Intel® Infrastructure DSP Solution
Version 1.1
Codelet Demo Guide

June 2007
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# Revision History

<table>
<thead>
<tr>
<th>Date</th>
<th>Revision</th>
<th>Description</th>
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<tbody>
<tr>
<td>January 2007</td>
<td>001</td>
<td>Initial release.</td>
</tr>
<tr>
<td>June 2007</td>
<td>002</td>
<td>Added support for the Intel® IXP43X product line of network processors.</td>
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1.0 Introduction

The Intel® Infrastructure DSP Solution Version 1.1 is a software module that provides the basic voice and signal processing functionalities for Voice-Over-Internet Protocol (VoIP) applications on the Intel® IXP4XX product line of network processors. The software is delivered as a library component that is meant to be integrated with a VoIP application program that uses the functionalities provided. A demo program, supported on Linux® platform is available to exercise the functionalities of the DSP software library for evaluation purposes.

The demo program has been implemented to allow maximum flexibility in controlling and setting up the DSP software. The document gives an overview of using this demo program.

Note: The Intel® Infrastructure DSP Solution Version 1.1 is referred to as the “DSP software” throughout this document.

1.1 Terminology

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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<tbody>
<tr>
<td>AGC</td>
<td>Automatic Gain Control for voice data towards IP network</td>
</tr>
<tr>
<td>ALC</td>
<td>Automatic Level Control</td>
</tr>
<tr>
<td>CLI</td>
<td>Command Line Interface</td>
</tr>
<tr>
<td>EC</td>
<td>Echo Cancellation</td>
</tr>
<tr>
<td>FSK</td>
<td>Frequency Shift Keying</td>
</tr>
<tr>
<td>HSS</td>
<td>High Speed Serial port</td>
</tr>
<tr>
<td>JB</td>
<td>Jitter Buffer</td>
</tr>
<tr>
<td>I/F</td>
<td>Interface</td>
</tr>
<tr>
<td>IP</td>
<td>Internet Protocol</td>
</tr>
<tr>
<td>ISR</td>
<td>Interrupt Service Routine</td>
</tr>
<tr>
<td>NLP</td>
<td>Non-linear Processing (for EC)</td>
</tr>
<tr>
<td>PCM</td>
<td>Pulse Coded Modulation</td>
</tr>
<tr>
<td>RTP</td>
<td>Real Time Transport Protocol</td>
</tr>
<tr>
<td>SLIC</td>
<td>Subscriber Line Interface circuit</td>
</tr>
<tr>
<td>SP</td>
<td>Signal Processing</td>
</tr>
<tr>
<td>UDP</td>
<td>User Datagram Protocol</td>
</tr>
<tr>
<td>VAD</td>
<td>Voice Activity Detection</td>
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1.2 Reference Documents

<table>
<thead>
<tr>
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<tr>
<td>Intel® Infrastructure DSP Solution Version 1.1 Programmer’s Guide</td>
<td></td>
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<tr>
<td>Intel® Infrastructure DSP Solution Version 1.1 API Reference Manual</td>
<td></td>
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<tr>
<td>Intel® Infrastructure DSP Solution Version 1.1 Release Notes</td>
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</table>
2.0 Demo Software Architecture

Figure 1 shows the diagram of the demo software architecture. Each of the modules is described as follows:

**Command Line Interface** – This module serves as the user interface to display the menu and to receive the user's selections and inputs from the keyboard. In Linux*, it runs from the main thread after initialization. Based on user inputs, the Command Line Interface may perform one of the following:

1. Send a control message to a resource component
2. Send a user-defined message to the Message Agent
3. Send a message to the Client Task via the outbound message queue to start a demo routine
4. Call an initial routine to start a demo procedure.

**DSP Software Client Task** – This module is executed from a separate task or thread. It is intended to handle most of the control procedures that are implemented as message-driven state machines. The task is pending on the DSP software’s outbound message queue through which all reply messages and other events are consolidated.

**HSS driver** – This is a module that enables the DSP software to read from and write to the HSS component of the Intel® IXP4XX product line of network processors. The HSS driver component is used to transmit and receive PCM data from analog telephones.

**SLIC driver** – This is a platform-specific module to support analog telephone interface.

In Linux, only the HSS driver and SLIC driver are in kernel mode and other modules (DSP software, Command Line Interface and DSP software Client Task) are in user mode.

![Demo Software Architecture Diagram](image_url)
3.0 Operation Guide

3.1 Overview

This guide describes the operation of the main demo program. For instructions on how to load/install the program in the Linux environment, refer to the Intel® Infrastructure DSP Solution Version 1.1 Release Notes.

Check that the J8 & J9 jumpers are plugged in to the Intel® IXP435 multi-service residential gateway reference platform. If not, plug in the jumpers.

The demo program of the DSP software is started by running the executable 'IxDspCodeletApp'. You will be prompted to select the telephone interface, as well as for country code selection. The example given below for the Intel® IXP435 multi-service residential gateway reference platform is for demo purposes and you can set other parameters based on your requirements.

Set the parameters as shown in the following table:

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Set country code (1:US, 81:Japan, 86:China)</td>
<td>1</td>
</tr>
<tr>
<td>Enter companding mode (0:A-law, 1:u-law, 2:Linear)</td>
<td>1</td>
</tr>
<tr>
<td>Enter SLIC type (0:Narrow band, 1:Wide band)</td>
<td>0</td>
</tr>
</tbody>
</table>

/IxDspCodeletApp
Set country code (1:US, 81:Japan, 86:China) - 1
Existing NPEA Image ID: 0x10900000
New NPEA Image ID : 0x10900000
---- Initializing HSS Device ----
Enter companding mode (0:A-law, 1:u-law, 2:Linear) - 0
Enter slic type (0:Narrow band,1:Wide band) - 0
DLcid 01010000-01

*****************************************************************
* Intel Infrastructure DSP Solution *
* Release 1.1 *
* Jun 12 2007, 11:42:17 *
* Intel Corporation *
*****************************************************************

Demo menu start
ClientProcess started
0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit

Please select test item -

Note that the configuration information of the DSP software is displayed to show the available number of TDM, IP terminations, the number of Audio Players, the number of mixer ports for conferencing, as well as the country code.

After initialization, the function `ixDspCodeletDemoMenu` is automatically invoked to bring up a menu for controlling the demo program.

```
/IxDspCodeletApp
```

Set country code (1:US, 81:Japan, 86:China) - 1

Existing NPEA Image ID: 0x10900000

New NPEA Image ID : 0x10900000

---- Initializing HSS Device ----

Enter companding mode (0:A-law, 1:u-law, 2:Linear) - 0

Enter slic type (0:Narrow band,1:Wide band) - 0

DLcid 01010000-01
Demo menu start
ClientProcess started

- IxDspCodelet Demo Menu -

0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit

Please select test item -

To exit the test menu at the main menu enter 19, and re-enter at anytime by executing:
Menu selection 1 sets up a call according to default parameters and prompts for codec type. In case of the IXDP465 development platform or the IXDPG425 development platform if 7 is entered for channel number, all channels are setup, in pairs (that is, channel 1 to channel 2; and channel 3 to channel 4, if 4 channels are allocated). In case of the IXP435 reference platform, if 0 is entered for channel number, all channels are setup (as IXP435 reference platform has two FXS and one FXO port).

The pairs of call are setup as loopback calls from Ethernet port 0 to port 1. Once the calls are setup, audio is transferred between the channel pairs in the respective voice channels.

Menu selection 2 tears down a call on the specified channel(s). Menu selection 5 allows parameters of the channel to be changed. It also displays the current settings of the parameters and a short description when queried. All parameters as listed in the Intel® Infrastructure DSP Solution Version 1.1 API Reference Manual are accessible. For a more detailed description of the parameters, refer to the Intel® Infrastructure DSP Solution Version 1.1 API Reference Manual and the Intel® Infrastructure DSP Solution Version 1.1 Programmer’s Guide.

The codecs listed below are assumed to be built into the application. For details on the procedures to build codecs into the application, refer to the Intel® Infrastructure DSP Solution Version 1.1 Release Notes and the Intel® Infrastructure DSP Solution Version 1.1 Programmer’s Guide Appendix A.

- G711_10ms u-Law
- G711_10ms A-Law
- G729a/b
- G723.1
- G722
- G726 40Kbps
- G726 32Kbps
- G726 24Kbps
- G726 16Kbps
- G729.1 (not supported in the current version)

If a codec that is not built into the application is selected while performing the test, it throws an error.

3.2 Initial Setup

Socket Configuration should be done before any other menu options can be exercised. Select 12 – Socket Configuration from the IxDspCodelet Demo Menu as shown below. The example shown below assumes that user have setup Ethernet port 0 (ifconfig ixp0 192.168.10.1) and port 1 (ifconfig ixp1 192.168.20.1) for the IXDP465 development platform or the IXDPG425 development platform and for the IXP435 reference platform Ethernet port 0 (ifconfig ixp1 192.168.10.1) and port 1 (ifconfig ixp2 192.168.20.1) as per the Intel® Infrastructure DSP Solution Version 1.1 Release Notes. In case of the IXP435 reference platform, the fourth socket is not used.

Please select test item – 12

----------------------------------------
- IxDspCodelet Socket Menu -
Please select test item - 6
Enabling Default Channel Configuration

ixp0/ixp2 IPAddrs of : 192.168.10.1 ixp1 IPAddrs of : 192.168.20.1 is assumed

*** DSP Codelet Socket And Voice Channel Config Info ***

<table>
<thead>
<tr>
<th>Chan#:RxSock#:TxSock#:Cfg:Act:Loc</th>
<th>Port:</th>
<th>Remote IP:Rem Port</th>
</tr>
</thead>
</table>

**Note:**

In case SLIC is initialized as A-law in NarrowBand:

The default setting of PCM format in NET component is Mu-law. If the companding mode is selected as A-law during SLIC initialization, it requires changing the PCM format parameter in NET component to A-law. The following sequence of operations can be used to change the parameter:

**From IxDspCodelet Demo Menu select the following item:** 5 - Set a Parameter

Enter the instance number (1,2,...; 0 for all instance) - 0

Enter the resource number


Enter the parameter id - 2

Enter the parameter value - 0
3.3 Menu Selection 1: Channel Setup

This allows calls to be setup. Individual channels can be setup by specifying the channel number. Channels number from 1 to N, where N is the number of channels supported. N is determined by the number of enabled time slots during HSS initialization. The DSP software is setup to support from one to four channels, depending on runtime initialization.

In case of the IXDP465 development platform or the IXDP425 development platform, the demo program allocates four channels for analog interface. The default socket configuration (under Menu Selection option 12->6) allows channel setups (1<->2), (3<->4) and (1<->2, 3<->4) only.

For other channel connect configuration, socket configuration must be changed. After selecting the combinations, you are prompted to select the codec. The frame per packet is set to 1 (10ms) for the demo:

Please select test item - 1

Select combinations from the following options

1: Channel (1<->2)
2: Channel (1<->3)
3: Channel (1<->4)
4: Channel (2<->3)
5: Channel (2<->4)
6: Channel (3<->4)
7: All Channels (1<->2, 3<->4)
8: All Channels (1<->3, 2<->4)

Enter your option - 7

Coder types:

0: PassThru (for debug only)
1: G711_10ms u-Law
2: G711_10ms A-Law
3: G729a/b
4: G723.1
5: G722
6: G726 40Kbps
7: G726 32Kbps
8: G726 24Kbps
9: G726 16Kbps
10: G729.1

Enter the coder type - 1
<<IxDspCodeletMsgSetupAck received (ch=1, numDspReply=10, numErr=0)>>

In case of the IXP435 reference platform as only two FXS and one FXO ports displays.

Please select test item – 1
Enter the channel number (1,2,...; 0 for all channels) – 0
Coder types : 
  0: PassThru (for debug only)
  1: G711_10ms u-Law
  2: G711_10ms A-Law
  3: G729a/b
  4: G723.1
  5: G722
  6: G726 40Kbps
  7: G726 32Kbps
  8: G726 24Kbps
  9: G726 16Kbps
  10: G729.1
Enter the coder type – 1
<<IxDspCodeletMsgSetupAck received (ch=1, numDspReply=10, numErr=0)>>
<<IxDspCodeletMsgSetupAck received (ch=2, numDspReply=10, numErr=0)>>
<<IxDspCodeletMsgSetupAck received (ch=3, numDspReply=10, numErr=0)>>

3.4 Menu Selection 2: Channel Teardown

By selecting item 2 of the menu, the channel(s) will be torn down. If it is never setup or already torn down, the informational error message is displayed.

In case of the IXDP465 development platform or the IXDPG425 development platform the following is displayed:

Please select test item – 2
Select combinations from the following options – 7
1: Channel (1<->2)
2: Channel (1<->3)
3: Channel (1<->4)
4: Channel (2<->3)
5: Channel (2<->4)
6: Channel (3<->4)
7: All Channels
In case of the IXP435 reference platform the following is displayed:

Please select test item - 2

Enter the channel number (1,2,...; 0 for all channels) - 0

<<IxDspCodeletMsgStopAck received (ch=1, numDspReply=3, numErr=0)>>
<<IxDspCodeletMsgStopAck received (ch=2, numDspReply=3, numErr=0)>>
<<IxDspCodeletMsgStopAck received (ch=3, numDspReply=3, numErr=0)>>

3.5 Menu Selection 3: Show Channel Parameters

This displays all the current parameters of the specified channel(s). Resource selections are NET (HSS interface and Echo Canceller); DEC (Decoder); ENC (Encoder); TG (Tone Generator, including FSK modulator); TD (Tone Detector, including FSK demodulator); PLY (Audio Player); MIX (3-way call mixer); and MA (Message Agent). For further information on the parameters, refer to the Intel® Infrastructure DSP Solution Version 1.1 API Reference Manual and Intel® Infrastructure DSP Solution Version 1.1 Programmer’s Guide. All parameters of the specified channel are printed as below.

Note: AEC component in NET Resource is not supported and all AEC parameters shown in NET Resource Parameters are not supported.

Note: T.38 component is not supported and all T.38 references in codelets are not supported.

A codec type of -1 indicates that the call has not been set up yet.

In case of the IXP435 reference platform the following is displayed:

Please enter the channel number (1,2,...; 0 for all channels) - 1

DSP resource NET[1] parameters

id value definition

------------------------------------------------------------------------------------------------------------------
0 1 Current state (0:Idle, 1:Active)
1 3 L-Port Stream ID (T-Port Base -

                      TDM:0, IP:3, Player:11, Mixer:15)
2 1 PCM format (0:A-law, 1:Mu-Law, 2:PassThru)
3 1 EC enable/disable (0:OFF, 1:ON)
4 6 EC tail length (2 ~ 64, multiple of 2, in 1-ms unit)
5 0 EC NLP (0:OFF, 1:NLP ON & SUP OFF, 2:NLP & SUP ON)
6 0 EC Freeze (0:adaptive, 1:freeze)
7 20 EC Delay compensation (0 ~ 240 in 0.125 ms unit)
8 100 Flash hook detection window (in 10-ms unit)
9 0 Timer counter (in 10-ms unit)
10 0 Rx Gain (+15 ~ -40 in 1 dB unit)
11 0 Tx Gain (+15 ~ -40 in 1 dB unit)
12 0 Short bypass enable/disable (0:OFF, 1:ON)
13 0 AEC enable/disable (0:OFF, 1:ON)
14 0 AEC Select algorithm (0: Sub Band, 1:Sub Band Fast)
15 16 AEC Tail length (1 ~ 128 ms tail length, in 1-ms unit)
16 1 AEC NLP enable/disable (0:OFF, 1:ON)
17 0 AEC Adaptation freeze (0:adaptive, 1:freeze)
18 0 AEC Howling control enable/disable (0:OFF, 1:ON)
19 0 AEC TD enable/disable (0:OFF, 1:ON)
20 0 Lip Sync Tx(PCM->IP) delay (0-1000ms in 1 ms unit)
21 0 Lip Sync Rx(PCM<-IP) delay (0-1000ms in 1 ms unit)
22 0 EC Bypass (0:OFF, 1:ON)
23 0 EC ToneDisabler Mode (0:OFF, 1:Manual, 2:Auto, 3:Auto withEvtReport)
24 0 T30 Preamble Detector Enable (0:OFF, 1:ON)
25 0 Enable Event Report (0:Enable TDIS_PhaseReversal_TxEvt,
   1:Enable TDIS_PhaseReversal_RxEvt,
   2:Enable TDIS_Silence_TxEvt,
   3:Enable TDIS_Silence_RxEvt,
   4:Enable T30_Preamble_TxEvt,
   5:Enable T30_Preamble_RxEvt,
   6:Enable All Event Reports)
26 -35 EC ToneDisabler Silence Threshold (-30 ~ -50 in 1 dBm unit)
27 250 EC ToneDisabler Silence Period (100 ~ 8000ms in 10ms unit)

DSP resource DEC[1] parameters

<table>
<thead>
<tr>
<th>id</th>
<th>value definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Current state (0:Idle, 1:Active)</td>
</tr>
<tr>
<td>1</td>
<td>Volume adjustment in dB (+15 ~ -40). -99 for mute</td>
</tr>
<tr>
<td>2</td>
<td>ALC enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>3</td>
<td>CNG enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>4</td>
<td>Code type (0:PassThru, 1:G711u, 2:G711a, 3:G729a, 4:G723, 5:G722, 6:G726_40, 7:G726_32, 8:G726_24, 9:G726_16, 10:G729.1)</td>
</tr>
<tr>
<td>5</td>
<td>Packet-loss report (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>6</td>
<td>Report packet type change (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>id</td>
<td>value</td>
</tr>
<tr>
<td>----</td>
<td>-----------</td>
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</tr>
<tr>
<td>13</td>
<td>0</td>
</tr>
<tr>
<td>14</td>
<td>100</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
</tr>
</tbody>
</table>
DSP resource TG[1] parameters

<table>
<thead>
<tr>
<th>id</th>
<th>value</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Current state (0:Idle, 1:Active)</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>Volume adjustment in dB (+15 ~ -20)</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Mode (0: V.23, 1: Bellcore 202)</td>
</tr>
<tr>
<td>3</td>
<td>300</td>
<td>Number of CS bits for FSK transmitter</td>
</tr>
<tr>
<td>4</td>
<td>180</td>
<td>Number of mark bits for FSK transmitter</td>
</tr>
<tr>
<td>5</td>
<td>8</td>
<td>FSK Baud rate (8:1200, 16:600, 32:300, 64:150, 128:75)</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>RFC2833 enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>7</td>
<td>72</td>
<td>Number of post mark bits for FSK transmitter</td>
</tr>
</tbody>
</table>

DSP resource TD[1] parameters

<table>
<thead>
<tr>
<th>id</th>
<th>value</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>Current state (0:Idle, 1:Active)</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>L-Port Stream ID (T-Port Base - TDM:0, IP:3, Player:11, Mixer:15)</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Tone clamping enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Tone clamping buffer size</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Tone event report(0:None,1:Tone On,2:Tone Off,3:Both)</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>RFC2833 event enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>Update rate of RFC2833 packets (in 10-ms unit)</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>Redundancy of end-of-RFC2833-packet</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>Redundancy of begin-of-RFC2833-packet</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Suppress Encoder in RFC2833 event (0:NO, 1:YES)</td>
</tr>
<tr>
<td>10</td>
<td>101</td>
<td>RFC2833 payload type</td>
</tr>
<tr>
<td>11</td>
<td>200</td>
<td>Minimum CS-bit length required by FSK receiver</td>
</tr>
<tr>
<td>12</td>
<td>100</td>
<td>Minimum mark-bit length required by FSK receiver</td>
</tr>
<tr>
<td>13</td>
<td>20</td>
<td>Extra stop bits allowed between the data</td>
</tr>
<tr>
<td>14</td>
<td>8</td>
<td>FSK receiver Baud rate (reserved for future)</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>FSK adaptive threshold (0: Non-adaptive, 1:Adaptive)</td>
</tr>
<tr>
<td>16</td>
<td>0</td>
<td>FSK Minimum No. of data bytes to receive (0: default, 0~15)</td>
</tr>
</tbody>
</table>
3.6 Menu Selection 4: Show Resource Parameter

This allows a parameter of a selected resource to be displayed. Resource selections are
NET (HSS interface and Echo Canceller); DEC (Decoder); ENC (Encoder); TG (Tone
Generator, including FSK modem); TD (Tone Detector, including FSK demodulator); PLY
(Audio Player); MIX (3-way call mixer); and MA (Message Agent).

**Note:**
AEC component in NET Resource is not supported and all AEC parameters shown in NET
Resource Parameters are not supported.

**Note:**
T.38 component is not supported and all T.38 references in codelets are not supported.

In case of the IXP435 reference platform the following is displayed:

```
Please select test item - 4
Enter the instance number (1,2,3,4,...; 0 for all instance) - 1
Enter the resource number
```

DSP resource TD[1] parameters

<table>
<thead>
<tr>
<th>id</th>
<th>value</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>Current state (0:Idle, 1:Active)</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>L-Port Stream ID (T-Port Base - TDM:0, IP:3, Player:11, Mixer:15)</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Tone clamping enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Tone clamping buffer size</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Tone event report (0=None, 1:On, 2:Off, 3:Both)</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>RFC2833 event enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>Update rate of RFC2833 packets (in 10-ms unit)</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>Redundancy of end-of-RFC2833-packet</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>Redundancy of begin-of-RFC2833-packet</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Suppress Encoder in RFC2833 event (0:No, 1:Yes)</td>
</tr>
<tr>
<td>10</td>
<td>101</td>
<td>RFC2833 payload type</td>
</tr>
<tr>
<td>11</td>
<td>200</td>
<td>Minimum CS-bit length required by FSK receiver</td>
</tr>
<tr>
<td>12</td>
<td>100</td>
<td>Minimum mark-bit length required by FSK receiver</td>
</tr>
<tr>
<td>13</td>
<td>20</td>
<td>Extra stop bits allowed between the data</td>
</tr>
<tr>
<td>14</td>
<td>8</td>
<td>FSK receiver Baud rate (reserved for future)</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>FSK adaptive threshold (0:Non-adaptive, 1:Adaptive)</td>
</tr>
<tr>
<td>16</td>
<td>0</td>
<td>FSK Minimum No. of data bytes to receive (0:default, 0-15)</td>
</tr>
</tbody>
</table>
### Menu Selection 5: Set a Parameter

This allows any parameters of a call to be modified. The parameters ID and current values of the specified resource are prompted. Resource selections are NET (HSS interface and Echo Canceller); DEC (Decoder); ENC (Encoder); TG (Tone Generator, including FSK modem); TD (Tone Detector, including FSK demodulator); PLY (Audio Player); MIX (3-way call summer); and MA (Message Agent). For further information on the parameters, refer to the Intel® Infrastructure DSP Solution Version 1.1 API Reference Manual and Intel® Infrastructure DSP Solution Version 1.1 Programmer’s Guide.

#### Note:
AEC component in NET Resource is not supported and all AEC parameters shown in NET Resource Parameters are not supported.

#### Note:
T.38 component is not supported and all T.38 references in codelets are not supported.

In case of the IXP435 reference platform the following is displayed:

```
Please select test item - 5
Enter the instance number (1,2,3,4...; 0 for all instance) - 1
Enter the resource number
```

**DSP resource TD[1] parameters**

<table>
<thead>
<tr>
<th>id</th>
<th>value</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>1</td>
<td>Current state (0:Idle, 1:Active)</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>L-Port Stream ID (T-Port Base - TDM:0, IP:3, Player:11, Mixer:15)</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>Tone clamping enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Tone clamping buffer size</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Tone event report (0:None, 1:Tone On, 2:Tone Off, 3:Both)</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
<td>RFC2833 event enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>Update rate of RFC2833 packets (in 10-ms unit)</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>Redundancy of end-of-RFC2833-packet</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>Redundancy of begin-of-RFC2833-packet</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Suppress Encoder in RFC2833 event (0:NO, 1:YES)</td>
</tr>
<tr>
<td>10</td>
<td>101</td>
<td>RFC2833 payload type</td>
</tr>
<tr>
<td>11</td>
<td>200</td>
<td>Minimum CS-bit length required by FSK receiver</td>
</tr>
<tr>
<td>12</td>
<td>100</td>
<td>Minimum mark-bit length required by FSK receiver</td>
</tr>
<tr>
<td>13</td>
<td>20</td>
<td>Extra stop bits allowed between the data</td>
</tr>
<tr>
<td>14</td>
<td>8</td>
<td>FSK receiver Baud rate (reserved for future)</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>FSK adaptive threshold (0: Non-adaptive, 1:Adaptive)</td>
</tr>
</tbody>
</table>
3.8 Menu Selection 6: Caller ID

This sends a Caller ID string to a Caller ID capable phone. The type of Caller ID is aligned with the country code selected. Note that this currently only works on analog interface, due to SLIC codec interface requirements.

Please select test item - 6

Enter the channel number (1, 2, ..., 0 for all channels) - 1

Enter the number to be displayed (Default: '0123456789') – 12345

3.9 Menu Selection 7: Gateway and Fax Bypass Demo

This menu item works only for analog interface and simulates the real call scenario as the previous DSP Demo program (IxDspCodeletApp). This menu item prompts you to select coder type, fax bypass enable and trace enable options. Once the selections are made, dial tone (based on country code selection) is heard once the handset is off-hook. Phone 1 (connected to FXS Port 1) may dial "222" to call phone 2 (connected to FXS Port 2) and phone 2 may dial "111" to call phone 1. If the IXDP465 development platform or the IXDPG425 development platform is used, four phones can be connected. The two additional phones can be connected to FXS Port 3 and FXS Port 4 respectively. Phones have to be set to "Tone dialing" mode. This will not work with "Pulse Dialing" mode.

If fax bypass is enabled and a fax tone is detected, the channel is set to clear for fax activities. If trace is enabled, all activities of state transition and its actions are printed on screen.

For fax transmission, only fax bypass mode is supported and T38 Fax Mode is not supported.

Note: T.38 component is not supported and all T.38 references in codelets are not supported.

While two phones are having conversation, it is not possible to select the following menu items: channel setup, channel teardown, Call ID and 3-Way call demo. However, it is possible to select the menu items to change and show resource/channel parameters.

Please select test item - 7

1 :G711_10ms u-Law
2 :G711_10ms A-Law
3 :G729a/b
4 :G723.1
5 :G722
6 :G726 40Kbps
7 :G726 32Kbps
8 : G726 24Kbps
9 : G726 16Kbps
10: G729.1

Enter the coder type – 1
Fax mode (0: Disabled, 1: Fax Bypass, 2: T38) ? 1
Enable trace (0: no, 1: yes) ? 0

3.10 Menu Selection 8: 3-Way Call Demo

This menu item allows you to enter the 3-Way call demo. The 3-Way call demo can be performed using a single board or two boards (for IXP435 reference platform, at least two boards are required). A submenu prompts you for the number of boards to be used for the demo. The setup required for the demo using a single board is given below. A separate demo menu is displayed to take commands. Selection 0 prints the current 3-way call demo state (Idle state, 2-Way call state and 3-Way call state). Selection 1 will setup call and enter 2-way call state. Selection 2 switches to 2-way call party. Selection 3 creates a 3-way call. Selection 4 exits 3-way call and back to 2-way call. Selection 5 exits 3-way call demo and back to the main menu.

A cross over cable (or hub) connects Ethernet port 1 and 2 of the board. Cross over cable (or hub) connection is optional because IP stack performs a software loopback if both ports are on the same platform. 3 phones are connected to the RJ11 ports on the IXDP465 development platform. This setup is shown in Figure 2.

**Figure 2.** 3-Way Call Demo Setup Using One Board for the Intel® IXDP465 Development Platform

The following steps setup 3-way calling.

The demo is started using “./IxDspCodeletApp”

Set up the sockets default configuration as given in Section 3.14.6.

3-way call Demo is chosen (option 8).

In choosing the number of boards, single board (Option 1) is chosen.

Setup call is chosen (option 1)
Switch 2-way call is chosen (option 2)

Make sure 3-way call is chosen (option 3)

Please select test item – 8

Select the number of boards used for 3-way call

1: Single board
2: Two boards

Enter your option - 1

-----------------------

3-Way Call Demo
-----------------------

0) Display menu and state
1) Setup Call
2) Switch 2-Way Call
3) Make 3-Way Call
4) Back to 2-Way Call
5) Exit

Please enter command:

1

-----------------------

3-Way Call Demo

-----------------------

0) Display menu and state
1) Setup Call
2) Switch 2-Way Call
3) Make 3-Way Call
4) Back to 2-Way Call
5) Exit

Please enter command:

[IDLE STATE]: Setup call - complete

*** 2W-CALL STATE ***

[2W-CALL STATE]: Available selections - 2), 3) and 5)

[2W-CALL STATE]: Available selections - 2), 3) and 5)

2

-----------------------
3-Way Call Demo
-----------------------
0) Display menu and state
1) Setup Call
2) Switch 2-Way Call
3) Make 3-Way Call
4) Back to 2-Way Call
5) Exit
Please enter command:

[2W-CALL STATE]: Switch to party 3 - complete
-----------------------
3-Way Call Demo
-----------------------
0) Display menu and state
1) Setup Call
2) Switch 2-Way Call
3) Make 3-Way Call
4) Back to 2-Way Call
5) Exit
Please enter command:

*** 2W-CALL STATE ***
3
-----------------------
3-Way Call Demo
-----------------------
0) Display menu and state
1) Setup Call
2) Switch 2-Way Call
3) Make 3-Way Call
4) Back to 2-Way Call
5) Exit
Please enter command:

[2W-CALL STATE]: Create 3-Way call - complete

*** 3W-CALL STATE ***
3.11 **Menu Selection 9: Player Demo**

This selection plays voice prompts and takes in dialed digits on the phone to direct the prompts.

Please select test item - 9

Enter the channel number (1,2,...; 0 for all channels) - 1

End of player demo

The initial prompt is:

Please dial your number

You are allowed a small time window to start entering a string of digits on the phone dial pad. A short time after the digit string is entered, the Player Demo plays the second voice prompt, followed by announcement of the digits that has been dialed:

The number you have dialed is ...

If the entry is not a numeric digit, then the third voice prompt is played:

You have dialed an invalid number

Then Player Demo eventually ends after a period of in-activity on the dial pad.

3.12 **Menu Selection 10: SLIC APIs**

This selection brings up a secondary menu that allows more specific test functions to be executed. Each item in this menu corresponds to a basic control message or a user-defined higher level control message. Slot and board parameters are not required for the IXP435 reference platform. Both parameters are required only for the IXP465 development platform and the IXDPG425 development platform.

Please select test item - 10

Select the following tests for SLIC

1:Slic Start Ringing
2:Slic stop ringing
3:Slic Hook Status
4:Get PCM configuration
5:Get Chip Details
6:Read from the Register
7:Write to the Register
8:Set the device into loopback mode
9:Get the loopback mode status of the device
10:Verify Communication with chip
11:Set PCM configuration
12:Initialise SLIC
13:Register the callback function
14: Reset the loopback mode of the device
15: Make FXO Off hook
16: Make FXO On hook
17: Enable Ring Detection
18: Disable Ring Detection
19: Slic Start Normal Ringing
20: Slic Start Short Ringing
21: FXS Polarity Inverse
22: FXS Onhook Transmission

3.12.1 **SLIC APIs Menu Selection 1: SLIC Start Ringing**

This selection allows for applying a ringing signal to a particular chip. Before applying start ringing signal, ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the Intel® Infrastructure DSP Solution Version 1.1 is validated with only one voice module. This parameter is ignored if it is the IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8).

Enter your option - 1
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0

In case of the IXP435 reference platform, the following is displayed:

Enter your option – 1
Enter the chip number (0,1:FXS; ) - 1

<< Start Ringing on FXS (chip=1). >>

The phone connected to FXS0 starts ringing.

3.12.2 **SLIC APIs Menu Selection 2: SLIC Stop Ringing**

This selection allows user to send a “stop ringing signal” to a particular chip, which is already ringing. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter will be ignored if it is IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8).

Enter your option - 2
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0

In case of the IXP435 reference platform, the following is displayed:

Enter your option - 2

Enter the chip number (0,1:FXS; ) - 0

The phone connected to FXS0 stops ringing

3.12.3 SLIC APIs Menu Selection 3: SLIC Hook Status

This menu selection allows to read the hook status of the FXS chips used in the board. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8). Before starting this test ensure that SLIC is already initialized, which is done through the menu option as described in Section 3.12.12.

Enter your option - 3

Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0

Enter the board number (0,1,2..7.; ) - 0

Enter the chip number (0-3 FXS, 4-FXO; ) - 0

ON hook

In case of the IXP435 reference platform, the following is displayed:

Enter your option - 3

Enter the chip number (0,1:FXS; ) - 1

ON hook

Based on the hook status, OFF hook or ON hook is displayed.

3.12.4 SLIC APIs Menu Selection 4: Get PCM Configuration

This menu selection allows to read PCM configuration of the FXS chip. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8). Before starting this test ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12.

Enter your option - 4

Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0

Enter the board number (0,1,2..7.; ) - 0

Enter the chip number (0-3 FXS, 4-FXO; ) - 0

In case of the IXP435 reference platform, the following is displayed:

Enter your option - 4
Enter the chip number (0,1:FXS, 30:FXO; ) - 1
PCM enable
Mu - LAW
8 - bits transfer

The configurations read are PCM enabled/disabled, Narrow band/Wide band, A Law/Mu Law.

3.12.5 SLIC APIs Menu Selection 5: Get Chip Details

This menu selection allows to read the make and manufacture of the FXO/FXS device. The chips can be Si3210, Si3211, Si3210M, and Si3050. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is IXPDP425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8). Before starting this test ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12.

Enter your option - 5
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 1

In case of the IXP435 reference platform, the following is displayed:

Enter your option - 5
Enter the chip number (0,1:FXS, 30:FXO; ) - 1
Si3216

3.12.6 SLIC APIs Menu Selection 6: Read from the Register

This menu selection allows to read from the direct registers of FXS/FXO device. Register 1-59 in case of FXO and Register 1-108 for FXS. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXPDP425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8). Before starting this test ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12.

Enter your option - 6
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0
Enter the register number (0,1,.....128;)- 1

In case of the IXP435 reference platform, the following is displayed:
3.12.7 SLIC APIs Menu Selection 7: Write to the Register

This menu selection allows writing to the direct registers of FXS/FXO device. Register 1-59 in case of FXO and Register 1-108 for FXS. Note that all registers can not be writable. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is only validated with one voice module. This parameter is ignored if it is the IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8). Before starting this test, ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12.

Enter your option - 7
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0
Enter the register number (0,1,.....128;) - 0
Enter the data in decimal - 0xa8

In case of the IXP435 reference platform, the following is displayed:

Enter your option - 7
Enter the chip number (0,1:FXS, 30:FXO; ) - 0
Enter the register number (0,1,.....128;) - 0
Enter the data in decimal - 0xa8

3.12.8 SLIC APIs Menu Selection 8: Set the Device into Loopback Mode

This menu selection sets the device FXS/FXO into digital loop back mode. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8). Before starting this test ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12.

Enter your option - 8
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0

In case of the IXP435 reference platform, the following is displayed:
Enter your option - 8
Enter the chip number (0,1:FXS; ) - 0

3.12.9 SLIC APIs Menu Selection 9: Get the Loopback Mode Status of the Device

This menu selection gets the loop back mode status of the FXS/FXO device. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8).

Before starting this test ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12.

Enter your option - 9
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0

In case of the IXP435 reference platform, the following is displayed:

Enter your option - 9
Enter the chip number (0,1:FXS; ) - 0

Chip is in digital loopback mode

3.12.10 SLIC APIs Menu Selection 10: Verify Communication with Chip

This menu selection verifies the communication with the chip (FXS/FXO). This is an optional test and if the tests like SLIC Start Ringing and SLIC Stop Ringing work, then it is not necessary to perform this test. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8).

Verify Communication ...

Communication exists with chip.

In case of the IXP435 reference platform, the following is displayed:

Verify Communication ...
3.12.11 SLIC APIs Menu Selection 11: Set PCM Configuration

This menu selection sets the PCM configuration of FXS. The configuration can be PCM enabled/disabled, A law/Mu law and Narrow band/Wide band. This is an optional feature, if SLIC is already initialized, then this is not required. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8).

Enter your option - 11
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0
0:Disable PCM transfer, 1: Enable PCM transfer- 1
0:A law, 1: Mu law, 2: Reserved, 3: Linear- 1
0: 8 bits transfer, 1: 16 bits transfer- 0

In case of the IXP435 reference platform, the following is displayed:

Enter your option - 11
Enter the chip number (0,1:FXS, 30:FXO; ) - 0
0:Disable PCM transfer, 1: Enable PCM transfer- 1
0:A-law, 1: Mu-law, 2: Reserved, 3: Linear- 1
0: 8 bits transfer, 1: 16 bits transfer- 0

3.12.12 SLIC APIs Menu Selection 12: Initialize SLIC

This menu selection initializes both FXS and FXO in case of the IXDP465 development platform and only FXS in case of the IXDPG425 development platform. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8).

Enter your option - 12
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0
0: A law, 1: Mu law, 2: Linear- 1
0: Narrow band, 1: Wide band- 0

In case of the IXP435 reference platform, the following is displayed:
Enter your option - 12
0:A-law, 1:Mu-law, 2:Linear - 0
0:Narrowband, 1:Wideband - 0

3.12.13  **SLIC APIs Menu Selection 13: Register the Callback Function**

This menu selection registers the callback functions for the FXS chips. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXDP425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8). Before starting this test ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12.

Enter your option - 13
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0

In case of the IXP435 reference platform, the following is displayed:

Enter the chip number (0,1:FXS, 30:FXO; ) - 0

3.12.14  **SLIC APIs Menu Selection 14: Reset the Loopback Mode of the Device**

This menu selection disables the digital loop back mode of the FXS/FXO device. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXDP425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8). Before starting this test ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12.

Enter your option - 14
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO; ) - 0

In case of the IXP435 reference platform, the following is displayed:

Enter the chip number (0,1:FXS; ) - 0

Sending the Loopback reset Cmd=0

3.12.15  **SLIC APIs Menu Selection 15: Make FXO Off Hook**

This menu selection allows to apply a Off-Hook signal on a particular SI3050 chip in the IXDP465 development platform. One input for this menu option is the board number. This denotes the number of boards supported. The IXDP465 development platform has
a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8).

Before starting this test, ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12. To test this feature, connect FXO port of the IXDP465 development platform to one FXS port (say FXS0) through a straight cable. Connect a phone to FXS1 port. Keep the phone ON hook and follow the sequence as below.

Enter your option - 15
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO;) - 4

In case of the IXP435 reference platform, the following is displayed:

Enter your option - 15
<< Off-hook command to FXO. >>

The hook state notification events are displayed on the screen.

3.12.16 SLIC APIs Menu Selection 16: Make FXO On Hook

This menu selection allows to perform On-Hook on a particular SI3050 chip in the IXDP465 development platform. Before starting this test ensure that SLIC is already initialized, which is done through the menu options as described in Section 3.12.12. One of the inputs for this menu option is the board number. This denotes number of boards supported. The IXDP465 development platform has a mezzanine slot that supports eight voice modules. However, the DSP software is validated with only one voice module. This parameter is ignored if it is the IXDPG425 development platform. (0: board1, 1: board2, 2: board3, 3: board4, 4: board5, 5: board6, 6: board7, 7: board8). In order to test this feature, connect FXO port of the IXDP465 development platform to one FXS port (say FXS0) through a straight cable. Connect a phone to FXS1 port. Keep the phone OFF hook and follow the sequence as below.

Enter your option - 16
Enter the slot number (0,1; 0 for HSS0, 1 for HSS1) - 0
Enter the board number (0,1,2..7.; ) - 0
Enter the chip number (0-3 FXS, 4-FXO;) - 4

In case of the IXP435 reference platform, the following is displayed:

Enter your option - 16
<< On-hook command to FXO. >>

The hook state notification events are displayed on the screen.
3.12.17  **SLIC APIs Menu Selection 17: Enable Ring Detection**

This menu selection is valid only for the IXP435 reference platform. This menu selection enables the FXO port of the platform to detect the ring signal and terminal print will be shown if ring signal is detected. No input parameter is expected because there is only one FXO port on the IXP435 reference platform.

Enter your option - 17

<< Enable Ring Detection command to FXO. >>

3.12.18  **SLIC APIs Menu Selection 18: Disable Ring Detection**

This menu selection is valid only for the IXP435 reference platform. This menu selection disables the FXO port of the platform, preventing it from detecting the ring signal. No input parameter is expected because there is only one FXO port on the IXP435 reference platform.

Enter your option - 18

<< Disable Ring Detection command to FXO. >>

3.12.19  **SLIC APIs Menu Selection 19: Slic Start Normal Ringing**

This menu selection allows for applying a ringing signal with Ring Active Timer of 1 second and Ring Inactive Timer of 2 seconds. Before applying the start ringing signal, ensure that SLIC is already initialized.

Enter your option - 19

Enter the chip number (0,1:FXS; ) - 0

<< Start Normal Ringing on FXS (chip=0). >>

3.12.20  **SLIC APIs Menu Selection 20: Slic Start Short Ringing**

This menu selection allows for applying a ringing signal with Ring Active Timer of 0.5 seconds and Ring Inactive Timer of 0.5 seconds. Before applying the start ringing signal, ensure that SLIC is already initialized.

Enter your option - 20

Enter the chip number (0,1:FXS; ) - 0

<< Start Short Ringing on FXS (chip=0). >>

3.12.21  **SLIC APIs Menu Selection 21: FXS Polarity Inverse**

This menu selection allows for inverting the polarity state of the FXS port. With Polarity Inverse, an On Hook non-ringing FXS port will start ringing or an On Hook ringing FXS port will stop ringing.

Enter your option - 21

Enter the chip number (0,1:FXS; ) - 0

<< Polarity Inverse on FXS (chip=0). >>
3.12.22  **SLIC APIs Menu Selection 22: FXS Onhook Transmission**

This menu selection allows for enabling On Hook Transmission on FXS port. With On Hook transmission enabled, PCM data will go through the FXS port even during On Hook. An example use case is to enable On Hook Transmission on FXS port and transmit Caller ID signal during On Hook.

Enter your option - 22

Enter the chip number (0,1:FXS; ) - 0

<< Enable Forward Onhook Transmission on FXS (chip=0). >>n FXS (chip=0). >>

3.13  **Menu Selection 11: Diagnostic**

This selection brings up a secondary menu that allows more specific test functions to be executed. Each item in this menu is corresponding to a basic control message or a user-defined higher level control message.

*Note:* AEC component in NET Resource is not supported and all AEC parameters shown in NET Resource Parameters are not supported.

*Note:* T.38 component is not supported and all T.38 references in codelets are not supported.

Please select test item - 11

```
----------------------------------------
   IXDspCodelet Diagnostic Menu      
----------------------------------------
  0 - Print Menu
  1 - Reset a resource
  2 - Start a resource
  3 - Stop a resource
  4 - Ping a resource
  5 - Set multiple params
  6 - Start codec
  7 - Start Player
  8 - Play tones
  9 - Play FSK data
 10 - Receive digits
 11 - Receive FSK
 12 - Get XR statistics
 13 - Start an IP term
 14 - Stop an IP term
 15 - Setup call w/parms
```
3.13.1 Diagnostic Menu Selection 1: Reset a Resource
This allows a specified resource to be reset. Resource selections are NET (HSS interface and Echo Canceller); DEC (Decoder); ENC (Encoder); TG (Tone Generator, including FSK modem); TD (Tone Detector); MIX (3-Way call mixer); and MA (Message Agent). For further information on the parameters, refer to the Intel® Infrastructure DSP Solution Version 1.1 API Reference Manual and the Intel® Infrastructure DSP Solution Version 1.1 Programmer’s Guide.

Please select test item - 1
Enter the instance number (1,2,...; 0 for all instances) - 1
Enter the resource number

3.13.2 Diagnostic Menu Selection 2: Start a Resource
This allows a specified resource to be started.

Please select test item - 2
Enter the instance number (1,2,...; 0 for all instances) - 1
Enter the resource number

3.13.3 Diagnostic Menu Selection 3: Stop a Resource
This allows a specified resource to be stopped.

Please select test item - 3
Enter the instance number (1,2,...; 0 for all instances) - 1
Enter the resource number

3.13.4 Diagnostic Menu Selection 4: Ping a Resource
This pings a specified resource for testing purposes.
Please select test item - 4
Enter the instance number (1,2,...; 0 for all instances) - 1
Enter the resource number
Resource : (1:Net, 2:DEC, 3:ENC, 4:TG, 5:TD, 6:PLY, 7:MIX, 8:T38, 9:MA) -

3.13.5 Diagnostic Menu Selection 5: Set Multiple Params

This allows multiple parameters of a selected resource to be changed.

Note: AEC component in NET Resource is not supported and all AEC parameters shown in NET Resource Parameters are not supported.

Note: T.38 component is not supported and all T.38 references in codelets are not supported.

It prompts for the number of parameters that needs to be changed:

Please select test item - 5
Enter the instance number (1,2,...; 0 for all instances) - 1
Enter the resource number
Enter the number of parameters to be set - 2
DSP resource TD[1] parameters

<table>
<thead>
<tr>
<th>id</th>
<th>value</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Current state (0:Idle, 1:Active)</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>L-Port Stream ID (T-Port Base - TDM:0, IP:3, Player:11, Mixer:15)</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>Tone clamping enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>3</td>
<td>3</td>
<td>Tone clamping buffer size</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>Tone event report (0:None, 1:Tone On, 2:Tone Off, 3:Both)</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>RFC2833 event enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>6</td>
<td>5</td>
<td>Update rate of RFC2833 packets (in 10-ms unit)</td>
</tr>
<tr>
<td>7</td>
<td>3</td>
<td>Redundancy of end-of-RFC2833-packet</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>Redundancy of begin-of-RFC2833-packet</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Suppress Encoder in RFC2833 event (0:NG, 1:YES)</td>
</tr>
<tr>
<td>10</td>
<td>101</td>
<td>RFC2833 payload type</td>
</tr>
<tr>
<td>11</td>
<td>200</td>
<td>Minimum CS-bit length required by FSK receiver</td>
</tr>
</tbody>
</table>
12  100  Minimum mark-bit length required by FSK receiver
13  20   Extra stop bits allowed between the data
14   8   FSK receiver Baud rate (reserved for future)
15   0   FSK adaptive threshold (0: Non-adaptive, 1:Adaptive)
16   0   FSK Minimum No. of data bytes to receive (0: default,0-15)

Enter the parameter id - 2
Enter the parameter value - 0
Enter the parameter id - 3
Enter the parameter value - 0

3.13.6 Diagnostic Menu Selection 6: Start Codec

This starts the selected resource (Only for Decoder and Encoder). You are prompted to select the codec:

Please select test item - 6

Enter the instance number (1,2,...; 0 for all instances) - 1

Enter the resource number

    Resource : (2:DEC, 3:ENC) - 2
    0 :PassThru (for debug only)
    1 :G711_10ms u-Law
    2 :G711_10ms A-Law
    3 :G729a/b
    4 :G723.1
    5 :G722
    6 :G726 40Kbps
    7 :G726 32Kbps
    8 :G726 24Kbps
    9 :G726 16Kbps
   10:G729.1

Enter the type of Codec - 1

3.13.7 Diagnostic Menu Selection 7: Start Player

This starts the player to play registered voice prompts. This includes the pre-registered voice prompts for the Player Demo, as well as any user voice prompts that have been loaded by the load a voice prompt or play a raw data file diagnostic menu selections. A string of prompts can be linked in a list to allow concatenation (up to 14).
The offset and length field allows a portion of the prompt to be played (length of 0 indicates playing the entire prompt). The last prompt should have a next link field set to 127 (end). Note that if the next link field is set to 0, the prompt is played continuously until the particular player resource is stopped. For start player to work, parameter 1 of Net resource has to be set to 9 (player).

Please select test item - 7
Enter the instance number (1,2,...; 0 for all instances) - 1
Enter the number of prompts (1 ~ 14) - 1
Registered Prompt List:

<table>
<thead>
<tr>
<th>prompt handle</th>
<th>file name</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Hard coded voice data</td>
</tr>
<tr>
<td>1</td>
<td>Hard coded voice data</td>
</tr>
<tr>
<td>2</td>
<td>/music.wav</td>
</tr>
</tbody>
</table>

Segment 1 :
Enter the prompt handle - 2
Enter the offset - 0
Enter the length - 0
Enter the next link(fwd:>0, back:<=0, end:127) - 127

3.13.8 Diagnostic Menu Selection 8: Play Tones

This plays a specified tone to the corresponding voice channel according to the default tone templates, as well as user defined tone templates. Since the tone is generated directly to the HSS side, which is already setup by default, this will work even when no calls are setup on the channel. Tone ID’s are RFC2833 tone ID’s. Note that the valid tone ID’s are dependent on the country code set. The default for DTMF tone is 100ms on time.

Please select test item - 8
Enter the instance number (1,2,...; 0 for all instances) - 1
Enter the number of tones to be played - 3
Tone IDs - DTMF:0-15, Dial:66, Ring:70, Busy:72, CW:79
Enter the tone id - 3
Enter the tone id - 4
Enter the tone id – 72

3.13.9 Diagnostic Menu Selection 9: Play FSK Data

This plays a specified string out as FSK data, intended for Caller ID testing. It prompts for an ASCII string.

Please select test item - 9
Enter the channel number (1,2,...; 0 for all channels) - 1
Enter an ASCII string - 1234

3.13.10 Diagnostic Menu Selection 10: Receive Digits

This test collects digit strings played on a specified voice channel according to the default tone templates. The menu prompts you to select: number of digits to receive, termination digit, timeout of the first digit, inter-digit timeout and the overall timeout.

Please select test item - 10
Enter the instance number (1,2,...; 0 for all instances) - 1
Enter the number of digits to receive - 3
Enter the termination digit bits (*=1024 #=2048 *#=3072) - 1024
Enter the first digit time out (in second) - 15
Enter the inter-digit time out (in second) - 10
Enter the total time out (in second) - 20

digits rcvd = '563'

Note: The TD resource of the specified channel (test item 2) must be started prior to the test.

3.13.11 Diagnostic Menu Selection 11: Receive FSK

This menu selection starts FSK reception with a specified timeout period. The received data is printed out in hex format. One way to test FSK receive is to perform an internal loop back from the Tone Generator (FSK transmit) to the Tone Detector (FSK receive). This can be done by using the router to assign the Tone Detector of the desired channel to listen to the IP termination (Tone Generator). After the Receive FSK selection is initiated with a timeout period to provide adequate time to set up the transmission, then the Play FSK selection is initiated.

Please select test item - 11
Enter the instance number (1,2,...; 0 for all instances) - 1
Enter the timeout (in 1 second unit) - 30

3.13.12 Diagnostic Menu Selection 12: Get XR Statistics

This gets the statistics from the Jitter Buffer of the Decoder resource component, and measures ERLE & MFPP

Please select test item - 12

----------------------------------------
<table>
<thead>
<tr>
<th>-  IxDspCodelet Extended Report Menu</th>
</tr>
</thead>
</table>

0 - Print Menu
1 - Get JB statistics
2 - Get ERLE statistics
3 - Get MFPP statistics
4 - Exit
Please select test item - 1
Enter the instance number (1,2,...; 0 for all instances) - 1
Reset the statistics (1:yes, 0:no) ? 1

<<MsgGet JB Stat Cmplt received (ch=1)>>
Total received packets : 12683
Lost packets via network : 0
Decoder's erasure frames : 0
Received Tone packets : 0
Maximum jitter (milliseconds): 686
Minimum jitter (milliseconds): 636
Mean Jitter (milliseconds): 656
Standard Deviation jitter (milliseconds): 0
JB Maximum Delay (milliseconds): 200
JB Absolute Maximum Delay (milliseconds): 500
JB Nominal Delay (milliseconds): 10
JB Discard Rate(maximum 255) : 0

Please select test item - 2
Enter the instance number (1,2,...; 0 for all instances) - 1

<<MsgGetERLEStatCmplt received (ch=1)>>
Value of ERLE(dB) : 40

Please select test item - 3
Enter the instance number (1,2,...; 0 for all instances) - 1

<<MsgGetMFPPStatCmplt received (ch=1)>>
Value of MFPP : 1

3.13.13 Diagnostic Menu Selection 13: Start an IP Term

This is a sub-functional engineering test, designed to verify resources setup corresponding to a specified IP. It needs to be combined with other test items for a complete functional test.

It starts an IP by sending the user-defined message IX_DSP_CODELET_MSG_START_IP to MA (Message Agent) to start ENC, DEC, TD and stop TG.

Please select test item - 13
IP channel = 1
3.13.14 Diagnostic Menu Selection 14: Stop an IP

Similar to start an IP, this test stops an IP by sending the user-defined message `IX_DSP_CODELET_MSG_STOP_IP` to MA (Message Agent) to stop ENC, DEC, TD and TG.

Please select test item - 14

IP channel = 1

3.13.15 Diagnostic Menu Selection 15: Setup Call w/parms

This sets up a call with a set of call parameters by sending the user-defined message `IX_DSP_CODELET_MSG_SETUP_CALLWPARMS`.

Please select test item - 15

TDM channel = 1
IP channel = 1
Auto switch = 0
Decoder type = 3
Encoder type = 3
VAD = 1
Frames Per Packet = 3
RFC2833 = 1
RFC2833 payload type = 101
Tone clamp = 1
Tone report = 1

3.13.16 Diagnostic Menu Selection 16: Set Clear Channel

This allows a channel to be cleared with specified coder. It is intended for fax bypass feature. You are prompted for the TDM channel and IP channel of a voice path.

Please select test item - 16

TDM channel = 1
IP channel = 1
Code type = 1

3.13.17 Diagnostic Menu Selection 17: Link 2 Terms

This allows changing of the full duplex routing between any TDM and IP terminations, as well as to the mixer. This allows many configurations, for example, an HSS channel can be routed back to another HSS channel for TDM loopback, and similarly for IP loopback. Other configurations allow 3-way conference support, and IP tone detection. The example below shows a demo to link between channel 1 of TDM termination and channel 1 of IP termination.
Please select test item - 17
Type of Term 1 (0:Null, 1:TDM, 2:IP, 3:Mixer) = 1
Channel of Term 1 = 1
Type of term 2 (0:Null, 1:TDM, 2:IP, 3:Mixer) = 2
Channel of Term 2 = 1
Make sure the TDM and IP terminations are re-connected properly before going to other test and demo selections.

3.13.18 Diagnostic Menu Selection 18: Create 3W Call
This connects 3 terminations with the mixer to create 3-way call.
In case of the IXDP465 development platform or the IXDPG425 development platform, the following is displayed:
Please select test item - 18
  Instance No (1-4):1
  Type of Party 1 (1:TDM, 2:IP) = 1
  Channel of party 1 = 1
  Type of Party 2 (1:TDM, 2:IP) = 2
  Channel of Party 2 = 1
  Type of Party 3 (1:TDM, 2:IP) = 2
  Channel of Party 3 = 2
<<IxDspCodeletMsg3WAck received (ch=1, numDspReply=9, numErr=0)>>
Make sure the TDM and IP terminations are re-connected properly before going to other test and demo selections.

3.13.19 Diagnostic Menu Selection 19: Back to 2W Call
This switches a 3-way call previously set by Select 18 back to a 2-way call.
Make sure the TDM and IP terminations are re-connected properly before going to other test and demo selections.
In case of the IXDP465 development platform or the IXDPG425 development platform, the following is displayed:
Please select test item - 19
  Instance No (1-4):1

3.13.20 Diagnostic Menu Selection 20: T38 Switch
This option is not supported in the Intel® Infrastructure DSP Solution Version 1.1. All T.38 references in codelets are not supported.
3.13.21 Diagnostic Menu Selection 21: Load a Voice Prompt

This menu selection loads a voice prompt from a .wav file. Supported wave file formats are G.711uLaw, G.711aLaw, and G.729a. The file reader will determine the format and data size, and reads the raw data into allocated memory. The memory data is then registered with the DSP software. This data can then be played by the Start Play menu selection via the displayed handle associated with the file name. The file path and name is prompted. Note that the file device is the same as that which provides the boot program to the boot device.

Please select test item - 21

Enter full path wave file name (for example, /wave/pcm.wav): /music.wav

3.13.22 Diagnostic Menu Selection 22: Play a Raw Data File

This menu selection is similar to the previous menu selection, but loads and plays a raw data file with G.711uLaw, G.711aLaw, and G.729a supported formats (with no header information). You must enter the sample size to be read and the data format. Note that this information is only entered once, as the same allocated buffer and data format is reused subsequently. After the data is loaded, the play is automatically initiated.

This menu selection is useful for loading and playing various files for testing purposes (for example, FSK database). For play a raw data file to work, parameter 1 of Net resource has to be set to 9 (player).

Please select test item - 22

Enter maximum sample size (8000=>1 sec.): 80000

Coder Type (1:uLaw;2:aLaw;3:G.729): 1

Enter full path raw data file name (e.g. /data/pcm.dat): /music.dat

Current settings: max. size = 80000, type = uLaw

Enter the instance number (1,2,...; 0 for all instance) - 1

3.13.23 Diagnostic Menu Selection 23: Exit

This exits the Diagnostic Menu back to the main menu.

3.14 Menu Selection 12: Socket Configuration

This selection brings up a secondary menu that allows more specific test functions to be executed. Each item in this menu is corresponding to a basic control message or a user-defined higher level control message.

Please select test item - 12

----------------------------------------
| IxDspCodelet Socket Menu             |
----------------------------------------

0 - Print Menus
1 - Channel Configuration
2 - Disable Channel
3 - Show Channel Configuration
4 - Show Channel Statistics
5 - Create Sockets
6 - Default Configuration
7 - Exit

Please select test item - 

Typical socket configuration is a two step process.

Use option -1 (channel configuration) to provide the source & destination channels and destination IP address information.

Use option-5 (Create Sockets) to activate the configuration provided in step 1

Use option-6 (Default Configuration) to setup the socket configuration if Ethernet port 0 and Ethernet port 1 is configured for the IXDP465 development platform or the IXDPG425 development platform as stated in the Intel® Infrastructure DSP Solution Version 1.1 Release Notes:

- ifconfig ixp0 192.168.10.1
- ifconfig ixp1 192.168.20.1

### 3.14.1 Socket Configuration Menu Selection 1: Channel Configuration

This selection configures the available channels.

Please select test item - 1

Enter the Src channel number (1,2,...) - 1
Enter the Dst channel number (1,2,...) - 2
Enter the Dst IP:10.223.96.78

### 3.14.2 Socket Configuration Menu Selection 2: Disable Channel

This menu selection disables the corresponding channel.

Please select test item - 2

Enter the channel number to Disable (1,2,... or 0 for all) - 1

### 3.14.3 Socket Configuration Menu Selection 3: Show Channel Configuration

This selection displays the channel configuration.

Please select test item - 3

*** DSP Codelet Socket and Voice Channel Config Info ***

<table>
<thead>
<tr>
<th>Chan#: RxSock#: TxSock#: Cfg: Act: Loc Port:</th>
<th>Remote IP: Rem Port</th>
</tr>
</thead>
</table>
3.14.4 Socket Configuration Menu Selection 4: Show Channel Statistics

This selection shows the channel statistics.

Please select test item - 4

*** DSP Codelet Socket Statistics ***

Channel 0 Statistics:

----------------------
Number of Rx pkts: 0
Total Rx bytes: 0
Number of invalid Rx data lengths: 0
Number of socket Rx failed: 0
Number of Successful Tx pkts: 0
Total Successful Tx bytes: 0
Number of times all Tx data was not transmitted: 0
Number of times socket Tx failed: 0
Number of remote signaling events sent: 0
Number of remote signaling events received: 0
Number of voice packets dropped: 0

Channel 1 Statistics:

----------------------
Number of Rx pkts: 0
Total Rx bytes: 0
Number of invalid Rx data lengths: 0
Number of socket Rx failed: 0
Number of Successful Tx pkts: 0
Total Successful Tx bytes: 0
Number of times all Tx data was not transmitted: 0
Number of times socket Tx failed: 0
Number of remote signaling events sent: 0
Number of remote signalling events received: 0
Number of voice packets dropped: 0

Channel 2 Statistics:
----------------------
Number of Rx pkts: 0
Total Rx bytes: 0
Number of invalid Rx data lengths: 0
Number of socket Rx failed: 0
Number of Successful Tx pkts: 0
Total Successful Tx bytes: 0
Number of times all Tx data was not transmitted: 0
Number of times socket Tx failed: 0
Number of remote signalling events sent: 0
Number of remote signalling events received: 0
Number of voice packets dropped: 0

Channel 3 Statistics:
----------------------
Number of Rx pkts: 0
Total Rx bytes: 0
Number of invalid Rx data lengths: 0
Number of socket Rx failed: 0
Number of Successful Tx pkts: 0
Total Successful Tx bytes: 0
Number of times all Tx data was not transmitted: 0
Number of times socket Tx failed: 0
Number of remote signaling events sent: 0
Number of remote signaling events received: 0
Number of voice packets dropped: 0

3.14.5 Socket Configuration Menu Selection 5: Create Sockets
This selection creates the sockets for the various channels.

Please select test item - 5
### 3.14.6 Socket Configuration Menu Selection 6: Default Configuration

This selection configures the channels with the default configuration. In case of the IXDP465 development platform or the IXDPG425 development platform this combines the two step socket configuration (Channel Configuration and Create Sockets) to link channel1 and 2 and channels 3 and 4 as the source and destination channels. This menu option also assumes that the two Ethernet interfaces (ixp0 and ixp1) of the same board are configured with IP addresses 192.168.10.1 and 192.168.20.1 respectively. The default configuration will not work for any other combination of channels and IP address. For all other combinations the two step method described in section 3.13 has to be used. The default configuration is not useful for calls across boards over an IP network. In case of the IXP435 reference platform, the fourth socket is not used.

Please select test item - 6

Enabling Default Channel Configuration

ixp0/ixp2 IPAddrs of : 192.168.10.1 ixp1 IPAddrs of : 192.168.20.1 is assumed

### 3.14.7 Socket Configuration Menu Selection 7: Exit

This selection would exit the socket configuration and return to the main menu.

### 3.15 Menu Selection 13: CPU Occupancy

This selection is not supported in the current release.
3.16 **Menu Selection 14: CIDCW Demo**

Connect the telephone to port 1 of the board. Start the codelet application by typing 'IxDspCodeletApp' set the country code to US (1) during initialization. Ensure the phone is off-hook. Select Caller ID-Call Waiting demo menu option (Menu option 11)

Enter the test phone number to be displayed as the Caller ID at the prompt. You hear Call Waiting Tone on phone connected to Channel-1. The number entered in the step 7 is displayed on the phone. Go back to the demo codelet main menu.

Please select test item - 14

Enter the number to be displayed (Default '0123456789') : 5636890

3.17 **Menu Selection 15: Pulse Dial**

This menu selection demonstrates the pulse dialing capability. The pulse dialing feature supports only single channel demo at a time. You are prompted to enter the channel from which the digits have to be collected, number of digits expected, inter digit timeout value and flash hook window size. A phone is connected to the RJ11 port in the board from which the digits can be dialed in. The phone should be set to pulse mode for this option to work. You are asked to go off hook and dial the digits. The dialed digits are displayed.

Please select test item - 15

Enter the channel number (1,2,...; Only one channel) - 1

Enter Number of Digits to be collected (1 to 20) : 2

Enter InterDigit Timeout Value (5 - 30 secs) : 20

Enter Flash Hook window Size (1000 - 2200 milli secs) : 2000

Number of expected digits -> 2

Inter Digit Timeout value-> 20

Channel Number-> 1

Flash Hook Window Size (ms)-> 2000

Now Go off hook and Dial the digits

Dialled Digits of 1 channel = 1 2

Please go ONHOOK and Press ENTER to go to MAIN MENU

3.18 **Menu Selection 16: Set Plug-in Parameter(s)**

This menu selection demonstrates the procedure to set the plug-in (EC and Codec) parameters directly. This allows setting for all channels together or for individual channels for the selected plug-in.

After selecting the desired plug-in, zero based USCI ID (not the same as Intel® Infrastructure DSP Solution parameter ID) will be prompted. The complete description of USCI ID is provided in the Intel® Infrastructure DSP Solution Version 1.1 Programmer’s Guide and the Intel® Infrastructure DSP Solution Version 1.1 API Reference Manual.

**Note:** AEC component in NET Resource is not supported and all AEC parameters shown in NET Resource Parameters are not supported.
The following steps show how to set the EC plug-in module for all channels,

Please select test item - 16
Enter the instance number (1,2,3,4...; 0 for all instance) - 0
Enter the resource number
    Resource : (1:Net, 2:DEC, 3:ENC) - 1
Echo Canceller types :
    1 :Acoustic Echo Canceller(AEC)
    2 :Line Echo Canceller(LEC)
Enter the type - 2
Enter the plugin parameter id(USCI index) - 3
Enter the parameter value - 2
    **** Writing plugin type 2 parameter ID:3, Value=2 ****
Successfully set the channel :1 Param ID 3 Value = 2
Successfully set the channel :2 Param ID 3 Value = 2
Successfully set the channel :3 Param ID 3 Value = 2
Successfully set the channel :4 Param ID 3 Value = 2
******* Done *******
Similarly you can set parameters of the decoder and encoder components by selecting resource DEC or ENC respectively.

3.19 Menu Selection 17: Show Plug-in Parameter(s)

This menu selection demonstrates how to access the desired plug-in parameter values.

This menu selection allows you to show either all channels or individual channels for the selected plug-in. After you select the desired plug-in module, the application asks for zero based USCI ID. The complete description of USCI ID is provided in the Intel® Infrastructure DSP Solution Version 1.1 Programmer’s Guide and the Intel® Infrastructure DSP Solution Version 1.1 API Reference Manual.

Note:  AEC component in NET Resource is not supported and all AEC parameters shown in NET Resource Parameters are not supported.

The following steps show how to get parameter values of EC plug-in module for all channels,

Please select test item - 17
Enter the instance number (1,2,3,4...; 0 for all instance) - 0
Enter the resource number
    Resource : (1:Net, 2:DEC, 3:ENC) - 1
Echo Canceller types :
    1 :Acoustic Echo Canceller(AEC)
2 : Line Echo Canceller (LEC)

Enter the type - 2

Enter the plugin parameter id (USCI index) - 3

****Reading plugin type 2 parameters****

Successfully read for channel :1 Param ID 3 Value = 5
Successfully read for channel :2 Param ID 3 Value = 5
Successfully read for channel :3 Param ID 3 Value = 5
Successfully read for channel :4 Param ID 3 Value = 5

******* Done ********

Similarly you can view parameter data for decoder and encoder components by selecting resource DEC or ENC respectively.

3.20 Menu Selection 18: Multiconference Call Demo

This menu item accesses the multiple conference calls demo. In case of IXDPG425 development platform the multiconference call demo uses three boards – a mixer board (board-1), where the mixer runs, and board-2 and board-3, to which the second and third parties for the conference are connected. A separate demo menu is displayed to take commands.

- Selection 1 sets up the socket configuration for board-1.
- Selection 2 sets up the socket configuration and the call between the TDM and IP channels on board-2.
- Selection 3 does the same on board-3, that is, it configures sockets and sets up the call between the TDM and IP channels on board-3.
- Selection 4 creates four conference calls (four 3-way calls). The parties (with reference to Board-1) involved in the conference calls are:
  - 1st 3-way call (Instance one): TDM-1, IP-1 and IP-2
  - 2nd 3-way call (Instance two): TDM-2, IP-3 and IP-4
  - 3rd 3-way call (Instance three): TDM-3, IP-5 and IP-6
  - 4th 3-way call (Instance four): TDM-4, IP-7 and IP-8
- Selection 5 exits all 3-way calls.

All three boards are connected to a hub via either ixp0 or ixp1. The board setup is shown in Figure 3.

Before starting this test, ensure that the Ethernet ports to be used for this test on the three boards are configured with different IP addresses and MAC addresses. To configure the IP address and MAC address of the Ethernet port, enter the command ifconfig <Ethernet port name> <IP address> and ifconfig <Ethernet port name> hw ether <MAC address> before starting the codelet application.
Figure 3. Multiple 3-Way Call Demo Setup Using Three Boards for the Intel® IXDPG425 Network Gateway Development Platform

---

- IxDspCodelet Demo Menu

---

0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit

Please select test item -
ClientProcess started
18

MultiConference Demo Menu
1: Setup Default Socket Configuration for Board-1
2: Setup Default Socket & Channel Configuration for Board-2
3: Setup Default Socket & Channel Configuration for Board-3
4: Setup 3-Way Call
5: Teardown 3-Way Call
6: Exit

Enter your option - 2

Enabling Default Channel Configuration for MC demo
Enter Mixer Board's - IP Add: 192.168.20.1

*** DSP Codelet Socket And Voice Channel Config Info ***

<table>
<thead>
<tr>
<th>Chan#:RxSock#:TxSock#:Cfg:Act:Loc Port:</th>
<th>Remote IP:Rem Port</th>
</tr>
</thead>
</table>

Coder types :
0: PassThru (for debug only)
1: G711_10ms u-Law
2: G711_10ms A-Law
3: G729a/b
4: G723.1
Enter the coder type - 1

MultiConference Demo Menu
1: Setup Default Socket Configuration for Board-1
2: Setup Default Socket & Channel Configuration for Board-2
3: Setup Default Socket & Channel Configuration for Board-3
4: Setup 3-Way Call
5: Teardown 3-Way Call
6: Exit

Enter your option -

On Board-3:

----------------------------------------
- IxDspCodelet Demo Menu -
----------------------------------------
0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit
Please select test item -
ClientProcess started
18
MultiConference Demo Menu
1: Setup Default Socket Configuration for Board-1
2: Setup Default Socket & Channel Configuration for Board-2
3: Setup Default Socket & Channel Configuration for Board-3
4: Setup 3-Way Call
5: Teardown 3-Way Call
6: Exit

Enter your option – 3
Enabling Default Channel Configuration for MC demo
Enter Mixer Board’s – IP Add: 192.168.20.1

*** DSP Codelet Socket And Voice Channel Config Info ***
Chan#:RxSock#:TxSock#:Cfg:Act:Loc Port:      Remote IP: Rem Port
-----:-------:-------:---:---:--------:---------------:--------

Coder types :
0: PassThru (for debug only)
1: G711_10ms u-Law
2: G711_10ms A-Law
3: G729a/b
Enter the coder type - 1

MultiConference Demo Menu

1: Setup Default Socket Configuration for Board-1
2: Setup Default Socket & Channel Configuration for Board-2
3: Setup Default Socket & Channel Configuration for Board-3
4: Setup 3-Way Call
5: Tear down 3-Way Call
6: Exit

Enter your option -

On Mixer Board (Board-1)

MultiConference Demo Menu

1: Setup Default Socket Configuration for Board-1
2: Setup Default Socket & Channel Configuration for Board-2
3: Setup Default Socket & Channel Configuration for Board-3
4: Setup 3-Way Call
5: Tear down 3-Way Call
6: Exit

Enter your option - 1

Enabling Default Channel Configuration for MC demo

Enter Board 2 - IP Add: 192.168.20.2
Enter Board 3 - IP Add: 192.168.20.3

*** DSP Codelet Socket And Voice Channel Config Info ***

<table>
<thead>
<tr>
<th>Chan#</th>
<th>RxSock#</th>
<th>TxSock#</th>
<th>Cfg:Act:Loc Port</th>
<th>Remote IP:Rem Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>------</td>
<td>---------</td>
<td>---------</td>
<td>------------------</td>
<td>--------------------</td>
</tr>
</tbody>
</table>

---:-------------------:-------------------:-------------------:-------------------:-------------------
MultiConference Demo Menu

1: Setup Default Socket Configuration for Board-1
2: Setup Default Socket & Channel Configuration for Board-2
3: Setup Default Socket & Channel Configuration for Board-3
4: Setup 3-Way Call
5: Teardown 3-Way Call
6: Exit

Enter your option - 4

Coder types :

0: PassThru (for debug only)
1: G711_10ms u-Law
2: G711_10ms A-Law
3: G729a/b
4: G723.1
5: G722
6: G726 40Kbps
7: G726 32Kbps
8: G726 24Kbps
9: G726 16Kbps
10: G729.1

Enter the coder type - 1

MultiConference Demo Menu

1: Setup Default Socket Configuration for Board-1
2: Setup Default Socket & Channel Configuration for Board-2
3: Setup Default Socket & Channel Configuration for Board-3
4: Setup 3-Way Call

5: Teardown 3-Way Call
6: Exit

Enter your option – 5

MultiConference Demo Menu
1: Setup Default Socket Configuration for Board-1
2: Setup Default Socket & Channel Configuration for Board-2
3: Setup Default Socket & Channel Configuration for Board-3
4: Setup 3-Way Call
5: Teardown 3-Way Call
6: Exit

Enter your option – 6

3.20.1 Multiconference with User Configurations

The Multiconference demo doesn't provide an option to configure the codec type for individual IP terminations and doesn't provide an option to change the parties involved in the conference call.

To make conference calls with a different codec type for each IP termination and with different parties, use the Diagnostic menu.

To setup a conference call using the IXP435 reference platform with two boards, follow the steps below. Only one 3-way conference call is possible with two IXP435 reference platform boards.

Before starting this test, ensure that the Ethernet ports to be used for this test on the two boards are configured with different IP addresses and MAC addresses.

On Board-2:

----------------------------------------
<table>
<thead>
<tr>
<th>IxDspCodelet Demo Menu</th>
</tr>
</thead>
</table>
0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit

Please select test item - 12

- IXDspCodelet Socket Menu -

0 - Print Menus
1 - Channel Configuration
2 - Disable Channel
3 - Show Channel Configuration
4 - Show Channel Statistics
5 - Create Sockets
6 - Default Configuration
7 - Exit

Please select test item - 1

Enter the Src channel number (1,2 ...) - 1
Enter the Dst channel number (1,2 ...) - 1
Enter the Dst IP: 192.168.20.1

- IXDspCodelet Socket Menu -

0 - Print Menus
1 - Channel Configuration
2 - Disable Channel
3 - Show Channel Configuration
4 - Show Channel Statistics
5 - Create Sockets
6 - Default Configuration
7 - Exit

Please select test item - 1
Enter the Src channel number (1,2 ...) - 2
Enter the Dst channel number (1,2 ...) - 2
Enter the Dst IP:192.168.20.1

----------------------------------------
-     IxDspCodelet Socket Menu      -
----------------------------------------
0 - Print Menus
1 - Channel Configuration
2 - Disable Channel
3 - Show Channel Configuration
4 - Show Channel Statistics
5 - Create Sockets
6 - Default Configuration
7 - Exit

Please select test item - 5

*** DSP Codelet Socket And Voice Channel Config Info ***

<table>
<thead>
<tr>
<th>Chan#:RxSock#:TxSock#:Cfg:Act:Loc Port:</th>
<th>Remote IP:Rem Port</th>
</tr>
</thead>
<tbody>
<tr>
<td>----------------------------------------</td>
<td>--------------------</td>
</tr>
</tbody>
</table>

----------------------------------------
- IXDspCodelet Socket Menu -

0 - Print Menus
1 - Channel Configuration
2 - Disable Channel
3 - Show Channel Configuration
4 - Show Channel Statistics
5 - Create Sockets
6 - Default Configuration
7 - Exit

Please select test item - 7

- IXDspCodelet Demo Menu -

0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit

Please select test item - 1

Enter the channel number (1,2,...; 0 for all channels) - 1

Coder types :

0: PassThru (for debug only)
1: G711_10ms u-Law
2: G711_10ms A-Law
3: G729a/b
4: G723.1
5: G722
6: G726 40Kbps
7: G726 32Kbps
8: G726 24Kbps
9: G726 16Kbps
10: G729.1

Enter the coder type - 3

<<IxDspCodeletMsgSetupAck received (ch=1, numDspReply=10, numErr=0)>>

---

- IxDspCodelet Demo Menu -
---

0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit
Please select test item - 1
Enter the channel number (1,2,...; 0 for all channels) - 2
Coder types :
0:PassThru (for debug only)
1:G711_10ms u-Law
2:G711_10ms A-Law
3:G729a/b
4:G723.1
5:G722
6:G726 40Kbps
7:G726 32Kbps
8:G726 24Kbps
9:G726 16Kbps
10:G729.1
Enter the coder type - 3
<<IxDspCodeletMsgSetupAck received (ch=2, numDspReply=10, numErr=0)>>

On Board-1:
----------------------------------------
|     |IXDspCodelet Demo Menu |
|---------------------------------------|
----------------------------------------
0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit
Please select test item - 12

---------------------------------------------------------------
- IxDspCodelet Socket Menu -
---------------------------------------------------------------
0 - Print Menus
1 - Channel Configuration
2 - Disable Channel
3 - Show Channel Configuration
4 - Show Channel Statistics
5 - Create Sockets
6 - Default Configuration
7 - Exit

Please select test item - 1
Enter the Src channel number (1,2 ...) - 1
Enter the Dst channel number (1,2 ...) - 1
Enter the Dst IP: 192.168.20.2

---------------------------------------------------------------
- IXDspCodelet Socket Menu -
----------------------------------------
0 - Print Menus
1 - Channel Configuration
2 - Disable Channel
3 - Show Channel Configuration
4 - Show Channel Statistics
5 - Create Sockets
6 - Default Configuration
7 - Exit
Please select test item - 1
Enter the Src channel number (1,2 ...) - 2
Enter the Dst channel number (1,2 ...) - 2
Enter the Dst IP:192.168.20.2
----------------------------------------
- IXDspCodelet Socket Menu -
----------------------------------------
0 - Print Menus
1 - Channel Configuration
2 - Disable Channel
3 - Show Channel Configuration
4 - Show Channel Statistics
5 - Create Sockets
6 - Default Configuration
7 - Exit
Please select test item - 5
*** DSP Codelet Socket And Voice Channel Config Info ***
Chan#:RxSock#:TxSock#:Cfg:Act:Loc Port: Remote IP:Rem Port
----------------------------------------
----------------------------------------
- IxDspCodelet Socket Menu -

0 - Print Menus
1 - Channel Configuration
2 - Disable Channel
3 - Show Channel Configuration
4 - Show Channel Statistics
5 - Create Sockets
6 - Default Configuration
7 - Exit

Please select test item - 7

- IxDspCodelet Demo Menu -

0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit

Please select test item - 11

----------------------------------------
-      IxDspCodelet Diagnostic Menu    -
----------------------------------------

 0 - Print Menu
 1 - Reset a resource
 2 - Start a resource
 3 - Stop a resource
 4 - Ping a resource
 5 - Set multiple params
 6 - Start codec
 7 - Start Player
 8 - Play tones
 9 - Play FSK data
10 - Receive digits
11 - Receive FSK
12 - Get XR statistics
13 - Start an IP term
14 - Stop an IP term
15 - Setup call w/parms
16 - Set clear channel
17 - Link 2 terms
18 - Create 3W call
19 - Back to 2W call
20 - T38 Switch
21 - Load a voice prompt
22 - Play raw data file
23 - Exit

Please select test item - 18

Instance No (1-4): 1
Type of Party 1 (1:TDM, 2:IP) - 1
Channel of party 1 - 1
Type of Party 2 (1:TDM, 2:IP) - 2
Channel of Party 2 = 1
Type of Party 3 (1:TDM, 2:IP) = 2
Channel of Party 3 = 2

<<IxDspCodeletMsg3WAck received (ch=1, numDspReply=9, numErr=0)>>

----------------------------------------
| IxDspCodelet Diagnostic Menu |
----------------------------------------
0 - Print Menu
1 - Reset a resource
2 - Start a resource
3 - Stop a resource
4 - Ping a resource
5 - Set multiple params
6 - Start codec
7 - Start Player
8 - Play tones
9 - Play FSK data
10 - Receive digits
11 - Receive FSK
12 - Get XR statistics
13 - Start an IP term
14 - Stop an IP term
15 - Setup call w/parms
16 - Set clear channel
17 - Link 2 terms
18 - Create 3W call
19 - Back to 2W call
20 - T38 Switch
21 - Load a voice prompt
22 - Play raw data file
23 - Exit
Please select test item - 23

----------------------------------------
Please select test item - 5
Enter the instance number (1,2,...; 0 for all instance) - 1
Enter the resource number


DSP resource ENC[1] parameters

<table>
<thead>
<tr>
<th>id</th>
<th>value</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Current state (0:Idle, 1:Active)</td>
</tr>
<tr>
<td>1,5</td>
<td>116</td>
<td>L-Port Stream ID (T-Port Base -</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TDM:0, IP:3, Player:11, Mixer:15)</td>
</tr>
<tr>
<td>2,5</td>
<td>0</td>
<td>AGC enable/disable (0:OFF, 1:ON)</td>
</tr>
</tbody>
</table>
3 0 VAD enable/disable (0:OFF, 1:ON)
4 1 Code type (0:PassThru, 1:G711u, 2:G711a, 3:G729a,
    4:G723, 5:G722, 6:G726_40, 7:G726_32, 8:G726_24,
    9:G726_16, 10:G729.1)
5 1 Number of frames per packet
6 0 Packet-loss report (0:OFF, 1:ON)
7 1 G723 encoding rate (0:6.3k, 1:5.3k)
8 96 G726 40Kbps RTP payload type
9 97 G726 32Kbps RTP payload type
10 98 G726 24Kbps RTP payload type
11 99 G726 16Kbps RTP payload type
12 0 G726 packing format (0:LSB - VoIP, 1:MSB - AAL)
13 0 Volume adjustment in dB (+15 ~ -40). -99 for mute
14 100 G729.1 RTP payload type
15 0 G729.1 Encoding rate(0:8k, 1:12k, 2:14k, 3:16k,
    4:18k, 5:20k, 6:22k, 7:24k, 8:26k, 9:28k, 10:30k, 11:32k)
Enter the parameter id - 4
Enter the parameter value - 3
<<MsgAck received (ch=1 res=ENC)>>

----------------------------------------
|      IxDspCodelet Demo Menu          |
----------------------------------------
0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
Please select test item - 5
Enter the instance number (1,2,...; 0 for all instance) - 1
Enter the resource number


DSP resource DEC[1] parameters

<table>
<thead>
<tr>
<th>id</th>
<th>value</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 0</td>
<td>Current state (0:Idle, 1:Active)</td>
<td></td>
</tr>
<tr>
<td>1 0</td>
<td>Volume adjustment in dB (+15 ~ -40). -99 for mute</td>
<td></td>
</tr>
<tr>
<td>2 1</td>
<td>ALC enable/disable (0:OFF, 1:ON)</td>
<td></td>
</tr>
<tr>
<td>3 1</td>
<td>CNG enable/disable (0:OFF, 1:ON)</td>
<td></td>
</tr>
<tr>
<td>4 1</td>
<td>Code type (0:PassThru, 1:G711u, 2:G711a, 3:G729a, 4:G723, 5:G722, 6:G726_40, 7:G726_32, 8:G726_24, 9:G726_16, 10:G729.1)</td>
<td></td>
</tr>
<tr>
<td>5 0</td>
<td>Packet-loss report (0:OFF, 1:ON)</td>
<td></td>
</tr>
<tr>
<td>6 1</td>
<td>Report packet type change (0:OFF, 1:ON)</td>
<td></td>
</tr>
<tr>
<td>7 -1</td>
<td>OR’d auto-switch cntrl bits (1:G711u, 2:G711a, 4:G729a, 8:G723, 16:G722, 32:G726_40, 64:G726_32, 128:G726_24, 256:G726_16, 512:G729.1)</td>
<td></td>
</tr>
<tr>
<td>8 200</td>
<td>Jitter buffer maximum delay in ms (10 ~ 500)</td>
<td></td>
</tr>
<tr>
<td>9 1</td>
<td>Jitter buffer packet loss rate (in 0.1% unit)</td>
<td></td>
</tr>
<tr>
<td>10 1</td>
<td>Jitter buffer mode (0:Static 1:Histogram 2:RFC3550)</td>
<td></td>
</tr>
<tr>
<td>11 96</td>
<td>G726 40Kbps RTP payload type</td>
<td></td>
</tr>
<tr>
<td>12 97</td>
<td>G726 32Kbps RTP payload type</td>
<td></td>
</tr>
</tbody>
</table>
13 98     G726 24Kbps RTP payload type
14 99     G726 16Kbps RTP payload type
15 0      G726 packing format (0:LSB - VoIP, 1:MSB - AAL)
16 100     G729.1 RTP payload type
Enter the parameter id - 4
Enter the parameter value - 3
<<MsgAck received (ch=1 res=DEC)>>

IxDspCodelet Demo Menu

0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit

Please select test item - 5
Enter the instance number (1,2,...; 0 for all instance) - 2
Enter the resource number
DSP resource DEC[2] parameters

<table>
<thead>
<tr>
<th>id</th>
<th>value</th>
<th>definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>Current state (0:Idle, 1:Active)</td>
</tr>
<tr>
<td>1</td>
<td>0</td>
<td>Volume adjustment in dB (+15 ~ -40). -99 for mute</td>
</tr>
<tr>
<td>2</td>
<td>1</td>
<td>ALC enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
<td>CNG enable/disable (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>4</td>
<td>1</td>
<td>Code type (0:PassThru, 1:G711u, 2:G711a, 3:G729a, 4:G723, 5:G722, 6:G726_40, 7:G726_32, 8:G726_24, 9:G726_16, 10:G729.1)</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>Packet-loss report (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>Report packet type change (0:OFF, 1:ON)</td>
</tr>
<tr>
<td>7</td>
<td>-1</td>
<td>OR'd auto-switch cntrl bits (1:G711u, 2:G711a, 4:G729a, 8:G723, 16:G722, 32:G726_40, 64:G726_32, 128:G726_24, 256:G726_16, 512:G729.1)</td>
</tr>
<tr>
<td>8</td>
<td>200</td>
<td>Jitter buffer maximum delay in ms (10 ~ 500)</td>
</tr>
<tr>
<td>9</td>
<td>1</td>
<td>Jitter buffer packet loss rate (in 0.1%% unit)</td>
</tr>
<tr>
<td>10</td>
<td>1</td>
<td>Jitter buffer mode (0:Static 1:Histogram 2:RFC3550)</td>
</tr>
<tr>
<td>11</td>
<td>96</td>
<td>G726 40Kbps RTP payload type</td>
</tr>
<tr>
<td>12</td>
<td>97</td>
<td>G726 32Kbps RTP payload type</td>
</tr>
<tr>
<td>13</td>
<td>98</td>
<td>G726 24Kbps RTP payload type</td>
</tr>
<tr>
<td>14</td>
<td>99</td>
<td>G726 16Kbps RTP payload type</td>
</tr>
<tr>
<td>15</td>
<td>0</td>
<td>G726 packing format (0:LSB - VoIP, 1:MSB - AAL)</td>
</tr>
<tr>
<td>16</td>
<td>100</td>
<td>G729.1 RTP payload type</td>
</tr>
</tbody>
</table>

Enter the parameter id - 4
Enter the parameter value - 3

<<MsgAck received (ch=2 res=DEC)>>
- IxDspCodelet Demo Menu -

0 - Print Menu
1 - Channel Setup
2 - Channel Teardown
3 - Show Channel Parameters
4 - Show Resource Parameters
5 - Set a Parameter
6 - Caller ID Demo
7 - Gateway and Fax Bypass Demo
8 - 3-Way Call Demo
9 - Player Demo
10 - SLIC APIs
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit

Please select test item - 5
Enter the instance number (1,2,...; 0 for all instance) - 2
Enter the resource number

DSP resource ENC[2] parameters

id value definition

<table>
<thead>
<tr>
<th>id</th>
<th>value definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Current state (0:Idle, 1:Active)</td>
</tr>
<tr>
<td>117</td>
<td>L-Port Stream ID (T-Port Base - TDM:0, IP:3, Player:11, Mixer:15)</td>
</tr>
<tr>
<td>2</td>
<td>AGC enable/disable (0:OFF, 1:ON)</td>
</tr>
</tbody>
</table>
Enter the parameter id = 4
Enter the parameter value = 3
<<MsgAck received (ch=2 res=ENC)>>
11 - Diagnostic
12 - Socket Configuration
13 - CPU Occupancy
14 - CIDCW Demo
15 - Pulse Dial
16 - Set Plug-in parameter(s)
17 - Show Plug-in parameter(s)
18 - Multiconference Demo
19 - Exit

Please select test item - 11

----------------------------------------
| IxDspCodelet Diagnostic Menu            |
----------------------------------------
| 0  | Print Menu          |
| 1  | Reset a resource    |
| 2  | Start a resource    |
| 3  | Stop a resource     |
| 4  | Ping a resource     |
| 5  | Set multiple params |
| 6  | Start codec         |
| 7  | Start Player        |
| 8  | Play tones          |
| 9  | Play FSK data       |
| 10 | Receive digits      |
| 11 | Receive FSK         |
| 12 | Get XR statistics   |
| 13 | Start an IP term    |
| 14 | Stop an IP term     |
| 15 | Setup call w/parms  |
| 16 | Set clear channel   |
| 17 | Link 2 terms        |
| 18 | Create 3W call      |
| 19 | Back to 2W call     |
20 - T38 Switch
21 - Load a voice prompt
22 - Play raw data file
23 - Exit
Please select test item - 13
IP channel = 1

<<IxDspCodeletMsgSetupAck received (ch=1, numDspReply=3, numErr=0)>>

------------------------------------------------------------------------
| IxDspCodelet Diagnostic Menu |
------------------------------------------------------------------------
0 - Print Menu
1 - Reset a resource
2 - Start a resource
3 - Stop a resource
4 - Ping a resource
5 - Set multiple params
6 - Start codec
7 - Start Player
8 - Play tones
9 - Play FSK data
10 - Receive digits
11 - Receive FSK
12 - Get XR statistics
13 - Start an IP term
14 - Stop an IP term
15 - Setup call w/parms
16 - Set clear channel
17 - Link 2 terms
18 - Create 3W call
19 - Back to 2W call
20 - T38 Switch
21 - Load a voice prompt
22 - Play raw data file
23 - Exit
Please select test item - 13
IP channel - 2

<<IxDspCodeletMsgSetupAck received (ch=2, numDspReply=3, numErr=0)>>

Setting up conference calls with narrowband, wideband, and combination of both using two boards:

Case 1: Both boards narrowband:
This case is explained in detail in Section 3.20.1.

Case 2: Both boards wideband:
1. Configure the SLIC to wideband at the start of the codelet application for both the boards.
2. Steps to setup conference are same as in section 3.20.1 except that wideband (G.722) codec should be selected for all IP terminations.

Case 3: Mixer Board wideband and board-2 narrowband:
1. Configure the SLIC to wideband at the start of the codelet application for Mixer board.
2. Configure the SLIC to narrowband at the start of the codelet application for board-2.
3. Steps to set up the conference are the same as in Section 3.20.1

Note: Codec type [G.711, G.723, G.726, G.729] selected for IP termination in Mixer board should match with board-2 IP termination codec types.

Case 4: Mixer board narrowband and board-2 wideband:
1. Configure the SLIC to narrowband at the start of the codelet application for Mixer board.
2. Configure the SLIC to wideband at the start of the codelet application for board-2.
3. Steps to setup conference are same as in section 3.20.1 except IP terminations in both boards should be configured with wideband codec (G.722)

3.21 Menu Selection 19: Exit

When selected, the test menu is exited to the system shell. The test menu can be re-entered by using the ‘IxDspCodeletApp’ command.