5.2 National ISDN Signaling Diagrams

This Section provides additional information for practitioners who wish to implement solutions involving National ISDN. Section 5.2.1 presents the BRI signaling flow diagrams for NI-1 and Section 5.2.2 presents the PRI signaling flow diagrams for NI-2. These flow diagrams are cited under the "technical notes" of each guide in Section 3.

5.2.1 National ISDN-1 BRI Signaling Flow Diagrams

This section provides examples of the ISDN Layer 2 and Layer 3 message flows required to realize the applications described in Section 3.1, National ISDN-1 BRI Solutions. The Layer 2 signaling used here is Q.921 LAPD signaling for circuit-mode and D Channel packet-mode calls, and X.25 LAPB signaling for B Channel packet-mode calls. The Layer 3 signaling used here is Q.931 signaling for circuit-mode calls and X.25 Packet Layer Protocol (PLP) signaling for packet-mode calls.

For Layer 2 signaling, Voice and CMD terminals support either Dynamic or Fixed TEIs for correct operation in National ISDN-1. D Channel PMD terminals need to support Fixed TEIs for correct operation in National ISDN-1. B Channel PMD terminals do not need to support either Dynamic or Fixed TEIs for correct operation in National ISDN-1, since TEIs are not needed for the National ISDN-1 version of B Channel PMD. [1]

For Layer 3 signaling, D Channel and B Channel PMD terminals do not need to support Terminal Initialization procedures for correct operation in National ISDN-1. Instead, D Channel PMD terminals are required to support "Test Call" procedures in National ISDN-1. B Channel PMD terminals are not required to support "Test Call" procedures in National ISDN-1. These "Test Call" procedures from D Channel PMD calls are similar to the Terminal Initialization procedures for circuit-mode calls. These "Test Call" procedures use X.25 PLP signaling and are performed at X.25 Layer 3 before the terminal sets up its first packet-mode call on a new Layer 2 data link.

Each Voice, CMD and PMD Signaling Flow Diagram given in subsections 5.2.1.4 through 5.2.1.10 typically involves Layer 2 data link setup and Layer 3 Terminal Initialization or Test Call procedures, which are shown in subsections 5.2.1.1 through 5.2.1.3. For example, if a terminal in a given Flow was "inactive" (not ready to place or receive calls), it would

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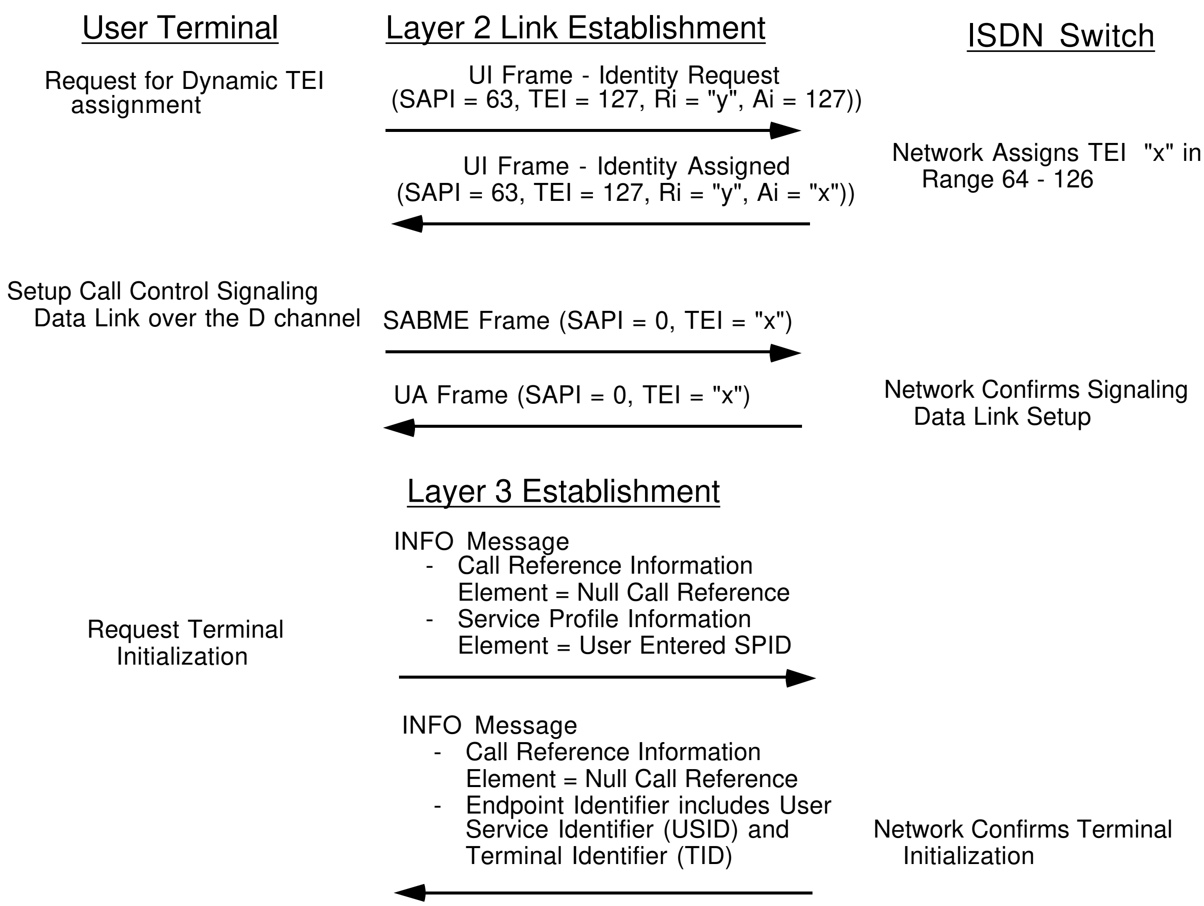
[1] The National ISDN-1 version of B Channel PMD is "Semi-Permanent B Channel," which does not require a TEI. The additional National ISDN-2 version of B Channel PMD will be "On-Demand B Channel," which will require either a Dynamic or a Fixed TEI.

have to go through data link setup and Terminal Initialization or Test Calls to make itself "active" (ready to place or receive calls).

WARNING: See the pertinent signaling standards for complete flow and interworking details, and abbreviated terms.

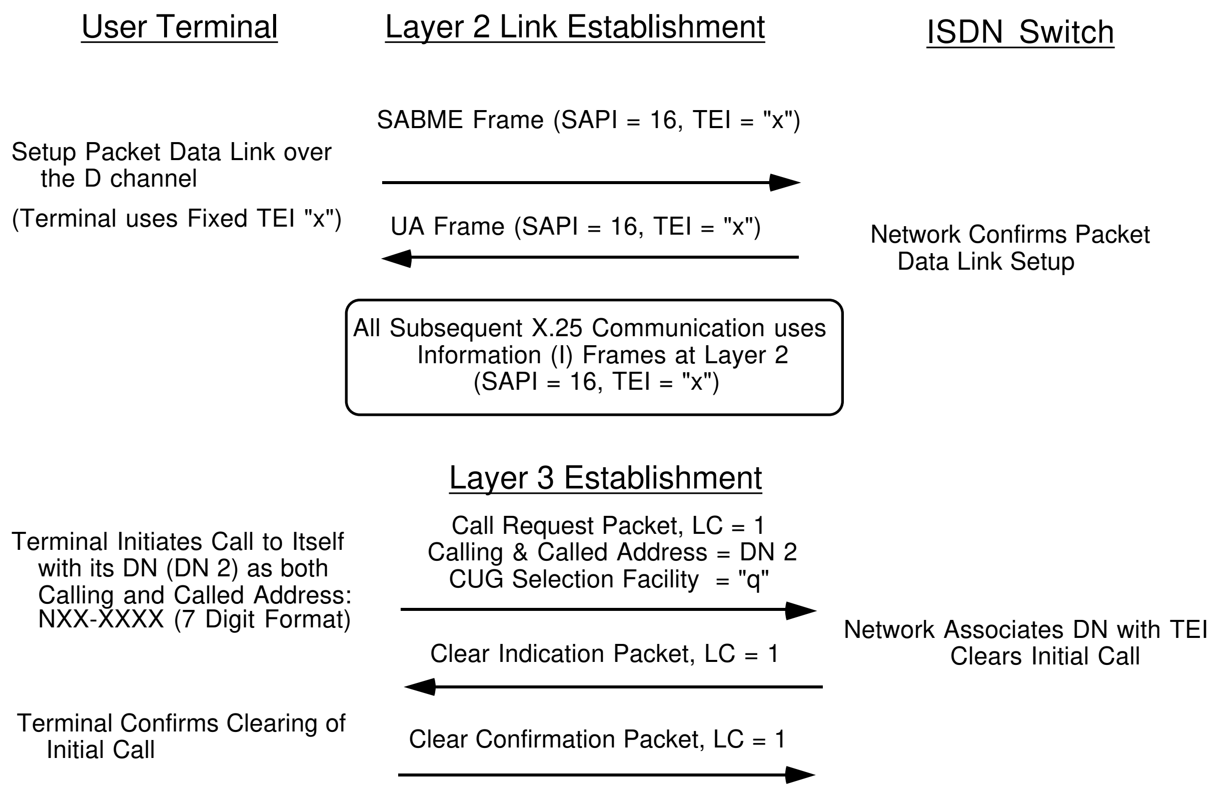
5.2.1.1 Data Link Setup & Terminal Initialization for Voice & Circuit-Data Terminals

(Circuit-mode protocols at Layer 2 and Layer 3, Using Dynamic TEI Assignment)



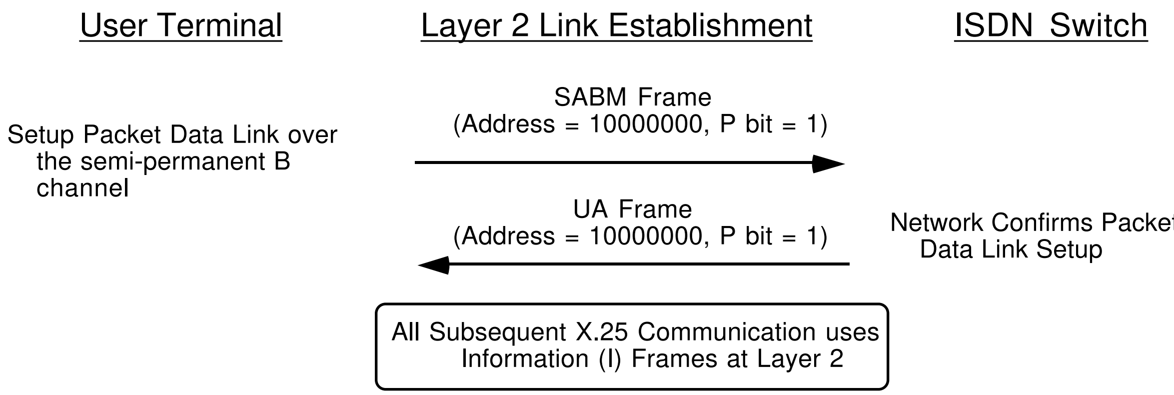
5.2.1.2 Data Link Setup & Test Call Procedure for D Channel Packet-Data Terminals

(Packet-mode protocols at Layer 2 and Layer 3, Using Fixed TEI Assignment)

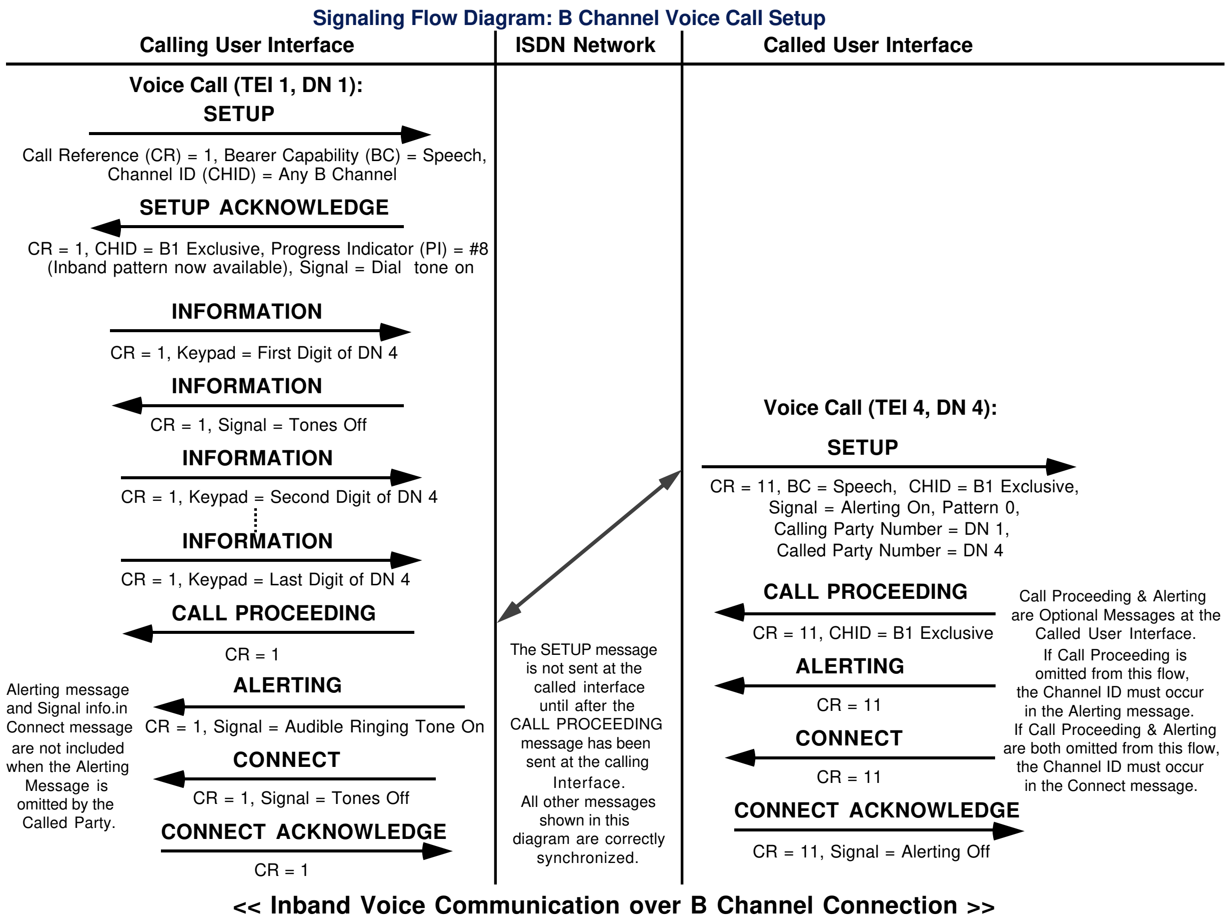


5.2.1.3 Data Link Setup for B Channel Packet-Data Terminals

(Packet-mode protocols at Layer 2, No TEI Assignment)

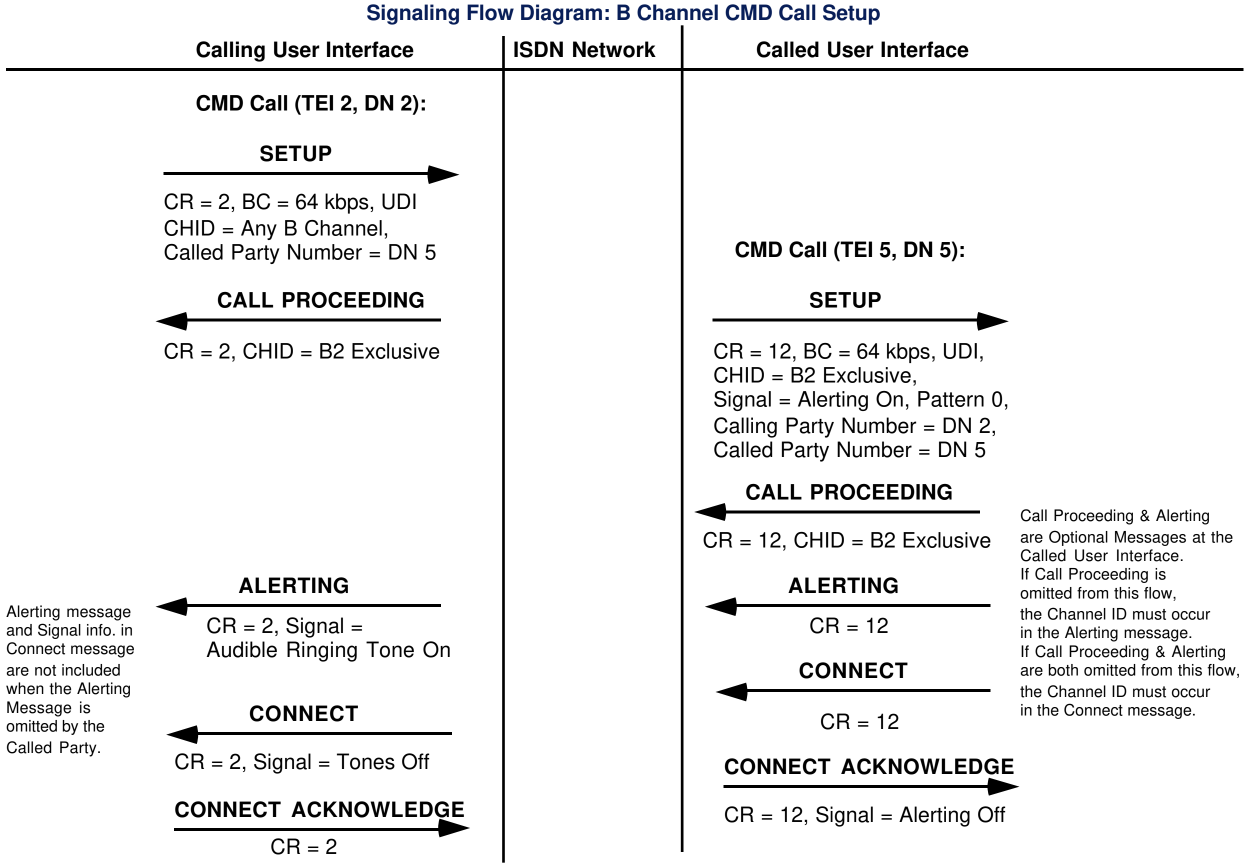


5.2.1.4 Voice Call Setup for B Channel Voice Terminals



5.2.1.5 Circuit-Data Call Setup for B Channel Circuit-Data Terminals

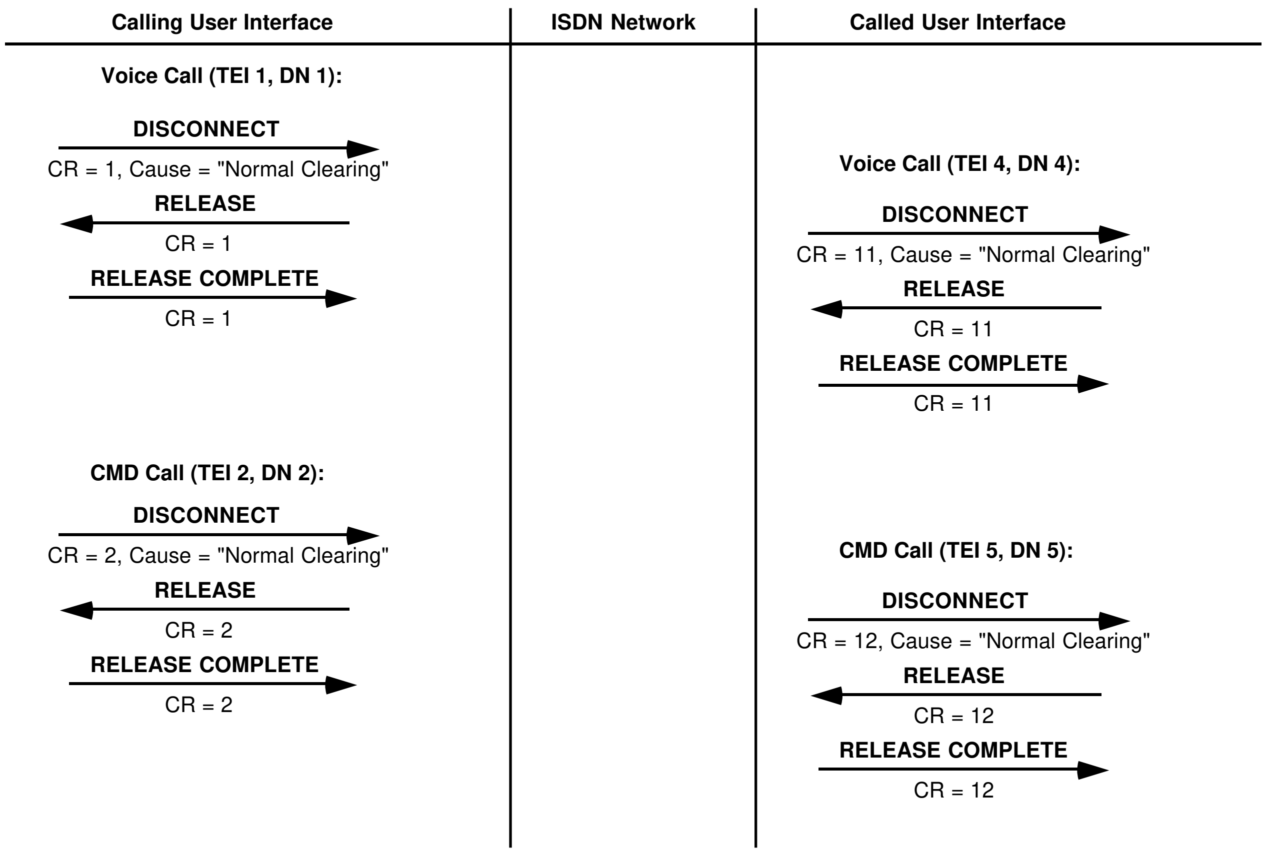
Signaling Flow Diagram: B Channel CMD Call Setup



<< Inband 64kbps CMD Communication over B Channel Connection >>

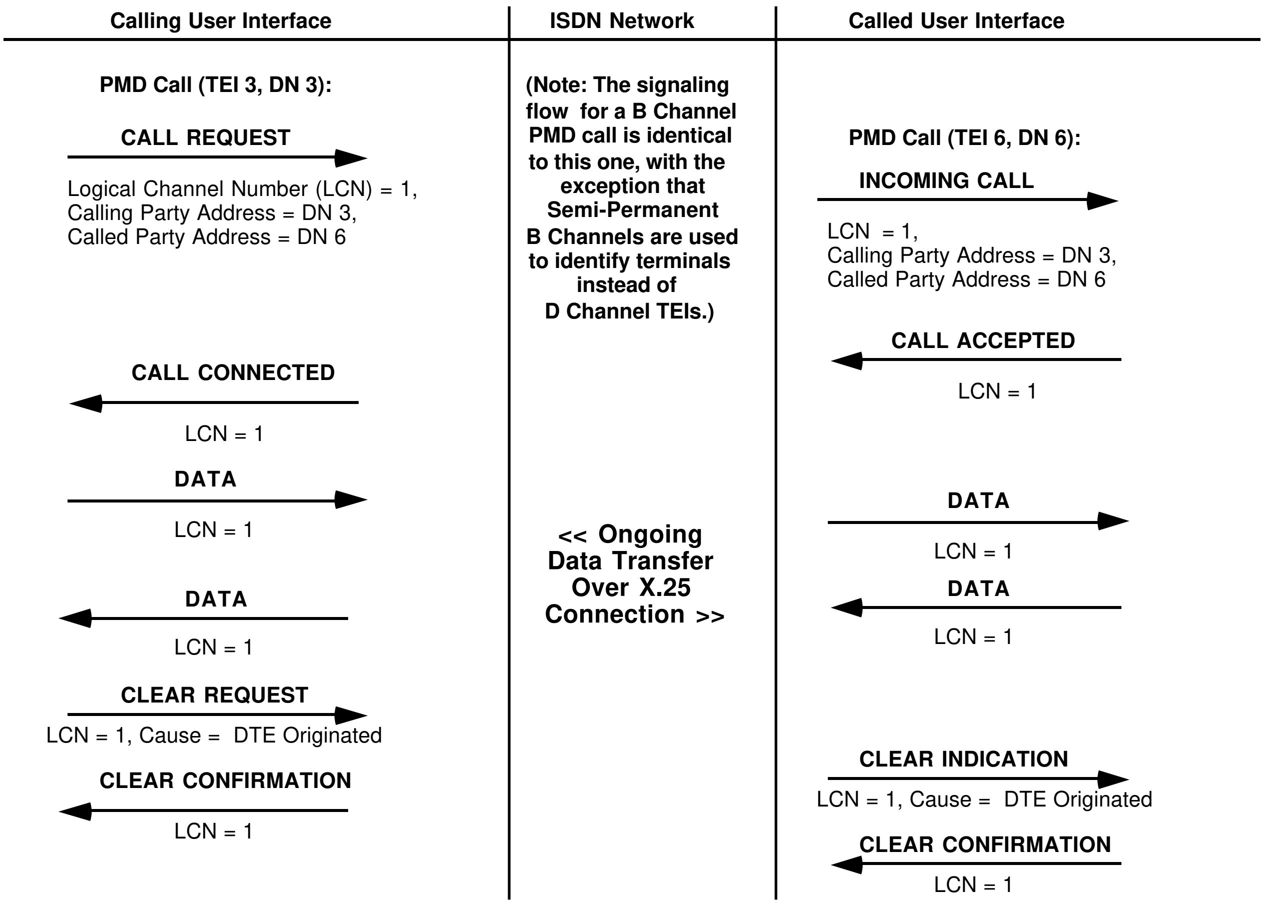
5.2.1.6 *Voice and Circuit-Data Call Clearing for B Channel Voice & Circuit-Data Terminals*

Signaling Flow Diagram: Voice and CMD Call Clearing



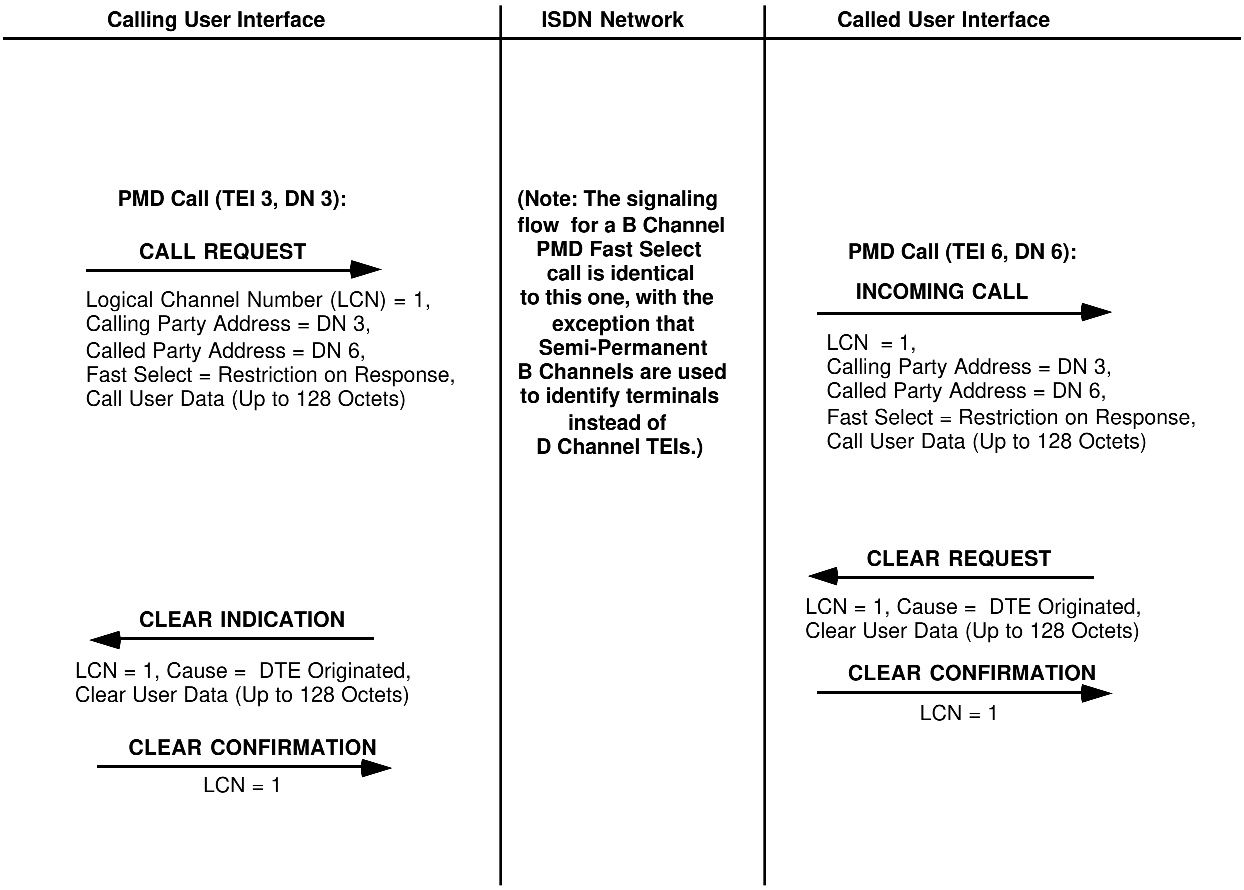
5.2.1.7 Packet-Data Call Setup and Clearing for D Channel Packet-Data Terminals

Signaling Flow Diagram: D Channel PMD Call Setup & Clearing



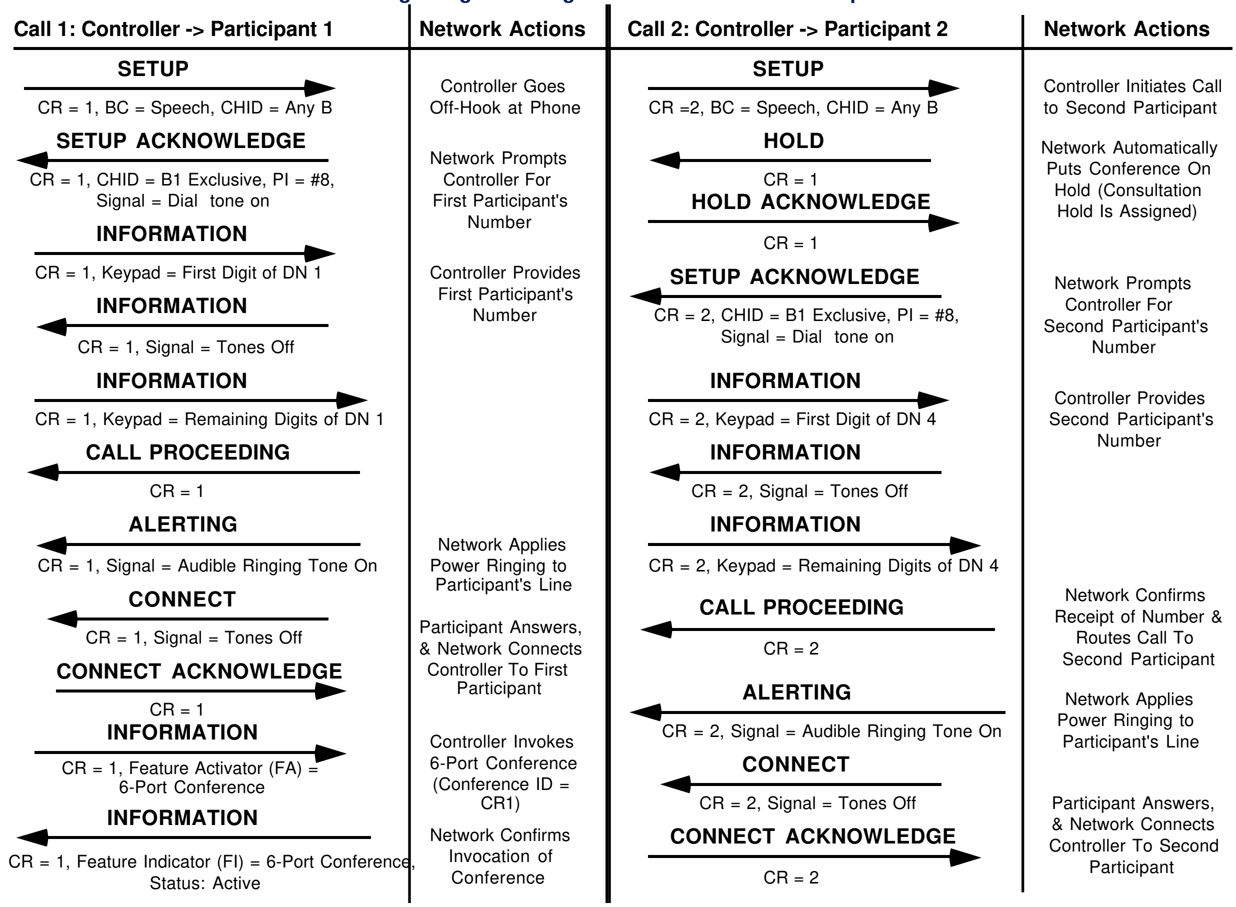
5.2.1.8 Packet-Data Fast Select Setup and Clearing for D Channel Packet-Data Terminals

Signaling Flow Diagram: D Channel PMD Fast Select Setup & Clearing

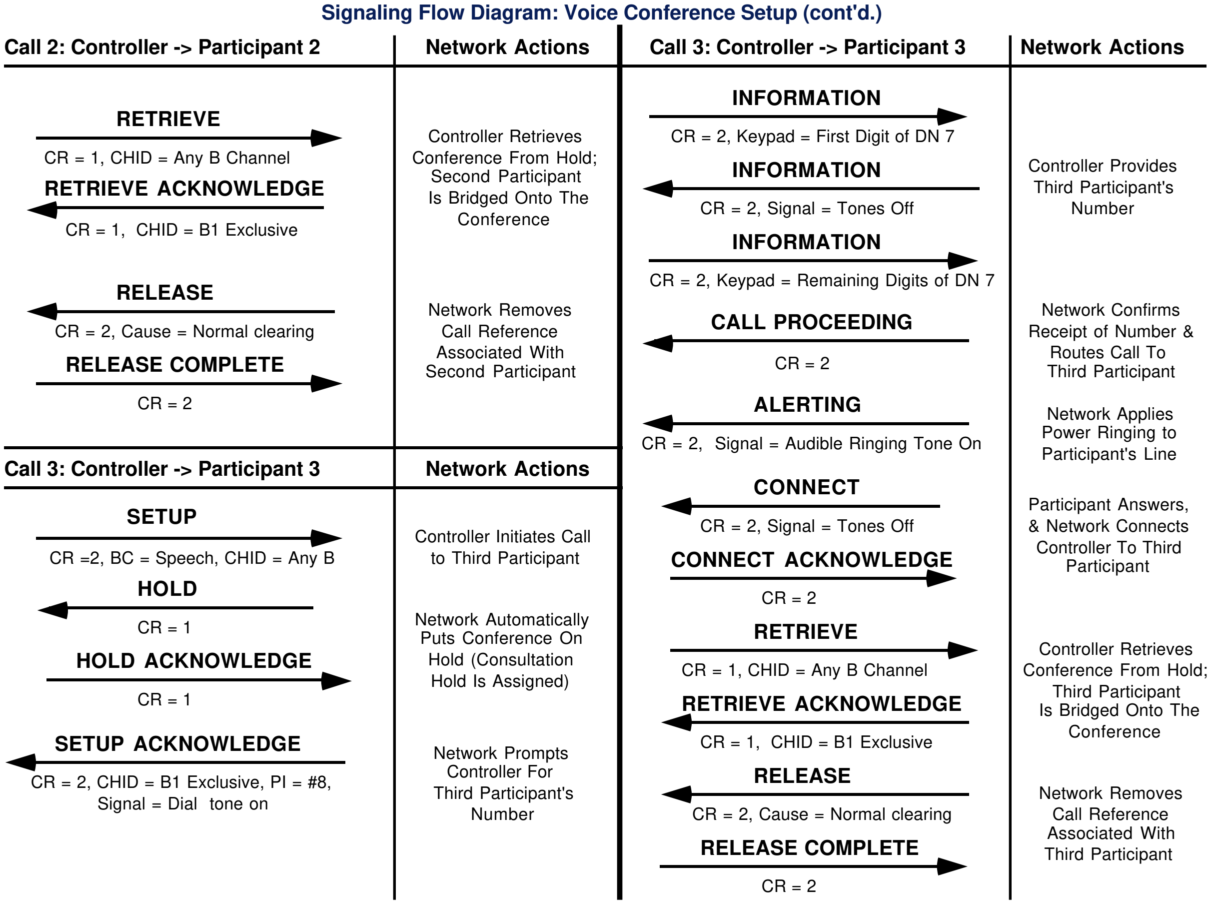


5.2.1.9 *Voice Conference Setup & Clearing for B Channel Voice Terminals*

Signaling Flow Diagram: Voice Conference Setup

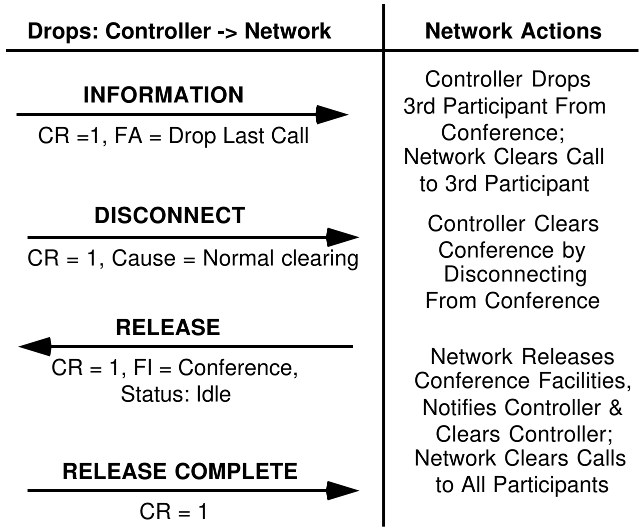


Signaling Flow Diagram: Voice Conference Setup (cont'd.)



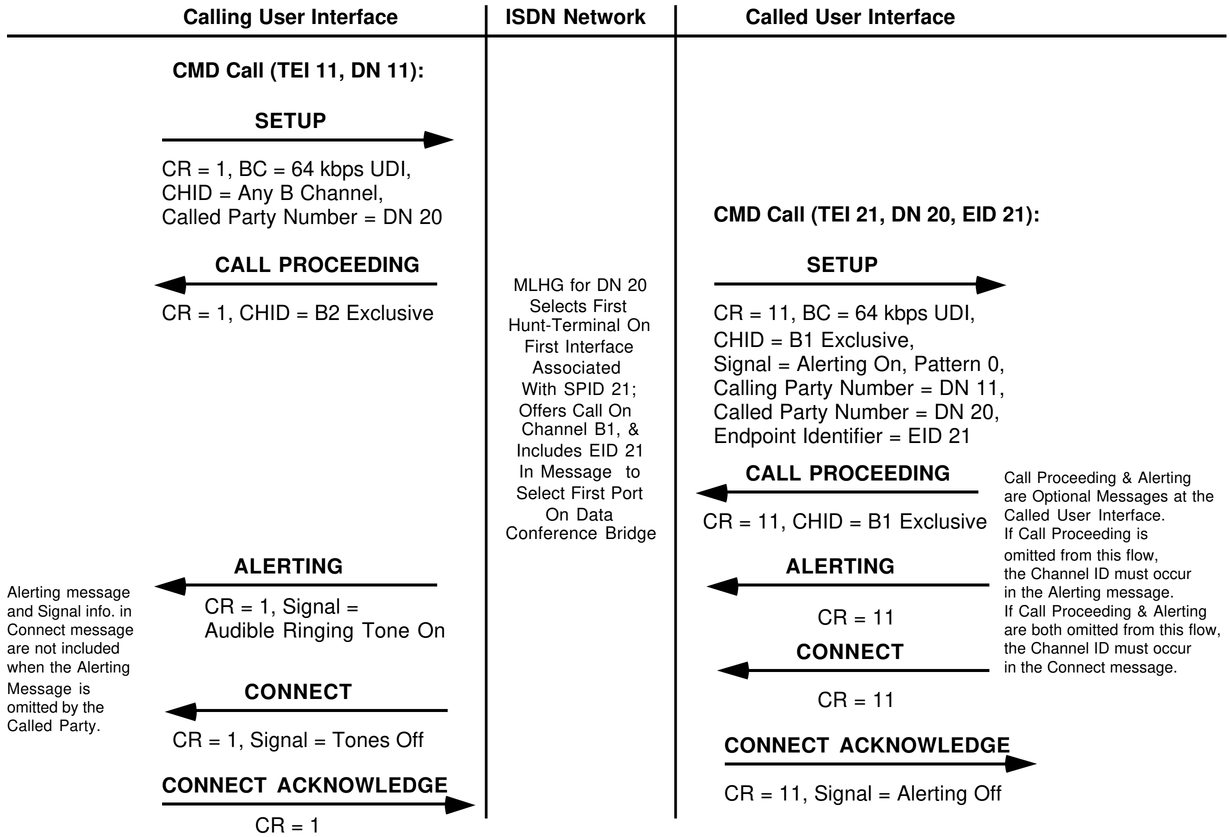
This information is subject to change without notice
See Notice of Disclaimer on Title Page

Signaling Flow Diagram: Voice Conference Clearing

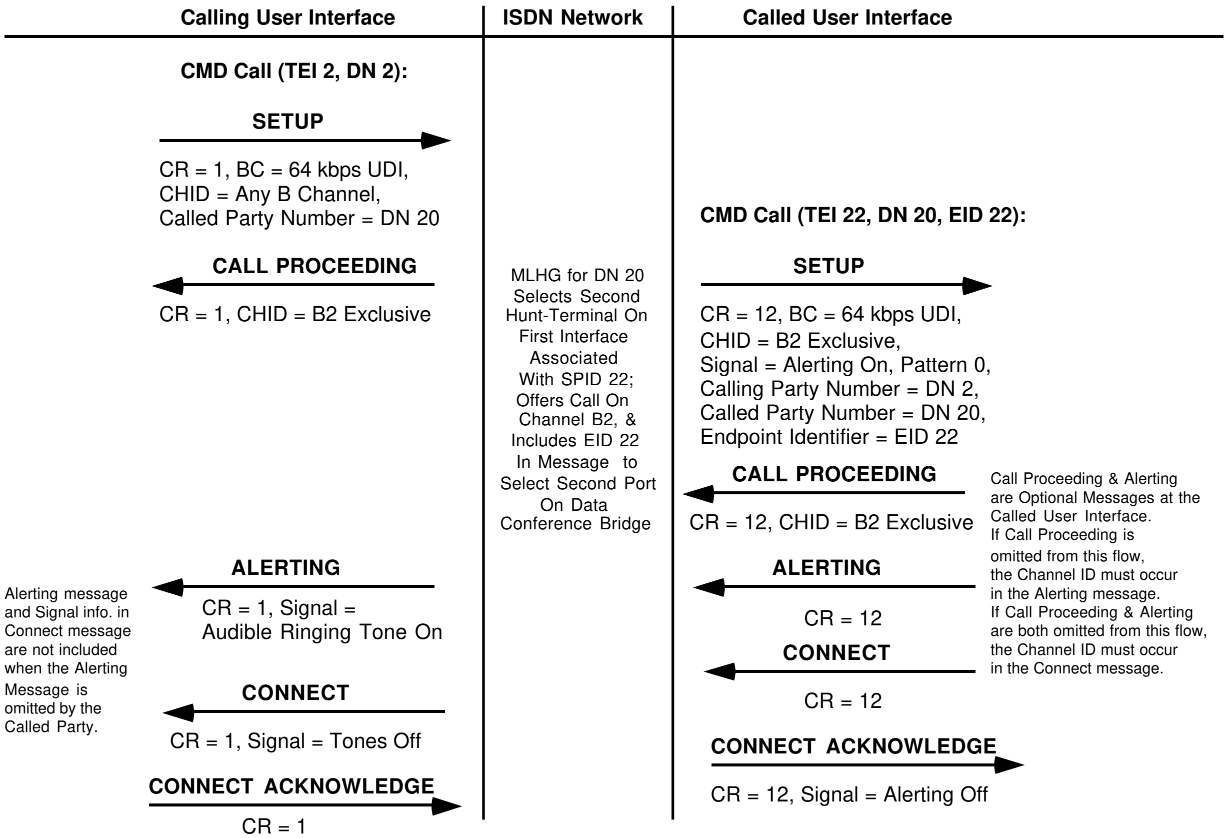


5.2.1.10 *Circuit-Data Conference Setup for B Channel Circuit-Data Terminals Using Multiline Hunt Group (MLHG)*

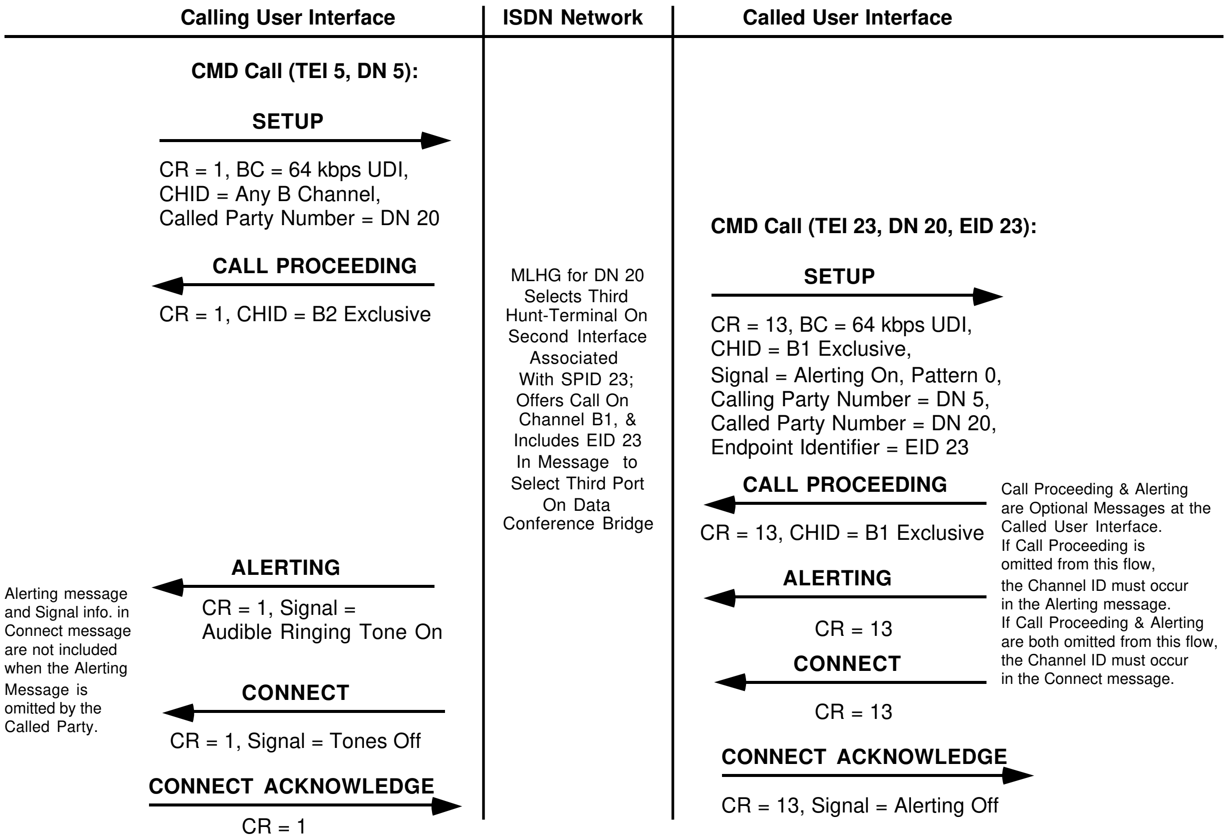
Signaling Flow Diagram: CMD Call 1 Setup



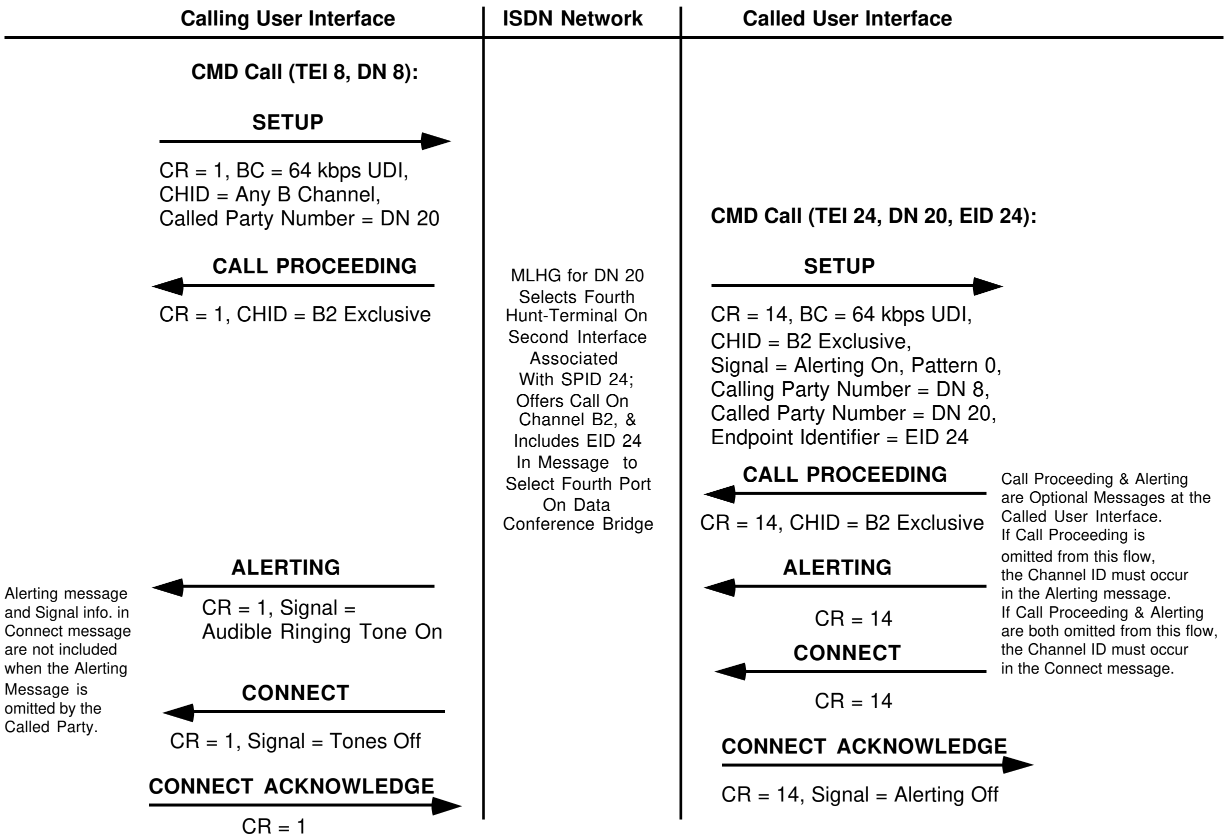
Signaling Flow Diagram: CMD Call 2 Setup



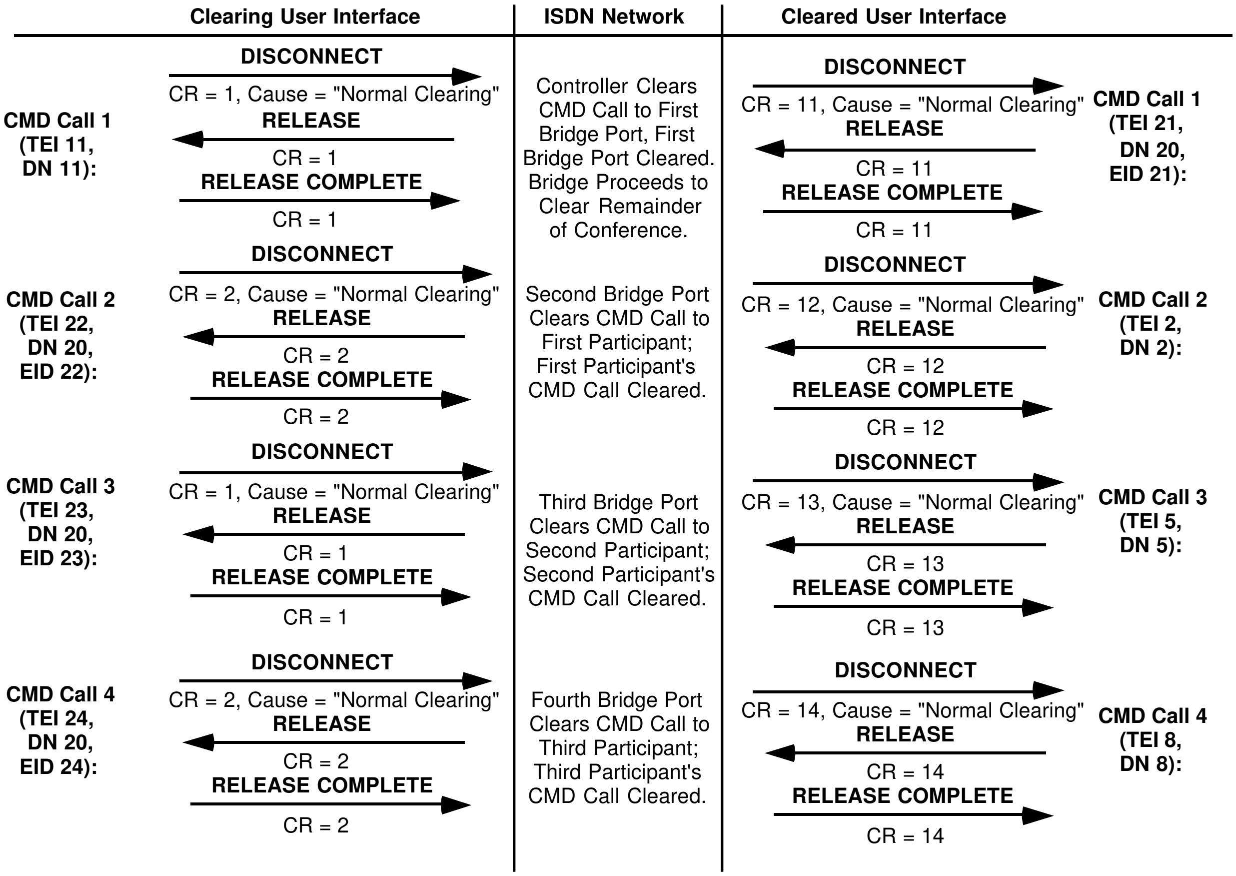
Signaling Flow Diagram: CMD Call 3 Setup



Signaling Flow Diagram: CMD Call 4 Setup



Signaling Flow Diagram: CMD Call Clearing

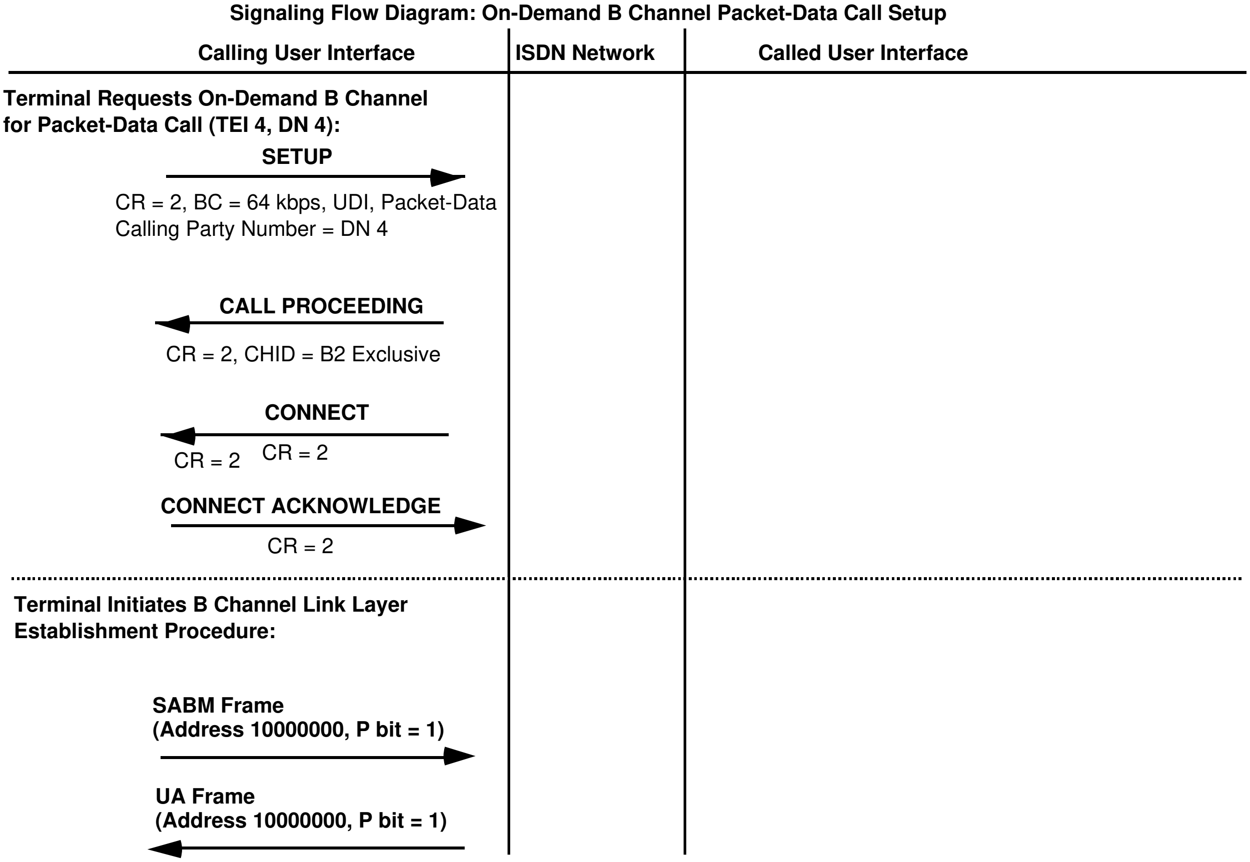


5.2.2 National ISDN-2 BRI Signaling Flow Diagrams

In addition to the procedures shown in Section 5.2.1, NI-2 supports procedures for establishing and clearing On-Demand B channel packet-data connections on a Basic Rate Interface.

5.2.2.1 *On-Demand Packet-Data Call Setup for B Channel Packet-Data Terminals*

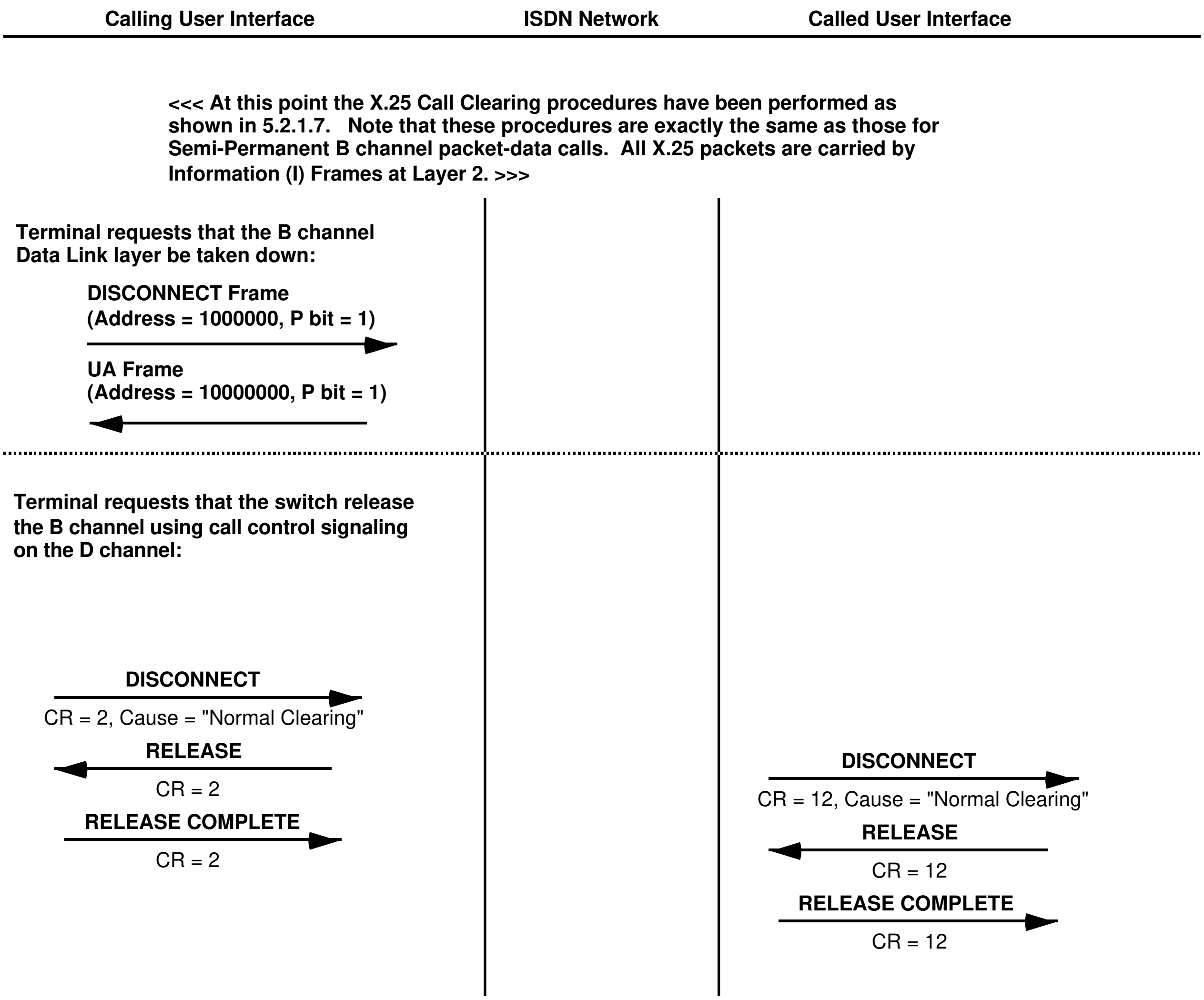
Signaling Flow Diagram: On-Demand B Channel Packet-Data Call Setup



<<< At this point the B channel link is established, X.25 Call Setup procedures are used as shown in 5.2.1.7. Note that these procedures are exactly the same as those for Semi-Permanent B channel packet-data calls. All X.25 packets are carried by Information (I) Frames at Layer 2. >>>

5.2.2.2 On-Demand Packet-Data Call Clearing for B Channel Packet-Data Terminals

Signaling Flow Diagram: Packet-DataCall Clearing on an On-Demand B Channel



5.2.3 National ISDN-2 PRI Signaling Flow Diagrams

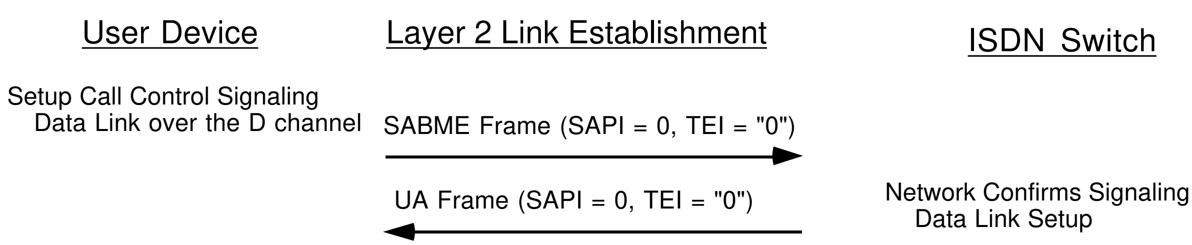
This section provides examples of the ISDN Layer 2 and Layer 3 message flows required to realize the applications described in Section 3.2, National ISDN-2 PRI Solutions. The Layer 2 signaling used here is Q.921 LAPD signaling for circuit-mode and D Channel packet-mode calls, and X.25 LAPB signaling for B Channel packet-mode calls. The Layer 3 signaling used here is Q.931 signaling for circuit-mode calls and X.25 Packet Layer Protocol (PLP) signaling for packet-mode calls.

Each Voice, .CMD, .PMD and Multi-Rate CMD Signaling Flow Diagram given below would typically involve Layer 2 data link setup procedures. For example, if a device in a given Flow was "inactive" (not ready to place or receive calls), it would require data link setup to make itself "active" (ready to place or receive calls).

The signaling for data link establishment is not reflected in each signal flow diagram associated with individual Voice, CMD, PMD, and Multi-Rate CMD calls. Rather, they are presented once for circuit mode devices in section 5.2.1 and for packet mode devices in 5.2.2.

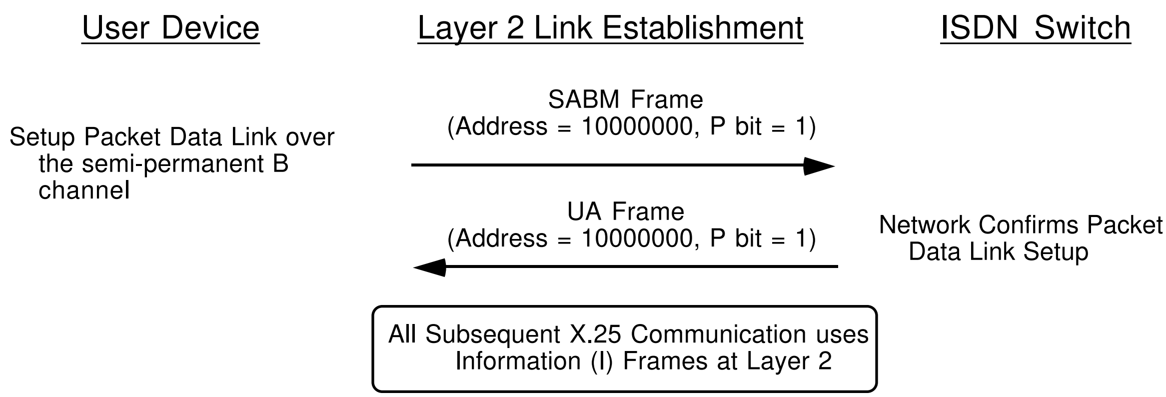
5.2.3.1 Data Link Setup for Voice & Circuit-Data, & Multi-Rate Circuit-Data Devices

(Circuit-mode protocols at Layer 2 , Using A Fixed TEI Value of 0)

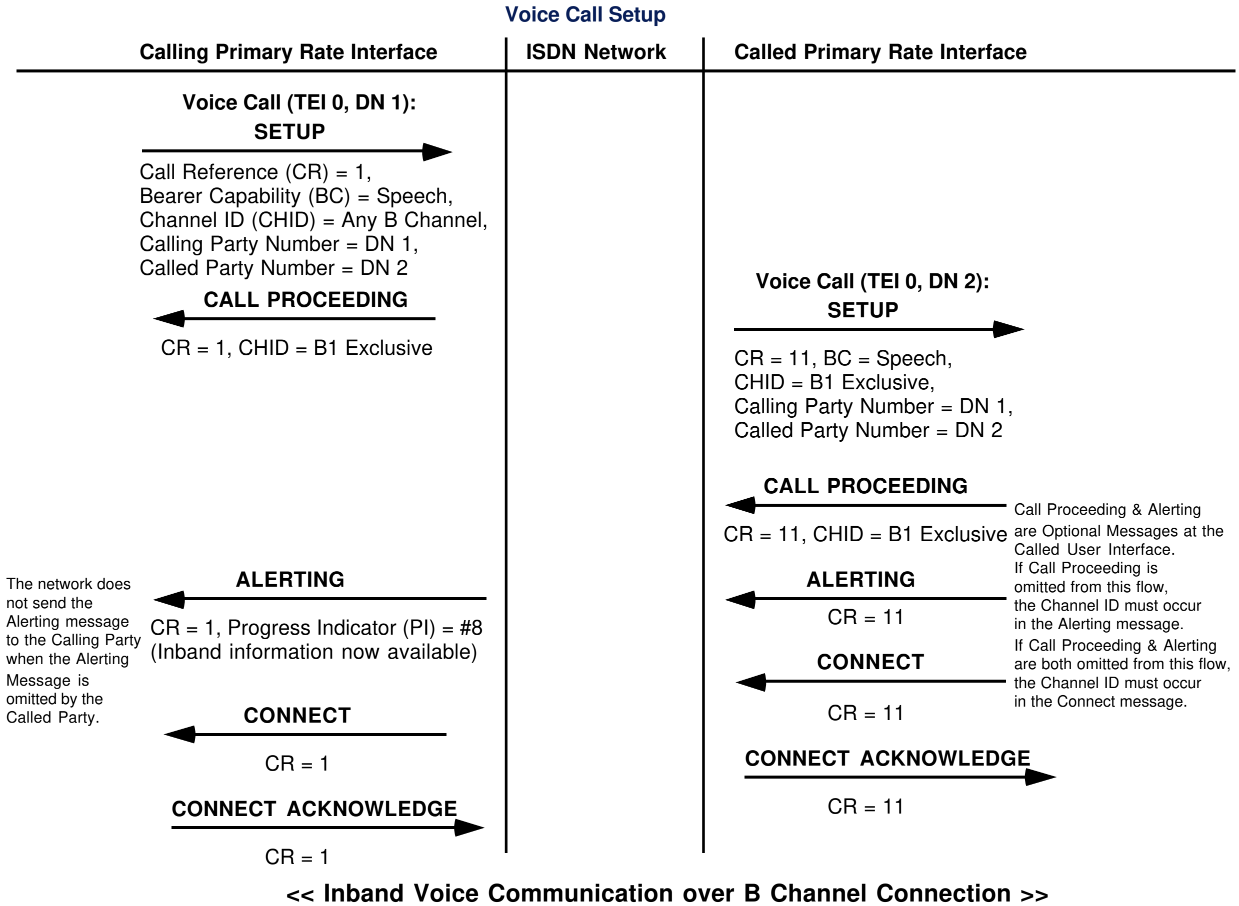


5.2.3.2 Data Link Setup for B Channel Packet-Data Terminals

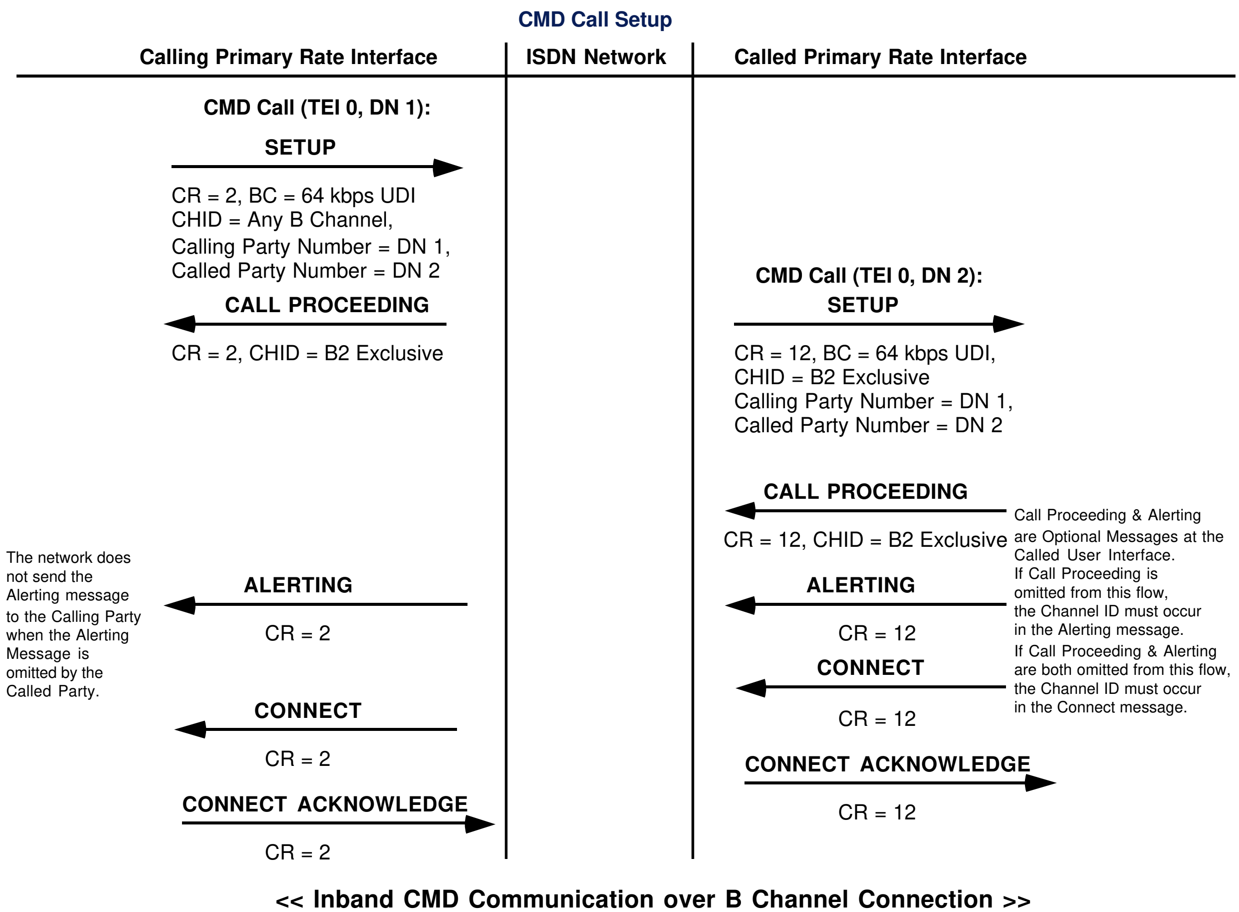
(Packet-mode protocols at Layer 2, No TEI Assignment)



5.2.3.3 *Voice Call Setup for B Channel Voice Devices*

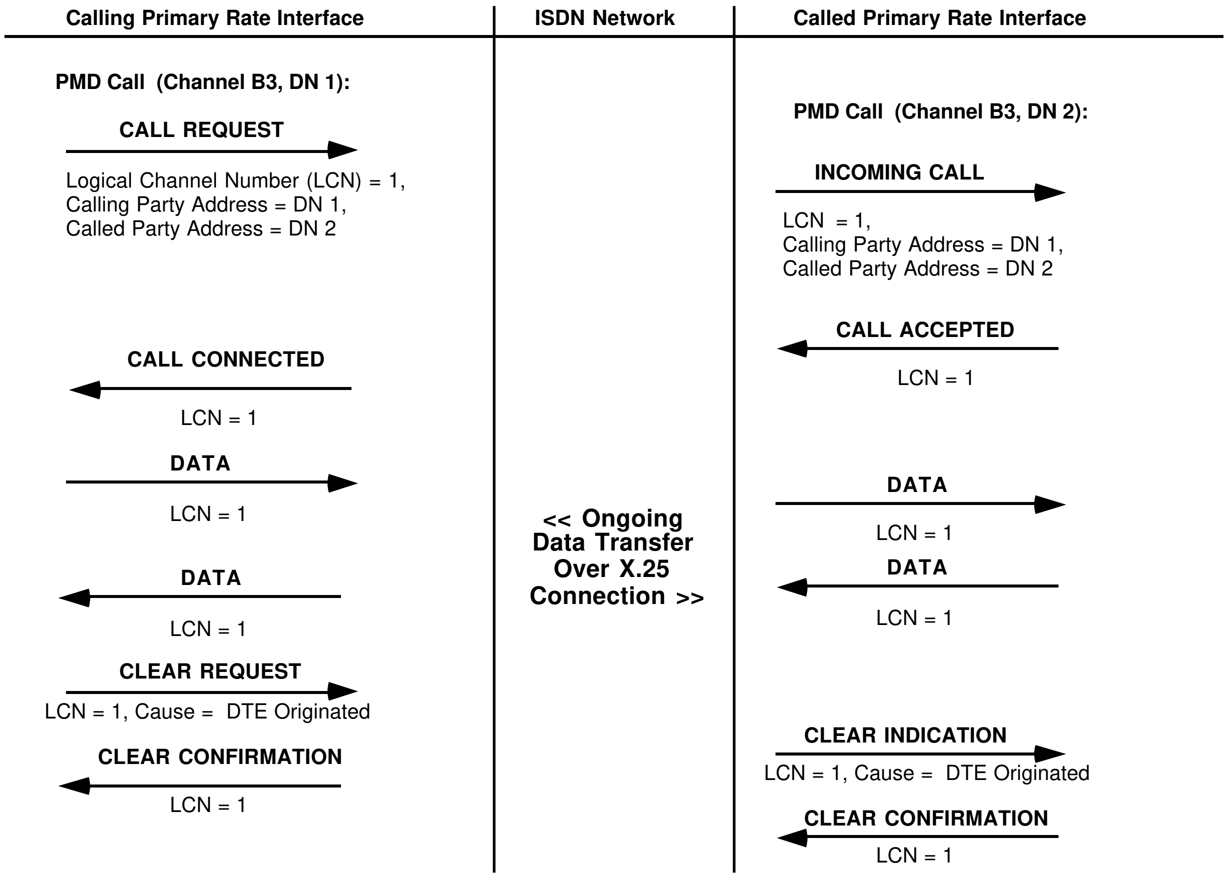


5.2.3.4 Circuit-Data Call Setup for B Channel Circuit-Data Devices

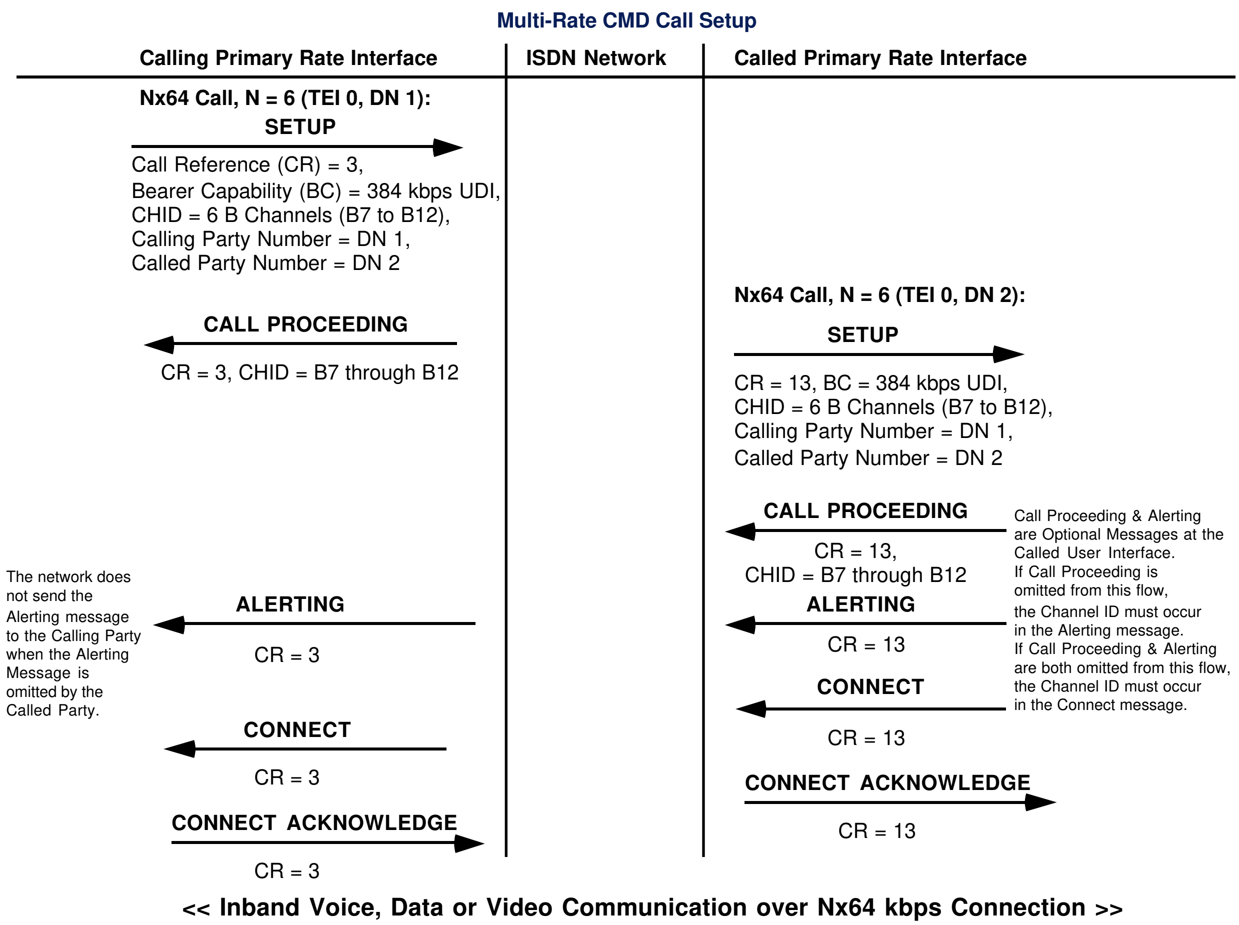


5.2.3.5 *Packet-Data Call Setup & Clearing for B Channel Packet-Data Devices*

PMD Call Setup & Clearing



5.2.3.7 *Multi-Rate Circuit-Data Call Setup for B Channel Multi-Rate Circuit-Data Devices*



5.2.3.8 *Voice, Circuit-Data, & Multi-Rate Circuit-Data Call Clearing for B Channel Devices*

Voice, CMD, & Multi-Rate CMD Call Clearing