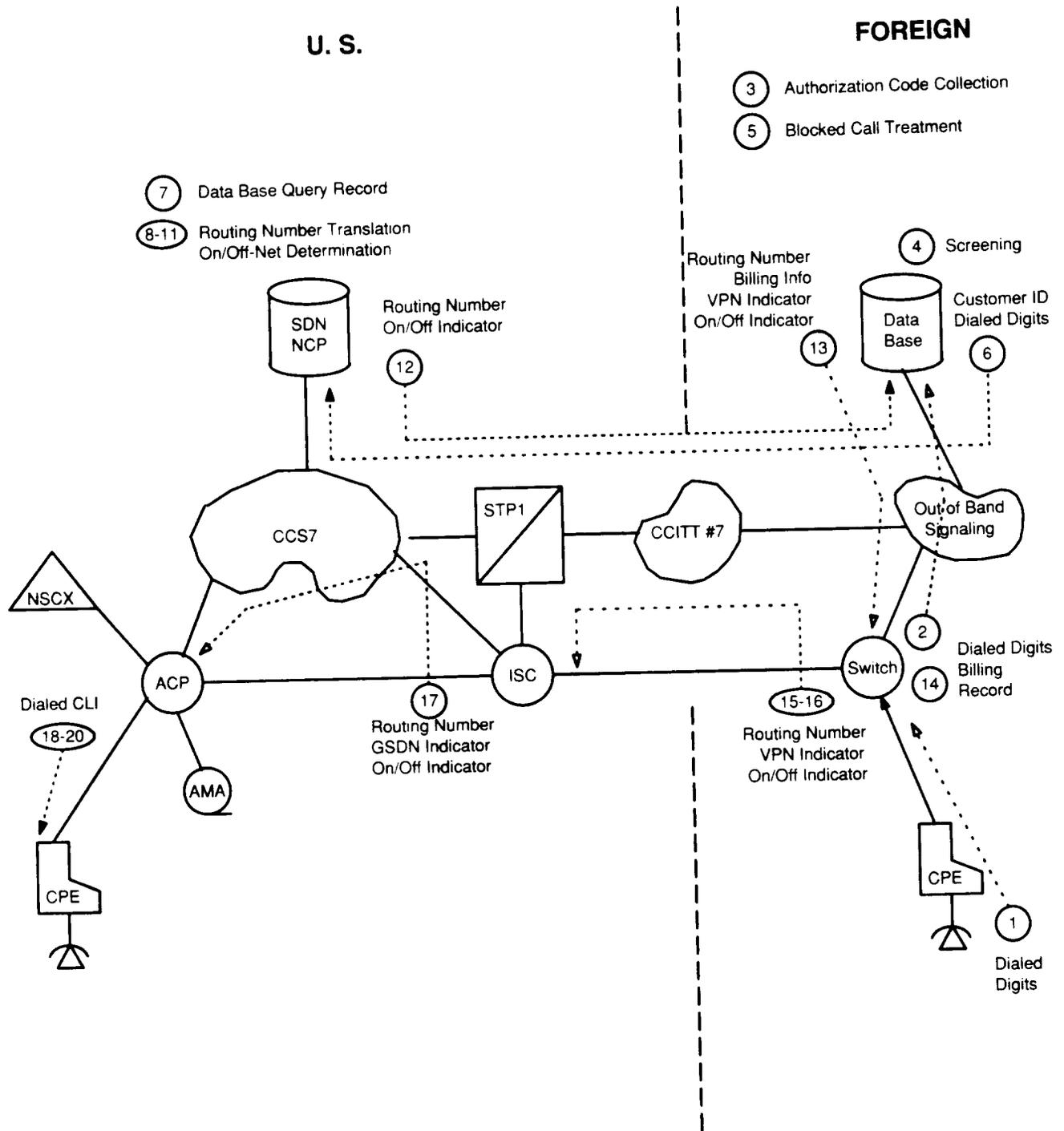
Figure 6—GSDN Inbound Call Flow (Unblocked)

SDN NCP ————————————————————————————————➤ Foreign Data Base

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
  OPERATION = Translate_VPN_Number_OS
  PARAMETERS (Mandatory)

        ● Customer ID

        ● Dialed Number

The SDN NCP activates the Foreign Data Base Response Timer.

SDN NCP ◄———————————————————————————————— Foreign Data Base

☐ MESSAGE TYPE = End

● COMPONENT TYPE = Return_Result_(Last)
  PARAMETERS (Mandatory)

        ● Routing Number

        ● On-Net/Off-Net Indicator

Figure 7—SDN NCP To Foreign Data Base - RETURN_RESULT_(LAST)

SDN NCP ————————————————————————————————➤ Foreign Data Base

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
  OPERATION = Translate_VPN_Number_OS
  PARAMETERS (Mandatory)

        ● Customer ID

        ● Dialed Number

The SDN NCP activates the Foreign Data Base Response Timer.

SDN NCP ◄———————————————————————————————— Foreign Data Base

☐ MESSAGE TYPE = End

● COMPONENT TYPE = Return_Error
  ERROR CODE = VPN Service Denied
  PARAMETERS (Mandatory)

        ● VPN Service Denied Cause

Figure 8—SDN NCP To Foreign Data Base - RETURN_ERROR

A. **Originating Foreign Calling Line Identification AMA Fields**

3.03 The I800 Phase 2 call code received in the generic billing data will be 324 for inbound calls. There are four existing structure codes that are recorded for inbound I800 calls that have not been put on queue, have not passed any CLI to the network or terminating end, and have not used any of the features contained in the supplemental A800 billing data parameter. These structures codes are:

SDN NCP ——————————————————————————————————▶ **Foreign Data Base**

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
  OPERATION = Translate_VPN_Number_OS
  PARAMETERS (Mandatory)

      ● Customer ID

      ● Dialed Number

The SDN NCP activates the Foreign Data Base Response Timer.

SDN NCP ◀—————————————————————————————————— **Foreign Data Base**

☐ MESSAGE TYPE = End

● COMPONENT TYPE = Reject
  PROBLEM CODE (Mandatory)
  PARAMETERS (Mandatory)

      ● None

Figure 9—SDN NCP To Foreign Data Base - REJECT

SDN NCP ——————————————————————————————————▶ **Foreign Data Base**

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
  OPERATION = Translate_VPN_Number_OS
  PARAMETERS (Mandatory)

      ● Customer ID

      ● Dialed Number

The SDN NCP activates the Foreign Data Base Response Timer.

SDN NCP ◀—————————————————————————————————— **Foreign Data Base**

☐ MESSAGE TYPE = Abort

● P_Abort_Cause
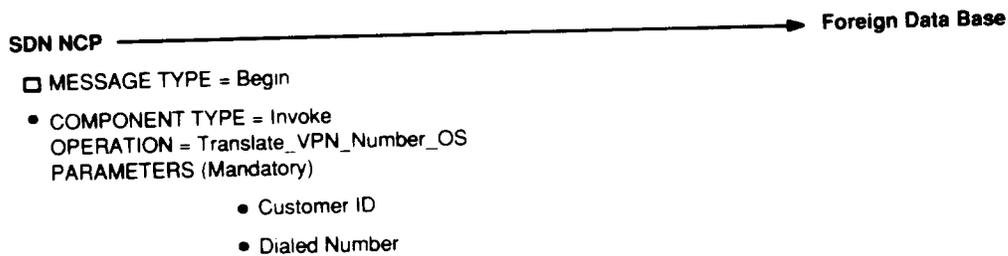
Figure 10—SDN NCP To Foreign Data Base - ABORT

● 00250 — No queue, no CLI, no alternate billing number

● 00251 — No queue, no CLI, with alternate billing number

● 00252 — (Long duration) No queue, no CLI, no alternate billing number

● 00253 — (Long duration) No queue, no CLI, with alternate billing number.

SDN NCP ————————————————————————————————▶ Foreign Data Base

□ MESSAGE TYPE = Begin

• COMPONENT TYPE = Invoke
 OPERATION = Translate_VPN_Number_OS
 PARAMETERS (Mandatory)

  • Customer ID

  • Dialed Number

The SDN NCP activates the Foreign Data Base Response Timer.

The Foreign Data Base Response Timer expires and the SDN NCP terminates the call.

Figure 11—SDN NCP To Foreign Data Base - TIMER EXPIRES

Foreign Data Base ————————————————————————————————▶ SDN NCP

□ MESSAGE TYPE = Begin

• COMPONENT TYPE = Invoke
 OPERATION = Translate_VPN_Number_OS
 PARAMETERS (Mandatory)

  • Customer ID

  • Dialed Number

Foreign Data Base ◀———————————————————————————————— SDN NCP

□ MESSAGE TYPE = End

• COMPONENT TYPE = Return_Result_(Last)
 PARAMETERS (Mandatory)

  • Routing Number

  • On-Net/Off-Net Indicator

Figure 12—Foreign Data Base To SDN NCP - RETURN_RESULT_(LAST)

3.04 There are four additional existing structure call codes that are recorded for inbound I800 calls that have been put on queue or have passed CLI to the network or terminating end. These call codes have not used any of the features contained in the supplemental A800 billing data parameter. These structure call codes are:

• 01059 — Queue and/or CLI, no alternate billing number

Foreign Data Base ————————————————————————————————————➤ **SDN NCP**

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
  OPERATION = Translate_VPN_Number_OS
  PARAMETERS (Mandatory)

  ● Customer ID

  ● Dialed Number

Foreign Data Base ◄———————————————————————————————————— **SDN NCP**

☐ MESSAGE TYPE = End

● COMPONENT TYPE = Return_Error
  ERROR CODE = Input Error
  PARAMETERS (Mandatory)

  ● Input Error Cause
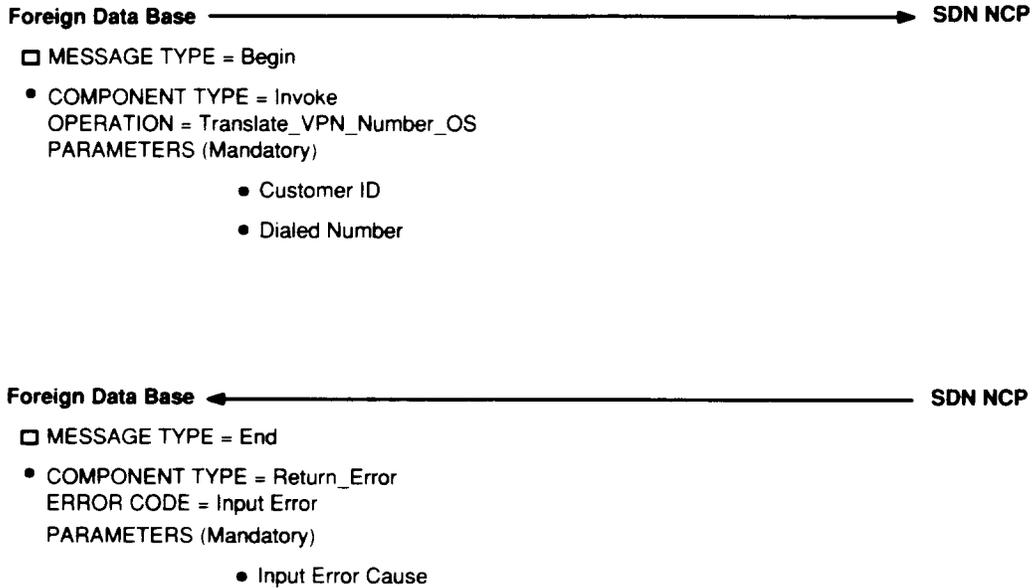
Figure 13—Foreign Data Base To SDN NCP - RETURN_ERROR (Input Error)

Foreign Data Base ————————————————————————————————➤ **SDN NCP**

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
  OPERATION = Translate_VPN_Number_OS
  PARAMETERS (Mandatory)

  ● Customer ID

  ● Dialed Number

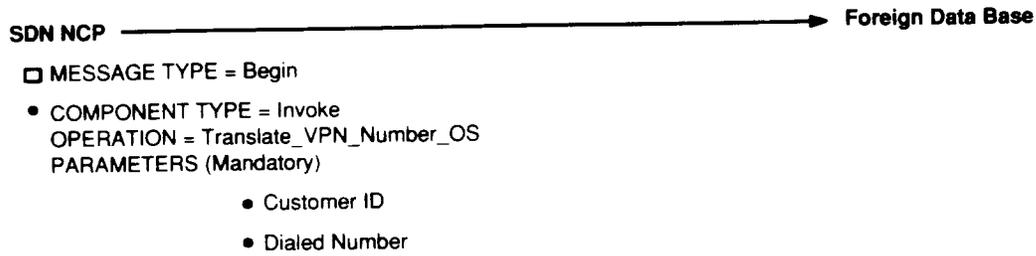**Foreign Data Base** ◄———————————————————————————————— **SDN NCP**

☐ MESSAGE TYPE = End

● COMPONENT TYPE = Return_Error
  ERROR CODE = VPN Service Denied
  PARAMETERS (Mandatory)

  ● VPN Service Denied Cause
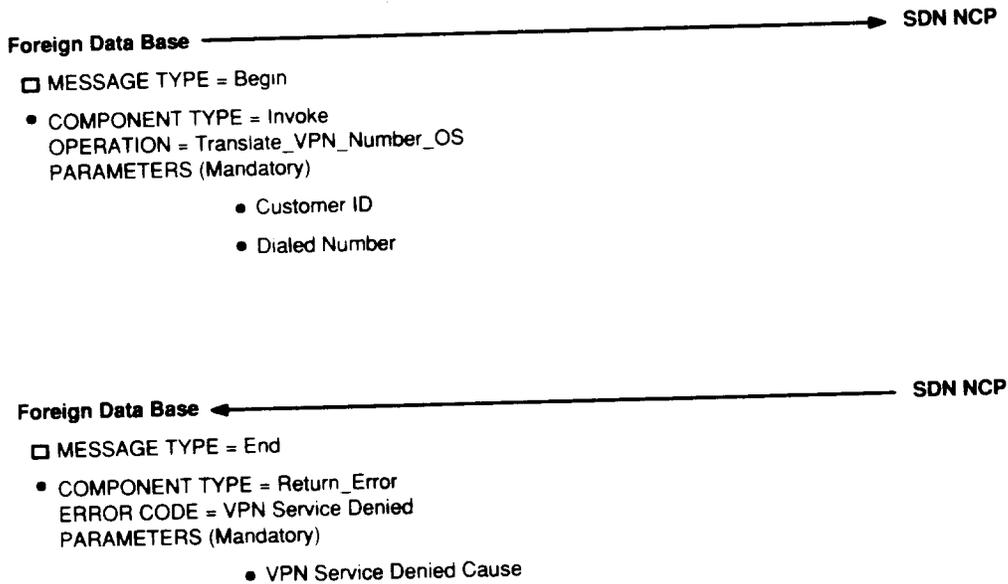
Figure 14—Foreign Data Base To SDN NCP - RETURN_ERROR (Service Denied)

● 01060 — Queue and/or CLI, with alternate billing number

● 01061 — (Long duration) Queue and/or CLI, no alternate billing number

● 00262 — (Long duration) No queue, no CLI, with alternate billing number.

MAXIMUM CAPACITY

3.05 The maximum capacity is determined by the total number of trunks in service and the number of trunks in use at any given time.

Foreign Data Base ——————————————————————————▶ **SDN NCP**

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
OPERATION = Translate_VPN_Number_OS
PARAMETERS (Mandatory)

   ● Customer ID

   ● Dialed Number

The SDN NCP activates the Foreign Data Base Response Timer.

Foreign Data Base ◀—————————————————————————— **SDN NCP**

☐ MESSAGE TYPE = End

● COMPONENT TYPE = Reject
PROBLEM CODE (Mandatory)
PARAMETERS (Mandatory)

   ● None
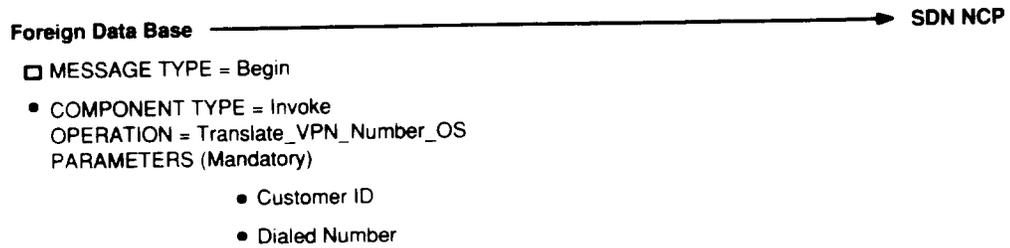
Figure 15—Foreign Data Base To SDN NCP - REJECT

Foreign Data Base ——————————————————————————▶ **SDN NCP**

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
OPERATION = Translate_VPN_Number_OS
PARAMETERS (Mandatory)

   ● Customer ID

   ● Dialed Number

The SDN NCP activates the Foreign Data Base Response Timer.

Foreign Data Base ◀—————————————————————————— **SDN NCP**

☐ MESSAGE TYPE = Abort

● P_Abort_Cause
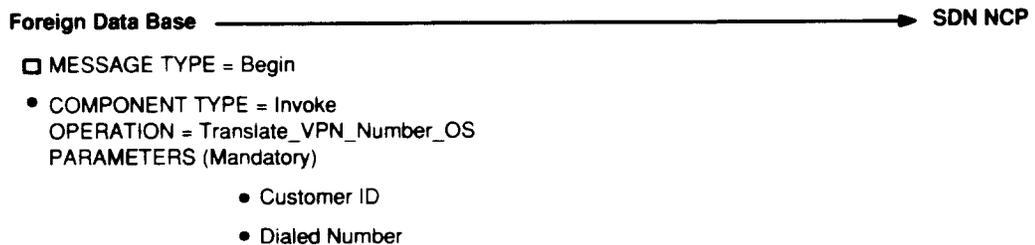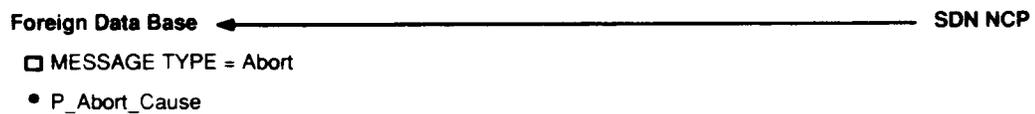
Figure 16—Foreign Data Base To SDN NCP - ABORT

DATA BASE MANAGEMENT

3.06 The implementation of the ISAC feature package does not require any new network management requirements.

RECENT CHANGE MESSAGES

3.07 The 4 ESS switch provides the capability to administratively change, using Recent Change (RC) screens, the following type of data:

   ● ISC call types

Originating DB ————————————————————————▶ Terminating DB

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
OPERATION = Translate_VPN_Number_OS
PARAMETERS (Mandatory)

● Customer ID

● Dialed Number

Originating DB ◀———————————————————————— Terminating DB

☐ MESSAGE TYPE = End

● COMPONENT TYPE = Return_Result_(Last)
PARAMETERS (Mandatory)

● Routing Number

● On-Net/Off-Net Indicator

Originating DB ◀———————————————————————— Terminating DB

☐ MESSAGE TYPE = Begin

● COMPONENT TYPE = Invoke
OPERATION = International_Automatic_Code_Gap
PARAMETERS (Mandatory)

● International_Automatic_Code_Gap_Indicator

● Service_Control_Code

Figure 17—Foreign Data Base to SDN NCP - TIMER EXPIRES

● Network Interface Facilities and Protocol.

3.08 The Recent Change screens will be included in this document when available.

MEASUREMENTS

3.09 The delivery of the ISAC feature package does not require new types of measurements.

AUTOMATIC MESSAGE ACCOUNTING

A. GSDN Call Recording Formats

3.10 The 5- to 12-digit dialed number is always recorded in the AMA record. The recorded number is always right justified in the dialed NPA and

dialed number fields and padded with zeros (if necessary) in the most significant digits.

GSDN Open Dialing Plan

3.11 For the open dialing plan, customer-defined private numbers (five to seven digits in length) are recorded only in the dialed number field. The dialed NPA field should contain all zeros. Private numbers, eight to twelve numbers in length, are partially recorded in the dialed NPA field with the most significant bits recorded in the dialed NPA field and the seven least significant bits recorded in the dialed number field. The bit assignments are listed in Table M.

GSDN TCAP Dialing Plan

3.12 The new AMA recording format requirements are listed in Table N.

4. SUPPLEMENTARY INFORMATION

ABBREVIATIONS AND ACRONYMS

4.01 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
APN	Action Point Number
ASN	AT&T Switch Network
AT	Access Tandem
ATP	All Tests Pass
BN	Billing Number
CAOSS	Centralized Administration Operations Support System
CC	Country Code
CCIS	Common Channel Interoffice Signaling
CCS	Common Channel Signaling
CCITT	International Telephone and Telegraph Consultative Committee
CLI	Calling Line Identification
Co'dN	Connected Number
COLI	Connected Line Identification
COLP	Connected Line Identification Presentation
COLR	Connected Line Identification Restriction
CON	Connect
CPE	Customer Premises Equipment
CPG	Call Progress
CPR	Call Progress Record
CUG	Closed User Group
CgPN	Calling Party Number
DTMF	Dual Tone Multi-Frequency
DNIS	Dialed Number Identification Service
DSD	Direct Services Dialing
DTMF	Dual Tone Multi-Frequency
EAEO	Equal Access Tandem End Office
GSDN	Global Software Defined Network
HANI	Hybrid ANI
I800	International 800
IAM	Initial Address Message
ICDR	International Call Detail Recording
ID	Identification
IE	Information Element
ILDS	International Long Distance Service
ISAC	International Services And Capabilities
ISC	International Switching Center
ISD	International Switched Digital Service
ISDN	Integrated Services Digital Network

ISUP	Integrated Services Digital Network User Part	TCAP	Transaction Capabilities Application Part
LDS	Long Distance Service	TMR	Transmission Medium Requirement
LEC	Local Exchange Carrier	USI	User Service Information
MA-UUI	Message Associated User-to-User Information	UUI	User-to-User Information
NANP	North American Numbering Plan	UUS	User-to-User Signaling
NCP	Network Control Point	VPN	Virtual Private Network
NN	National Number		
NSCX	Network Services Complex		
PBX	Private Branch Exchange		
PRI	Primary Rate Interface		
PSTN	Public Switch Telephone Network		
PTT	Post Telephone and Telegraph		
RC	Recent Change		
SDI	Switched Digital International		
SDN	Software Defined Network		
SGD	Station Group Designator		
SID	Station Identification		
STP	Signal Transfer Point		

REFERENCES

A. AT&T Practices

(1) 231-390-063 Automatic Message Accounting Feature

(2) 234-040-030 Measurements System Measurements NO. 4 ESS Switch

B. Other Documentation

(1) Parameter Guide PG-4E

(2) Translation Guide TG-4E

5. ISSUING ORGANIZATION

Published by
The AT&T Documentation Development Organization

TABLE A	
I800 INBOUND ROUTING CONVERSION	
BCD Chars.	**Description**
196	Special service code
CC	2-digit real or I800 Pseudo Country Code Identifying Country of origin
VWXYZ	Identifies AT&T Subscriber

TABLE B		
MAPPING FROM CCITT NO. 7 CPG TO CCS7 CPG		
CALL PROGRESS (CPG) MESSAGE		
CCITT NO. 7 PARAMETERS	INCOMING	CCS7 PARAMETERS

Event Information
 	
bits GFEDCBA: Event indicator
  0000000 spare
  0000001 ALERTing
  0000010 PROGress
  0000011 in band
   information or an
   appropriate pattern
   is now available
  0000100 Call forward on busy
  0000101 Call forward on no reply
  0000110 Call forward
         unconditional
  0000111
   to spare
  1111111
 	
bit H: Event presentation
    restricted indicator
  0 no indication
  1 presentation restricted
	3.17A/Q.763	Event Information
		
		bits GFEDCBA: Event indicator
		  0000000 spare
		  0000001 ALERTing
		  0000010 PROGress
		  0000011 in band
		   information or an
		   appropriate pattern
		   is now available
		  0000100 Call forward on busy
		  0000101 Call forward on no reply
		  0000110 Call forward
		         unconditional
		  0000111
		   to spare
		  1111111
		
		bit H: Event presentation
		    restricted indicator
		  0 no indication
		  1 presentation restricted

Access Transport	3.2/Q.763	Access Transport
Backward Call Indicator	3.3/Q.763	Backward Call Indicator
User-to-User Indicator	3.33A/Q.763	User-to-User Indicator
User-to-User Information	3.34/Q.763	User-to-User Information

TABLE C		
MAPPING FROM CCS7 CPG TO CCITT NO. 7 CPG		
CALL PROGRESS (CPG) MESSAGE		
CCS7 PARAMETERS	OUTGOING	CCITT NO. 7 PARAMETERS

Event Information
 	
bits GFEDCBA: Event indicator
    0000000 spare
    0000001 ALERTing
    0000010 PROGress
    0000011 in band
      information or an
      appropriate pattern
      is now available
    0000100 Call forward on busy
    0000101 Call forward on no reply
    0000110 Call forward
            unconditional
    0000111
      to spare
    1111111
 	
bit H: Event presentation
        restricted indicator
    0 no indication
    1 presentation restricted
	3.17A/Q.763	Event Information
		
		bits GFEDCBA: Event indicator
		    0000000 spare
		    0000001 ALERTing
		    0000010 PROGress
		    0000011 in band
		      information or an
		      appropriate pattern
		      is now available
		    0000100 Call forward on busy
		    0000101 Call forward on no reply
		    0000110 Call forward
		            unconditional
		    0000111
		      to spare
		    1111111
		
		bit H: Event presentation
		        restricted indicator
		    0 no indication
		    1 presentation restricted

Access Transport	3.2/Q.763	Access Transport
Backward Call Indicator	3.3/Q.763	Backward Call Indicator
User-to-User Indicator	3.33A/Q.763	User-to-User Indicator
User-to-User Information	3.34/Q.763	User-to-User Information

TABLE D MAPPING OF TRANSIT CPG		
CALL PROGRESS (CPG) MESSAGE		
CCITT NO. 7 PARAMETERS (INCOMING)	**CCS7 PARAMETERS (VIA)**	**CCITT NO. 7 PARAMETERS (OUTGOING)**

Event Information
bits GFEDCBA: Event indicator
  0000000 spare
  0000001 ALERTing
  0000010 PROGress
  0000011 in band
    information or an
    appropriate pattern
    is now available
  0000100 Call forward
      on busy
  0000101 Call forward on
      no reply
  0000110 Call forward
      unconditional
  0000111
    to spare
  1111111
 	
bit H: Event presentation
    restricted indicator
  0 no indication
  1 presentation restricted
 	
Access Transport
 	
Backward Call Indicator
 	
User-to-User Indicators
 	
User-to-User Information
	Event Information
	bits GFEDCBA: Event indicator
	  0000000 spare
	  0000001 ALERTing
	  0000010 PROGress
	  0000011 in band
	    information or an
	    appropriate pattern
	    is now available
	  0000100 Call forward
	      on busy
	  0000101 Call forward
	      on no reply
	  0000110 Call forward
	      unconditional
	  0000111
	    to spare
	  1111111
	
	bit H: Event presentation
	    restricted indicator
	  0 no indication
	  1 presentation restricted
	
	Access Transport
	
	Backward Call Indicator
	
	User-to-User Indicators
	
	User-to-User Information
		Event Information
		bits GFEDCBA: Event indicator
		  0000000 spare
		  0000001 ALERTing
		  0000010 PROGress
		  0000011 in band
		    information or an
		    appropriate pattern
		    is now available
		  0000100 Call forward
		      on busy
		  0000101 Call forward
		      on no reply
		  0000110 Call forward
		      unconditional
		  0000111
		    to spare
		  1111111
		
		bit H: Event presentation
		    restricted indicator
		  0 no indication
		  1 presentation restricted
		
		Access Transport
		
		Backward Call Indicator
		
		User-to-User Indicators
		
		User-to-User Information

TABLE E
MAPPING OF CCITT NO. 7 CON MESSAGE TO CCS7 ACM AND ANM

CCITT NO. 7 PARAMETERS	ACTIONS INCOMING ONLY	CCS7 PARAMETERS
CONNECT (CON) MESSAGE		**ADDRESS COMPLETE MESSAGE (ACM)**
Backward Call Indicator	3.3/Q.763	Backward Call Indicator
Optional Backward Call Indicator	3.24A/Q.763	Discard
		ANSWER MESSAGE (ANM)
Connected Number	3.14A/Q.763 See Table H	Connected Number
User-to-User Indicator	3.33A/Q.763	User-to-User Indicator
User-to-User Information	3.34/Q.763	User-to-User Information
Access Transport	3.2/Q.763	Access transport

TABLE F
SPEECH TO 3.1 kHz

USI		USI, TMR
CCS7 USI	**ACTION OUTGOING**	**CCITT NO. 7 USI, TMR**

Speech
 	
USI: 1000 0000
    (CCITT Standard,speech)
1001 0000
(Circuit mode, 64 kb/s)
1010 0010
(layer 1, u-law speech)
		3.1 kHz
		TMR: 0000 0011
		USI: 1001, 0000
		    (CCITT Standard,3.1 kHz)
		1001 0000
		Circuit mode, 64 kb/s)
		Discard

TABLE G		
CONNECTED NUMBER (Co'dN) FOR INBOUND CALL		
CONNECTED NUMBER FOR INBOUND CALL		
CCS7 PARAMETERS	**CCITT NO. 7 PARAMETER**	**REMARKS**
Odd/Even	Odd/Even	
Nature of address indicator	Nature of address indicator	
0000000 spare		recode as "0000100"
0000001 subscriber number	1111000 private number	
0000010 spare,reserved for national use		recode as "0000100"
0000011 national (sig.) number		recode as "0000100"
0000100 international number	0000100 international number	
0000101 to spare 1101111		recode as "0000100"
1110000 to reserved for national use 1111110		recode as "0000100"
1111111 spare		recode as "0000100"
Numbering Plan	Numbering Plan	
000 unknown		recode as "001"
001 ISDN (telephony) numbering plan (Rec. E.164, E.163)	001 ISDN (telephony) numbering plan (Rec. E.164, E.163)	
010 to spare 100		recode as "001"
101 private numbering plan	101 private numbering plan	
110 spare		recode as "001"
111 spare		recode as "001"
Address presentation restricted indicator	Address presentation restricted indicator	
00 presentation allowed	00 presentation allowed	
01 presentation restricted	01 presentation restricted	
10 spare		recode as "01"
11 spare		recode as "01"
Screening Indicator	Screening Indicator	
00 user provided, not verified	00 reserved	
01 user provided, verified and passed	01 user provided, verified and passed	
10 user provided, verified and failed		**Discard Co'dN parameter**
11 Network provided	11 Network provided	
Address Signals	Address Signals	"ST" not included

TABLE H		
CONNECTED NUMBER (Co'dN) IN OUTBOUND CALL		
CONNECTED NUMBER IN OUTBOUND CALL		
CCITT NO. 7 PARAMETERS	**CCS7 PARAMETER**	**REMARKS**
Odd/Even	Odd/Even	
Nature of address indicator	Nature of address indicator	
0000000 spare		recode as "0000100"
0000001 subscriber number		recode as "0000100"
0000010 spare,reserved for national use		recode as "0000100"
0000011 national (sig.) number		recode as "0000100"
0000100 international number	0000100 international number	
0000101 to spare 1101111		recode as "0000100"
1110000 to reserved for national use 1110111		recode as "0000100"
1111000 private number	0000001 subscriber number	
1111001 to reserved for national use 1111110		recode as "0000100"
1111111 spare		recode as "0000100"
Numbering Plan	Numbering Plan	
000 spare		recode as "001"
001 ISDN (telephony) numbering plan (Rec. E.164, E.163)	001 ISDN (telephony) numbering plan (Rec. E.164, E.163)	
010 spare		recode as "001"
011 Data numbering plan (Rec. X.121)	011 spare	value passed
100 Telex numbering plan (Rec. F.69)	100 spare	value passed
101 private numbering plan	101 private numbering plan	
110 spare		recode as "001"
111 spare		recode as "001"
Address presentation restricted indicator	Address presentation restricted indicator	
00 presentation allowed	00 presentation allowed	
01 presentation restricted	01 presentation restricted	
10 address not available		**Discard Co'dN parameter**
11 spare		record as "01"
Screening Indicator	Screening Indicator	
00 reserved	00 user provided, not verified	
01 user provided, verified and passed	01 user provided, verified and passed	
10 reserved	10 user provided, verified and failed	
11 Network provided	11 Network provided	
Address Signals	Address Signals	"ST" not included

TABLE I		
TRANSIT CONNECTED NUMBER (Co'dN)		
TRANSIT CONNECTED NUMBER		
CCITT NO. 7 INCOMING PARAMETERS	CCS7 VIA PARAMETERS	CCITT NO. 7 OUTGOING PARAMETERS
Odd/Even	Odd/Even	Odd/Even

Nature of address indicator
0000000 spare
0000001 subscriber number
0000010 spare,reserved for
    national use
0000011 national (sig.) number
0000100 international number
0000101
  to spare
1101111
1110000
  to reserved for national use
1110111
1111000 private number
1111001
  to reserved for national use
1111110
1111111 spare
	Nature of address indicator
	0000000 spare
	0000001 subscriber number
	0000010 spare,reserved for
	    national use
	0000011 national (sig.) number
	0000100 international number
	0000101
	  to spare
	1101111
	1110000
	  to reserved for national use
	1110111
	0000001 subscriber number
	1111001
	  to reserved for national use
	1111110
	1111111 spare
		Nature of address indicator
		0000000 spare
		0000001 subscriber number
		0000010 spare,reserved for
		    national use
		0000011 national (sig.) number
		0000100 international number
		0000101
		  to spare
		1101111
		1110000
		  to reserved for national use
		1110111
		1111000 private number
		1111001
		  to reserved for national use
		1111110
		1111111 spare

Numbering Plan
  000 spare
  001 ISDN (telephony)
     numbering plan
     (Rec. E.164, E.163)
  010 spare
  011 Data numbering plan
     (Rec. X.121)
  100 Telex numbering plan
     (Rec. F.69)
  101 private numbering plan
  110 spare
  111 spare
	Numbering Plan
	  000 unknown
	  001 ISDN (telephony)
	     numbering plan
	     (Rec. E.164, E.163)
	  010 spare
	  011 spare
	
	  100 spare
	
	  101 private numbering plan
	  110 spare
	  111 spare
		Numbering Plan
		  000 spare
		  001 ISDN (telephony)
		     numbering plan
		     (Rec. E.164, E.163)
		  010 spare
		  011 Data numbering plan
		     (Rec. X.121)
		  100 Telex numbering plan
		     (Rec. F.69)
		  101 private numbering plan
		  110 spare
		  111 spare

Address presentation
restricted indicator
  00 presentation allowed
  01 presentation restricted
  10 address not available
  11 spare
	Address presentation
	restricted indicator
	  00 presentation allowed
	  01 presentation restricted
	  Discard Co'dN parameter
	  01 presentation resstricted
		Address presentation
		restricted indicator
		  00 presentation allowed
		  01 presentation restricted
		  Co'dN para. not generated
		  01 presentation restricted

TABLE I (contd) TRANSIT CONNECTED NUMBER (Co'dN)		
TRANSIT CONNECTED NUMBER		
CCITT NO. 7 INCOMING PARAMETERS	**CCS7 VIA PARAMETERS**	**CCITT NO. 7 OUTGOING PARAMETERS**

Screening Indicator
  00 reserved
  01 user provided, verified
     and passed
  10 reserved
 	
  11 Network provided
	Screening Indicator
	  00 user provided, not screened
	  01 user provided, screening
	     passed
	  10 user provided, screened
	     and failed
	  11 Network provided
		Screening Indicator
		  00 reserved
		  01 user provided, verified
		     and passed
		  10 reserved
		
		  11 Network provided

TABLE J
THE SDN/GSDN DIALING OPTIONS
DIALED DIGITS
STANDARD DIALING PLAN:
NNX-XXXX
NPA-NXX-XXXX
011+CC+NN+[#]
11X-NXX-XXXX
1+DIALING PLAN:
NXX-XXXX
[1+]NPA-NXX-XXXX*
011+CC+NN+[#]
1+11X-NXX-XXXX
NXX DIALING PLAN:
NXX-XXXX+[#]
NPA-NXX-XXXX
011+CC+NN+[#]
11X-NXX-XXXX
OPEN DIALING PLAN:
NXX....XX (5 to 12 digits) + [#]
[1 +] NPA-NXX-XXXX*
011+CC+NN+[#]
1+11X-NXX-XXXX
* From ISDN PBXs, dialing the "1" before the NANP number is optional. If the "1" is dialed, the PBX deletes the "1" before sending the NANP number to the ACP.

TABLE K						
Q.931/TCAP MAPPING FOR THE OPEN DIALING PLAN						
			Q.931		TCAP	
DIALED NUMBER	PBX ACTION	DIGITS RECEIVED	TYPE OF NUMBER	NUMBERING PLAN ID	NATURE OF NUMBER	NUMBERING PLAN
[1+]NANP*	Delete 1	NANP	National	ISDN/Telephony	National	E.164
011+CC+NN	Delete 011	CC+NN	International	ISDN/Telephony	International	E.164
5-12 Digits	nothing	5-12 Digits	National	ISDN/Telephony	National	E.164
* Dialing the prefix "1" is optional; includes 11X-NXX-XXXX, where X $\neq$ 0,1						

TABLE L		
DIALED DIGITS RECEIVED AND NUMBERING PLAN TYPE SET BY ACP		
DIALED DIGITS	**NATURE OF NUMBER/ NUMBERING PLAN**	**DIGITS PASSED TO NCP**
ORIGINAL DIALING PLAN:		
NNX-XXXX	National/E.164	NNX-XXXX
NPA-NXX-XXXX	National/E.164	NPA-NXX-XXXX
011+CC+NN+[#]	International/E.164	CC+NN
11X-NXX-XXXX	National/E.164	11X-NXX-XXXX
1+DIALING PLAN:		
NXX-XXXX	National/E.164	NXX-XXXX
1+NPA-NXX-XXXX	National/E.164	NPA-NXX-XXXX
011+CC+NN+[#]	International/E.164	CC+NN
1+11X-NXX-XXXX	National/E.164	11X-NXX-XXXX
NXX DIALING PLAN:		
NXX-XXXX+[#]	National/E.164	NXX-XXXX
NPA-NXX-XXXX	National/E.164	NPA-NXX-XXXX
011+CC+NN+[#]	International/E.164	CC+NN
11X-NXX-XXXX	National/E.164	11X-NXX-XXXX
OPEN DIALING PLAN:		
NXX....XX(5 to 12 digits) + [#]	National/E.164	NXX....XX
1+NPA-NXX-XXXX	National/E.164	NPA-NXX-XXXX
011+CC+NN+[#]	International/E.164	CC+NN
1+11X-NXX-XXXX	National/E.164	11X-NXX-XXXX

TABLE M		
POPULATING DIALED NUMBER AND DIALED NPA FIELDS FOR 5 TO 12 DIGIT PRIVATE NUMBERS		
DIALED DIGITS	**DIALED NUMBER FIELD**	**DIALED NPA FIELD**

NXXXX
(5 digits)
	1-2: padding (0)
	3-7: NXXXX
	  8: SIGN(hex C)
		1-5: padding (0)
		  6: SIGN (hex C)

NXXXXX
(6 digits)
	1: padding (0)
	2-7 NXXXXX
	  8: SIGN(hex C)
		1-5: padding (0)
		  6: SIGN (hex C)

NXXXXXX
(7 digits)
	1-7: NXXXXXX
	  8: SIGN(hex C)
		1-5: padding (0)
		  6: SIGN(hex C)

NXXXXXXX
(8 digits)
	1-7: XXXXXXX
	  8: SIGN (hex C)
		1-4: padding (0)
		  5: N
		  6: SIGN(hex C)

NXXXXXXXX
(9 digits)
	1-7: XXXXXXX
	  8: SIGN(hex C)
		1-3: padding (0)
		4-5: NX
		  6: SIGN(hex C)

NXXXXXXXXX
(10 digits)
	1-7: XXXXXXX
	  8: SIGN(hex C)
		1-2: padding (0)
		3-5: NXX
		  6: SIGN(hex C)

NXXXXXXXXXX
(11 digits)
	1-7: XXXXXXX
	  8: SIGN (hex C)
		1: padding (0)
		2-5: NXXX
		  6: SIGN(hex C)

NXXXXXXXXXXX
(12 digits)
	1-7: XXXXXX
	  8: SIGN(hex C)
		1-5: NXXXX
		  6: SIGN(hex C)

TABLE N
NEW VALUE FOR CALL_PROGRESS_STOPPED

BCD CHARS.	MEANING
1	0 = No indication in this character 1 = No NCP Blockage 2 = Screening or Privilege Blockage 3 = Resource Blockage 4 = Nonexistent On-Net Number or Feature Code 5 = CPR requires collecting digits, but call is from a rotary location or NSC receives no digits 6 = Nonexistent or Inactive Authorization Code 7 = SMS Crisis Management (call routed to announcement) 8 = Foreign Data Base Blockage* 9 = Not Currently Assigned
2	SIGN (hex C)
* New Value	

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