This chapter provides instructions for configuring the ISDN protocols in the SP201 for signaling conversion. Use the sections that reflect the software you are configuring. Before configuring the protocols for your SP201, be sure you have completed all the configuration procedures in Chapter 2, Configuration Overview.

The following subsections contain information on configuring ISDN protocols in the SP201:

- Section 5.1, ISDN in the SP201
- Section 5.2, Commands for Configuring ISDN Protocols
- Section 5.3, Configuring ISDN Signaling
- Section 5.4, Configuring ISDN LAPD and Call Control
- Section 5.5, The ISDN Rate Converter
An integrated services digital network (ISDN) provides high-speed end-to-end digital service over existing telecommunications networks, including copper-wire telephone lines used in most homes. ISDN allows a single high-speed interface to provide several services, such as telephone (voice), fax, computer (data), and video transmission. ISDN supports transmission at 64 kbps on each channel. The SP201 supports the following variants of ISDN:

- National ISDN version 2 (NI2), used primarily in North America
- European Telecommunications Standards Institute (ETSI) ISDN, used in most places outside North America

ETSI ISDN and NI2 ISDN systems vary as follows:

- NI2 supports the T1 rate (1.544 Mbps: 24 channels at 64 kbps per channel). In NI2, timeslot 24 is used for the D-channel.
- ETSI supports the E1 rate (2.048 Mbps: 31 channels at 64 kbps per channel). In ETSI, timeslot 16 is used for the D-channel.

The ISDN protocols implemented in the SP201 conform to the following standards:

- ETSI ISDN conforms to ETSI 300-102 and to ITU-T Recommendations Q.931 and Q.921.
- NI2 ISDN conforms to BellCore TR-NWT-001268 and TR-NWT-002343 and to ITU-T Recommendations Q.931 and Q.921.

Both variants of ISDN used in the SP201 are configured in the same manner. Any differences occur in options for parameters; each variant will present its own options. Where appropriate, steps in procedures will point out any differences for the variants.

The ISDN protocol uses out-of-band signaling. Each standard ISDN trunk has one signaling channel (D-channel); the trunk’s remaining channels are bearer channels (B-channels). A T1 line has 23 B-channels; an E1 line has 30 B-channels. On T1 lines, timeslot 24 is usually the D-channel; on E1 lines, timeslot 16 must be the D-channel.

The ISDN protocols supported in the SP201 use the ISDN Primary Rate Interface (PRI, for carrying data and voice over the B-channels).

---

1. Sometimes the SP201 software uses the term “PRI” to indicate ISDN parameters.
5.2 Commands for Configuring ISDN Protocols

Table 5-1 describes the commands used for configuring ISDN protocols in the SP201.

Table 5-1. ISDN Protocol Configuration Commands

<table>
<thead>
<tr>
<th>Command Name</th>
<th>Protocol</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>config cc autoblock</td>
<td>ETSI ISDN, NI2 ISDN</td>
<td>Enable or disables automatic blocking of SS7 ISUP circuits, according to the state of the ISDN D-channel. See Section 5.4.1.1, The config cc autoblock Command.</td>
</tr>
<tr>
<td>config cc cgptynum</td>
<td>NI2 ISDN (to SS7)</td>
<td>Indicates whether to transmit calling party information. See Section 5.4.1.2, The config cc cgptynum Command.</td>
</tr>
<tr>
<td>config cc chargeInd</td>
<td>NI2 ISDN (to SS7)</td>
<td>Indicates whether to include a CHARGE and CALLED PARTY CAT indication in the ACM message. See Section 5.4.1.3, The config cc chargeInd Command.</td>
</tr>
<tr>
<td>config cc dialtone</td>
<td>ETSI ISDN</td>
<td>Indicates whether to generate dial tone for the caller. See Section 5.4.1.4, The config cc dialtone Command.</td>
</tr>
<tr>
<td>config cc forceacm</td>
<td>ETSI ISDN (to SS7), NI2 ISDN (to SS7)</td>
<td>Indicates whether to support forced ACM. See Section 5.4.1.5, The config cc forceacm Command.</td>
</tr>
<tr>
<td>config cc number</td>
<td>ETSI ISDN (to SS7), NI2 ISDN (to SS7)</td>
<td>Configures mapping of SS7 Nature of Address, ISDN Type of Number, and Numbering Plan fields in Called Party Number and Calling Party Number Information Elements. See Section 5.4.1.6, The config cc number Command.</td>
</tr>
<tr>
<td>config cc overlap</td>
<td>ETSI ISDN</td>
<td>Indicate whether to allow overlap dialing. See Section 5.4.1.7, The config cc overlap Command.</td>
</tr>
<tr>
<td>config cc useruserinfo</td>
<td>NI2 ISDN (to SS7)</td>
<td>Indicates whether to include a user-to-user information element in the ISDN setup message. See Section 5.4.1.8, The config cc useruserinfo Command.</td>
</tr>
<tr>
<td>config dchans</td>
<td>all ISDN</td>
<td>Configures ISDN signaling channels (D-channels) to meet installation requirements. Configuration of D-channels varies slightly by type of ISDN; it differs substantially for standard ISDN channels and bundled (facility) ISDN channels. See Section 5.3, Configuring ISDN Signaling.</td>
</tr>
</tbody>
</table>
ISDN trunks are on the SP201’s physical (hardware) ports 5–8. (To verify the ports for ISDN trunks, use the `show dchans` command, described in Section 9.2.11.10, *The show dchans Command*.)

Each ISDN trunk also has an interface (software) ID in the configuration commands. The IDs for current ISDN commands conform to the physical port numbers. The interface IDs in legacy ISDN commands start with trunk value 1. In the ISDN debug commands (`config q931` and `config lapd`), the profile numbers (sometimes called element numbers) and interface IDs start with trunk value 0.

Table 5-2 lists each physical trunk on the SP201, its ISDN trunk number, and its interface IDs for ISDN legacy and debug commands.

**Table 5-2. SP201 ISDN Trunks and Corresponding ISDN Interface Numbers**

<table>
<thead>
<tr>
<th>SP201’s Physical Port</th>
<th>ISDN Trunk</th>
<th>Interface ID for Legacy ISDN Commands</th>
<th>Profile Number and Interface ID for ISDN Debug Commands</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>5</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>6</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7</td>
<td>7</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>8</td>
<td>4</td>
<td>3</td>
</tr>
</tbody>
</table>

### 5.3 Configuring ISDN Signaling

This section contains instructions for configuring the signaling timeslot (the D-channel) for ISDN trunks on the SP201. See the following sections:

- **Section 5.3.1, Standard ISDN Signaling**
- **Section 5.3.2, Network Facility Associated Signaling**

#### 5.3.1 Standard ISDN Signaling

This document uses the term *standard ISDN trunk* to indicate a standalone ISDN trunk—that is, an ISDN trunk that is not part of a facility. (An ISDN facility bundles two or more ISDN trunks into one entity.)
Each standard ISDN trunk has one signaling channel (D-channel). On T1 lines, timeslot 24 is usually the D-channel; on E1 lines, timeslot 16 must be the D-channel.

### 5.3.1.1 The `config dchans` Command for Standard ISDN Trunks

You use the `config dchans` command to configure signaling channels (D-channels) for ISDN trunks. Figure 5-1 shows the task flow for the `config dchans` command when configuring standard ISDN trunks. Follow the procedure below to configure a D-channel for each ISDN trunk on the SP201.

![Diagram of the config dchans command](image)

*Figure 5-1. Task Flow for the config dchans Command for a Standard ISDN Trunk*

See one of the following to configure standard ISDN trunks:

- To configure an ETSI ISDN trunk, see *How to Use the config dchans Command for a Standard ETSI ISDN Trunk*.

- To configure a standard National ISDN trunk, see *How to Use the config dchans Command for a Standard National ISDN Trunk*.

**Note:** To configure National ISDN trunks as a facility, see *Section 5.3.2, Network Facility Associated Signaling*.
How to Use the config dchans Command for a Standard ETSI ISDN Trunk

1. At the user> prompt, type config dchans and press Enter.
   - Information similar to the following appears.

```
user> config dchans
The following is the present Trunk configuration.
If a change to the Timeslot or Interface Type is desired
Enter the Trunk number you wish to modify or exit:
******************************************************************************
*************************** ISDN D-CHANNEL STATUS ***************************
******************************************************************************
  Trunk            FAS/    Signaling   Interface  Time    # of   D-Channel
Trunk Type  Protocol   NFAS      Type        Type     Slot  Failures  Status
******************************************************************************
  5    E1   ETSI ISDN  FAS     D-Channel    Network    16     0000   Inactive
  6    E1   ETSI ISDN  FAS     D-Channel    Network    16     0000   Inactive
  7    E1   ETSI ISDN  FAS     D-Channel    Network    16     0000   Inactive
  8    E1   ETSI ISDN  FAS     D-Channel    Network    16     0000   Inactive
******************************************************************************
ISDN Trunk Number
Enter value([5-8]) or "exit" :
```

2. Do one of the following:

   a. If the ISDN trunk configuration is appropriate for your network, type exit and press Enter.
      - The user> prompt reappears.

```
user>
```

   b. If you wish to change information for a trunk, type the trunk number (where trunk 5 identifies the ISDN trunk on port 5) and press Enter.
      - The following prompt appears.

```
user>
```
Configuring ISDN Signaling

3 Indicate the role the SP201 will play in the ISDN connection. Type 0 for User or 1 for Network, and press Enter.

- The following prompt appears.

```
Select interface type - user(0) or network(1) : <current=1>
```

4 Type the number of the timeslot that will be the signaling channel for this trunk, and press Enter.

---

**Note:**

- E1 trunks must use timeslot 16 as the signaling channel.
- T1 trunks usually use timeslot 24 as the signaling channel.

- One of the following results occurs:
  - If you changed nothing, the user> prompt appears. Go to Step 6.
  - If you changed any of the configuration, the following message appears.

```
The card must be reset for the changes to operate properly
Do you wish to reset now (y/n)?
```

5 Do one of the following:

a If you have other ISDN trunks to configure, type n and press Enter.

- The user> prompt is displayed.
b If you have no other ISDN trunks to configure, type y and press Enter.

- The SP201 performs a warmstart. When it has finished, the user> prompt is displayed.

6 If you wish to change information for another ISDN trunk, perform Step 1 through Step 5 again.

Note: If you answered no in Step 5 to any trunk that asked you to reset, you must warmstart the SP201 so that the changes will be implemented. See Section 3.4.1, The warmstart Command.

How to Use the config dchans Command for a Standard National ISDN Trunk

1 At the user> prompt, type config dchans and press Enter.

- The following question appears.

```
user>
```

2 Type n and press Enter.

Note: If you do wish to configure an NFAS (facility) interface, see How to Use the config dchans Command for an ISDN Facility.

- Information similar to the following appears.
3. Do one of the following:
   a. If the ISDN trunk configuration is appropriate for your network, type `exit` and press `Enter`.
      - The `user>` prompt reappears.

   b. If you wish to change information for a trunk, type the trunk number (where trunk 5 identifies the ISDN trunk on port 5) and press `Enter`.
      - The following prompt appears.

4. Indicate the role the SP201 will play in the ISDN connection. Type 0 for User or 1 for Network, and press `Enter`.
   - The following prompt appears.
Chapter 5: Configuration of ISDN Protocols

**Note:** Because this is a standard ISDN trunk, the software selects the standard **D Channel** for the signaling channel type. The other choices are for signaling types used in facilities. (An ISDN facility bundles two or more ISDN trunks, using only one signaling channel for the bearer channels on all the bundled trunks. See Section 5.3.2, *Network Facility Associated Signaling*.)

5. Select **D Channel** and press Enter.

- The following prompt appears.

```
D Channel Time Slot
Enter value(1 - 31; current="24") or "exit" :
```

6. Type the number of the timeslot that will be the signaling channel for this trunk, and press Enter.

**Note:** E1 trunks must use timeslot 16 as the signaling channel. T1 trunks usually use timeslot 24 as the signaling channel.

- One of the following results occurs:
  - If you changed nothing, the **user>** prompt appears. Go to Step 8.
• If you changed any of the configuration, the following message appears.

The card must be reset for the changes to operate properly
Do you wish to reset now {y/n}?

7 Do one of the following:

a If you have other ISDN trunks to configure, type n and press Enter.
   ❖ The user> prompt is displayed.

   user>

b If you have no other ISDN trunks to configure, type y and press Enter.
   ❖ The SP201 performs a warmstart. When it has finished, the user> prompt is displayed.

8 If you wish to change information for another ISDN trunk, perform Step 1 through Step 7 again.

Note: If you answered no in Step 7 to any trunk that asked you to reset, you must warmstart the SP201 so that the changes will be implemented. See Section 3.4.1, The warmstart Command.

5.3.2 Network Facility Associated Signaling

Note: Facilities are available only in NI2 ISDN. ETSI ISDN does not support facilities.

Each standard, standalone ISDN trunk has one signaling channel (D-channel). However, in National ISDN you can bundle the SP201’s four
ISDN trunks into one facility. This allows the four trunks to handle traffic as one entity; one D-channel carries the signaling for all ISDN trunks in the facility.

This allows the timeslots that would normally be D-channels on the other trunks to function as B-channels, increasing the traffic that the trunks can carry. In the SP201, you can bundle four ISDN trunks into a facility, freeing up three D-channels to function as B-channels. An additional benefit is that you can set a backup D-channel for a facility so that, if the active D-channel goes out of service, signaling is transferred to the backup D-channel. (On standard, standalone ISDN trunks, there is no backup D-channel.)

A facility's backup D-channel is always ready to assume signaling responsibilities if the active D-channel goes out of service. The backup D-channel does not carry traffic of any kind while the active D-channel is in service, so that the backup D-channel will not have to wait for other traffic to disperse before it assumes the signaling function.

---

**Note:** All trunks in a facility must connect to the same remote device, and the remote device must have the trunks configured as a facility, as well.

---

### 5.3.2.1 The config dchans Command for ISDN Facilities

You can use the `config dchans` command to configure signaling channels (D-channels) for a facility of ISDN trunks. Follow the procedure below to configure a D-channel for a National ISDN facility on the SP201.

---

**Note:** To configure standard, non-bundled ISDN trunks, see Section 5.3.1, *Standard ISDN Signaling*.

---

### How to Use the config dchans Command for an ISDN Facility

**Note:** Only National ISDN supports facilities. ETSI ISDN does not support facilities.

1. At the `user>` prompt, type `config dchans` and press `Enter`.  

---

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The following question appears.

Is this an NFAS interface? (y or n) : <current=n>

**2** Type *y* and press **Enter**.

**Note:** If you wish to configure a standard ISDN trunk, see *How to Use the config dchans Command for a Standard National ISDN Trunk*.

The following question is displayed.

ISDN Trunk Number for NFAS Signaling
Enter value(5 - 8) or "exit" :

**3** Type the number of the ISDN trunk that holds the signaling timeslot, and press **Enter**.

**Note:** Trunk 5 should always be the trunk that holds the signaling timeslot. If you wish to choose otherwise, consult your Encore Networks representative.

Information similar to the following appears.
Chapter 5: Configuration of ISDN Protocols

The following is the present Trunk configuration. If a change to the Timeslot or Interface Type is desired, enter the Trunk number you wish to modify or exit:

- Enter the Trunk number you wish to modify or exit.

The following is the present Trunk configuration. If a change to the Timeslot or Interface Type is desired, enter the Trunk number you wish to modify or exit:

<table>
<thead>
<tr>
<th>Trunk</th>
<th>FAS/</th>
<th>Signaling</th>
<th>Interface</th>
<th>Time</th>
<th># of D-Channel</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trunk Type</td>
<td>Protocol</td>
<td>NFAS</td>
<td>Type</td>
<td>Type</td>
<td>Slot</td>
</tr>
<tr>
<td>5</td>
<td>T1</td>
<td>NI2 ISDN</td>
<td>NFAS</td>
<td>Active</td>
<td>D-chan</td>
</tr>
<tr>
<td>6</td>
<td>T1</td>
<td>NI2 ISDN</td>
<td>NFAS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>T1</td>
<td>NI2 ISDN</td>
<td>NFAS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>T1</td>
<td>NI2 ISDN</td>
<td>NFAS</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**ISDN Trunk Number**
Enter value([5-8]) or "exit":

4. Do one of the following:

a. If the ISDN trunk configuration is appropriate for your network, type **exit** and press Enter.
   - The user> prompt reappears.

   ```
   user>
   ```

b. If you wish to change information for a trunk, type the trunk number (where trunk 5 identifies the ISDN trunk on port 5) and press Enter.
   - The following prompt appears.

   ```
   Select interface type - user(0) or network(1) : <current=1>
   ```

5. Indicate the role the SP201 will play in the ISDN connection. Type **0** for User or **1** for Network, and press Enter.
   - The following prompt appears.
Note: The ISDN facility’s signaling channel must use the interface type Active D Channel.

6 Select Active D Channel and press Enter.

- The following prompt appears.

```
ISDN Interface number 1 assigned to Trunk 5,
with an Active D Channel on timeslot 24.

ISDN Interface Type
[d] D Channel
[n] NFAS Channel
[a] Active D Channel
[exit] Exit

Enter selection(current="Active D Channel") :
```

7 Type the number of the timeslot that will be the signaling channel for this trunk, and press Enter.

Note: E1 trunks must use timeslot 16 as the signaling channel. T1 trunks usually use timeslot 24 as the signaling channel.

- One of the following results occurs:
  - If you changed nothing, the user> prompt appears. Go to Step 9.
  - If you changed any of the configuration, the following message appears.
Do one of the following:

a. If you have other ISDN trunks to configure, type `n` and press Enter.
   - The `user>` prompt is displayed.

b. If you have no other ISDN trunks to configure, type `y` and press Enter.
   - The SP201 performs a warmstart. When it has finished, the `user>` prompt is displayed.

If you wish to change information for another ISDN trunk, perform Step 1 through Step 8 again.

Note: If you answered no in Step 8 to any trunk that asked you to reset, you must warmstart the SP201 so that the changes will be implemented. See Section 3.4.1, The warmstart Command.

### 5.4 Configuring ISDN LAPD and Call Control

See the following for a discussion of configuration of call control parameters:

- Section 5.4.1, SS7–ISDN Call Control

#### 5.4.1 SS7–ISDN Call Control

If the SP201 performs protocol conversion between SS7 and ISDN, you can configure SS7–ISDN call control options as described in the following
sections. (Some config cc commands are available only in ETSI ISDN or only in NI2 ISDN. Some config cc commands are available in both types of ISDN.)

- Section 5.4.1.1, The config cc autoblock Command
- Section 5.4.1.2, The config cc cgptynum Command
- Section 5.4.1.3, The config cc chargeInd Command
- Section 5.4.1.4, The config cc dialtone Command
- Section 5.4.1.5, The config cc forceacm Command
- Section 5.4.1.6, The config cc number Command
- Section 5.4.1.7, The config cc overlap Command
- Section 5.4.1.8, The config cc useruserinfo Command

### 5.4.1.1 The config cc autoblock Command

When enabled, this command automatically blocks and unblocks SS7 ISUP circuits according to the state of the ISDN signaling channel.

**How to Use the config cc autoblock Command**

1. At the user> prompt, type `config cc autoblock` and press Enter.

   - The following prompt appears.

   ```
   Do you want to support blocking/unblocking of ISUP circuits whenever the ISDN D-channel goes active/inactive? (y/n, current=y) :
   ```

2. Do one of the following:

   - If you want to block SS7 ISUP circuits when the ISDN signaling channel is inactive and unblock them when the ISDN signaling channel is active, answer **y** and press Enter.

     - Automatic blocking is set, and the user> prompt re-appears.
If you do not want to use automatic blocking of ISUP circuits, answer
and press Enter.

Automatic blocking is disabled, and the user> prompt re-appears.

5.4.1.2 The config cc cgptynum Command

This command indicates whether to transmit calling party information to
the called number.

How to Use the config cc cgptynum Command

1. At the user> prompt, type config cc cgptynum and press Enter.

The following prompt appears.

Do you want to transmit the calling party information from the
SS7 side to the ISDN side (y/n, current=n) :

2. Answer y or n and press Enter.

The following prompt appears.

Do you want to transmit the calling party information from the
ISDN side to the SS7 side (y/n, current=n) :

3. Answer y or n and press Enter.

The user> prompt re-appears.

5.4.1.3 The config cc chargelnd Command

This command indicates whether to include a CHARGE and CALLED
PARTY CAT indication in the ACM message.
**How to Use the config cc chargeInd Command**

1. At the `user>` prompt, type `config cc chargeInd` and press Enter.
   - The following prompt appears.

   ![Prompt](image)

2. Answer `y` or `n` and press Enter.
   - The `user>` prompt re-appears.

**5.4.1.4 The config cc dialtone Command**

This command indicates whether to generate dial tone to the caller.

**How to Use the config cc dialtone Command**

1. At the `user>` prompt, type `config cc dialtone` and press Enter.
   - The following message appears.

   ![Message](image)

2. Indicate whether to generate dial tone for signaling channels when the SP201 is the Network side of the connection.

**Note:** You define whether the SP201 is the Network or User side of the ISDN connection when you configure ISDN. See Section 5.3, Configuring ISDN Signaling.
The following prompt appears:

User D-channels? (y/n, current=y) :

3 Indicate whether to generate dial tone for signaling channels when the SP201 is the User side of the connection.

The user> prompt is re-displayed.

5.4.1.5 The config cc forceacm Command

This command indicates whether to support forced ACM. If you indicate to support forced ACM, an ACM will precede the transmission of an ANM when a CONN message is received in the absence of an ALERT message. Otherwise, an ANM message will be sent when the CONN is received.

How to Use the config cc forceacm Command

1 At the user> prompt, type config cc forceacm and press Enter.

The following message appears.

user> config cc forceacm
Do you want to support forced ACM for CONN with no ALERT (y/n, current=n) :

2 Indicate whether to support forced ACM, and press Enter.

If you enter y, an ACM will precede the transmission of an ANM when a CONN message is received in the absence of an ALERT message.

If you enter n, an ANM message will be sent when the CONN is received.

In either case, the user> prompt is displayed.
5.4.1.6 **The config cc number Command**

This command configures mapping for the following fields in the Called Party Number and Calling Party Number information elements:

- ISDN Type of Number
- ISDN Numbering Plan
- SS7 Nature of Address
- SS7 Numbering Plan

**How to Use the config cc number Command**

---

**Note:** The options that appear for each information element depend on the type of ISDN the SP201 uses. The examples shown here are for ETSI ISDN.

1. At the `user>` prompt, type `config cc number` and press Enter.
   - The following message appears.

   ![Do you want to manually map Called and Calling Party Number Nature of Address Ind. from SS7 going to ISDN Type of Number (y/n, current=n) :](image)

2. Do one of the following:
   - a. If you do not want to manually map the SS7 Nature of Address for the called and calling party numbers, type `n` and press Enter.
      - The following prompt appears. Go to Step 5.

     ![Do you want to manually map Called and Calling Party Number Numbering Plan from SS7 going to ISDN Numbering Plan (y/n, current=n) :](image)
b If you want to manually map the SS7 Nature of Address for the called and calling party numbers, type \textbf{y} and press \textbf{Enter}.

\begin{itemize}
\item The SS7 Nature of Address menu appears.
\end{itemize}

\textbf{Note:} The types of items (and, consequently, the number of items) on this menu depend on the type of ISDN installed on this SP201.

\begin{table}[h]
\centering
\begin{tabular}{|c|c|c|}
\hline
Incoming SS7 & Outgoing ISDN & Type of Number \\
\hline
1 & Unknown --> National & \\
2 & Subscriber number --> Subscriber Number & \\
3 & National Number --> National & \\
4 & International Number --> International & \\
5 & Subscbr #, op rqsted --> National & \\
6 & Nat1 #, op rqsted --> National & \\
7 & Intntl #, op rqsted --> National & \\
8 & No #, op rqsted --> National & \\
9 & No #, call carrier --> National & \\
10 & 950+ call --> National & \\
11 & Test line test code --> National & \\
12 & QUIT & \\
\hline
\end{tabular}
\end{table}

Enter the number of the parameter you wish to change (1-12):

3 Do one of the following:

a To exit the SS7 Nature of Address menu, type the line number for QUIT (12 in this example), and press \textbf{Enter}. (Or just press \textbf{Enter} without typing anything.)

\begin{itemize}
\item The following prompt appears. Go to Step 5.
\end{itemize}

\begin{itemize}
\item Do you want to manually map Called and Calling Party Number Numbering Plan from SS7 going to ISDN Numbering Plan (y/n, current=n) :
\end{itemize}

b Type the line number of the Incoming SS7 Nature of Address item you wish to change, and press \textbf{Enter}. 

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An item menu similar to the following appears, where x represents the Incoming SS7 Nature of Address item whose line number you selected. (The outgoing options depend on permissible Outgoing ISDN Type of Number values for Incoming SS7 Nature of Address item x.)

```
Translate incoming "x" to outgoing value:
  1  Unknown
  2  International
  3  National
  4  Network Specific
  5  Subscriber Number
  6  Abbreviated Number
  7  Reserved-extension
  8  QUIT

Enter the number you wish to map the parameter to (1-8):
```

4  Do one of the following:

a  To exit the item menu without changing Incoming item x’s outgoing option, do not type anything. Just press Enter.

  ❖  The SS7 Nature of Address menu re-appears. Go to Step 3.

b  Type the line number for the outgoing value you wish the Incoming item x to use, and press Enter.

  ❖  The outgoing value for incoming item x is changed, and the SS7 Nature of Address menu re-appears. Go to Step 3.

c  To exit the SS7 Nature of Address menu system, type the line number for QUIT (8 in this example), and press Enter.

  ❖  The SS7 Nature of Address menu system terminates, and the following prompt appears. Continue to Step 5.

```
Do you want to manually map Called and Calling Party Number Numbering Plan
from SS7 going to ISDN Numbering Plan (y/n, current=n) :
```

5  Do one of the following:
a If you do not want to manually map the SS7 Numbering Plan for the called and calling party numbers, type n and press Enter.

❖ The following prompt appears. Go to Step 8.

b If you want to manually map the SS7 Numbering Plan for the called and calling party numbers, type y and press Enter.

❖ The SS7 Numbering Plan menu appears.

Note: The types of items (and, consequently, the number of items) on this menu depend on the type of ISDN installed on this SP201.

---

**Do you want to manually map Called and Calling Party Number Type of Number from ISDN going to the SS7 Nature of Address Ind. (y/n, current=n) :**

---

6 Do one of the following:

a To exit the SS7 Numbering Plan menu, type the line number for QUIT (4 in this example), and press Enter. (Or just press Enter without typing anything.)

❖ The following prompt appears. Go to Step 8.
b Type the line number of the Incoming SS7 Numbering Plan item you wish to change, and press **Enter**.

- An item menu similar to the following appears, where \( x \) represents the Incoming SS7 Numbering Plan item whose line number you selected. (The outgoing options depend on permissible Outgoing ISDN Numbering Plan values for Incoming SS7 Numbering Plan item \( x \).)

    Translate incoming "\( x \)" to outgoing value:
    1  Unknown
    2  ISDN/telephony num
    3  QUIT

    Enter the number you wish to map the parameter to (1-3):

7 Do one of the following:

a To exit the item menu without changing Incoming item \( x \)'s outgoing option, do not type anything. Just press **Enter**.

- The SS7 Numbering Plan menu re-appears. Go to **Step 6**.

b Type the line number for the outgoing value you wish the Incoming item \( x \) to use, and press **Enter**.

- The outgoing value for incoming item \( x \) is changed, and the SS7 Numbering Plan menu re-appears. Go to **Step 6**.

c To exit the SS7 Numbering Plan menu system, type the line number for QUIT (3 in this example), and press **Enter**.

- The SS7 Numbering Plan menu system terminates, and the following prompt appears. Continue to **Step 8**.
8 Do one of the following:

a If you do not want to manually map the ISDN Type of Number for the called and calling party numbers, type n and press Enter.

   The following prompt appears. Go to Step 11.

b If you want to manually map the ISDN Type of Number for the called and calling party numbers, type y and press Enter.

   The ISDN Type of Number menu appears.

---

**Note:** The types of items (and, consequently, the number of items) on this menu depend on the type of ISDN installed on this SP201.
9 Do one of the following:

a To exit the ISDN Type of Number menu, type the line number for QUIT (8 in this example), and press Enter. (Or just press Enter without typing anything.)

- The following prompt appears. Go to Step 11.

Do you want to manually map Called and Calling Party Number
Numbering Plan
from ISDN going to SS7 Numbering Plan (y/n, current=n) :

b Type the line number of the Incoming ISDN Type of Number item you wish to change, and press Enter.

- An item menu similar to the following appears, where \( x \) represents the Incoming ISDN Type of Number item whose line number you selected. (The outgoing options depend on permissible Outgoing SS7 Nature of Address values for Incoming ISDN Type of Number item \( x \).)

Translate incoming "\( x \)" to outgoing value:
1 Unknown
2 Subscriber number
3 National Number
4 International Number
5 Subscr \#, op rqsted
6 Natl \#, op rqsted
7 Intntl \#, op rqsted
8 No \#, op rqsted
9 No \#, call carrier
10 950+ call
11 Test line test code
12 QUIT

Enter the number you wish to map the parameter to (1-12):

10 Do one of the following:

a To exit the item menu without changing Incoming item \( x \)'s outgoing option, do not type anything. Just press Enter.

- The ISDN Type of Number menu re-appears. Go to Step 9.
b Type the line number for the outgoing value you wish the Incoming item \( x \) to use, and press Enter.

- The outgoing value for incoming item \( x \) is changed, and the ISDN Type of Number menu re-appears. Go to Step 9.

c To exit the ISDN Type of Number menu system, type the line number for QUIT (12 in this example), and press Enter.

- The ISDN Type of Number menu system terminates, and the following prompt appears. Continue to Step 11.

```
Do you want to manually map Called and Calling Party Numbering Plan from ISDN going to SS7 Numbering Plan (y/n, current=n) :
```

11 Do one of the following:

a If you do not want to manually map the ISDN Numbering Plan for the called and calling party numbers, type n and press Enter.

- The user> prompt appears.

b If you want to manually map the ISDN Numbering Plan for the called and calling party numbers, type y and press Enter.

- The ISDN Numbering Plan menu appears.

**Note:** The types of items (and, consequently, the number of items) on this menu depend on the type of ISDN installed on this SP201.
Do one of the following:

a To exit the ISDN Numbering Plan menu, type the line number for QUIT (8 in this example), and press Enter. (Or just press Enter without typing anything.)

   The user> prompt appears.

b Type the line number of the Incoming ISDN Numbering Plan item you wish to change, and press Enter.

   An item menu similar to the following appears, where \( x \) represents the Incoming ISDN Numbering Plan item whose line number you selected. (The outgoing options depend on permissible Outgoing SS7 Numbering Plan values for Incoming ISDN Numbering Plan item \( x \)).

<table>
<thead>
<tr>
<th>Incoming ISDN Numbering Plan</th>
<th>Outgoing SS7 Numbering Plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 Unknown</td>
<td>ISDN/telephony num</td>
</tr>
<tr>
<td>2 ISDN/telephony num</td>
<td>ISDN/telephony num</td>
</tr>
<tr>
<td>3 Data Numbering - X.121</td>
<td>ISDN/telephony num</td>
</tr>
<tr>
<td>4 Telex numbering - F.69</td>
<td>ISDN/telephony num</td>
</tr>
<tr>
<td>5 National Standard Num.</td>
<td>ISDN/telephony num</td>
</tr>
<tr>
<td>6 Private Numbering</td>
<td>private numbering</td>
</tr>
<tr>
<td>7 Reserved for Ext.</td>
<td>ISDN/telephony num</td>
</tr>
<tr>
<td>8 QUIT</td>
<td></td>
</tr>
</tbody>
</table>

   Enter the number of the parameter you wish to change (1-8):

Do one of the following:

a To exit the item menu without changing Incoming item \( x \)'s outgoing option, do not type anything. Just press Enter.
The ISDN Numbering Plan menu re-appears. Go to Step 12.

b Type the line number for the outgoing value you wish the Incoming item \( x \) to use, and press \textbf{Enter}.

✓ The outgoing value for incoming item \( x \) is changed, and the ISDN Numbering Plan menu re-appears. Go to Step 12.

c To exit the ISDN Numbering Plan menu system, type the line number for QUIT (4 in this example), and press \textbf{Enter}.

✓ The ISDN Numbering Plan menu system terminates, and the user> prompt re-appears.

\subsection{5.4.1.7 The config cc overlap Command}

This command enables or disables overlap dialing in ETSI ISDN.

\textbf{How to Use the config cc overlap Command}

\begin{enumerate}
\item At the user> prompt, type \texttt{config cc overlap} and press \textbf{Enter}.
  
  ✓ The following prompt appears.

\begin{quote}
\begin{center}
Enable ETSI Overlap Dialing option? (y/n, current=n) :
\end{center}
\end{quote}

\item Answer \texttt{y} or \texttt{n} and press \textbf{Enter}.

  ✓ The user> prompt is re-displayed.
\end{enumerate}

\subsection{5.4.1.8 The config cc useruserinfo Command}

This command indicates whether the ISDN Setup message will include a user-to-user information element with information collected from the calling party number, the charge number, and the original called number in the ISUP IAM.
How to Use the config cc useruserinfo Command

1. At the user> prompt, type config cc useruserinfo and press Enter.
   - The following prompt appears.

2. Answer y or n and press Enter.
   - The user> prompt re-appears.

5.5 The ISDN Rate Converter

Note: Although this software is called the ISDN Rate Converter, it is generally available for rate conversion in other protocols. If you need to use rate conversion for a protocol other than ISDN, contact your sales representative to determine how to proceed.

In SignalPath software 1110 and above, ISDN rate conversion includes E1–E1 rate conversion, T1–T1 rate conversion, and E1–T1 rate conversion. The software senses whether the SP201 has eight E1 ports, eight T1 ports, or E1 ports for trunks 1–4 and T1 ports for trunks 5–8, and uses the appropriate E1–E1, T1–T1, or E1–T1 rate conversion. (The SP201 must support one of these port configurations; otherwise, the software may not perform properly.) See the following sections for details of rate conversion:

- Section 5.5.1, The E1–E1 Rate Converter
- Section 5.5.2, The T1–T1 Rate Converter
- Section 5.5.3, The E1–T1 Rate Converter

Because the rate conversion software does not perform any aspect of signaling conversion other than that of rate conversion (and, when appropriate, E1 to T1), the software has no unique commands. Make sure you have configured the system-level parameters, paying particular
attention to the `config framer` command for trunks. See the following sections to configure the system-level parameters for rate conversion:

- **Section 2.3.2, The config framer Command**
- **Section 2.3.5, The config clocks Command**
- **Section 2.3.3, The config alarms Command**
- **Section 2.3.4, The config almrelay Command**

### 5.5.1 The E1–E1 Rate Converter

The software for E1–E1 rate conversion passes signals between a switch that uses E1 trunks with A-law and one that uses E1 trunks with µ-law (mu-law). In this setup, A-law to µ-law conversion is used for the bearer channels, and the signaling channel is passed through as clear channel from timeslot 16 to timeslot 24. All other properties of the signals are passed through without change.

The E1–E1 conversion software must, of course, be installed on an SP201 that has eight E1 ports. (For descriptions of specific trunk configurations, see the *SP201 Hardware Reference Guide*.) When the software senses eight E1 ports, it automatically assigns A-law for trunks 1–4 and µ-law for trunks 5–8. Make sure the trunks that will be used for conversion are connected to the respective E1 devices, and configure the software parameters.

### 5.5.2 The T1–T1 Rate Converter

The software for T1–T1 rate conversion passes signals between a switch that uses T1 trunks with A-law and one that uses T1 trunks with µ-law (mu-law). In this setup, A-law to µ-law conversion is used for the bearer channels (1–23), and the signaling channel (24) is passed through as clear channel. All other properties of the signals are passed through without change.

The T1–T1 conversion software must, of course, be installed on an SP201 that has eight T1 ports. (For descriptions of specific trunk configurations, see the *SP201 Hardware Reference Guide*.) When the software senses eight T1 ports, it automatically assigns A-law for trunks 1–4 and µ-law for trunks 5–8. Make sure the trunks that will be used for conversion are connected to the respective T1 devices, and configure the software parameters.

### 5.5.3 The E1–T1 Rate Converter

The software for E1–T1 rate conversion passes signals between a switch that uses E1 trunks and one that uses T1 trunks. The rate converter maps the E1
signaling channel (timeslot 16) to the T1 signaling channel (timeslot 24), and uses A-law to µ-law (mu-law) conversion for the bearer channels. (E1 trunks use A-law; T1 trunks use µ-law.) All other properties of the signals are passed through without change.

The E1–T1 conversion software must, of course, be installed on an SP201 that has both E1 ports and T1 ports. The LIM must have E1 ports for trunks 1–4 and T1 ports for trunks 5–8. (For descriptions of specific trunk configurations, see the *SP201 Hardware Reference Guide.*) Make sure the trunks that will be used for conversion are connected to the respective E1 and T1 devices, and configure the software parameters.