Dialogic
Making Innovation Thrive

Dialogic® SS7 Software for Dialogic® Diva® Interfaces

Reference Guide

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Contents

About This Publication

How to use this online guide

- To view a section, click the corresponding bookmark located on the left.
- To view a topic that contains further information, click the corresponding blue underlined phrase.
- You may wish to print out the pages required for installing the drivers.

Structure of this guide

This guide provides a detailed description of how to install and configure the Dialogic® SS7 Software for Dialogic® Diva® Interfaces.

This guide is structured as follows:

Section	Contents
About The Dialogic® SS7 Software for Dialogic® Diva® Interfaces	The SS7 Software for Diva Interfaces features and supported Dialogic® Diva® Media Boards.
Preparing The Dialogic® Diva® Media Boards	Preparations before using the SS7 Software for Diva Interfaces.
Installing The Dialogic® SS7 Software for Dialogic® Diva® Interfaces	Installation of the SS7 Software for Diva Interfaces.
Dialogic® Diva® System Release Software Configuration	Modifications in the Dialogic® Diva® Configuration Wizard, activation and installation of the license file.
Starting The Dialogic® SS7 Software for Dialogic® Diva® Interfaces	Start and verification of the SS7 Software for Diva Interfaces.
Tracing	Creation of traces with the Diva Configuration Wizard.
Uninstalling	Uninstallation of the SS7 Software for Diva Interfaces.
Troubleshooting	How to solve problems with the SS7 Software for Diva Interfaces.
Management Interface of the SSDD Process	Parameters of the ssdd management interface.
Management Interface of the DVSCC Process	Parameters of the Diva Virtual Signaling Call Control management interface.
Glossary	Common terms in the SS7 environment.
Examples of the Default Configuration Files	Examples and explanation of the default SS7 for Diva Interfaces configuration file.

Chapter 1: About The Dialogic® SS7 Software for Dialogic® Diva® Interfaces

The SS7 Software for Diva Interfaces is an add-on for the Dialogic® Diva® System Release software. It enables you to have connectivity over the SS7 signaling network and still be able to use applications with standard programming interfaces like CAPI and the Dialogic® Diva® SDK.

This reference guide describes the basic Linux configuration for the SS7 Software for Diva Interfaces. It is intended to provide advice and instructions on how to install the SS7 for Diva Interfaces modules as add-on software for the Diva System Release software.

1.1 Dialogic® SS7 Software for Dialogic® Diva® Interfaces

- Basic inbound and outbound calls
- Support for SS7 MTP/ISUP protocols
- SS7 Signaling End Point (SEP) functionality
- Connection to other SEP or Signaling Transfer Point (STP)
- Associated signaling mode (SS7 link and bearer channels on same trunk)
- Quasi-associated signaling mode via STP (one or more SS7 link(s) on one or more trunk(s), bearer channels on different trunks)
- User-defined trunk number(s) and 64 kbps timeslot(s) for signaling link(s)
- Up to 16 E1 trunks per installation
- Up to 496 bearer channels per installation
- Up to 4 signling links and up to 4 linksets
- Support of B-channel types (speech, 3.1 kHz audio, 64 kbps transparent, Data, 3G Video GW)
- Configuration for MTP 2 and 3, ISUP and call control parameters per text file
- Blocking/unblocking according to ITU-T ISUP
- User mode management interface for SSDD and DVSCC
- Dialogic® Diva® DSI management for MTP3 and ISUP
- Enable dynamic change of:
  - blocking states
  - debug mask
  - via user mode management interface
- Representation of layer 1 state on ISUP via blocking, e.g., if Layer 1 goes down on a trunk, the related interface is blocked
- Event disabling signaling is represented on ISUP via blocking, e.g., if the signaling connection between the trunk card and the SS7 system service is down, the related interface is blocked
- Representation of blocking state on specific channels via the Dialogic® Diva® Management software.

1.2 Supported hardware

The Dialogic® Diva® Media Board product family includes PCI and PCI Express (PCIe) form factor boards described in the Dialogic® Diva® Media Board Installation Guide, which is available for download at: www.dialogic.com/manuals.

The Dialogic® SS7 Software for Dialogic® Diva® Interfaces software supports the following Diva Media Boards:

Diva PRI:

- Diva PRI/E1/T1-CTI PCI
- Diva PRI/E1/T1-8 PCI and PCIe
- Diva PRI/T1-24 PCI and PCIe
- Diva PRI/E1-30 PCI and PCIe

Diva V-PRI:

- Diva V-PRI/T1-24 PCI and PCIe
- Diva V-PRI/E1-30 PCI and PCIe

Diva UM-PRI:

- Diva UM-PRI/T1-24 PCI and PCIe
- Diva UM-PRI/E1-30 PCI and PCIe

Diva Multiport PRI:

- Diva V-2PRI/T1-48 PCI
- Diva V-2PRI/E1-60 PCI
- Diva V-4PRI/T1-96 PCI
- Diva V-4PRI/E1-120 PCI
- Diva V-1PRI/E1/T1-30 PCIe HS
- Diva V-2PRI/E1/T1-60 PCIe HS
- Diva V-4PRI/E1/T1-120 PCIe HS
- Diva V-4PRI/E1/T1-120 PCIe FS
- Diva V-8PRI/E1/T1-240 PCIe FS

Note: "HS" stands for the half size and "FS" for the full size board format.

Chapter 2: Preparing The Dialogic® Diva® Media Boards

The Dialogic® SS7 Software for Diva® Interfaces software is included in the Dialogic® Diva® System Release software. You can download the files for installing the software from the Dialogic web site at:

http://www.dialogic.com/products/tdm_boards/system_release_software/Diva_for_Linux.htm

The online Dialogic® Diva® System Release LIN Reference Guide provides help for the installation of the software. You can download it from the Dialogic web site at:

http://www.dialogic.com/manuals.htm

The drivers of the SS7 Software for Diva Interfaces are installed together with the Diva System Release.

Chapter 3: Installing The Dialogic® SS7 Software for Dialogic® Diva® Interfaces

The SS7 Software for Diva Interfaces drivers are provided together with the Dialogic® Diva® System Release software. If you upgrade from an former SS7 Software for Diva Interfaces version and have not changed the folder structure, the configuration of the previous version is used.

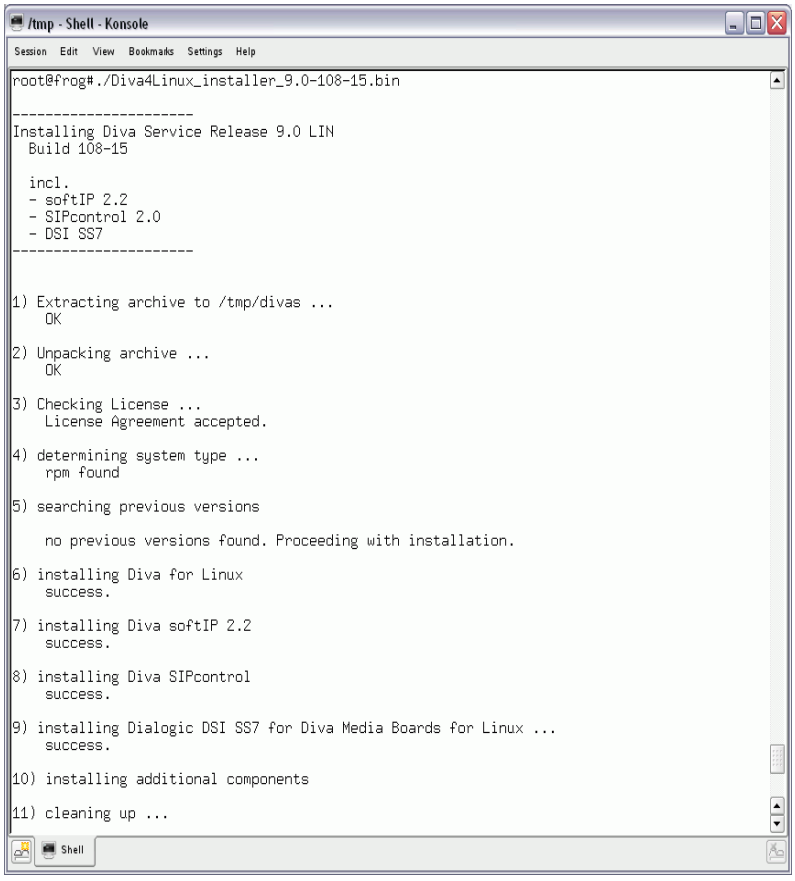
Notes:

- If you want to replace an existing Dialogic® Diva® softSS7 software installation with the SS7 software for Diva Interfaces, the existing Diva softSS7 software installation will not be removed.
- If you have the Diva softSS7 software previously installed and you want to install the SS7 Software for Diva Interfaces, you need to manually rename the directory 'usr/lib/opendiva/divas.ss7'.

To install the Diva System Release software, do the following:

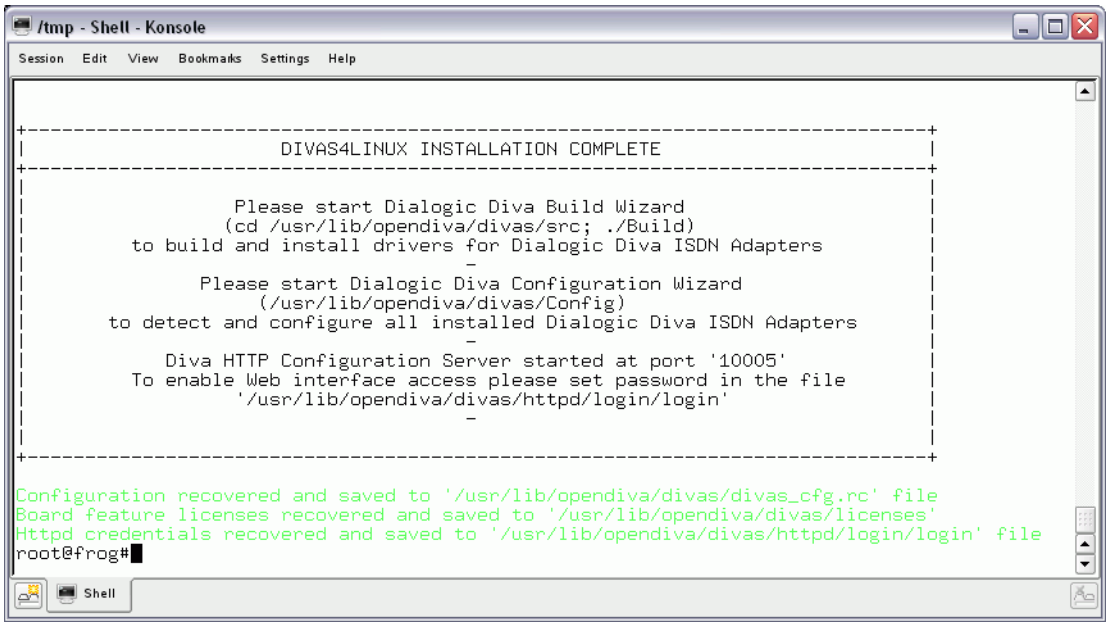
1. Login to the Linux system with root permissions.
2. Download the Diva System Release software from: http://www.dialogic.com/products/tdm_boards/system_release_software/Diva_for_Linux.htm and store it on your hard disk, e.g., under `/tmp/`.
3. Change to the directory in which the installer-.bin file is located, e.g., `cd /tmp`.
4. Start the installation: `./Diva4Linux_installer-<build number>.bin`

   During the installation, you will be asked to accept the End-User License Agreement and to confirm the installation.



5. After the installation is complete, press the **Return** button to finish the installation.

6. Follow the instructions shown in the graphic below:



- Start the Dialogic® Diva® Build Wizard to build and install the drivers for Diva Media Boards:
  `cd /usr/lib/opendiva/divas/src; ./Build`
- To configure the Diva Media Boards, either
  - start the Dialogic® Diva® Configuration Wizard to detect and configure the installed Diva Media Boards: `/usr/lib/opendiva/divas/Config`
    or
  - start the Dialogic® Diva® web Configuration Server at port 10005. To enable the web interface access, change the password in the following file: `/usr/lib/opendiva/divas/httpd/login/login` .

    Use an editor of your choice, delete the first line "XX" characters and replace them with your password. The password needs to be at least 7 digits long.

The table below shows the files that are copied into the installation directory `/usr/lib/opendiva/dlgss7` for the SS7 Software for Diva Interfaces.

File	Purpose
`ssdd`	Dialogic® SS7 Software for Dialogic® Diva® Interfaces board management and interface process for Diva Media Boards (Signalling Service Device Driver).
`mtp_lnx6`	SS7 for Diva Interfaces MTP3 is the layer 3 (network layer) of an SS7 stack.
`isp_lnx6`	SS7 for Diva Interfaces ISUP is the ISDN User Part of SS7 it abstracts ISDN signaling and adds additional functionality to it.
`dvscc`	Diva Virtual Signaling Call ControlSS7, it translates ISUP primitives into Diva signaling primitives forwarded to and received from the virtual signaling protocol running on the Diva Media Board. Component of SS7 for Diva Interfaces for Linux.
`gctlib.lib`	Library to be linked with user's application.
`system.txt`	Example system configuration file
`config.txt`	Example protocol configuration file
`versions.txt`	Hold version information of components

File	Purpose
gctload	Task that initializes the Dialogic® DSI SS7 host system environment and starts up all other processes (such as ssdd and dvscc), deriving the process and message queue configuration from the system.txt file.
tick_lnx tim_lnx s7_mgt s7_log s7_play actlinks mtpsl	Executables for use as described in the Dialogic® DSI SS7 Software for Dialogic® Diva® Media Boards Programmer's Manual (Linux version).

To enable the dynamic linking of gctlib.lib (libgctlib.so), the following symbolic links are created by the installation:

/usr/lib/libgctlib.so -> /usr/lib/opendiva/dlgss7/libgctlib.so.1.0.0

/usr/lib/libgctlib.so.1 -> /usr/lib/opendiva/dlgss7/libgctlib.so.1.0.0

/usr/lib/libgctlib.so.1.0.0 -> /usr/lib/opendiva/dlgss7/libgctlib.so.1.0.0

After you installed the software, continue with the Dialogic® Diva® System Release Software Configuration on page 16.

Chapter 4: Dialogic® Diva® System Release Software Configuration

After you have installed the Dialogic® Diva® System Release software as described in Installing The Dialogic® SS7 Software for Dialogic® Diva® Interfaces on page 13, configure the SS7-related Dialogic® Diva® Media Board parameters. You can either use:

- the Dialogic® Diva® Configuration web interface as described on page 17, or
- the Dialogic® Diva® Configuration Wizard as described page 24.

Before you start to configure the Diva Media Board parameters, activate the license file as described below.

4.1 License activation

Depending on the signaling requirements, you will need the following host licenses in conjunction with the Dialogic® DSI SS7 Software for Dialogic® Diva® Media Boards software.

Product Name	Protocol
SS7SBMTP2D1 SS7SBMTP2D2 SS7SBMTP2D4	MTP2 Protocol Layer host license 1 link 2 links 4 links
SS7SBHSTMTP3	MTP3 Protocol Layer host license
SS7SBHSTISUP	ISUP Protocol Layer host license

Note: As specified above, MTP2 host licensed are available for 1, 2, or 4 links. One license file per protocol (e.g., MTP2) is supported.

These licenses are bound to a specific host, identified by a host ID. The host ID can be queried by calling:

```
cd /usr/lib/opendiva/dlgss7
```

```
./ssdd -v
```

In the install directory of DSI SS7 for Diva Media Boards software, the host ID will be displayed as follows:

```
The Licensing Host ID for this machine is: 0123456789ab.
```

Note, that there are different classes of licenses depending on the performance requirements which need to be satisfied. For further information on the Dialogic® SS7 Software for Dialogic® Diva® Interfaces host licensing, refer to Dialogic® DSI Protocol Stacks - Host Protocol Licensing User Guide - U32SSS.

Following the instruction in the Dialogic® DSI Protocol Stacks - Host Protocol Licensing User Guide - U32SS you will receive one or more license files via e-mail. Please copy the attached .lic files to a directory on the host, e.g., /usr/lib/opendiva/dlgss7/ (default license path). Copying the license files to this directory will include them automatically into the SS7 environment. In case you want to store the license in another directory, you need to extend your system.txt file with the correct license path (-Lp option) for the `ssdd`, `mtp_lnx6`, and `isp_lnx6` commands as described in Command Description on page 32.

For test purposes there is a possibility to run SS7 for Diva without a valid license key. For more information, see Testmode on page 31.

4.2 Regulatory and Geographic Considerations

Certain functions of Dialogic® Diva® Media Boards, although implemented in the hardware, have selectable options that are configured by the Dialogic® Diva® System Release LIN software. A user or integrator needs to consider the requirements of the application when choosing these settings, but must also consider any local regulatory requirements for the intended deployment location to ensure a compliant overall system. As an aid to this process, the table below details some of the areas where the correct selection of configuration options may be required.

Configuration Area		Dialogic® Diva® Media Board
T1/E1 Ports	Interface type	• Selected via D-channel protocol E1/T1[1]) (120 Ω balanced) • 75 Ω unbalanced requires an external unbalanced to balanced transformer
	Puls shape	Selected via D-channel protocol E1/T1
	Line code	Selected via D-channel protocol: • E1:HDB3 • T1:B8ZS
	Frame format	Selected via layer 1 framing • E1:multiframe (default) or double framing, no CRC • T1:ESF
	CRC/E-bit operation	Selected via layer 1 framing • E1:CRC4 • T1:CRC6

[1]) T1 includes J1

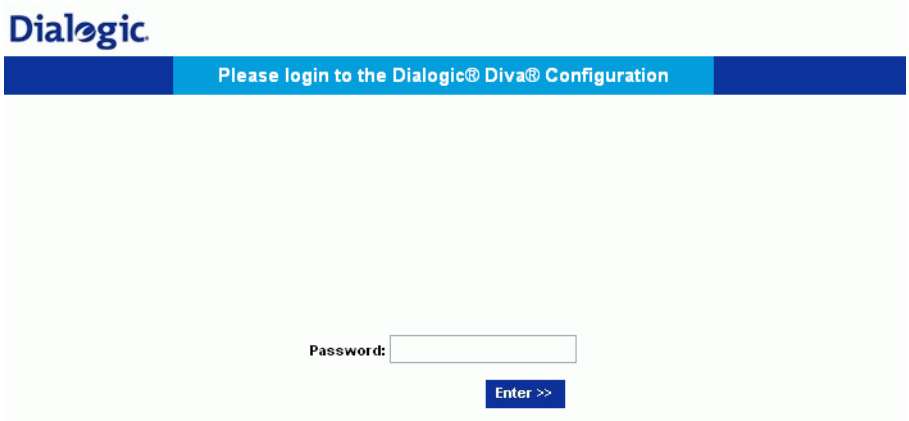
4.3 Configuration in the Dialogic® Diva® Configuration web interface

You can configure the necessary settings in the Diva Configuration web interface. To access the configuration via the web interface, you need to set an administration password as described on page 14. You can open the web interface either from the computer on which the Dialogic® SS7 Software for Dialogic® Diva® Interfaces software is installed or from a remote computer.

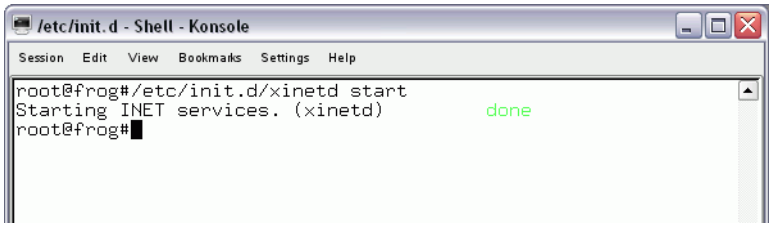
To open the web interface from the local computer, enter: http://localhost:10005.

To access the web interface from a remote computer, enter: http://<IP-addresss>:10005.

After you entered the URL, the login page appears, where you need to type the administration password.



If the server is not able to resolve the URL, make sure the inet services are started on the computer on which the Dialogic® Diva® System Release LIN software is installed, as shown in the graphic below.



After successful login, the main configuration page opens.

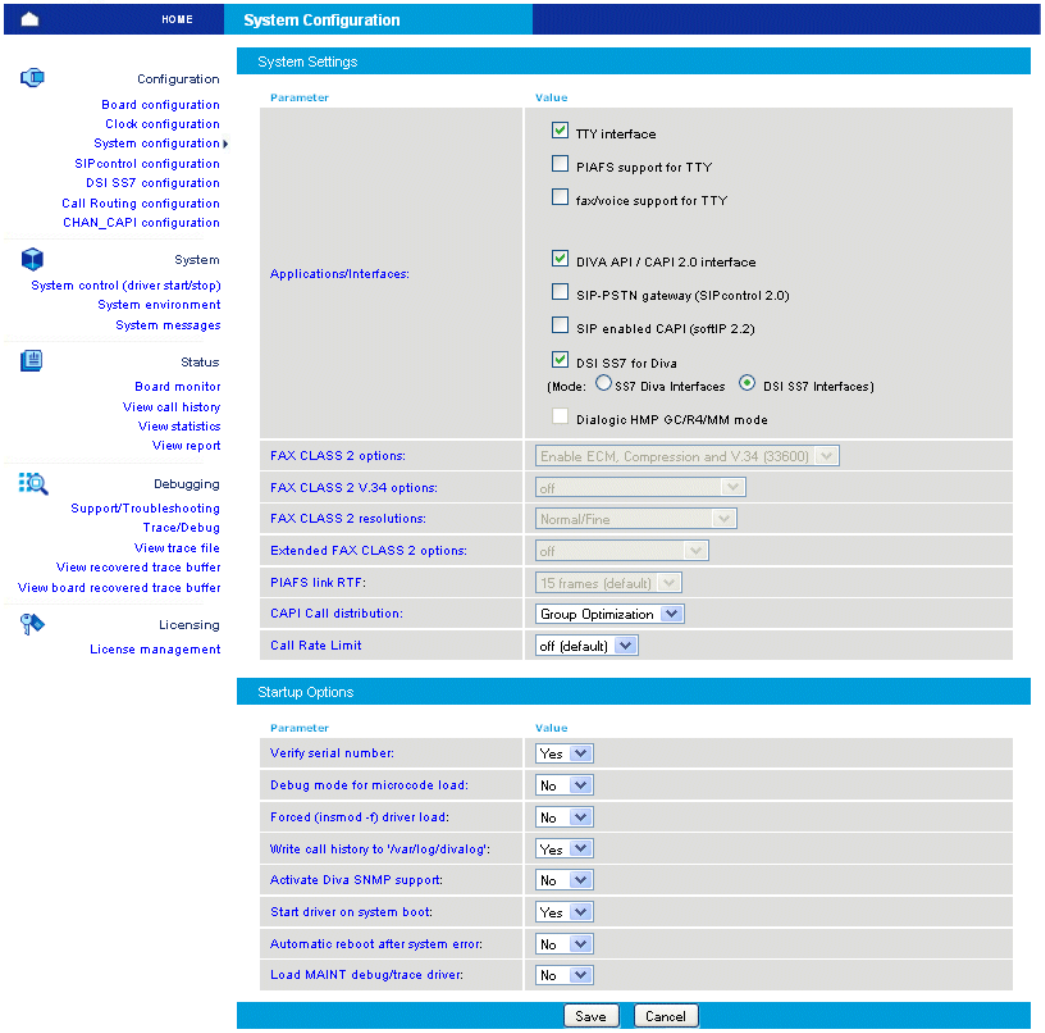
For the SS7 Software for Diva Interfaces, you need to configure the settings under:

- System configuration,
- Board configuration, and
- DSI SS7 configuration.

4.3.1 System configuration

Click **System configuration** on the left hand side. The following page appears:

Note: If you have the Dialogic® Diva® softSS7 software installed, the option **DSI SS7 for Diva** is replaced by **softSS7**.

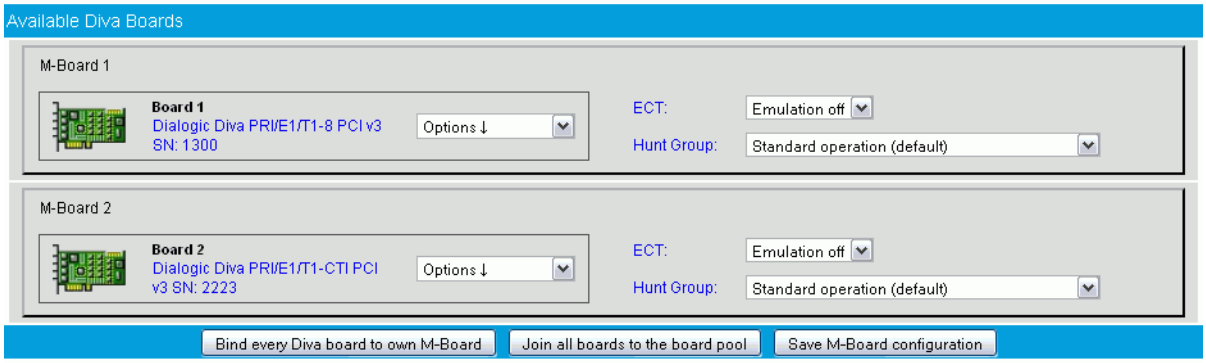


The system configuration consists of two sections:

- **System Settings**: For Dialogic® DSI SS7 Software for Dialogic® Diva® Media Boards settings. Enable the **Diva API / CAPI 2.0 interface** and the **DSI SS7 for Diva** option with the **DSI SS7 Interfaces** mode.
- **Startup Options**: To set up the necessary settings for the system behavior on startup. The following parameters are set to **Yes** by default: **Verify serial number**, **Start driver on system boot**, and **Load Maint/debug driver on system start**.

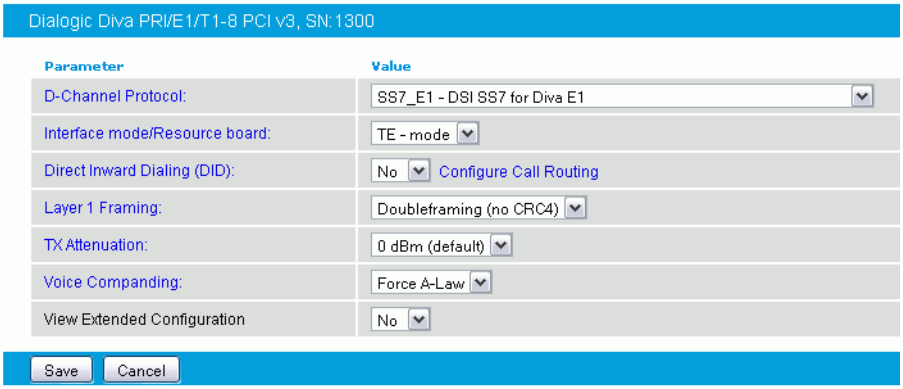
4.3.2 Board configuration

1. Click **Board configuration** on the left hand side. The following page opens:



Click the Dialogic® Diva® Media Board icon of the board you want to configure.

2. A page dislaying the Diva Media Board parameters opens:



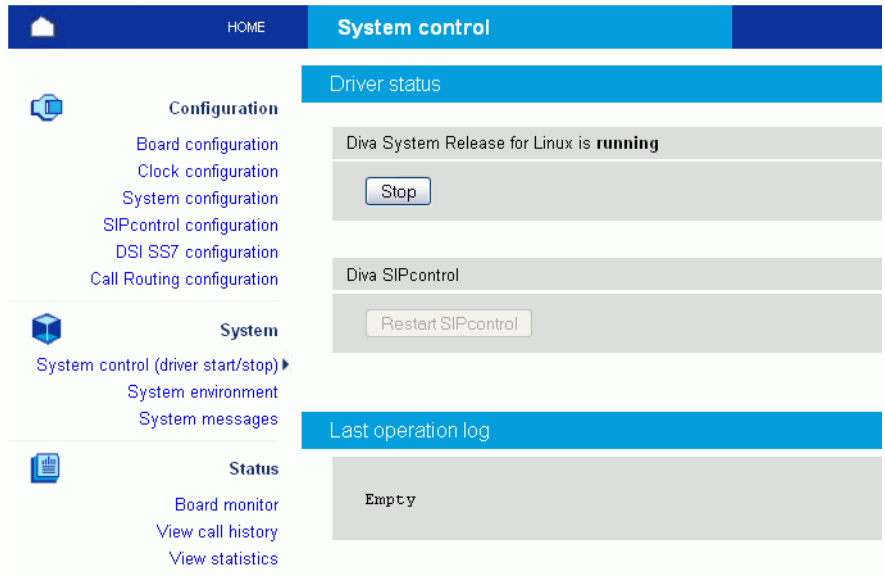
Configure the parameters according to your system configuration. For the Dialogic® SS7 Software for Dialogic® Diva® Interfaces software, you may choose between the values shown in the table below.

Parameter	Value
D-Channel Protocol	• SS7_E1 - DSI SS7 for E1 lines • SS7_T1 - DSI SS7 for T1 lines
Interface mode resource	• TE - mode • NT - mode
Direct Inward Dialing	Enable: • Yes • No
TX Attenuation	• 0 dbm (default) • -7.5 dbm • -15 dbm
Voice Companding	• Force A-Law • Force µ-Law

3. After you have made the changes, click **Save** to write the changes to the Diva Media Board configuration file.

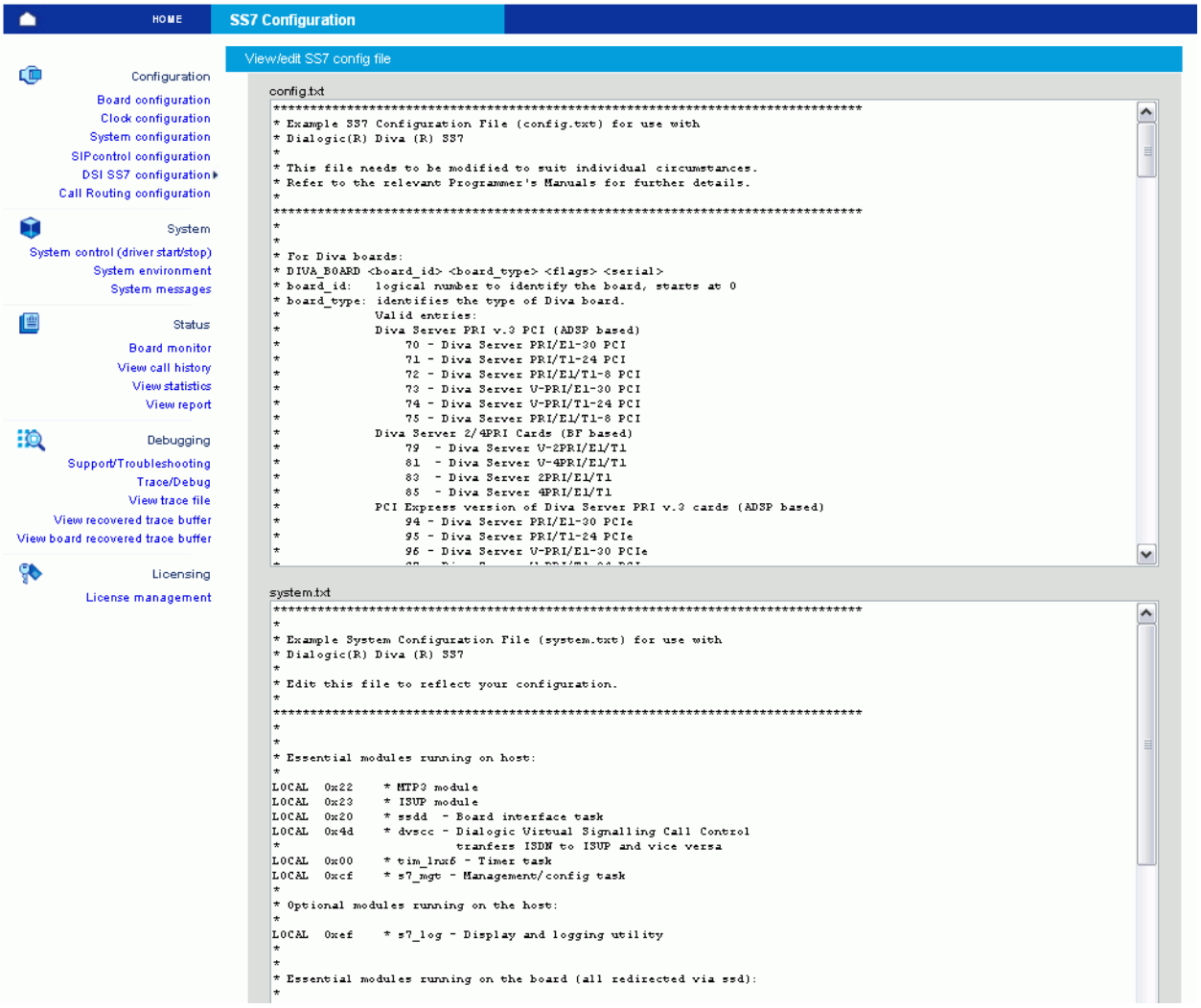
`usr/lib/opendiva/divas/divas_cfg.rc`

4. Restart your Diva Media Board for the changes to take effect. To do so, click **System control (driver start/stop)** on the left hand side and under **Driver status** click **Stop** and then **Start**.



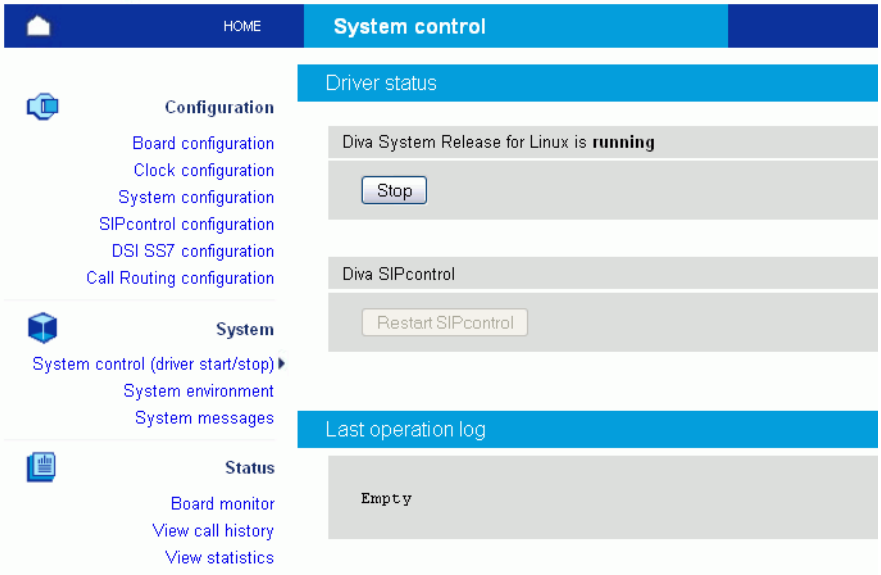
4.3.3 DSI SS7 configuration

1. Click **DSI SS7 configuration** on the left hand side of the main configuration page. The following page opens:



2. Change the configuration files according to your network setup as described under Dialogic® SS7 Software Configuration on page 30.
3. To save your settings, press the **change config** button.

4. Restart your Diva Media Board for the changes to take effect. To do so, click **System control (driver start/stop)** on the left hand side and under **Driver status** click **Stop** and then **Start**.



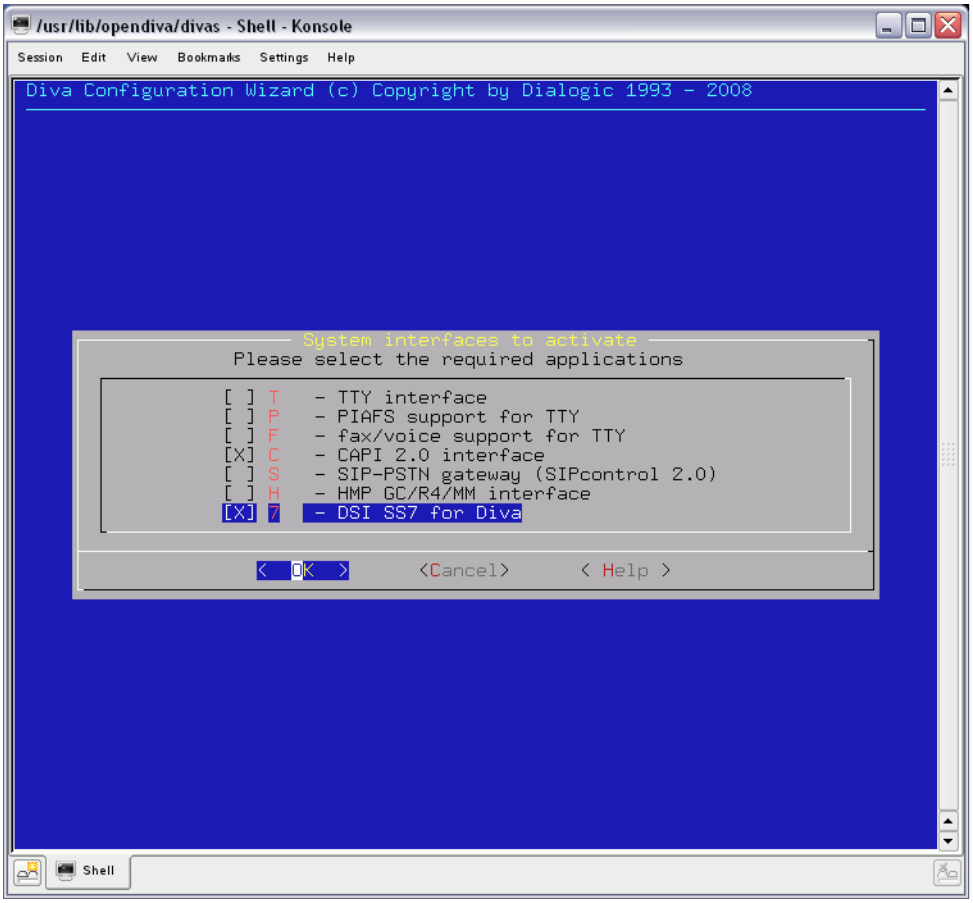
4.4 Configuration with the Dialogic® Diva® Configuration Wizard

1. To start the Diva Configuration Wizard, execute the following command:

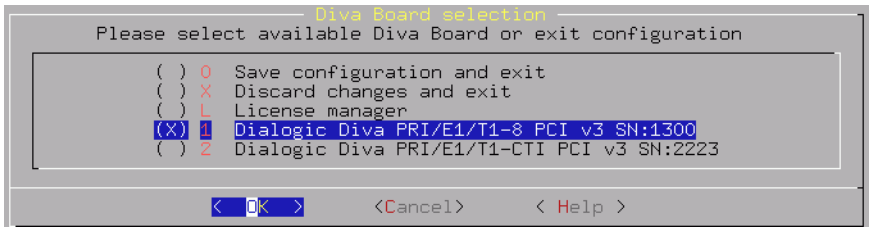
   ```
   /usr/lib/opendiva/divas/Config
   ```

   - To navigate in the wizard, use <up> and <down> keys.
   - To select a choice, use <space>.

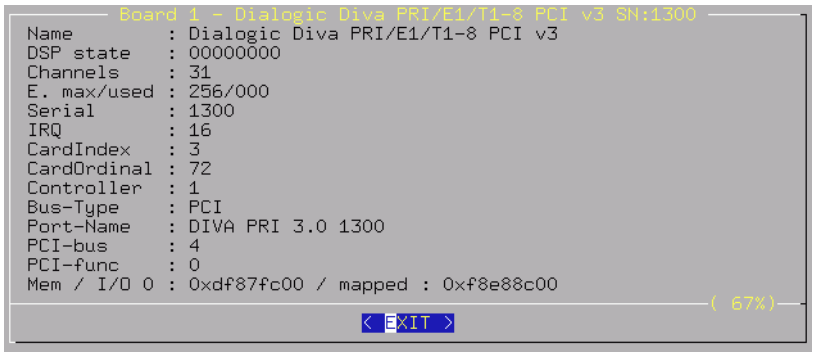
2. Select **CAPI 2.0 interface** and **DSI SS7 for Diva**.



3. Install the License via the License Manager as described in License activation on page 16.
4. Select the board you want to configure and click **<OK>**.

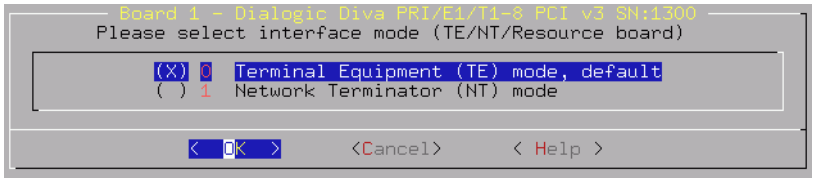


5. Some information about the selected Diva Media Board is displayed.



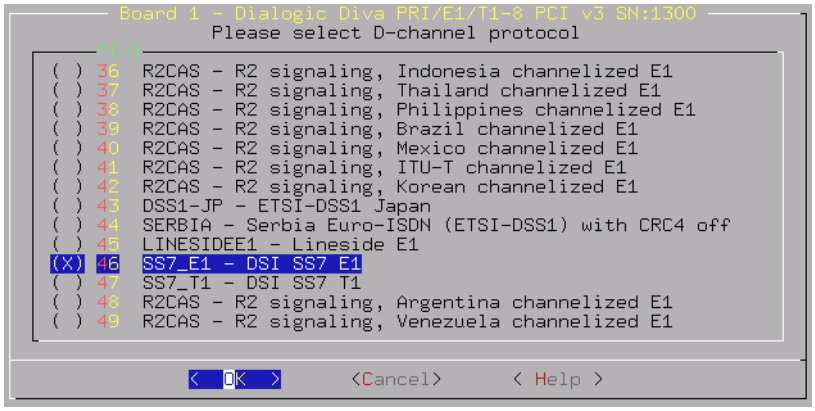
Click **<EXIT>**.

6. If the network provides the clock for the signaling, set the interface mode to **Terminal Equipment (TE) mode, default** otherwise select **Network Termination (NT) mode**.



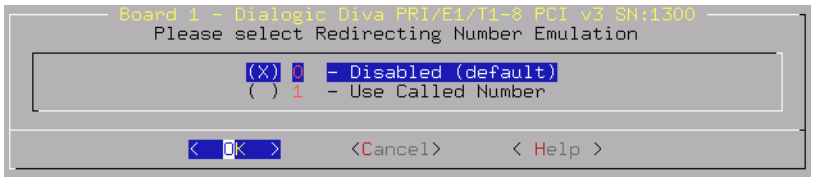
Click **<OK>**.

7. Select as D-Channel protocol SS7 with the variant E1 or T1. For details about the configuration settings, refer to Regulatory and Geographic Considerations on page 17.



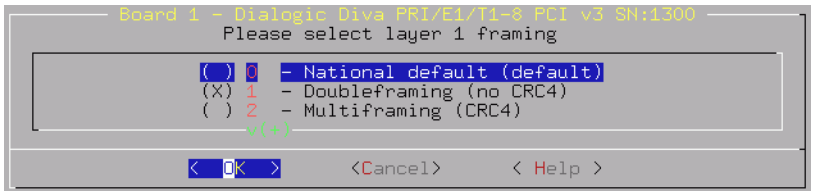
Click **<OK>**.

8. Select the redirecting number emulation settings.



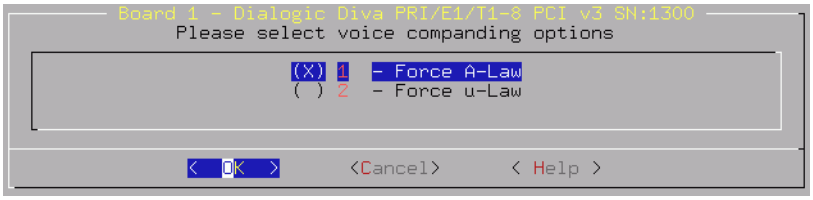
Click **<OK>**.

9. Select the layer 1 framing. Depending on the network, leave the default value **Multiframing (CRC4)** or select **Doubleframing (no CRC4)**.



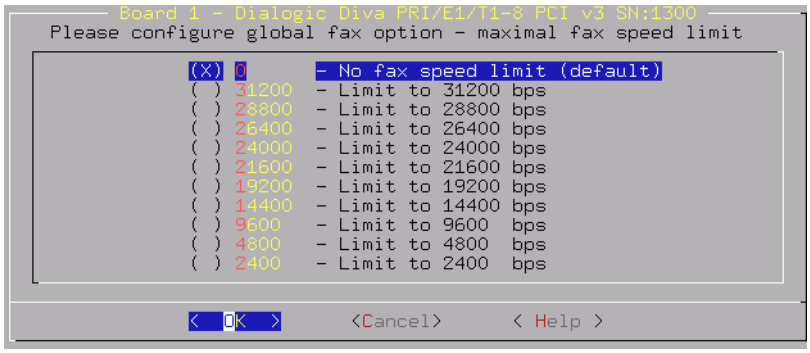
Click **<OK>**.

10. Select voice companding options. The default value for E.1 is a-law and μ-law for T.1.



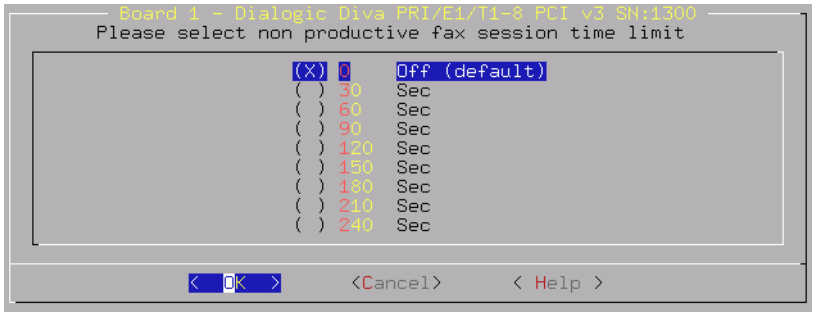
Click **<OK>**.

11. Select the fax speed limit. (Relevant for media applications using fax.)



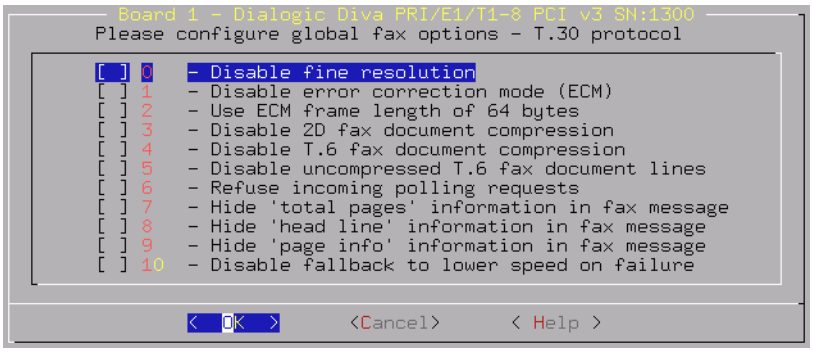
Click **<OK>**.

12. Select the non-productive fax session time limit. (Relevant for media applications using fax.)



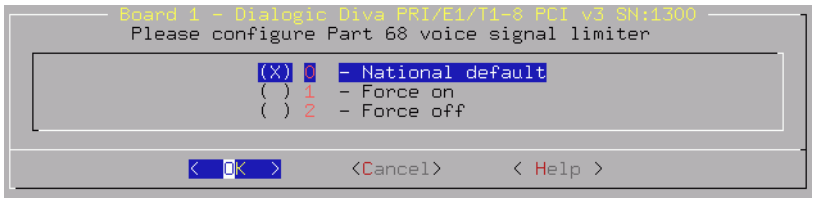
Click **<OK>**.

13. Select the global fax options for T.30 protocol. (Relevant for media applications using fax.)



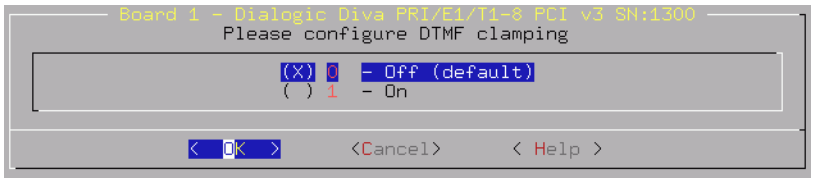
Click **<OK>**.

14. Select the part 68 voice signal limiter settings. (Relevant for media applications using voice.)



Click **<OK>**.

15. Select the DTMF clamping settings. (Relevant for media applications using voice.)

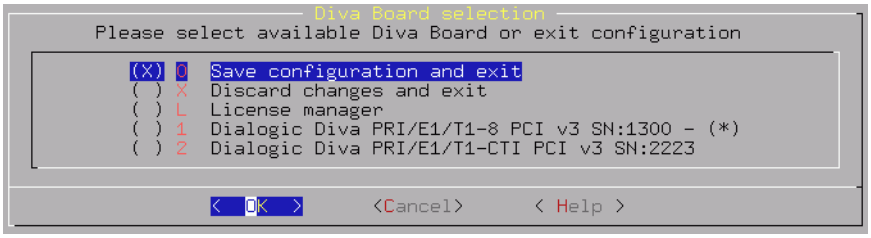


Click **<OK>**.

16. Select the Audio Recording AGC settings. (Relevant for media applications using voice.)

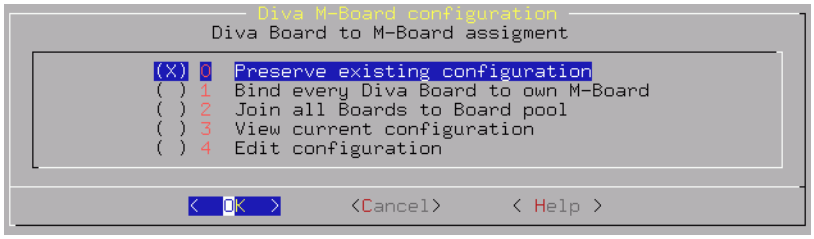
Click **<OK>**.

17. Save the configuration and exit the configuration wizard or select another Diva Media Board for configuration.



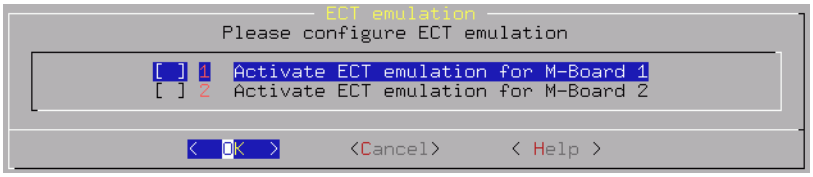
Click **<OK>**.

18. If you selected **Save configuration and exit**, you have to select the Diva Board to M-Board assignment, where you should choose to **Preserve existing configuration** or to **Bind every Diva Board to own M-Board**.



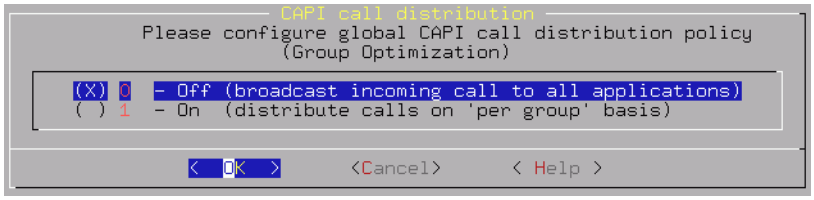
Click **<OK>**.

19. Select the ECT emulation settings.



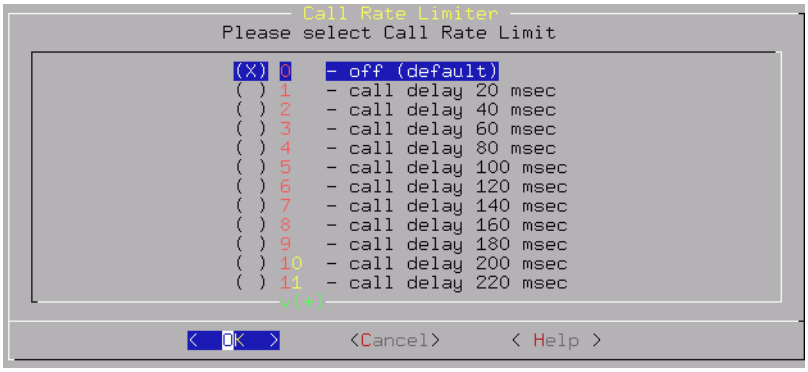
Click **<OK>**.

20. Select the global CAPI call distribution policy settings.



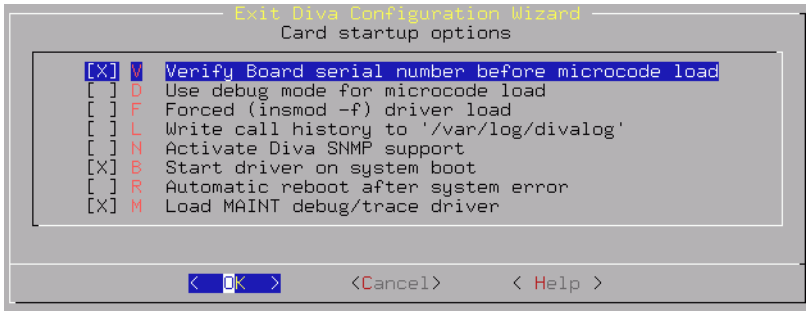
Click **<OK>**.

21. Select the call rate limit settings.



Click **<OK>**.

22. Select the card startup otions. If you want to start the Diva driver on system boot, you need to select it here.



Click **<OK>**.

23. Now the configuration is complete, press <EXIT> to exit the wizard.

24. Change the configuration files of the SS7 Software for Diva Interfaces as described below.

4.5 Test the Dialogic® Diva® Media Board

After the restart of the system, plug the E.1/T.1 cable into one port of your Diva Media Board. If the red LED of this port is turned off, your configuration is working properly from the hardware point of view. If the red LED remains lit, make sure that the other end of the cable is properly connected to the end-point. If that is the case, verify the configuration with help of the Dialogic® Diva® Configuration web interface or the Dialogic® Diva® Configuration Wizard.

4.5.1 Loopback test

If your Diva Media Board has various ports or you have various Diva Media Boards installed, you can also do a loopback test. To do so, plug the loopback cable in the ports you want to test. If the red LED is turned off, your configuration is working properly on a hardware/electrical level. If it remains lit, you need to verify the configuration with help of the Diva Configuration web interface or the Diva Configuration Wizard.

Chapter 5: Dialogic® SS7 Software Configuration

A set of sample configuration files (system.txt.ss7, config.txt.ss7) is copied with the SS7 Software for Diva Interfaces package. These configuration files are text-based. You need to rename them to config.txt/system.txt and enter your own SS7 configuration parameters either in the Dialogic® Diva® Configuration web interface or in a text editor, e.g., vi. The complete path to the configuration files is:

```
/usr/lib/opendiva/dlgss7/system.txt
```

```
/usr/lib/opendiva/dlgss7/config.txt
```

5.1 Dialogic® SS7 Software system configuration

The system.txt configuration file is a text file used to configure the software environment. The file syntax permits the use of comments to improve the readability of the file. Comments are inserted into the file by using an asterisk (*). Numbers can be entered in either decimal or hexadecimal format. Hexadecimal numbers should be prefixed with 0x.

The system configuration file contains the following commands:

- `LOCAL` commands to allow the gctload program to generate message queues for modules running locally.
- `REDIRECT` commands to cause messages generated for modules not running locally to be redirected via a module that is running locally.
- `FORK_PROCESS` commands advising the gctload program of any processes that need to be started locally.

The full syntax of each command is listed in the Dialogic® DSI SS7 Protocols Software Environment Programmer's Manual.

An example system.txt configuration file for Dialogic® SS7 Software for Dialogic® Diva® Interfaces is shown here:

```
*******************************************************************************
*
* Example System Configuration File (system.txt) for use with
* Dialogic(R) SS7 for Diva(R) Interfaces
*
* Edit this file to reflect your configuration.
*
*******************************************************************************
*
*
* Essential modules running on host:
*
LOCAL  0x20    * ssdd  - Board interface task
LOCAL  0x22    * MTP3 module
LOCAL  0x23    * ISUP module
LOCAL  0x4d    * dvscc - Diva Virtual Signaling Call Control
*                        tranfers ISDN to ISUP and vice versa
LOCAL  0x00    * tim_lnx6 - Timer task
LOCAL  0xcf    * s7_mgt - Management/config task
*
* Optional modules running on the host:
*
LOCAL  0xef    * s7_log - Display and logging utility
*
*
* Essential modules running on the board (all redirected via ssd):
*
REDIRECT  0x71  0x20    * MTP2 module (except SS7HD boards)
REDIRECT  0x8e  0x20    * On-board management module
*
*
* Redirection of status indications:
*
REDIRECT  0xdf  0xef  * LIU/MTP2 status messages -> s7_log
*
```

```
*
* Dimensioning the Message Passing Environment:
*
NUM_MSGS   10000      * Number of standard size
*                       messages in the environment
*
*
* Now start-up all local tasks:
FORK_PROCESS  ./tim_lnx
FORK_PROCESS  ./tick_lnx
FORK_PROCESS  ./s7_log -o0xff1f
FORK_PROCESS  ./s7_mgt -i0x4d -d
FORK_PROCESS  ./ssdd
FORK_PROCESS  ./mtp_lnx6
FORK_PROCESS  ./isp_lnx6
FORK_PROCESS  ./dvscc
*
*******************************************************************************
```

5.1.1 Adapting the system.txt configuration file

The default system.txt contains the correct settings of a standard SS7 Software for Diva Interfaces system. Therefore, you should change commands only if it is required by the used system implementation. The following commands may be adapted:

```
FORK_PROCESS  ./ssdd

FORK_PROCESS  ./dvscc

FORK_PROCESS  ./s7_log

FORK_PROCESS  ./mtp_lnx6

FORK_PROCESS  ./isp_lnx6
```

For a detailed description of the mentioned processes see Command Description on page 32, for all others refer to the Dialogic® DSI SS7 Protocols Software Environment Programmer's Manual.

5.1.2 Testmode

To run Dialogic® SS7 Software for Dialogic® Diva® Interfaces, you need valid licenses for MTP2, MTP3 and ISUP.

Without a valid license file, you can start the according processes in a test mode. The option `-t` is available for the following process calls:

```
FORK_PROCESS  ./ssdd -t          (MTP2 License)
FORK_PROCESS  ./mtp_lnx6 -t      (MTP3 License)
FORK_PROCESS  ./isp_lnx6 -t      (ISUP)
```

The testmode will expire after 10 hours.

5.1.3 Command Description

ssdd

Syntax:

```
ssdd [-m<module_id>] [-d<trace_mask>] [-v] [-lt] [-Lp<path>] [-t]
```

Command	Option	Description	Remark
ssdd	-m<module id>	Defines the module id of ssdd (default: 0x20)	
	-d<trace mask>	Enable diagnostic tracing and define the initial trace mask of ssdd as hexadecimal number (default:0x7)	For details, see table below.
	-v	Show version information and exit	command line only
	-lt	License Test displays MTP2 license information and exit	command line only
	-Lp<path>	Set the path to the license file (default:'.')	
	-t	Start ssdd in trail mode. (no MTP2 license required). It will terminate after 10 hours	

Trace mask definition:

Bit	Meaning
0	initialisation and state changes
1	Errors
2	Warnings
3	internal status change
4	protocol wrapper
5	internal verbose
6	messages/primitives
x	All other bits are reserved.

The debug information is written into the Dialogic® Diva® System Release standard tracing utilities, refer to the Dialogic® Diva® System Release LIN Reference Guide for more information.

Notes:

- The trace mask used on live systems, should not define more than bit 0,1, and 2 since it may significantly harm the overall system performance. The `-d` option is intended for use during fault finding on a system that has not been configured correctly.
- The trace mask can be changed while ssdd is up and running via the management interface, refer to Management Interface of the SSDD Process on page 54

dvscc

Syntax:

```
dvscc [-m<module_id>] [-d<trace_mask>] [-i<module_id>]
```

Command	Option	Description	Remark
dvscc	-m<module id>	Defines the module id of the Diva Virtual Signaling Call Control (default: 0x4d)	
	-d<trace mask>	Enable diagnostic tracing and define the initial trace mask of ssdd as hexadecimal number (default:0x7)	For details, see command ssdd on page 32.
	-i<module id>	Defines the destination module ID of ISUP (default:0x23)	

Trace mask definition: see ssdd on page 32

s7_log

Syntax:

```
s7_log [-m<module_id> -f<logfile> -o<options> -s<max_log_size [kilobytes]> -n<max_log_files>
-c<max_messages> -t<timestamp> -p<pcap_file_name>
```

Command	Option	Description	Remark
s7_log	[-m<module_id>]	s7_log's module ID (default=0xef)	
	-f<logfile>	Optional file to write console output (default=none) Enable fixed length logfile by setting `-f` and `-n` and/or `-s`.	
	-o<options>	16 bit run-time options (default 0xaf0d) each bit set to 1 enables : 0 Text interpretation of MSGs 1 Display all MSG as binary 2 MGT trace event decoding 3 Display of trace event time 8 Display m.hdr.type 9 Display m.hdr.id 10 Display m.hdr.src 11 Display m.hdr.dst 12 Display m.hdr.rsp_req 13 Display m.hdr.status 14 Display m.hdr.err_info 15 Display m.param	
	-s<max_log_size>	Defines maximum logfile size (kbyte)	
	-n<max_log_files>	Defines maximum number of logfiles	
	-c<max_messages>	Defines maximum number of messages	
	-t<timestamp>	enable time stamp: • time only t [-tt] • time and date d [-td]	
	-p<pcap_file_name>	Optional file to write PCAP formatted logging (default=none)	

mtp_lnx6

Syntax:

```
mtp_lnx6 [-m<module_id>] [-v] [-Lt] [-Lp<path>] [-t]
```

Command	Option	Description	Remark
mtp_lnx6	-m<module id>	Defines the module id of mtp_lnx6 (default: 0x22)	
	-v	Show version information and exit	command line only
	-Lt	License Test displays MTP3 license information and exit	command line only
	-Lp<path>	Set the path to the license file (default:'.')	
	-t	Start mtp_lnx6 in trail mode. (no MTP3 license required). It will terminate after 10 hours.	

isp_lnx6

Syntax:

```
isp_lnx6 [-m<module_id>] [-v] -Lt[-Lp<path>] [-t]
```

Command	Option	Description	Remark
isp_lnx6	-m<module id>	Defines the module id of isp_lnx6 (default: 0x23)	
	-v	Show version information and exit	command line only
	-Lt	License Test displays MTP3 license information and exit	command line only
	-Lp<path>	Set the path to the license file (default:'.')	
	-t	Start mtp_lnx6 in trail mode. (no MTP3 license required). It will terminate after 10 hours.	

5.2 Dialogic® SS7 protocol configuration

This chapter describes the commands and parameters used in the config.txt protocol configuration file. These commands are used by the s7_mgt protocol configuration utility to perform one time configuration of the protocol stack at startup.

The commands are logically grouped in the following categories:

- Physical Interface Configuration Command on page 37
- MTP Configuration Commands on page 38
- ISUP Configuration Commands on page 42
- DVSCC Command Reference on page 44

This is an example of the config.txt protocol configuration file. The commands are described below the example.

```
*************************************************************************
* Example SS7 Configuration File (config.txt) for use with
* Dialogic(R) Global Call for SS7 based on Dialogic(R) Diva(R) Media Boards
*
* This file needs to be modified to suit individual circumstances.
*
*************************************************************************
*
* Board Definitions:
*
*************************************************************************
* For Diva boards:
* DIVA_BOARD <board_id> <board_type> <flags> <serial>
* board_id:   logical number to identify the board, starts at 0
* board_type: identifies the type of Diva board.
```

```
*             Valid entries:
*             Diva PRI v.3 PCI (ADSP based)
*               70 - Dialogic Diva PRI/E1-30 PCI v3
*               71 - Dialogic Diva PRI/T1-24 PCI v3
*               72 - Dialogic Diva PRI/E1/T1-8 PCI v3
*               73 - Dialogic Diva V-PRI/E1-30 PCI v3
*               74 - Dialogic Diva V-PRI/T1-24 PCI v3
*               75 - Dialogic Diva PRI/E1/T1-CTI PCI v3
*             Diva 2/4PRI Boards (BF based)
*               79 - Dialogic Diva V-2PRI/E1/T1-60 PCI v1
*               81 - Dialogic Diva V-4PRI/E1/T1-120 PCI v1
*             PCI Express version of Diva PRI v.3 boards (ADSP based)
*               94 - Dialogic Diva PRI/E1-30 PCIe v3
*               95 - Dialogic Diva PRI/T1-24 PCIe v3
*               96 - Dialogic Diva V-PRI/E1-30 PCIe v3
*               97 - Dialogic Diva V-PRI/T1-24 PCIe v3
*               98 - Dialogic Diva PRI/E1/T1-CTI PCIe v3
*             PCI Express version of Diva 2/4PRI boards (BF based)
*               110 - Dialogic Diva V-4PRI PCIe HS v1
*               111 - Dialogic Diva V-2PRI PCIe HS v1
*               112 - Dialogic Diva V-1PRI PCIe HS v1
*             PCI Express version of Diva 4/8PRI boards (BF based)
*               113 - Dialogic Diva V-4PRI PCIe FS v1
*               114 - Dialogic Diva V-8PRI PCIe FS v1
*             Unified Messaging version of Diva PRI v.3 boards (ADSP based)
*               115 - Dialogic Diva UM-PRI/E1-30 PCI v3
*               116 - Dialogic Diva UM-PRI/T1-24 PCI v3
*               117 - Dialogic Diva UM-PRI/E1-30 PCIe v3
*               118 - Dialogic Diva UM-PRI/T1-24 PCIe v3
* flags:     for future use, shall be set to 0
* serial:    serial number of that board
* Note: The LIUs are implicit declared here
*       E.g. Diva board type 81 (Dialogic Diva V-4PRI/E1/T1-120 PCI v1) consists
*       of 4 LIUs.
*       Diva 'InterfaceNr' 0 -> LIU Id 0
*                          1 -> LIU Id 1
*                          2 -> LIU Id 2
*                          3 -> LIU Id 3
*
*         <board_id> <board_type> <flags> <serial>
DIVA_BOARD     0          81        0x0     1234  * Dialogic Diva V-4PRI/E1/T1-120 PCI v1
*                                                 * serial number 1234
*
*
*******************************************************************************
*
* MTP parameters:
*
*******************************************************************************
* MTP_CONFIG <reserved1> <reserved2> <options>
* ============
MTP_CONFIG 0 0 0x00040004  * RPO handling according to ITU-T 1992 (and later)
*                          * 14 bit point codes
*                          * Host-based MTP3
*
*******************************************************************************
* MTP_LINKSET <linkset_id> <adjacent_spc> <num_links> <flags> <local_spc> <ssf>
* ============
MTP_LINKSET 0 129 2 0x0000 130 0x08 * APC: 129 as 14 bit PC (hex: 81, 4-3-4-3:0-1-0-1)
*                                   * two links in this linkset
*                                   * OPC: 130 as 14 bit PC (hex: 82, 4-3-4-3:0-1-0-2)
*                                   * ssf: national 0
*
*******************************************************************************
* MTP_ROUTE <dpc> <norm_ls> <user_part_mask> <flags> <second_ls>
* ============
MTP_ROUTE 129 0 0x0020 * DPC: 129 as 14 bit PC (hex: 81, 4-3-4-3:0-1-0-1)
*                      * linkset Id: 0
*                      * user_part_mask: Bit 5 is set -> ISUP Service indicator
*
*******************************************************************************
* MTP_LINK <link_id><linkset_id><link_ref><slc><board_id><blink><stream>
* ============
MTP_LINK  0    0    0    0    0    0   0    16   0x0006 * link on board Id 0,
*                                                       * liu Id 0,timeslot 16
*                                                       * signalling link test
*                                                       * 64 kb/s
MTP_LINK  1    0    1    1    0    2   2    16   0x0006 * link on board Id 0,
*                                                       * liu Id 1,timeslot 16
*                                                       * signalling link test
*                                                       * 64 kb/s
*******************************************************************************
*
```

```
*****************************************************************************
*
* ISUP parameters:
*
*****************************************************************************
* ISUP_CONFIG <res1><res2><user_id><options><num_grps><num_ccts>
* ============
ISUP_CONFIG  0  0  0x4d  0x0414  4  128 * gcss7 module ID: 0x4d (see system.txt)
*                                       * call release procedures are supported by gcss7
*                                       * errors are reported to gcss7
*                                       * 4 Circuit groups are defined
*                                       * Max. CID 128
*
*****************************************************************************
* Configure ISUP circuit groups:
* ISUP_CFG_CCTGRP <gid><dpc><base_cic><base_cid><cic_mask><options><user_inst>
*                                        <user_id><opc><ssf><variant><options2>
* ============
ISUP_CFG_CCTGRP 0 130 0x01 0x01 0x7FFF7FFF 0x249001e 0 0x4d 129 0x8 1 0x00d0
*               * Circuit group = 0
*               * DPC = 130 (HEX:0x82, 4-3-4-3:0-1-0-2)
*               * Base CIC = 0x01 (dec:1)
*               * Base CID = 0x01 (dec:1)
*               * group consist of 30 CICs (0x1-0xF, 0x11-0x1F)
*               * options:
*               *  - outgoing call priority:
*               *    Higher point code has priority on even cic s.
*               *  - T7, T9 (ACM, ANM) timers are used
*               *  - T2 or T6 are runninng in suspended state
*               *  - abnormal circuit group blocking procedures follows
*               *    Q.767, Q.764 (03/93) and ANSI T1.113 operation
*               *  - 'Confusion' (CFN) messages are enabled
*               *  - T34 for segtmented messages will be enabled
*               *  - Q.764 (03/93) end node (i.e. exchange type A) message
*               *    and parameter compatibility handling will be
*               *    performed (passing on unrecognised information is
*               *    possible)
*               * user instance = 0
*               * gcss7 module ID: 0x4d (see system.txt)
*               * OPC = 129 (HEX:0x81, 4-3-4-3:0-1-0-1
*               * Sub Service Field = 0x8 (national 0)
*               * variant = 1 (Q.761   Q.764 (1992 and later editions)
*               * options2:
*               * - T39 (waiting for IRS after sending IDR) is used
*               * - enable the user part unavailability procedure
ISUP_CFG_CCTGRP 1 130 0x20 0x21 0x7FFFFFFF 0x249001e 0 0x4d 129 0x8 1 0x00c0 *$ conform=ETSI_V2_V3
*               * Circuit group = 1
*               * Base CIC = 0x20 (dec:32)
*               * Base CID = 0x21 (dec:33)
*               * group consist of 31 CICs (0x20-0x3E)
*               * other parameters as for group 0
ISUP_CFG_CCTGRP 2 130 0x3F 0x41 0x7FFF7FFF 0x249001e 0 0x4d 129 0x8 1 0x00c0 *$ conform=ETSI_V2_V3
*               * Circuit group = 2
*               * Base CIC = 0x3F (dec:63)
*               * Base CID = 0x41 (dec:65)
*               * group consist of 30 CICs (0x3F-0x4D, 0x4F-0x5D)
*               * other parameters as for group 0
ISUP_CFG_CCTGRP 3 130 0x5E 0x61 0x7FFFFFFF 0x249001e 0 0x4d 129 0x8 1 0x00c0 *$ conform=ETSI_V2_V3
*               * Circuit group = 3
*               * Base CIC = 0x5E (dec:94)
*               * Base CID = 0x61 (dec:97)
*               * group consist of 31 CICs (0x5E-0x7D)
*               * other parameters as for group 0
*
*****************************************************************************
```

5.2.1 Physical Interface Configuration Command

The physical interface configuration command is:

DIVA_BOARD - Configure Dialogic® Diva® Media Board

Synopsis

Command to configure an Dialogic® Diva® Media Board for the use in the Dialogic® SS7 Software for Dialogic® Diva® Interfaces environment.

Syntax

```
DIVA_BOARD <board_id> <board_type> <flags> <serial>
```

Example

```
DIVA_BOARD 0 81 0x0 1092
```

Parameters

The DIVA_BOARD command includes the following parameters:

- <board_id>

  The logical identity of the board in the range of 0 to one less than the number of boards supported (starting at 0, range of 0 to 15).

- <board_type>

  Dialogic® Diva® Media Board type.

Board Type	Diva Media Board
70	Diva PRI/E1-30 PCI v3
71	Diva PRI/T1-24 PCI v3
72	Diva PRI/E1/T1-8 PCI v3
73	Diva V-PRI/E1-30 PCI v3
74	Diva V-PRI/T1-24 PCI v3
75	Diva PRI/E1/T1-CTI PCI v3
79	Diva PRI/E1/T1-CTI PCI v3
81	Diva V-4PRI/E1/T1-120 PCI v1
83	Diva -V2PRI/E1/T1-60 PCI v1
85	Diva V-4PRI/E1/T1-120 PCI v1
94	Diva PRI/E1-30 PCIe v3
95	Diva PRI/T1-24 PCIe v3
96	Diva V-PRI/E1-30 PCIe v3
97	Diva V-PRI/T1-24 PCIe v3
98	Diva PRI/E1/T1-CTI PCIe v3
110	Diva V-4PRI PCIe HS v1
111	Diva V-2PRI PCIe HS v1
112	Diva V-1PRI PCIe HS v1
113	Diva V-4PRI PCIe FS v1
114	Diva V-8PRI PCIe FS v1
115	Diva UM-PRI/E1-30 PCI v3
116	Diva UM-PRI/T1-24 PCI v3

Board Type	Diva Media Board
117	Diva UM-PRI/E1-30 PCIe v3
118	Diva UM-PRI/T1-24 PCIe v3

- <flags>

  Reserved for future use, set to 0x0
- <serial>

  Serial number of the Diva Media Board

5.2.2 MTP Configuration Commands

The Message Transfer Part (MTP) configuration commands are:

- MTP_CONFIG - Configure MTP
- MTP_LINKSET - Configure a Linkset
- MTP_LINK - Configure a Link
- MTP_ROUTE - Configure a Route

MTP_CONFIG - Configure MTP

Synopsis

The global configuration parameters for the Message Transfer Part (MTP).

Syntax

```
MTP_CONFIG <reserved1> <reserved2> <options>
```

Example

```
MTP_CONFIG 0 0 0x00040000
```

Parameters

The MTP_CONFIG command includes the following parameters:

- <reserved1>, <reserved2>

  These parameters are reserved for backwards compatibility only. For applications conforming to this release, these parameters should always be set to 0.
- <options>

  A 32-bit value containing run-time options for the operation of MTP as follows:

- Bit 0 is set to 1 to disable the MTP3 message discrimination function and thus to allow the signaling point to receive all messages irrespective of the destination point code contained in the message or zero to allow the discrimination function to operate normally.
- Bit 1 is set to 1 to disable sub-service field (SSF) discrimination. If this bit is set to zero, each received MSU with an ssf value that does not match the configured ssf value for that link set is discarded.
- Bit 3 is set to 1 to cause MTP3 to generate a User Part Unavailable (UPU) message to the network on receipt of a message containing a Service Indicator (SI) value that has not been configured. If set to zero, the message will be discarded without sending the UPU message.
- Bit 8 is set to 1 to select ANSI operation; otherwise it should be set to zero.
- Bit 9 is set to 1 to select 24-bit point codes in the MTP routing label or zero to select 14-bit or 16-bit point codes. This bit should always be set to 1 when ANSI operation is required.
- Bit 10 is set to 1 for ANSI operation; otherwise it should be set to zero.
- Bit 11 is set to 1 for ANSI operation; otherwise it should be set to zero.
- Bit 18 is used to control MTP functionality in the event of detection of Remote Processor Outage (RPO). If set to 1, RPO is handled in accordance with the ITU-T 1992 (and later) recommendations. If set to zero, on detection of RPO, the signaling link is taken out of service and restoration commences. This bit should normally be set to 1.
- Bit 20 is set to 1 to select 16-bit point codes in the MTP routing label for use in Japanese networks or zero to allow the use of 24-bit or 14-bit point codes as set using bit 9 (see above).
- Bit 21 should be set to 1 for use in Japanese networks; otherwise it should be set to zero.

All other bits are reserved for future use and should be set to zero.

Note: For correct ANSI operation, bits 8, 9, 10, 11, and 18 must be set to 1. This gives a typical <options> field value of 0x00040f00 for ANSI configurations.

MTP_LINKSET - Configure a Linkset

Synopsis

Configuration of a linkset to an adjacent signaling point.

Syntax

```
MTP_LINKSET <linkset_id> <adjacent_spc> <num_links> <flags> <local_spc> <ssf>
```

Example

```
MTP_LINKSET 0 321 2 0x0000 456 0x8
```

Parameters

The MTP_LINKSET command includes the following parameters:

- <linkset_id>

  The logical identity of the linkset, in the range of zero to one less than the number of linksets supported. The linkset_id is used in other commands for reference.

- <adjacent_spc>

  The point code of the adjacent signaling point.

- <num_links>

  The number of links to be allocated to the linkset.

- <flags>

  This field is a 16-bit field containing run-time configuration options for the link set as follows:

- Bit 3 is set to 1 to enable MTP restart procedures for this link set.
- All other bits are reserved for future use and should be set to zero.

- <local_spc>

  The point code of the signaling point itself.

- <ssf>

The value to be used in the Sub-Service Field (SSF) of all MTP3 messages and checked for by the discrimination function in all received messages. This is a 4-bit value. For ANSI operation, each of the two least significant bits should be set to 1.

Note: For correct operation, the adjacent point code must also appear in an MTP_ROUTE declaration.

MTP_LINK - Configure a Link

Synopsis

Configuration of a signaling link.

Syntax

```
MTP_LINK <link_id> <linkset_id> <link_ref> <slc> <board_id> <blink> <stream> <timeslot> <flags>
```

Example

```
MTP_LINK 0 0 2 2 0 1 1 16 0x0006
```

Parameters

The MTP_LINK command includes the following parameters:

- <link_id>

  The unique logical identity of the link. It must be in the range of zero to one less than the total number of signaling links supported.

- <linkset_id>

  The logical identity of the linkset to which the link belongs. The linkset must already have been configured using the MTP_LINKSET command.

- <link_ref>

  The logical identity within the linkset of the signaling link. It should be in the range of zero to one less than the number of links in the linkset.

- <slc>

  The signaling link code for the signaling link. This must be unique within the linkset and is typically the same as <link_ref>. The valid range is 0 to 15.

- <board_id>

  The board ID of the signaling processor allocated for this signaling link.

- <blink>

  This parameter indicates the channel of the link within the board. Each blink can be used only once per board. The parameter must be between zero and one less than the number of links supported.

- <stream>

  When the <timeslot> parameter is set to a non-zero value, the <stream> parameter is the logical identity of the T1/E1 Line Interface Unit (LIU) (liu_id) containing the signaling link. It should be in the range of zero to one less than the number of LIUs. In these cases, the timeslot should be the signaling processor's signaling link in the range of 0 to 31.

- <timeslot>

  The timeslot used for signaling in the range of 0 to 31. The valid ranges are:

  - For an E1 interface: 1 to 31.
  - For a T1 interface: 1 to 24.
- <flags>

  A 16-bit value containing additional run-time options. The bit significance is as follows:
  - Bit 0 is set to 1 to force the use of the emergency proving period during link alignment or zero to use the appropriate proving period according to the MTP3 recommendations.
  - Bit 1 is set to 1 to cause a signaling link test (in accordance with ITU-T Q.707 / ANSI T1.111.7) to be carried out before a link is put into service, or zero if a test is not required.
  - Bit 2 is set to 1 to cause a signaling link test (in accordance with ITU-T Q.707 / ANSI T1.111.7) to be carried out every 30 seconds. This bit is ignored unless bit 1 is set to 1.
  - Bit 8 is used to select the MTP2 error correction mode. It is set to 1 to select PCR (Preventive Cyclic Retransmission) operation or zero for the Basic Method of Error Correction.
  - Bits 10 and 11 together select the appropriate operating bit rate for the link. The table below specifies the appropriate values for 48, 56 or 64 kb/sec.

Bit 10	Bit 11	Data Rate (pattern)
0	0	64 kb/s (0xFF)
0	1	48 kb/s (0x7E)
1	0	56 kb/s (0xFE)
1	1	6 kb/s (0xFD)

  - Bit 15 is set to 1 to disable the link. This bit should be set to zero to enable normal link operation.

  All other bits are reserved for future use and should be set to zero.

MTP_ROUTE - Configure a Route

Synopsis

Configuration of a route for use with one or more user parts.

Syntax

```
MTP_ROUTE <dpc> <norm_ls> <user_part_mask> <flags> <second_ls>
```

Example

```
MTP_ROUTE 567 0 0x0020 0x0000 0
```

Parameters

The MTP_ROUTE command includes the following parameters:

- <dpc>

  The point code of the remote signaling point for which this command is configuring routing data. It may be either an adjacent point code or a point code accessible via an adjacent Signaling Transfer Point (STP).
- <norm_ls>

  The linkset_id of the normal linkset used to reach the specified destination. This parameter must be a linkset_id that has already been configured using the MTP_LINKSET command. The normal linkset may be any of the following:

- The only linkset used to reach the destination.
- The preferred linkset used to reach the destination.
- One of a pair of links sets forming a combined linkset.

In the latter two cases, a second linkset, <second_ls>, must also be specified.

Within a linkset, messages are automatically load shared across links using the Signaling Link Selection (SLS) field in the message.

- <second_ls>

  The linkset_id of an optional second linkset used to reach the specified destination. This may be either of the following options:

  - The secondary linkset used to reach the destination only on failure of the preferred linkset.
  - One of a pair of links sets forming a combined linkset over which load sharing takes place. In this case, bit 1 must also be set in the <flags> parameter of the command.

  When a second linkset is specified, the user must also set bit 0 in the <flags> field of this command.

- <user_part_mask>

  This is a 16-bit field used identify the user parts that are supported over this route. The bits are labelled 0 to 15. For each user part supported, the bit corresponding to the Service Indicator for that user part should be set. For example, to support just ISUP messages, the ISUP Service Indicator is 5. Bit 5 should be set, and therefore a value of 0x0020 is appropriate.

- <flags>

  A 16-bit field containing run-time configuration options for the route as follows:

  - Bit 0 is set to 1 to indicate that a second linkset is specified within the command. If set to zero, the <second_ls> parameter is ignored.
  - Bit 1 is used to determine whether or not to load share messages across the two linksets. It is only used when two linksets are specified for the route. When set, the MTP3 module load shares messages for the destination equally across each of the two specified linksets. Otherwise, the MTP3 module considers the normal linkset to be the preferred linkset and only uses the second linkset in the event of failure of the normal linkset. The bit should be set to 1 to enable load sharing across the two linksets or zero to disable load sharing and use preferred and secondary linksets.

  All other bits are reserved for future use and must be set to zero.

5.2.3 ISUP Configuration Commands

The ISUP configuration commands are:

- ISUP_CONFIG - Configure ISUP
- ISUP_CFG_CCTGRP - Configure an ISUP Circuit Group
- ISUP_TIMER - Configure ISUP Timers

ISUP_CONFIG - Configure ISUP

Synopsis

The global configuration parameters for the ISUP module.

Syntax

```
ISUP_CONFIG <res1> <res2> <user_id> <options> <num_grps> <num_ccts> [<partner_id>]
```

Example

```
ISUP_CONFIG 0 0 0x2d 0x0435 4 128
```

Parameters

The ISUP_CONFIG command includes the following parameters:

- <res1> , <res2>

  Reserved for backwards compatibility. These fields should be set to 0.

- <user_id>

  The module_id of the application running on the host that uses the ISUP module.

- <options>

  A 16-bit value that contains global run-time options for the operation of the ISUP module. The meaning of each bit is as defined for the options parameter in the ISUP Configure Request message as detailed in the Dialogic® SS7 Protocols ISUP Programmer's Manual.

- <num_grps>

  The maximum number of ISUP circuit groups that the user intends to use. This must not exceed the maximum number of circuit groups supported, otherwise module configuration fails. Typically, this parameter should be set to the maximum number of circuit groups supported.

- <num_ccts>

  The maximum number of ISUP circuits that the user intends to use. This must not exceed the maximum number of circuits supported otherwise module configuration fails. Typically, this parameter is set to:

  - 32 times the number of groups for E1 operation
  - 24 times the number of circuit groups for T1 operation

  Note: The valid range for the circuit identifier (cid) is from zero to one less than the maximum cid value.

- <partner_id>

  Optional parameter for use when operating in dual resilient configuration. This parameter is the module_id of the partner ISUP module (equivalent to the module_id field in the ISUP Configure Request message as documented in the Dialogic® SS7 Protocols ISUP Programmer's Manual).

ISUP_CFG_CCTGRP - Configure an ISUP Circuit Group

Synopsis

The configuration parameters for a group of ISUP circuits. Typically, a group is all the circuits in a single E1 or T1 interface.

Syntax

```
ISUP_CFG_CCTGRP <gid> <dpc> <base_cic> <base_cid> <cic_mask> <options> <user_inst> <user_id>
<opc> <ssf> <variant> <options2>
```

Example

```
ISUP_CFG_CCTGRP 0 3 1 1 0x7fff7fff 0x00000003 0 0x2d 2 0x8 4 0x00000000
```

Parameters

The ISUP_CFG_CCTGRP command includes the following parameters:

- <gid>

  The group id of the circuit group in the range of zero to one less than the number of groups supported.

- <dpc>

  The destination point code for all circuits in the circuit group.

- <base_cic>

  The Circuit Identification Code (CIC) that is allocated to the first circuit in the circuit group.

- <base_cid>

  The logical id for the first circuit in the circuit group. It must lie in the range of zero to one less than the number of circuits supported.

- <cic_mask>

  A 32-bit mask with bits set to indicate which circuits are to be allocated to the circuit group. Bit 0 must always be set since it represents the <base_cic> / <base_cid> . Subsequent bits represent the subsequent circuits. ANSI circuit groups are not permitted to contain more than 24 circuits.

- <options>

  A 32-bit value containing run-time options for the ISUP circuit group. Refer to the Configure Circuit Group Request section of the ISUP Programmer's Manual). Bits 0 to 15 are equivalent to the options field and bits 16 to 31 represent the ext_options field as detailed in the Dialogic® SS7 Protocols ISUP Programmer's Manual.

- <user_inst>

  The instance number of the user application. Typically, only a single user application exists, so this field should be set to zero.

- <user_id>

  The module_id of the user application.

- <opc>

  Originating Point Code. The local point code for all circuits in the group.

- <ssf>

  The value to be used in the Sub-Service Field (SSF) of all ISUP messages for this circuit group.

- <variant>

  The protocol variant for this circuit group. Refer to the Dialogic® SS7 Protocols ISUP Programmer's Manual for full details.

- <options2>

  A 32-bit value containing additional run-time options for the ISUP circuit group. Refer to the Configure Circuit Group Request section of the Dialogic® SS7 Protocols ISUP Programmer's Manual. Bits 0 to 31 are equivalent to the ext_1_options parameter, as detailed in the Dialogic® SS7 Protocols ISUP Programmer's Manual.

5.2.4 DVSCC Command Reference

CCT_RESOURCE, CCTGRP_RESOURCE - map a CIC to a Diva trunk timeslot

Synopsis

Define the fix mapping of a CIC to a Diva trunk timeslot.

There are two possibilities to define the relation CIC to Board/liu/timeslot

1. Configure CIC to physical board/trunk/timeslot by a line for each CIC, this means, the CCT_RESOURCE has to be stated for each CIC defined by ISUP_CFG_CCTGRP.

   Syntax

   ```
   CCT_RESOURCE <gid> <cic> <board_id> <liu_id> <timeslot>
   ```

   Example

   ```
   CCT_RESOURCE 0  0x01  0 0   1
   ```

   Parameters

   The CCT_RESOURCE command includes the following parameters:

   - <gid>

     The group Id of circuit as defined in command ISUP_CFG_CCTGRP.

- <cic>

  The CIC circuit identification code.

- <board_id>

  The board ID of the signaling processor allocated for this CIC.

- < liu_id>

  The logical identity of the T1/E1 Line Interface Unit (LIU) (liu_id) containing the signaling link.

- <timeslot>

  The trunk timeslot used for the according CIC (E1: 1 .. 31, T1: 1 .. 24).

2. Map a complete group of CICs to a related trunk. Therefore the CCTGRP_RESOURCE has to be stated for each CIC group defined by ISUP_CFG_CCTGRP.

Syntax

```
CCTGRP_RESOURCE <gid> <board_id> <liu_id> <tslot_mask> <tslot_s>
```

Example

```
CCTGRP_RESOURCE 0 0 0 0x7FFF7FFF 0

            gid           - 0
            board_id      - 0
            liu_id        - 0
            tslot_mask    - 0x7FFF7FFF
                          E1 timeslot 16 reserved (e.g. for signaling) all
                          other timeslot have to be assigned to a CIC.
            tslot_s       - 0
                          Start CIC on lowest timeslot Last CIC on highest
                          timeslot
```

Parameters

The CCT_RESOURCE command includes the following parameters:

- <gid>

  The group Id of circuit as defined in command ISUP_CFG_CCTGRP.

- <board_id>

  The board ID of the signaling processor allocated for this CIC.

- < liu_id>

  The logical identity of the T1/E1 Line Interface Unit (LIU) (liu_id) containing the signaling link.

- <tslot_mask>

  A bitmask which defines which timeslots are used

0 -	not used
1 -	used
bit 0 -	timeslot 1
bit 23 -	timeslot 24
bit 30 -	timeslot 31

- < tslot_start>

  Timeslot, where the assignment is starting, identifies the first timeslot to which cic_start will be assigned.

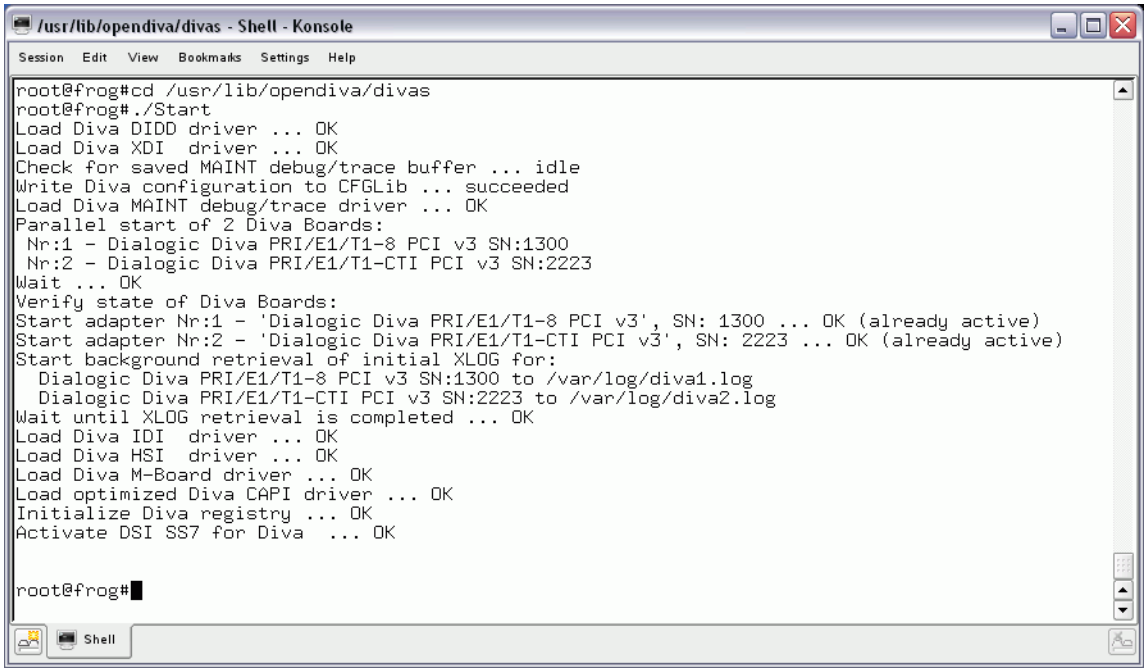
0 -	Start CIC on lowest timeslot Last CIC on highest timeslot
1 -	Start CIC on highest timeslot Last CIC on lowest timeslot

  Note: This type of CIC configuration will just work, if allocation is continuous (beside the CICs which are barred by the cic_mask of ISUP_CFG_CCTGRP).

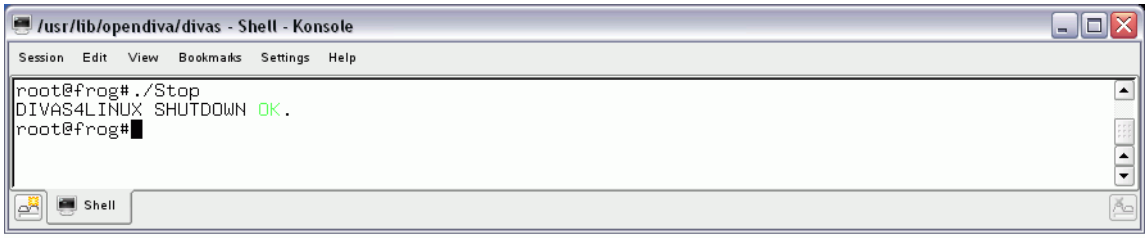
Chapter 6: Starting The Dialogic® SS7 Software for Dialogic® Diva® Interfaces

After you installed the SS7 Software for Diva Interfaces, the license files and made the necessary changes to the "config.txt" and "system.txt" configuration files, you can start the Dialogic® SS7 Software for Diva® Interfaces.

1. Change to the divas directory: `cd /usr/lib/opendiva/divas.`
2. Start the Dialogic® Diva® Media Board with the command `./Start`



3. To stop the Diva Media Board and the related processes, use the `./Stop` command in the same directory as in step 2.



If you only want to stop the Diva SS7 processes and not the entire Diva Media Board, you can use the command `gctload`.

To shutdown all SS7 processes use:

```
cd /usr/lib/opendiva/dlgss7

./gctload -x
```

To start all SS7 processes use:

```
./gctload -d
```

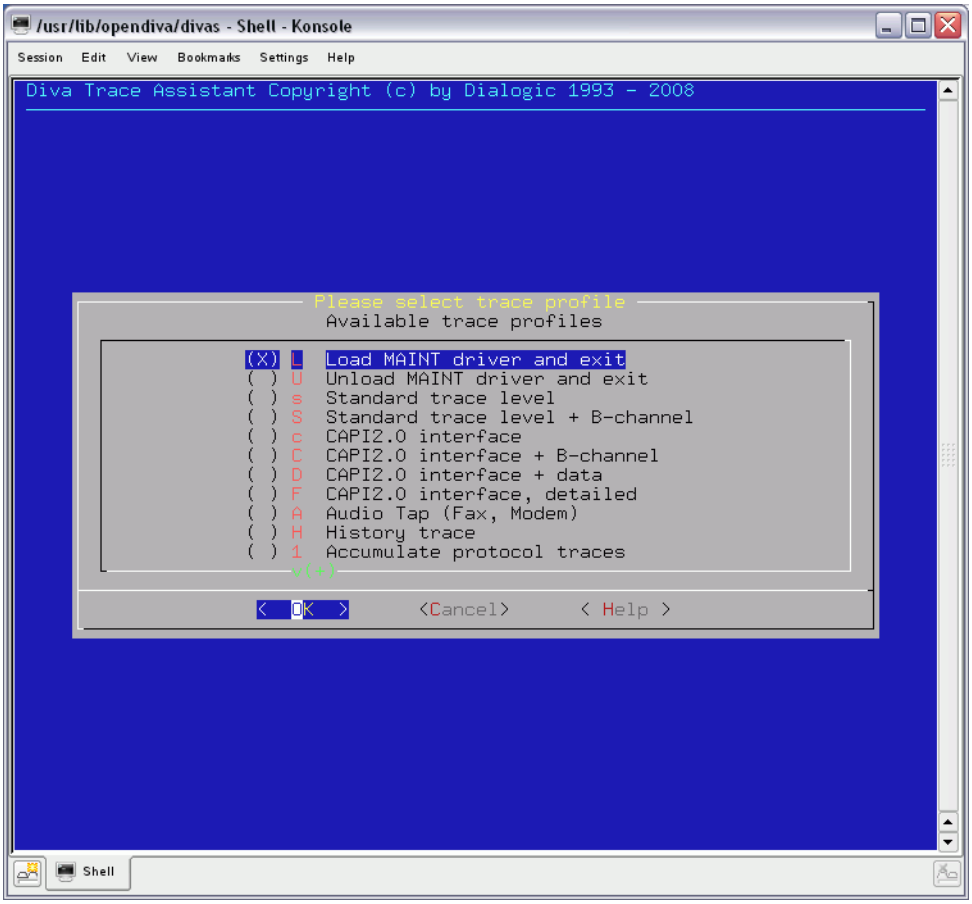
Chapter 7: Tracing

Trace information will be written via the standard Dialogic® Diva® trace utilities. To enable tracing for the Dialogic® SS7 Software for Dialogic® Diva® Interfaces software, you have to make sure that the debug mask which can be added to the process call in the "system.txt" file are set to a comfortable level. See the Examples of the Default Configuration Files on page 85 for a complete description of the debug mask. If you need to make changes to the "system.txt" file, you need to stop the Diva DSI SS7 software and start it again as described in Starting The Dialogic® SS7 Software for Dialogic® Diva® Interfaces on page 46. MTP and ISUP tracing is done via the DSI SS7 trace mechanisms. See the Dialogic® SS7 Protocols Software Environment Programmer's Manual, for more information.

7.1 Verify if Dialogic® SS7 Software for Dialogic® Diva® Interfaces software is running

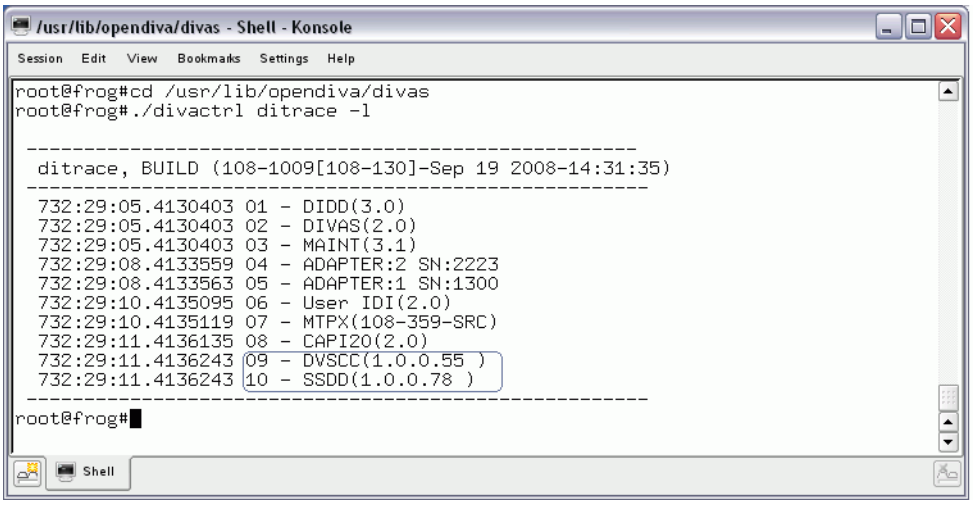
To verify if the SS7 Software for Diva Interfaces starts properly, you may use the following commands, to setup a trace message.

1. Enable Diva tracing with `cd /usr/lib/opendiva/divas` and type `./Trace`.
2. Select **Load MAINT driver and exit**.

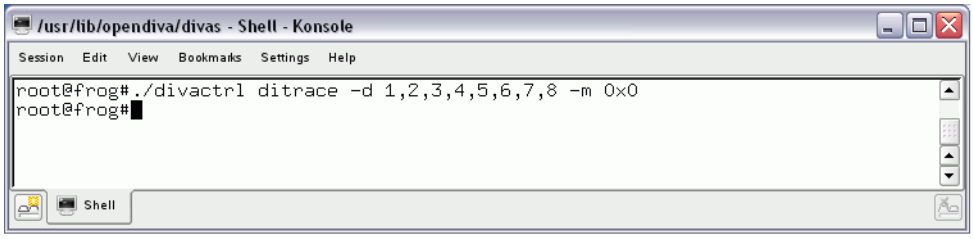


Click **<OK>**.

3. Display the available interfaces. For the SS7 software, the DVSCC and the SSDD interfaces are the most important ones.



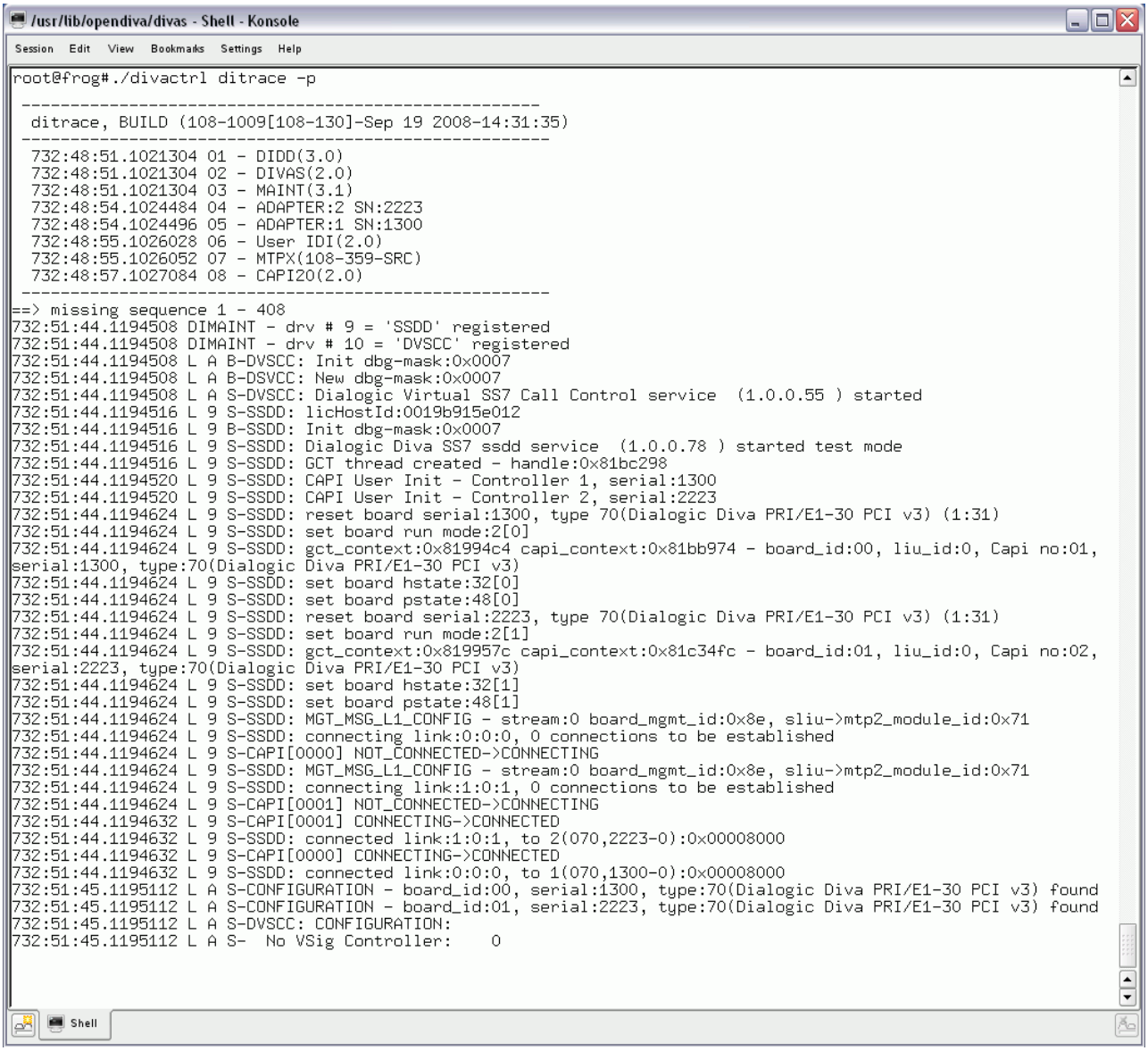
4. If only the information of the SSDD and DVSCC is relevant, you may disable the trace output of the other drivers by setting their trace mask to zero.



5. The default trace masks for the SS7 Software for Diva Interfaces are saved in the system.txt configuration file. The default masks for tracing are set with `-d` option, e.g.,

```
FORK_PROCESS  ./ssdd -d0x7
FORK_PROCESS  ./dvscc -d0x7
```

6. Start the trace. The output will be prompted to the default output. Alternatively, you can write the trace output into a file, therefore use the command shown in the picture below. The trace is written into the file trace1.txt in the current working directory. For more information about tracing of the Diva Media Board and Diva Systsem Release Software, see the Dialogic® Diva® System Release LIN Reference Guide.



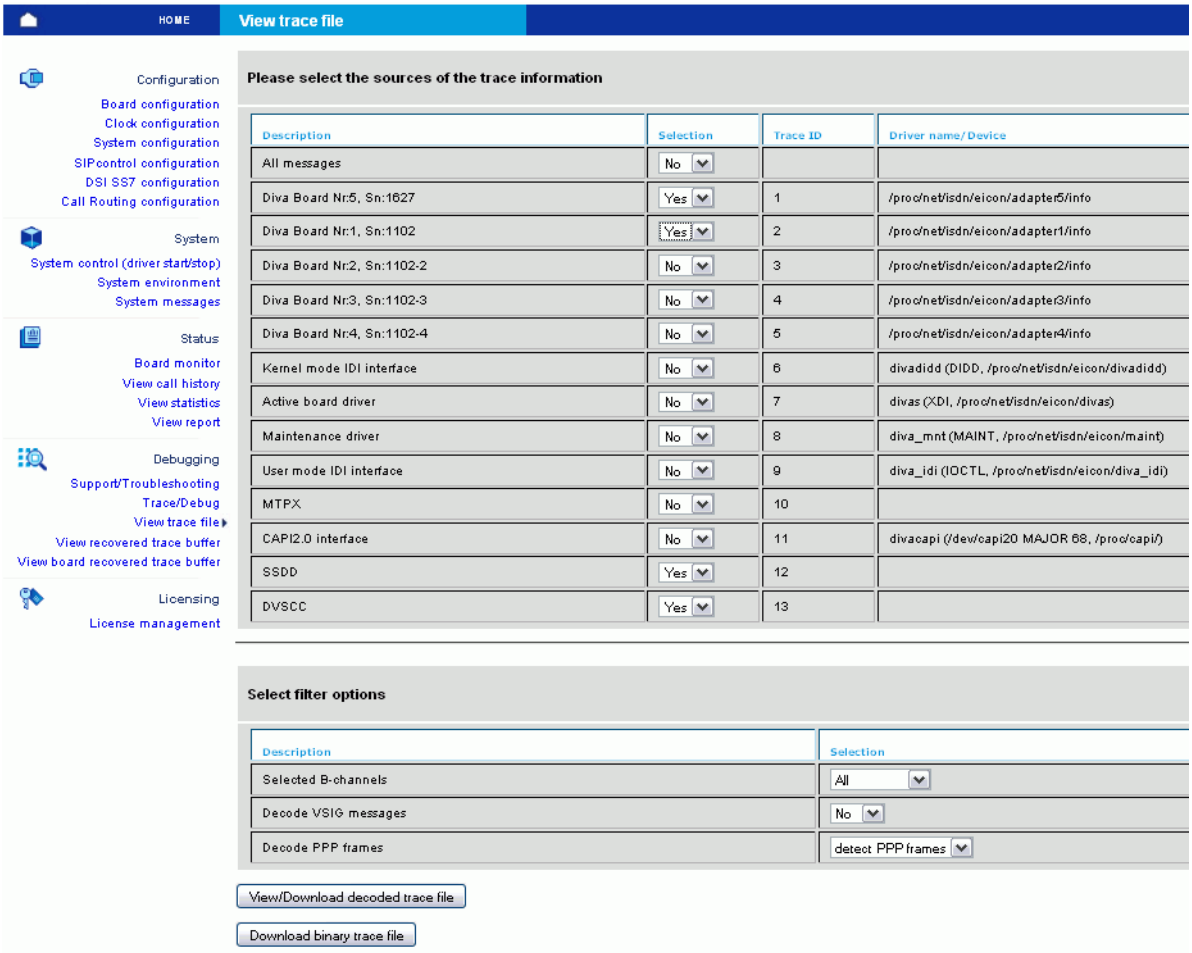
7.2 Tracing with the Dialogic® Diva® Configuration web interface

1. Start the Diva Configuration web interface and click **Trace/Debug** on the left hand side to open the Dialogic® Diva® Trace Wizard.
2. Leave the settings at their default values and click **Start Trace**.
3. To stop the tracing, click **Stop trace process and retrieve compressed trace file**.

   If you use the Diva Trace Wizard at start-up, keep in mind that the whole start-up procedure for the Dialogic® Diva® DSI SS7 software takes about 70 seconds. Therefore, wait at least 70 seconds before you stop the trace.

   You can also make traces when the stack is up and running, but the trace information depends on the settings you made in the trace mask in the system.txt file. If you make changes to these trace settings, you need to restart Diva DSI SS7 software.

4. After you stopped the trace process, you can view and/or download the trace file and select with the trace viewer the components you want to see in your trace file. For the Dialogic® SS7 Software for Dialogic® Diva® Interfaces, set the **SSDD** and **DVSCC** components to **Yes** and all others to **No**.



5. Choose whether to view or to download the trace file.

7.3 Dynamic tracing

Below are listed some examples for the MTP process on how to enable/disable the SS7 Software for Diva Interfaces tracing dynamically. If you change the -c 1021 to -c 1022, you are setting the debug masks for the ISUP processes. For information about the trace mask, see the description in the system.txt configuration file. After setting the trace masks for the SSDD and DVSCC processes, you can use the Dialogic® Diva® Trace tool as described in Tracing with the Dialogic® Diva® Configuration web interface on page 49 or use the command line interface as described in Verify if Dialogic® SS7 Software for Dialogic® Diva® Interfaces software is running on page 47. You can find more information about the Management Interface of the SSDD Process on page 54.

- Display the available adapters

```
/usr/lib/opendivas/diva/divactrl mantool -F
14:{5,1,2,3,4,1004,101,102,103,104,105,1000,1021,1022}
```

- Check current debug mask

```
/usr/lib/opendivas/diva/divactrl mantool -c 1021 -r"Debug"
```

Will cause to output the current state of the diva tracing for ssdd (1021).

```
I: adapter 1021 selected
Management Interface B-Channel State Trace utility for Diva cards
BUILD (108-1009-Sep 19 2008-14:31:35)
Copyright (c) 1991-2007 Dialogic

-w------hit-[debug_mask .................] = 0x7
--------fn -[DebugStop ..................]
```

- Set debug mask to 3FF

```
/usr/lib/opendivas/diva/divactrl mantool -c 1021 -w"Debug/debug_mask=0x3FF"
I: adapter 1021 selected
Management Interface B-Channel State Trace utility for Diva cards
BUILD (108-1009-Sep 19 2008-14:31:35)
Copyright (c) 1991-2007 Dialogic
```

- Set debug mask to 0

```
/usr/lib/opendivas/diva/divactrl mantool -c 1021 -w"Debug/debug_mask=0x0"
I: adapter 1021 selected
Management Interface B-Channel State Trace utility for Diva cards
BUILD (108-1009-Sep 19 2008-14:31:35)
Copyright (c) 1991-2007 Dialogic
```

Chapter 8: Uninstalling

Note: There is no separate uninstaller provided for the Dialogic® SS7 Software for Dialogic® Diva® Interfaces. The software is uninstalled with the Dialogic® Diva® System Release software.

To uninstall the SS7 Software for Diva Interfaces, do the following:

1. Open a terminal and go to `/usr/lib/opendiva/divas` and change the file Diva4Linux_uninstaller.sh to an executable
   `chmod a+x Diva4Linux_uninstaller.sh`.
2. Stop the Dialogic® Diva® driver with `./Stop`
3. Execute the script `Diva4Linux_uninstaller.sh`. While executing the script you will be asked:
   - If you would like to uninstall the Dialogic® Diva® softIP software, the Dialogic® Diva® SIPcontrol™ software (when these products are installed). Answer **No** if you do not want to uninstall these products or press **Yes** to confirm that you want to remove these software products.
   - If you want to uninstall the SS7 Software for Diva Interfaces, press **Yes** to confirm.
   - For the Dialogic® Diva® System Release software, answer **NO** if you do not want to uninstall or press **Yes** to confirm that you want to remove this software product.
4. The license files of the Dialogic® DSI SS7 software and the configuration files (config.txt and system.txt) are saved into /usr/lib/opendiva/dlgss7_backup.tgz.
5. After the uninstall, the DSI SS7 software will not be started when starting the Diva System Release software.
6. When you reinstall or upgrade the DSI SS7 software, the configuration and license files will be restored.

Chapter 9: Troubleshooting

If you experience any issues with the SS7 Software for Diva Interfaces, please contact Dialogic Customer support at: http://www.dialogic.com/support/contact/.

Note: When contacting support, you will be asked to provide traces of your SS7 Software for Diva Interfaces application as well as of the CAPI and the Dialogic® Diva® Media Board. For more information, see Tracing on page 47 and see the corresponding chapter in the Dialogic® Diva® System Release LIN Reference Guide.

Chapter 10: Management Interface of the SSDD Process

The Dialogic® Diva® System Release LIN software provides a common management utility to access configuration, status, statistics and debugging information while running. The ssdd process has implemented a management interface which can be accessed with the standard Diva System Release method, see Dialogic® Diva® System Release LIN Reference Guide.

This chapter describes the parameters of the ssdd management interface.

The management interface of the ssdd has the logical board number 1021; this number is fixed on all systems. Accessing the management interface with the option `-c 1021` registers with the management interface of the ssdd.

Reading the root directory of the ssdd management interface:

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r""
```

will generate the following information:

```
--------hit-[MIF Version ..............] = 0x117
--------asz-[Build ....................] = 108-76 Sep  5 2008 12:59:13
--------asz-[StartUpTime ..............] = Fri Sep  5 17:49:10 2008
--------dir-[Config .....................]
--------dir-[State ......................]
--------dir-[Statistics..................]
--------dir-[License .....................]
--------dir-[Debug ......................]
```

Values

- **MIF Version**

  Identifies the version of the management information base
- **Build**

  Displays available version information of the ssdd
- **StartUpTime**

  Displays system time at start of the ssdd
- **Config**

  Directory containing configuration information, see Config Directory on page 55
- **State**

  Directory containing the current state of the ssdd, see State Directory on page 58
- **Statistics**

  Directory containing available statistics of the ssdd, see Statistics Directory on page 60
- **License**

  Directory containing extracted license information, see License Directory on page 64
- **Debug**

  Directory containing and controlling the current debug state, see Debug Directory on page 65

10.1 Config Directory

Description

Via the config directory of the ssdd, you can retrieve configuration information received by the ssdd.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Config"
```

Output

```
--------dir-[Boards .....................]
--------dir-[LIUs .......................]
--------dir-[Links ......................]
```

Values

- Boards on page 55
  Directory containig board configuration information
- LIUs on page 56
  Directory containing information about the line interface unit (LIU) configuration
- Links on page 57
  Directory containing information about the signaling link configuration

10.1.1 Boards

Description

The boards directory lists configuration information about all configured boards.

When calling:

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Config\Boards"
```

the boards that have been reset by the **SSD_MSG_RST_BOARD** or **DIVA_BOARD** command (see Physical Interface Configuration Command on page 44) are enumerated.

```
--------uit-[NumberBoards ..............] = N
--------dir-[Board 1 ...................]
...
--------dir-[Board N ...................]
```

Where `N` is the number of boards reset.

Reading the configuration of a single board is described below.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Config\Boards\Board X"
```

where `X` is the Link management number.

Output (example)

```
--------int-[board_id ..................] = 0
--------asz-[serial_number ..............] = 1234
--------int-[board_type .................] = 81
--------int-[board_typeS ................] = Dialogic Diva V-4PRI/E1/T1-120 PCI v1
--------int-[number_of_LIUs .............] = 4
```

Values

- **board_id**
  board_id as defined by the **SSD_BOARD_RESET** or **DIVA_BOARD** command.
- **serial_number**
  serial_number as defined by the **SSD_BOARD_RESET** or **DIVA_BOARD** command.
- **board_type**
  Dialogic® Diva® Media Board **board_type** as defined by **SSD_BOARD_RESET** or **DIVA_BOARD** command.
- **board_typeS**
  Diva Media Board **board_type** as ASCII string.
- **number_of_LIUs**
  Number of line interface unit(s) (LIU) of the board.

10.1.2 LIUs

Description

The LIUs directory lists configuration information about the configured line interface units (LIU).

When calling:

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Config\LIUs"
```

the LIUs configured for signaling are enumerated:

```
--------uit-[NumberLIUs ..............] = N
--------dir-[LIU 1 ..................]
...
--------dir-[LIU N ..................]
```

Where N is the number of LIUs.

Reading the configuration of a single LIU is described below.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Config\LIUs\LIU X"
```

where X is the LIU management number

Output (example)

```
--------int-[board_id ..................] = 0
--------asz-[serial_number ..............] = 1234
--------int-[liu_id .....................] = 0
--------hit-[board_mgmt_id ..............] = 0x8e
--------hit-[mtp2_module_id .............] = 0xff
```

Values

- **board_id**
  Board ID of the Diva Media Board.
- **serial_number**
  Serial number of the Diva Media Board.
- **liu_id**
  LIU ID of this LIU.

- **board_mgmt_id**
  Module ID of board management module.
- **mtp2_module_id**
  Module ID of MTP2 module.

10.1.3 Links

Description

The links directory lists configuration information about all MTP2 links.

When calling:

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Config\Links"
```

all configured links which were received in a **MGT_L1_CONFIG** request message are enumerated:

```
--------uit-[NumberOfLinks ..............] = N
--------dir-[Link 1 ..................]
...
--------dir-[Link N ..................]
```

Where N is the number of links.

Reading the configuration of a single link is described below.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Config\Links\Link X"
```

where X is the LIU management number

```
Output (example)
--------int-[board_id ..................] = 0
--------asz-[serial_number ..............] = 1234
--------int-[liu_id .....................] = 0
--------int-[llid ......................] = 0
--------bit-[timeslotmask ..............] = 0000:0000:0000:0000:1000:0000:0000:0000
--------bit-[channelBitMask .............] = 1111:1111
--------hit-[mtp2_module_id .............] = 0x71
--------asz-[mgt_msg_L1_config ..........] =
      I0000-t7f17-i0000-fcf-d8e-r8000-c00-s00-e00000000-p(040)000000000000000000000000
```

Values

- **board_id**
  Board ID of the Diva Media Board.
- **serial_number**
  Serial number of the Diva Media Board.
- **liu_id**
  LIU ID of the Diva Media Board.
- **llid**
  Logical link ID (llid) of the link.
- **timeslotmask**
  Shows channel used for this link (example shows timeslot 16).
- **channelBitMask**
  Shows bits utilized for this link (example shows all bits - 64k).

- **mtp2_module_id**
  Module ID of MTP2 module.
- **mgt_msg_L1_config**
  Displays **MGT_L1_CONFIG** request message.

10.2 State Directory

Description

The state directory gives hints when the stack is not working properly (e.g., CAPI link down).

Via the **State** directory, state information of the ssdd can be retrieved.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"State"
```

Output

```
--------dir-[Links ......................]
```

Value

Links below

Directory containing information about the signaling link states

10.2.1 Links

Description

The links directory lists state information about all MTP2 links.

When calling:

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"State\Links"
```

All configured links, the ssdd is maintaining, are enumerated:

```
--------uit-[NumberOfLinks ..............] = N
--------dir-[Link 1 ...................]
...
--------dir-[Link N ...................]
```

Where `N` is the number of links.

Reading the state of a single link is described below.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"State\Links\Link X"
```

where `X` is the link management number

Output (example)

```
--------int-[board_id ...................] = 0
--------int-[liu_id .....................] = 0
--------int-[llid .......................] = 0
--------hit-[LastPrimitiveRX ............] = 0x8f01
--------hit-[LastPrimitiveTX ............] = 0xcf00
--------int-[MaxDataB3Req ...............] = 2
--------int-[CurrentDataB3Req ...........] = 0
--------int-[maxMsgCapiReq ..............] = 0
--------int-[CurrentMsgCapiReq ..........] = 0
--------int-[CapiState ..................] = 2
--------asz-[CapiStateS .................] = CONNECTED
--------asz-[ChangeTime .................] = Mon Sep  8 09:27:03
```

Values

- **board_id**

  Board ID of the Diva Media Board.
- **liu_id**

  LIU ID of the Diva Media Board.
- **llid**

  Logical link ID (llid) of the link.
- **LastPrimitiveRX**

  Shows the message type of the last primitive received from the board.

  In this example: 0x8f01 - **API_MSG_RX_IND**
- **LastPrimitiveRX**

  Shows the message type of the last primitive sent to the board.

  In this example: 0xcf00 - **API_MSG_TX_REQ**
- **MaxDataB3Req**

  Maximum number of CAPI requests of the link queued towards the board.
- **CurrentDataB3Req**

  Current number of CAPI requests of the link queued towards the board.
- **MaxMsgCapiReq**

  Maximum number of Dialogic® DSI primitives in CAPI request of the link queued towards the board.
- **CurrentDataB3Req**

  Current number of Dialogic® DSI primitives in CAPI request of the link queued towards the board.
- **CapiState**

  Current CAPI state.
- **CapiStateS**

  Current CAPI state as ASCII string.
- **ChangeTime**

  System time when entered the above state.

10.3 Statistics Directory

Description

The statistics directory gives further hints when the stack is not working properly (load balancing, …).

Via the statistics directory of the ssdd, information about the number of messages/octets received or transmitted is retrieved. The values can be reset.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Statistics"
```

Output

```
--------dir-[All .......................]
--------dir-[Boards ....................]
--------dir-[LIUs ......................]
--------dir-[Links .....................]
```

Values

- **All on page 60**

  The **All** directory lists the numbers of all links.
- **Boards on page 61**

  The **Boards** directory lists the numbers of all links running on that board.
- **LIUs on page 62**

  The **LIUs** directory lists the numbers of all links running on that line interface unit (LIU).
- **Links on page 63**

  The **Links** directory lists the numbers of the corresponding links.

10.3.1 All

Description

The **All** directory lists the statistics numbers of all links maintained by ssdd.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Statistics\All"
```

Output (example)

```
--------int-[NumberPrimitivesRX .........] = 16
--------int-[NumberPrimitivesTX .........] = 28
--------int-[NumberOctetsRX .............] = 388
--------int-[NumberOctetsTX .............] = 388
--------fn -[Reset .....................]
```

Values

- **NumberPrimitivesRX**

  Total number of Dialogic® DSI primitives received from all link instances maintained by ssdd.
- **NumberPrimitivesTX**

  Total number of Dialogic® DSI primitives sent to all link instances maintained by ssdd.

- **NumberOctetsRX**

  Total number of octets in Dialogic® DSI primitives received from all link instances maintained by ssdd.

- **NumberOctetsTX**

  Total number of octets in Dialogic® DSI primitives sent to all link instances maintained by ssdd.

- **Reset**

  Function call to reset all statistics numbers of all link instances maintained by ssdd:

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -e"Statistics\All\Reset"
  ```

10.3.2 Boards

Description

The **Boards** directory lists the total number of all links maintained by the ssdd running on that board.

When calling:

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Statistics\Boards"
```

All boards are enumerated:

```
--------uit-[NumberBoards ..............] = N
--------dir-[Board 1 ...................]
...
--------dir-[Board N ...................]
```

Where `N` is the number of boards.

Reading the statistics of a single board is described below.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Statistics\Boards\Board X"
```

where `X` is the board management number

Output (example)

```
--------int-[board_id ...................] = 0
--------int-[NumberPrimitivesRX .........] = 16
--------int-[NumberPrimitivesTX .........] = 28
--------int-[NumberOctetsRX .............] = 388
--------int-[NumberOctetsTX .............] = 388
--------fn -[Reset .....................]
```

Values

- **board_id**

  Board ID as received in the **SSD_BOARD_RESET** request message.

- **NumberPrimitivesRX**

  Total number of Dialogic® DSI primitives received from link instances assigned to the board and maintained by ssdd.

- **NumberPrimitivesTX**

  Total number of Dialogic® DSI primitives sent to all link instances assigned to the board and maintained by ssdd.

- **NumberOctetsRX**

  Total number of octets in Dialogic® DSI primitives received from all link instances assigned to the board and maintained by ssdd.

- **NumberOctetsTX**

  Total number of octets in Dialogic® DSI primitives sent to all link instances assigned to the board and maintained by ssdd.

- **Reset**

  Function call to reset all statistics numbers of all link instances assigned to the board and maintained by ssdd.

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -e"Statistic\Boards\Board X \Reset"
  ```

Note: The numbers of all link instances maintained by ssdd will be reset to 0.

10.3.3 LIUs

Description

The LIUs directory lists the total number of all links maintained by the ssdd running on that line interface unit (LIU).

When calling:

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Statistics\LIUs"
```

The LIUs configured to be used for signaling are enumerated:

```
--------uit-[NumberLIUs ..............] = N
--------dir-[LIU 1 ..................]
...
--------dir-[LIU N ..................]
```

Where `N` is the number of LIUs.

Reading the statistics of a single LIU is described below.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Statistics\LIUs\LIU X"
```

where `X` is the LIU management number.

Output (example)

```
--------int-[board_id ..................] = 0
--------int-[liu_id .....................] = 0
--------int-[NumberPrimitivesRX .........] = 6
--------int-[NumberPrimitivesTX .........] = 12
--------int-[NumberOctetsRX .............] = 172
--------int-[NumberOctetsTX .............] = 172
--------fn -[Reset .....................]
```

Values

- **board_id**

  board_id, reference to the board

- **liu_id**

  LIU id of this LIU

- **NumberPrimitivesRX**

  Total number of Dialogic® DSI primitives received from link instances assigned to that LIU and maintained by ssdd.

- **NumberPrimitivesTX**

  Total number of Dialogic® DSI primitives sent to all link instances assigned to that LIU and maintained by ssdd.

- **NumberOctetsRX**

  Total number of octets in Dialogic® DSI primitives received from all link instances assigned to that LIU and maintained by ssdd.

- **NumberOctetsTX**

  Total number of octets in Dialogic® DSI primitives sent to all link instances assigned to that LIU and maintained by ssdd.

- **Reset**

  Function call to reset all statistics numbers of all link instances assigned to that LIU and maintained by ssdd.

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -e"Statistics\LIUs\LIU X \Reset"
  ```

10.3.4 Links

Description

The links directory lists the statistics numbers of each MTP2 link maintained by ssdd.

When calling:

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Statistics\Links"
```

all configured links which were received in a **MGT_L1_CONFIG** request message are enumerated:

```
--------uit-[NumberOfLinks ..............] = N
--------dir-[Link 1 ..................]
...
--------dir-[Link N ..................]
```

Where `N` is the number of links.

Reading the statistics of a single link is described below.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Statistics\Links\Link X"
```

where `X` is the link management number.

Output (example)

```
--------int-[board_id ..................] = 0
--------int-[liu_id .....................] = 0
--------int-[llid .......................] = 0
--------int-[NumberPrimitivesRX .........] = 3
--------int-[NumberPrimitivesTX .........] = 6
--------int-[NumberOctetsRX .............] = 86
--------int-[NumberOctetsTX .............] = 86
--------fn -[Reset ......................]
```

Values

- **board_id**

  Board ID referencing to the board.

- **liu_id**

  LIU ID referencing to the LIU of the board.

- **llid**

  Logical link ID (llid) of the link.

- **NumberPrimitivesRX**

  Total number of Dialogic® DSI primitives received from this link instance.

- **NumberPrimitivesTX**

  Total number of Dialogic® DSI primitives sent to this link instance.
- **NumberOctetsRX**

  Total number of octets in Dialogic® DSI primitives received from this link instance.
- **NumberOctetsTX**

  Total number of octets in Dialogic® DSI primitives sent to this link instance.
- **Reset**

  Function call to reset the statistic numbers of this link instance.

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -e"Statistic\Links\Link X \Reset"
  ```

10.4 License Directory

Description

Via the license directory of the ssdd, the current license status can be obtained.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"License"
```

Output (example)

```
--------asz-[HostId .....................] = 00123456789A
--------uit-[NumberOfLinks ..............] = 4
--------uit-[NumberOfLinksInUse .........] = 4
--------asz-[LicensePath .................] = ./.
--------bol-[TestMode ...................] = FALSE
```

Values

- **HostId**

  Displays the host ID of the system.
- **NumberOfLinks**

  If a valid license is found, **NumberOfLinks** displays the number of licensed MTP2 links.
- **NumberOfLinksInUse**

  Number of links currently configured.
- **LicensePath**

  Path to license found.
- **TrialMode**

  Indicates if running in test mode (ssdd -t).

10.5 Debug Directory

Description

Via the debug directory, the debug information of the ssdd written into the Dialogic® Diva® System Release standard tracing utilities (see the Dialogic® Diva® System Release Software Reference Guide) can be controlled.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Debug"
```

Output (example)

```
-w------hit-[debug_mask .................] = 0x47
--------fn -[DebugStop ..................]
```

Values

- **debug_mask**

  Current debug mask.

Bit	Meaning
0	Initialisation and state changes
1	Errors
2	Warnings
3	Internal status changes
4	Protocol wrapper
5	Internal verbose
6	Messages/primitves
7	-
8	CAPI - NCCI state machine
9	CAPI - PLCI state machine
10	CAPI - controller state machine
11	Memory allocation
12	Timer handling

  Note: The trace mask used on live systems, should not define more than bit 0, 1, and 2 since it may harm the overall system performance significantly. The -d option is intended for use during fault finding on a system that has not been configured correctly.

  The value of the debug_mask can be changed during runtime:

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -w"Debug\debug_mask=0x7"
  ```

  will change the current debug mask to 0x7 (initialisation and state changes AND errors AND warnings)

- **DebugStop/DebugStart**

  Enables or disables debugging.

  When debugging is enabled, **DebugStop** will be displayed. By calling:

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -e"Debug\DebugStop"
  ```

  debugging may be disabled.

  When debugging is disabled, **DebugStart** will be displayed. By calling:

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -e"Debug\DebugStart"
  ```

  debugging may be enabled.

Chapter 11: Management Interface of the DVSCC Process

The Dialogic® Diva® System Release LIN provides a common management utility to access the configuration, status, statistics, and debugging information while it is running. The Diva Virtual Signaling Call Control (DVSCC) has implemented a management interface that can be accessed with the standard Diva System Release method, see the Dialogic® Diva® System Release LIN Reference Guide for more information.

This chapter describes the parameters of the DVSCC management interface:

- Config directory on page 67
- State directory on page 71
- Statistics directory on page 78
- Debug Directory on page 84

The management interface of the DVSCC has the board number 1022, this number is fix on all systems. Accessing the management interface with the option "-c 1022" registers with the management interface of the DVSCC.

Reading the root directory of the DVSCC management interface:

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r""
```

will generate the following information:

```
--------hit-[MIF Version ................] = 0x115

--------asz-[Build ......................] = 108-67 Oct 29 2008 18:53:35

--------dir-[Config .....................]

--------dir-[State ......................]

--------dir-[Statistics .................]

--------dir-[Debug ......................]
```

Values

- **MIF Version**

  Identifies the version of the management information base.
- **Build**

  Displays available version information of the DVSCC.
- **Config**

  Directory containing configuration information, see page 67.
- **State**

  Directory containing the current state of the DVSCC, see page 71.
- **Statistic**

  Directory containing available statistics of the DVSCC, see page 78.
- **Debug**

  Directory containing and controlling the current debug state, see page 84.

11.1 Config directory

Description

Via the Config directory, you can retrieve the configuration information of DVSCC.

DVSCC reads its configuration from the common config.txt file. Some specific values of the configuration are not configurable by the standard mechanism; the corresponding values are explicitly mentioned in the description.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Config"
```

Output

```
--------dir-[Trunks .....................]

--------dir-[CICs .......................]

-w------uit-[utilizeCHI .................] = 0

-w------uit-[BCI_ChargeInd ..............] = 0

-w------uit-[BCI_CalledPartC ............] = 0
```

Values

- **Trunks**

  Directory contains the configuration information of all trunks.

- **CICs**

  Directory contains the configuration information of all CICs.

- **utilizeCHI**

  When configured, it tries to fulfill the channel request from the user.

  Values:

  0 - Specific channel requests of the user are ignored (default).

  1 - DVSCC tries to fulfill the channel request from the user.

  When the channel is already taken or on dual seizure, the channel request is ignored and the next free bearer channel is utilized.

  Note: The value can only be set by writing this variable.

- **BCI_ChargeInd**

  The value of the Charge Indicator (bit 0,1 of the backward call indicator) in the ACM (address complete message).

  Values:

  0 - no indication (default)

  1 - no charge

  2 - charge

  Note: The value can only be set by writing this variable.

- **BCI_CalledPartC**

  The value of the Called Party's Category Indicator (bit 4, 5 of the backward call indicator) in the ACM (Address Complete Message).

  Values:

  0 – no indication (default)

  1 – ordinary subscriber

  2 – payphone (value can only be set by writing this variable)

11.1.1 Trunks directory

Description

The Trunks directory enumerates the configuration information about all configured trunks.

When calling:

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Config\Trunks"
--------uit-[NumberTrunks ..............] = N
--------dir-[Trunk 1 ..................]
...
--------dir-[Trunk N ..................]
```

Where N is the number of Trunks configured.

Reading the configuration of a single trunk is described below.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Config\Trunks\Trunk X"
```

Where X is the board management number.

Output (example)

```
--------int-[CapiController ............] = 2
--------asz-[SerialNumber ..............] = 1008-0
--------int-[BoardId ..................] = 0
--------int-[LiuId ....................] = 0
--------int-[GID ......................] = 0
--------int-[OPC ......................] = 129
--------int-[DPC ......................] = 130
--------asz-[ProtocolVariantS ..........] = 1-ITU92
--------asz-[ConformanceS ..............] = ITU(03/93 and later)
--------asz-[NetworkIndicatorS ..........] = 0x08-national network
--------asz-[L1CodingS ..................] = a-law
```

Values

- **CapiController**
  CAPI controller number of the trunk.
- **SerialNumber**
  Serial number of the Dialogic® Diva® Media Board.
- **BoardId**
  Board ID of the Diva Media Board.
- **LiuId**
  Line Interface Unit Identifier of the trunk on the Diva Media Board.

- **GID**
  Group ID of the circuit group (the circuits assigned to the trunk).
- **OPC**
  Originating Point Code of the circuit group.
- **DPC**
  Destination Point Code of the circuit group.
- **ProtocolVariantS**
  Protocol variant of the circuit group as string.
- **ConformanceS**
  Conformance string, subvariant of the protocol of that circuit group.
- **NetworkIndicatorS**
  Network Indicator string of the circuit group.
- **L1CodingS**
  L1 coding string of the trunk (read from the Dialogic® Diva® System Release configuration).

11.1.2 CICs directory

Description

The CICs directory lists the configuration information about the configured CICs.

When calling:

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Config\CICs"
--------uit-[NumberCICs .................] = N
--------dir-[CIC 1 ....................]
...
--------dir-[CIC N ....................]
```

Where N is the number of CICs configured.

Reading the configuration of one CIC is described below.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Config\CICs\CIC X"
```

Where X is the board number.

Output (example)

```
--------int-[CIC .......................] = 1
--------int-[GID .......................] = 1
--------int-[CID .......................] = 1
--------int-[OPC .......................] = 129
--------int-[DPC .......................] = 130
--------asz-[SerialNumber ..............] = 1008-0
--------int-[BoardId ....................] = 0
```

```
--------int-[LiuId ......................] = 0
--------int-[Timeslot ...................] = 1
```

Values

- **CIC**
  Circuit Identification Code
- **GID**
  Group ID to which the circuit belongs.
- **CID**
  Circuit identifier of the circuit.
- **OPC**
  Originating Point Code of the circuit.
- **DPC**
  Destination Point Code of the circuit.
- **SerialNumber**
  Serial number of the Dialogic® Diva® Media Board that administers the timeslot of the circuit.
- **BoardId**
  Board ID of the Diva Media Board that administers the timeslot of the circuit.
- **LiuId**
  Line Interface Unit Identifier of the trunk that administers the timeslot of the circuit.
- **Timeslot**
  Timeslot of the circuit.

11.2 State directory

Description

The State directory shows the current state of the DVSCC; additionally it gives hints if the stack is not working properly (e.g., CAPI connection down).

Via the State directory, state information of the DVSCC can be retrieved.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"State"
```

Output

```
--------asz-[StartUpTime ................] = Fri Oct 31 10:02:00 2008
--------dir-[Trunks .....................]
--------dir-[CICs .......................]
```

Value

- **StartUpTime**
  Displays system time at DVSCC start.
- **Trunks**
  Directory containing information about the current state of all trunks.
- **CICs**
  Directory containing information about the current state of all CICs.

11.2.1 Trunks directory

Description

The Trunks directory lists state information about all trunks.

When calling:

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"State\Trunks"
--------uit-[NumberTrunks ..............] = N
--------dir-[Trunk 1 ...................]
...
--------dir-[Trunk N ...................]
```

Where `N` is the number of trunks configured.

Reading the state of a single trunk is described below.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"State\Trunks\Trunk X"
```

Where `X` is the board number.

Output (example)

```
--------int-[CapiController .............] = 2
--------asz-[SerialNumber ...............] = 1008-0
--------int-[BoardId ....................] = 0
--------int-[LiuId ......................] = 0
--------int-[GID ........................] = 1
--------dir-[CAPI .......................]
--------bit-[TimeslotConfigured .........] =0111:1111:1111:1111:0111:1111:1111:1111
-w------bit-[LocMaintBlockState .........] =0000:0000:0000:0000:0000:0000:0000:0000
--------bit-[LocHWBlockState ............] =0000:0000:0000:0000:0000:0000:0000:0000
--------dir-[SpecLocHWBlockState ........]
--------dir-[L1State ....................]
--------dir-[ConnState ..................]
--------fn -[GRS ........................]
```

```
-w------bit-[RSC_ByOperator .............] =0000:0000:0000:0000:0000:0000:0000:0000
--------bit-[RemoteMaintBlocked .........] =0000:0000:0000:0000:0000:0000:0000:0000
--------bit-[RemoteHWBlocked ............] =0000:0000:0000:0000:0000:0000:0000:0000
--------bit-[ActiveState ................] =0111:1111:1111:1111:0111:1111:1111:1111
--------bit-[WaitForGRA ................] =0000:0000:0000:0000:0000:0000:0000:0000
```

Values

- **CapiController**

  CAPI controller number of the trunk.
- **SerialNumber**

  Serial number of the Dialogic® Diva® Media Board.
- **BoardId**

  Board ID of the Diva Media Board.
- **LiuId**

  Line Interface Unit Identifier of the trunk on the Diva Media Board.
- **GID**

  Group ID of the circuit group (the circuits assigned to the trunk).
- **CAPI**

  The CAPI directory as described on page 74.
- **TimeslotConfigured**

  Bitmask representing the timeslots utilized by circuits administered by this trunk (bit 0 represents timeslot 1).
- **LocMaintBlockState**

  Bitmask representing the current local maintenance blocking state (bit 0 represents timeslot 1). The local maintenance blocking state may be changed by writing a new value. The following command will set all circuits administered by this trunk to local maintenance blocked:

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1022 -w"State/Trunks/Trunk
  X/LocMaintBlockState=0x7fffffff".
  ```
- **LocHWBlockState**

  Bitmask representing the current local hardware blocking state (bit 0 represents timeslot 1).
- **SpecLocHWBlockState**

  The special local hardware blocking state directory. For more information, see page 71.
- **L1State**

  Directory details the L1 state as described on page 75.
- **ConnState**

  Directory containing the current state of the CAPI connection to the trunk.
- **GRS**

  Circuit group reset function. When called, the DVSCC will issue a GRS command to ISUP for the circuit group of the circuits assigned to the trunk.

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1022 -e"State/Trunks/Trunk 1/GRS".
  ```

- **RSC_ByOperator**

  Bitmask to reset a single circuit. Setting one bit of this bitmask will issue an RSC command to ISUP for the circuit allocated to the timeslot (bit 0, represents timeslot 1).

  The command:

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1022 -w"State/Trunks/Trunk X/RSC_ByOperator=0x4"
  ```

  will cause an RSC message to be generated for the circuit assigned to timeslot 3 of the corresponding trunk.

  Note: Only one bit can be set.

- **RemoteMaintBlocked**

  Bitmask representing the current remote maintenance blocking state (bit 0 represents timeslot 1).

- **RemoteHWBlocked**

  Bitmask representing the current remote hardware blocking state (bit 0 represents timeslot 1).

- **ActiveState**

  Bitmask representing the current signaling state (bit 0 represents timeslot 1).

  0 - paused

  1 - active

- **WaitForGRA**

  Bitmask indicating that the circuit is not available for communication, because a GRA is awaited (bit 0 represents timeslot 1).

11.2.2 CAPI directory

Description

The CAPI directory shows the available CAPI information.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"State/Trunks/Trunk 1/CAPI"
```

shows CAPI state.

Output (example)

```
--------asz-[LastMsgRX ..................] = IND_DATA_B3_IND
--------asz-[LastMsgTX ..................] = REQ_NULL
--------int-[MaxDataB3Req ..............] = 1
```

Values

- LastMSGRX

  Shows the message type of the last message received from the CAPI.

  In this example: `0x8f01 - API_MSG_RX_IND`.

- LastMSGTX

  Shows the message type of the last message sent to the CAPI.

  In this example: `0xcf00 - API_MSG_TX_REQ`.

- **MaxDataB3Req**

  Maximum number of CAPI requests of the link that are queued towards the CAPI.

11.2.3 SpecLocHWBlockState directory

Description

The SpecLocHWBlockState directory shows the reason for the local hardware blocking state. It enables the setting of the local hardware blocking state.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1022 -r"State/Trunks/Trunk X/SpecLocHWBlockState"
```

Output (example)

```
-w------bit-[ByOperator .................] =0000:0000:0000:0000:0000:0000:0000:0000

--------bit-[ByResourceUnavail ..........] =0000:0000:0000:0000:0000:0000:0000:0000
```

Values

- **ByOperator**

  Bitmask representing the current local hardware blocking state set by the operator (bit 0 represents timeslot 1).

  The operator may change it by writing a new value.

  The following command will set all circuits administered by this trunk to local hardware blocked (byOperator):

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1022 -w"State/Trunks/Trunk
  X/SpecLocHWBlockState/ByOperator=0x7fffffff"
  ```

  Note: A hardware blocking request for a single circuit cannot be communicated and is therefore ignored.

- **ByResourceUnavail**

  Bitmask representing the current local hardware blocking state caused by Layer 1 errors (bit 0 represents timeslot 1).

11.2.4 L1State directory

Description

The L1State directory shows the available layer 1 information.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"State/Trunks/Trunk 1/L1State"
```

shows the CAPI state.

Output (example)

```
--------int-[EventReporting .............] = 0

--------asz-[StateS .....................] = Activated

--------asz-[TimeOfLastStateChange ......] = Tue Nov 18 07:07:05 2008
```

Values

- **EventReporting**

  Indicating if management reporting is enabled. When disabled, layer 1 events are not reported and the DVSCC assumes that layer 1 is always activated.

- **StateS**
  Current layer 1 state as ASCII string.
- **TimeOfLastStateChange**
  System time when layer 1 entered the above state.

11.2.5 ConnState directory

Description

The ConnState directory displays the state of the CAPI connection to the Dialogic® Diva® Media Board.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"State/Trunks/Trunk 1/ConnState"
```

Output (example)

```
--------int-[State ......................] = 1
--------asz-[TimeOfLastStateChange ......] = Tue Nov 18 07:07:05 2008
```

Values

- **State**
  Current state of the CAPI connection to the Diva Media Board.
  Values:
  0 - not connected
  1 - connected
- **TimeOfLastStateChange**
  System time when entered the above state.

11.2.6 CICs directory

Description

The CICs directory lists state information about the configured CICs.

When calling:

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"State\CICs"
--------uit-[NumberCICs .................] = N
--------dir-[CIC 1 ...................]
...
--------dir-[CIC N ...................]
```

Where `N` is the number of CICs configured.

Reading the configuration of a single CIC is described below.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"State\CICs\CIC X"
```

Where `X` is the CIC number.

Output (example)

```
--------int-[CIC .......................] = 1
--------int-[GID .......................] = 0
--------int-[CID .......................] = 1
--------int-[OPC .......................] = 130
--------int-[DPC .......................] = 129
--------int-[BoardId ...................] = 1
--------int-[LiuId .....................] = 1
--------int-[Timeslot ..................] = 1
-w------int-[LocMaintBlockState .........] = 0
--------int-[LocHWBlockState ............] = 0
--------dir-[SpecLocHWBlockState ........]
--------int-[RemoteMaintBlocked .........] = 0
--------int-[RemoteHWBlocked ............] = 0
--------bol-[ActiveState ................] = TRUE
--------bol-[WaitForGRA .................] = FALSE
```

Values

- **CIC**
  Circuit Identification Code
- **GID**
  Group ID to which the circuit belongs.
- **CID**
  Circuit ID of the circuit.
- **OPC**
  Originating point code of that circuit.
- **DPC**
  Destination point code of that circuit.
- **Timeslot**
  Timeslot the circuit is assigned to on the corresponding trunk, which is hidden behind the GID.
- **LocMaintBlockState**
  Current Local Maintenance blocking state of the circuit.
  The state can be changed:
  `/usr/lib/opendiva/divas/divactrl mantool -c 1022 -w"State/CICs/CIC X/LocMaintBlockState=1".`
  This will set local maintenance blocking for that circuit.
- **LocHWBlockState**
  Current local hardware blocking state of the circuit.
- **SpecLocHWBlockState**
  The special local hardware blocking state directory gives more specific information on page 78.

- **RemoteMaintBlocked**
  Current value of the remote maintenance blocking state of the circuit.
- **RemoteHWBlocked**
  Current value of the remote hardware blocking state of the circuit.
- **ActiveState**
  Current signaling state of that circuit (TRUE = active, FALSE = paused).
- **WaitForGRA**
  Indicating that the circuit is not available for communication because a GRA is awaited.

11.2.7 SpecLocHWBlockState directory

Description

The SpecLocHWBlockState directory shows the reason of the local hardware blocking state.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1022 -r"State/CICs/CIC X/SpecLocHWBlockState"
```

Output (example)

```
--------int-[ByOperator .................] =0
--------int-[ByResourceUnavail ..........] =0
```

Values

- **ByOperator**
  Current Local Hardware blocking state of the circuit caused by operator blocking.
- **ByResourceUnavail**
  Current Local Hardware blocking state of the circuit caused by layer 1 not active.

11.3 Statistics directory

Description

The Statistics directory gives a quick overview of the throughput call success or failure since startup.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Statistics"
```

Output

```
--------dir-[All ........................]
--------dir-[Trunks ......................]
--------dir-[CICs .......................]
```

Values

- **All**
  Statistics of the system (see page 79).
- **Trunks**
  The combined statistics of all circuits of the corresponding trunk (see page 80).
- **CICs**
  Statistic information of the corresponding circuit (see page 81).

11.3.1 All

Description

The All directory lists the condensed statistic numbers.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Statistic\All"
```

Output (example)

```
--------int-[OutGoodCounter .............] = 0
--------int-[OutFailCounter .............] = 0
--------int-[InGoodCounter ..............] = 0
--------int-[InFailCounter ..............] = 0
--------int-[CauseE6Counter .............] = 0
--------int-[Cause9FCounter .............] = 0
--------int-[InCollisions ..............] = 0
--------int-[OutFailNoTerm ..............] = 0
--------fn -[ResetStatistics ............]
```

Values

- **OutGoodCounter**
  Total number of outgoing good completed calls of all circuits.
- **OutFailCounter**
  Total number of outgoing failed calls of all circuits.
- **InGoodCounter**
  Total number of incoming good completed calls of all circuits.
- **InFailCounter**
  Total number of incoming failed calls of all circuits.
- **CauseE6Counter**
  Total number of failed calls with reason "recover on timer expiry" (0xE6) of all circuits.
- **Cause9FCounter**
  Total number of failed calls with reason "normal, unspecified" (0x9F) of all circuits.

- **InCollisions**

  Total number of call collisions indicated by ISUP of all circuits.

  Note: Call collisions may be resolved (configuration see ISUP Programmers's Manual, "Configure Circuit Group Request", options bit0,1).

- **OutFailNoTerm**

  Total number of outgoing calls failed when "circuit available/no channel available" (0xA2) or "no route to destination" (0x83) of all circuits.

- **ResetStatistics**

  Reset all counters of all circuits.

11.3.2 Trunks

Description

The Trunks directory lists statistic information about all trunks.

When calling:

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Statistics\Trunks"

--------uit-[NumberTrunks ..............] = N

--------dir-[Trunk 1 ..................]

...

--------dir-[Trunk N ..................]
```

Where `N` is the number of trunks configured.

Reading the statistics of a single trunk is described below.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Statistics\Trunks\Trunk X"
```

Where `X` is the trunk number.

Output (example)

```
--------asz-[SerialNumber ..............] = 1008-2

--------int-[BoardId ..................] = 0

--------int-[LiuId .....................] = 1

--------int-[OutGoodCounter ............] = 2078375

--------int-[OutFailCounter ............] = 0

--------int-[InGoodCounter ............] = 2769376

--------int-[InFailCounter ............] = 0

--------int-[CauseE6Counter ............] = 0

--------int-[Cause9FCounter ............] = 0

--------int-[InCollisions ..............] = 856

--------int-[OutFailNoTerm ............] = 87

--------fn -[ResetStatistics ............]
```

Values

- **SerialNumber**

  Serial number of the Dialogic® Diva® Media Board.

- **BoardId**

  Board ID of the Diva Media Board.

- **LiuId**

  Line Interface Unit Identifier of the trunk on the Diva Media Board.

- **OutGoodCounter**

  Total number of outgoing good completed calls of all circuits on that trunk.

- **OutFailCounter**

  Total number of outgoing failed calls of all circuits on that trunk.

- **InGoodCounter**

  Total number of incoming good completed calls of all circuits on that trunk.

- **InFailCounter**

  Total number of incoming failed calls of all circuits on that trunk.

- **CauseE6Counter**

  Total number of failed calls with reason "recover on timer expiry" (0xE6) of all circuits on that trunk.

- **Cause9FCounter**

  Total number of failed calls with reason "normal, unspecified" (0x9F) of all circuits on that trunk.

- **InCollisions**

  Total number of call collisions indicated by ISUP of all circuits on that trunk.

  Note: Call collisions may be resolved (For the configuration, see the ISUP Programmers's Manual, "Configure Circuit Group Request", options bit 0,1).

- **OutFailNoTerm**

  Total number of outgoing calls failed when "circuit available/no channel available" (0xA2) or "no route to destination" (0x83) of all circuits on that trunk.

- **ResetStatistics**

  Reset all counters of all circuits on that trunk.

11.3.3 CICs

Description

The CICs directory lists statistic information of all CICs.

When calling:

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Statistics\CICs"

--------uit-[NumberCICs .................] = N

--------dir-[CIC 1 ......................]

...

--------dir-[CIC N ......................]
```

Where `N` is the number of CICs configured.

Reading the statistics of a single CIC is described below.

Syntax

```
/usr/lib/opendivas/diva/divactrl mantool -c 1022 -r"Statistics\CICs\CIC X"
```

Where X is the Diva Media Board number.

Output (example)

```
--------int-[Timeslot ..................] = 1
--------int-[CIC ......................] = 1
--------int-[GID ......................] = 0
--------int-[CID ......................] = 1
--------uit-[SigState ..................] = 0
--------hit-[LastMsgToCapi ..............] = 0x4d
--------asz-[LastMsgToCapiS .............] = REL
--------hit-[LastMsgFromCapi ............] = 0x5a
--------asz-[LastMsgFromCapiS ...........] = REL_COM|REL_ACK
--------int-[OutGoodCounter .............] = 80056
--------int-[OutFailCounter .............] = 0
--------int-[InGoodCounter ..............] = 79567
--------int-[InFailCounter ..............] = 0
--------int-[CauseCountE6 ...............] = 0
--------int-[CauseCount9F ...............] = 0
--------int-[InCollisions ...............] = 0
--------hit-[Cause0 ......................] = 0x0
--------hit-[Cause1 ......................] = 0x0
--------hit-[Cause2 ......................] = 0x0
--------hit-[Cause3 ......................] = 0x0
--------hit-[Cause4 ......................] = 0x0
--------hit-[Cause5 ......................] = 0x0
--------hit-[Cause6 ......................] = 0x0
--------hit-[Cause7 ......................] = 0x0
--------hit-[Cause8 ......................] = 0x0
--------hit-[Cause9 ......................] = 0x0
--------fn -[ResetStatistics ............]
```

Values

- **Timeslot**

  Timeslot of the circuit.

- **CIC**

  Circuit Identification Code of the circuit.

- **GID**

  Group ID to which the circuit belongs.
- **CID**

  Circuit ID of the circuit.
- **SigState**

  Current CAPI signaling state.
- **LastMsgToCapi**

  Last message request to CAPI as hexadecimal value.
- **LastMsgToCapiS**

  Last message request to CAPI as ASCII string.
- **LastMsgFromCapi**

  Last message indication from CAPI as hexadecimal value.
- **LastMsgFromCapiS**

  Last message indication from CAPI as ASCII string.
- **OutGoodCounter**

  Total number of outgoing good calls completed for this circuit.
- **OutFailCounter**

  Total number of outgoing failed calls from for this circuit.
- **InGoodCounter**

  Total number of incoming good calls completed for this circuit.
- **InFailCounter**

  Total number of incoming failed calls for this circuit.
- **CauseE6Counter**

  Total number of failed calls with reason "recover on timer expiry" (0xE6) for this circuit.
- **Cause9FCounter**

  Total number of failed calls with reason "normal, unspecified" (0x9F) for this circuit.
- **InCollisions**

  Total number of call collisions indicated by ISUP for this circuit.

  Note: Call collisions may be resolved (For configuration, see the ISUP Programmers's Manual, "Configure Circuit Group Request", options bit 0,1).

  Cause0..9

  Last 10 causes received other than normal call clearing for this circuit.
- **ResetStatistics**

  Reset all counters of this CIC.

11.4 Debug Directory

Description

Via the Debug directory, the debug information of the DVSCC written into the Dialogic® Diva® System Release standard tracing utilities (see the Dialogic® Diva® System Release Software Reference Guide) can be controlled.

Syntax

```
/usr/lib/opendiva/divas/divactrl mantool -c 1021 -r"Debug"
```

Output (example)

```
-w------hit-[debug_mask .................] = 0x47
--------fn -[DebugStop ..................]
```

Values

- **debug_mask**

  Current debug mask.

Bit	Meaning
0	Initialisation and state changes
1	Errors
2	Warnings
3	Internal status changes
4	Protocol wrapper
5	Internal verbose
6	Messages/primitves
7	-
8	CAPI - NCCI state machine
9	CAPI - PLCI state machine
10	CAPI - controller state machine
11	Memory allocation
12	Timer handling

  Note: The trace mask used on live systems, should not define more than bit 0, 1, and 2 since it may harm the overall system performance significantly. The -d option is intended for use during fault finding on a system that has not been configured correctly.

  The value of the debug_mask can be changed during runtime:

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -w"Debug\debug_mask=0x7"
  ```

  will change the current debug mask to 0x7 (initialisation and state changes AND errors AND warnings)

- **DebugStop/DebugStart**

  Enables or disables debugging.

  When debugging is enabled, **DebugStop** will be displayed. By calling:

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -e"Debug\DebugStop"
  ```

  debugging may be disabled.

  When debugging is disabled, **DebugStart** will be displayed. By calling:

  ```
  /usr/lib/opendiva/divas/divactrl mantool -c 1021 -e"Debug\DebugStart"
  ```

  debugging may be enabled.

Chapter 12: Examples of the Default Configuration Files

This chapter provides examples and explanations of the default Dialogic® SS7 Software for Dialogic® Diva® Interfaces configuration files (system.txt, config.txt).

```
*******************************************************************************
*
* Example System Configuration File (system.txt) for use with
* Dialogic(R) Diva (R) SS7
*
* Edit this file to reflect your configuration.
*
*******************************************************************************
*
*
* Essential modules running on host:
*
LOCAL  0x22    * MTP3 module
LOCAL  0x23    * ISUP module
LOCAL  0x20    * ssdd  - Board interface task
LOCAL  0x4d    * dvscc - Diva Virtual Signalling Call Control
*                        tranfers ISDN to ISUP and vice versa
LOCAL  0x00    * tim_lnx6 - Timer task
LOCAL  0xcf    * s7_mgt - Management/config task
*
* Optional modules running on the host:
*
LOCAL  0xef    * s7_log - Display and logging utility
*
*
* Essential modules running on the board (all redirected via ssd):
*
REDIRECT  0x71  0x20    * MTP2 module (except SS7HD boards)
REDIRECT  0x10  0x20    * CT bus/Clocking control module
REDIRECT  0x8e  0x20    * On-board management module
*
*
* Redirection of status indications:
*
REDIRECT  0xdf  0xef  * LIU/MTP2 status messages -> s7_log
*
*
* Dimensioning the Message Passing Environment:
*
NUM_MSGS   65000      * Number of standard size
*                       messages in the environment
*
*
*Now start-up all local tasks:
FORK_PROCESS  ./ssdd
FORK_PROCESS  ./dvscc
FORK_PROCESS  ./tim_lnx
FORK_PROCESS  ./tick_lnx
FORK_PROCESS  ./s7_log -o0xff1f
FORK_PROCESS  ./s7_mgt -i0x4d -d
FORK_PROCESS  ./mtp_lnx6
FORK_PROCESS  ./isp_lnx6
*
*******************************************************************************
```

Back to Back configuration (Dialogic® Diva® V-4PRI/E1/T1, 16 Ports, 2 Linksets, 4 Links) Controller 1 & 2 - 3 & 4 are connected via a loop cable.

```
*******************************************************************************
* Example SS7 Configuration File (config.txt) for use with
* Dialogic(R) Diva (R) SS7
*
* This file needs to be modified to suit individual circumstances.
* Refer to the relevant Programmer's Manuals for further details.
*
*******************************************************************************
*
* DIVA_BOARD
*           <board_id> <board_type> <flags> <serial>
DIVA_BOARD  0          81           0x0     1412
DIVA_BOARD  1          81           0x0     1411
DIVA_BOARD  2          81           0x0     1418
DIVA_BOARD  3          81           0x0     1104

*
*******************************************************************************
*
* MTP_CONFIG
*          <reserved1> <reserved2> <options>
MTP_CONFIG 0           0           0x00040044
*
*******************************************************************************
*
* MTP_LINKSET
*           <linkset_id> <adjacent_spc> <num_links> <flags> <local_spc> <ssf>
MTP_LINKSET 0            129            2           0x0000  130         0x08
MTP_LINKSET 1            130            2           0x0000  129         0x08
*
*******************************************************************************
*
* MTP_ROUTE
*         <dpc> <norm_ls> <user_part_mask> <flags> <second_ls>
MTP_ROUTE 129   0         0x0020
MTP_ROUTE 130   1         0x0020

*
*******************************************************************************
* MTP_LINK
*         <link_id> <linkset_id> <link_ref> <slc> <board_id> <blink> <stream> <timeslot> <flags>
MTP_LINK  0         0            0          0     0          0       0        16         0x0000
MTP_LINK  1         1            0          1     1          0       0        16         0x0000
MTP_LINK  2         0            1          0     2          0       0        16         0x0000
MTP_LINK  3         1            1          1     3          0       0        16         0x0000
*******************************************************************************
*
*******************************************************************************
*
* ISUP_CONFIG
*            <reserved> <reserved> <user_id> <options> <num_grps> <num_ccts> [<partner_id>]
ISUP_CONFIG  0          0          0x4d      0x0414    17         511
*
```

```
*****************************************************************************
*
* ISUP_CFG_CCTGRP
*            <gid> <dpc> <base_cic> <base_cid> <cic_mask> <options>   <user_inst> <user_id> <opc> <ssf>
<variant> <options2>
ISUP_CFG_CCTGRP  1  129  0x01    0x01     0x7fff7fff 0x0249001c  0     0x4d      130 0x8   1       0x00d0
ISUP_CFG_CCTGRP 2   129  0x21    0x20    0x7fffffff 0x0249001c  0       0x4d      130  0x8  1       0x00d0

ISUP_CFG_CCTGRP  3   129  0x41     0x40     0x7fffffff 0x0249001c  0       0x4d    130  0x8  1       0x00d0
ISUP_CFG_CCTGRP  4   129  0x61     0x60     0x7fffffff 0x0249001c  0       0x4d    130  0x8  1       0x00d0
*
ISUP_CFG_CCTGRP 5   130   0x01    0x80     0x7fff7fff 0x0249001c  0      0x4d    129  0x8   1       0x00d

ISUP_CFG_CCTGRP 6   130   0x21     0xA0     0x7fffffff 0x0249001c  0     0x4d    129 0x8   1      0x00d0

ISUP_CFG_CCTGRP  7   130  0x41     0xC0     0x7fffffff 0x0249001c  0       0x4d    129  0x8  1       0x00d0
ISUP_CFG_CCTGRP  8   130  0x61     0xE0     0x7fffffff 0x0249001c  0       0x4d    129  0x8  1       0x00d0
*
ISUP_CFG_CCTGRP  9   129  0x81     0x101    0x7fff7fff 0x0249001c  0       0x4d    130  0x8  1       0x00d0
ISUP_CFG_CCTGRP  10  129  0xA1     0x120    0x7fffffff 0x0249001c  0       0x4d    130  0x8  1       0x00d0
ISUP_CFG_CCTGRP  11  129  0xC1     0x140    0x7fffffff 0x0249001c  0       0x4d    130  0x8  1       0x00d0
ISUP_CFG_CCTGRP  12 129   0xE1     0x160    0x7fffffff 0x0249001c  0      0x4d    130   0x8  1       0x00d0
*
ISUP_CFG_CCTGRP  13  130  0x81     0x180    0x7fff7fff 0x0249001c  0       0x4d    129  0x8  1       0x00d0
ISUP_CFG_CCTGRP  14  130  0xA1     0x1A0    0x7fffffff 0x0249001c  0       0x4d    129  0x8  1       0x00d0
ISUP_CFG_CCTGRP  15  130  0xC1     0x1C0    0x7fffffff 0x0249001c  0       0x4d    129  0x8  1       0x00d0
ISUP_CFG_CCTGRP  16  130  0xE1     0x1E0    0x7fffffff 0x0249001c  0       0x4d    129  0x8  1       0x00d0
*****************************************************************************
* CCTGRP_RESOURCE
*                <gid> <board_id> <liu_id> <tslot_mask> <tslot_s>
CCTGRP_RESOURCE  1     0          0        0x7FFF7FFF   0
CCTGRP_RESOURCE  2     0          1        0x7FFFFFFF   0
CCTGRP_RESOURCE  3     0          2        0x7FFFFFFF   0
CCTGRP_RESOURCE  4     0          3        0x7FFFFFFF   0
*
CCTGRP_RESOURCE  5     1          0        0x7FFF7FFF   0
CCTGRP_RESOURCE  6     1          1        0x7FFFFFFF   0
CCTGRP_RESOURCE  7     1          2        0x7FFFFFFF   0
CCTGRP_RESOURCE  8     1          3        0x7FFFFFFF   0
*
CCTGRP_RESOURCE  9     2          0        0x7FFF7FFF   0
CCTGRP_RESOURCE  10    2          1        0x7FFFFFFF   0
CCTGRP_RESOURCE  11    2          2        0x7FFFFFFF   0
CCTGRP_RESOURCE  12    2          3        0x7FFFFFFF   0
*
CCTGRP_RESOURCE  13    3          0        0x7FFF7FFF   0
CCTGRP_RESOURCE  14    3          1        0x7FFFFFFF   0
CCTGRP_RESOURCE  15    3          2        0x7FFFFFFF   0
CCTGRP_RESOURCE  16    3          3        0x7FFFFFFF   0
*
*****************************************************************
```

Glossary

CAPI	COMMON-ISDN-API: CAPI - the ISDN interface
CIC	Circuit Identification Code
config.txt	A text file used for protocol configuration.
DPC	Destination Point Code. Identifies the address (point code) of the SS7 network node to which a Message Signal Unit (MSU) should be directed.
DSI	Distributed Signaling Interface
DVSCC	Diva Virtual Signaling Call Control
gctload	A program that handles the initialization sequence and creates inter-process communication.
ISUP	ISDN User Part. An SS7 stack layer that defines the messages and protocols used in the establishment and tear down of voice and data calls over the public switched network, and to manage the trunk network on which they rely.
Link	A physical and logical connection between two signaling points.
Linkset	One or more signaling links that are connected to adjacent signaling points.
LIU	Line Interface Unit
LPC	Local Point Code this is the same as the OPC
MSU	Message Signal Unit. A data unit that carries signaling information for call control, transaction processing, network management and maintenance. Typically, the MSU is carried in the Signaling Information Field (SIF) of SS7 messages.
MTP	Message Transfer Part. Layers 1 to 3 of the SS7 protocol stack broadly equivalent to the Physical, Data Link and Network layers in the OSI protocol stack. See also MTP1, MTP2, and MTP3 below.
MTP1	Message Transfer Part Level 1. An SS7 stack layer that defines the physical and electrical characteristics of the signaling links of the SS7 network. Signaling links use DS0 channels and carry raw signaling data at a rate of 48, 56, or 64 kbps.
MTP2	Message Transfer Part level 2. An SS7 stack layer that provides link-layer functionality. Ensures that two end points of a signaling link can reliably exchange signaling messages. It provides error checking, flow control, and sequence checking.
MTP3	Message Transfer Part level 3. An SS7 stack layer that provides network-layer functionality. Ensures that messages can be delivered between signaling points across the SS7 network regardless of whether the signaling points are directly connected. It provides node addressing, routing, alternate routing and congestion control.
mtpsl	An example utility that can also be used to activate and deactivate signaling links.
OPC	Originator Point Code
route	An MTP3 concept that determines how signaling is distributed over linksets. A route consists of a destination point code and the linkset ID of one or two linksets over which traffic to the destination node should be routed. When two linksets are provided, the user can choose to load share traffic or treat the linksets as primary and secondary.
s7_log	A utility that enables messages received from the protocol stack to be logged in a text file. Typically used for diagnostic purposes.
s7_mgt	A utility that performs one time protocol configuration of all protocol modules using configuration parameters from the config.txt file.
s7_play	A utility that can be used to generate messages from a text file and send them to the system. Typically used for diagnostic purposes.
SLS	Signaling Link Selection field. A field in the MTP3 routing label used to determine the selection of an outgoing link for messages being routed to another point code.

SS7	Signaling System Number 7
SS7 Protocol Stack	A set of software modules that implement the various layers of the SS7 protocol stack.
ssdd	Process to interface with the device driver of Dialogic® Diva® Media Boards for passing messages to and from the board(s) and for configuring the Dialogic® DSI SS7 part running on the board(s).
system.txt	A text file used for system configuration.