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North American ISDN Users' Forum
Agreements on
Integrated Services Digital Network

INTEGRATED SERVICES DIGITAL NETWORK

# North American ISDN Users' Forum Agreements on Integrated Services Digital Network

Based on work performed by the
North American ISDN Users' Forum

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## Reports on Computer Systems Technology

The National Institute of Standards and Technology (NIST) has a unique responsibility for computer systems technology within the Federal government. NIST's Computer Systems Laboratory (CSL) develops standards and guidelines, provides technical assistance, and conducts research for computers and related telecommunications systems to achieve more effective utilization of Federal information technology resources. CSL's responsibilities include development of technical, management, physical, and administrative standards and guidelines for the cost-effective security and privacy of sensitive unclassified information processed in Federal computers. CSL assists agencies in developing security plans and in improving computer security awareness training. This Special Publication 500 series reports CSL research and guidelines to Federal agencies as well as to organizations in industry, government, and academia.

## ABSTRACT

This document compiles the existing NIU-Forum agreements for an ISDN developed and approved in the NIU-Forum as of November 1990. These agreements cover: Layer 1 BRI at the U, and S/T reference points; Layer 1 PRI at the U reference point; Layer 2 BRI and PRI; Layer 3 BRI Basic Call Control for Class I equipment; Layer 3 PRI Basic Call Control for Class II equipment; and Generic Control procedures for Class I BRI Supplementary Services. In addition, this document references the Conformance tests which have been completed by the NIU-Forum. These include: Layer 1 BRI S/T interface; and Layer 2 BRI LAPD. Finally, this document contains the Application Profile for four of the Incoming Call Management applications which have been submitted to the NIU-Forum.

## KEYWORDS

## NOTICE OF DISCLAIMER

# ACKNOWLEDGMENTS

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# 1 Introduction

The purpose of the ISDN Agreements document, its organization and an overview of the North American ISDN Users' Forum (NIU-Forum) are described in the following subsections.

## 1.1 Purpose of this Document

Participants in the February 1991 NIU-Forum Plenary meeting, approved a motion to publish all agreements reached among the members as of November 1990. This document is a compilation of these NIU-Forum agreements for an ISDN.

## 1.2 Evolution of this Document

New versions of this document will be issued as progress is made in developing and approving implementation agreements, conformance tests, and application profiles within the NIU-Forum. It is the intent of the NIU-Forum, that each new version be compatible with previous versions. Therefore, each revision will supersede preceding versions, as each new version will include all of the unchanged agreements from previous versions, as well as errata pages for previously approved agreements.

## 1.3 Document Organization

The ISDN Agreements document is organized into specific sections as follows:

- Section 1
  Introduction — The purpose of this document, the document organization, and an overview of the structure and organization of the NIU-Forum.

- Section 2
  ISDN Versions — A specific interoperable subset of an ISDN which functions in a multi-vendor environment.

- Section 3
  Implementation Configurations — A categorization of the ISDN capabilities, based upon access and equipment class information.

- Section 4
  Implementation Agreements — The Implementation Agreements (IAs) are developed by both implementor and user representatives participating in the NIU-Forum Expert Working Groups. The IAs provided in this section allow for expeditious development of ISDN capabilities, and promote interoperability of ISDN communications equipments.

- Section 5
  ISDN Conformance Test Specifications — Conformance Test (CT) suites for an ISDN are detailed in this section of the agreements.

- Section 6
  Application Software Interface — The Application Software Interface (ASI) section will focus on the definition of a common application interface for accessing and administering ISDN services provided by Network Adapters.

- Section 7

    Application Profiles — The Application Profiles (APs) contain the recommended set of agreements and specifications for all layers and aspects of ISDN communication which must be present to support a particular users' application or set of applications (application family).

- Section 8

    References — The References section provides a listing of documents identified but not included in this publication.

## 1.4 NIU-Forum Overview

The following text introduces the NIU-Forum purpose and organization.

### 1.4.1 Purpose of the Forum

The Integrated Services Digital Network (ISDN) is defined in a group of international recommendations for a worldwide communications network for the exchange of all information (voice, data, and image) among all users, independent of any manufacturer, service provider, or implementation technology.

ISDN recommendations are being developed by the International Telephone and Telegraph Consultative Committee (CCITT). In North America, the ISDN standards are being developed by Committee T1, which is accredited by the American National Standards Institute (ANSI) and sponsored by the Exchange Carriers Standards Association (ECSA).

The result is one extensive standard with a tremendous variety of options and parameters. This is necessary to meet all the possible needs and technologies for which the standards could be used. However, to ensure interoperability and terminal portability within the ISDN network and its attendant terminals and other Customer Premises Equipment (CPE), a uniform subset of these options and parameters must be selected. Each application usually only requires a subset of functionality and in order for products to work together in a multi-vendor environment, common sets of options must be selected.

To cope with this proliferation of choices and to provide practical products and services which meet users' needs, the specification process must be extended to include Application Profiles, Implementation Agreements, and Conformance tests to promote interoperability.

### 1.4.2 NIU-Forum/NIST Relationship

The North American ISDN Users' Forum has created a user voice in the implementation of ISDN and ISDN applications and has helped to ensure that the emerging ISDN environment meets users' application needs. The NIU-Forum is sponsored by the National Institute of Standards and Technology (NIST). The precise relationship of the NIU-Forum, NIST, and other business concerns is defined by the "Cooperative Research and Development Agreement: The Consortium on ISDN Based Systems."[1]

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[1] For more information, contact the NIU-Forum Administrator (see sec. 1.5).

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### 1.4.3 NIU-Forum Organization and Procedures

The actual work of the NIU-Forum is accomplished in two workshops; the ISDN Users' Workshop (IUW) and the ISDN Implementors' Workshop (IIW). These workshops, which consist of various working groups and special project teams, meet several times a year and develop the following products: Application Requirements, Application Analyses, Application Profiles, Implementation Agreements, Conformance Criteria, and an Applications Software Interface. The IUW produces Application Requirements which describe potential applications of ISDN and the features which may be required.

The IIW develops Application Analyses, Application Profiles, Implementation Agreements, Conformance Criteria, and an Applications Software Interface which provide the technical detail necessary to implement an Application Requirement in an interoperable manner.

The activities within the two workshops are coordinated by the NIU-Forum Executive Steering Committee. While specifics of the NIU-Forum organization follow, particulars relating to the procedures for the NIU-Forum are found in the "North American ISDN Users' Forum Practices Manual."[2]

### 1.4.3.1 ISDN Users' Workshop (IUW)

The IUW is responsible for identifying, defining, and prioritizing user requirements, as well as working with the IIW to define and approve agreements necessary to support the implementation of user requirements. Membership in the IUW is open to any organization. Users participating in the IUW are organized into seven Industry Groups: Manufacturing Industries, Process Industries, Service Industries, Small Business, Financial Services, Government, and Computing and Telecommunications Industries. The IUW organization emphasizes the synergy present when organizations from the same industry segment work together to define applications. Activities within the IUW are coordinated by the IUW Steering Committee.

The IUW work program is based on identifying potential user applications and structuring the IIW work to satisfy the user applications. Any user can request consideration for a particular ISDN application. The request should be for an application which could be used to support business related operations. It is important that ISDN solutions to business problems be based on business considerations which include:

- cost reductions
- productivity enhancements
- standard application interfaces
- and performance improvements.

For a detailed description of the "User Application" Processing within the ISDN Users' Workshop, please refer to section 1.3.4.2 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]).

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[2]   For more information, please contact the NIU-Forum Administrator (see sec. 1.5).

### 1.4.3.2  ISDN Implementors' Workshop (IIW)

The IIW is responsible for developing Application Analyses, Application Profiles, Implementation Agreements, Conformance Criteria, and an Applications Software Interface in support of IUW defined Application Requirements.  The IIW also provides technical advice and consultation to the IUW, sponsors multi-vendor demonstrations and trials, and provides formal liaisons with appropriate organizations such as the Corporation for Open Systems (COS), the Open Systems Interconnection (OSI) Implementors' Workshop (OIW), or the ANSI Accredited Standards Committee T1.  Membership in the IIW is open to any organization.

The IIW Steering Committee is responsible for coordinating the activities of the IIW groups.  The IIW is organized into the following groups:

- Applications Analysis Working Group (WG)
- Application Profile Teams
- Expert WGs
- ISDN Conformance Test (ICOT) WG.

The Applications Analysis WG develops an analysis of the user's application requirements, which serves as a basis for development of the Application Profile by the Applications Profile Teams. The Expert WGs produce the Implementation Agreements that are generally based on ANSI standards.  In addition, there is an Expert WG defining an Applications Software Interface.  The ICOT WG defines conformance requirements and develops abstract test suites for Implementation Agreements and Application Profiles.

### 1.4.4  ISDN Versions

A version defines and specifies ISDN as it exists at a certain point in time as derived from existing national and international standards and other consensus activities.  Each version should be completely compatible with earlier versions.  Manufacturers and service providers would be expected to develop ISDN offerings based on a particular version.

### 1.5  Point of Contact

Further information about the NIU-Forum can be obtained by contacting:

NIU-Forum Secretariat
National Institute of Standards and Technology
Building 223, Room B364
Gaithersburg, Maryland  20899
(301) 975-2937

For information regarding specific groups or activities within the NIU-Forum please refer to the appropriate representative listed in Attachment 2 of section 1 in the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), which lists the chairs, vice chairs, secretariats, and emeriti members of the NIU-Forum Executive Steering Committee (ESC), IIW, and IUW.

## 2  Future ISDN Versions

Editor's Note:   This section is reserved for future agreements regarding the definition and specification of ISDN Versions.  Refer to section 2.0 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

The ISDN architecture is intended to interconnect all user and network equipments, in a ubiquitous fashion, to provide a common network encompassing all possible communication scenarios. Because of this broad scope, the national standards for the ISDN could not be universally applied to all the conceivable combinations of equipment types, access arrangements and applications. The concept of implementation configurations is introduced to allow specific ISDN capabilities (procedures) to be associated with a class of equipment, an access arrangement, or an application.

The use of the equipment class/access arrangement terminology permits clarification of the circumstances under which a certain capability should be available (i.e., when a particular equipment class is in use). It also permits a mechanism for indicating that a particular capability applies only to a subset of four possible configurations.

The implementation configurations, which were defined by the NIU-Forum Signalling Working Group (SWG), have been applied to the Layer 3 circuit-switched signalling protocols only. Future work will evaluate the implementation configuration concept for applicability to all agreements emerging from the NIU-Forum.

The following text provides the current description of implementation configurations from the SWG:

The concept of equipment classes is introduced in this document to permit certain procedures to be associated with a particular application or class of equipment, e.g., station equipment versus (Private Branch Exchange (PBX). Specifically, two classes of equipment are defined on the basis of two fundamental attributes.

The first attribute relates to the possibility of an exchange of signals occurring beyond the public network's point of contact with the interface (i.e., between the equipment directly connected to the public network and ISDN terminals or telephones connected to that equipment). For example, some user equipment may support subtending Basic Access digital subscriber loops and/or analog telephone loops. For Class I equipment, the network makes no provision for such an arrangement and assumes the Class I equipment constitutes the endpoint of the communication. Conversely, in the case of Class II equipment, the procedures at the network take into account that communication between Class II equipment (with which it communicates directly) and other equipment (with which the network does not have direct contact) may occur. As an example, Class II equipment may support digital and/or analog subscriber loops. Use of Class II equipment also involves the possibility of having interworking occur beyond the equipment with which the network has direct contact. Therefore, it is reasonable for Class II equipment to provide the network with an interworking notification, for both outgoing and incoming calls, when either the calling or called party respectively, is a non-ISDN user. Class II equipment may also send an interworking notification, if a private network exists beyond the Class II equipment and interworking to a non-ISDN facility within that network takes place. When an interface is associated with Class I equipment, it is assumed that multiple pieces of equipment may exist and communicate with the network over the D-channel. However, in this case, all equipment is assumed to be ISDN-capable and is considered as the endpoint of the communication. Therefore, interworking notification should not be accepted from Class I equipment.

The second attribute relates to the manner in which a SETUP message, the message which initiates an ISDN call, should be presented to the user equipment. When Class I equipment is applied on

a particular interface, the network should broadcast the SETUP message associated with each call that terminates on that interface, since interaction between the network and multiple pieces of user equipment should be supported. On the other hand, the network should not broadcast SETUP messages associated with terminating calls to an interface on which Class II equipment is being used. Here, a single piece of user equipment is assumed to be involved in all communication with the network.

To the extent possible, it is desirable to have one set of requirements for ISDN call control apply to all ISDN user configurations. However, in cases for which integrated procedures are not appropriate, the call control procedures associated with Equipment Class I will differ from those associated with Equipment Class II. Unless otherwise noted, the assumption should be that a particular procedure/capability should be provided for both classes of equipment on both basic and primary rate access. However, use of the equipment class terminology permits clarification of the circumstances under which a certain capability should be available (i.e., when a particular equipment class is in use). It also permits a mechanism for indicating that a particular capability applies only to a subset of four possible configurations which are labeled as follows.

**Table 3-1.** Implementation Configurations

|     | Class I | Class II |
| --- | --- | --- |
| BRI | *IB* | *IIB* |
| PRI | *IP* | *IIP* |

In other words, a capability that applies to Class I equipment may be provided on basic access interfaces (*IB*) and/or primary rate access interfaces (*IP*). Similarly, a capability that applies to Class II equipment may be provided on basic access interfaces (*IIB*) and/or primary rate access interfaces (*IIP*).

The notation shown in the table above is used within this implementation agreement to indicate when protocol or procedures are only expected to be supported for a particular class and/or are limited to a particular type of interface, i.e., basic or primary rate interface.

The Implementation Agreements (IAs) generated by the NIU-Forum IIW provide the agreements for implementing the American National Standard (ANS) specifications for an ISDN. These IAs were developed and approved by both industry and user representatives participating in the Expert Working Groups, as well as the NIU-Forum Plenary. The IAs exist to expedite the development of ISDN capabilities, to promote interoperability of ISDN communications equipments, and to provide a universal, multi-vendor implementation. The following text details the IAs.[3]

## 4.1 ISDN Lower Layer Specifications

The ISDN lower layer specifications define the Layer 1, 2, and 3 requirements of an ISDN. Network signalling, via the D-channel, is the focus of these agreements but, where appropriate, user data specifications of Layers 1, 2, and 3 have been included. These IAs were developed in the Signalling Expert Working Group (SWG) of the IIW. These IAs provide a framework and a set of protocol procedures for accessing an ISDN so that systems implemented according to these agreements can successfully interoperate. The following text details the ISDN lower layer IAs.

### 4.1.1 Layer 1 Basic Rate Interface (BRI)

The ISDN Basic Rate Interface (BRI) physical layer specifications are defined for their specific reference point of application. These reference points are S, T and U, providing the user and network interfaces for Terminal Equipment (TE) and Network Termination (NT) equipments. The following IAs are defined for the BRI physical layer.

#### 4.1.1.1 U Reference Point

The IA (NIU 89-101) for the U reference point states: the physical layer of the Basic Access Interface at the U reference point is specified in ANS T1.601-1988, *Integrated Services Digital Network — Basic Access Interface for Use on Metallic Loops for Application on the Network Side of the NT — Layer 1 Specification*, (Ref. [12]).

The IA has adopted the ANS T1.601-1988 (Ref. [12]) standard without exception.

#### 4.1.1.2 S and T Reference Points

The IA (NIU 89-105) for the S/T reference point states: the physical layer of the Basic Access Interface at the S and T reference points is specified in ANS T1.605-1989, *Integrated Services Digital Network — Basic Access Interface at S and T Reference Points — Layer 1 Specification*, (Ref. [16]).

The IA has adopted the ANS T1.605-1989 (Ref. [16]) standard without exception.

### 4.1.2 Layer 1 Primary Rate Interface (PRI)

The ISDN Primary Rate Interface (PRI) physical layer specifications are defined for their specific reference point of application. These reference points are the S, T and U, providing the user and

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[3] The NIU-Forum Plenary document numbers (e.g., NIU 89-101) are included for reference purposes only, as every numbered implementation agreement is included in the present document in its entirety.

network interfaces for TE and NT equipments. The following IAs are defined for the PRI physical layer.

### 4.1.2.1 U Reference Point

The IA (NIU 89-103) for the U reference point states: the physical layer of the Primary Access Interface is governed by ANS T1.403-1989, *Carrier to Customer Installation — DS1 Metallic Interface*, (Ref. [10]), and CCITT Recommendation I.431-1988, *Primary Rate User — Network Interface — Layer 1 Specification*, (Ref. [24]).

The following provisions of ANS T1.403-1989 (Ref. [10]), are excluded from the ISDN Primary Rate Interface IA:

1. section 5.3.1:      The bit rate tolerance of +/-200 bit/s.
2. section 5.6:        The minimum pulse density requirements of this section.
3. section 6.1:        The superframe format (SF).
4. section 6.3:        The complete section.
5. section 8.0:        The reference to the superframe format (SF).
6. section 8.3:        The text in paragraph 8.3.1.1 and footnote 7 (8.3.1.2).
7. section 8.4.1:      Footnote 9.
8. section 9/Figure 9:  Provisions for the use of the RJ48M connector.
9. Table 1:            This Table.
10. Table 2:           The illustration in Table 2 of Robbed-Bit Signalling.

The following provisions of ANS T1.403-1989 (Ref. [10]), shall be modified for the ISDN Primary Rate Interface IA:

1. section 5.3.2:      The text of this section is replaced by the statement, "The line code is B8ZS except as noted in section 7."
2. section 7.0:        The reference to the pulse density requirements of section 5.6 is inappropriate. The text is replaced by: "The provision of Clear Channel Capability (CCC) depends upon the use of the B8ZS line code, though the use of ZBTSI is one interim method that may be employed by agreement of the network and the user."

The provisions of ANS T1.403-1989 (Ref. [10]), shall be supplemented by the provisions of section 4.4 of the CCITT Recommendation I.431-1988, (Ref. [24]).

This IA is currently based upon the ANS T1.403-1989 (Ref. [10]), standard (the DS1 specification). The ANSI accredited technical subcommittee T1E1 has recently completed a standard for the ISDN Primary Access Interface at the reference points S, T and U (ANS T1.408-1990, *Integrated Services Digital Network (ISDN) — Primary Rate Customer Installation Metallic Interfaces — Layer 1 Specification*, Ref. [11]). This IA is currently undergoing changes to reference it.[4]

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[4]   This IA (NIU 89-103) has been revised to adopt ANS T1.408-1990 (Ref. [11]) without exception. This revision (NIU 91-103 R1) is still undergoing approval by the NIU-Forum, and will be published in the next version of the NIU-Forum ISDN Agreements document.

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#### 4.1.2.2  Future S and T Reference Points

Editor's Note:  This section is reserved for future agreements regarding the Layer 1 PRI S and T Reference Points.  Refer to section 4.1.2 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 4.1.3  Layer 2 BRI and PRI

The ISDN Basic Rate Interface (BRI) and Primary Rate Interface (PRI) access arrangements specifies one common IA for the D-channel Layer 2 data link.

The IA (NIU 89-210) for the ISDN data link layer states:  the data link layer of the D-channel is specified in ANS T1.602-1989, *ISDN Data-Link Layer Signalling Specification for Application at the User-Network Interface*, (Ref. [13]).

The IA has adopted the ANS T1.602-1989 (Ref. [13]) standard with the following, additional clarifications:

1)  Both automatic and non-automatic Terminal Endpoint Identifier (TEI) assignment terminals shall be allowed to connect to a passive bus.  Automatic TEI assignments are preferred, since it would be the responsibility of the user to ensure that different TEIs are used by each different terminal for non-automatic TEI allocation equipment.

2)  It is recommended that the data link monitor function be operated on at least one link associated with each TEI.

### 4.1.4  Layer 3 BRI and PRI

The ISDN BRI and PRI access arrangements will utilize the Layer 3 Signalling protocol as defined by ANS T1.607-1990, ANS T1.608-1990 and ANS T1.610-1990 (Refs. [17, 18, 20]).  These specifications apply to two distinct connection types:  circuit-switched and packet-switched.  The following text details the IAs for ISDN Layer 3 signalling.

#### 4.1.4.1  Circuit-Switched Call Control Procedures

The circuit-switched Layer 3 signalling protocol shall be responsible for the establishment, maintenance and tear-down of basic signalling connections and supplementary service signalling connections which utilize circuit-switched access.  The following text details the circuit-switched call control procedures.

#### 4.1.4.1.1  Basic Call Control Procedures

The IAs (NIU 300 Series) for the ISDN Basic Call Control procedures state:  the circuit-switched network layer protocol is specified in the ANS T1.607-1990, *Digital Subscriber Signalling System No. 1 (DSS1) — ISDN Layer 3 Signalling Specification for Circuit-Switched Bearer Service*, (Ref. [17]).

The IAs have adopted ANS T1.607-1990 (Ref. [17]), according to the implementation configurations, as follows:

- Class I BRI (*IB*)

The Class I BRI (*IB*) basic call control signalling IA (NIU 90-301) is included in Appendix A.

- Future Class I PRI (*IP*)

Editor's Note: This section is reserved for future agreements regarding Class I PRI (*IP*) basic call control signalling. Refer to section 4.1.4.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

- Future Class II BRI (*IIB*)

Editor's Note: This section is reserved for future agreements regarding Class II BRI (*IIB*) basic call control signalling. Refer to section 4.1.4.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

- Class II PRI (*IIP*)

The Class II PRI (*IIP*) basic call control signalling IA (NIU 90-302) is included in Appendix B.

### 4.1.4.1.2 Supplementary Services Control Procedures

The IAs (NIU 310 Series) for the ISDN Supplementary Services Control procedures are based upon ANS T1.610-1990, *Digital Subscriber Signalling System No. 1 (DSS1) — Generic Procedures for the Control of ISDN Supplementary Services*, (Ref. [20]). The following text details the IAs.

- Class I BRI (*IB*)

The IA (NIU 89-311) for the Class I BRI (*IB*) Supplementary Services Control procedures states: The generic procedures for the control of ISDN Supplementary Services for Class I equipment on a Basic Rate Interface (BRI) is specified in ANS T1.610-1990 (Ref. [20]).

The following changes shall apply to the ANS T1.610-1990 (Ref. [20]) specification:

1. In section 4, the Keypad protocol only applies during the establishment phase of a call;
2. In section 5.2.2.1, the option of using the dummy call reference for sending a call-associated feature request is removed.
3. In section 2.1.3, section 6, and Appendix I, the Common Information Element Category of the Functional Protocol is removed;
4. In section 7, the FACILITY and REGISTER messages are removed;
5. In section 8, the Facility information element is removed;
6. In Annex A, the Terminal Identification procedures for assignment of USID and TID at subscription time are removed;
7. In Annex B, section 2.1, the words "in the Called party number information element in one or more INFORMATION messages" should be changed to "in the Called party number information element in one INFORMATION message;"
8. Remove Appendix III General Description of Component Encoding Rules.
9. The scope of this implementation agreements is applicable only to the ISDN Basic Access Rate as applied to Class I equipment.

- Future Class I PRI (*IP*)

Editor's Note: This section is reserved for future agreements regarding Class I PRI (*IP*) Supplementary Services Control procedures. Refer to section 4.1.4.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

- Future Class II BRI (*IIB*)

Editor's Note: This section is reserved for future agreements regarding Class II BRI (*IIB*) Supplementary Services Control procedures. Refer to section 4.1.4.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

- Future Class II PRI (*IIP*)

Editor's Note: This section is reserved for future agreements regarding Class II PRI (*IIP*) Supplementary Services Control procedures. Refer to section 4.1.4.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 4.1.4.2 Packet-Switched Call Control Procedures

The Lower Layer Special Interest Group (LLSIG), of the OSI Implementors' Workshop (OIW), has the responsibility of developing the IAs for packet-switched connections. Their work overlaps with the packet-switched services provided by an ISDN. Therefore, the SWG has the responsibility to review the LLSIG's IAs and provide to the LLSIG any additional information/clarification necessary to align these IAs with those defining the ISDN.

The packet-switched layer 3 signalling protocol shall be responsible for the establishment, maintenance and tear-down of basic signalling connections and supplementary service signalling connections which utilize packet-switched access. The following text details the packet-switched call control procedures.

The IA (NIU 89-320) for the ISDN Basic Call Control procedures states: the packet-switched network layer protocol is specified in the CCITT Recommendation Q.931-1988 (also designated CCITT Recommendation I.451-1988), *ISDN User-Network Interface Layer 3 Specification*,[5] (Ref. [26]).

The following agreements have been reached concerning the use of CCITT Recommendation Q.931-1988, (Ref. [26]):

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[5] This IA will be aligned with ANS T1.608-1990, *Digital Subscriber Signalling System No. 1 (DSS1) — Signalling Specification for X.25 Packet Switched Bearer Service* (Ref. [18]) when ANS T1.608-1990 is stable. Please refer to section 4.1.4.2 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1* (Ref. [32]) for more information on this alignment.

1. On a BRI supporting the ISDN virtual circuit service, all of CCITT Recommendation Q.931-1988 (Ref. [26]) section 6, except for 6.1.1 and 6.2.1 (the sections covering the circuit-switched access case), shall apply. The following sections also apply; 3.2 (messages for packet-mode access connection control), 4-4.5 (section specifying general information element handling and encoding), 4.7 (information elements for packet communications).

2. On a PRI supporting the ISDN virtual circuit service all of Q.931-1988 (Ref. [26]) section 6, except for 6.1.1 and 6.2.1 (the sections covering the circuit-switched access case), 6.1.2.2, 6.2.2.2 and 6.4.2 (the sections specifying the D-channel ISDN virtual circuit service case), shall apply. The following sections also apply: 2.2 (packet-mode access connection states), 3.2 (messages for packet-mode access connection control), 4-4.5 (section specifying general information element handling and encoding), 4.7 (information elements for packet communications).

3. On a BRI or PRI supporting the Unrestricted 64 kbit/s circuit-mode service, CCITT Recommendation Q.931-1988 (Ref. [26]) sections 6.1.1, 6.2.1, 6.4.1 and 6.4.3 shall apply. The following sections also apply: 2.1 (circuit-mode connection states), 3.1 (messages for circuit-mode connection control), 4-4.5 (section specifying general information element handling and encoding).

### 4.2 Future Basic Bearer Services Specification

The ISDN basic bearer services specifications define the minimal set of bearer services provided by an ISDN. The specifications outline the set of essential bearer services, and their attributes, to be provided by an ISDN. The IAs developed for the bearer services will provide a specification outlining the required bearer services and their respective characteristics. The following text will detail the ISDN basic bearer services IAs.

### 4.2.1 Future Minimal Set of BRI Services

Editor's Note: This section is reserved for future agreements regarding the minimal set of ISDN Basic Rate Interface (BRI) bearer services. Refer to section 4.2.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 4.2.2 Future Minimal Set of PRI Services

Editor's Note: This section is reserved for future agreements regarding the minimal set of ISDN Primary Rate Interface (PRI) bearer services. Refer to section 4.2.2 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 4.3 Future Supplementary Services Specification

Editor's Note: This section is reserved for future agreements regarding the ISDN supplementary services specifications. Refer to section 4.3 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 4.4 ISDN Terminal Adaptation Specification

The ISDN Terminal Adaptation specifications define the requirements for attaching a non-ISDN terminal to an ISDN. This attachment is performed across the R reference point, with the specification of the R reference point providing the necessary characteristics, attributes and functions such that successful interoperability between the non-ISDN and the ISDN is achieved. The IAs developed for terminal adaptation provide a specification of the R reference point requirements. The following text details the ISDN terminal adaptation IAs.

#### 4.4.1 Future Circuit-Mode Data Terminal Adaptation

Editor's Note: This section is reserved for future agreements regarding circuit-mode data terminal adaptation which will define the R reference point requirements when circuit-switched connections are provided by an ISDN. Refer to section 4.4.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for the information regarding the current status of this work within the NIU-Forum.

#### 4.4.2 Packet-Mode Data Terminal Adaptation

The packet-mode data terminal adaptation IAs define the aspects of the packet-mode services to be used by the packet-mode DTE, the access requirements, and the functions of the Terminal Adaptor provided across the R reference point. These IAs were developed in the LLSIG of the OSI Implementors' Workshop. Refer to section 7 of the NIST OSI Implementors' Workshop Stable Implementation Agreements for OSI Protocols (Ref. [42]).

### 4.5 ISDN Management Specification

The ISDN Management specifications provide the operations and maintenance requirements for the various access interfaces and protocol levels of the ISDN. The IAs are to be developed in the Network Management Expert Working Group (NMWG) of the IIW. The following text details the ISDN Management IAs.

#### 4.5.1 Future Layer 1 BRI

Editor's Note: This section is reserved for future agreements regarding Layer 1 ISDN management specification, for a Basic Rate Interface (BRI). Refer to section 4.5.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

#### 4.5.2 Future Layer 1 PRI

Editor's Note: This section is reserved for future agreements regarding Layer 1 ISDN management specification, for a Primary Rate Interface (PRI). Refer to section 4.5.2 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 4.5.3  Future Layer 2 and 3, BRI and PRI

Editor's Note:  This section is reserved for future agreements regarding Layer 2 and 3 ISDN management specification, for a Basic Rate Interface (BRI) and a Primary Rate Interface (PRI). Refer to section 4.5.3 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 4.6  Future Common Channel Signalling — Signalling System #7

Editor's Note:  This section is reserved for future agreements regarding common channel signalling system, ANSI Signalling System #7 (Refs. [1, 2, 3, 4, 5, 6, 19]. Refer to section 4.6 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

# 5 ISDN Conformance Test Specifications

The NIU-Forum's Conformance Test (CT) specifications provide test suites to be used to verify the conformance of ISDN equipments to the designated specification. They are written in abstract form so that multiple test equipment vendors may provide implementations of the test suite. The ISDN Conformance test specifications are developed in the ISDN Conformance Test (ICOT) Working Group, and its subordinate Expert Working Groups: the Abstract Conformance Test Group for Layer 1 (ACT1) and the Abstract Conformance Test Group for Layers 2 and 3 (ACT23). The following text details the Conformance Tests for ISDN equipments.

## 5.1 Layer 1 BRI

The Basic Rate Interface (BRI) Layer 1 Conformance Test specifications provide the requirements for verifying equipment conformance at Layer 1 of the ISDN BRI user-network interface. The following text details the Conformance Tests for Layer 1 operation of a BRI.

- Future "U" Interface

Editor's Note: This section is reserved for future agreements regarding the Layer 1 BRI conformance test abstract test suites, and conformance criteria to the ANS T1.601-1988 (Ref. [12]). Refer to section 5.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

- The "S/T" Interface

The CT defining the conformance criteria and abstract test suites to verify equipment implementation conformance to the BRI S and T interface as specified in ANS T1.605-1989 (Ref. [16]) is defined by the NIU-Forum specification, NIU 90-002 (NIU-F/IIW/ICOT-90-040) *Integrated Services Digital Network (ISDN) Conformance Testing, Layer 1 Basic Rate S/T Interface, User Side*, (Ref. [33]).

## 5.2 Future Layer 1 PRI

Editor's Note: This section is reserved for future agreements regarding the Layer 1 PRI conformance test abstract test suites, and conformance criteria to the ANS T1.601-1988 (Ref. [12]). Refer to section 5.2 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

## 5.3 Layer 2 BRI

The Layer 2 Conformance Test specifications, for the BRI and PRI access arrangements, provide the requirements for verifying equipment conformance at Layer 2 of the ISDN BRI/PRI. The ISDN test suite development process is aligned with ISO 9646 (Ref. [43]), OSI Conformance Testing Methodology and Framework, Parts 1-3. The following text details the Conformance Tests for Layer 2 operation of an ISDN.

The CT defining the abstract test suites to verify equipment implementation conformance to the Layer 2 of an ISDN at the user-network interface is defined by the NIU-Forum specification, NIU 91-007[6] (NIU-Forum/IIW/ICOT/ACT-91/22.2 V1.2) "Integrated Services Digital Network (ISDN) Conformance Testing, Layer 2 Basic Rate Interface, Link Access Procedure, D-channel (LAPD), User Side," (Ref. [34]). This conformance test suite is for the Link Access Procedure D-channel (LAPD) data link protocol and is described in Tree and Tabular Combined Notation (TTCN). Its use is for ISDN terminal equipments attaching to the user side of a Basic Access interface.

The CT defines the conformance criteria to the ANS T1.602-1989 (Ref. [13]) and to the CCITT Recommendation Q.921-1988 (Ref. [25]) (Note: These specifications are the same text). The purpose of the Abstract Test Suite is to provide the most complete protocol conformance test coverage as is possible, not to be completely exhaustive. The LAPD Test Suite has many additional test cases for TEI Management procedures and system related cases which are covered in the body of the CCITT Recommendation Q.921-1988 text (Ref. [25]) but not in the CCITT Recommendation Q.921-1988 state transition tables.

## 5.4 Future Layer 2 PRI

Editor's Note: This section is reserved for future agreements regarding the Layer 1 PRI conformance test abstract test suites, and conformance criteria to the ANS T1.602-1989 (Ref. [13]).

## 5.5 Future Layer 3

Editor's Note: This section is reserved for future agreements regarding the Layer 3 Conformance Test specifications, for BRI and PRI access arrangements. Refer to section 5.4 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for the information regarding the current status of this work within the NIU-Forum.

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[6] In order to accurately represent the Layer 2 Conformance tests, the reference was changed from NIU 89-001 (NIU-Forum/IIW/ICOT/89-065.2) to the final, and NIU-Forum approved document NIU 91-007 (NIU-Forum/IIW/ICOT/ACT23-91-22.2 V1.2).

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## 6 Future Application Software Interface (ASI)

Editor's Note: This section is reserved for future agreements regarding the definition and specification of the Application Software Interface. Refer to section 6.0 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

## 7 Application Profiles

Since the inception of the NIU-Forum, the goal has been to provide an ISDN that users want and need, and to do so in a way that promotes application interoperability in a multi-vendor environment. Application profiles are the final step in the functional standardization process to achieve this goal.

### 7.1 NIU-Forum Application Profiles

An application profile provides an overall specification of the ISDN elements and the application elements necessary to provide a specific, interoperable application for an ISDN. A profile supports a particular application, or a set of applications, specifying the ISDN standards to use, the options to implement within each standard, the layered protocol configuration and the application's usage of the ISDN's attributes. Please refer to section 7.1.1 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for a description of the process for developing Application Profiles.

### 7.1.1 Application Profile Conformance

It is essential that the Application Profile teams identify criteria that the implementor must meet in order to claim compliance with the Application Profile. It is intended that a tester agency be established (e.g., the Corporation for Open Systems) which applies ICOT-derived conformance tests in order to verify a product's relative sufficiency of interoperability against a testbed which applies standardized testing methodologies (e.g., ISO 9646, Ref. [43]). Real multi-vendor interoperability is achieved in an interoperability testing environment which validates the Application Profile's compliance amongst participatory users and vendors.

### 7.2 Application Profile Families

The NIU-Forum ISDN applications have been categorized into one of six "application families." The families provide a means of assimilating applications based upon a commonality of usage.

Each family has been assigned its own Application Profile team to develop the Application Profiles for the family. The following Application Profile teams have been identified:

- ISDN Call Management
- ISDN CPE Compatibility/Capability
- ISDN Network Interconnectivity
- Messaging and Answering
- Bandwidth Negotiation
- Network Management/ISDN Administration

The following text details the Application Profile IAs.[7]

### 7.2.1 ISDN Call Management

The ISDN Call Management Profile team has completed an Application Profile, NIU 90-003, for incoming call management which covers all of the following applications:

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[7] The NIU-Forum Plenary document numbers (e.g., NIU 90-003) are included for reference purposes only, as every numbered application profile is included in the present document in its entirety.

| Title | User Req't Document Number |
|-------|---------------------------|
| • Database Information to Corporate Security | 810005 |
| • New Account Customer Inquiry Handling | 840023 |
| • Customer Service Call Handling | 840024 |
| • Automatic Callback for Financial Services | 840025 |

### 7.2.1.1  Abstract

This application profile provides the User Descriptions, Alternative Architectures, Information Flows, and recommended Protocol Stacks for the Incoming Call Management Applications (User Application Requirements Data Form Numbers:  810005, 840023, 840024, 840025, Refs. [35, 36, 37, 38]).  The Incoming Call Management Applications involve customer service agents who currently receive incoming calls, ask the caller for their member number, and input that data into a terminal connected to a host application.  ISDN will be used to automate the transfer of the Caller's ID to the host.  In addition, agents may transfer the call to an additional agent who should be able to continue the call without having to request the same information from the caller again. ISDN will be used to effect the call transfer and allow the second agent to bring up the right application screen without repeating questions.  Finally, when all the agents are busy, the caller's number should be captured for later callback.  ISDN will be used to capture the caller's number and allow callback later.  ISDN can be used to connect the agent's terminal to the host.

### 7.2.1.2  User Description

Customer service agents currently receive incoming calls, ask the caller for their member number, and then input the member number into a terminal connected to a host application to obtain the customer information.  Agents may transfer the customer to another agent to provide a different service.  The second agent has to again ask for the member number and enter a transaction to receive the customer information.  The second agent may access a different host application.  In addition, when all agents are busy, the caller's number should be captured for later callback.

### 7.2.1.3  ISDN Application Breakdown

The user's proposed application and the breakdown of the application into service elements can be seen in figure 7-1.

  • Call Transfer with Associated Data Service Element

  Agent 1 wishes to transfer a voice call from the Customer to agent 2.  The voice call is transferred to agent 2.  Certain information associated with the terminal session is transferred to the host to which agent 2 is attached, so that the appropriate screen can be delivered to agent 2.

  • Call Delivery with Associated Data Service Element

  The customer places a voice call in order to speak to an agent.  The call arrives at a Central Office (Co) or Customer Premises switch (PBX).  The switch delivers the voice
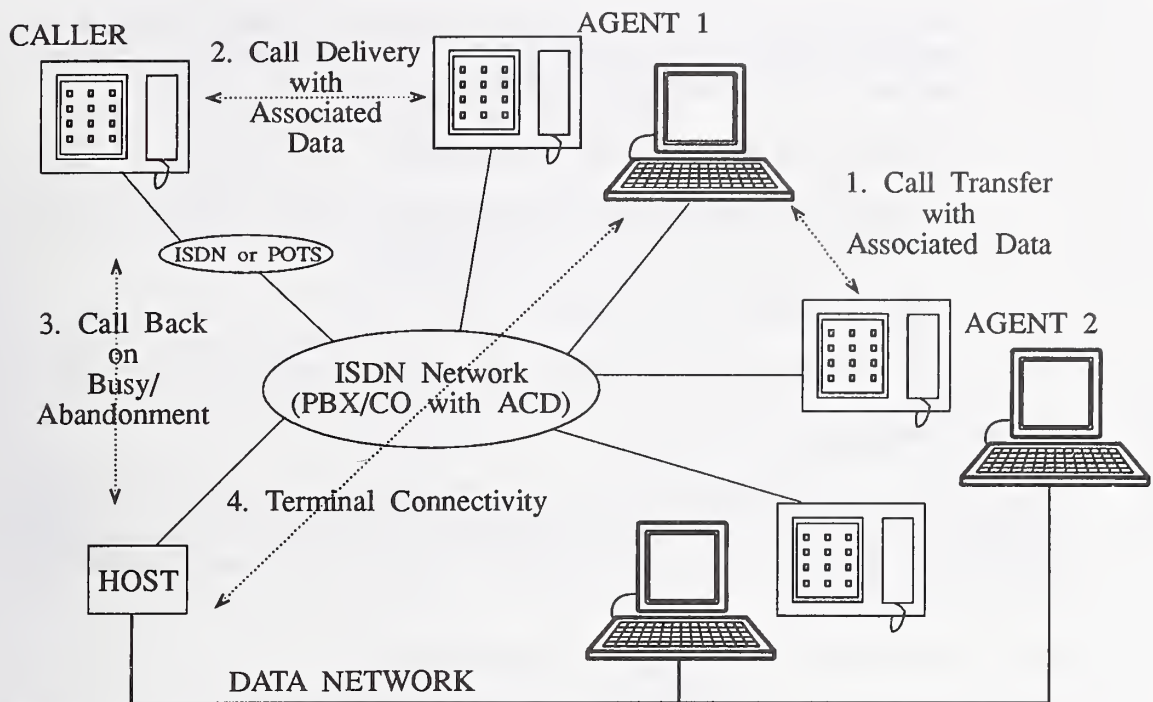
**Figure 7-1.** User Proposed Application Service Breakdown.

call to agent 1.[8]  Certain information that is delivered to the switch with the voice call (probably the calling party's number) is delivered to a host application, so that the host application can deliver an appropriate screen to agent 1.

• Call Back on Busy/Abandonment Service Element

This service allows an available agent to place calls to customers who have received busy or abandoned the call prior to delivery to an agent.

• Terminal Connectivity Service Element

The agents data terminal is connected to the host via an ISDN link.

### 7.2.1.3.1  Service Logic

Figure 7-2 shows the sequence of services put together to provide Incoming Call Management Applications.  The Terminal Connectivity Service Element may be optional and a Call coming in without the associated data (Calling Line Identification (CLID) may be available for Call Transfer with associated data.

### 7.2.1.4  Call Transfer with Associated Data Service Element

In this service a call is already active between agent 1 and the caller.  Agent 1 could then perform any of the following:

1. Blind Transfer — Transfer the call to a second agent and disconnect before the second agent answers.

2. Transfer with Consulting — Transfer the call to a second agent, discuss the call with the second agent, then complete the transfer.

3. Consult — Agent 1 calls the second agent to discuss the call and then disconnects agent 2.

The components are shown in figure 7-3.

The sequence of events for each type is:

*Blind Transfer*

a. Agent 1 places the caller on hold.

b. Agent 1 places a call to agent 2 and invokes transfer.

c. Agent 1 hangs up.

d. Agent 2 is selected directly or by an intervening CO/PBX (Automatic Call Distributor (ACD) function).

---

[8]  The topic of how the switch decides to deliver the call to a particular agent has not been described as part of this application, but may have some bearing on implementation.
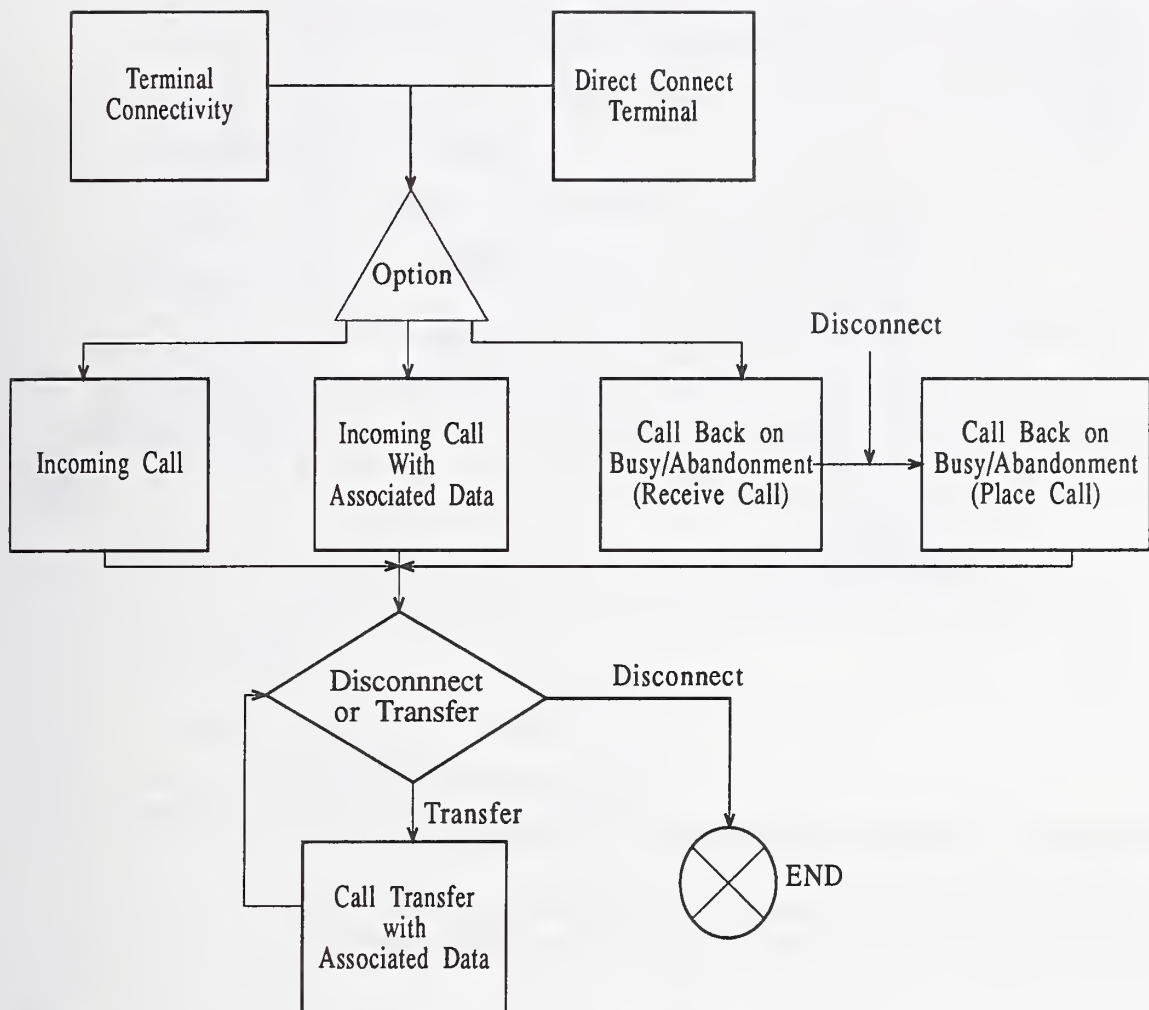
**Figure 7-2.** Incoming Call Management Application Logic Flow.
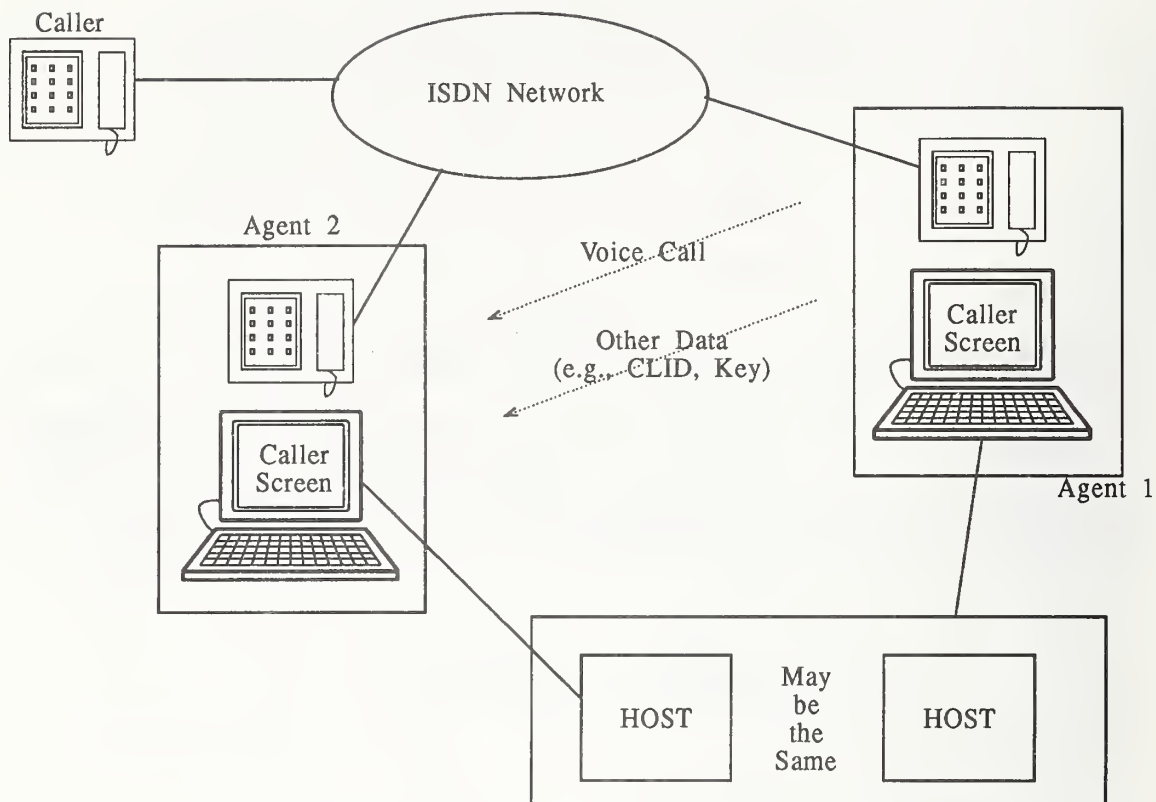
**Figure 7-3.** Call Transfer with Data Service Element Description.

e.   Agent 2 receives the voice call, while concurrently a host[9] application brings up an appropriate screen based on some information delivered with the call to agent 2.

*Transfer with Consulting*

a.   Agent 1 places the caller on hold.

b.   Agent 1 places a call to agent 2.

c.   Agent 2 is selected directly or by an intervening CO/PBX (ACD function).

d.   Agent 2 receives the voice call, while concurrently a host application brings up an appropriate screen based on some information delivered with the call to agent 2.

e.   Agent 1 talks with agent 2.

f.   Agent 1 transfers the caller to agent 2 and disconnects.

*Consulting*

a.   Agent 1 places the caller on hold.

b.   Agent 1 places a call to agent 2.

c.   Agent 2 is selected directly or by an intervening CO/PBX (ACD function).

d.   Agent 2 receives the voice call, while concurrently a host application brings up an appropriate screen based on some information delivered with the call to agent 2.

e.   Agent 1 talks with agent 2.

f.   Agent 2 disconnects.

The information being passed along with the call will be called the Key. The Key may be any of the following:

- a database key used by the agent's application,

- the Calling Party Number,

- an Application or Screen ID,

- some other information used by the users application,

- or a combination of the above.

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[9]   The host that the application is running on may be the same for both agents or different.

#### 7.2.1.4.1 User Environment

Some of the users' descriptions of the service have specified a hardware and software environment in which the service should work. At a minimum, the service should work in the following environment:

- IBM 3270[†] type terminals

- An IBM-compatible host

- SNA (Systems Network Architecture) host networks.

These are minimum requirements and the actual description of the service is more general in that it will work with other terminals, hosts, and networks.

#### 7.2.1.4.2 Alternative Architectures

Two architectures for this application have been proposed and adopted (March 1989 and June 1989 NIU-Forum). The first architecture calls for the Call information to be delivered to the agent's station or terminal adaptor (TA)[10] and then have that device transmit it to the host application (see fig. 7-4). If the agent's station is sufficiently intelligent (e.g., a personal computer), the station could run the application locally.

The second architecture calls for the Host to provide the central office or customer premises switch with the Key, and that Key is passed to agent 2's Host (see fig. 7-5). The call is delivered to the agent's station normally. The data terminal could be attached to the host directly or be attached using the **ISDN Terminal Connectivity Service Element** described in section 7.2.1.7.

#### 7.2.1.4.3 Information Flow

The information flow diagrams show that data that must be sent between nodes necessary to provide the service described. Signalling messages that are normally present (i.e., confirmation messages, error messages, disconnect) are not shown for simplicity if they are not necessary to explain the working of the service.

The information flow for Architecture 1 — Smart Terminal/TA can be seen in figure 7-6.

Agent 1 places a call (Call Setup) which is delivered to agent 2's station with the Key (carried as User to User information). Agent 2's station could generate an appropriate screen using the Key

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[†]   Trademark of IBM Corporation

[10]   This requires intelligence not normally associated with a TA to satisfy the requirement that any 3270-like device were to be able to use this service. A separate functional entity, and Intelligence Unit (IU), will be described as providing the service of relaying Call information to the host. In effect this unit would upgrade the 3270 to an intelligent terminal with an attached voice terminal. The TA-intelligence unit will have to be able to have a separate session to the host running, so the data can be passed. Alternately, but more complex, the Intelligence Unit would have to be able to understand the screens being passed between the host and the terminal and insert information in the data stream.

**Figure 7-4.**   Call Transfer with Data Service Element Architecture 1 — Smart Terminal/TA.



**Figure 7-5.**   Call Transfer with Data Service Element Architecture 2 — Switch Host Interface.

**Figure 7-6.** Call Transfer with Data Service Element Smart Terminal/TA — Information Flow Diagram.

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or the station could then transfer the Key to the host. The host application would then select and transmit the appropriate screen to agent 2's terminal.

The information flow for Architecture 2 — Switch Host interface can be seen in figure 7-7.

The call would be initiated by agent 1 selecting to transfer via the terminal. The terminal would transfer this information to the host ("Init Call"). The host would then transmit this to the PBX/CO along with the Key as User to User information ("Init Call (Key)"). The PBX/CO the second agent is attached to would transmit the call setup information to agent 2's station. Simultaneously the PBX/CO would send the call setup information (including the user to user information containing the Key) to the host computer. The host selects and transmits the appropriate screen to agent 2's terminal.

In both flows, if consulting is desired instead of completing the transfer, agent 2 would disconnect.

#### 7.2.1.4.4  Network Signalling Requirements — Protocol Identification

The network signalling requirements for providing this service with each architecture are shown in figures 7-8 and 7-9. Not shown is how the call was originally received, since it may have come in via ISDN or POTS. The requirement for this capability is that the end-points involved in the call transfer must be connected via end-to-end ISDN signalling so that user-to-user information can be exchanged.

In the figures 7-8 and 7-9 any connection between two devices without a specific protocol marked may use any applicable protocol including a proprietary one.

#### 7.2.1.4.5  Protocol Description

The messages and protocol elements described below are only those required by the service being described. Other messages and protocol elements are not discussed if they are not used by the application being described, even through they may be required for other reasons, such as routing of the call.

#### 7.2.1.4.5.1  Call Setup User Information

The Key can be carried from the origination to destination terminal in the **SETUP** message described in NIU 90-301 (see Appendix A) and NIU 90-302 (see Appendix B). The **SETUP** Message described as sent to the network and by the network to the called user to initiate call establishment.

The information element used to carry the Key would be the **User-User** information element described as follows: "The purpose of the User-user information element is to convey information between ISDN users. This information is not interpreted by the network, but rather is carried transparently and delivered to the remote user(s). There are no restrictions on the content of the user information."
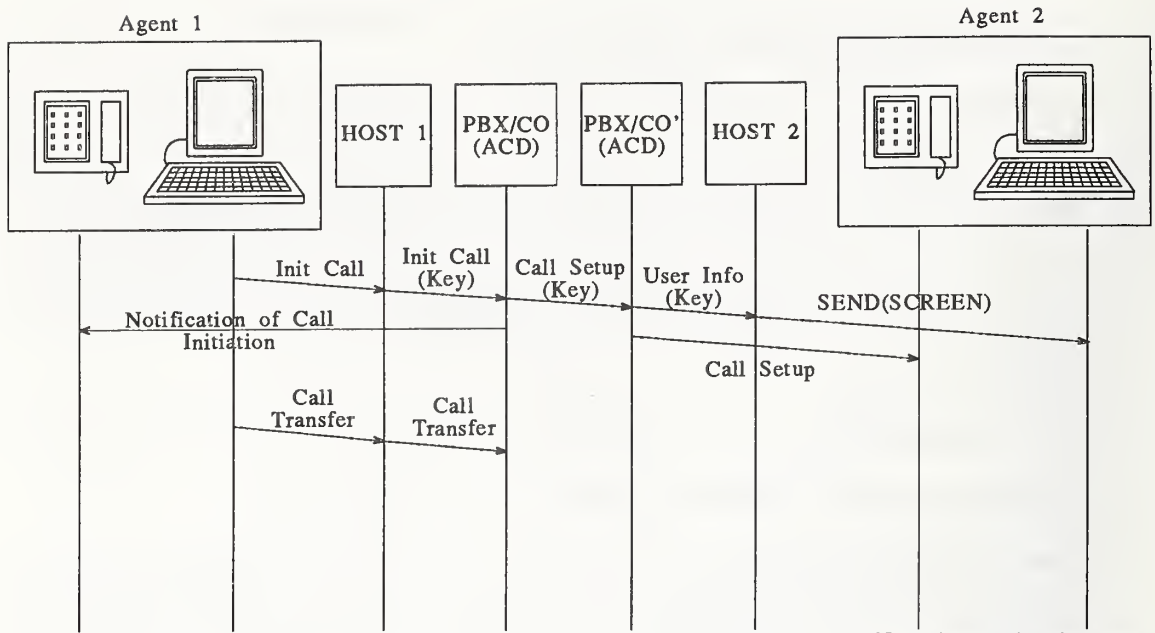
**Figure 7-7.** Call Transfer with Data Service Element Switch Host Interface — Information Flow Diagram.



**Figure 7-8.** Call Transfer with Data Service Element Smart Terminal/TA — Network Signalling Requirements.
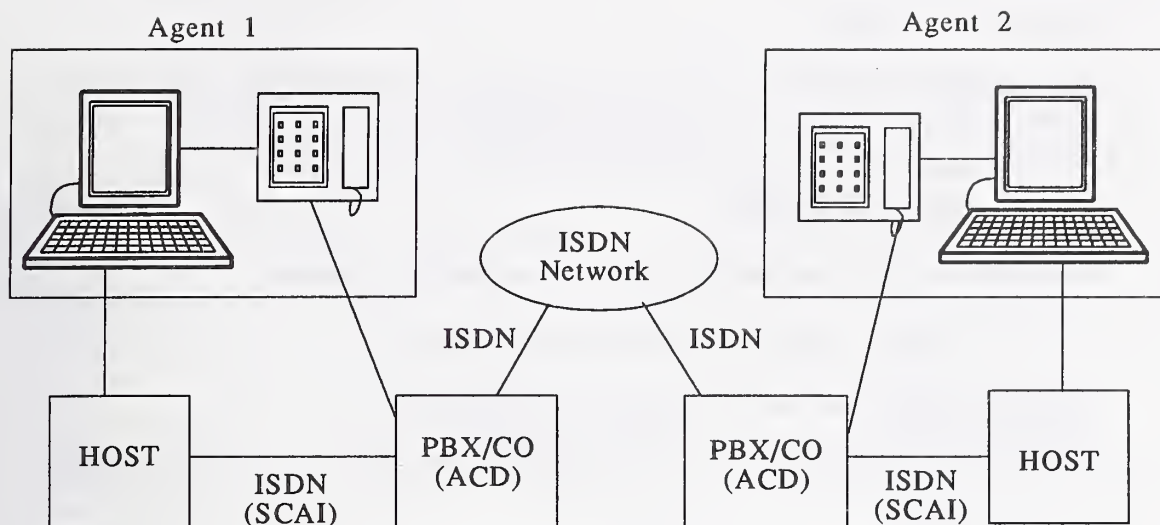
**Figure 7-9.** Call Transfer with Data Service Element Switch Host Interface — Network Signalling Requirements.

### 7.2.1.4.5.2 Call Transfer

Proposed baseline text for the Normal Call Transfer supplementary service exists within T1S1.2/91-309, *Supplementary Service — Normal Call Transfer Stage 1, 2, and 3*, (Ref. [22]).[11]  There is no consensus on the protocol description for this service yet.

### 7.2.1.4.5.3 Host-Switch Messages

The functions that need to be provided to allow this service are the following:

- Send User-User information (Key) and initiate a call.

- Receive User-User information (Key) on an incoming call.

- Possibly initiate the call transfer operation, this could be done from the voice terminal directly.

The Host Computer messages are being described in the ANSI *Switch-Computer Applications Interface (SCAI) Working Document*, T1S1.1/91-387 (Ref. [23]).  Section 5 of the SCAI working document described the **DATA/VOICE COORDINATION ASE** "which may be used by an Application Process on either a switch or a computer to exchange information and commands for the purpose of coordinating voice and data services."  The protocol definition is currently for further study.

### 7.2.1.5 Call Delivery with Associated Data Service Element

In this service an agent is available to receive an incoming call.  When a customer's call is presented to the agent an appropriate screen is displayed on the agent's data terminal that relates to the caller or the application being provided by the agent (see fig. 7-10).

The sequence of events is as follows:

a. Caller places a call to the phone number of the "Call Delivery service user" (800 number in some User's application).

b. An agent is selected by the CO/PBX (ACD function).

c. The agent receives the voice call, while concurrently a host application brings up an appropriate screen (based upon the calling party's number).

### 7.2.1.5.1 User Environment

Some of the users' descriptions of the service have specified a hardware and software environment in which the service should work.  At a minimum, the service should work in the following environment:

- IBM 3270 type terminals

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[11] There is also ongoing work within ANSI to define Explicit Call Transfer and Single Step Call Transfer Supplementary Services.
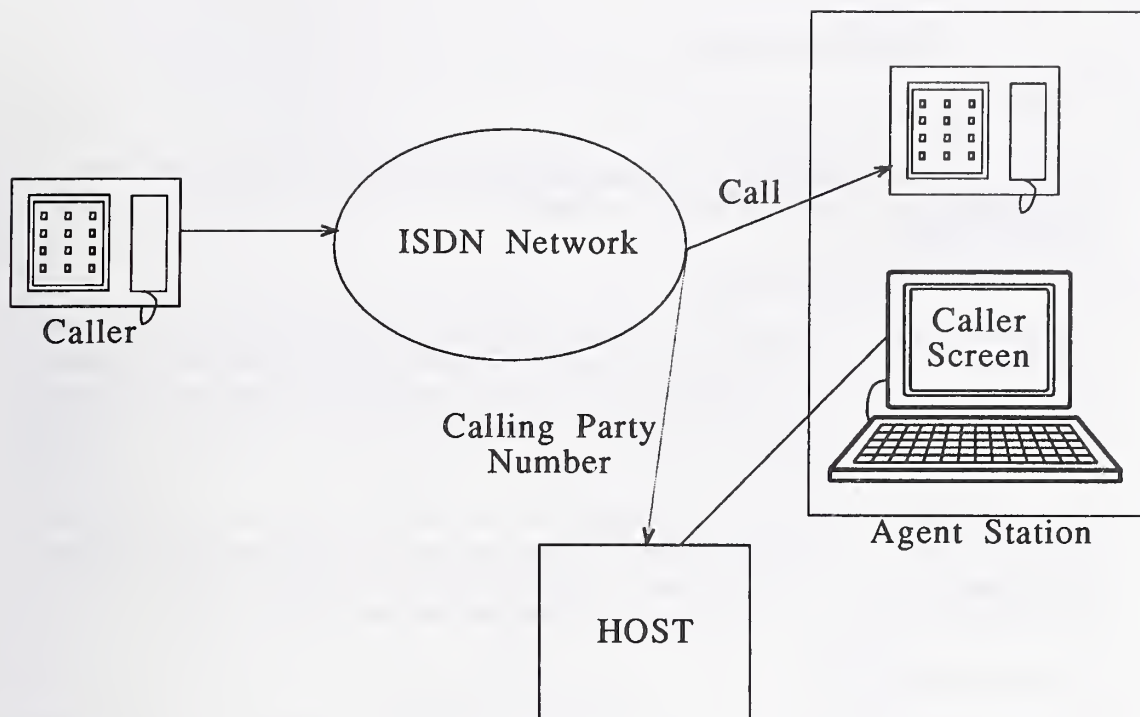
**Figure 7-10.** Call Delivery with Data Service Element Description.

- An IBM-compatible host

- SNA host networks.

These are minimum requirements and the actual description of the service is more general in that it will work with other terminals, hosts, and networks.

### 7.2.1.5.2 Alternative Architectures

Two architectures for this application have been proposed and adopted (March 1989 and June 1989 NIU-Forum). The first architecture calls for the Call information to be delivered to the agent's station or terminal adaptor (TA)[12] and then have that device transmit it to the host application (see fig. 7-11). If the agent's station is sufficiently intelligent (e.g., a personal computer), the station could run the application locally.

The second architecture calls for the Host to provide the central office or customer premises switch with the Key, and that Key is passed to agent 2's Host (see fig. 7-12). The call is delivered to the agent's station normally. The data terminal could be attached to the host directly or be attached using the **ISDN Terminal Connectivity Service Element** described in section 7.2.1.7.

### 7.2.1.5.3 Information Flow

The information flow diagrams show the data that must be sent between nodes necessary to provide the service described. Signalling messages that are normally present (i.e., confirmation messages, error messages, disconnect) are not shown for simplicity, if they are not necessary to explain the working of the service.

The information flow for Architecture 1 — Smart Terminal/TA can be seen in figure 7-13.

The call is delivered to the agent's station with the Calling Party Number (CPN). The station will generate an appropriate screen locally or by interacting with a host application.

The information flow for Architecture 2 — Switch Host interface can be seen in figure 7-14.

The Switch transmits the call setup information to the agent's station and the host computer simultaneously. The host selects and transmits the appropriate screen.

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[12] This requires intelligence not normally associated with a TA to satisfy the requirement that any 3270-like device were to be able to use this service. A separate functional entity, and Intelligence Unit (IU), will be described as providing the service of relaying Call information to the host. In effect this unit would upgrade the 3270 to an intelligent terminal with an attached voice terminal. The TA-intelligence unit will have to be able to have a separate session to the host running, so the data can be passed. Alternately, but more complex, the Intelligence Unit would have to be able to understand the screens being passed between the host and the terminal and insert information in the data stream.
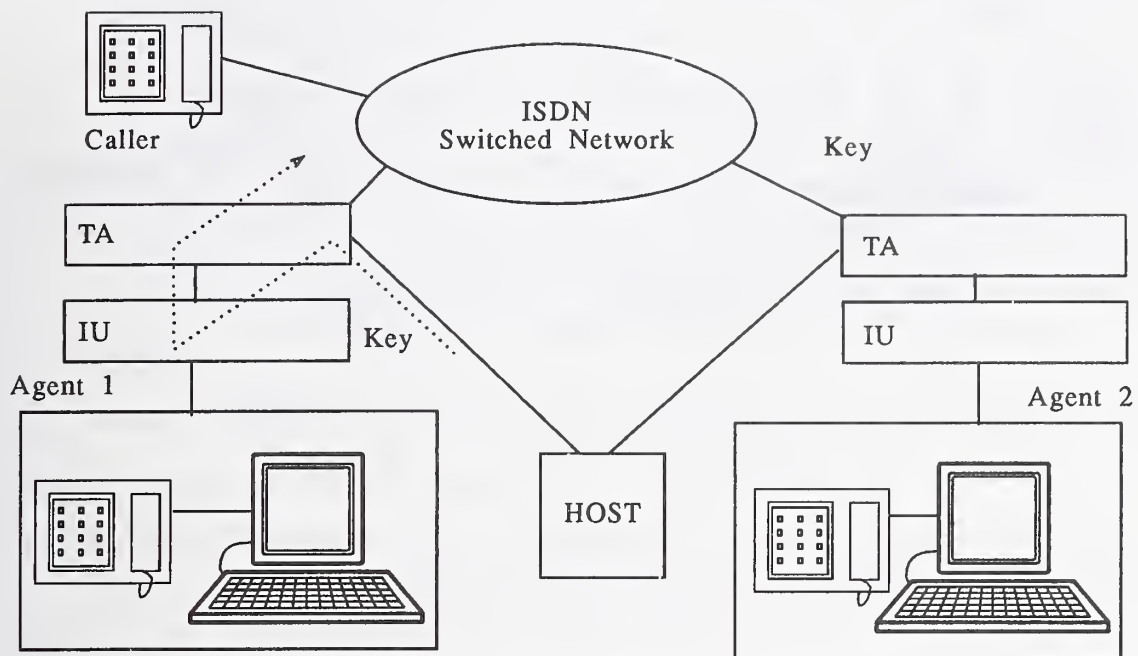
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**Figure 7-11.** Call Delivery with Data Service Element Architecture 1 — Smart Terminal/TA.
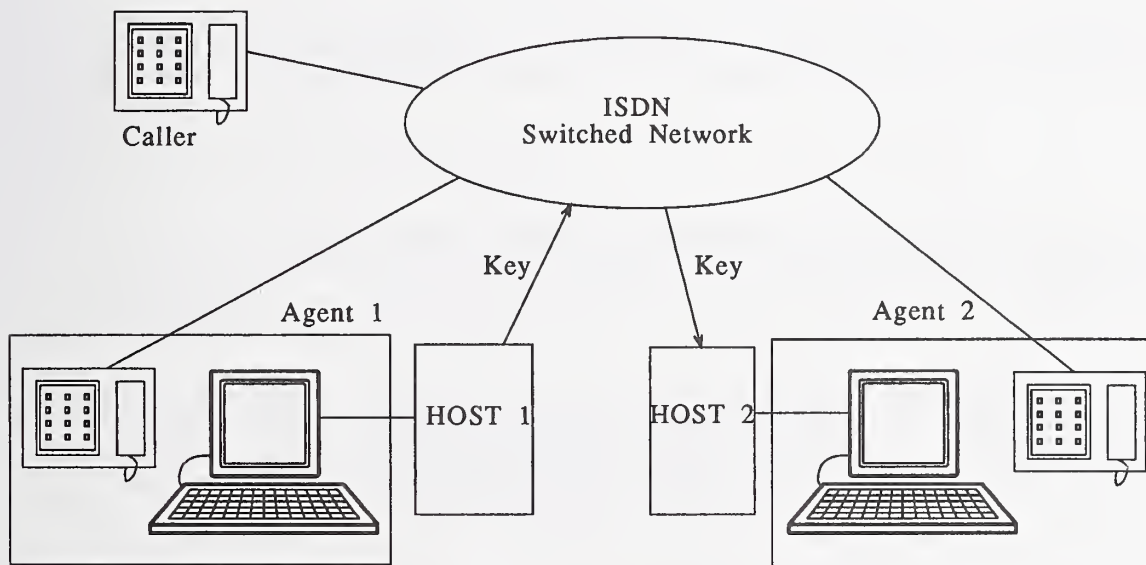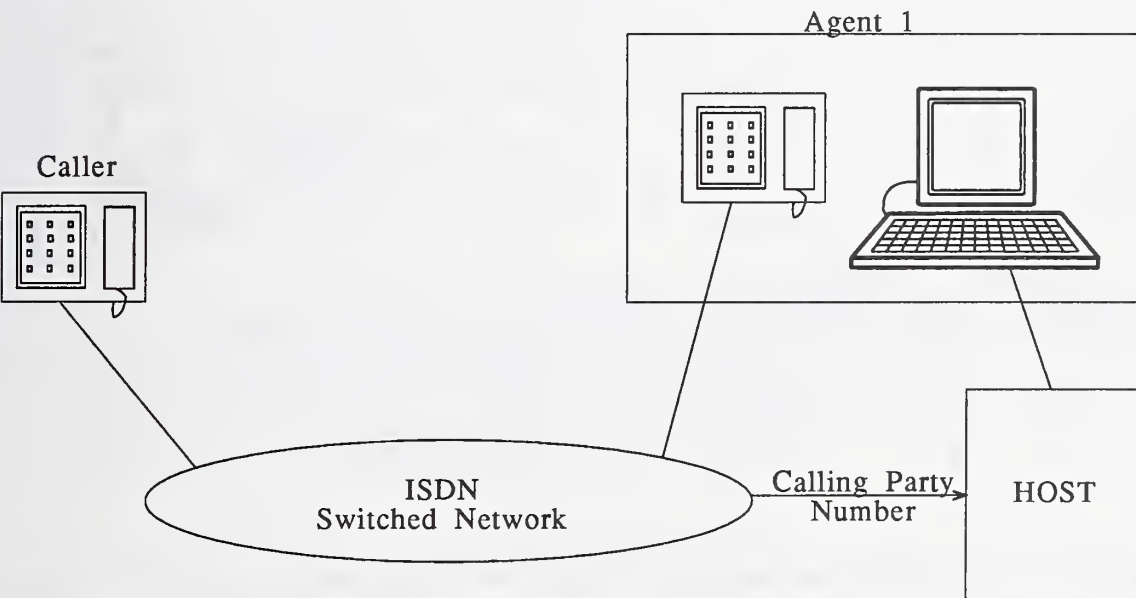


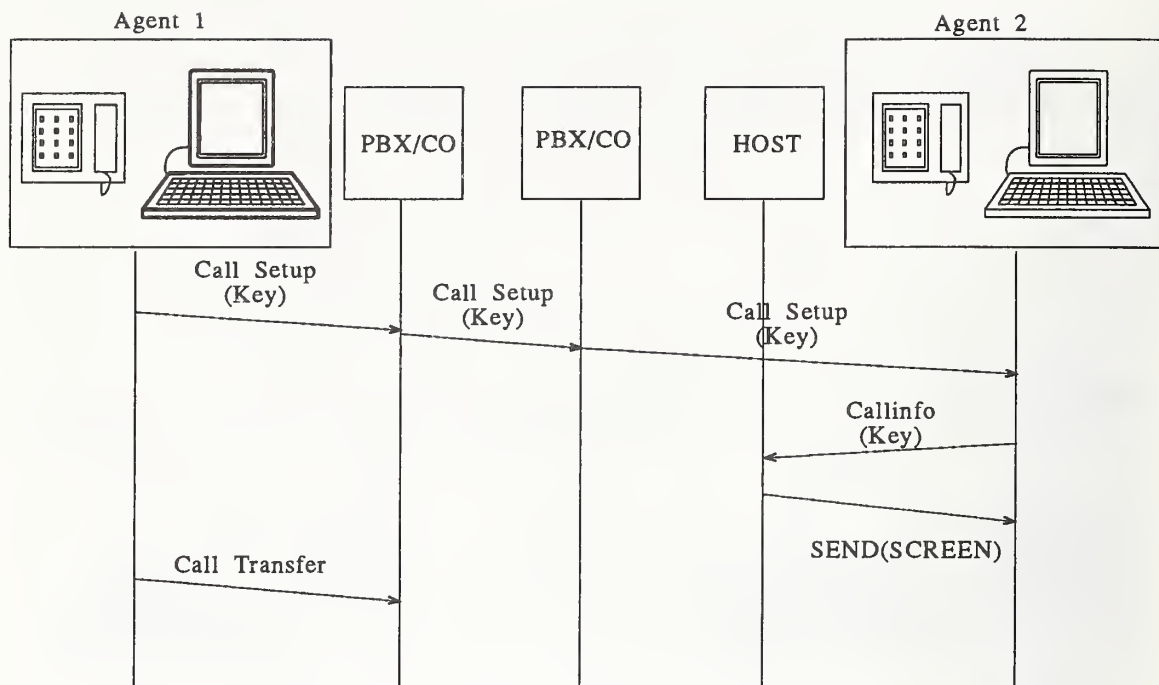**Figure 7-12.** Call Delivery with Data Service Element Architecture 2 — Switch Host Interface.
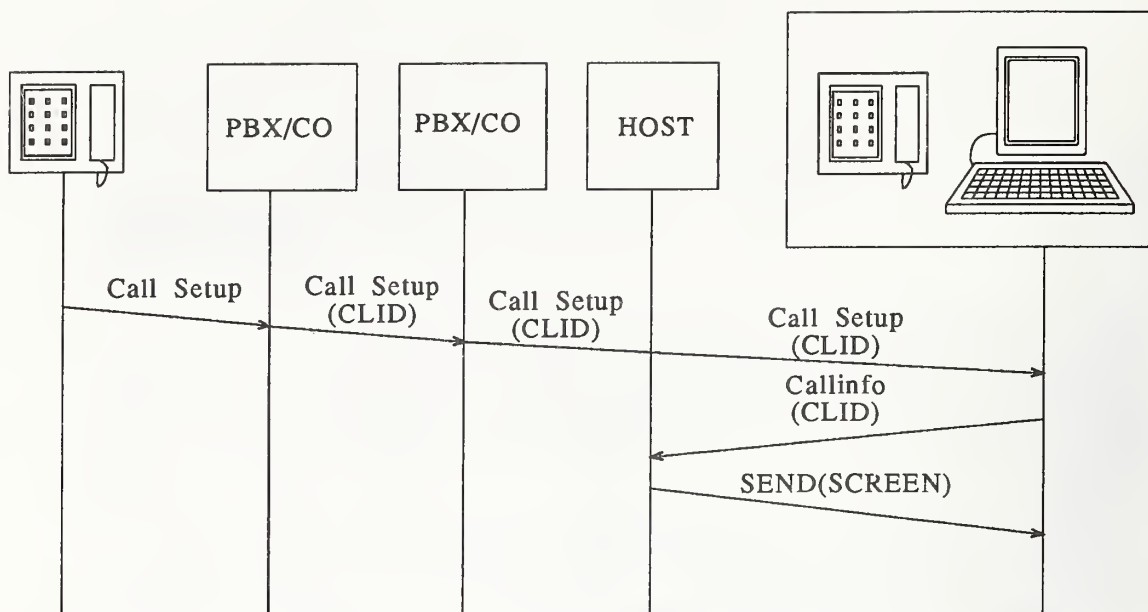
**Figure 7-13.** Call Delivery with Data Service Element Smart Terminal/TA — Information Flow Diagram.
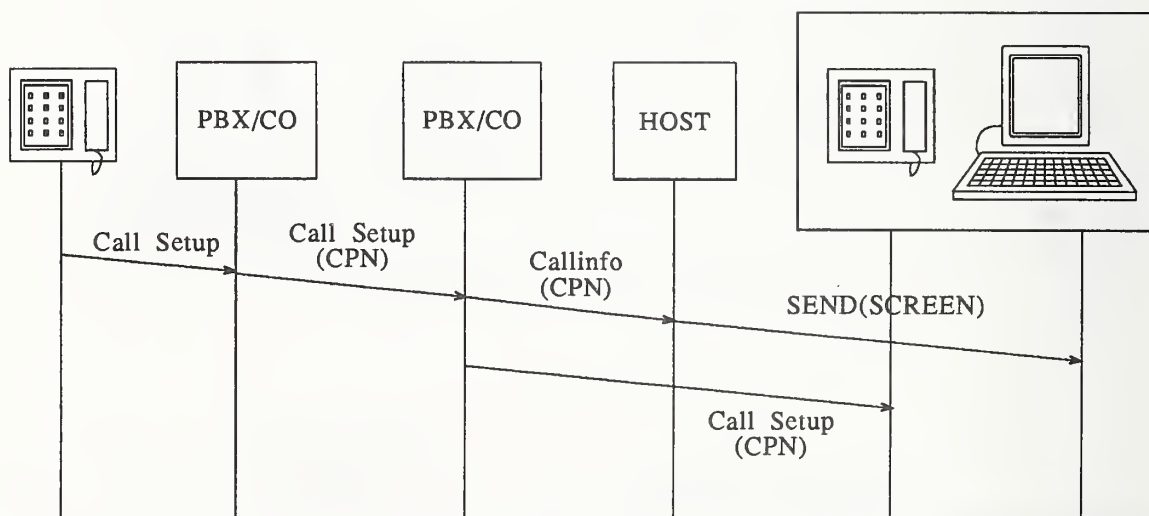


**Figure 7-14.** Call Delivery with Data Service Element Switch Host Interface — Information Flow Diagram.

### 7.2.1.5.4 Network Signalling Requirements — Protocol Identification

In order to implement this service, certain signalling capabilities are required in the user and carrier networks. Figures 7-15 and 7-16 identify what are the signalling requirements at each point in the network. As can be seen in the diagrams the requirements for signalling within the network are the same for the smart terminal and switch-host scenarios, but there are differences within the premises.

EAMF stands for Equal Access Multi-Frequency which can be used to pass the Calling Party Number. Any connection between two devices without a specific protocol marked may use any applicable protocol including a proprietary one.

### 7.2.1.5.5 Protocol Description

The messages and protocol elements described below are only those required by the service being described. Other messages and protocol elements are not discussed if they are not used by the application being described, even through they may be required for other reasons, such as routing of the call.

### 7.2.1.5.5.1 Call Setup User Information

The Calling Party Number can be carried from the origination to destination terminal in the **SETUP** message described in NIU 90-301 (see Appendix A) and NIU 90-302 (see Appendix B). The **SETUP** message is described as sent to the network and by the network toward the called user to initiate call establishment.

The Information needed to carry the Calling Party Number is described in a paragraph titled **Calling Party Number.** "The Purpose of the Calling party number information element is to identify the origin of the call." The information element may say that the number is not available, the application must be able to handle this situation appropriately.

### 7.2.1.5.5.2 Host-Switch Messages

The necessary function required by this service is the handling of the incoming Calling Party Number.

The Host Computer messages are being described in the ANSI *Switch-Computer Applications Interface (SCAI) Working Document*, T1S1.1/91-387 (Ref. [23]). Section 5 of the SCAI working document described the **DATA/VOICE COORDINATION ASE** "which may be used by an Application Process on either a switch or a computer to exchange information and commands for the purpose of coordinating voice and data services." The protocol definition is currently for further study.
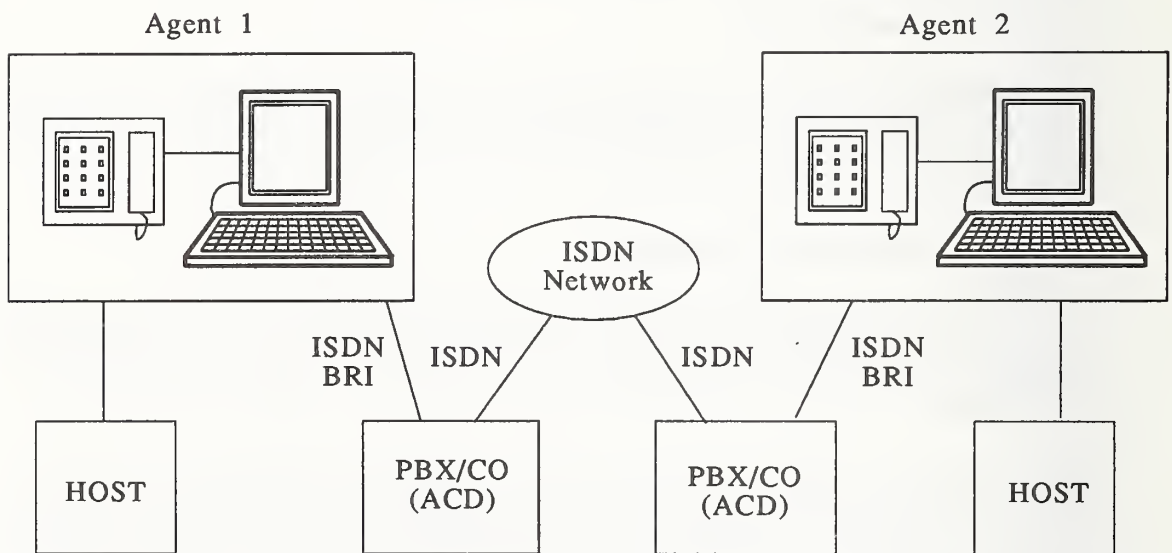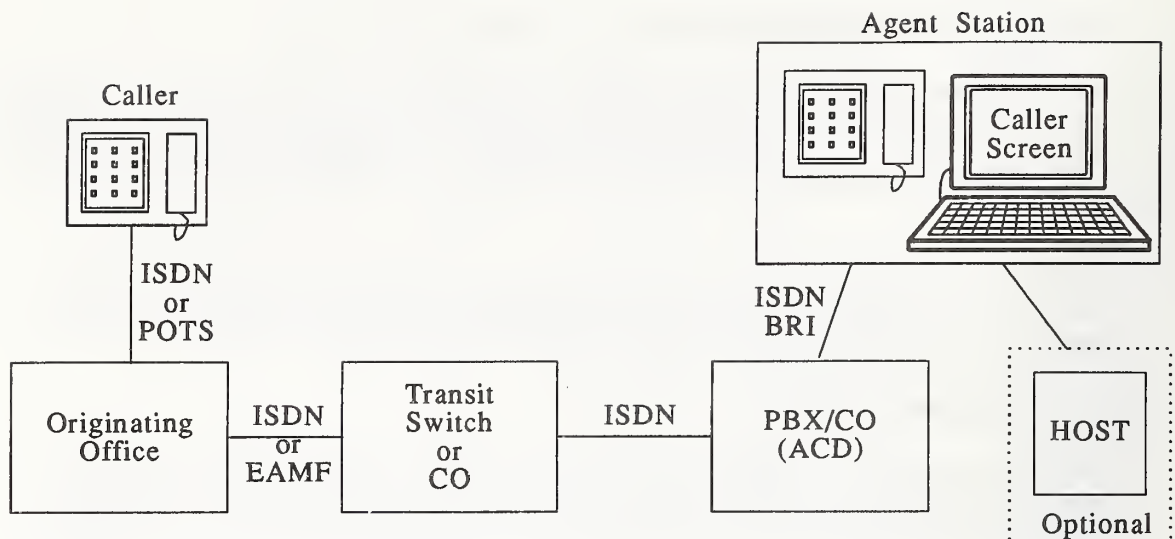
**Figure 7-15.** Call Delivery with Data Service Element Smart Terminal/TA — Network Signalling Requirements.
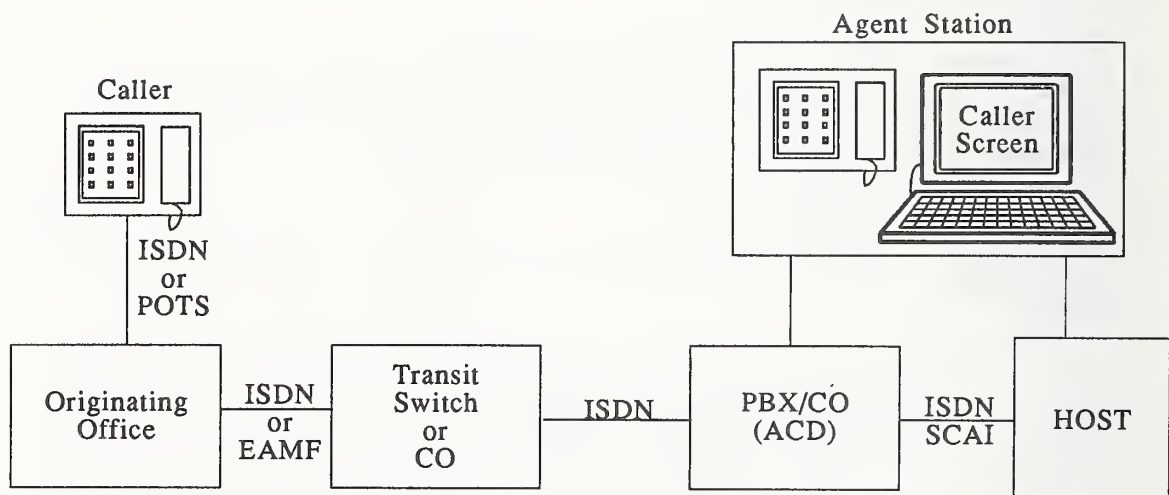


**Figure 7-16.** Call Delivery with Data Service Element Switch Host Interface — Network Signalling Requirements.

### 7.2.1.6 Call Back on Busy/Abandonment Service Element

In this service, no agents are available to receive an incoming call. The caller may do any of the following:

1. Receive Busy (possible reasons: all agents busy, maximum queue size),

2. Receive an Announcement (i.e., "All Lines are Busy, An agent will call you back when one becomes available") followed by disconnect,

3. be placed in a queue (possibly with an announcement "Wait for the next available agent, if you hangup, an agent will return your call") for the next available agent and then disconnect.

The caller's phone number will be recorded so that an agent can call back later (see fig. 7-17). This service cannot be invoked, unless the call is delivered to the final switch.

The sequence of events is as follows:

a. Caller places a call to the phone number of the "Call Delivery service user" (800 number in one user's application).

b. The calling line id is recorded by a host application.

c. The treatment may be busy, an announcement and disconnect, or being placed in a queue. If the caller was placed in a queue, they subsequently disconnected.

d. Agent obtains the number from the application software and places a call.

### 7.2.1.6.1 User Environment

Some of the users' descriptions of the service have specified a hardware and software environment in which the service should work. At a minimum, the service should work in the following environment:

- IBM 3270 type terminals

- An IBM-compatible host

- SNA host networks.

These are minimum requirements and the actual description of the service is more general in that it will work with other terminals, hosts, and networks.

### 7.2.1.6.2 Architecture

Two architectures for this application have been proposed and adopted (March 1989 and June 1989 NIU-Forum). The first architecture calls for the information to be delivered to the agent's terminal and the second to a host computer. Only the second architecture is considered here because there
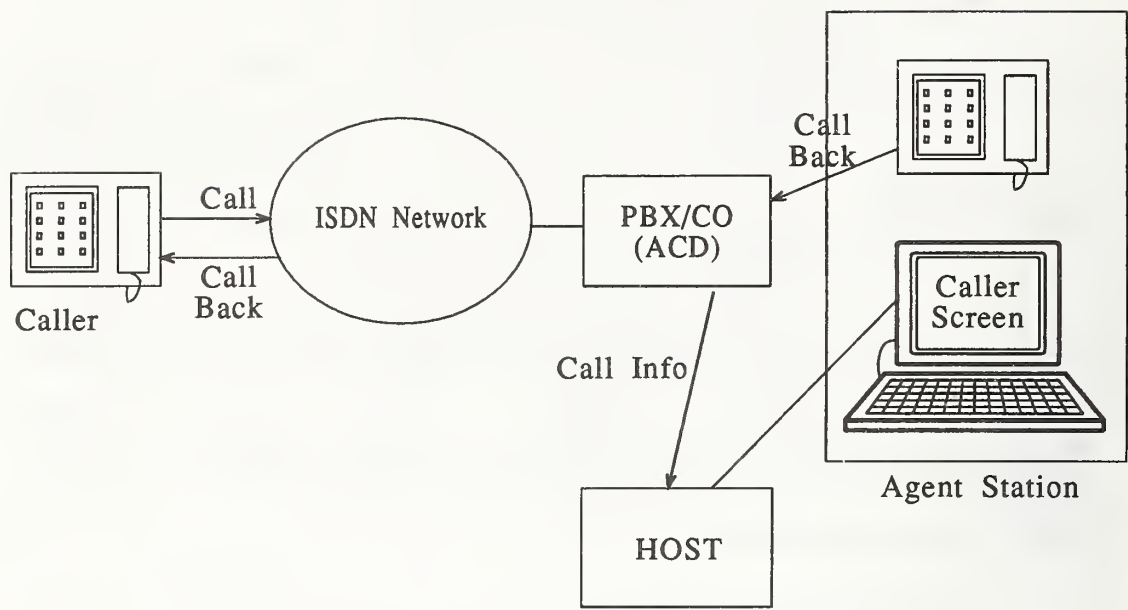
**Figure 7-17.** Call Back on Busy/Abandonment Service Element Description.

**NIU-Forum Agreements on ISDN**

is no mechanism to pass information about calls that have never reached a station (i.e., Caller disconnects, PBX returns busy) to a station.

### 7.2.1.6.3 Information Flow

The flow diagrams show the general information flow necessary to provide the service described. Some messages that are normally present (i.e., confirmation messages, error messages, disconnect) are not shown if they are not necessary to explain the working of the service.

The flow diagram for call abandonment can be seen in figure 7-18. The call setup information, including Calling Party Number (CPN) goes across the network. The Switch transmits the call setup information (CPN) to the host computer. The caller then "Disconnects" and the host computer is informed, so it puts the number in a list for later callback. At a later time, the agent interacts with the host and selects a callback number. The agent can then either generate the call via the host or dial the number using the phone. Figure 7-19 is the flow diagram for the case where the caller receives busy or hears an announcement.

### 7.2.1.6.4 Network Signalling Requirements

The network signalling requirements for this service are the same as for Call Delivery using the Switch to Host interface (see fig. 7-16).

### 7.2.1.6.5 Protocol Description

The messages and protocol elements described below are only those required by the service being described. Other messages and protocol elements are not discussed if they are not used by the application being described, even through they may be required for other reasons, such as routing of the call.

#### 7.2.1.6.5.1 Call Setup User Information

The Customer identifier can be carried from the origination to destination terminal in the **SETUP** message described in NIU 90-301 (see Appendix A) and NIU 90-302 (see Appendix B). The **SETUP** message is described as sent by the calling user to the network and by the network to the called user to initiate call establishment.

The Information needed to carry the Calling Party Number is found in the paragraph titled **Calling Party Number**. "The purpose of the Calling party number information element is to identify the origin of the call." The information element may say that the number is not available, the application must be able to handle this situation appropriately.

#### 7.2.1.6.5.2 Host-Switch Messages

The necessary function required by this service is the handling of the incoming Calling Party Number.

The Host Computer messages are being described in the ANSI *Switch-Computer Applications Interface (SCAI) Working Document*, T1S1.1/91-387 (Ref. [23]).

**Figure 7-18.** Call Back on Busy/Abandonment Service Element Information Flow Diagram — Abandonment.
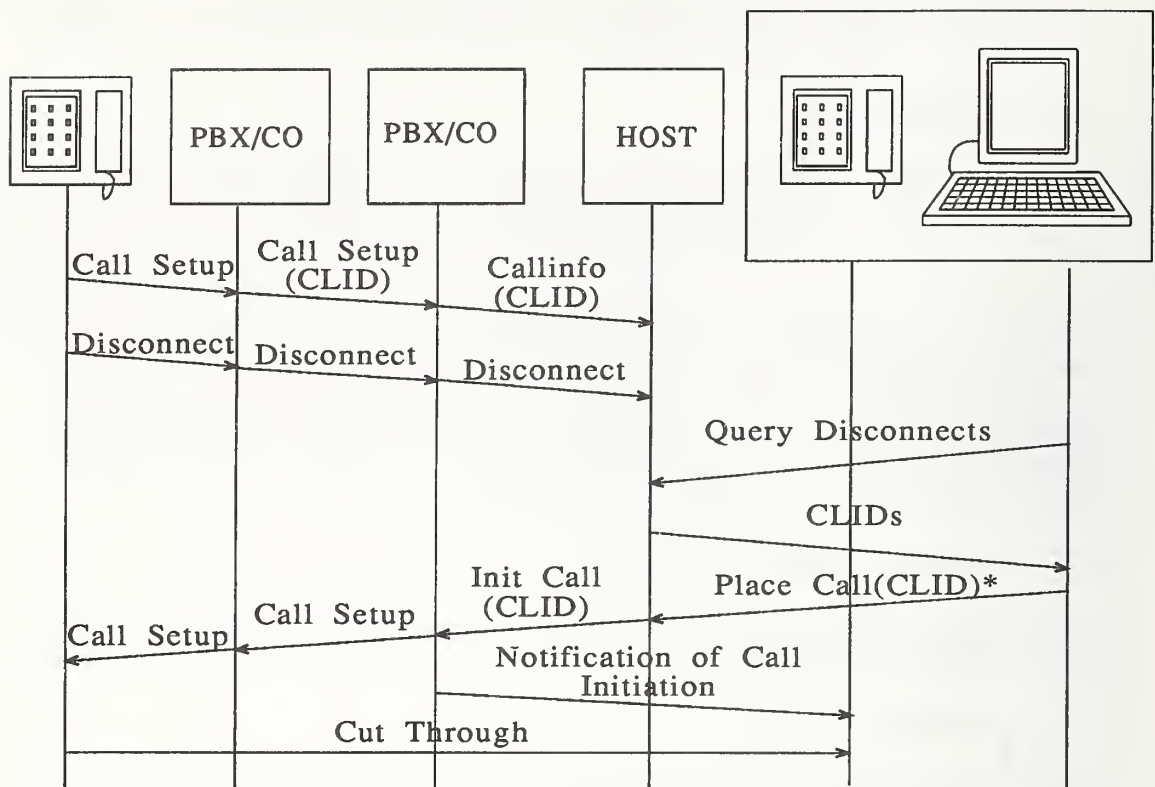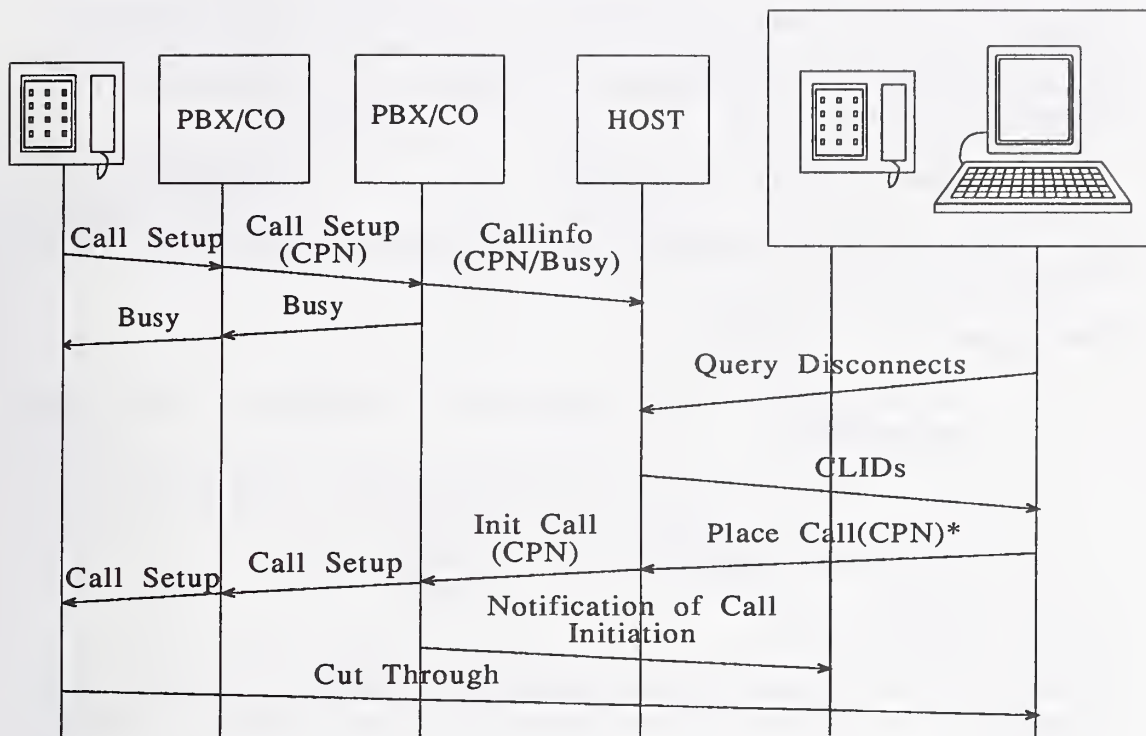
* Placement of the Call could be from a Phone

**Figure 7-19.** Call Back on Busy/Abandonment Service Element Information Flow Diagram — Busy.

Section 5 of the SCAI working document described the **DATA/VOICE COORDINATION ASE** "which may be used by an Application Process on either a switch or a computer to exchange information and commands for the purpose of coordinating voice services." The protocol is currently for further study.

### 7.2.1.7 Terminal Connectivity Service Element

This service provides connectivity between a terminal and a host using an ISDN link. This is illustrated in figure 7-20.

The sequence of events is as follows:

a. The user causes a call to be placed from the terminal to a port on the host/controller.[13]

b. Upon connection of the call the data transport protocol is initiated.

c. When the data session is complete the call is disconnected.

### 7.2.1.7.1 User Environment

Some of the users' descriptions of the service have specified a hardware and software environment in which the service should work. At a minimum, the service should work in the following environment:

- IBM 3270 type terminals

- An IBM-compatible host

- SNA host networks.

These are minimum requirements and the actual description of the service is more general in that it will work with other terminals, hosts, and networks.

### 7.2.1.7.2 Information Flow

The information flow diagrams show the data that must be sent between nodes necessary to provide the service described. Signalling messages that are normally present (i.e., confirmation messages, error messages, disconnect) are shown for simplicity if they are not necessary to explain the working of the service.

The flow diagram in figure 7-21 shows the general information flow necessary to provide the described service.

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[13] The use of some ISDN features for security (i.e., CLID) may be required, but are not part of the user application description (text or figures).
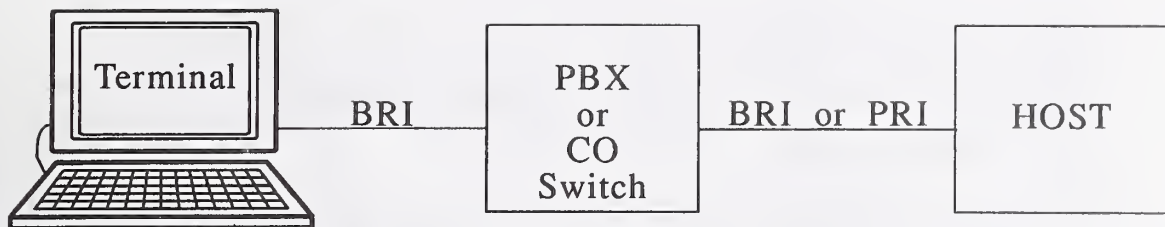
**Figure 7-20.**    Terminal Connectivity Service Element — Description.
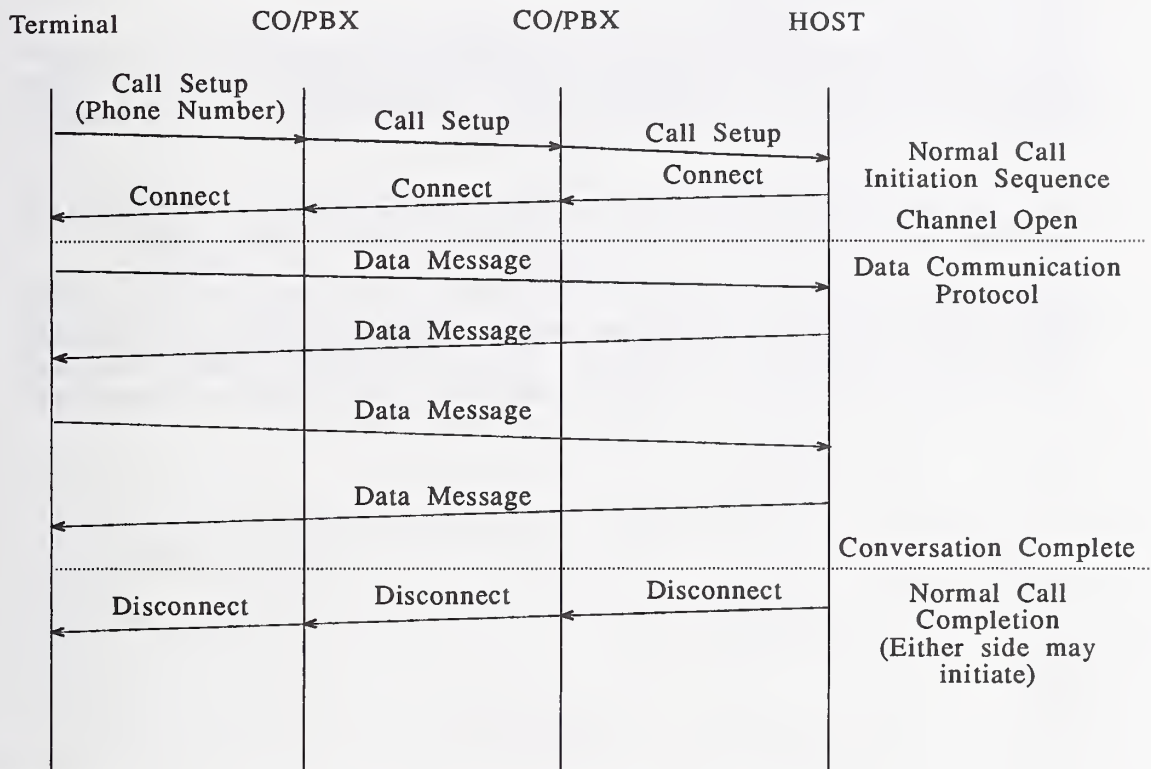


**Figure 7-21.**    Terminal Connectivity Service Element Flow Diagram.

### 7.2.1.7.3 Network Protocol Requirements

The network protocol requirements for this service can be seen in figure 7-20. As shown in that figure, there needs to be ISDN connectivity between the terminal and the point where it is attached to the computer or controller.

The higher layer protocols for carrying the user data are not described here. The Network Interconnectivity Profile Team should provide the higher level protocol specification when completing Application Profiles for the User Application Requirements Data Forms numbered: 830008, 830009, 960009 (Refs. [39, 40, 41]).

### 7.2.1.7.4 Protocol Description

The messages and protocol elements described below are only those required by the service being described. Other messages and protocol elements are not discussed if they are not used by the application being described, even through they may be required for other reasons, such as routing of the call.

The protocol described in NIU 90-301 (see Appendix A) and NIU 90-302 (see Appendix B) can be used for the setup and breakdown of the call being made to carry the data protocol.

The only information element that may have a direct bearing on the service is in the **SETUP** message described as "sent by the calling user to the network and by the network to the called user to initiate call establishment." The information element is the Bearer Capability Information Element. The user can ask for the appropriate information transfer capability and transfer mode.

### 7.2.1.8 Protocol Summary and Status

The following is a summary of the protocol requirements of the Incoming Call Management Application.

**Table 7-2.** Protocol Requirements for Incoming Call Management Application Profile

| Application Service Element | Protocol Element | Document | Status |
|---|---|---|---|
| Call Transfer With Associated Data | User—User | NIU 90—301 & NIU 90—302 Implementation Agreements | See Appendices B and C of this document |
| | Call Transfer | T1S1.2/91—309 (Ref. [22]) Proposed | Protocol Definition |
| | Host—Switch | T1S1.1/91—387 SCAI Working Document, (Ref. [23]) | Service Definition |
| Call Delivery With Associated Data | Calling Party Number | NIU 90—301 & NIU 90—302 Implementation Agreements | See Appendices B and C of this document |
| | Host—Switch | T1S1.1/91—387 SCAI Working Document (Ref. [23]) | Service Definition |
| Terminal Connectivity | Bearer Capability | NIU 90—301 & NIU 90—302 Implementation Agreements | See Appendices B and C of this document |
| | Higher Layer | Network Interconnectivity Family | In Progress |
| Call Back | Calling Party Number | NIU 90—301 & NIU 90—302 Implementation Agreements | See Appendices B and C of this document |
| | Host—Switch | T1S1.1/91—387 SCAI Working Document (Ref. [23]) | Service Definition |

Legend  Near Completion — Implementation Agreements are near completion.
Protocol definition — The protocol is currently being defined.
Service definition — Ground work for starting protocol work is being done.

### 7.2.2 Future ISDN CPE Compatibility/Capability

Editor's Note: This section is reserved for future agreements regarding ISDN CPE Compatibility/Capability. Refer to section 7.2.2 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 7.2.3 Future ISDN Network Interconnectivity

Editor's Note: This section is reserved for future agreements regarding ISDN Network Interconnectivity. Refer to section 7.2.3 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 7.2.4 Future Messaging and Answering

Editor's Note: This section is reserved for future agreements regarding Messaging and Answering. Refer to section 7.2.4 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 7.2.5 Future Bandwidth Negotiation

Editor's Note: This section is reserved for future agreements regarding Bandwidth Negotiation. Refer to section 7.2.5 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

### 7.2.6 Future Network Management/ISDN Administration

Editor's Note: This section is reserved for future agreements regarding Network Management/ISDN Administration. Refer to section 7.2.6 of the *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN) — Publication 1*, (Ref. [32]), for information regarding the current status of this work within the NIU-Forum.

# 8 References

## 8.1 ANS documents

[1]     ANS T1.111-1988, *Telecommunications — Signalling System Number 7 (SS7) — Message Transfer Part (MTP)*.

[2]     ANS T1.112-1988, *Telecommunications — Signalling System Number 7 (SS7) — Signalling Connection Control Part (SCCP)*.

[3]     ANS T1.113-1988, *Telecommunications — Signalling System Number 7 (SS7) — ISDN User Part (ISUP)*.

[4]     ANS T1.114-1988, *Telecommunications — Signalling System Number 7 (SS7) — Transactions Capability Application Part (TCAP)*.

[5]     ANS T1.115-1989, *Telecommunications — Signalling System Number 7 (SS7) — Monitoring and Measurements*.

[6]     ANS T1.116-1989, *Telecommunications — Signalling System Number 7 (SS7) — Operations, Maintenance, Administration and Provisioning (OMAP)*.

[7]     ANS T1.216-1991, *ISDN Management — Basic Rate Physical Layer*.

[8]     ANS T1.217-1991, *ISDN Management — Primary Rate Physical Layer*.

[9]     ANS T1.218-1991, *ISDN Management — Data Link and Network Layers*.

[10]    ANS T1.403-1989, *Telecommunications — Carrier to Customer Installation — DS1 Metallic Interface*.

[11]    ANS T1.408-1990, *Telecommunications — Integrated Services Digital Network (ISDN) — Primary Rate — Customer Installation Metallic Interfaces — Layer 1 Specification*.

[12]    ANS T1.601-1988, *Telecommunications — Integrated Services Digital Network (ISDN) — Basic Access Interface for Use on Metallic Loops for Application on the Network Side of the NT-Layer 1 Specification*.

[13]    ANS T1.602-1989, *Telecommunications — Integrated Services Digital Network (ISDN) — Data-Link Layer Signalling Specification for Application at the User-Network Interface*.

[14]    ANS T1.603-1990, *Telecommunications — Integrated Services Digital Network (ISDN) — Minimal Set of Bearer Services for the Primary Rate Interface*.

[15]    ANS T1.604-1990, *Telecommunications — Integrated Services Digital Network (ISDN) — Minimal Set of Bearer Services for the Basic Rate Interface*.

[16]    ANS T1.605-1989, *Telecommunications — Integrated Services Digital Network (ISDN) — Basic Access Interface at S and T Reference Points — Layer 1 Specification*.

[17]     ANS T1.607-1990, *Telecommunications — Integrated Services Digital Network (ISDN) — Digital Subscriber Signalling System Number 1 (DSS1) — Layer 3 Signalling Specification for Circuit-Switched Bearer Service.*

[18]     ANS T1.608-1990, *Telecommunications — Integrated Services Digital Network (ISDN) — Digital Subscriber Signalling System Number 1 (DSS1) — Signalling Specification for X.25 Packet-Switched Bearer Service.*

[19]     ANS T1.609-1990, *Telecommunications — Integrated Services Digital Network (ISDN) — Interworking between the ISDN User-Network Interface Protocol and the Signalling System Number 7 (SS7) ISDN User Part.*

[20]     ANS T1.610-1990, *Telecommunications — Integrated Services Digital Network (ISDN) — Digital Subscriber Signalling System Number 1 (DSS1) — Generic Procedures for the Control of ISDN Supplementary Services.*

[21]     ANS T1.612-1990, *Telecommunications — Integrated Services Digital Network (ISDN) — Terminal Adaptation Using Statistical Multiplexing.*

[22]     T1S1.2/91-309 (T1S1.2/89-299), *Supplementary Service — Normal Call Transfer Stage 1, 2 and 3.*

[23]     T1S1.1/91-387 (T1S1.1/90-077), *Switch-Computer Applications Interface (SCAI) Working Document.*

## 8.2     CCITT Documents

[24]     CCITT Recommendation I.431-1988, *ISDN Primary Rate User-Network Interface — Layer 1 Specification.*

[25]     CCITT Recommendation Q.921-1988 (also designated CCITT Recommendation I.441-1988), *ISDN User-Network Data Link Layer Specification.*

[26]     CCITT Recommendation Q.931-1988 (also designated CCITT Recommendation I.451-1988), *ISDN Primary Rate User-Network Interface — Layer 3 Specification.*

[27]     CCITT Recommendation V.120-1988, *Support by an ISDN of Data Terminal Equipment with V-series Type Interfaces with Provision for Statistical Multiplexing.*

[28]     CCITT Recommendation X.25-1984, *Interface between Data Terminal Equipment (DTE) and Data Circuit-Terminating Equipment (DCE) for Terminals Operating in the Packet Mode and Connected to Public Data Networks by Dedicated Circuit.*

[29]     CCITT Recommendation X.31-1988, *Support of Packet Mode Terminal Equipment by an ISDN.*

[30]     CCITT Recommendation I.231-1988, *Circuit-Mode Bearer Service Categories.*

[31]     CCITT Recommendation I.232-1988, *Packet-Mode Bearer Services Categories.*

## 8.3    NIU-Forum Documents[14]

[32]    NIU Publication 1, *North American ISDN Users' Forum (NIU-Forum) Working Agreements for the Integrated Services Digital Network (ISDN)*, 01 June 1990.

[33]    NIU 90-002 (NIU/IIW/ICOT/90-40), *Integrated Services Digital Network (ISDN) Conformance Testing, Layer 1 Basic Rate S/T Interface, User Side*, 1990.

[34]    NIU 91-007 (NIU/IIW/ICOT/ACT23/91-22.2 V1.2), *Integrated Services Digital Network (ISDN) Conformance Testing, Layer 2 Basic Rate Interface, Link Access Procedure, D-channel (LAPD), User side*, 1991.

[35]    NIU-Forum User Application Requirements Data Form 810005, "Database Information to Corporate Security".

[36]    NIU-Forum User Application Requirements Data Form 840023, "New Account Customer Inquiry Handling".

[37]    NIU-Forum User Application Requirements Data Form 840024, "Customer Service Call Handling (Incoming Call Management)".

[38]    NIU-Forum User Application Requirements Data Form 840025, "Automatic Callback for Financial Services".

[39]    NIU-Forum User Application Requirements Data Form 830008, "Asynchronous to SNA/SDLC".

[40]    NIU-Forum User Application Requirements Data Form 830009, "Synchronous Terminal to Controller".

[41]    NIU-Forum User Application Requirements Data Form 960009, "Asynchronous Access to Host Computer".

## 8.4    Other Documents

[42]    NIST Special Publication 500-183, *Stable Implementation Agreements for Open Systems Interconnection Protocols*, Version 4, Edition 1, December 1990.

[43]    ISO 9646, *Information Processing Systems, OSI Conformance Testing Methodology and Framework*. Parts 1-5, 1989.

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[14]    These documents are available by contacting the NIU-Forum Administrator, NIST, Building 223, Room B364, Gaithersburg, MD  20899.

NIU 90-301
Implementation Agreement
of the North American ISDN Users' Forum

Layer 3 Signalling Specification for the
Minimal Set of Circuit-Switched Bearer Services for
the ISDN Basic Rate Interface/Class I.

*Baseline Text*
American National Standard T1.607-1990:
Integrated Services Digital Network (ISDN) —
Layer 3 Signalling Specification for
Circuit-Switched Bearer Service for
Digital Subscriber Signalling System Number 1 (DSS1).

*Base Standards*
CCITT Recommendation Q.931 (1988):
ISDN User-Network Interface Layer 3 —
Specification For Basic Call Control.
ANSI T1.607-1990
ANSI T1.604*:
Integrated Services Digital Network (ISDN) —
Minimal Set of Bearer Services for
the Basic Rate Interface.

## A.1 Abstract

This Implementation Agreement specifies procedures for establishing, maintaining, and clearing connections at the Integrated Services Digital Network (ISDN) user-network interfaces and are mandatory for the support of the minimal set of circuit-switched bearer services specified by ANSI T1.604-1990* *Integrated Services Digital Network (ISDN) — Minimal Set of Bearer Services for the Basic Rate Interface*, (Ref. [15]). Procedures for circuit-mode digital, circuit-mode speech and circuit-mode voiceband data bearer services are as specified in the baseline text ANS T1.607-1990, *Integrated Services Digital Network (ISDN) — Digital Subscriber Signalling System Number 1 (DSS1) — Layer 3 Signalling Specification for Circuit-Switched Bearer Service*, (Ref. [17]) as further resolved by this agreement. The packet-mode data service is included in this document as a bearer service. Procedures for the packet-mode bearer service will be detailed in another document.

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\*    Subject to further discussion.

## A.2 Introduction

The original implementation agreement (NIU 90-301) was reached by marking up the text of ANS T1.607-1990, (Ref. [17]) to reflect the clarifications of text and selection of options. This appendix translates the implementation agreement markup into a listing of these clarifications and selections, (i.e., this appendix lists the differences [the "delta"] between the implementation agreement marked up ANS T1.607-1990, and the original text of ANS T1.607-1990).

## A.3 NIU 90-301 Delta List**

The IA has adopted the ANS T1.607-1990*** (Ref. [17]) standard with the following clarifications of the text, and selection of options:

| ANS T1.607-1990 SECTION/TABLE NUMBER/NAME | IMPLEMENTATION AGREEMENTS - CLARIFICATION OF TEXT AND SELECTION OF OPTIONS |
|---|---|
| Section 1 General | Delete "1. General" heading. |
| Section 1.1 Scope and Purpose | Replace this section with Attachment A of this document. |
| Section 2.2 States associated with the global reference call | Delete this section including subsections. |
| Section 3 Message functional definition and content Item (b), Subitem (2) | Delete last sentence from the Note: "Annex D contains a description of the information element usage for symmetric NT2-NT2 interfaces." |
| Section 3.1 Messages for circuit-mode connection control Table 1 — Messages for circuit-mode connection control | Change "NOTIFY 3.1.7" to "*NOTIFY". |
| Section 3.1 Messages for circuit-mode connection control Table 1 — Messages for circuit-mode connection control | Add the following footnote below table 1: "* See section 5.8.4 for treatment of this message." |

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** Note that this Delta List was developed in "good faith" by NIST as a simple equivalent representation of the actual agreements. It has been reviewed and approved by the editors of the Signalling Working Group as per recommendation of the Executive Steering Committee.

*** This documents can be purchased from: American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

| | |
|---|---|
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Change the "Call Reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Change the "Channel Identification/Direction" cell from "both (Note 1)" to "u -> n". |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Change the "Channel Identification/Length" cell from "2-*" to "2-3". |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Change the "Progress Indicator/Direction" cell from "both" to "n -> u". |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Change the "Progress Indicator/Length" cell from "2-4" to "2,4". |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Delete "Display" row. |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Delete Notes 1, 4, 5. |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Delete the last sentence from Note 3. |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Change Note "6  Included if the network optionally provides additional information describing tones." to "6  The network will always provide this IE." |
| Section 3.1.2<br>CALL PROCEEDING<br>Table 3 — CALL PROCEEDING message content | Change the "Channel Identification/Length" cell from "2-*" to "2-3". |
| Section 3.1.2<br>CALL PROCEEDING<br>Table 3 — CALL PROCEEDING message content | Delete reference to "Note 2" in the "Progress indicator/Type" cell. |
| Section 3.1.2<br>CALL PROCEEDING<br>Table 3 — CALL PROCEEDING message content | Change the "Progress Indicator/Length" cell from "2-4" to "2, 4". |
| Section 3.1.2<br>CALL PROCEEDING<br>Table 3 — CALL PROCEEDING message content | Delete "Display" row. |

Section 3.1.2
CALL PROCEEDING
Table 3 — CALL PROCEEDING message content

Delete Notes 2, 3, 4.

Section 3.1.3
CONNECT
Table 4 — CONNECT message content

Change the "Call Reference/Length" cell from "2-*" to "2-3".

Section 3.1.3
CONNECT
Table 4 — CONNECT message content

Change the "Channel Identification/Direction" cell from "both (Note 1)" to "u -> n (Note 1)".

Section 3.1.3
CONNECT
Table 4 — CONNECT message content

Change the "Channel Identification/Length" cell from "2-*" to "3".

Section 3.1.3
CONNECT
Table 4 — CONNECT message content

Change the "Progress indicator/Direction" cell from "both" to "n -> u".

Section 3.1.3
CONNECT
Table 4 — CONNECT message content

Change the "Progress Indicator/Length" cell from "2-4" to "2, 4".

Section 3.1.3
CONNECT
Table 4 — CONNECT message content

Delete the following rows:
• "Display";
• "Connected number";
• "Connected subaddress";
• "Low Layer compatibility".

Section 3.1.3
CONNECT
Table 4 — CONNECT message content

Change Note 1 from "Included in the network-to-user direction for support of the procedures in Annex D." to "The coding of this IE should be always 'Exclusive B'."

Section 3.1.3
CONNECT
Table 4 — CONNECT message content

Delete the following from Note 3: "or in connection with the provision of in-band tones and patterns."

Section 3.1.3
CONNECT
Table 4 — CONNECT message content

Delete Notes 4, 5, 7, 8, 9.

Section 3.1.4
CONNECT ACKNOWLEDGE
Table 5 — CONNECT ACKNOWLEDGE message content

Change the "Call Reference/Length" cell from "2-*" to "2-3".

| Section 3.1.4<br>CONNECT ACKNOWLEDGE<br>Table 5 — CONNECT ACKNOWLEDGE message content | Delete "Display" row. |
|---|---|
| Section 3.1.4<br>CONNECT ACKNOWLEDGE<br>Table 5 — CONNECT ACKNOWLEDGE message content | Delete Notes 1, 2. |
| Section 3.1.4<br>CONNECT ACKNOWLEDGE<br>Table 5 — CONNECT ACKNOWLEDGE message content | Change Note 3 from "Included if the network optionally provides additional information describing tones." to "Included if the network is required to turn Alerting off." |
| Section 3.1.5<br>DISCONNECT<br>Table 6 — DISCONNECT message content | Change the "Call Reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.5<br>DISCONNECT<br>Table 6 — DISCONNECT message content | Change the "Cause/Length" cell from "4-32" to "4-10". |
| Section 3.1.5<br>DISCONNECT<br>Table 6 — DISCONNECT message content | Delete the following rows:<br>• "Display";<br>• "Connected Number";<br>• "Connected subaddress". |
| Section 3.1.5<br>DISCONNECT<br>Table 6 — DISCONNECT message content | Delete Notes 1, 2, 4, 5. |
| Section 3.1.5<br>DISCONNECT<br>Table 6 — DISCONNECT message content | Change Note 3 to: "Included if the network must turn tones on or off, or turn ALERTING off." |
| Section 3.1.6<br>INFORMATION<br>Table 7 — INFORMATION message content | Change the "Call Reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.6<br>INFORMATION<br>Table 7 — INFORMATION message content | Delete "Display" row. |
| Section 3.1.6<br>INFORMATION<br>Table 7 — INFORMATION message content | Change the "Keypad Facility/Length" cell from "2-34" to "3-34". |
| Section 3.1.6<br>INFORMATION<br>Table 7 — INFORMATION message content | Delete Notes 2, 3. |

| Section 3.1.6<br>INFORMATION<br>Table 7 — INFORMATION message content | Add the following to the end of Note 4 ("The Keypad facility information element..."): "When INFO is sent u -> n, this IE must be present." |
|---|---|
| Section 3.1.6<br>INFORMATION<br>Table 7 — INFORMATION message content | Change Note 5 from "Included if the network optionally provides additional information describing tones." to "Included if the network is required to turn tones off." |
| Section 3.1.7<br>NOTIFY | Delete this section. |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Change "Direction" in table header from "both" to "n -> u". |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Change the "Direction" cell in the following rows from "both" to "n -> u":<br>• "Protocol discriminator";<br>• "Call reference";<br>• "Message type";<br>• "Cause";<br>• "Progress Indicator". |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Change the "Cause/Length" cell from "2-32" to "2,4-10". |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Delete "Display" row. |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Delete Notes 2, 3. |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Change Note 4 from "Included if the network optionally provides additional information describing tones." to "Included when tones or some announcement are provided in-band." |
| Section 3.1.9<br>RELEASE<br>Table 10 — RELEASE message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |

Section 3.1.9
RELEASE
Table 10 — RELEASE message content

Change the "Cause/Length" cell from "2-32" to "2,4-10".

Section 3.1.9
RELEASE
Table 10 — RELEASE message content

Delete the following rows:
- "Display";
- "Connected number";
- "Connected subaddress".

Section 3.1.9
RELEASE
Table 10 — RELEASE message content

Delete Notes 3, 4, 6, 7.

Section 3.1.9
RELEASE
Table 10 — RELEASE message content

Change Note 5 from "Included if the network optionally provides additional information describing tones." to "Included if the network must turn tones or Alerting off."

Section 3.1.10
RELEASE COMPLETE
Table 11 — RELEASE COMPLETE message content

Change the "Call reference/Length" cell from "2-*" to "2-3".

Section 3.1.10
RELEASE COMPLETE
Table 11 — RELEASE COMPLETE message content

Change the "Cause/Length" cell from "2-32" to "2, 4-10".

Section 3.1.10
RELEASE COMPLETE
Table 11 — RELEASE COMPLETE message content

Delete the following rows:
- "Display";
- "Connected number"
- "Connected subaddress".

Section 3.1.10
RELEASE COMPLETE
Table 11 — RELEASE COMPLETE message content

Delete Notes 3, 4, 6, 7.

Section 3.1.10
RELEASE COMPLETE
Table 11 — RELEASE COMPLETE message content

Change Note 5 from "Included if the network optionally provides additional information describing tones." to "Included if the network is required to turn tones on or off."

Section 3.1.11
SETUP
Table 12 — SETUP message content

Change the "Call Reference/Length" cell from "2-*" to "2-3".

Section 3.1.11
SETUP
Table 12 — SETUP message content

Delete the following rows:
- "Repeat Indicator";
- "Network-Specific Facilities";
- "Display".

| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Delete from the "Bearer Capability/Type" cell the reference to Note 2. |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "Bearer Capability/Length" cell from "4-13" to "4-8". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "Channel Identification/Length" cell from "2-*" to "2-3". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "Progress Indicator/Direction" cell from "both" to "n -> u". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "Progress Indicator/Length" cell from "2-4" to "2,4". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "Calling party number/Length" cell from "2-*" to "2-19". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "Called party address/Length" cell from "2-*" to "2-18". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "Transit Network Selection/Length" cell from "2-*" to "2-7". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "Higher Layer Compatibility/Length" cell from "2-4" to "2-5". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Delete Notes 1, 2, 5, 6, 7. |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Add to the end of Note 8: "The digits in this IE are 0 to 9, *, and #." |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change Note 9 from "Included if the network optionally provides additional information describing tones." to "The network will always provide this IE." |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Add to the end of Note 13: "The network should transport this IE transparently. This IE is optional on the user side." |

| Section 3.1.11 SETUP Table 12 — SETUP message content | Add to the end of Note 15: "The network should transport this IE transparently. This IE is optional on the user side. The total length is 2 to 16 octets." |
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| Section 3.1.11 SETUP Table 12 — SETUP message content | Add to the end of Note 16: "The network should transport this IE transparently. This IE is optional on the user side." |
| Section 3.1.11 SETUP Table 12 — SETUP message content | Add to the end of Note 17: "The network will treat this IE on sending and receiving as described in the User-User supplementary service Implementation Agreement." |
| Section 3.1.11 SETUP Table 12 — SETUP message content | Delete "and 7kHz audio" from Note 20. |
| Section 3.1.12 SETUP ACKNOWLEDGE Table 13 — SETUP ACKNOWLEDGE message content | Change the "Call Reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.12 SETUP ACKNOWLEDGE Table 13 — SETUP ACKNOWLEDGE message content | Change the "Channel Identification/Type" cell from "M" to "M*". |
| Section 3.1.12 SETUP ACKNOWLEDGE Table 13 — SETUP ACKNOWLEDGE message content | Add the following footnote before Note 1: "* The coding of the channel ID should always be 'Exclusive B'." |
| Section 3.1.12 SETUP ACKNOWLEDGE Table 13 — SETUP ACKNOWLEDGE message content | Change the "Channel Identification/Length" cell from "3-*" to "3". |
| Section 3.1.12 SETUP ACKNOWLEDGE Table 13 — SETUP ACKNOWLEDGE message content | Change the "Progress Indicator/Length" cell from "2-4" to "2,4". |
| Section 3.1.12 SETUP ACKNOWLEDGE Table 13 — SETUP ACKNOWLEDGE message content | Delete "Display" row. |
| Section 3.1.12 SETUP ACKNOWLEDGE Table 13 — SETUP ACKNOWLEDGE message content | Change Note 1 to: "The only valid value for progress indicator is 8 (refer to section 4.5.21 octet 4). Included in connection with the provision of in-band information/patterns." |

| Section 3.1.12 SETUP ACKNOWLEDGE Table 13 — SETUP ACKNOWLEDGE message content | Delete Notes 2, 3. |

Section 3.1.12
SETUP ACKNOWLEDGE
Table 13 — SETUP ACKNOWLEDGE message content

Change Note 4 from "Included if the network optionally provides additional information describing tones (e.g., activate dial tone)." to "Included if the network is required to turn on dial tone."

Section 3.1.13
STATUS

Change the first sentence from "This message is sent by the user or the network in response to a STATUS ENQUIRY message or at any time during a call to report certain error conditions as listed in 5.8." to "This message is sent by the user in response to a STATUS ENQUIRY message sent by the network, or by either the user or the network to report certain error conditions as listed in 5.8."

Section 3.1.13
STATUS
Table 14 — STATUS message content

Change the "Call Reference/Length" cell "2-*" to "2-3".

Section 3.1.13
STATUS
Table 14 — STATUS message content

Change the "Cause/Length" cell from "4-32" to "4-10".

Section 3.1.13
STATUS
Table 14 — STATUS message content

Delete "Display" row.

Section 3.1.13
STATUS
Table 14 — STATUS message content

Delete Notes 1, 2.

Section 3.1.14
STATUS ENQUIRY

Change "This message is sent by the user or the network at any time to solicit a STATUS message from the peer layer 3 entity." to "This message is sent by the network during the active state to solicit a STATUS message from the peer layer 3 entity."

Section 3.1.14
STATUS ENQUIRY
Table 15 — STATUS ENQUIRY message content

Change "Direction" in the table header from "both" to "n -> u".

Section 3.1.14
STATUS ENQUIRY
Table 15 — STATUS ENQUIRY message content

Change the "Direction" cell in the following rows from "both" to "n -> u":
• "Protocol discriminator";
• "Call reference";
• "Message type".

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| Section 3.1.14<br>STATUS ENQUIRY<br>Table 15 — STATUS ENQUIRY message content | Change "Call Reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.14<br>STATUS ENQUIRY<br>Table 15 — STATUS ENQUIRY message content | Delete "Display" row. |
| Section 3.1.14<br>STATUS ENQUIRY<br>Table 15 — STATUS ENQUIRY message content | Delete Notes 1, 2. |
| Section 3.2<br>Messages used with the global call reference | Delete this section including subsections. |
| Section 4.2<br>Protocol Discriminator | Add the following paragraph after the second paragraph. "The only value supported for call control messages is described below, in Figure 2." |
| Section 4.2<br>Protocol Discriminator<br>Figure 2 — Protocol Discriminator | Change "ANSI T1.607" to "Q.931". |
| Section 4.2<br>Protocol Discriminator<br>Table 19 — Protocol Discriminator | Change "ANSI T1.607" to "Q.931" in the row labeled "0000 1000". |
| Section 4.3<br>Call Reference | Change the first sentence of the third paragraph from "... for a basic user-network interface, and a call reference value of two octets for a primary rate interface." to "and a maximum of 2. The network will send one octet call reference value (CRV) unless all 127 available codepoints are occupied." |
| Section 4.3<br>Call Reference | Delete the fourth paragraph "As a network option ... one or two octets." |
| Section 4.3<br>Call Reference | Add "The Dummy Call Reference and the Global Call Reference are not supported for BRI/Class I circuit-switched calls." after figure 5. |
| Section 4.3<br>Call Reference | Delete the last sentence from the eighth paragraph "The call reference ... (e.g., Restart procedures)." |
| Section 4.3<br>Call Reference | Delete Note 2 ("The numerical value ... defined in 3.2."). |
| Section 4.4<br>Message Type<br>Table 20 — Message types | Add an asterisk (*) to the beginning of the "NOTIFY" row. |

| Section 4.4<br>Message Type<br>Table 20 — Message Types | Add as a footnote "* See section 5.8.4 for treatment of this message type." |
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| Section 4.5.1<br>Coding Rules | Delete the last 3 sentences of the fourth paragraph "Two types of ... octet elements." |
| Section 4.5.1<br>Coding Rules<br>Figure 7 — Formats of information elements | Delete Figure 7 (b). Single octet information element format (type 2). |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Delete "Repeat Indicator" row. |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Delete reference to Note 6 in row "Bearer capability". |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Change the "Bearer capability/max length" cell from "13" to "8". |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Change the "Cause/max length" cell from "32" to "10". |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Change the "Cause/max. no. of occurrences" cell from "3" to "2". |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Change the "Channel identification/max length" cell from "(Note 4)" to "3". |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Delete the following rows:<br>• "Network-specific facilities";<br>• "Notification indicator";<br>• "Display";<br>• "Connected number";<br>• "Connected subaddress". |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Change the "Calling Party Number/max length" cell from "(Note 4)" to "19". |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Change the "Called Party Number/max length" cell "(Note 4)" to "18". |

| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Delete reference to Note 2 in the "Transit Network selection" row. |
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| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Change the "Transit Network selection/max length" cell from "(Note 4)" to "7". |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Delete "4" from the "Transit Network Selection/max. no. of occurrences" cell. |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Delete the following rows:<br>• "Restart indicator" and<br>• "Escape for extension". |
| Section 4.5.1<br>Coding Rules<br>Table 21 — Information element identifier coding | Delete Notes 3, 4, and 6. |
| Section 4.5.1<br>Coding Rules<br>Figure 8 — Information element format using escape for extension | Delete this figure. |
| Section 4.5.2<br>Extensions of codesets | Change "T1.608" to "NIU 89-320" in the first bullet in the fourth paragraph. |
| Section 4.5.2<br>Extensions of codesets | Change the ninth paragraph to: "Codeset 7 information elements shall be handled according to the procedures for unrecognized information elements (see 5.8.7.1) by the first exchange." |
| Section 4.5.2<br>Extensions of codesets | Delete the tenth paragraph ("Codeset 6 ... bilateral agreements."). |
| Section 4.5.3<br>Locking shift procedure<br>New codeset identification coding | Change "T1.608" to "NIU 89-320" in row "codeset 5". |
| Section 4.5.4<br>Non-locking shift procedures | Delete "(a) process the non-locking ... below." from the second paragraph. |
| Section 4.5.4<br>Non-locking shift procedures<br>Temporary codeset identification coding | Change "T1.607" to "NIU 90-301" in row "codeset 0". |
| Section 4.5.4<br>Non-locking shift procedures<br>Temporary codeset identification coding | Change "T1.608" to "NIU 89-320" in row "codeset 5". |

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| Section 4.5.5<br>Bearer capability | In the second paragraph change "13 octets" to "8 octets". |
| Section 4.5.5<br>Bearer capability<br>Figure 11 — Bearer capability information element | Change octet 4, bit 8 from "0/1" to "1". |
| Section 4.5.5<br>Bearer capability<br>Figure 11 — Bearer capability information element | Delete octets<br>• 4a*;<br>• 4b*;<br>• 5b* Note 2;<br>• 5b* Note 3;<br>• 5c*;<br>• 5d*. |
| Section 4.5.5<br>Bearer capability<br>Figure 11 — Bearer capability information element | Change octet 5a*, bit 8 from "0/1" to "1". |
| Section 4.5.5<br>Bearer capability<br>Figure 11 — Bearer capability information element | Delete Notes 1, 2, and 3. |
| Section 4.5.5<br>Bearer capability<br>Figure 11 — Bearer capability information element | Delete "or V.120" from the end of Note 4. |
| Section 4.5.5<br>Bearer capability | Add the following after Figure 11: "Octets 6 and 7 are included for information only and shall not be used for circuit-switched calls. The coding and application for these octets are included in another document." |
| Section 4.5.5<br>Bearer capability<br>Information transfer capability (octet 3) coding | Delete row "10001 7 kHz audio". |
| Section 4.5.5<br>Bearer capability<br>Information transfer rate (octets 4 and 4b) coding | Change the title to "Information transfer rate (octet 4)". |
| Section 4.5.5<br>Bearer capability<br>Information transfer rate (octet 4) coding | Delete the following rows:<br>• "10011 384 kbit/s";<br>• "10100 1472 kbit/s (see Note 2)";<br>• "10101 1536 kbit/s". |
| Section 4.5.5<br>Bearer capability<br>Information transfer rate (octet 4) coding | Change Note 1 to: "The bearer capability is bidirectional symmetric at the information transfer rate specified in octet 4." |

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| Section 4.5.5<br>Bearer capability<br>Information transfer rate (octet 4) coding | Delete Note 2. |
| Section 4.5.5<br>Bearer capability | Delete the codings of octets 4a (structure, configuration, establishment) and 4b (symmetry). |
| Section 4.5.5<br>Bearer capability<br>User information layer 1 protocol (octet 5) coding | Delete "and optionally octets 5b, 5c, and 5d as defined below." from row "00001". |
| Section 4.5.5<br>Bearer capability<br>User information layer 1 protocol (octet 5) coding | Delete "and G.725 7 kHz audio" from row "00101". |
| Section 4.5.5<br>Bearer capability<br>User information layer 1 protocol (octet 5) coding | Delete rows "00111" and "01000". |
| Section 4.5.5<br>Bearer capability<br>User information layer 1 protocol (octet 5) coding | Delete Note 2. |
| Section 4.5.5<br>Bearer capability<br>Synchronous/asynchronous (octet 5a) coding | Delete row "1   asynchronous". |
| Section 4.5.5<br>Bearer capability<br>Synchronous/asynchronous (octet 5a) coding | Delete the second and third sentences from the Note. |
| Section 4.5.5<br>Bearer capability<br>Negotiation (octet 5a) coding | Delete row "1  In-band negotiation possible". |
| Section 4.5.5<br>Bearer capability<br>User rate (octet 5a) coding | Delete all code points except "01111   56   kbit/s CCITT Recommendation V.6." |
| Section 4.5.5<br>Bearer capability | Delete all text relating to octet 5b (i.e., sections labeled "Octet 5b for CCITT Recommendation V.100 or X.30 rate adaption" and "Octet 5b for CCITT Recommendation V.120 rate adaption"). |
| Section 4.5.5<br>Bearer capability | Delete all tables and text referring to octets 5c (number of data bits excluding parity bit, parity information) and 5d (duplex mode, modem type). |
| Section 4.5.6<br>Call state<br>Global interface state value (octet 3) coding | Delete this coding. |

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| Section 4.5.7<br>Called party number | Change the second paragraph to: "The maximum length of this information element is 18 octets." |
| Section 4.5.7<br>Called party number<br>Type of number (octet 3) coding | Delete the following rows:<br>• "011 network specific number (see Note 4)" and<br>• "111 reserved for extension". |
| Section 4.5.7<br>Called party number | Delete Note 4. |
| Section 4.5.7<br>Called party number<br>Numbering plan identification (octet 3) coding | Delete the following rows:<br>• "0011 Data numbering plan (CCITT Recommendation X.121)";<br>• "0100 Telex numbering plan (CCITT Recommendation F.69)";<br>• "1111 Reserved for extension". |
| Section 4.5.7<br>Called party number | Add Attachment B of this document after the following:<br>*"Number digits (octets 4, etc.)*<br>This field is coded with ASCII characters, according to the formats specified in the appropriate numbering and dialing plan." |
| Section 4.5.9<br>Calling party number | Change the second paragraph from: "The maximum length of this information element is network dependent." to "The maximum length of this information element is 19 octets." |
| Section 4.5.9<br>Calling party number<br>Type of number (octet 3) coding | Delete the following rows:<br>• "011 network specific number (see Note 4)" and<br>• "111 reserved for extension". |
| Section 4.5.9<br>Calling party number<br>Type of number (octet 3) coding | Delete Note 4. |
| Section 4.5.9<br>Calling party number<br>Numbering plan identification (octet 3) coding | Delete the following rows:<br>• "0100 Telex numbering plan (CCITT Recommendation F.69)" and<br>• "1111 Reserved for extension". |
| Section 4.5.9<br>Calling party number | Add Attachment C of this document after the following:<br>*"Number digits (octets 4, etc.)*<br>This field is coded with ASCII characters, according to the formats specified in the appropriate numbering or dialing plan." |

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| Section 4.5.10<br>Calling party subaddress | Add a new paragraph at the end of the section: "In the network to user direction (n —> u), the coding and delivery of this IE depends on the definition of the Calling Line ID service." |
| Section 4.5.11<br>Cause | Change the second sentence of the first paragraph from "The maximum length of this information element is 32 octets." to "The maximum length of this information element is 10 octets." |
| Section 4.5.11<br>Cause<br>Figure 17 — Cause information element | Change octet 3, bit 8 from "0/1" to "1". |
| Section 4.5.11<br>Cause<br>Figure 17 — Cause information element | Delete octet 3a*. |
| Section 4.5.11<br>Cause<br>Figure 17 — Cause information element | Delete the Note. |
| Section 4.5.11<br>Cause<br>Recommendation (octet 3a) coding | Delete this coding and its associated Notes 1 and 2. |
| Section 4.5.11<br>Cause | Add the following sentence to the end of the paragraph under "Diagnostics (octet 5)": "If more than one IE is identified in a diagnostic, they should be ordered as IE's normally appear in a message." |
| Section 4.5.11<br>Cause<br>Cause table | Change the "diagnostics" cell of the first three code points to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Change the "Normal call clearing/diagnostics" cell from "(see Note 12)" to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Add to the "User busy/diagnostics" cell: "(see Note 10)" |
| Section 4.5.11<br>Cause<br>Cause table | Change the "call rejected/diagnostics" cell from "(see Note 12, user supplied diagnostic) (see Note 4)" to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Delete row "Number changed". |

| Section 4.5.11<br>Cause<br>Cause table | Add "(see Note 10)" to the "Network out of order/diagnostics" cell. |

| Section 4.5.11<br>Cause<br>Cause table | Add "(see Note 10)" to the "Requested circuit or channel not available/diagnostics" cell. |

| Section 4.5.11<br>Cause<br>Cause table | Delete row "Quality of service unavailable". |

| Section 4.5.11<br>Cause<br>Cause table | Change the "Requested facility not subscribed/ diagnostics" cell from "Facility identification (see Note 1)" to "Not used". |

| Section 4.5.11<br>Cause<br>Cause table | Change the "Bearer capability not authorized/ diagnostics" cell from "(see Note 3)" to "Not used". |

| Section 4.5.11<br>Cause<br>Cause table | Delete row "Bearer capability not presently available". |

| Section 4.5.11<br>Cause<br>Cause table | Delete row "Service or option not available, unspecified". |

| Section 4.5.11<br>Cause<br>Cause table | Change the "Bearer capability not implemented/ diagnostics" cell from "(see Note 3)" to "Not used". |

| Section 4.5.11<br>Cause<br>Cause table | Delete row "Channel type not implemented". |

| Section 4.5.11<br>Cause<br>Cause table | Change the "requested facility no implemented/ diagnostics" cell from "Facility identification (see Note 1)" to "Not used". |

| Section 4.5.11<br>Cause<br>Cause table | Delete rows "Only restricted digital information bearer capability is available" and "Service or option not implemented, unspecified". |

| Section 4.5.11<br>Cause<br>Cause table | Delete row "Identified channel does not exist". |

| Section 4.5.11<br>Cause<br>Cause table | Change the "incompatible destination/diagnostics" cell from "Incompatible parameter (see Note 2)" to "Not used". |

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| Section 4.5.11<br>Cause<br>Cause table | Delete row "Invalid message, unspecified". |
| Section 4.5.11<br>Cause<br>Cause table | Change the "Recovery on timer expiry/diagnostics" cell from "Timer number (see Note 9)" to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Delete Notes 2, 3, 4, 5, 7, 9, 11, 12. |
| Section 4.5.11<br>Cause<br>Figure 18 — Coding of the diagnostic field for causes 57, 58 and 65 | Delete Figure 18 and text for octets 5, 5a, and 5b. |
| Section 4.5.12<br>Channel identification<br>Figure 19 — Channel identification information element | Delete the octets 3.1, 3.2, and 3.3. |
| Section 4.5.12<br>Channel identification<br>Figure 19 — Channel identification information element | Delete Notes 1, 2, 3, 4. |
| Section 4.5.12<br>Channel identification<br>Interface identifier present (octet 3) coding | Delete row "1  Interface explicitly ... with octet 3.1." |
| Section 4.5.12<br>Channel identification<br>Interface identifier present (octet 3) coding | Delete the Note and the reference to it in row "0 Interface implicitly identified". |
| Section 4.5.12<br>Channel identification<br>Interface type (octet 3) coding | Delete row "1  other interface: ... (see Note)". |
| Section 4.5.12<br>Channel identification<br>Interface type (octet 3) coding | Delete the Note. |
| Section 4.5.12<br>Channel identification<br>Information channel selection (octet 3) coding | Add the following after Note 3:  "4  The combination of 'Any Channel' (bits 1,2), and 'Exclusive' (bit 4) is invalid." |
| Section 4.5.12<br>Channel identification | Delete the text, codings, and figures relating to octets 3.1, 3.2, and 3.3. |

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|---|---|
| Section 4.5.13<br>Connected Number | Delete this section. |
| Section 4.5.14<br>Connected subaddress | Delete this section. |
| Section 4.5.15<br>Display | Delete this section. |
| Section 4.5.16<br>High layer compatibility | Change the second paragraph from "The maximum length of this information element is four octets." to "The maximum length of this information element is five octets." |
| Section 4.5.18<br>Low layer compatibility | Delete the second paragraph. |
| Section 4.5.18<br>Low layer compatibility<br>Negotiation indicator (octet 3a) coding | Delete row "1  Out-band negotiation possible". |
| Section 4.5.18<br>Low layer compatibility<br>Negotiation indicator (octet 3a) coding | Delete Note 1. |
| Section 4.5.18<br>Low Layer compatibility<br>User information layer 3 protocol (octet 7) coding | Change "ANSI T1.607" to "NIU 90-301" in row "00010". |
| Section 4.5.19<br>Network-specific facilities | Delete this section. |
| Section 4.5.20<br>Notification Indicator | Delete this section. |
| Section 4.5.21<br>Progress indicator<br>Progress description (octet 4) coding | Delete row "000 0100  4    call has returned to the ISDN." |
| Section 4.5.21<br>Progress indicator<br>Progress description (octet 4) coding | Add the following after Note 2:  "3  In the SETUP message, n -> u, one of two values may be used: 1 or 3." |
| Section 4.5.22<br>Repeat indicator | Delete this section. |
| Section 4.5.23<br>Restart indicator | Delete this section. |

Section 4.5.24
Signal
Figure 32 — Signal information element

Add below the figure: "Note  In the n -> u direction, and in the absence of supplementary services, the public network will offer signalling pattern 0 only."

Section 4.5.24
Signal
Signal value (octet 3) coding

Delete the following rows:
- "intercept tone on";
- "answer tone on";
- "off hook warning tone on";
- "ALERTING on — pattern 5";
- "ALERTING on — pattern 6";
- "ALERTING on — pattern 7".

Section 4.5.25
Transit network selection

Change the second sentence of the first paragraph to: "The transit network selection information element should not be repeated in a message (See Annex C)."

Section 4.5.25
Transit network selection

Change the second paragraph to: "The default maximum length of this information element is 7 octets."

Section 4.5.25
Transit network selection
Type of network identification (octet 3) coding

Delete row "011 international network identification".

Section 4.5.25
Transit network selection
Network identification plan (octet 3) coding

Delete row "0011 Data network identification code (CCITT Recommendation X.121)".

Section 4.5.26
User-user

Add the following sentence to the end of the Note (after the second paragraph): "This IE is included based on user-user supplementary service description and user application."

Section 4.5.26
User-user
Protocol discriminator (octet 3) coding

Change "ANSI T1.607" to "NIU 90-301" in row "0000 1000".

Section 4.6.1
Operator system access
type of access (octet 3) coding

Delete row "10 private/principal".

Section 5
Circuit-switched call control procedures

Delete the fourth paragraph ("As a general principle, ...").

Section 5
Circuit-switched call control procedures

Delete the last sentence of second Note ("Display information ... network to user.").

Section 5.1
Call establishment at the originating interface

Change "ANSI T1.602" to "NIU 89-210" in the last sentence of the first paragraph.

Section 5.1.3
Overlap sending

Add the following at the end of section 5.1.3:
"However, as an option, the network can determine that a potentially complete code has been received following the receipt of address information, and the network could use critical interdigit timing (instead of T302) to determine whether additional digits are following. This timing could be 3-5 seconds. If implemented, when this timer expires, a complete address is assumed and the procedures in Sec. 5.1.5.2 shall be followed. In an INFORMATION message is received and the critical interdigit timing is running, it shall be stopped."

Section 5.1.4
Invalid call information

Delete the following line from the last paragraph: "22 'number changed';".

Section 5.1.4
Invalid call information

Add the following two paragraphs to the end of section 5.1.4:
"The network should reject the call request if the SETUP message contains the keypad information element, and any of the following information elements: transit network selection, called party number, or operator system access. In this case, the network should send the calling user equipment a RELEASE COMPLETE message containing cause 28, 'invalid number format (location: public network serving the local user).'".

"If the network receives a called party number information element containing more address digits than expected, as determined by the 'type of number and numbering plan identification' field, the network should discard the superfluous digits and route the call. Similarly, if the transit network selection information element contains more address digits than expected, as determined by the 'type of network identification' and 'network identification plan' fields, the network should discard the superfluous digits and route the call. If the network receives a keypad information element containing more address digits than required for completion of digit analysis, the network should discard the superfluous digits (according to the network dialing plan) and route the call. If any of these events occur, the local public network should send the calling user equipment a STATUS message containing National-specific cause 11, 'More digits received than allowed: call is proceeding (location: public network serving the local user' and the call state information element coded as call state 1, 'call initiated.' Private networks may support this procedure, optionally."

Section 5.1.5.1
Call proceeding, en-bloc sending

Delete causes "58 'bearer capability not presently available';" and "63 'service or option not available, unspecified';" from the second paragraph.

Section 5.1.5.1
Call proceeding, en-block sending

Add to the second paragraph after "57 ... authorized": "34 'no circuit or channel available';".

Section 5.1.5.2
Call proceeding, overlap sending

Delete "58 ...available" and "63 ... unspecified" from the first paragraph.

Section 5.1.5.2
Call proceeding, overlap sending

Add after "57 ... not authorized": "34 'no circuit or channel available';" in the first paragraph.

Section 5.1.5.2
Call proceeding, overlap sending

Add the following at the end of section 5.1.5.2:

*"Other Misdialing Treatments*

The Network should be capable of recognizing several types of misdialing. If network-provided tones and announcements do not apply, the network should initiate call clearing in response to a misdialing error. If en-bloc sending has been used, the network should send a RELEASE COMPLETE message to the calling user equipment. If overlap sending has been used, the network should send a DISCONNECT message to the calling user equipment. The initial clearing message should contain the appropriate cause information, as indicated below, and the signal information 'reorder tone on.' If tones and announcements apply, see section 5.3.4.1.

— Vacant code: National-specific cause 4, 'vacant code.'

— Prefix 0 dialed in error: National-specific cause 8, 'prefix 0 dialed in error.'

— Prefix 1 dialed in error: National-specific cause 9 'prefix 1 dialed in error.'

— Prefix 1 not dialed: National-specific cause 10, 'prefix 1 not dialed.'"

Section 5.1.6
Notification of interworking at the originating interface

Change (a) in the first paragraph to: "In an appropriate call control message when a state change is required (i.e., CONNECT); or,".

Section 5.1.6
Notification of interworking at the originating interface

Delete from the second paragraph the progress description value "4 'call has returned to the ISDN'. Call is now end-to-end and ISDN."

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|---|---|
| Section 5.1.7<br>Call confirmation indication | Change the last sentence of the first paragraph to:<br>"When the user receives the ALERTING message, the user shall enter the Call Delivered state." |
| Section 5.2<br>Call establishment at the destination interface | Change "ANSI standard T1.602" to "NIU 89-210" in the first sentence of the first paragraph. |
| Section 5.2<br>Call establishment at the destination interface | Delete the third paragraph ("The SETUP message offered ... of the data link layer."). |
| Section 5.2.1<br>Incoming call | Delete "Display," from the second paragraph "(e.g., Display, Low layer compatibility)." |
| Section 5.2.1<br>Incoming call | Add the following to the end of second paragraph. "In general, a call terminating from a non-ISDN line or from a Public Switched Telephone Network (PSTN) trunk should be offered to the called user equipment with the 3.1. kHz audio bearer capability." |
| Section 5.2.1<br>Incoming call | Change "(e.g., for DDI)" to "(e.g., 7 digits)" in the second sentence of the third paragraph. |
| Section 5.2.1<br>Incoming call | Delete the third sentence from the third paragraph. |
| Section 5.2.2<br>Compatibility checking | Delete the third paragraph. |
| Section 5.2.3.1<br>SETUP message delivered by point-to-point data link | Delete this section. |
| Section 5.2.3.2<br>SETUP message delivered by broadcast data link | Combine the first and second sentences of the first paragraph to: "When the SETUP message is delivered by a broadcast data link, the network sends a SETUP message with the Channel identification information element indicating a specific channel with no alternative acceptable." |
| Section 5.2.5.1<br>Response to en-block SETUP | Delete "(see Note)" from the first sentence of the first paragraph. |
| Section 5.2.5.1<br>Response to en-block SETUP | Delete the Note after the first paragraph. |
| Section 5.2.5.1<br>Response to en-block SETUP | Delete the third paragraph ("When the SETUP message was delivered via a point-to-point data link ..."). |
| Section 5.2.5.3<br>Called user clearing during incoming call establishment | Delete the first paragraph. |

**Section 5.2.5.3**
**Called user clearing during incoming call establishment**

Change the second sentence of the second paragraph to: "If timer T303 expires (i.e., if no valid message such as CALL PROCEEDING, ALERTING, or CONNECT has been received), the network shall take action as follows:

> a. If all clearing messages received from the called user equipment contain cause 88, 'incompatible destination,' the call should be cleared at the calling ISDN interface with cause 18, 'no user responding (location: public network serving the remote user)' and signal 'ring-back/audible ringing tone on.'

> b. If one or more call clearing messages with cause 17, 'user busy,' have been received from the called user equipment, the call should be cleared at the calling ISDN interface with cause 17,'user busy (location: user).' The signal information should be coded as 'busy tone on' unless an audible ringing tone was indicated because timer T delay (if implemented) previously expired (see sec. 5.2.1). If audible ringing is being provided, the signal information should be coded as 'ring-back/audible ringing tone on.'

> c. If no call clearing messages with cause 17 have been received from the called user equipment and at least one call clearing message with a cause other than 88 has been received, the call should be cleared at the calling ISDN interface with cause 21, 'call rejected (location: user),' and signal 'ring-back/audible ringing tone on.'".

**Section 5.2.5.3**
**Called user clearing during incoming call establishment**

Delete the last sentence from the second paragraph: "When multiple RELEASE COMPLETE ... sent to the originating user (see 5.3)."

**Section 5.2.5.3.1**
**DISCONNECT received prior to expiry of T312**

Change the second sentence in the second paragraph from "If an ALERTING message has been received, ... any other cause sent by a called user." to "If an ALERTING message has been received, the cause sent to the calling user shall be 21 'call rejected' (location: user)."

Section 5.2.5.3.1
DISCONNECT received prior to expiry of T312

Change the third sentence in the second paragraph from "In only CALL PROCEEDING ... sent by a called user." to "If only CALL PROCEEDING messages have been received from called users, the cause sent to the calling user shall be as in 5.2.5.3."

Section 5.2.5.3.2
DISCONNECT received after expiry of timer T312

Change the second sentence in the third paragraph from "If an ALERTING message has been received, ... any other cause sent by a called user." to "If an ALERTING message has been received, the cause sent to the calling user shall be 21 'call rejected' (location: user)."

Section 5.2.5.3.2
DISCONNECT received after to expiry of T312

Change the third sentence in the third paragraph from "If only CALL PROCEEDING ... by a called user" to "If only CALL PROCEEDING messages have been received, the cause sent to the calling user shall be as in 5.2.5.3."

Section 5.2.5.4
Call failure

Delete all occurrences of "(b) ..." (paragraphs 1, 3, 4) from this section.

Section 5.2.6
Notification of interworking at the terminating interface

Delete this section.

Section 5.2.7
Call accept

Add to the end of the second paragraph: "If the CONNECT message is the first response to the SETUP message, it shall contain the channel ID information element."

Section 5.2.8
Active indication

Delete the last paragraph of section 5.2.8 ("A user which has ... has been completed").

Section 5.3.2
Exception conditions

Add the following before the Note that appears at the end of this section.

"        — In the case of a SETUP message sent to the user via the broadcast data link, if a called user terminal sends a first response to the SETUP message after timer T303 has expired (the first expiration of T303 is the SETUP message should not be retransmitted, and the second expiration of T303 if the SETUP message should be retransmitted — note that the SETUP message is retransmitted only when no response is received prior to the first expiry of T303, e.g., the SETUP message should not be retransmitted when a call clearing message(s) is received prior to the first expiry of T303), but before timer T312 expires, the network should clear the call to that user by sending a RELEASE message. This message should contain cause 102, 'recovery on timer expiry' (location: public network serving the local user.).

        — In the case of call offering via the broadcast data link, if either timer T310 or T301 expires at the called user interface, the network should initiate call clearing by sending a RELEASE message to all called user equipment responding to the SETUP message sent by the network. The RELEASE message(s) should contain cause 102, 'recovery on timer expiry' (location: public network serving the local user).

        — If a call attempt is unsuccessful and a speech, 3.1 kHz audio call will not be immediately cleared because inband tones or announcements are being provided, the network should send the calling user a PROGRESS message containing progress message containing progress indicator 8, 'inband information or appropriate pattern now available.'."

Section 5.3.3
Clearing initiated by the user

Delete the last Note in this section.

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|---|---|
| Section 5.3.4.1<br>Clearing when tones or announcements provided | Add the following at the end of section 5.3.4.1:<br>"To return an inband tone for an unsuccessful speech, 3.1. kHz audio the network should send a PROGRESS message and start a tone timer (value to be specified by network provider) in anticipation of the user initiating the clearing process. The PROGRESS message should contain the cause value indicated in the detailed procedures of Section 5.3, along with progress indicator 8, 'inband information or appropriate pattern now available.' If the tone timer expires, the network should initiate call clearing by sending the calling user a DISCONNECT message containing cause 102, 'recovery on timer expiry.' The network should then continue clearing the connection to the calling user equipment according to the procedures for sending a DISCONNECT message. The procedures described above also apply for returning an inband announcement for an unsuccessful speech, 3.1 kHz audio call, with the exception that the tone timer is not used. Inband announcements should not be timed; however, it is desirable that the network Delete an inband announcement after one or two message cycles, depending on the number specified by the network provider. In removing the inband announcement, the network should follow the above procedures for expiration of the tone timer." |
| Section 5.3.4.3<br>Completion of clearing | Delete the last Note at the end of section 5.3.4.3. |
| Section 5.5<br>Restart procedure | Delete this section including all subsections. |
| Section 5.8<br>Handling of error conditions | Change "T1.607" to "Q.931" in the first sentence of the first paragraph. |
| Section 5.8.1<br>Protocol discrimination error | Change "T1.607" to "Q.931" in the first sentence in the first paragraph. |
| Section 5.8.3.1<br>Invalid call reference format | Change the second paragraph to: "If the Call reference information element octet 1, bits 1 through 4 indicates a length greater than the maximum length supported by the receiving equipment (see 4.3), or the Null call reference, or the global call reference is used to identify a call, then the message shall be ignored." |
| Section 5.8.3.2<br>Call reference procedural errors | Delete item "(f) When any message ... shall be returned." |

Section 5.8.4
Message type or message sequence errors

Add as a new paragraph "A NOTIFY message may also be ignored by the recipient." after the first paragraph (i.e., after the list of cause values).

Section 5.8.4
Message type or message sequence errors

Change the fourth sentence in the second paragraph to: "Whenever the network receives an unexpected RELEASE message, the network shall: disconnect and release the B-channel; clear the network connection and the call to the remote user with cause as specified in 5.2.5.3, or cause in the RELEASE message sent by the user. If no cause is included, cause 31 'normal, unspecified' or other causes as specified in 5.8.6.1; return a RELEASE COMPLETE message to the user; release the call reference; stop all timers; and enter the Null state."

Section 5.8.4
Message type or message sequence errors

Change the second sentence of the third paragraph to: "Whenever the network receives an unexpected RELEASE COMPLETE message, the network shall: disconnect and release the B-channel; clear the network connection and the call to the remote user with the cause indicated by the user or, if not included, cause 111 'protocol error, unspecified' or other causes as specified in 5.8.6.1; release the call reference; stop all timers; and enter the Null state."

Section 5.8.6.1
Mandatory information element missing

Change the beginning of the first sentence in the third paragraph to: "When a DISCONNECT message (first clearing message) is received with ...."

Section 5.8.6.1
Mandatory information element missing

Add the following as a new paragraph after the third paragraph: "As an option the network shall follow the following procedure. The DISCONNECT message sent to the network should contain cause information. If the network receives an initial clearing message without a cause information element, it should accept the message, disconnect the associated channel, and initiate procedures to clear the network connection and the call to the remote user. If the call is active or if the originating user cleared the call while in the setup phase, the network should send cause 16, 'normal clearing (location: user)' to the remote user. It should send cause 21, 'call rejected (location: user)' if the terminating user cleared the call while in the setup phase. The network should respond to the user initiating call clearing by sending a RELEASE message containing cause 96, 'mandatory information element is missing (location: public network serving the local user; diagnostic: cause information element identifier).'".

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|---|---|
| Section 5.8.6.2<br>Mandatory information element content error | Change the third paragraph to: "When a DISCONNECT message is received with invalid content of the Cause information element, the action taken shall be the same as if a DISCONNECT message with the cause missing was received with the exception that the RELEASE message sent on the local interface contains cause 100 'invalid information element contents'." |
| Section 5.8.7.1<br>Unrecognized information elements | Add the following to the Note after the first paragraph: "or not implemented by the receiver in a specific message." |
| Section 5.8.8<br>Data-link reset | Change "ANSI T1.607" to "NIU 90-301" in the first sentence of the first paragraph. |
| Section 5.8.9<br>Data-link failure | Change "ANSI T1.607" to "NIU 90-301" in the first sentence of the first paragraph. |
| Section 5.8.9<br>Data-link failure | Change both occurrences of "ANSI T1.607" in the first paragraph bullet b) to "NIU 90-301". |
| Section 5.8.9<br>Data-link failure | Change the first Note after the first paragraph to: "If the transfer mode of the call is circuit-mode, the NIU 90-301 entity may clear the calls." |
| Section 5.8.10<br>Status enquiry procedure | Delete the first paragraph. |
| Section 5.8.11<br>Receiving a STATUS message | Delete "As an option:" from the second sentence of the third paragraph ("The determination ..."). |
| Section 5.8.11<br>Receiving a STATUS message | Change "a)" in the third paragraph to: "If a STATUS message indicating any call state except the Null state is received in the Null state, then the receiving entity shall send a RELEASE COMPLETE message with a cause 101 'message not compatible with call state' or cause 81 'Invalid Call reference value' and remain in the Null state. Otherwise, no action shall be taken on receipt of STATUS unless it is in response to STATUS ENQUIRY." |
| Section 5.8.11<br>Receiving a STATUS message | Delete "b) If a ..." and "c) If a STATUS message, indicating the Null ... into the Null state." after the third paragraph. |
| Section 5.8.11<br>Receiving a STATUS message | Delete the last three paragraphs and the last Note in this section. |
| Section 5.9<br>User notification procedure | Delete this section. |

**NIU-Forum Agreements on ISDN**

Section 6
Packet communication procedures

Change sentence to "See NIU 89-320".

Section 9.1
Timers in the network side
Table 22 — Timers in the network side

Change the "T302/Default time out value" cell from "10-15 s" to "16-24 s".

Section 9.1
Timers in the network side
Table 22 — Timers in the network side

Change the "T302/cause for start" cell from "SETUP ACKNOWLEDGE sent. Receipt of INFORMATION restarts T302." to "SETUP ACKNOWLEDGE sent. Receipt of INFORMATION not containing complete address information restarts T302."

Section 9.1
Timers in the network side
Table 22 — Timers in the network side

Change the "T302/NORMAL STOP" cell to: "With sending complete indication, or potentially complete address information received, as an option, the network can determine that a potentially complete code has been received following the receipt of address information, and the network could use critical interdigit timing (instead of T302) to determine whether additional digits are following. This timing could be 3-5 seconds. If implemented, when this timer expires, a complete address is assumed and the procedures in Sec. 5.1.5.2 shall be followed. In an INFORMATION message is received and the critical interdigit timing is running, it shall be stopped."

Section 9.1
Timers in the network side
Table 22 — Timers in the network side

Add the following row entry for Timer "Tpot_comp" after row "T302":

| TIMER NUMBER | DEFAULT TIME OUT VALUE | STATE OF CALL | CAUSES FOR START | NORMAL STOP | AT THE FIRST EXPIRY | AT THE SECOND EXPIRY | CROSS REFERENCE |
|---|---|---|---|---|---|---|---|
| Tpot_comp | 3-5 s | Overlap Sending | Potentially complete address information received | INFORMATION received | Route call | Timer not restarted | * |

"* optional — as an option, the network can determine that a potentially complete code has been received following the receipt of address information, and the network could use critical interdigit timing (instead of T302) to determine whether additional digits are following. This timing could be 3-5 seconds. If implemented, when this timer expires, a complete address is assumed and the procedures in Sec. 5.1.5.2 shall be followed. In an INFORMATION message is received and the critical interdigit timing is running, it shall be stopped."

| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Change the "T303/DEFAULT TIME OUT VALUE" cell from "4s" to "2.5s". |
| --- | --- |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Change the "T303/NORMAL STOP" cell to "ALERT, CONNECT, or CALL PROCEEDING received". |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Change the "T303/AT THE FIRST EXPIRY" cell to "Retransmit SETUP; re-start T303." |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Delete "Note 7" from the "T308/AT SECOND EXPIRY" cell. |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Change "10s" to "5s" in the "T310/DEFAULT TIME OUT VALUE" cell. |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Delete "Note 6" from the "T310/DEFAULT TIME OUT VALUE" cell. |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Delete the following rows: "T316", "T317", "T321". |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Delete the following Notes: 3, 6, 7 at the end of Table 22. |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Change the "T301/CROSS REFERENCE" cell to "Note 3". |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Change the "T303/NORMAL STOP" cell to "SETUP ACKNOWLEDGE, CALL PROCEEDING or RELEASE COMPLETE received". |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Delete "(annex D)" from the "T303/AT THE FIRST EXPIRY" cell. |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Change the "T303/CROSS REFERENCE" cell to "optional". |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Delete "Note 5" from the "T308/AT THE SECOND EXPIRY" cell. |

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| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Delete rows "T310", "T316", "T317", "T321". |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Delete Notes 2 and 5 that appear at the end of table 7. |
| Annex A | Delete this section. NOTE: This section has not been addressed. |
| Annex B, Section B.3.1<br>Compatibility checking with addressing information | Change the second sentence under "a)" to: "In the case of a mismatch, the user shall either ignore or reject the call." |
| Annex B, Section B.3.2<br>Network to user compatibility | Change the last sentence in this section to: "If a mismatch is detected, then the user shall either ignore or reject the offered call using cause 88 'incompatible destination'." |
| Annex B, Section B.3.4<br>User action figures<br>Figure B.1 — Bearer capability compatibility checking<br>Figure B.2 — Low layer and high layer compatibility checking; compatibility assured<br>Figure B.3 — Low layer and high layer compatibility checking; compatibility not assured | Delete the "point-to-point data link" columns. |
| Annex B, Section B.3.4<br>User action figures<br>Figure B.1 — Bearer capability compatibility checking<br>Figure B.2 — Low layer and high layer compatibility checking; compatibility assured | Change the "Incompatible/Broadcast data link" cell from "Reject" to "Ignore or Reject". |
| Annex B, Section B.3.4<br>User action figures<br>Figure B.2 — Low layer and high layer compatibility checking; compatibility assured<br>Figure B.3 — Low layer and high layer compatibility checking; compatibility not assured | Delete "Note 3" from the "Incompatible/broadcast data link" column. |
| Annex B, Section B.3.4<br>User action figures<br>Figure B.1 — Bearer capability compatibility checking<br>Figure B.2 — Low layer and high layer compatibility checking; compatibility assured<br>Figure B.3 — Low layer and high layer compatibility checking; compatibility not assured | Delete the reference to "Note 1" from the last column. |

| Annex B, Section B.3.4<br>User action figures<br>Figure B.3 — Low layer and high layer compatibility checking; compatibility not assured | Change "Accept or Reject" to "Accept, Ignore, or Reject" in the Broadcast Data Link column. |
|---|---|
| Annex B, Section B.3.4<br>User action figures<br>Figure B.3 — Low layer and high layer compatibility checking; compatibility not assured | Delete Note 1 below figure B.3. |
| Annex B, Section B.3.4<br>User action figures<br>Figure B.3 — Low layer and high layer compatibility checking; compatibility not assured | Change "will reject the call if incompatible" to "may reject the call if incompatible" in Note 2 below figure B.3. |
| Annex B, Section B.3.4<br>User action figures<br>Figure B.3 — Low layer and high layer compatibility checking; compatibility not assured | Delete Note 3 ("Attempt low layer compatibility negotiation (see Annex M).") below Figure B.3. |
| Annex C, Section C.1<br>Introduction | Delete "optional" from the first paragraph. |
| Annex C, Section C.2<br>Selection not supported | Delete this section. |
| Annex C, Section C.3<br>Selection supported | Change the first sentence of the first paragraph to: "The user identifies the selected transit network in the SETUP message." |
| Annex C, Section C.3<br>Selection supported | Delete the second and third paragraphs. |
| Annex C, Section C.3<br>Selection supported | Delete the first sentence of the fourth paragraph. |
| Annex C, Section C.3<br>Selection supported | Delete the last sentence in the sixth paragraph. |
| Annex C, Section C.3<br>Selection supported | Delete the seventh, eighth, and ninth paragraphs. |
| Annex D<br>Extension for symmetric call operation | Delete this section. |
| Annex E<br>Network-specific facility selection | Delete this section. |
| Annex F<br>D-channel backup procedure | Delete this section. |

| Annex G, Section G.1<br>Introduction | Add the following at the end of the first paragraph: "Section 4.5.11 identifies the causes supported in NIU 90-301." |
| --- | --- |

Annex G
Cause Definitions

Delete the following sections:
- Section G.2.16 Cause 22 "number changed"
- Section G.3.2 Cause 38 "network out of order"
- Section G.3.7 Cause 45 "preemption"
- Section G.3.8 Cause 46 "precedence call blocked"
- Section G.3.9 Cause 47 "resource unavailable, unspecified"
- Section G.4.1 Cause 49 "quality of service unavailable"
- Section G.4.4 Cause 58 "bearer capability no presently available"
- Section G.4.5 Cause 63 "service or option not available, unspecified"
- Section G.5.2 Cause 66 "channel type not implemented"
- Section G.5.4 Cause 70 "only restricted digital information bearer capability is available"
- Section G.5.5 Cause 79 "service or option not implemented, unspecified"
- Section G.6.2 Cause 82 "identified channel does not exist"
- Section G.6.4 Cause 91 "invalid transit network selection"
- Section G.6.5 Cause 95 "invalid message, unspecified"

Annex H
Examples of Information elements coding

Change the status of this section from "informative" to "normative".

Annex H, Section H.1
Introduction

Replace the first and second paragraphs with the following: "These are the only recognized codings of the following Information Elements for circuit-mode services:
— Bearer capability information element
— Channel identification information element".

Annex H
Examples of information elements coding

Delete the following figures and sections:
- Figure "H.3 Coding for 7 kHz Audio"
- Figure "H.6 Coding for synchronous 1472 kbit/s";
- sections H.3.2 (Figures H.9, H.10, H.11);
- H.3.3 (Figures H.12 through H.17);
- H.4 (Figures H.18 through H.21);

Annex H, Section H.3.1
Basic Interface, circuit mode, B-channel

Add Attachment D of this document.

| | |
|---|---|
| Annex I<br>Use of Progress Indicators | Change the status of this Annex from "Informative" to "Normative". |
| Annex I<br>Use of progress indicators | Delete the fifth paragraph ("*Progress Indicator 4 ...*"). |
| Annex I<br>Use of Progress Indicators | Delete "or primary" from the left side (between TE and ISDN) of Figure I.1. |
| Annex I<br>Use of Progress Indicators | Delete "Basic or" from the right side (between ISDN and NT2) of Figure I.1 |
| Annex J<br>Examples of Cause Values and location for busy condition | Change "American National Standard T1.607" to "NIU 90-301" in the first sentence of the first paragraph. |
| Annex L<br>low layer information coding principles | Change the first sentence of the first paragraph to: "This annex is part of NIU 90-301." |
| Annex M<br>Low layer compatibility Negotiation | Delete this annex. |
| Annex N<br>Procedures for establishment of bearer connection prior to call acceptance | Delete this annex. |
| Annex O<br>Optional procedures for bearer service change | Delete this annex. |
| Annex P, Section P.1<br>Introduction | Delete "optional" from the first sentence. |
| Annex P, Section P.1<br>Introduction | Delete "or attendant system" from the end of the first sentence in the first paragraph. |
| Annex P, Section P.1<br>Introduction | Change the last sentence of the first paragraph to: "These procedures apply to the speech and 3.1 kHz audio bearer services." |
| Annex P, Section P.1<br>Introduction | Delete "or attendant system" from the first sentence in the second paragraph. |
| Annex P, Section P.2<br>Operator system access requested in keypad facility information element | Delete "or attendant system" from the first sentence of the first paragraph. |
| Annex P, Section P.2<br>Operator system access requested in keypad facility information element | Delete "or attendant system" from the last sentence of the first paragraph. |

| | |
|---|---|
| Annex P, Section P.3<br>Use of the operator system access information element | Delete "or attendant system" from the first sentence of the first paragraph. |
| Annex P, Section P.3<br>Use of the operator system access information element | Delete "c) Private/principal ... SETUP message." from the second paragraph. |
| Annex P, Section P.3<br>Use of the operator system access information element | Delete "or attendant system" from the third paragraph. |
| Annex P, Section P.3<br>Use of the operator system access information element | Delete the sixth paragraph. |
| Annex Q<br>Responding address requirements of the OSI network layer service | Delete this annex. |
| Annex R<br>Application of the Signal Information Element to Tones and Alerting Patterns | Change the status of this Annex from "informative" to "normative". |
| Annex R<br>Application of the Signal Information Element to Tones and Alerting Patterns<br>Table 21 — Tones | Delete the following rows: 2, 6, 8. |
| Annex S<br>Comparison of CCITT Recommendation Q.931 to ANSI T1.607 | Delete this annex. |

**Attachment A**
(of Appendix A)

*1. General*

*1.1 Scope and Purpose*

This Implementation Agreement specifies a minimal subset of procedures and codepoints from the American National Standards T1.607-1990 (Ref. [17]) for the establishment, maintenance, and clearing of ISDN connections at the user-to-network interface. This signalling standard is used to support the circuit-switched bearer services specified in ANSI standards T1.603*.

Terminals are not required to support all services. Switches will support all of the mandatory protocols and codepoints in this implementation agreement. This does not preclude the support of additional services and procedures. However, equipment must be able to interoperate with equipment supporting only this minimal subset.

*1.1.1 Definitions*

The ANS T1.607-1990 (Ref. [17]) assumes that procedures apply generically to ISDN access interfaces, i.e., the document does not distinguish between basic and primary rates access interfaces. In addition, there are no references to specific applications in that document. The concept of equipment classes is introduced in this document to permit certain procedures to be associated with a particular application or class of equipment, e.g., station equipment versus PBX. Specifically, two classes of equipment are defined on the basis of two fundamental attributes.

The first attribute relates to the possibility of an exchange of signals occurring beyond the public network's point of contact with the interface (i.e., between the equipment directly connected to the public network and ISDN terminals or telephones connected to that equipment). For example, some user equipment may support subtending Basic Access digital subscriber loops and/or analog telephone loops. For Class I equipment, the network makes no provision for such an arrangement and assumes the Class I equipment constitutes the endpoint of the communication. Conversely, in the case of Class II equipment, the procedures at the network take into account that communication between Class II equipment (with which it communicates directly) and other equipment (with which the network does not have direct contact) may occur. As an example, Class II equipment may support digital and/or analog subscriber loops. Use of Class II equipment also involves the possibility of having interworking occur beyond the equipment with which the network has direct contact. Therefore, it is reasonable for Class II equipment to provide the network with an interworking notification, for both outgoing and incoming calls, when either the calling or called party respectively, is a non-ISDN user. Class II equipment may also send an interworking notification if a private network exists beyond the Class II equipment and interworking to a non-ISDN facility within that network takes place. When an interface is associated with Class I equipment, it is assumed the multiple pieces of equipment may exist and communicate with the network over the D-channel. However, in this case, all equipment is assumed to be ISDN-capable and is considered as the endpoint of the communication. Therefore, interworking notification should not be accepted from Class I equipment.

The second attribute relates to the manner in which a SETUP message should be presented to the user equipment. When Class I equipment is applied on a particular interfaces, the network should broadcast the SETUP message associated with each call that terminates on that interface, since interaction between the network and multiple pieces of user equipment should be supported. On the other hand, the network should not broadcast SETUP messages

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\*    Subject to further discussion.

associated with terminating calls to an interface on which Class II equipment is being used. Here, a single piece of user equipment is assumed to be involved in all communication with the network.

To the extent possible, it is desirable to have one set of requirements for ISDN call control apply to all ISDN user configurations. However, in cases for which integrated procedures are not appropriate, the call control procedures associated with Equipment Class I will differ from those associated with Equipment Class II. Unless otherwise noted, the assumption should be that a particular procedure/capability should be provided for both classes of equipment on both basic and primary rate access. However, use of the equipment class terminology permits clarification of the circumstances under which a certain capability should be available (i.e., when a particular equipment class is in use). It also permits a mechanism for indicating that a particular capability applies only to a subset of four possible configurations which are labeled as follows.

|     | Class I | Class II |
|-----|---------|----------|
| BRI | *IB*    | *IIB*    |
| PRI | *IP*    | *IIP*    |

In other words, a capability that applies to Class I equipment may be provided on basic access interfaces (IB) and/or primary rate access interfaces (IP). Similarly, a capability that applies to Class II equipment may be provided on basic access interfaces (IIB) and/or primary rate access interfaces (IIP).

The notation shown in the table above is used within this implementation agreement to indicate when protocol or procedures are only expected to be supported for a particular equipment class and/or are limited to a particular type of interface, i.e., basic or primary rate interface.

## Attachment B
### (of Appendix A)

The various parts of the called party number information element should be coded as follows:

— Type of number and numbering plan (octet 3)

| Bits 7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 0 0 0 0 0 0 | Unknown |
| 0 0 1 0 0 0 1 | International number in ISDN numbering plan (Rec. E.164) |
| 0 1 0 0 0 0 1 | National number in ISDN numbering plan (Rec. E.164) |
| 1 0 0 0 0 0 1 | Local (directory) number in ISDN numbering plan (Rec. E.164) |
| 1 1 0 1 0 0 1 | Abbreviated Number in Private Numbering plan |

All other values are reserved

— Digits (octet 4, etc.)

| Bits 7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 1 1 0 0 0 0 | 0 |
| 0 1 1 0 0 0 1 | 1 |
| 0 1 1 0 0 1 0 | 2 |
| 0 1 1 0 0 1 1 | 3 |
| 0 1 1 0 1 0 0 | 4 |
| 0 1 1 0 1 0 1 | 5 |
| 0 1 1 0 1 1 0 | 6 |
| 0 1 1 0 1 1 1 | 7 |
| 0 1 1 1 0 0 0 | 8 |
| 0 1 1 1 0 0 1 | 9 |

All other values are reserved

Digits should be represented by IA5 characters whose encoding is shown above.

In the network to user direction (n -> u), this IE will be always signaled in the SETUP message, and public network interfaces will use only one codepoint: local number in ISDN. For private networks, this IE can contain the following codepoints: abbreviated type of number, and private numbering plan, and extra digits such A, B, C, and D (as per IA5).

**NIU-Forum Agreements on ISDN**

**Attachment C**
(of Appendix A)

The various parts of the calling party number information element should be coded as described below. The numbering plans are as described in CCITT Recommendations E.164 or X.121.

— Type of number and numbering plan (octet 3) follows:

| Bits<br>7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 0 0 0 0 0 0 | Unknown |
| 0 0 1 0 0 0 1 | International number in ISDN numbering plan (Rec. E.164) |
| 0 0 1 0 0 1 1 | International number in data numbering plan (Rec. X.121) |
| 0 1 0 0 0 0 1 | National number in ISDN numbering plan (Rec. E.164) |
| 1 0 0 0 0 0 1 | Local (directory) number in ISDN numbering plan (Rec. E.164) |
| 1 1 0 1 0 0 1 | Abbreviated Number in Private Numbering plan |

All other values are reserved

— Origin of number and presentation status (octet 3a) follows:

| Bits<br>7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 0 0 0 0 0 0 | Presentation allowed of user-provided number, number not screened |
| 0 0 0 0 0 0 1 | Presentation allowed of user-provided number, number passed network screening |
| 0 0 0 0 0 1 0 | Presentation allowed of user-provided number, number failed network screening |
| 0 0 0 0 0 1 1 | Presentation allowed of network-provided number |
| 0 1 0 0 0 0 0 | Presentation prohibited of user-provided number, number not screened |
| 0 1 0 0 0 0 1 | Presentation prohibited of user-provided number, number passed network screening |
| 0 1 0 0 0 1 0 | Presentation prohibited of user-provided number, number failed network screening |
| 0 1 0 0 0 1 1 | Presentation prohibited of network-provided number |
| 1 0 0 0 0 1 1 | Number not available |

All other values are reserved

Notes

1  When octet 3a is omitted, the default value of Number Presentation parameter for the signaled DN value should be used, if it is available. If a value for this parameter is unavailable (i.e., the signaled DN value either fails screening or is not screened by the SPCS), the presentation parameter value of the default DN should be used.

2  Octet 3a, bits 7 and 6 are for the Presentation Indicator; bits 2 and 1 are for the Screening Indicator.

— Digits (octet 4, etc.)

Digits should be represented by IA5 characters whose encoding is shown below:

| Bits 7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 1 1 0 0 0 0 | 0 |
| 0 1 1 0 0 0 1 | 1 |
| 0 1 1 0 0 1 0 | 2 |
| 0 1 1 0 0 1 1 | 3 |
| 0 1 1 0 1 0 0 | 4 |
| 0 1 1 0 1 0 1 | 5 |
| 0 1 1 0 1 1 0 | 6 |
| 0 1 1 0 1 1 1 | 7 |
| 0 1 1 1 0 0 0 | 8 |
| 0 1 1 1 0 0 1 | 9 |

All other values are reserved

Codings At Originating Party Interface

The calling party number information element should only be accepted when in the SETUP message. When the type of number and numbering plan indicator indicates "local number in the ISDN (E.164) numbering plan", the calling party number information element should contain a 7-digit local number. When the type of number and numbering plan indicator indicates "national number in the ISDN (E.164) numbering plan" the calling party number information element should contain a 10-digit national number.

In the network to user direction (n -> u), the coding and delivery of this IE depends on the definition of the Calling Line ID service. For private networks, this IE can contain the following codepoints: abbreviated type of number, and private numbering plan, and extra digits such as A, B, C, and D (as per IA5).

• add the following figures to section H.3.1

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | octet |
|---|---|---|---|---|---|---|---|---|
| Channel identification | | | | | | | | |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| Information element identifier | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| Length of the channel identification contents | | | | | | | | |
| 1 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 3 |
| | int id | int type | | Pref/ Excl | D ch. id. | Ch. sel. | | |

Figure H.7-1. Channel B1 exclusive.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | octet |
|---|---|---|---|---|---|---|---|---|
| Channel identification | | | | | | | | |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| Information element identifier | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| Length of the channel identification contents | | | | | | | | |
| 1 | 0 | -0 | 0 | 0 | 0 | 1 | 0 | 3 |
| | int id | int type | | Pref/ Excl | D ch. id. | Ch. sel. | | |

Figure H.7-2. Channel B2 preferred.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | octet |
|---|---|---|---|---|---|---|---|---|
| Channel identification | | | | | | | | |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| Information element identifier | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| Length of the channel identification contents | | | | | | | | |
| 1 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 3 |
|  | int id | int type |  | Pref/ Excl | D ch. id. | Ch. sel. | | |

Figure H.7-3. Channel B2 exclusive.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | octet |
|---|---|---|---|---|---|---|---|---|
| Channel identification | | | | | | | | |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| Information element identifier | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| Length of the channel identification contents | | | | | | | | |
| 1 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 3 |
|  | int id | int type |  | Pref/ Excl | D ch. id. | Ch. sel. | | |

Figure H.7-4. Any B-channel.

| 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | octet |
|---|---|---|---|---|---|---|---|-------|
| Channel identification | | | | | | | | |
| 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 |
| Information element identifier | | | | | | | | |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | |
| Length of the channel identification contents | | | | | | | | 2 |
| 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| | int id | int type | | Pref/ Excl | D ch. id. | Ch. sel. | | |

Figure H.7-5. No B-channel Indicated.

## APPENDIX B.

## B.1 Abstract

This Implementation Agreement specifies procedures for establishing, maintaining, and clearing connections at the Integrated Services Digital Network (ISDN) user-network interfaces identified as Class II PRI, and are mandatory for the support of the minimal set of circuit-switched bearer services specified by ANSI T1.603-1990* *Integrated Services Digital Network (ISDN) — Minimal Set of Bearer Services for the Primary Rate Interface*, (Ref. [14]). Procedures for circuit-mode digital, circuit-mode speech and circuit-mode voiceband data bearer services are as specified in the baseline text ANS T1.607-1990, *Integrated Services Digital Network (ISDN) — Digital Subscriber Signalling System Number 1 (DSS1) — Layer 3 Signalling Specification for Circuit-Switched Bearer Service*, (Ref. [17]), as further resolved by this agreement. The packet-mode data service is included in this document as a bearer service. Procedures for the packet-mode bearer service will be detailed in another document.

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* Subject to further discussion

## B.2 Introduction

The original implementation agreement (NIU 90-302) was reached by marking up the text of ANS T1.607-1990, (Ref. [17]) to reflect the clarifications of text and selection of options. This appendix translates the implementation agreement markup into a listing of these clarifications and selections, (i.e., this appendix lists the differences [the "delta"] between the implementation agreement marked up ANS T1.607-1990, and the original text of ANS T1.607-1990).

## B.3 NIU 90-302 Delta List**

The IA has adopted the ANS T1.607-1990*** (Ref. [17]) standard with the following clarifications of the text, and selection of options:

| ANS T1.607-1990 SECTION/TABLE NUMBER/NAME | IMPLEMENTATION AGREEMENTS - CLARIFICATION OF TEXT AND SELECTION OF OPTIONS |
|---|---|
| Section 1.1 Scope and Purpose | Replace this section with Attachment A of this document. |
| Section 2.1.1.3 Overlap Sending (U2) | Delete this section. |
| Section 2.1.2.3 Overlap Sending (N2) | Delete this section. |
| Section 2.1.2.14 Call Abort (N22) | Delete this section. |
| Section 3.1 Table 1 — Messages for circuit-mode connection control | Delete the following message and reference: "INFORMATION 3.1.6". |
| Section 3.1 Table 1 — Messages for circuit-mode connection control | Delete the following message and reference: "SETUP ACKNOWLEDGE 3.1.12". |
| Section 3.1 Table 1 — Messages for circuit-mode connection control | Change "NOTIFY 3.1.7" to "NOTIFY*". |

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** Note that this Delta List was developed in "good faith" by NIST as a simple equivalent representation of the actual agreements. It has been reviewed and approved by the editors of the Signalling Working Group as per recommendation of the Executive Steering Committee.

*** These documents can be purchased from: American National Standards Institute, 11 West 42nd Street, New York, NY 10036.

| | |
|---|---|
| Section 3.1<br>Messages for circuit-mode connection control | Add the following footnote below Table 1 "* See section 5.8.4 for treatment of this message." |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Change the "Channel identification/Length" cell from "2-*" to "2, 5-6". |
| Section 3.1.1<br>ALERTING<br>Table 2 - ALERTING message content | Delete the following rows:<br>• "Display";<br>• "Signal". |
| Section 3.1.1<br>ALERTING<br>Table 2 — ALERTING message content | Delete Notes 4, 5, 6. |
| Section 3.1.2<br>CALL PROCEEDING<br>Table 3 — CALL PROCEEDING message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.2<br>CALL PROCEEDING<br>Table 3 — CALL PROCEEDING message content | Change the "Channel identification/Type" cell from "O(Note 1)" to "M". |
| Section 3.1.2<br>CALL PROCEEDING<br>Table 3 — CALL PROCEEDING message content | Change the "Channel identification/Length" cell from "2-*" to "2, 5-6". |
| Section 3.1.2<br>CALL PROCEEDING<br>Table 3 — CALL PROCEEDING message content | Delete rows<br>• "Progress indicator";<br>• "Display". |
| Section 3.1.2<br>CALL PROCEEDING<br>Table 3 — CALL PROCEEDING message content | Delete Notes 1, 2, 3, 4. |
| Section 3.1.3<br>CONNECT<br>Table 4 — CONNECT message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.3<br>CONNECT<br>Table 4 — CONNECT message content | Change the "Channel identification/Length" cell from "2-*" to "2, 5-6". |

| | |
|---|---|
| Section 3.1.3<br>CONNECT<br>Table 4 — CONNECT message content | Delete the following rows:<br>• "Display";<br>• "Signal";<br>• "Connected number";<br>• "Connected subaddress";<br>• "Low layer compatibility". |
| Section 3.1.3<br>CONNECT<br>Table 4 — CONNECT message content | Change Note 3 to: "Included in the event of interworking." |
| Section 3.1.3<br>CONNECT<br>Table 4 — CONNECT message content | Delete Notes 4, 5, 6, 7, 8, 9. |
| Section 3.1.4<br>CONNECT ACKNOWLEDGE<br>Table 5 — CONNECT ACKNOWLEDGE message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.4<br>CONNECT ACKNOWLEDGE<br>Table 5 — CONNECT ACKNOWLEDGE message content | Delete the following rows:<br>• "Display";<br>• "Signal". |
| Section 3.1.4<br>CONNECT ACKNOWLEDGE<br>Table 5 — CONNECT ACKNOWLEDGE message content | Delete Notes 1, 2, 3. |
| Section 3.1.5<br>DISCONNECT<br>Table 6 — DISCONNECT message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.5<br>DISCONNECT<br>Table 6 — DISCONNECT message content | Change the "Cause/Length" from "4-32" to "4-10". |
| Section 3.1.5<br>DISCONNECT<br>Table 6 — DISCONNECT message content | Delete the following rows:<br>• "Display";<br>• "Signal"'<br>• "Connected Number";<br>• "Connected subaddress". |
| Section 3.1.5<br>DISCONNECT<br>Table 6 — DISCONNECT message content | Delete Notes 1, 2, 3, 4, and 5. |
| Section 3.1.6<br>INFORMATION | Delete this section. |

| Section 3.1.7<br>NOTIFY | Delete this section. |
|---|---|
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Change the "Cause/Length" cell from "2-32" to "2, 4-10". |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Delete the following rows:<br>• "Display";<br>• "Signal". |
| Section 3.1.8<br>PROGRESS<br>Table 9 — PROGRESS message content | Delete Notes 2, 3, 4. |
| Section 3.1.9<br>RELEASE<br>Table 10 — RELEASE message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.9<br>RELEASE<br>Table 10 — RELEASE message content | Change the "Cause/Length" cell from "2-32" to "2, 4-10". |
| Section 3.1.9<br>RELEASE<br>Table 10 — RELEASE message content | Delete the following rows:<br>• "Display";<br>• "Signal";<br>• "Connected number";<br>• "Connected subaddress". |
| Section 3.1.9<br>RELEASE<br>Table 10 — RELEASE message content | Delete Notes 3, 4, 5, 6, 7. |
| Section 3.1.10<br>RELEASE COMPLETE<br>Table 11 — RELEASE COMPLETE message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |
| Section 3.1.10<br>RELEASE COMPLETE<br>Table 11 — RELEASE COMPLETE message content | Change the "Cause/Length" cell from "2-32" to "2, 4-10". |

| Section 3.1.10 | Delete the following rows: |
| RELEASE COMPLETE | • "Display"; |
| Table 11 — RELEASE COMPLETE message content | • "Signal"; |
| | • "Connected number"; |
| | • "Connected subaddress". |

Section 3.1.10
RELEASE COMPLETE
Table 11 — RELEASE COMPLETE message content

Delete Notes 3, 4, 5, 6, 7.

Section 3.1.11
SETUP
Table 12 — SETUP message content

Change the "Call reference/Length" cell from "2-*" to "2-3".

Section 3.1.11
SETUP
Table 12 — SETUP message content

Delete the following rows:
• "Repeat indicator";
• "Display";
• "Keypad facility";
• "Signal".

Section 3.1.11
SETUP
Table 12 — SETUP message content

Change the "Bearer capability/Type" cell from "M(Note 2)" to "M".

Section 3.1.11
SETUP
Table 12 — SETUP message content

Change the "Bearer capability/Length" cell from "4-13" to "4-8".

Section 3.1.11
SETUP
Table 12 — SETUP message content

Change the "Channel identification/Type" cell from "O(Note 3)" to "M".

Section 3.1.11
SETUP
Table 12 — SETUP message content

Change the "Channel identification/Length" cell from "2-*" to "5-6".

Section 3.1.11
SETUP
Table 12 — SETUP message content

Change the "Network specific facilities/Length" cell from "2-*" to "2-32".

Section 3.1.11
SETUP
Table 12 — SETUP message content

Change the "Calling party number/Length" cell from "2-*" to "2-19".

Section 3.1.11
SETUP
Table 12 — SETUP message content

Change the "Called party address/Length" cell from "2-*" to "2-18".

| | |
|---|---|
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "Transit network selection/Length" cell from "2-*" to "2-7". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the "High layer capability/Length" cell from "2-4" to "2-5". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Delete Notes 1, 2, 3, 6, 7, 8, 9. |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change Note 4 to:  "Included in the event of interworking." |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the first sentence of Note 12 to:  "The called party number information element is included by the user ....". |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Change the first sentence of Note 20 to:  "This information applies to speech and 3.1 kHz audio bearer services." |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Add the following to the end of Note 13:  "The network should transport this IE transparently.  This IE is optional on the user side." |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Add the following to the end of Note 15:  "The network should transport this IE transparently.  This IE is optional on the user side.  The total length is 2 to 16 octets." |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Add the following to the end of Note 16:  "The network should transport this IE transparently.  This IE is optional on the user side." |
| Section 3.1.11<br>SETUP<br>Table 12 — SETUP message content | Add the following to the end of Note 17:  "The network will treat this IE on sending and receiving as described in the User-User supplementary service Implementation Agreement." |
| Section 3.1.12<br>SETUP ACKNOWLEDGE | Delete this section. |
| Section 3.1.13<br>STATUS<br>Table 14 — STATUS message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |

| Section 3.1.13 STATUS Table 14 — STATUS message content | Change the "Cause/Length" cell from "4-32" to "4-10". |

| Section 3.1.13 STATUS Table 14 — STATUS message content | Delete row "Display". |

| Section 3.1.13 STATUS Table 14 — STATUS message content | Delete Notes 1, 2. |

| Section 3.1.14 STATUS ENQUIRY | Change the first sentence to:  "This message is sent by the user or the network during the active state to solicit a STATUS message from the peer layer 3 entity." |

| Section 3.1.14 STATUS ENQUIRY Table 15 — STATUS ENQUIRY message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |

| Section 3.1.14 STATUS ENQUIRY Table 15 — STATUS ENQUIRY message content | Delete row "Display". |

| Section 3.1.14 STATUS ENQUIRY Table 15 — STATUS ENQUIRY message content | Delete Notes 1, 2. |

| Section 3.2.1 RESTART Table 17 — RESTART message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |

| Section 3.2.1 RESTART Table 17 — RESTART message content | Change the "Channel identification/Length" cell from "2-*" to "2, 5-6". |

| Section 3.2.1 RESTART Table 17 — RESTART message content | Delete row "Display". |

| Section 3.2.1 RESTART Table 17 — RESTART message content | Delete Notes 3, 4. |

| Section 3.2.2 RESTART ACKNOWLEDGE Table 18 — RESTART ACKNOWLEDGE message content | Change the "Call reference/Length" cell from "2-*" to "2-3". |

| | |
|---|---|
| Section 3.2.2<br>RESTART ACKNOWLEDGE<br>Table 18 — RESTART ACKNOWLEDGE message content | Change the "Channel identification/Length" cell from "2-*" to "2, 5-6". |
| Section 3.2.2<br>RESTART ACKNOWLEDGE<br>Table 18 — RESTART ACKNOWLEDGE message content | Delete row "Display". |
| Section 3.2.2<br>RESTART ACKNOWLEDGE<br>Table 18 — RESTART ACKNOWLEDGE message content | Delete Notes 3, 4. |
| Section 4.2<br>Protocol discriminator | Add the following sentence after the first sentence in the second paragraph:  "The only value supported for call control messages is described below in Figure 2." |
| Section 4.2<br>Protocol discriminator<br>Figure 2 — Protocol Discriminator | Change "ANSI T1.607" to "Q.931". |
| Section 4.2<br>Protocol discriminator<br>Table 19 — Protocol Discriminator | Change "ANSI T1.607" to "Q.931" in row "0000 1000". |
| Section 4.3<br>Call reference | Change the third paragraph ("At a minimum ...") to: "At a minimum, all networks and users must be able to support a call reference value of one and two octets for a primary rate interface." |
| Section 4.3<br>Call reference | Delete the first sentence of the fourth paragraph "As a network ... also be supported." |
| Section 4.3<br>Call reference<br>Figure 4 — Dummy call reference | Change "Figure 4. Dummy call reference" to "Figure 4. Dummy call reference *". |
| Section 4.3<br>Call reference | Add the following footnote after Figure 4:  "*The dummy call reference is not supported for primary rate Class II circuit-switched calls." |
| Section 4.3<br>Call reference | Delete Note 1 ("The call reference ... ") at the end of the section. |
| Section 4.4<br>Message type<br>Table 20 — Message types | Delete the following rows:<br>• "SETUP ACKNOWLEDGE";<br>• "INFORMATION". |

| Section 4.4 | Add the following to the end of row "NOTIFY": "(see sec. 5.8.4 for treatment of this message type)." |
|---|---|
| Message type | |
| Table 20 — Message types | |

| Section 4.5.1 | Delete the second, third, and fourth sentences from the fourth paragraph. |
|---|---|
| Coding rules | |

| Section 4.5.1 | Delete figure (b) Single octet information element format (type 2). |
|---|---|
| Coding rules | |
| Figure 7 — Formats of information elements | |

| Section 4.5.1 | Delete the following rows: |
|---|---|
| Coding rules | • "Repeat indicator"; |
| Table 21 — Information element identifier coding | • "Notification indicator"; |
| | • "Display"; |
| | • "Keypad facility"; |
| | • "Signal"; |
| | • "Connected number"; |
| | • "Connected subaddress"; |
| | • "Escape for extension". |

| Section 4.5.1 | Delete reference to "(Note 6)" from "Bearer capability" row. |
|---|---|
| Coding rules | |
| Table 21 — Information element identifier coding | |

| Section 4.5.1 | Change the "Bearer capability/Max length" cell from "13" to "8". |
|---|---|
| Coding rules | |
| Table 21 — Information element identifier coding | |

| Section 4.5.1 | Change the "Cause/Max length" cell from "32" to "10". |
|---|---|
| Coding rules | |
| Table 21 — Information element identifier coding | |

| Section 4.5.1 | Change the "Cause/Max no of occurrences" cell from "3" to "2". |
|---|---|
| Coding rules | |
| Table 21 — Information element identifier coding | |

| Section 4.5.1 | Change the "Channel identification/Max length" cell from "(Note 4)" to "6". |
|---|---|
| Coding rules | |
| Table 21 — Information element identifier coding | |

| Section 4.5.1 | Change the "Network-specific facilities/Max length" cell from "(Note 4)" to "32". |
|---|---|
| Coding rules | |
| Table 21 — Information element identifier coding | |

| Section 4.5.1 | Change the "Network-specific facilities/Max no. of occurrences" cell from "4" to "2". |
|---|---|
| Coding rules | |
| Table 21 — Information element identifier coding | |

| | |
|---|---|
| Section 4.5.1<br>Coding rules<br>Table 21 — Information element identifier coding | Change the "Calling party number/Max length" cell from "(Note 4)" to "19". |
| Section 4.5.1<br>Coding rules<br>Table 21 — Information element identifier coding | Change the "Called party number/Max length" cell from "(Note 4)" to "18". |
| Section 4.5.1<br>Coding rules<br>Table 21 — Information element identifier coding | Delete reference to "(Note 2)" from "Transit network selection" row. |
| Section 4.5.1<br>Coding rules<br>Table 21 — Information element identifier coding | Change the "Transit network selection/Max length" cell from "(Note 4)" to "7". |
| Section 4.5.1<br>Coding rules<br>Table 21 — Information element identifier coding | Delete "4" from the "Transit network selection/Max no. of occurrences" cell. |
| Section 4.5.1<br>Coding rules<br>Table 21 — Information element identifier coding | Change the "High layer compatibility/Max length" cell from "4" to "5". |
| Section 4.5.1<br>Coding rules<br>Table 21 — Information element identifier coding | Delete Notes 3, 4, 6. |
| Section 4.5.1<br>Coding rules<br>Figure 8 — Information element format using escape for extension | Delete this figure. |
| Section 4.5.2<br>Extensions of codesets | Change "T1.608" to "NIU 89-320" in the first bullet in the fourth paragraph. |

| Section 4.5.2 | Replace the tenth paragraph ("Codeset 6 ...") with the following: |
| :--- | :--- |
| Extensions of codesets | |

"Codeset 6 is reserved for information elements specific to the local network (either public or private). These information elements can appear in a call establishment (i.e., SETUP, ALERTING, or CONNECT) or first clearing message. As such, they do not have significance across a national or international boundary. For these two cases, codeset 6 information elements shall be handled according to the procedures for unrecognized information elements (see sec. 5.8.7.1) beyond the local network boundary. Inside a private local network recognized codeset 6 information elements shall be consumed, manipulated, or passed transparently according to the rule for that information element. Across the boundary between local networks (e.g., a public and a private network), recognized codeset 6 information elements shall be consumed and manipulated according to the rule for that information element. Inside a private local network, unrecognized codeset 6 information elements may be passed transparently. Across the boundary between a private local network and a public local network, unrecognized codeset 6 information elements shall be either treated as per section 5.8.7.1 or passed transparently if a bilateral agreement exists."

Section 4.5.3
Locking shift procedure
New codeset identification table

Change "T1.608" to "NIU 89-320" for codeset 5.

Section 4.5.4
Non-locking shift procedures

Delete "a) process the nonblocking ... as described below" from the second paragraph.

Section 4.5.4
Non-locking shift procedures
Temporary codeset identification table

Change "T1.607" to "NIU 90-302" for codeset 0.

Section 4.5.4
Non-locking shift procedures
Temporary codeset identification table

Change "T1.608" to "NIU 89-320" for codeset 5.

Section 4.5.5
Bearer Capability

Change "13 octets" to "8 octets" in the second sentence ("The maximum length ...") of the second paragraph.

Section 4.5.5
Bearer Capability
Figure 11 — Bearer capability information element

Change octet 4, bit 8 from "0/1" to "1".

| Section 4.5.5<br>Bearer Capability<br>Figure 11 — Bearer capability information element | Delete the following octets:<br>• 4a;<br>• 4b;<br>• 5b (Note 2);<br>• 5b (Note 3);<br>• 5c;<br>• 5d. |
|---|---|
| Section 4.5.5<br>Bearer Capability<br>Figure 11 — Bearer capability information element | Change octet 5a, bit 8 from "0/1" to "1". |
| Section 4.5.5<br>Bearer Capability<br>Figure 11 — Bearer capability information element | Delete Notes 1, 2, 3. |
| Section 4.5.5<br>Bearer Capability<br>Figure 11 — Bearer capability information element | Add the following after Note 4: "5 Octets 6 and 7 are included for information only. The coding and application of these octets are included in another document." |
| Section 4.5.5<br>Bearer Capability<br>Information transfer capability (octet 3) coding | Delete row "10001 7 kHz audio". |
| Section 4.5.5<br>Bearer Capability<br>Information transfer rate (octets 4 and 4b) coding | Change the title to "Information transfer rate (octet 4)". |
| Section 4.5.5<br>Bearer Capability<br>Information transfer rate (octets 4 and 4b) coding | Delete the following rows: "10011 384 kbit/s", "10100 1472 kbit/s (Note 2)", "10101 1526 kbit/s". |
| Section 4.5.5<br>Bearer Capability<br>Information transfer rate (octets 4 and 4b) coding | Change Note 1 to: "The bearer capability is bidirectional symmetric at the information transfer rate specified in octet 4." |
| Section 4.5.5<br>Bearer Capability<br>Information transfer rate (octets 4 and 4b) coding | Delete Note 2. |
| Section 4.5.5<br>Bearer Capability | Delete all codings and text referring to octet 4a (structure, configuration, establishment) and octet 4b (symmetry). |
| Section 4.5.5<br>Bearer Capability<br>User information layer 1 protocol (octet 5) coding | Delete "and optionally octets 5b, 5c, and 5d as defined below." from row "00001". |

| Section 4.5.5 | Delete "and G.725 7 kHz audio" from row "00101". |
| Bearer Capability | |
| User information layer 1 protocol (octet 5) coding | |

Section 4.5.5
Bearer Capability
User information layer 1 protocol (octet 5) coding

Delete rows "00111" and "01000".

Section 4.5.5
Bearer Capability
User information layer 1 protocol (octet 5) coding

Delete Note 2.

Section 4.5.5
Bearer Capability
Synchronous/asynchronous (octet 5a) coding

Delete row "1  asynchronous".

Section 4.5.5
Bearer Capability
Synchronous/asynchronous (octet 5a) coding

Delete the second and third sentences from the Note.

Section 4.5.5
Bearer Capability
Negotiation (octet 5a) coding

Delete row "1  In-band negotiation possible".

Section 4.5.5
Bearer Capability
User rate (octet 5a) coding

Delete all rows except row "01111 56 kbit/s CCITT Recommendation V.6".

Section 4.5.5
Bearer Capability

Delete all text relating to octet 5b (i.e., sections labeled "Octet 5b for CCITT Recommendation V.100 or X.30 rate adaption" and "Octet 5b for CCITT Recommendation V.120 rate adaption".)

Section 4.5.5
Bearer Capability

Delete all codings and text referring to octets 5c (number of data bits excluding parity bit, parity information) and 5d (duplex mode, modem type).

Section 4.5.6
Call state
Call state value (octet 3) coding

Delete row "000010 U2 — overlap sending".

Section 4.5.6
Call state
Call state value (octet 3) coding

Add the following column to the right of the coding:
<u>Symmetric States*</u>
S0 — Null
S1 — Call Initiated
S3 — Outgoing Call Proceeding
S4 — Call Delivered
S6 — Call Present
S7 — Call Received
S8 — Connect Request
S9 — Incoming Call Proceeding

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S10 — Active
S11 — Disconnect Request
S12 — Disconnect Indication
S19 — Release Request

| | |
|---|---|
| Section 4.5.6<br>Call state<br>Call state value (octet 3) coding | Add the following after the coding: "*Note — For Symmetric states see Annex D." |
| Section 4.5.6<br>Call state<br>Call state value (octet 3) coding | Delete "N22 — Call abort" from the "010110/ Network State" cell. |
| Section 4.5.7<br>Called party number | Change the second paragraph to: "The maximum length of this information element is 18 octets." |
| Section 4.5.7<br>Called party number<br>Type of number (octet 3) coding | Delete the following rows:<br>• "011 network specific number";<br>• "111 reserved for extension". |
| Section 4.5.7<br>Called party number<br>Type of number (octet 3) coding | Change the end of Note 2 to: "this information element cannot be used in combination with Operator System Access or Transit Network Selection information elements." |
| Section 4.5.7<br>Called party number<br>Type of number (octet 3) coding | Delete Note 4. |
| Section 4.5.7<br>Called party number<br>Numbering Plan Identification (octet 3) coding | Delete the following rows:<br>• "0011 data numbering plan";<br>• "0100 telex numbering plan";<br>• "1111 reserved for extension". |
| Section 4.5.7<br>Called party number<br>Numbering plan identification (octet 3) coding | Change "c)" under the Note to: "this information element cannot be used in combination with Operator System Access or Transit Network Selection information elements." |
| Section 4.5.7<br>Called party number | Add Attachment B of this document after the following:<br>*"Number digits (octets 4, etc.)*<br>This field is coded with ASCII characters, according to the formats specified in the appropriate numbering/dialing plan." |
| Section 4.5.9<br>Calling party number | Change the second paragraph from "The maximum length of this information element is network dependent." to "The maximum length of this information element is 19 octets." |

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|---|---|
| Section 4.5.9<br>Calling party number<br>Type of number (octet 3) coding | Delete the following rows:<br>• "011 network specific number";<br>• "111 reserved for extension". |
| Section 4.5.9<br>Calling party number<br>Type of number (octet 3) coding | Delete Note 4. |
| Section 4.5.9<br>Calling party number<br>Numbering Plan Identification (octet 3) coding | Delete the following rows:<br>• "0100 telex numbering plan";<br>• "1111 reserved for extension". |
| Section 4.5.9<br>Calling party number | Add Attachment C of this document after the following:<br>*"Number digits (octets 4, etc.)*<br>       This field is coded with ASCII characters, according to the formats specified in the appropriate numbering/dialing plan." |
| Section 4.5.11<br>Cause | Change the second sentence of the first paragraph to: "The maximum length of this information element is 10 octets." |
| Section 4.5.11<br>Cause<br>Figure 17 — Cause information element | Change octet 3, bit 8 from "0/1" to "1". |
| Section 4.5.11<br>Cause<br>Figure 17 — Cause information element | Delete octet 3a. |
| Section 4.5.11<br>Cause<br>Figure 17 — Cause information element | Delete the Note under the figure. |
| Section 4.5.11<br>Cause<br>Recommendation (octet 3a) coding | Delete this coding and Notes 1 and 2. |
| Section 4.5.11<br>Cause | Add the following sentence to the end of the paragraph following "*Diagnostics (octet 5)*": "If more than one IE is identified in a diagnostic, they should be ordered as IEs normally appear in a message." |
| Section 4.5.11<br>Cause<br>Cause table | Change the "unallocated (unassigned) number/ diagnostics" cell to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Change the "no route to specified transit network/ diagnostics" cell to "Not used". |

| | |
|---|---|
| Section 4.5.11<br>Cause<br>Cause table | Change the "no route to destination/diagnostics" cell to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Change "normal call clearing/diagnostics" cell to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Change the "user busy/diagnostics" cell to "(see Note 10)". |
| Section 4.5.11<br>Cause<br>Cause table | Change the "call rejected/diagnostics" cell to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Delete the "number changed/diagnostics" cell. |
| Section 4.5.11<br>Cause<br>Cause table | Delete the following rows:<br>• "non-selected user clearing";<br>• "network out of order";<br>• "resource unavailable, unspecified";<br>• "quality of service unavailable";<br>• "only restricted digital information bearer capability is available";<br>• "service or option not implemented, unspecified";<br>• "invalid transit network selection";<br>• "invalid message, unspecified". |
| Section 4.5.11<br>Cause<br>Cause table | Change the "No circuit/channel available/diagnostics" cell to "(see Note 10)". |
| Section 4.5.11<br>Cause<br>Cause table | Delete reference to "(see Note 6)" in the "access information discarded/diagnostics" cell. |
| Section 4.5.11<br>Cause<br>Cause table | Add "(see Note 10)" to the "requested circuit or channel not available/diagnostics" cell. |
| Section 4.5.11<br>Cause<br>Cause table | Delete the corresponding cell in the "diagnostics" column for the following rows:<br>• "requested facility not subscribed";<br>• "bearer capability not authorized";<br>• "bearer capability not presently available";<br>• "channel type not implemented";<br>• "requested facility not implemented". |

| | |
|---|---|
| Section 4.5.11<br>Cause<br>Cause table | Change the "bearer capability not implemented/<br>diagnostics" cell to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Change the "identified channel does not exist/<br>diagnostics" cell to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Delete the "incompatible destination/diagnostics" cell. |
| Section 4.5.11<br>Cause<br>Cause table | Delete the reference to "(see Note 6)" in the<br>"mandatory information element is missing/<br>diagnostics" cell. |
| Section 4.5.11<br>Cause<br>Cause table | Change the "information element non-existent or not<br>implemented/diagnostics" cell to "Information<br>element identifier(s) (see Note 8)". |
| Section 4.5.11<br>Cause<br>Cause table | Change the "invalid information element contents/<br>diagnostics" cell to "Information element<br>identifier(s)". |
| Section 4.5.11<br>Cause<br>Cause table | Change the "recovery on timer expiry/diagnostics"<br>cell to "Not used". |
| Section 4.5.11<br>Cause<br>Cause table | Delete the following Notes: 2, 3, 4, 5, 6, 7, 9, 11, 12. |
| Section 4.5.11<br>Cause<br>Figure 18 — Coding of the diagnostic field for causes<br>57, 58 and 65. | Delete this figure and Notes 1 and 2 appearing below<br>it. |
| Section 4.5.11<br>Cause | Delete all text referring to octets 5 (attribute number),<br>5a (rejected attribute), and 5b (available attribute). |
| Section 4.5.12<br>Channel identification | Change the last sentence in the first paragraph to:<br>"The default maximum length for this information<br>element is 6 octets." |
| Section 4.5.12<br>Channel identification | Delete the second paragraph. |

| | |
|---|---|
| Section 4.5.12<br>Channel identification<br>Figure 19 — Channel identification information element | Change octet 3.1, bit 8 from "0/1" to "1". |
| Section 4.5.12<br>Channel identification<br>Figure 19 — Channel identification information element | Delete the reference to "Note 2" of octet 3.2. |
| Section 4.5.12<br>Channel identification<br>Figure 19 — Channel identification information element | Delete the references to "(Note 2)" and "Note 4" in octet 3.3. |
| Section 4.5.12<br>Channel identification<br>Figure 19 — Channel identification information element | Delete the last sentence of Note 1. |
| Section 4.5.12<br>Channel identification<br>Figure 19 — Channel identification information element | Delete Notes 2 and 4. |
| Section 4.5.12<br>Channel identification<br>Figure 19 — Channel identification information element | Add the following to the end of Note 3: "For completeness, a pointer to slot map is shown. It is not supported for this IA." |
| Section 4.5.12<br>Channel identification<br>Interface identifier present (octet 3) coding | Change row the last row ("1") to: "1 Interface explicitly identified in octet 3.1." |
| Section 4.5.12<br>Channel identification<br>Interface type (octet 3) coding | Delete the following row: "0 basic interface". |
| Section 4.5.12<br>Channel identification<br>Information channel selection (octet 3) coding | Delete the column "basic interface". |
| Section 4.5.12<br>Channel identification<br>Information channel selection (octet 3) coding | Delete the last two rows ("10" and "11"). |
| Section 4.5.12<br>Channel identification<br>Information channel selection (octet 3) coding | Delete Note 3. |

| | |
|---|---|
| Section 4.5.12<br>Channel identification<br>Interface identifier (octet 3.1) coding | Delete the second sentence ("At subscription time ..."). |
| Section 4.5.12<br>Channel identification<br>Coding standard (octet 3.2) coding | Delete row " 1 0 National Standard ..." |
| Section 4.5.12<br>Channel identification<br>Number/map (octet 3.2) coding | Delete the last row. |
| Section 4.5.12<br>Channel identification<br>Channel type/map element type (octet 3.2) coding | Delete the last three rows. |
| Section 4.5.12<br>Channel identification<br>Channel type/map element type (octet 3.2) coding | Delete the Note. |
| Section 4.5.12<br>Channel identification | Delete all text and Figure 20 referring to "Slot map (octet 3.3)". |
| Section 4.5.12<br>Channel identification | Add the following at the end of the section: "Note — In the network to user direction (n -> u), the terminating PRI will allow channel negotiation. The network will support offering calls with preferred B-channel and the user responds specifying the channel to be used for the call." |
| Section 4.5.13<br>Connected number | Delete this section. |
| Section 4.5.14<br>Connected subaddress | Delete this section. |
| Section 4.5.15<br>Display | Delete this section. |
| Section 4.5.16<br>High layer compatibility | Change the second paragraph to: "The maximum length of this information element is five octets." |
| Section 4.5.17<br>Keypad facility | Delete this section. |
| Section 4.5.18<br>Low layer compatibility | Delete the second paragraph. |
| Section 4.5.18<br>Low layer compatibility<br>Negotiation indicator (octet 3a) coding | Delete the last row. |

| | |
|---|---|
| Section 4.5.18<br>Low layer compatibility<br>Negotiation indicator (octet 3a) coding | Delete Note 1. |
| Section 4.5.18<br>Low layer compatibility<br>User information layer 3 protocol (octet 7) coding | Change "ANSI T1.607" to "NIU 90-302" in the first row. |
| Section 4.5.19<br>Network-specific facilities | Change the second sentence of the first paragraph to: "No more than two Network-specific facilities information elements may be included in a single message." |
| Section 4.5.19<br>Network-specific facilities | Change the second paragraph to: "The maximum length of this information element is 32 octets." |
| Section 4.5.19<br>Network-specific facilities | Add Attachment D of this document to the end of this section. |
| Section 4.5.20<br>Notification indicator | Delete this section. |
| Section 4.5.21<br>Progress indicator<br>Progress description (octet 4) coding | Delete row "000 0100   4   call has returned to the ISDN." |
| Section 4.5.21<br>Progress indicator | Add the following Note after Notes 1 and 2 following the "*Progress description (octet 4)*" coding: "3   In the SETUP message, in the user to network direction (u -> n) on PRI, one of two values may be used in the progress description field: 'call is not end-to-end ISDN' (1), or 'calling equipment is non-ISDN' (3). In the SETUP message, in the network to user direction (n -> u) on PRI, one of two values may be used in the progress description field: 'call is not end-to-end ISDN' (1), or 'calling equipment is non-ISDN' (3)." |
| Section 4.5.22<br>Repeat Indicator | Delete this section. |
| Section 4.5.24<br>Signal | Delete this section. |
| Section 4.5.25<br>Transit network selection | Change the first paragraph to: "The purpose of the Transit network selection information element is to identify one requested transit network (See Annex C)." |

| | |
|---|---|
| Section 4.5.25<br>Transit network selection | Change the second paragraph to: "The default maximum length of this information element is 7 octets." |
| Section 4.5.25<br>Transit network selection<br>Type of network identification (octet 3) coding | Delete the last row ("011 ..."). |
| Section 4.5.25<br>Transit network selection<br>Network identification plan (octet 3) coding | Delete the last row ("0011 ..."). |
| Section 4.5.26<br>User-user | Add the following to the end of the first paragraph: "This IE is to be included based on the User-to-user supplementary service description and user application." |
| Section 4.5.26<br>User-user<br>Protocol discriminator (octet 3) coding | Change "ANSI T1.607" to "NIU 90-302" in the last row of the coding. |
| Section 5<br>Circuit-switched call control procedures | Change the third paragraph ("All messages ...") to: "All messages in this standard contain the functional type of information elements. Functional information elements are characterized as requiring a degree of intelligent processing by the Customer Premise Equipment (CPE) in either their generation or analysis." |
| Section 5<br>Circuit-switched call control procedures | Delete the fifth paragraph ("As a general ..."), the second Note of the section, and the seventh paragraphs ("In addition ..."). |
| Section 5.1<br>Call establishment at the originating interface | Change "ANSI T1.602" to "NIU 89-210" in the last sentence. |
| Section 5.1.1<br>Call request | Change the last sentence of the first paragraph to: "The Bearer capability information element is mandatory in the SETUP message." |
| Section 5.1.1<br>Call request | Change the third paragraph to: "Furthermore, the SETUP message shall also contain all of the call information (i.e., address and facility requests) necessary for call establishment." |
| Section 5.1.1<br>Call request | Delete the following from the fourth paragraph: "b) the Keypad information ... other call information", and the Note ("All networks are ..."). |
| Section 5.1.1<br>Call request | Delete the last paragraph ("For overlap ..."). |

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| Section 5.1.2<br>B-channel selection — originating | Delete the following from the first paragraph: "c) any channel ... alternative c) is assumed." |
| Section 5.1.2<br>B-channel selection — originating | Delete the last sentence from the third paragraph: "In case c), the ... with the D-channel." |
| Section 5.1.2<br>B-channel selection — originating | Change the end of the first sentence in the fourth paragraph from "(i.e., a SETUP ACKNOWLEDGE or CALL PROCEEDING message)." to "(i.e., a CALL PROCEEDING message)." |
| Section 5.1.2<br>B-channel selection — originating | Change the fifth paragraph to: "The user need not attach until receiving a: a) CALL PROCEEDING, b) ALERTING message with the progress indicator 8 'in-band information or appropriate pattern is now available' or c) a PROGRESS message with the progress indicator 1 'call is not end-to-end ISDN; further call progress information may be available in-band'. Prior to this time, the network cannot assume that the user has attached ... (if it has not already done so)." |
| Section 5.1.2<br>B-channel selection — originating | Change the first sentence of the last paragraph to: "In case a), if the specified channel is not available, and in case b) if not channel is available, a RELEASE COMPLETE message with a cause value of 44 'requested circuit/channel not available' or 34 'no circuit/channel available', respectively, is sent by the network as described in 5.3." |
| Section 5.1.3<br>Overlap sending | Delete this section. |
| Section 5.1.4<br>Invalid call information | Change the first sentence in the first paragraph to: "If, following the receipt of the SETUP message, the network determines ... cause such as the following:". |
| Section 5.1.4<br>Invalid call information | Add the following to the end of the first paragraph after "28 ...": "82 'identified channel does not exist'." |
| Section 5.1.5.1<br>Call proceeding, en-bloc sending | Add the following to the second paragraph after "58 ...": "34 'no circuit/channel available'." |
| Section 5.1.5.2<br>Call proceeding, overlap sending | Delete this section. |
| Section 5.1.6<br>Notification of interworking at the originating interface | Change "a) ..." in the first paragraph to: "a) in an appropriate call control message when a state change is required (CONNECT); or,". |

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| Section 5.1.6<br>Notification of interworking at the originating interface | Add to the end of "1 ..." in the second paragraph "(i.e., in a PROGRESS message); or,". |
| Section 5.1.6<br>Notification of interworking at the originating interface | Change "2 ..." in the second paragraph to: "2 'destination address is non-ISDN' (i.e., in a CONNECT message);". |
| Section 5.1.6<br>Notification of interworking at the originating interface | Delete "4 ... end-to-end ISDN" from the second paragraph. |
| Section 5.1.6<br>Notification of interworking at the originating interface | Delete "or more" from the second part of the first sentence in the fourth paragraph. |
| Section 5.1.7<br>Call confirmation indication | Change the last sentence in the first paragraph to: "When the user receives the ALERTING message, the user shall enter the Call Delivered state." |
| Section 5.2<br>Call establishment at the destination interface | Delete the last sentence of the third paragraph ("No use ..."). |
| Section 5.2.1<br>Incoming call | Delete the last two sentences of the first paragraph. |
| Section 5.2.1<br>Incoming call | Change the last part of the second paragraph from "(e.g., Display, Low layer compatibility)." to "(e.g., Low layer compatibility.)". |
| Section 5.2.1<br>Incoming call | Add the following to the end of the second paragraph: "In general, a call terminating from a non-ISDN line or from a Public Switched Telephone Network (PSTN) trunk should be offered to the called user equipment with the 3.1 kHz audio bearer capability." |
| Section 5.2.1<br>Incoming call | Delete the first and second sentences of the third paragraph. Delete "However, if ... the interface" from the third sentence. The third paragraph will now read: "A point-to-point data link shall be used to carry the SETUP message. After sending the SETUP message, the network starts timer T303." |
| Section 5.2.1<br>Incoming call | Delete the fifth paragraph and the Note following this paragraph. |
| Section 5.2.1<br>Incoming call | Change the second part of the last sentence in the seventh paragraph from "timers T303 and T312 are restarted." to "timer 303 is restarted." |

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| Section 5.2.2<br>Compatibility checking | Delete the second paragraph ("When the SETUP message ..."). |
| Section 5.2.3.1<br>SETUP message delivered by point-to-point data link | Delete the following from the first paragraph under "a) ...": "3) any channel is acceptable." |
| Section 5.2.3.1<br>SETUP message delivered by point-to-point data link | Delete the paragraph under "b) ...." that reads "In case 3), ...." |
| Section 5.2.3.1<br>SETUP message delivered by point-to-point data link | Change the first sentence in the third paragraph under "b)" to: "If in case 1) the B-channel indicated in the first response message is not the channel offered by the network, or in case 2) the B-channel indicated in the first response message is unacceptable to the network, it will clear the call by sending a RELEASE message with cause 6 'channel unacceptable' (see 5.3.2 d)." |
| Section 5.2.3.1<br>SETUP message delivered by point-to-point data link | Change the first part of "e) ..." to: "e) In case 1) if the indicated B-channel is not available, or in case 2) if no B-channel is available ...." |
| Section 5.2.3.2<br>SETUP message delivered by broadcast data link | Delete this section. |
| Section 5.2.5.1<br>Response to en-bloc SETUP | Change the first sentence of the Note to: "A Progress indicator information element may be included in a CONNECT message (e.g., when an analogue terminal is connected to an NT2 functional grouping)." |
| Section 5.2.5.1<br>Response to en-bloc SETUP | Delete the second paragraph ("When the SETUP message was delivered via a broadcast ..."). |
| Section 5.2.5.2<br>Receipt of CALL PROCEEDING and ALERTING | Delete the first paragraph ("When the SETUP message is delivered on a broadcast ..."). |
| Section 5.2.5.2<br>Receipt of CALL PROCEEDING and ALERTING | Change the second paragraph to: "Upon receipt of the first CALL PROCEEDING message from a user, the network shall: stop timer T303; start time T310; and enter the incoming Call Proceeding state." |
| Section 5.2.5.2<br>Receipt of CALL PROCEEDING and ALERTING | Delete the fourth paragraph ("When the SETUP message was delivered via a broadcast ..."). |

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|---|---|
| Section 5.2.5.2<br>Receipt of CALL PROCEEDING and ALERTING | Change the fifth paragraph to: "Upon receipt of the ALERTING message from a user, the network shall: stop timers T303 or T310 (if running) and TDEL (if running); start optional timer T301 (unless another internal alerting supervision timer function exists; w.g. incorporated in call control); enter the Call Received state; and send a corresponding ALERTING message to the calling user." |
| Section 5.2.5.2<br>Receipt of CALL PROCEEDING and ALERTING | Delete the sixth paragraph ("When a SETUP message has been delivered on a broadcast link ..."). |
| Section 5.2.5.3<br>Called user clearing during Incoming call establishment | Change the first part of the first paragraph to: "If the RELEASE COMPLETE or DISCONNECT message is received ...." |
| Section 5.2.5.3<br>Called user clearing during Incoming call establishment | Delete the second and third paragraphs. |
| Section 5.2.5.3.1<br>DISCONNECT received prior to expiry of T312 | Delete this section. |
| Section 5.2.5.3.2<br>DISCONNECT received after expiry of timer T312 | Delete this section. |
| Section 5.2.5.4<br>Call failure | Delete the following from the first paragraph: "a) If the SETUP message ... Call Abort state;" |
| Section 5.2.5.4<br>Call failure | Change "b)" in the first paragraph to: "b) The network shall also initiate clearing procedures toward the called user in accordance with 5.3.4, using cause 102 'recovery on timer expiry'." |
| Section 5.2.5.4<br>Call failure | Delete the second paragraph ("If the network receives ..."). |
| Section 5.2.5.4<br>Call failure | Delete the following from the third paragraph: "a) If the SETUP ... shall be sent." |
| Section 5.2.5.4<br>Call failure | Change "b)" in the third paragraph to: "b) The called user shall be cleared in accordance with 5.3.4, using cause 102 'recovery on timer expiry'." |
| Section 5.2.5.4<br>Call failure | Change the beginning of the first sentence in the fourth paragraph to: "If the network supports timer T301 and has received a ALERTING message, ...." |
| Section 5.2.5.4<br>Call failure | Delete from the fourth paragraph: "a) If the SETUP message was ... shall be sent." |

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| Section 5.2.5.4<br>Call failure | Change "b)" in the fourth paragraph to: "b) The called user shall be cleared in accordance with 5.3.4, using cause 102 'recovery on timer expiry'." |
| Section 5.2.6<br>Notification of interworking at the terminating interface | Change the first item in the list in the second paragraph from: "— in an appropriate ..." to: "— in an appropriate call control message when a state change is required (CONNECT); or,". |
| Section 5.2.6<br>Notification of interworking at the termination interface | Delete the third item from the list in the third paragraph: "4   Call has ...'". |
| Section 5.2.7<br>Call accept | Add the following to the end of the last paragraph: "If the CONNECT message is the first response to the SETUP message, it shall contain the channel identification information element." |
| Section 5.2.8<br>Active indication | Delete the fourth paragraph ("A user that has received the SETUP via the broadcast data link ..."). |
| Section 5.2.9<br>Non-selected user clearing | Delete this section. |
| Section 5.3.2<br>Exception conditions | Change in the first paragraph "a)" to: "a) In response to a SETUP message, the user or network can reject a call (e.g., because of the unavailability of a suitable B-channel) by:   responding with a RELEASE COMPLETE message provided no other response has previously been sent releasing; the call reference and entering the Null state." |
| Section 5.3.2<br>Exception conditions | Delete from the first paragraph:  "b)  In the case ... user clearing". |
| Section 5.3.2<br>Exception conditions | Delete from the first paragraph e)1) and e)2) and the Note at the end of the section. |
| Section 5.4<br>In-band tones and announcements | Change the title of this section to "In-band audible ringing tone and announcements". |

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| Section 5.4<br>In-band tones and announcements | Change the first paragraph to: "It is assumed that the originating Class II device will provide a busy tone and a reorder tone to the calling user for speech and 3.1 kHz calls. The network will not provide in-band busy or reorder tone. When in-band audible ringing tone/announcements not associated with a call state change are to be provided by the network before reaching the Active state, a PROGRESS message is returned simultaneously with the application of the in-band audible ringing tone/announcement. The PROGRESS message contains the progress indicator 8 'in-band information or appropriate pattern is now available'." |
| Section 5.4<br>in-band tones and announcements | Change the second paragraph to: "When an audible ringing tone has to be provided together with a ... is sent simultaneously with the application of the inband audible ringing tone." |
| Section 5.4<br>in-band tones and announcements | Delete Note 1. |
| Section 5.4<br>in-band tones and announcements | Change Note 2 to: "When the PROGRESS message is used, the user may initiate call clearing as a result of the applied in-band audible ringing tone/ announcement, according to procedures specified in 5.3.3." |
| Section 5.5<br>Restart procedure | Delete from the second paragraph "b) the interface is a ... exists; or,". |
| Section 5.5.2<br>Receipt of RESTART | Change in Note 2 the reference to "ANSI T1.602" to "NIU 89-210". |
| Section 5.5.2<br>Receipt of RESTART | Change in Note 2 "b)" to: "b) that correspond to the specified channel or interface." |
| Section 5.7<br>Call collisions | Delete the Note at the end of the section. |
| Section 5.8.2<br>Message too short | Change this paragraph to: "When a message is received that is too short (less than 4 octets) to contain a complete message type information element, that message shall be ignored." |
| Section 5.8.4<br>Message type or message sequence errors | Add the following after the first paragraph: "The NOTIFY message may be ignored by the recipient." |
| Section 5.8.7.2<br>Non-mandatory information element content error | Delete the last sentence of the second paragraph ("However, in some ..."). |

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| Section 5.8.8<br>Data link reset | Delete from the first paragraph: "a) For calls in the Overlap ... procedures of 5.3". |
| Section 5.8.9<br>Data link failure | Delete from the first paragraph the first sentence of "a) ..." ("The calls in the ... internally."). |
| Section 5.8.9<br>Data link failure | Delete the second sentence of the Note following the first paragraph ("Note — If the transfer mode ...."). |
| Section 5.9<br>User notification procedure | Delete this section. |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Delete row "T302". |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Delete the second sentence in the "T310/NORMAL STOP" cell ("If DISCONNECT ..."). |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Delete rows "T312" and "T321". |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Delete Notes 4 and 5. |
| Section 9.1<br>Timers in the network side<br>Table 22 — Timers in the network side | Add the following to the end of Note 6: "(see Annex D)". |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Delete the following rows:<br>• "T301";<br>• "T304". |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Delete "SETUP ACKNOWLEDGE" from the "T303/NORMAL STOP" cell. |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side | Delete the reference to "Note 4" in the "T310/TIMER NUMBER" cell. |
| Section 9.2<br>Timers in the user side<br>Table 23 — Timers in the user side (Part 2) | Delete Notes 3 and 4. |
| Annex A — SDL diagrams | Delete this section. NOTE: This section has not been addressed. |

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| Section B.3.1<br>Compatibility checking with addressing information | Delete Note 2 ("If an incoming call, ... or subaddress."). |
| Section B.3.4<br>User action figures<br>Figure B.1 — Bearer capability compatibility checking<br>Figure B.2 — Low layer and high layer compatibility checking; compatibility assured | Delete the reference to "(Note 1)" from the cell in the first row of the second column. |
| Section B.3.4<br>User action figures<br>Figure B.1 — Bearer capability compatibility checking<br>Figure B.2 — Low layer and high layer compatibility checking; compatibility assured | Delete the "broadcast data link" column. |
| Section B.3.4<br>User action figures<br>Figure B.3 — Low layer and high layer compatibility checking; compatibility not assured | Delete the reference for "(Note 1)" in the cells in the first row of the second and third columns. |
| Section B.3.4<br>User action figures | Delete Notes 1 and 3 (ed. note: Note 3 is still referenced in the figures). |
| Annex C, Section C.1<br>Introduction | Delete "optional" from the first paragraph. |
| Annex C, Section C.2<br>Selection Not Supported | Delete this section. |
| Annex C, Section C.3<br>Selection Supported | Change the first paragraph to: "The user identifies the selected transit network in the SETUP message. One Transit network selection information element is used to convey a single network identification." |
| Annex C, Section C.3<br>Selection Supported | Delete the second ("The user may ..."), third ("As the call ..."), and fourth ("No more than ...") paragraphs. |
| Annex C, Section C.3<br>Selection Supported | Delete the last sentence of the sixth paragraph ("The diagnostic ..."). |
| Annex C, Section C.3<br>Selection Supported | Delete the seventh ("A network may ...") and eighth ("If the transit ...") paragraphs. |
| Annex D<br>Extensions for Symmetric Call Operation | Delete Annex D and replace with Attachment E of this document. |

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| Annex E, Section E.3<br>Routing Not Supported | Add the following paragraph before at the end of this section: "When the requested facility can not be provided an indication shall be returned in the first clearing message with cause 29 'facility rejected'." |
| Annex E, Section E.4<br>Routing Supported | Change the first sentence in the fourth paragraph to: "No more than two Network-specific facilities information elements may be used in a SETUP message." |
| Annex E, Section E.4<br>Routing Supported | Delete the last sentence of the fifth paragraph ("The diagnostic ..."). |
| Annex F<br>D-channel Backup Procedure | Delete this Annex. |
| Annex G, Section G.1<br>Introduction | Add the following to the end of the first paragraph: "Section 4.5.11 identifies the causes supported in NIU 90-302." |
| Annex G, Section G.3.8<br>Cause 46 "precedence call blocked" | Change "precedence circuits" to "preemptable circuits". |
| Annex H, Section H.1<br>Introduction | Change the first paragraph to: "These are the only recognized codings of the following information elements." |
| Annex H, Section H.1<br>Introduction | Delete the last two bullet items from the second paragraph. |
| Annex H<br>Examples of Information Elements Coding | Delete the following figures and sections:<br>• Figure "H.3 Coding for 7kHz Audio";<br>• Figure "H.6 Coding for synchronous 1472 kbit/s";<br>• Section H.3 Channel identification information element;<br>• Section H.4 Called and Calling party subaddress information element. |
| Annex I<br>Use of Progress indicators | Delete the fifth paragraph ("*Progress indicator 4 ...*"). |
| Annex I<br>Use of Progress indicators | Delete "or basic" from the left side of Figure I.1 (between the TE and ISDN). |
| Annex I<br>Use of Progress indicators | Delete "or basic" from the right side of Figure I.1 (between ISDN and NT2). |
| Annex M<br>Low Layer Compatibility Negotiation | Delete this Annex. |

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| Annex N<br>Procedures for Establishment of Bearer Connection<br>Prior to Call Acceptance | Delete this Annex and replace with Attachment F of this document. |
| Annex O<br>Optional Procedures for Bearer Service Change | Delete this Annex. |
| Annex P, Section P.1<br>Introduction | Delete "optional" from the first sentence in the first paragraph. |
| Annex P, Section P.1<br>Introduction | Change the last sentence of the first paragraph to: "These procedures apply to the speech, and 3.1 kHz and audio bearer services." |
| Annex P, Section P.1<br>Introduction | Change the second paragraph to: "The user may indicate a request for access to an operator or attendant system using the Operator system access information element." |
| Annex P, Section P.2<br>Operator system access requested in Keypad facility information | Delete this section. |
| Section P.4<br>invalid request | Delete this section. |
| Annex Q<br>Responding address requirements of the OSI network layer service | Delete this Annex. |

**Attachment A**
(of Appendix B)

*1. General*

*1.1 Scope and Purpose*

This Implementation Agreement specifies a minimal subset of procedures and codepoints from the American National Standards T1.607-1990 (Ref. [17]) for the establishment, maintenance, and clearing of ISDN connections at the user-to-network interface. This signalling standard is used to support the circuit-switched bearer services specified in ANS T1.604-1990*.

Terminals are not required to support all services. Switches will support all of the mandatory protocols and codepoints in this implementation agreement. This does not preclude the support of additional services and procedures. However, equipment must be able to interoperate with equipment supporting only this minimal subset.

*1.1.1 Definitions*

The ANS T1.607-1990 (Ref. [17]) assumes that procedures apply generically to ISDN access interfaces, i.e., the document does not distinguish between basic and primary rates access interfaces. In addition, there are no references to specific applications in that document. The concept of equipment classes is introduced in this document to permit certain procedures to be associated with a particular application or class of equipment, e.g., station equipment versus PBX. Specifically, two classes of equipment are defined on the basis of two fundamental attributes.

The first attribute relates to the possibility of an exchange of signals occurring beyond the public network's point of contact with the interface (i.e., between the equipment directly connected to the public network and ISDN terminals or telephones connected to that equipment). For example, some user equipment may support subtending Basic Access digital subscriber loops and/or analog telephone loops. For Class I equipment, the network makes no provision for such an arrangement and assumes the Class I equipment constitutes the endpoint of the communication. Conversely, in the case of Class II equipment, the procedures at the network take into account that communication between Class II equipment (with which it communicates directly) and other equipment (with which the network does not have direct contact) may occur. As an example, Class II equipment may support digital and/or analog subscriber loops. Use of Class II equipment also involves the possibility of having interworking occur beyond the equipment with which the network has direct contact. Therefore, it is reasonable for Class II equipment to provide the network with an interworking notification, for both outgoing and incoming calls, when either the calling or called party respectively, is a non-ISDN user. Class II equipment may also send an interworking notification if a private network exists beyond the Class II equipment and interworking to a non-ISDN facility within that network takes place. When an interface is associated with Class I equipment, it is assumed the multiple pieces of equipment may exist and communicate with the network over the D-channel. However, in this case, all equipment is assumed to be ISDN-capable and is considered as the endpoint of the communication. Therefore, interworking notification should not be accepted from Class I equipment.

The second attribute relates to the manner in which a SETUP message should be presented to the user equipment. When Class I equipment is applied on a particular interfaces, the network should broadcast the SETUP message associated with each call that terminates on that interface, since interaction between the network and multiple pieces of user equipment should be supported. On the other hand, the network should not broadcast SETUP messages associated with terminating calls to an interface on which Class II equipment is being used. Here, a single piece of user equipment is assumed to be involved in all communication with the network.

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\* Subject to further discussion.

To the extent possible, it is desirable to have one set of requirements for ISDN call control apply to all ISDN user configurations. However, in cases for which integrated procedures are not appropriate, the call control procedures associated with Equipment Class I will differ from those associated with Equipment Class II. Unless otherwise noted, the assumption should be that a particular procedure/capability should be provided for both classes of equipment on both basic and primary rate access. However, use of the equipment class terminology permits clarification of the circumstances under which a certain capability should be available (i.e., when a particular equipment class is in use). It also permits a mechanism for indicating that a particular capability applies only to a subset of four possible configurations which are labeled as follows.

|  | Class I | Class II |
|---|---|---|
| BRI | *IB* | *IIB* |
| PRI | *IP* | *IIP* |

In other words, a capability that applies to Class I equipment may be provided on basic access interfaces (IB) and/or primary rate access interfaces (IP). Similarly, a capability that applies to Class II equipment may be provided on basic access interfaces (IIB) and/or primary rate access interfaces (IIP).

The notation shown in the table above is used within this implementation agreement to indicate when protocol or procedures are only expected to be supported for a particular equipment class and/or are limited to a particular type of interface, i.e., basic or primary rate interface.

## Attachment B
## (of Appendix B)

The various parts of the called party number information element should be coded as follows:

— Type of number and numbering plan (octet 3)

| Bits 7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 0 0 0 0 0 0 | Unknown |
| 0 0 1 0 0 0 1 | International number in ISDN numbering plan (Rec. E.164) |
| 0 1 0 0 0 0 1 | National number in ISDN numbering plan (Rec. E.164) |
| 1 0 0 0 0 0 1 | Local (directory) number in ISDN numbering plan (Rec. E.164) |

All other values are reserved

— Digits (octet 4, etc.)

| Bits 7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 1 1 0 0 0 0 | 0 |
| 0 1 1 0 0 0 1 | 1 |
| 0 1 1 0 0 1 0 | 2 |
| 0 1 1 0 0 1 1 | 3 |
| 0 1 1 0 1 0 0 | 4 |
| 0 1 1 0 1 0 1 | 5 |
| 0 1 1 0 1 1 0 | 6 |
| 0 1 1 0 1 1 1 | 7 |
| 0 1 1 1 0 0 0 | 8 |
| 0 1 1 1 0 0 1 | 9 |

All other values are reserved

Digits should be represented by IA5 characters whose encoding is shown above.

In the network to user direction (n -> u), this IE will be always signaled in the SETUP message, and public network interfaces will use only one codepoint: local number in ISDN. For private networks, this IE can contain the following codepoints: abbreviated type of number, and private numbering plan, and extra digits such A, B, C, and D (as per IA5).

## Attachment C
### (of Appendix B)

The various parts of the calling party number information element should be coded as described below.

— Type of number and numbering plan (octet 3) follows:

| Bits<br>7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 0 0 0 0 0 0 | Unknown |
| 0 0 1 0 0 0 1 | International number in ISDN numbering plan (Rec. E.164) |
| 0 0 1 0 0 1 1 | International number in data numbering plan (Rec. X.121) |
| 0 1 0 0 0 0 1 | National number in ISDN numbering plan (Rec. E.164) |
| 1 0 0 0 0 0 1 | Local (directory) number in ISDN numbering plan (Rec. E.164) |
| 1 1 0 1 0 0 1 | Abbreviated Number in Private Numbering plan<br>All other values are reserved |

— Origin of number and presentation status (octet 3a) follows:

| Bits<br>7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 0 0 0 0 0 0 | Presentation allowed of user-provided number, number not screened |
| 0 0 0 0 0 0 1 | Presentation allowed of user-provided number, number passed network screening |
| 0 0 0 0 0 1 0 | Presentation allowed of user-provided number, number failed network screening |
| 0 0 0 0 0 1 1 | Presentation allowed of network-provided number |
| 0 1 0 0 0 0 0 | Presentation prohibited of user-provided number, number not screened |
| 0 1 0 0 0 0 1 | Presentation prohibited of user-provided number, number passed network screening |
| 0 1 0 0 0 1 0 | Presentation prohibited of user-provided number, number failed network screening |
| 0 1 0 0 0 1 1 | Presentation prohibited of network-provided number |
| 1 0 0 0 0 1 1 | Number not available<br>All other values are reserved |

Note 1 — When octet 3a is omitted, the default value of the Number Presentation parameter for the signaled DN value should be used, if it is available. If a value for this parameter is unavailable (i.e., the signaled DN value either fails screening or is not screened by the SPCS), the presentation parameter value of the default DN should be used.

Note 2 — Octet 3a, bits 7 & 6, are for the Presentation indicator; bits 2 & 1 are for the screening indicator.

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— Digits (octet 4, etc.)

Digits should be represented by IA5 characters whose encoding is shown below:

| Bits 7 6 5 4 3 2 1 | Meaning |
|---|---|
| 0 1 1 0 0 0 0 | 0 |
| 0 1 1 0 0 0 1 | 1 |
| 0 1 1 0 0 1 0 | 2 |
| 0 1 1 0 0 1 1 | 3 |
| 0 1 1 0 1 0 0 | 4 |
| 0 1 1 0 1 0 1 | 5 |
| 0 1 1 0 1 1 0 | 6 |
| 0 1 1 0 1 1 1 | 7 |
| 0 1 1 1 0 0 0 | 8 |
| 0 1 1 1 0 0 1 | 9 |

All other values reserved

Codings At Originating Party Interface

The calling party number information element should only be accepted when in the SETUP message. When the type of number and numbering plan indicator indicates "local number in the ISDN (E.164) numbering plan", the calling party number information element should contain a 7-digit local number. When the type of number and numbering plan indicator indicates "national number in the ISDN (E.164) numbering plan" the calling party number information element should contain a 10-digit national number.

In the network to user direction (n -> u). the coding and delivery of this IE depends on the definition of the Calling Line ID service. For private networks, this IE can contain the following codepoints: abbreviated type of number, and private numbering plan, and extra digits such as A, B, C, and D. (as per IE5)

Network — Specific facilities Information Element Examples

One recommended use for the Network Specific Facilities information element is to indicate which type of network facilities are being invoked at the specified network. In this arrangement, many different facility types are allowed to share a single Primary Rate Interface. Examples of the different DS-1 facility types allowed are:

  Private Lines
  Inwats Circuits
  Outwats Circuits
  Foreign Exchange (FX)
  Tie Trunks

**Attachment E**
(of Appendix B)

(editor's note: the sections contained in the brackets are unchanged from the original Annex D)

*Annex D — Extensions for symmetric (peer-to-peer) call operation*

This annex is part of NIU 90-302.

Symmetric call operation, or peer-to-peer call operation, shall be applied to the switches within a private network where all switches, such as PBXs and central office switches serving business group users are considered as peers. For example, PBX-to-PBX, PBX-to-Centrex, Centrex-to-Centrex.

*D.1  Additional message handling*

[In symmetric applications, the SETUP message will contain a Channel Identification information element indicating a particular B-channel to be used for the call.  A point-to-point data link shall be used to carry the SETUP message.]

The following procedures shall be followed for symmetrical operation.  The call control states followed should be the symmetric states defined in section D.6.

*D.1.1  Call Request*

The initiator of the call shall follow the network side procedures described in section 5.2.1.

*D.1.2  B-channel Selection — symmetric interface*

[Only B-channels controlled by the same D-channel will be the subject of the selection procedure.  The selection procedure is as follows:

a)    The SETUP message will indicate one of the following:

  1)  channel is indicated, no acceptable alternative, or

  2)  channel is indicated, any alternative is acceptable.

b)    In cases 1) and 2), if the indicated channel is acceptable and available, the recipient of the SETUP message reserves it for the call.  In case 2), if the recipient of the SETUP message cannot grant the indicated channel, it reserves any other available B-channel associated with the D-channel.]

c)    The recipient of the SETUP message indicates the selected B-channel in a CALL PROCEEDING, message transferred across the interface and enters the Incoming Call Proceeding state.  If an ALERTING or a CONNECT message is received in response to a SETUP message, the call should continue to be processed, if the channel indicated is acceptable to the initiator of the call, in accordance with Sections D.1.5.1 and D.1.8, respectively.  Although these are acceptable responses, a CALL PROCEEDING message is the recommended response to a SETUP message.

d)

e)    In case 1) if the indicated B-channel is not available, or in case 2) if no B-channel is available, a RELEASE COMPLETE message with a cause value of No. 44 "requested circuit/channel not

available" or No. 34 "no circuit/channel available" respectively is returned to the initiator of the call. The sender of this message remains in the Null state.

f)      If the channel indicated in the CALL PROCEEDING, message is unacceptable to the initiator of the call, it clears the call in accordance with Section 5.3. If an ALERTING or a CONNECT message is received in response to a SETUP message and the channel indicated is unacceptable to the initiator of the call, it clears the call in accordance with section 5.3. Although these are acceptable responses, a CALL PROCEEDING message is the recommended response to a SETUP message.

### D.1.3  Invalid Call Information

The recipient of a SETUP message shall follow the network side procedures described in section 5.1.4.

### D.1.4  Compatibility Checking

The recipient of a SETUP message shall follow the user side procedures described in section 5.2.2.

### D.1.5  Call Confirmation

Upon receipt of a SETUP message, the equipment enters the Call Present state. Valid responses to the SETUP message are a CALL PROCEEDING, or a RELEASE COMPLETE message. If an ALERTING or a CONNECT message is received in response to a SETUP message, the call should continue to be processed, if the channel indicated is acceptable to the initiator of the call, in accordance with Sections D.1.5.1. and D.1.8, respectively. Although these are acceptable responses, a CALL PROCEEDING message is the recommended response to a SETUP message.

If the indicated channel is acceptable to the initiator of the call, the initiator shall attach to the indicated B-channel according to the procedures in Annex N.

### D.1.5.1  Receipt of CALL PROCEEDING and ALERTING

The Initiator of a call shall follow the network side procedures in section 5.2.5.2.

### D.1.5.2  Clearing during incoming call establishment

The initiator of a call shall follow the network side procedures in section 5.2.5.3.

### D.1.5.3  Call Failure

The initiator of a call shall follow the network side procedures in section 5.2.5.4.

### D.1.6  Clearing by the called user employing user-provided tones/announcements

When tones or announcements are provided in conjunction with call clearing, the party providing the in-band treatment shall send a PROGRESS message.

### D.1.7  Call Accept

The recipient of the call shall follow the user side procedures in section 5.2.7.

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## D.1.8 Active indication

Upon receipt of a CONNECT message, the initiator of the call shall respond with a CONNECT ACKNOWLEDGE message and enter the Active State (see sec. 5.2.8 network side procedures).

## D.1.9 Call Clearing

### D.1.9.1 Normal Call Clearing

Then sender of the DISCONNECT message shall follow the user side procedures in section 5.3.3. The recipient of the DISCONNECT message shall follow the network side procedures in section 5.3.3.

## D.2 Timers for call establishment

The timers described in section 9 table 7 shall be implemented along with the corresponding procedures for action's taken upon expiration of these timers. The default of T310 should be extended to 20 seconds. In addition, timer T309 shall be mandatory.

## D.3 Call collisions

In symmetric arrangements, call collisions can occur when both sides simultaneously transfer a SETUP message indicating the same channel. In the absence of administrative procedures for assignment of channels to each side of the interface, the following procedure is employed.

First, one side of the interface will be designated the **"controlling function"** and the other side of the interface will be designated the **"responding function"**. This can be accomplished by administering the Layer 2 Command/ Response bit. The controlling function is assigned **"command"** and has control of all the channels on the interface. The responding function is assigned **"response"**. Second, for the three possible scenarios where the same channel is indicated by combinations of preferred and exclusive from the responding function and controlling function, the following procedure is used:

a)      **"controlling function"** preferred, **"responding function"** preferred:

The **"controlling function"** preferred channel is awarded and an alternate channel is indicated in the first response to the **"responding function"** SETUP message.

b)      **"controlling function"** exclusive, **"responding function"** exclusive:

The **"controlling function"** exclusive channel is awarded and the **"responding function"** SETUP message is cleared with a RELEASE COMPLETE message with cause No. 34 "no circuit/channel available".

c)      **"controlling function"** preferred, **"responding function"** exclusive; or **"controlling function"** exclusive, **"responding function"** preferred:

The side of the interface with an exclusive indicator in a SETUP message is awarded the channel and an alternate channel is indicated in the first response to the side using a preferred indicator in the SETUP message.

Channel identification is allowed in both directions for ALERTING and CONNECT.

*D.4     Restart Procedures*

See section 5.5.

*D.5     Handling of Error Codes*

See section 5.8.

*D.6     Call control states for symmetric call operation*

The state below are used in association with call references other than the global call reference, and apply to symmetric interfaces. The Outgoing side is the side of the symmetric interface that transmits the SETUP message, while the incoming side is the recipient of the SETUP message.

*D.6.1    Null State (S0)*

No call exists.

*D.6.2    Call Initiated (S1)*

This state exists for an outgoing call when the Outgoing Side has sent a request for call establishment to the Incoming Side but has not yet received a response.

*D.6.3    Outgoing Call Proceeding (S3)*

This state exists for an outgoing call when the Outgoing Side has received acknowledgement that the Incoming Side has received all call information necessary to effect call establishment.

*D.6.4    Call Delivered (S4)*

This state exists for an outgoing call when the Outgoing Side has received from the Incoming Side an indication that the called user is being alerted.

*D.6.5    Call Present (S6)*

This state exists for an incoming call when the Incoming Side has not yet responded to the request from the Outgoing Side for call establishment.

*D.6.6    Call Received (S7)*

This state exists for an incoming call when the Incoming Side has indicated to the Outgoing Side that the called user is being alerted.

*D.6.7    Connect Request (S8)*

This state exists for an incoming call when the Incoming Side has indicated to the Outgoing Side that the called user has answered the call.

*D.6.8    Incoming Call Proceeding (S9)*

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This state exists for an incoming call when the Incoming Site has sent to the Outgoing Side acknowledgement that it has received all call information necessary to effect call establishment.

### D.6.9    Active (S10)

This state exists for an incoming call when the Incoming Side has received from the Outgoing Side an acknowledgement of the indication that the called user has answered the call.  This state exists for an outgoing call when the Outgoing Side has received from the Incoming Side  an indication that the called user has answered the call.

### D.6.10   Disconnect Request (S11)

This state exists when a Side has sent to the other Side a request to disconnect the user information connection and is waiting for a response.

### D.6.11   Disconnect Indication (S12)

This state exists when a Side has received from the other Side a request to disconnect the user information connection and has not yet responded.

### D.6.12   Release Request (S19)

This state exists when a Side has sent to the other Side a request to release the call and has not yet received a response.

*Annex N — Procedures for Establishment of Bearer Connection Prior to Call Acceptance*

This annex is part of NIU 90-302.

*N.1 General*

For some applications, it is desirable to allow the completion of the transmission path associated with a bearer service prior to receiving call acceptance. In particular, the completion of the backward direction for non-peer communication or both directions for peer-to-peer communication (see Annex D for peer-to-peer call operation) of the transmission path prior to receipt of a CONNECT message from the called user may be desirable to:

    1)    allow the called user to provide internally-generated tones and announcements that are sent in-band to the calling user prior to answer by the called user; or,

    2)    avoid speech clipping on connections involving an NT2 where delays may occur in relaying the answer indication within the called user equipment.

The procedures described in this annex are applicable to the speech and 3.1 kHz audio bearer services, for non-peer communication of both directions for peer-to-peer communication (see Annex D for peer-to-peer call operation).

*N.2 Procedures*

Completion of the transmission path prior to receipt of a call acceptance indication shall be provided in three ways:

    1)    For peer-to-peer communications on receipt of a CALL PROCEEDING message or an ALERTING message indicating completion of successful channel negotiation.

    2)    For non-peer communication on receipt of an ALERTING message; and

    3)    For non-peer communications on receipt of a PROGRESS message.

When criteria (1) is used to determine that a transmission path should be established, the sender of the SETUP message shall connect, both directions of the transmission path upon receipt of either a CALL PROCEEDING message or an ALERTING message containing an acceptable B-channel indication.

When criteria (2) is used to establish the transmission path, the network shall connect, the backward direction of the transmission path upon receipt of an ALERTING message assuming channel negotiation procedures have been successful.

When criteria (3) is used to establish the transmission path, the network shall connect, the backward direction of the transmission path upon receipt of a PROGRESS message containing progress indicator 1 "call is not end-to-end ISDN; further call progress information may be available in-band," assuming that the user has already returned a CALL PROCEEDING message and channel negotiation procedures have been successful.

If an ALERTING message follows a PROGRESS message containing progress indicator 1, it should be treated as an unexpected message.

The network may choose to further restrict when message(s) will result in establishment of the transmission path. These restrictions may be imposed on a per interface basis to provide an administrative means for limiting potential misuse of the early connection capabilities.

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**11. ABSTRACT (A 200-WORD OR LESS FACTUAL SUMMARY OF MOST SIGNIFICANT INFORMATION. IF DOCUMENT INCLUDES A SIGNIFICANT BIBLIOGRAPHY OR LITERATURE SURVEY, MENTION IT HERE.)**

This document compiles the existing NIU-Forum agreements for an ISDN developed and approved in the NIU-Forum as of November 1990. These agreements cover: Layer 1 BRI at the U, and S/T reference points; Layer 1 PRI at the U reference point; Layer 2 BRI and PRI; Layer 3 BRI Basic Call Control for Class I equipment; Layer 3 PRI Basic Call Control for Class II equipment; and Generic Control procedures for Class I BRI Supplementary Services. In addition, this document references the Conformance tests which have been completed by the NIU-Forum. These include: Layer 1 BRI S/T interface; and Layer 2 BRI LAPD. Finally, this document contains the Application Profile for four of the Incoming Call Management applications which have been submitted to the NIU-Forum.

**12. KEY WORDS (6 TO 12 ENTRIES; ALPHABETICAL ORDER; CAPITALIZE ONLY PROPER NAMES; AND SEPARATE KEY WORDS BY SEMICOLONS)**

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