Chapter 4

Configuration of ISDN Protocols

This chapter provides instructions for configuring the ISDN protocols in the SP201-SA for signaling conversion. Use the sections that reflect the software you are configuring. Before configuring the protocols for your SP201-SA, 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-SA:

- Section 4.1, ISDN in the SP201-SA
- Section 4.2, Command for Configuring ISDN Protocols
- Section 4.3, Configuring ISDN Signaling
- Section 4.4, The ISDN Rate Converter
4.1 **ISDN in the SP201-SA**

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-SA 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-SA 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.

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-SA are Primary Rate Interface (PRI, used for carrying data and voice over the B-channels).¹

The two-port SP201-SA’s ISDN trunk is on physical (hardware) port 2. The four-port SP201-SA’s ISDN trunks are on physical (hardware) ports 3 and 4.

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¹ The SignalPath™ software sometimes uses the term “PRI” to indicate ISDN parameters.
(To verify the ports for ISDN trunks, use the `show dchans` command, described in Section 7.2.4.9, *The show dchans Command*.)

Both variants of ISDN are configured in the same manner on the SP201-SA. 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.

### 4.2 Command for Configuring ISDN Protocols

Table 4-1 describes the command used for configuring ISDN protocols in the SP201-SA.

<table>
<thead>
<tr>
<th>Command Name</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>config dchans</td>
<td>Allows you to configure signaling channels (D-channels) of ISDN PRI trunks, to meet installation requirements. To configure D-channels for ISDN trunks, see Section 4.3.1, <em>The config dchans Command</em>.</td>
</tr>
</tbody>
</table>

Note: For commands to configure the common parameters in the SP201-SA or for commands to configure other protocols, see the following:

- Section 2.3, *System Configuration*
- Section 3.2, *Commands for Configuring Channel-Associated Signaling Protocols*
- Section 5.1, *Non-System-Level Commands Used by More Than One Protocol*
- Section 6.1, *Commands for Mapping Timeslots and CICs*

Note: In all commands, make sure you type the port number or trunk number that corresponds to the port you are configuring, regardless of the port or trunk number shown in the instructions.

For details of SP201-SA port numbering, see the Note in Section 1.3, *Connecting the SP201-SA to the Telephony Network*.
ISDN trunks are on the two-port SP201-SA’s port 2 and on the four-port SP201-SA’s ports 3 and 4. (To verify the ports for ISDN trunks, use the `show dchans` command, described in Section 7.2.4.9, *The show dchans Command*.)

### 4.3 Configuring ISDN Signaling

This section contains instructions for configuring the signaling timeslot (the D-channel) for ISDN trunks on an SP201-SA. 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.

#### 4.3.1 The config dchans Command

You use the `config dchans` command to configure signaling channels (D-channels) for ISDN trunks. Figure 4-1 shows the task flow for the `config dchans` command. Follow the procedure below to configure a D-channel for each ISDN trunk on the SP201-SA.

![Figure 4-1. Task Flow for the config dchans Command](image)
**How to Use the config dchans Command**

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
   **************************************************************************
   3    E1   ETSI ISDN  FAS     D-Channel    Network    16     0000   Inactive
   4    E1   ETSI ISDN  FAS     D-Channel    Network    16     0000   Inactive
   **************************************************************************
   ISDN Trunk Number
   Enter value([3-4] 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 3 identifies the ISDN trunk on port 3) and press Enter.

   - The following prompt appears.

   ```
   Select interface type - user(0) or network(1) : <current=1>
   ```
3 Indicate the role the SP201-SA will play in the ISDN connection. Type 0 for User or 1 for Network, and press Enter.

- The following prompt appears.

```
ISDN Interface number 1 assigned to Trunk 3, with a D Channel on timeslot 16.
Change ISDN Signaling Channel
Enter value(1 - 31; current="16") or "exit":
```

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.

- The user> prompt reappears.

5 If you wish to change information for another ISDN trunk, perform Step 1 through Step 4 again.

### 4.4 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.
Depending on the port configuration in the SP201-SA, the software uses the appropriate E1–E1, T1–T1, or E1–T1 rate conversion. See the following sections for details of rate conversion:

- **Section 4.4.1, The E1–E1 Rate Converter**
- **Section 4.4.2, The T1–T1 Rate Converter**
- **Section 4.4.3, 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. Configure the following system-level parameters:

- **Section 2.3.4, The config framer Command**
- **Section 2.3.3, The config clocks Command**
- **Section 2.3.5, The config alarms Command**
- **Section 2.3.6, The config almrelay Command**

**Note:** When you configure the system-level parameters, pay particular attention to the `config framer` command for each trunk.

### 4.4.1 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 \( \mu \)-law (mu-law). In this setup, A-law to \( \mu \)-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-SA that has uses E1 ports. The rate conversion software automatically assigns A-law or \( \mu \)-law to the appropriate trunks. Make sure you have set up the SP201-SA in the following way. (See **Section 2.3.2, The config lim Command**.)
On the two-port model, configure trunk 1 as an E1 port and configure trunk 2 as an E1 port.

On the four-port model, configure trunks 1 and 2 as E1 ports, and configure trunks 3 and 4 as E1 ports.

Make sure the trunks that will be used for rate conversion are connected to the respective E1 devices, and configure the remaining software parameters.

4.4.2 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-SA that has T1 ports. The rate conversion software automatically assigns A-law or µ-law to the appropriate trunks. Make sure you have set up the SP201-SA in the following way. (See Section 2.3.2, The config lim Command.)

On the two-port model, configure trunk 1 as a T1 port and configure trunk 2 as a T1 port.

On the four-port model, configure trunks 1 and 2 as T1 ports, and configure trunks 3 and 4 as T1 ports.

Make sure the trunks that will be used for rate conversion are connected to the respective T1 devices, and configure the remaining software parameters.

4.4.3 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-SA that has both E1 ports and T1 ports. The rate conversion software automatically assigns A-law or µ-law to the appropriate trunks. Make sure you have set up the SP201-SA in the following way. (See Section 2.3.2, The config lim Command.)
• On the two-port model, configure trunk 1 as an E1 port and configure trunk 2 as a T1 port.

• On the four-port model, configure trunks 1 and 2 as E1 ports, and configure trunks 3 and 4 as T1 ports.

Make sure the trunks that will be used for rate conversion are connected to the respective E1 and T1 devices, and configure the remaining software parameters.