System Release 5.1 for Linux Software Installation Guide

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For **Sales Offices** and other contact information, visit the main Dialogic website at:
http://www.dialogic.com

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About This Publication

The following topics provide information about this guide:

- Purpose
- Intended Audience
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Purpose

This guide explains how to install the Dialogic System Software for System Release 5.1 for Linux. It also provides procedures for configuration, system administration, and troubleshooting.

Intended Audience

This information is intended for:

- Distributors
- System integrators
- Toolkit developers
- Value added resellers (VARs)
- Original equipment manufacturers (OEMs)

How to Use This Information

This information is organized as follows:

- Chapter 1, "Installation Overview" describes the major installation and configuration steps in the order in which they are performed, giving an overview of the process.
- Chapter 2, "Installing the Software" discusses the prerequisites for software installation and gives a step by step procedure for installing the software.

- Chapter 3, “Configuring SpringWare Boards” gives a step by step procedure for configuring SpringWare boards, and detailed reference information about all configuration parameters.
- Chapter 4, “Configuring DM3 Boards” gives a step by step procedure for configuring DM3 boards, and detailed reference information about all configuration parameters.
- Chapter 5, “Additional Configuration Procedures” covers additional configuration procedures that may not be required on all systems, for example, configuring BoardWatch, using a third-party board as clock master, and other procedures.
- Chapter 6, “Starting and Stopping the Dialogic System Service” explains how to start the Dialogic System Service for the first time, stop the Dialogic System Service, and restart the Dialogic System Service after the initial startup.
- Chapter 7, “Administration Procedures and Reference” gives some procedures for system administration following the initial installation and configuration of Dialogic system release software.
- Chapter 8, “Uninstalling the Software” gives a step by step procedure for uninstalling Dialogic software.
- Chapter 9, “Troubleshooting” discusses what to do if there is a problem with the installation.

Related Information

For additional information related to installation, configuration, and diagnostics, see the following:

- The Dialogic FirstCall InfoServer Web site at *http://support.dialogic.com* provides wide-ranging information in the form of technical notes, problem tracking reports, application notes, and other helpful documentation.
- For timely information that may affect installation and configuration, see the *Release Guide* and *Release Update*. The *Release Update* is available only from the FirstCall InfoServer Web site referenced above.
- For hardware installation instructions, see the *Quick Install Card* that comes with each board.
- For procedures and reference information about DM3 configuration files, see the *DM3 Configuration File Reference*.

- For hardware testing information, see the *DM3 Diagnostic Utilities Reference Guide* (for DM3 boards) and the *Dialogic Universal Hardware Diagnostics Guide* (for SpringWare boards).
- For information about using BoardWatch, the Dialogic SNMP-based remote administration product, see the *BoardWatch User's Guide for Linux*.

1. Installation Overview

This chapter gives a high-level summary of the steps required to install System Release 5.1 for Linux.

System Release 5.1 for Linux provides software for developing and running call processing applications on a Red Hat Linux 7.1 or 7.2 system with Dialogic DM3 boards and SpringWare boards.

The installation procedure can be summarized as follows:

1. Read the System Release 5.1 for Linux *Release Guide* and *Release Update* before starting the installation. The *Release Guide* contains information about hardware and software requirements for this release, and boards supported by this release. The *Release Update* provides the latest information about any issues, restrictions, or limitations that may affect the installation.
2. Make sure that all prerequisites for installing the software have been met. Prerequisites include:
   - Uninstall any previous version of Dialogic system software and Linux STREAMS (LiS) installed on your system.
   - Install Dialogic hardware.
   - Upgrade the kernel, kernel source, and kernel headers. This Dialogic system release requires Red Hat Linux 7.1 or 7.2 with Kernel Errata from *http://www.redhat.com/support/errata/RHSA-2001-142.html*.
   - Install LiS Version 2.13.9.

   For further information about these and other prerequisites, see Section 2.1, “Prerequisites for Software Installation”, on page 3.
3. Install the Dialogic software using the `install.sh` command. Instructions are in Section 2.2, “Installing the Dialogic Software”, on page 19.
4. Start the board configuration procedure using the `config.sh` command. Instructions are in Section 2.4, “Starting the Board Configuration Procedure”, on page 25. The `config.sh` command is the overall configuration tool for all boards; it invokes the tools for SpringWare board configuration and DM3 board configuration.

- For further information about configuring SpringWare boards, see Chapter 3, "Configuring SpringWare Boards". SpringWare configuration information is saved in a file named *dialogic.cfg*.
- For further information about configuring DM3 boards, see Chapter 4, "Configuring DM3 Boards". DM3 board configuration information is saved in a file named *pyramid.scd*.
- Check Chapter 5, "Additional Configuration Procedures" to see if any of those procedures are applicable to your configuration. (For example, additional configuration procedures are needed for using BoardWatch.)

5. When configuration is complete, reboot to start the software for the first time. Rebooting the system initializes all the Dialogic products in the system. See Chapter 6, "Starting and Stopping the Dialogic System Service".

2. Installing the Software

This chapter covers the following topics about installing the software:

2.1. Prerequisites for Software Installation

This Dialogic system release requires Red Hat Linux 7.1 or 7.2. When installing Red Hat Linux, the Development and Kernel Development packages are required. If you are using Dialogic DM3 boards, the compat-libstc++ package is also required and is selected by choosing the “Select Individual Packages” option during Package Selection and accessing the System Environment->Libraries folder. (Other packages may be installed if you like, but these are necessary.)

NOTE: With Red Hat Linux 7.2, you must do a **custom** install in order to select these required packages.

This Dialogic system release also requires Red Hat Kernel Errata from *http://www.redhat.com/support/errata/RHSA-2001-142.html*, and Linux STREAMS (LiS) Version 2.13.9 from *ftp://ftp.gcom.com/pub/linux/src/LiS/LiS-2.13.9.tgz*.

NOTES:

1. Ensure that the C compiler from the Red Hat Linux 7.1 or 7.2 release and the correct version of the upgraded kernel from the Red Hat Kernel Errata have been installed; because if they’re not, LiS won’t build.
2. If you upgraded from a previous version of Red Hat Linux to 7.1 or 7.2, check if there is a symbolic link from */usr/src/linux* to */usr/src/linux-<previous kernel number>*. If this link exists, it should be removed; otherwise it will cause LiS to fail when building.
3. The “Installing the Linux STREAMS (LiS) Package” procedure includes instructions to make sure that these requirements are met.

For more information about hardware and software requirements for this release, and boards supported by this release, see the *Release Guide*. In addition, check the online *Release Update* for the latest information about any issues, restrictions, or limitations that may affect the installation.

To install Dialogic software and LiS, you must be logged in to the Linux system as root.

Before installing Dialogic software, make sure that the following prerequisites are met:

- If you have a previous version of Dialogic system software and LiS installed on your system, remove it. See Chapter 8, "Uninstalling the Software".
- Install Dialogic hardware according to the *Quick Install Card* that comes with each board. In addition, see Section 2.1.1, "General Guidelines for Installing Dialogic Hardware", on page 5.
- Upgrade the kernel, kernel source, and kernel headers. **This is required on all systems.** See Section 2.1.2, "Upgrading the Kernel", on page 10.
- Install LiS. **This is required on all systems.** See Section 2.1.3, "Installing the Linux STREAMS (LiS) Package", on page 10.

  NOTE: An Internet connection is required to obtain the kernel upgrade from the Red Hat, Inc., Web site and to obtain LiS from the Gcom, Inc., Web site.
- Edit the */etc/hosts* file. If your */etc/hosts* file is not configured properly, you will have problems when downloading Dialogic boards. See Section 2.1.4, "Editing the /etc/hosts File", on page 13.
- If you intend to use BoardWatch for remote monitoring and administration of Dialogic boards over an IP network, Net-SNMP must be installed on the managed node(s). See Section 2.1.5, "Installing the Net-SNMP Package", on page 14.
- For systems using SpringWare boards, if your configuration supports more than four spans of voice and network processing (such as more than two DualSpan JCT boards), increase the kernel memory as explained in Section 2.1.6, "Reserving Kernel Memory for High Density SpringWare Systems", on page 16.

- For information about the packages in this system release, to help you determine which packages to install, see Section 2.1.7, "Determining Which Packages to Install", on page 18.

2.1.1. General Guidelines for Installing Dialogic Hardware

This section provides some general guidelines about the following topics:

- Checking Power and Cooling Requirements
- Determining the Board Types and IRQ
- Selecting the Clock Master
- Interconnecting Boards via CT Bus or SCbus

For hardware installation instructions, refer to the *Quick Install Card* provided with each Dialogic board.

CAUTION

All computer boards are electrostatic sensitive. Handle all static sensitive components, boards, and computers at a static-safeguarded work area. Refer to the discussion of electrostatic discharge in the *Quick Install Card* provided with your Dialogic board for further information. Electrostatic discharge can damage your board.

Checking Power and Cooling Requirements

Before installing Dialogic boards, ensure that your system has a power supply and multiple fan cooling system adequate to provide power and cooling to all system components. Refer to the product data sheets for requirements. For product data sheets, go to *http://www.intel.com/network/csp/products/boards_index.htm* and search for your product(s).

Determining the Board Types and IRQ

It is important to know the types of boards in your system, because the configuration procedures are different depending on the board type. You should be aware of the kind of information you'll need to provide for each board type, so you can be prepared to answer the prompts in the installation and configuration scripts.

The two main categories of board types are DM3 boards and SpringWare boards.

For DM3 boards, you have to choose a product configuration description (PCD) file for each board. There are numerous PCD files which determine the feature set (media load) and protocol that each board will use. Check the *Release Guide* for the features available in specific PCD files. In addition, for DM3 IPLink boards, you'll need the network interface connector (NIC) parameters such as the IP address, IP address of the host system's NIC, subnet mask, a valid username on the host system, and a gateway IP address.

For SpringWare boards, you need to know if they are Industry Standard Architecture (ISA) boards or Peripheral Component Interface (PCI) boards. If they are ISA boards, you need to know if they are Board Locator Technology (BLT) boards or hardware configurable boards. (PCI boards are BLT.) You also need to know the board model such as MSI/80SC or D/480JCT-2T1. To determine the board type and model, refer to the *Quick Install Card*. Depending on the board type and model, you may be asked for the hardware interrupt level (IRQ), memory address, and board ID.

NOTE: Ensure that the correct IRQ values are entered in response to these prompts, because an incorrect entry will cause problems later. For example, when the Dialogic drivers are being loaded, if the IRQ value is wrong or that IRQ is assigned to a PCI board, the SCbus time slot assignment program (*sctsassign*) hangs for several minutes. Although the system ultimately continues on through the bootup sequence with no indication of failure, when your program attempts to open the device, it will also hang.

The way in which the IRQ is set depends on the board group the Dialogic board is in. For ISA hardware configurable boards, which use hardware jumpers to set the IRQ, the value you enter must match the IRQ that was set on the board. For ISA BLT boards, you enter the IRQ for only one board in a group, and the configuration

program sets the other boards to the same IRQ. For PCI boards, the BIOS assigns an IRQ, and the configuration program automatically detects the IRQ.

All boards in a group must share the same IRQ, and this IRQ must be different from the IRQ used by boards in the other groups. (For example, ISA interrupts cannot be shared with PCI.) The ISA IRQ must also be different from the IRQs used by the other ISA boards in the system, such as mouse card, modem, floppy disk controller, CD-ROM controller, sound card, network card, serial/parallel ports, or the computer itself. To see the IRQs that are currently used on your system, enter the command:

```
cat /proc/interrupts
```

Valid IRQs for various types of Dialogic BLT boards are:

- DIALOG/HD boards: 3, 4, 5, 6, 7, 10, 11, 12, 14, 15
- D/xxE boards (D/41ESC, VFX/40ESC, VFX/40ESCplus): 3, 4, 5, 6, 7, 10, 11, 12

NOTES:

1. Some versions of BIOS may have certain IRQs assigned to ISA or PCI by default. You may need to reconfigure your BIOS in this case. For ISA boards, you may need to reserve an IRQ in the BIOS for "Legacy ISA" (or some other terminology) so that the BIOS won't use this IRQ for PCI devices. Refer to your BIOS or system manual to reconfigure the BIOS.
2. The computer may not start after PCI boards are installed. This may be due to an IRQ conflict between SCSI or IDE controllers and DIALOG/HD PCI boards. Refer to your computer manufacturer's system manual to reconfigure PCI interrupts.
3. When new PCI boards are added to the system, the operating system's resource manager entries are changed, resulting in Dialogic board startup failure. This means that the hardware must be installed before the software is installed. If you subsequently add hardware after a software installation, you have to rerun the configuration utility, which modifies the configuration file *dialogic.cfg*. (The *dialogic.cfg* file is described in Chapter 3, "Configuring SpringWare Boards".)

Selecting the Clock Master

The clock master is one of the boards in a system that is designated to provide reference timing for all boards attached to the bus. This board must derive timing from a network reference which ultimately derives clock from a T-1 or E-1 line (for example, the H.100 CT_NETREF), or else must derive timing directly from a digital network interface or, as a last alternative, from its own internal oscillator.

Use the following guidelines for clock master selection:

- It is highly recommended that the selection of the clock master should be based upon a board's access to a digital network interface such as a T-1 or E-1 line.
- H.100 boards require certain signals that can only be provided by another H.100 board and routed over the H.100 cable. Make sure that the board that you intend to use as the clock master can do the following:
  - Derive timing from a network reference or directly from a digital network interface
  - Provide both H.100 core signals and compatibility bus signals
- The placement of the clock master board within the chassis is significant in mixed CT Bus/SCbus systems. Typically, the clock master board is located at either end of the 68-lead H.100 cable.
- In systems that include at least one board with a 26-pin (SCbus) connector, the H.100 board to the furthest right (when viewed from the faceplate) should be designated as the clock master. If the board currently in this location is not your intended clock master, relocate boards as appropriate.
- In systems that use the H.100 cable only, the slot location of the clock master is less important.

For additional reference information about the H.100/H.110 CT Bus, see Section 7.6, "H.100/H.110 CT Bus Reference", on page 136.

NOTE: When both DM3 and SpringWare boards are installed in the same system, the technology (board type) that is to provide the clock master must be downloaded first. By default, this is assumed to be DM3. If you want a SpringWare board to be the clock master in a mixed DM3/SpringWare system, you have to use the `dlorder` command (or edit the *.order* file) to specify that a SpringWare board is the clock master and should be

downloaded first. For further information, see Section 5.2, “Changing the Board Download Order When a SpringWare Board Is Clock Master in a Mixed DM3/SpringWare System”, on page 109.

Interconnecting Boards via CT Bus or SCbus

In order for the Dialogic boards in your system to interoperate, you must connect all SCbus or CT Bus compatible boards with either an SCbus or a CT Bus cable. All DM3 boards have the H.100 connector. For SpringWare boards, determine whether they have an H.100 connector or SCbus connector. To determine which connector your board uses, refer to the *Quick Install Card*.

Connect the boards as follows:

- All boards with H.100 connectors: Connect the boards with a CT Bus cable.
- All boards with SCbus connectors: Connect the boards with an SCbus cable.
- For a **mixed chassis**, additional cabling is required:
  - PCI SCbus boards with ISA SCbus boards: A cable is required to connect the SCbus over from the PCI side of the chassis to the ISA side. The cable must provide a gap long enough to span over the motherboard residing between the PCI portion of the backplane and the ISA portion of the backplane. Cables are available from Dialogic.
  - PCI CT Bus boards with SCbus boards: A CT Bus/SCbus Adapter is needed to connect the two buses together. This adapter, available from Dialogic, is a small printed circuit board that becomes part of the cable assembly. The adapter resides in only one place in the chassis, determined by where the changeover from the SCbus cable to the CT Bus cable is made within the system. All products using the CT Bus are on one side of the adapter, and all products using the SCbus are on the other side. Only one adapter should be used in order to preserve electrical signal integrity on the bus. For further information about the adapter. see the *CT Bus/SCbus Adapter Quick Install Card*.

When your hardware installation and cabling are complete, continue with the procedure in Section 2.1.2, “Upgrading the Kernel”, on page 10.

2.1.2. Upgrading the Kernel

Before installing Linux STREAMS (LiS) and the Dialogic software, you must upgrade the kernel. This Dialogic system release requires Red Hat Linux 7.1 or 7.2 with Kernel Errata from *http://www.redhat.com/support/errata/RHSA-2001-142.html*. Choose the appropriate kernel version (i386, i586, or i686) for your system, and use the i386 version of the kernel source and kernel headers.

For instructions about how to apply this Errata, refer to *http://www.redhat.com/support/resources/howto/kernel-upgrade/kernel-upgrade.html*.

The Red Hat, Inc., Web site pages referenced are current as of the date of this publication.

After upgrading the kernel, continue with the procedure in Section 2.1.3, “Installing the Linux STREAMS (LiS) Package”, on page 10.

2.1.3. Installing the Linux STREAMS (LiS) Package

Linux STREAMS (LiS) is a software package that comprises an implementation of STREAMS for Linux. It consists of loadable modules for the Linux kernel. LiS installs in a directory on your system, not in the kernel source tree. You must install LiS Version 2.13.9 before configuring Dialogic software.

NOTE: For more information about LiS, including detailed download and installation instructions, see the following Gcom, Inc., Web site: *http://www.gcom.com/home/linux/lis/index.html*. You should refer to the instructions at that site if you want more comprehensive information about the commands and configuration script used in the following procedure.

The Gcom, Inc., Web site pages referenced are current as of the date of this publication.

Perform the following steps to install LiS:

1. Ensure that the C compiler from the Red Hat Linux 7.1 or 7.2 release and the correct version of the upgraded kernel from the Red Hat Kernel Errata have been installed; because if they’re not, LiS won’t build.

1.a. Verify the C compiler by entering the following command:

```
rpm -qa | grep gcc
```

For Red Hat Linux 7.1, the output from this command should indicate the following version:

```
gcc-c++-2.96-85
gcc-2.96-85
```

For Red Hat Linux 7.2, the output from this command should indicate the following version:

```
gcc-c++-2.96-98
gcc-2.96-98
```

1.b. Verify the kernel version by entering the following command:

```
rpm -qa | grep kernel
```

For Red Hat Linux 7.1, the output from this command should indicate the following version:

```
kernel-2.4.9-12
kernel-headers-2.4.9-12
kernel-source-2.4.9-12
```

For Red Hat Linux 7.2, the output from this command should indicate the following version:

```
kernel-2.4.9-13
kernel-headers-2.4.9-13
kernel-source-2.4.9-13
```

2. If you upgraded from a previous version of Red Hat Linux to 7.1 or 7.2, check if there is a symbolic link from */usr/src/linux* to */usr/src/linux-<previous kernel number>*. If this link exists, it should be removed; otherwise, it will cause LiS to fail when building.

   To check if the link exists, enter:

   ```
   ls -l /usr/src
   ```

   The `ls` command output for a symbolic link begins with the letter “l” before the file permissions (for example, lrwxrwxrwx), and the symbolic link is

shown as *filename->referenced_file*. If the link exists, remove it by entering (in the */usr/src* directory) `rm filename`.

3. Add */sbin* to the PATH environment variable if it is not already there; this is required for the `make install` which is run later in this procedure:

   ```
   PATH=$PATH:/sbin
   ```

4. Obtain LiS Version 2.13.9 from the following Gcom, Inc., Web site:
   ftp://ftp.gcom.com/pub/linux/src/LiS/LiS-2.13.9.tgz

   LiS is provided in the form of a compressed tar file called *LiS-2.13.9.tgz*. A tar file is a mechanism for placing (archiving) the contents of several files or directories into one file. The *.tgz* extension indicates a compressed tar file.

5. Place this file in */usr/src* and unpack it with the command:

   ```
   tar -xzf LiS-2.13.9.tgz
   ```

   This expands the compressed tar file, extracts its contents, and places the contents in a directory called */usr/src/LiS-2.13*. This directory now contains all of the files and subdirectories for LiS.

6. Change directory to *LiS-2.13*:

   ```
   cd LiS-2.13
   ```

7. Perform the `make` command to run the LiS Configure script:

   ```
   make
   ```

   The LiS Configure script asks a series of questions about the configuration you want to use.

   NOTE: When answering these questions, the only question in which the default response may not be appropriate is the directory location of your kernel source. Enter whatever is appropriate for your system, for example, */usr/src/linux-2.4.9-12* for Red Hat Linux 7.1 or */usr/src/linux-2.4.9-13* for Red Hat Linux 7.2.

8. Press Enter to use the default response for each question except as noted above for the directory location of your kernel source.

After you respond to the LiS configuration questions, the `make` command takes several minutes to complete. As part of its output, you may see some warning messages, which can be ignored.

9. Now run `make install` to install the LiS utility programs in their proper places on your system:

```
make install
```

This completes the Gcom LiS installation.

10. To verify the installation, list the contents of the */usr/src* directory:

```
ls -l /usr/src
```

Check that the symbolic link */usr/src/LiS* exists.

Continue with the procedure in Section 2.1.4, “Editing the /etc/hosts File”, on page 13.

2.1.4. Editing the /etc/hosts File

NOTE: If your */etc/hosts* file is not configured properly, you will have problems when downloading Dialogic boards. Consult your network administrator if you need help with editing the */etc/hosts* file.

The */etc/hosts* file contains IP addresses and the host names to which the IP addresses should be resolved. If a name is not in the Domain Naming System (DNS), you need to have the fully qualified domain name as an alias in */etc/hosts*. If your machine is a Dynamic Host Configuration Protocol (DHCP) client, this still has to be done.

The */etc/hosts* file contains a line for the local loopback interface, for example:

```
127.0.0.1 localhost
```

Edit */etc/hosts* to add an alias for your machine name to the local loopback line. For example, if you have a machine named “mymachine,” edit */etc/hosts* as follows:

```
127.0.0.1 localhost mymachine mymachine.mydomain.com
```

Continue with the procedures in Section 2.1.5, "Installing the Net-SNMP Package", on page 14 and Section 2.1.6, "Reserving Kernel Memory for High Density SpringWare Systems", on page 16 if applicable to your configuration. Otherwise, refer to Section 2.1.7, "Determining Which Packages to Install", on page 18 before starting the Dialogic software installation procedure.

2.1.5. Installing the Net-SNMP Package

Net-SNMP is a software package that comprises various tools relating to the Simple Network Management Protocol (SNMP). If you intend to use BoardWatch for remote monitoring and administration of Dialogic boards over an IP network, Net-SNMP is required on the managed node(s). The managed node is the system that is being remotely monitored and has the SNMP agent installed.

For Red Hat Linux 7.1, Net-SNMP can be installed from the Red Hat Linux 7.1 CD-ROM. For Red Hat Linux 7.2, do **not** use the Net-SNMP files from the Red Hat Linux 7.2 CD-ROM; you must download a later version from the Web site *http://www.net-snmp.org*. (When using Red Hat Linux 7.1, this download is not necessary.)

Use one of the following procedures, depending on your operating system version:

- Installing the Net-SNMP Package on a Red Hat Linux 7.1 System
- Installing the Net-SNMP Package on a Red Hat Linux 7.2 System

Installing the Net-SNMP Package on a Red Hat Linux 7.1 System

Net-SNMP can be installed from the Red Hat Linux 7.1 CD-ROM. The following files are required:

- *ucd-snmp-4.2-12.i386.rpm*
- *ucd-snmp-utils-4.2-12.i386.rpm*

Perform the following steps to check if Net-SNMP is already installed, and to install it if necessary:

1. Check if a compatible version of Net-SNMP has already been installed on the managed node by entering the following command:

   ```
   rpm -qa | grep ucd
   ```

If Net-SNMP is installed, the output from this command appears similar to:

```
ucd-snmp-4.2-12
ucd-snmp-utils-4.2-12
```

2. If Net-SNMP is not currently installed, install the ucd-snmp-4.2 and ucd-snmp-utils-4.2 packages from the Red Hat Linux 7.1 CD-ROM using Red Hat Package Manager (`rpm`).

NOTE: After the Dialogic software, including the BoardWatch package, is installed, Net-SNMP must be configured to use the Dialogic SNMP agent extension software. Instructions are given in Section 5.1, "Configuring BoardWatch", on page 101.

Continue with the procedure in Section 2.1.6, "Reserving Kernel Memory for High Density SpringWare Systems", on page 16 if applicable to your configuration. Otherwise, refer to Section 2.1.7, "Determining Which Packages to Install", on page 18 before starting the Dialogic software installation procedure.

Installing the Net-SNMP Package on a Red Hat Linux 7.2 System

For Red Hat Linux 7.2, do **not** use the Net-SNMP files from the Red Hat Linux 7.2 CD-ROM; you must download a later version from the Web site *http://www.net-snmp.org*. The following files are required:

- *ucd-snmp-4.2.3-1.i386.rpm*
- *ucd-snmp-utils-4.2.3-1.i386.rpm*

The Net-SNMP Web site pages referenced are current as of the date of this publication.

Perform the following steps to check if Net-SNMP was already installed from the Red Hat Linux 7.2 CD-ROM, delete that version of Net-SNMP, and install the required version:

1. Check if the version of Net-SNMP from the Red Hat Linux 7.2 CD-ROM has already been installed on the managed node by entering the following command:

```
rpm -qa | grep ucd
```

If Net-SNMP is installed, the output from this command appears similar to:

```
ucd-snmp-4.2.1
ucd-snmp-utils-4.2.1
```

2. If the 4.2.1 version of Net-SNMP is installed, remove it by entering the following commands:

```
rpm -e ucd-snmp-4.2.1
rpm -e ucd-snmp-utils-4.2.1
```

3. Obtain Net-SNMP version 4.2.3 from the following Web site: *http://www.net-snmp.org*. Go to the "Download" link and download the following files:
   - *ucd-snmp-4.2.3-1.i386.rpm*
   - *ucd-snmp-utils-4.2.3-1.i386.rpm*

NOTE: After the Dialogic software, including the BoardWatch package, is installed, Net-SNMP must be configured to use the Dialogic SNMP agent extension software. Instructions are given in Section 5.1, "Configuring BoardWatch", on page 101.

Continue with the procedure in Section 2.1.6, "Reserving Kernel Memory for High Density SpringWare Systems", on page 16 if applicable to your configuration. Otherwise, refer to Section 2.1.7, "Determining Which Packages to Install", on page 18 before starting the Dialogic software installation procedure.

2.1.6. Reserving Kernel Memory for High Density SpringWare Systems

For systems using SpringWare boards, if your configuration supports more than four spans of voice and network processing (such as more than two DualSpan JCT boards), you must execute special instructions **only once** prior to running Dialogic software in a system with Red Hat Linux 7.1 or 7.2. Due to a limitation in the current Linux kernel, this procedure must be used to reserve memory for the Dialogic driver to access when allocating the large number of devices used in high density systems.

NOTES: 1. If kernel memory is not reserved as described, boards may not download or a kernel panic may occur during startup and you will have to perform a hard reboot.

2. This procedure is required only for high density systems using SpringWare boards. It is not necessary for high density DM3 configurations.

Use one of the following procedures, depending on your operating system version:

- Reserving Kernel Memory on a Red Hat Linux 7.1 System
- Reserving Kernel Memory on a Red Hat Linux 7.2 System

Reserving Kernel Memory on a Red Hat Linux 7.1 System

Perform the following steps:

1. Edit */etc/lilo.conf*

2. Add the following as the last line in *lilo.conf*:

   ```
   append="mem=127M"
   ```

   NOTE: The amount of kernel memory to append is always 1 MB less than the actual amount of kernel memory in the system. In this example, 128 MB of memory is configured in the system, so 127 MB is appended. If you have 256 MB of memory configured, then append the following line to the file instead:

   ```
   append="mem=255M"
   ```

3. Save the file.

4. Run *lilo*:

   ```
   /sbin/lilo
   ```

5. Reboot the system.

Now, before starting the Dialogic software installation procedure, refer to Section 2.1.7, “Determining Which Packages to Install”, on page 18.

Reserving Kernel Memory on a Red Hat Linux 7.2 System

If your boot loader is *lilo*, perform the procedure for Reserving Kernel Memory on a Red Hat Linux 7.1 System instead. Otherwise, perform the following steps:

1. Edit */boot/grub/grub.conf*

2. Add `mem=127M` at the end of the `kernel` line in *grub.conf*. For example, to the `kernel` line:

   ```
   kernel /boot/vmlinuz-2.4.9-13 ro root=/dev/hda1 read-only
   ```

   add `mem=127M` as follows:

   ```
   kernel /boot/vmlinuz-2.4.9-13 ro root=/dev/hda1 read-only mem=127M
   ```

   NOTE: The amount of kernel memory to specify is always 1 MB less than the actual amount of kernel memory in the system. In this example, 128 MB of memory is configured in the system, so 127 MB is specified. If you have 256 MB of memory configured, then add `mem=255M` at the end of the `kernel` line instead.

3. Save the file.

4. Reboot the system.

Now, before starting the Dialogic software installation procedure, refer to Section 2.1.7, “Determining Which Packages to Install”, on page 18.

2.1.7. Determining Which Packages to Install

When you install the Dialogic system release, you will be asked to select the packages to install. The selections are:

- SpringWare Software
- SpringWare Antares Software
- DM3 MediaSpan Software
- DM3 IPLink Software
- DM3 FAX Software
- DM3 High Density Station Interface Software

- BoardWatch SNMP Software
- Documentation

  If you prefer, the documentation can be browsed from the CD-ROM without being installed on the hard drive.

The install script may actually install several packages to support the menu selection made, because most of the menu selections require some common support packages to be installed. For example, when you select DM3 MediaSpan Software, the following packages are installed: DLGCcom, DLGCooc, DLGCdev, DLGCdmdev, DLGCgc, DLGCcsp, and DLGCqspan. You don't have to be concerned with these individual package names; the install script installs all required packages, in the proper sequence, automatically. Messages will be displayed to indicate all packages being installed and whether they were installed because of selection or dependency.

If you're interested in what the individual packages are, they're explained in Section 2.3, "Verifying the Installation", on page 22.

2.2. Installing the Dialogic Software

Before starting the installation, make sure that all of the prerequisites have been met. See Section 2.1, "Prerequisites for Software Installation", on page 3.

If the install script finds that a package from a previous release is installed, the following message is displayed and the installation terminates:

```
A package from the previous release is already installed.
Please uninstall all previous release software before installing this release.
```

Follow the instructions in Chapter 8, "Uninstalling the Software" before you start the installation again.

You can install the software directly from the CD, or you can copy the files to any empty directory on your hard drive to install the packages. The installation process installs the packages in the proper directories regardless of whether you use the CD or another directory. The following procedure assumes that you are installing software from the CD.

Perform the following steps to install the Dialogic software. The software will always be installed in */usr/dialogic*.

1. Log in to the Linux system as root.

2. Ensure that you are using the bash shell by entering the following command:

   ```
   echo $SHELL
   ```

   The response should be */bin/bash* for the bash shell. If it is not, use the `chsh` command to change the shell to bash:

   ```
   chsh -s /bin/bash
   ```

3. Insert the CD containing the Dialogic system release software in the CD-ROM drive. Then, if your system is not set up to automount the CD-ROM drive when a CD is inserted, enter the following command to mount the CD to */mnt/cdrom*:

   ```
   mount /dev/cdrom /mnt/cdrom
   ```

   For further information about mounting a directory in Linux, see the Red Hat Linux documentation.

4. Change directory to */mnt/cdrom*:

   ```
   cd /mnt/cdrom
   ```

5. Enter the following command to start the install script:

   ```
   ./install.sh
   ```

   The following messages are displayed:

   ```
                  Dialogic System Release 5.1 for Linux
                            INSTALLATION

   You will now have the opportunity to install software packages.
   After the menu is displayed, enter the package number(s) of the desired
   packages, separated by a space. Enter A for all packages, Q to quit.

   Package dependencies will be automatically resolved during installation. For
   example, selecting a single package will automatically install all packages
   required for that selection.

   Press ENTER to display the menu of packages:
   ```

6. Press Enter.

   The menu of packages is displayed:

```
Item   Package Description
----   -----------------------------------------------------------
   1   SpringWare Software
   2   SpringWare Antares Software
   3   DM3 MediaSpan Software
   4   DM3 IPLink Software
   5   DM3 FAX Software
   6   DM3 High Density Station Interface Software
   7   BoardWatch SNMP Software
   8   Documentation

   A   Install All
   Q   Quit Installation

Enter the packages you wish installed, separated by a space, or [A,a,Q,q]:
```

7. Enter the number of the package you want to install, or a series of package numbers separated by spaces, or A for all packages.

   If a specified package has dependencies, all required packages are installed automatically.

   For example, when you install DM3 MediaSpan Software, the following messages are displayed:

```
Package installation order (including dependencies):
   DLGCcom
   DLGCooc
   DLGCdev
   DLGCdmdev
   DLGCgc
   DLGCcsp
   DLGCqspan

Checking for previously installed packages:
   None found.

Installing needed packages:
   DLGCcom...    due to dependency...    successfully installed DLGCcom
   DLGCooc...    due to dependency...    successfully installed DLGCooc
   DLGCdev...    due to dependency...    successfully installed DLGCdev
   DLGCdmdev...  due to dependency...    successfully installed DLGCdmdev
   DLGCgc...     due to dependency...    successfully installed DLGCgc
   DLGCcsp...    due to dependency...    successfully installed DLGCcsp
   DLGCqspan...  due to selection...     successfully installed DLGCqspan
Press ENTER to continue:
```

8. Press Enter.

   The menu of packages is displayed again.

9. If you want to install more packages, enter the package number(s). Otherwise, enter Q to quit.

   When you quit, the following messages are displayed:

```
Quitting the installation tool by request.

If you installed software, you must now configure.
Please execute config.sh to configure the software.
```

Before starting the configuration procedure, if you would like to verify that the installation was successful, see Section 2.3, "Verifying the Installation", on page 22. Otherwise, continue with Section 2.4, "Starting the Board Configuration Procedure", on page 25.

2.3. Verifying the Installation

Enter the following commands to verify that the Dialogic software installation was successful:

1. To check which packages were installed, enter:

   ```
   rpm -qa | grep DLGC
   ```

   The names of the installed packages are listed.

   See Table 1 for the software packages that are installed for each menu selection, and see Table 2 for a description of each package.

2. To list the contents of the */usr/dialogic* directory, enter:

   ```
   ls /usr/dialogic
   ```

   See Table 3 for a description of the directories under */usr/dialogic*.

Now, continue with Section 2.4, "Starting the Board Configuration Procedure", on page 25.

Table 1. Software Packages Installed

Menu Selection	Packages Installed
SpringWare Software	DLGCcom, DLGCooc, DLGCdev, DLGCgc, DLGCcsp, DLGCparms, DLGCpri
SpringWare Antares Software	DLGCcom, DLGCooc, DLGCdev, DLGCant
DM3 MediaSpan Software	DLGCcom, DLGCooc, DLGCdev, DLGCdmdev, DLGCgc, DLGCcsp, DLGCqspan
DM3 IPLink Software	DLGCcom, DLGCooc, DLGCdev, DLGCdmdev, DLGCgc, DLGCiplnk
DM3 FAX Software	DLGCcom, DLGCooc, DLGCdev, DLGCdmdev, DLGCgc, DLGCdmfax
DM3 High Density Station Interface Software	DLGCcom, DLGCooc, DLGCdev, DLGCdmdev, DLGCgc, DLGChdsi
BoardWatch SNMP Software	DLGCcom, DLGCooc, DLGCsnmp
Documentation	DLGCdocs
Install All	DLGCcom, DLGCooc, DLGCdev, DLGCdmdev, DLGCgc, DLGCcsp, DLGCqspan, DLGCiplnk, DLGCant, DLGCparms, DLGCdmfax, DLGChdsi, DLGCpri, DLGCsnmp, DLGCdocs

See Table 2 for a description of each package.

Table 2. Software Package Descriptions

Package Name	Package Description
DLGCcom	Common Components for DM3 and SpringWare
DLGCooc	Orbacus Support Package **Note:** This is a CORBA support package that is required and runs in the background.

Table 2. Software Package Descriptions (Continued)

Package Name	Package Description
DLGCdev	SpringWare Base Development Package
DLGCdmdev	DM3 Base Development Package
DLGCgc	GlobalCall Development Package—includes GlobalCall API Library and associated software, GlobalCall ANAPI and ICAPI Call Control Libraries, and GlobalCall Protocol Development Kit Run-Time Call Control Library (PDKRT). GlobalCall ISDN support package is installed as part of DLGCdev. **Note:** GlobalCall Protocols are installed from a separately ordered CD.
DLGCcsp	Continuous Speech Processing Demo
DLGCqspan	DM3 MediaSpan Support
DLGCiplnk	DM3 IPLink Support
DLGCant	SpringWare Antares Development Package
DLGCparms	Country Specific Parameters for SpringWare boards
DLGCdmfax	DM3 Fax Support
DLGChdsi	DM3 High Density Station Interface Support
DLGCpri	ISDN PRI Protocols Package for SpringWare boards
DLGCsnmp	BoardWatch SNMP Components
DLGCdocs	Dialogic Documentation Package

Table 3. File Locations under /usr/dialogic

Directory	Contents
bin	All Dialogic executables
cfg	Configuration related files that can be viewed and modified by users. (Some configuration files are also in the *data* directory.)

Table 3. File Locations under /usr/dialogic (Continued)

Directory	Contents
data	Firmware load files. Also contains DM3 *.pcd*, *.fcd*, and *.config* files.
demos	Demonstration programs (in separate subdirectories according to the feature)
docs	Documentation
drivers	Drivers
inc	Header files (symbolically linked into */usr/include*)
init.d	System startup scripts
lib	Library files (symbolically linked into */usr/lib*)
log	Log files that should be checked by users
ooc	CORBA support package
qscript	QScript tools. These tools are described in the *DM3 Diagnostic Utilities Reference Guide*.
sctools	Files for SCbus routing convenience functions

2.4. Starting the Board Configuration Procedure

When the `install.sh` installation procedure is completed, you can configure Dialogic boards. At this time, the drivers for LiS are also built and installed.

If you want to keep a record of all configuration prompts and responses for later reference, use the Linux `script` utility. You can then refer to the `script` output file for information such as IRQs, board IDs, memory addresses, and all configuration parameter selections. For information about using the `script` utility, see the Red Hat Linux documentation.

The following procedure explains the initial steps of board configuration. After these initial steps, further instructions depend on the board types that you have installed.

1. Enter the following command to start the board configuration procedure:

   ```
   ./config.sh
   ```

   The system displays some messages and then prompts for the types of boards you have installed:

   ```
                   Dialogic System Release 5.1 for Linux
                              CONFIGURATION

   This is the configuration tool for Dialogic System Release software.
   You will be asked to supply information for configuring Dialogic software.

   Does the system contain a DM3 type board (y/n, default=y) ?
   ```

2. If you have DM3 boards in your system, enter y; otherwise enter n.

   The next prompt is:

   ```
   Does the system contain any other type of Intel Dialogic board (y/n,
   default=n) ?
   ```

3. If you have SpringWare boards in your system, enter y; otherwise enter n.

   The next prompt is:

   ```
   Would you like to configure SNMP on this system (y/n, default=n) ?
   ```

4. If you installed the BoardWatch SNMP Software, enter y; otherwise enter n.

   NOTE: Do not enter y to configure SNMP if you have not installed the BoardWatch SNMP Software. If you do this, the configuration procedure is aborted and you will be prompted to run `install.sh` again so you can install the BoardWatch SNMP Software.

   Before any further prompts for board configuration, the drivers for LiS are built and installed. The following messages are displayed:

   ```
   Copying driver files...

   Drivers for LiS will now be built and installed.
   A makefile will be invoked, which may take several minutes to complete. Many
   lines of makefile output will be displayed, some of which may indicate a
   warning. This is normal.
   ```

```
Press ENTER to build and install drivers...
```

5. Press Enter.

   As indicated by the preceding messages, it may take several minutes before the drivers are loaded, and many lines of `makefile` output will be displayed.

At this time, configuration continues as follows:

- If you have SpringWare boards installed, the following message is displayed:

  ```
  Starting SpringWare specific configuration...
  ```

  For information about configuring SpringWare boards, go to Chapter 3, “Configuring SpringWare Boards”. Note that if you have both SpringWare boards and DM3 boards installed, you are prompted to configure the SpringWare boards first.
- If you have DM3 boards installed, the following message is displayed:

  ```
  Starting DM3-specific configuration...
  ```

  For information about configuring DM3 boards, go to Chapter 4, “Configuring DM3 Boards”.
- After SpringWare and DM3 board configuration, if you installed BoardWatch SNMP Software, the following message is displayed:

  ```
  SNMP configuration...
  ```

  For information about configuring BoardWatch, go to Chapter 5, “Additional Configuration Procedures”.

3. Configuring SpringWare Boards

This chapter covers the following topics about configuring SpringWare boards:

3.1. SpringWare Configuration Overview

When the `install.sh` installation procedure is completed, you can configure Dialogic boards. You start the procedure by executing `config.sh` as explained in Section 2.4, “Starting the Board Configuration Procedure”, on page 25. For SpringWare boards, a utility called `mkcfg` is automatically invoked to prompt for configuration information. The procedure is described in Section 3.2, “Using the mkcfg Utility”, on page 29. Reference information about the parameters, including configuration guidelines, is given in Section 3.3, “SpringWare Board Configuration Parameter Reference”, on page 35.

Completing this procedure results in the creation of an ASCII text file named *dialogic.cfg* containing the SpringWare configuration information that you entered. The file is saved in */usr/dialogic/cfg* and is used by the downloader to initialize the system when the Dialogic boards are started.

Configuration information for Antares boards is supplied by the *antares.cfg* file, which is not modified by `mkcfg`. See Chapter 5, “Additional Configuration Procedures” for information about configuring Antares boards.

3.2. Using the mkcfg Utility

When you start the `config.sh` procedure, you are prompted to configure SpringWare boards first, before any DM3 boards that are installed. The SpringWare part of the configuration begins with the following message:

```
Starting SpringWare specific configuration...
```

followed by some prompts about board types and IRQs. Refer to Section 2.1.1, "General Guidelines for Installing Dialogic Hardware", on page 5 for information about Determining the Board Types and IRQ, so you can be prepared to answer these prompts. Proceed as follows:

1. The first prompt is:

   ```
   Will this system use "ISA / board locator technology" boards e.g., D/XXE,
   D/240SC-T1 boards (y/n, default=y)?
   ```

   1.a. If you have Industry Standard Architecture (ISA) Board Locator Technology (BLT) boards in your system, enter y; otherwise enter n.

   1.b. If you enter y, you'll be prompted for the IRQ to use. Enter the IRQ for the ISA BLT boards.

2. The next prompt is:

   ```
   Will this system use "hardware configurable" boards e.g., D/XXD or D/XXH
   series boards (y/n, default=n)?
   ```

   2.a. If you have ISA hardware configurable boards in your system, enter y; otherwise enter n.

   2.b. If you enter y, you'll be prompted for the IRQ to use. Enter the IRQ for the ISA hardware configurable boards.

   At this time, the `mkcfg` utility begins. The following messages are displayed:

   ```
   The mkcfg utility will now be run so you can set up your hardware
   configuration.
   Please press ENTER to continue...
   ```

3. Press Enter.

   The following messages are displayed:

   ```
         Dialogic Configuration File Generator
   Version 5.00
   Copyright 1997-2000 Dialogic Corporation

   [Type 'Q' at any prompt to exit]
   [Type '?' at any prompt for help]

   Press <return> to begin...
   ```

NOTE: You should respond to the entire series of prompts from the `mkcfg` utility even after you enter the information for your boards. Do not type Q to exit. Typing Q will abort the `mkcfg` utility without saving your configuration in the *dialogic.cfg* file. If this happens, you will have to run `mkcfg` again from the beginning.

4. Press Enter.

   The `mkcfg` utility starts prompting for the type(s) of SpringWare boards you have installed. For example:

```
CONFIG INFORMATION FOR D/XXJCT-U BOARDS
_______________________________________

(Includes D/42JCT-U, D/82JCT-U)

Hit RETURN to accept default values, which are listed in () at each
prompt...

Enter the number of D/XXJCT-U boards in the system (0):
```

5. If you **don't** have this type of board installed, press Enter to accept the default value of 0. The `mkcfg` utility then prompts for another board type. Keep pressing Enter until `mkcfg` prompts for a board type that you **do** have installed.

   When you come to a prompt for a board type that you **do** have installed, respond with the number of boards that you have of that board type. Depending on the board type, the `mkcfg` utility then prompts you for:

   - IRQ level—Be sure to enter the same value that you gave to the earlier prompt about IRQ.

   NOTE: Ensure that the correct IRQ values are entered in response to these prompts, because an incorrect entry will cause problems later. For example, when the Dialogic drivers are being loaded, if the IRQ value is wrong or that IRQ is assigned to a PCI board, the SCbus time slot assignment program (*sctsassign*) hangs for several minutes. Although the system ultimately continues on through the bootup sequence with no indication of failure, when your program attempts to open the device, it will also hang.

   - Memory address—For hardware configurable boards, each board must have a unique base memory address, and the value entered here must match the setting of the board jumpers and switches. See Section 3.3.6, "D41DAddress = <base-address-list>", on page 46 for further

information. For BLT boards, all boards must share the same base memory address. You enter the base memory address for only one board in the group, and the configuration program sets the other boards to the same address. See Section 3.3.2, "BLTAddress = <base-address>", on page 40 for further information.

- Board ID—For BLT boards, each board must have a unique ID, and the value entered here must match the setting of the board switches. PCI boards can have any value from 0 to 15. If you set board specific parameters for PCI boards in the *dialogic.cfg* file, use unique board IDs for all PCI boards.

  NOTE: For boards that do not have a BLT switch (referred to as LED boards), the downloader program (Genload) picks PCI IDs for these boards based on what is available after all of the boards with BLT switches are taken into account.

- Encoding (ALAW or ULAW)—Normally, ALAW is used for E-1 and ULAW for T-1. See Section 3.3.28, "PCMEncoding = <pcm-encoding-method>", on page 68 for further information.
- PBX switch type—For PBX integration boards, select the PBX make and model that the board will interface to. See Section 3.3.27, "PBXswitch = <PBX-switch-type>", on page 67 for further information.

6. Respond to each prompt as requested. For help at any prompt, type ?.

   After you have completed the configuration prompts for all board types, a summary of your board information is displayed. For example:

```
                          +====================+
+-------------------------|  Board Information  |-------------------------+
|                         +====================+                         |
|                                                                          |
| T1/E1 PCI HD            ID  0:                                           |
| T1/E1 PCI HD            ID  1:                                           |
| T1/E1 PCI HD            ID  2:                                           |
| ------------------------------------------------------------------------ |
|                                                                          |
|   NOTE:                                                                  |
| If the above information for Network board(s) is correct, you should     |
| record the information and modify the appropriate .prm file(s).          |

  Is this information correct (y/n)?
```

7. If the information is correct, enter y; otherwise enter n.

If you enter n, the `mkcfg` utility takes you through the configuration prompts again. (You must reenter everything; none of your previous responses are saved.)

Once the information is correct and you enter y, the configuration information is saved in the *dialogic.cfg* file (in */usr/dialogic/cfg*). If a previous version of *dialogic.cfg* exists (for example, if you entered updated configuration information), the previous version is saved as *dialogic.01* (or *dialogic.02,* etc.).

The `mkcfg` utility ends with the message:

```
Drivers will now be loaded...
```

At this time, configuration continues as follows:

- If you have DM3 boards installed, the following message is displayed:

  ```
  Starting DM3-specific configuration...
  ```

  For information about configuring DM3 boards, go to Chapter 4, "Configuring DM3 Boards".

- If you have the BoardWatch SNMP Software installed, the following message is displayed:

  ```
  SNMP configuration...
  ```

  For information about configuring BoardWatch, go to Chapter 5, "Additional Configuration Procedures".

- When the configuration procedure is complete, the following messages are displayed:

  ```
  Configuration is complete.

  You must reboot the system to start the software for the first time.
  Thereafter, you may use the dlstop and dlstart scripts found in
  /usr/dialogic/bin
  ```

8. To verify the configuration, check the *dialogic.cfg* file that was generated (in */usr/dialogic/cfg*).

   The file contains a global parameter section and sections for each board. For example:

```
[Genload - All Boards]
Dialog/HD=YES
BusType=SCBus
SCBusClockMaster=AUTOMATIC
SCBusClockMasterSource=AUTOMATIC
PCMEncoding=AUTOMATIC

[Genload - PCI ID 0]
ParameterFile=spandti.prm
.
. (other board parameters go here)
.
[Genload - PCI ID 1]
.
.
.
```

Refer to Section 3.3, "SpringWare Board Configuration Parameter Reference", on page 35 for information about the *dialogic.cfg* file and all of the configuration parameters.

9. If necessary, edit the *dialogic.cfg* file. For example, you have to edit *dialogic.cfg* for the following features and configurations:
   - If you want to capture download information in a log file, add **LogFile = genload.log** as the first line in the global parameter section (after [Genload - All Boards]).
   - When H.100 SpringWare boards are installed, set **BusType = H100** and specify the clock master using the **PrimaryMaster** and **PrimaryMasterClockSource** parameters instead of the **SCbusClockMaster** and **SCbusClockMasterSource** parameters.
   - If you have DM3 boards installed and a DM3 board is the clock master, set the **SCBusClockMaster** and **SCBusClockMasterSource** parameters to **NONE**.
   - For country specific parameters, use the **Country** parameter to set the country code.
   - For ISDN protocols, use the **ISDNProtocol** parameter to select the protocol.
   - When GlobalCall Protocols and their corresponding Country Dependent Parameters (CDP) are installed, use the **ParameterFile** parameter to specify the correct parameter file for each board. Note that GlobalCall Protocols are installed from a separately ordered CD. See Section 5.4, "Configuring GlobalCall Protocols", on page 113 for further information.

- To use Continuous Speech Processing (CSP) on SpringWare board(s), set the **CSPExtraTimeSlot**, **FirmwareFile**, **FirmwareFile2**, **ISDNProtocol**, and **ISDNProtocol2** parameters to enable CSP.

10. Check Chapter 5, "Additional Configuration Procedures" to see if any of these procedures are applicable to your configuration. (For example, additional configuration procedures are needed for using BoardWatch.) Perform the applicable procedures before you start the software.

    NOTE: If you have D/xxJCT boards installed (for example, D/42JCT-U, D/82JCT-U), an additional procedure is needed **after** you start the software. See Section 5.9, "Updating the PCI ID in the dialogic.cfg File for D/xxJCT Boards", on page 121.

When you are satisfied with all configuration information (including DM3 configuration if applicable), you must reboot to start the software for the first time. Rebooting the system initializes all the Dialogic products in the system. For information about system startup, see Chapter 6, "Starting and Stopping the Dialogic System Service".

3.3. SpringWare Board Configuration Parameter Reference

The following sections provide general information about the *dialogic.cfg* file and detailed descriptions of all SpringWare board configuration parameters used in the *dialogic.cfg* file:

3.3.1. General Information about the dialogic.cfg File

The *dialogic.cfg* file, located in */usr/dialogic/cfg*, is an ASCII file that contains board information required by the Dialogic board drivers and generic board downloader (Genload). The *dialogic.cfg* file is created when you run the `mkcfg`

utility. You can update *dialogic.cfg* by rerunning the `mkcfg` utility or by editing the file manually if you prefer.

Although it is possible to use the *dialogic.cfg* file as created by `mkcfg` without modification, some configurations require manual editing of *dialogic.cfg* because the default parameter values are not appropriate. You also have to edit *dialogic.cfg* if you add or remove boards without performing another software installation.

When editing d*ialogic.cfg*, use the following conventions:

- The *dialogic.cfg* file contains a global parameter section and a board parameter section for each SpringWare board.
  - The global parameter section begins with:

    ```
    [Genload - All Boards]
    ```

    This section head indicates that the parameters below it apply to all the boards in the system and/or to the bus.
  - Each board parameter section begins with one of the following section heads:

    ```
    [Genload - ID <board-ID>]
    [Genload - PCI ID <board-ID>]
    [Genload - Address <board-shared-RAM-base-address>]
    ```

    A board section head indicates that the parameters below it apply to the board specified in the section head. Each board is identified by <*board-ID*>, that is, the identification number assigned to a board in the range 00H to 1FH. D/41H boards (2/4-channel voice resource boards that use hardware jumpers and switches to set the address) are identified by <*board-shared-RAM-base-address*>, that is, the unique base memory address in the range A0000 to DE000 (hexadecimal).
- Within each section, the parameters can be in any order; Genload does not require any particular sequence of parameters. However, the **LogFile** parameter, if used, should be the first line in the [Genload - All Boards] section to ensure that all download information is captured in the log file.
- Some parameters can be used as either a global parameter or a board parameter. When a parameter is used as both a global and board parameter, the board parameter value overrides the global parameter value for the specified board. Many parameters apply only to certain boards or types of boards.

Table 4 lists all of the parameters in alphabetical order and explains how they are used.

- Comments can be added to *dialogic.cfg*. If you use the pound sign (#) or semicolon (;) anywhere on a line, all text to the right of the character until the end of the line is treated as a comment (ignored). C code style comments are also allowed. If you use /* anywhere on a line, all text that follows is treated as a comment (ignored) until the */ character sequence is encountered.

Table 4. Summary of dialogic.cfg Parameters

Parameter	Usage
BLTAddress = <base-address>	Global parameter, required for ISA Board Locator Technology (BLT) boards. Not applicable in a PCI-only configuration.
BusType = <bus-type>	Global or board parameter, required for boards that support multiple bus types (SCbus boards).
Country = <country-code>	Global or board parameter, required outside North America.
CSPExtraTimeSlot = <ON | OFF>	Board parameter, optional, applies to boards that support Continuous Speech Processing (CSP).
D41DAddress = <base-address-list>	Global parameter, required for D/41H boards.
D41E_Resource = <ON | OFF>	Global or board parameter, optional, applies to D/xxESC and VFX/xxSC boards in SCbus mode.
DbFirmwareFile = <fwl-file-name>	Board parameter, optional, applies to 4-channel daughterboards (VFX/40ESC, VFX/40ESCplus).
Dialog/HD = <YES | NO>	Global parameter, required for DIALOG/HD boards.
Download4ChanDb = <YES | NO>	Global or board parameter, optional, applies to 4-channel daughterboards (VR/40).
DownloadOnly = <board-list>	Global parameter, optional, applies to all boards.
EC_Resource = <ON | OFF>	Board parameter, optional, applies to DIALOG/HD boards.
Features = <feature-list>	Global or board parameter, optional, applies when country specific parameters are used.

NOTE: Entries in *dialogic.cfg* are case insensitive (capitalization is used for readability), but the file names are case sensitive. Spacing is for readability. Items in <angle brackets> describe a type of value for you to supply.

Table 4. Summary of dialogic.cfg Parameters (Continued)

Parameter	Usage
FirmwareFile = <fwl-file-name>	Board parameter, optional, applies to all baseboards.
FirmwareFile2 = <fwl-file-name>	Board parameter, optional, applies to boards with two spans (for example, D/480JCT-2T1) and to enable Continuous Speech Processing (CSP) capability on SpringWare boards that support this feature.
FrontEnd = <ANALOG | DIGITAL>	Global or board parameter, optional, applies only to DIALOG/HD voice boards that use an external network interface board (for example, D/80SC, D/160SC, D/240SC, D/320SC, D/640SC).
IgnoreMissingBoards = <YES | NO>	Global parameter, optional.
ISABusWidth = <8-BIT | 16-BIT>	Global parameter, optional, applies to ISA Board Locator Technology (BLT) boards.
ISDNProtocol = <protocol-name>	Global or board parameter, optional, applies to boards with a digital network interface.
ISDNProtocol2 = <protocol-name>	Board parameter, optional, applies to digital network interface boards with two spans (for example, D/480JCT-2T1).
Katakana = <ON | OFF>	Global or board parameter, optional, applies to VFX/40ESC boards.
LogFile = <file-name>	Global parameter, optional, applies to all boards.
Netref1Provider = <board-id>	Global parameter, optional, applies to systems with NETREF_1 as a clock source.
Netref1ProviderSource = <clock-source>	Global parameter, optional, applies to systems with NETREF_1 as a clock source.
ParameterFile = <file-name>	Global or board parameter, optional, applies to boards with a digital network interface. Also applicable to MSI boards and sometimes needed for voice boards.
ParameterFile2 = <file-name>	Board parameter, optional, applies to digital network interface boards with two spans (for example, D/480JCT-2T1).

NOTE: Entries in *dialogic.cfg* are case insensitive (capitalization is used for readability), but the file names are case sensitive. Spacing is for readability. Items in <angle brackets> describe a type of value for you to supply.

Table 4. Summary of dialogic.cfg Parameters (Continued)

Parameter	Usage
PBXswitch = <PBX-switch-type>	Board parameter, optional, applies to PBX integration boards (for example, D/xxJCT-U type boards).
PCMEncoding = <pcm-encoding-method>	Global or board parameter, required in mixed E-1/T-1 systems; otherwise optional, applies to boards that contain a network interface.
PrimaryMaster = <board-id>	Global parameter, required for systems with H.100 SpringWare boards.
PrimaryMasterClockSource = <clock-source>	Global parameter, optional, applies to systems with H.100 SpringWare boards.
SCbusClockMaster = <board-id>	Global parameter, optional, applies to all SCbus boards.
SCbusClockMasterSource = <clock-source>	Global parameter, optional, applies to all SCbus boards.
SecondaryMaster = <board-id>	Global parameter, optional, applies to H.100 CT Bus applications only.
SecondaryMasterClockSource= <clock-source>	Global parameter, optional, applies to H.100 CT Bus applications only.
SkipBoards = <board-list>	Global parameter, optional, applies to all boards.

NOTE: Entries in *dialogic.cfg* are case insensitive (capitalization is used for readability), but the file names are case sensitive. Spacing is for readability. Items in <angle brackets> describe a type of value for you to supply.

3.3.2. BLTAddress = <base-address>

Usage: Global parameter, required for ISA Board Locator Technology (BLT) boards. Not applicable in a PCI-only configuration.

Description: Specifies the base memory address in shared RAM assigned to ISA BLT boards, in hexadecimal.

All ISA BLT boards share the same base memory address; this feature is referred to as Flexible Board Address Mapping (FBAM). The base memory address space

must not occupy or overlap the space used by other Dialogic boards or by any non-Dialogic board (such as a network board) or device in the computer.

Guidelines: If your system is configured with more than 512 Kb of lower memory (for example, 640 Kb) and you set the Dialogic board memory address in the 8000 or 9000 segment, it causes a conflict; choose a base memory address in another segment.

If your system has a VGA adapter card, avoid using an address in the range A0000 through C7FFF, as this may cause memory conflicts.

Some versions of BIOS reserve memory address C000H for PCI slots. If this causes a memory conflict, you may need to reconfigure your BIOS.

Values: For DIALOG/HD boards, any base address from 80000 to F8000 that is divisible by 8000H:

F0000 F8000
E0000 E8000
D0000 D8000
C0000 C8000
B0000 B8000
A0000 A8000
90000 98000
80000 88000

For D/xxE boards, any base address from 80000 to FE000 that is divisible by 2000H:

F0000	F2000	F4000	F6000	F8000	FA000	FC000	FE000
E0000	E2000	E4000	E6000	E8000	EA000	EC000	EE000
D0000	D2000	D4000	D6000	D8000	DA000	DC000	DE000

NOTE: If a DIALOG/HD board is also in the system, you must use the DIALOG/HD base address.

C0000	C2000	C4000	C6000	C8000	CA000	CC000	CE000
B0000	B2000	B4000	B6000	B8000	BA000	BC000	BE000
A0000	A2000	A4000	A6000	A8000	AA000	AC000	AE000
90000	92000	94000	96000	98000	9A000	9C000	9E000
80000	82000	84000	86000	88000	8A000	8C000	8E000

NOTE: If a DIALOG/HD board is also in the system, you must use the DIALOG/HD base address.

Default value: D0000

3.3.3. BusType = <bus-type>

Usage: Global or board parameter, required for boards that support multiple bus types (SCbus boards).

Description: Specifies the telephony bus type.

Guidelines: In systems with mixed bus types, the global parameter can be overridden on a board-by-board basis by including **BusType** as a board parameter.

For H.100, you must manually edit the *dialogic.cfg* file to enter **BusType = H100**. In addition, use the **PrimaryMaster** and **PrimaryMasterClockSource** parameters instead of the **SCbusClockMaster** and **SCbusClockMasterSource** parameters to specify clocking. For example:

```
#BusType=SCBus
#SCBusClockMaster=AUTOMATIC
#SCBusClockMasterSource=AUTOMATIC
BusType=H100
PrimaryMaster=0
PrimaryMasterClockSource=EXTERNAL1
```

Values: Valid values for **BusType** are:

- H100
- NONE

- SCBUS
- Standalone

Default value: Default for D/4xxE boards is NONE. Default for SCbus boards and all others is SCBUS.

The default depends on the types of boards that are installed in the system. The defaults are, in order of precedence:

- NONE for all D/41E boards if there are any D/x1H boards in the system
- SCBUS if there are DIALOG/HD boards
- NONE if there are any D/41E boards

3.3.4. Country = <country-code>

Usage: Global or board parameter, required outside North America.

Description: Specifies an international standard, two-letter country code, indicating that a parameter file containing country specific parameters is to be used when firmware is downloaded to the boards. For example, with **Country = FR**, parameter files in */usr/dialogic/data* beginning with FR (for France) are downloaded.

See Section 3.3.13, “Features = <feature-list>”, on page 53 for information about selecting features from the country specific parameter file.

Guidelines: The Country Specific Parameters package (DLGCparms) is installed with the SpringWare Software. The install script installs the parameter files in the */usr/dialogic/data* directory, but you must manually configure *dialogic.cfg* with the correct country code.

If *dialogic.cfg* contains a **Country** parameter as well as a **ParameterFile** parameter, Genload selects the parameter file based on the following precedence: the **ParameterFile** board parameter takes precedence, followed by the **ParameterFile** global parameter, and then by the **Country** parameter.

- If the **Country** parameter is used, Genload uses any parameter files beginning with the specified country code, unless a **ParameterFile** parameter exists.

- If the **ParameterFile** parameter is used as a global parameter, Genload uses the specified parameter file name for all boards, except when a **ParameterFile** board parameter is used.
- If the **ParameterFile** parameter is used as a board parameter, Genload uses the specified parameter file name for that board only.

Values: Valid values for **Country** are:

Country	**Country Parameter Value**
Argentina	AR
Australia	AU
Australia/New Zealand	AN
Austria	AT
Belgium	BE
Brazil	BR
Chile	CL
China	CN
Columbia	CO
Denmark	DK
Euro (CTR-21)	EU
Finland	FI
France	FR
Germany	DE
Greece	GR
Hungary	HU
India	IN
Indonesia	ID
Ireland	IE
Israel	IL

Country	Country Parameter Value
Italy	IT
Japan	JP
Luxembourg	LU
Malaysia	MY
Mexico	MX
Morocco	MA
Netherlands	NL
New Zealand	NZ
Norway	NO
Poland	PL
Portugal	PT
Singapore	SG
South Africa	ZA
South Korea	KR
Spain	ES
Sweden	SE
Switzerland	CH
United Kingdom	UK
United States	US
Venezuela	VE

Default value: No country specific parameters.

3.3.5. CSPExtraTimeSlot = <ON | OFF>

Usage: Board parameter, optional, applies to boards that support Continuous Speech Processing (CSP).

Description: In CSP, extra time slots must be reserved to send echo canceled data over a TDM bus such as the SCbus or CT Bus. When enabled, this parameter causes one extra time slot to be reserved on the TDM bus for each voice channel on a CSP-enabled span or board.

Guidelines: On D/120JCT-LS boards, you must set the **CSPExtraTimeSlot** parameter to ON.

Values: Valid values for **CSPExtraTimeSlot** are:

- ON: Extra time slots are reserved.
- OFF: Extra time slots are not reserved.

Default value: OFF

3.3.6. D41DAddress = <base-address-list>

Usage: Global parameter, required for D/41H boards.

Description: Specifies the base memory address in shared RAM assigned to D/41H boards, in hexadecimal. The address is set using jumpers and switches on the board itself, and the memory address entered for this parameter must match the segment and offset address that was set on the board during hardware installation.

Each D/41H board must have a unique base memory address. The base memory address space must not occupy or overlap the space used by other Dialogic boards or by any non-Dialogic board (such as a network board) or program in the computer.

When entering this parameter, the <base-address-list> can be any combination of the following: a single base address; a comma-separated list of base addresses; and a range of base addresses indicated by starting base address, hyphen, and ending base address (inclusive). For example:

- **D41DAddress = D0000** establishes D000:0000 (segment:offset) as the base memory address for the D/41H board.
- **D41DAddress = D0000, D2000** establishes D000:0000 and D000:2000 (segment:offset) as the base memory addresses for the two D/41H boards.

- **D41DAddress = D0000 - D6000** establishes D000:0000, D000:2000, D000:4000, and D000:6000 (segment:offset) as the base memory addresses for the four D/41H boards.

Guidelines: If your system has a VGA adapter card, avoid using an address in the range A0000 through C8000, as this may cause memory conflicts.

Values: The following table summarizes the valid values for the **D41DAddress** parameter, showing base address, segment, offset, and ending address. The value in the "Base Address" column is the value to enter for the **D41DAddress** parameter.

Base Address	Segment	Offset	Ending Address
A0000	A000	0000	A1FFF
A2000	A000	2000	A3FFF
A4000	A000	4000	A5FFF
A6000	A000	6000	A7FFF
A8000	A000	8000	A9FFF
AA000	A000	A000	ABFFF
AC000	A000	C000	ADFFF
AE000	A000	E000	AFFFF
B8000	B000	8000	B9FFF
BA000	B000	A000	BBFFF
BC000	B000	C000	BDFFF
BE000	B000	E000	BFFFF
C0000	C000	0000	C1FFF
C2000	C000	2000	C3FFF
C4000	C000	4000	C5FFF
C6000	C000	6000	C7FFF
C8000	C000	8000	C9FFF
CA000	C000	A000	CBFFF
CC000	C000	C000	CDFFF

Base Address	Segment	Offset	Ending Address
CE000	C000	E000	CFFFF
D0000	D000	0000	D1FFF
D2000	D000	2000	D3FFF
D4000	D000	4000	D5FFF
D6000	D000	6000	D7FFF
D8000	D000	8000	D9FFF
DA000	D000	A000	DBFFF
DC000	D000	C000	DDFFF
DE000	D000	E000	DFFFF

Default value: D0000

3.3.7. D41E_Resource = <ON | OFF>

Usage: Global or board parameter, optional, applies to D/xxESC and VFX/xxSC boards in SCbus mode.

Description: Specifies whether to use this board as a resource module on the SCbus, which means that the front end on the board is disabled and data goes to the SCbus rather than the board front end.

Guidelines: Setting this parameter to ON allows the board to be used as a shared resource on the SCbus.

Values: Valid values for **D41E_Resource** are:

- ON: Enables the board as an SCbus resource module with the front end disabled. For VFX boards, both fax and voice resources are available and are connected to the same time slot.
- OFF: Board is an SCbus network module. If the board is used in SCbus mode, the board provides analog lines to the bus; neither voice nor fax resources are available to the SCbus.

Default value: OFF

3.3.8. DbFirmwareFile = <fwl-file-name>

Usage: Board parameter, optional, applies to 4-channel daughterboards (VFX/40ESC, VFX/40ESCplus).

Description: Specifies the name of a firmware load file for 4-channel daughterboards. This firmware file is used for debugging purposes and takes the place of the file that is normally downloaded.

Guidelines: When you execute Genload, the file that you specify here is located according to the following sequence:

- If a full pathname is specified (for example, **DbFirmwareFile = /usr/firmware/fax.fwl**), that file is used.
- If only a file name is specified (for example, **DbFirmwareFile = fax.fwl**) and the file is in the directory from which Genload is executed, that file is used.
- Otherwise, the default firmware file location is */usr/dialogic/data*.

Values: The firmware load files are installed in */usr/dialogic/data* and most have the extension *.fwl*.

Default value: Without this parameter, Genload automatically selects the correct firmware file to download.

3.3.9. Dialog/HD = <YES | NO>

Usage: Global parameter, required for DIALOG/HD boards.

Description: Specifies whether to perform a memory check for DIALOG/HD boards.

Guidelines: If this parameter is set to YES, Genload performs a memory check on the 32 Kb of shared RAM starting at the base memory address specified by the **BLTAddress** parameter. If this parameter is set to NO, only 8 Kb of shared RAM is checked.

Values: Valid values for **Dialog/HD** are:

- YES: Check 32 Kb of shared RAM.
- NO: Check 8 Kb of shared RAM.

Default value: NO

3.3.10. Download4ChanDb = <YES | NO>

Usage: Global or board parameter, optional, applies to 4-channel daughterboards (VR/40).

Description: Specifies whether the firmware load file should be downloaded to 4-channel daughterboards.

Guidelines: You can independently download 4-channel daughterboards by placing **Download4ChanDb** in a board section. The baseboard is downloaded.

Values: Valid values for **Download4ChanDb** are:

- YES: Download any 4-channel daughterboards.
- NO: Do not download any 4-channel daughterboards.

Default value: YES

3.3.11. DownloadOnly = <board-list>

Usage: Global parameter, optional, applies to all boards.

Description: Specifies the boards to which you want firmware downloaded. If this parameter is not specified, the default is all boards. If this parameter is used, the firmware is downloaded **only** to the boards in this list.

When entering this parameter, the <board-list> can be a single board, a comma-separated list of boards, or a range of boards indicated by starting board, hyphen, and ending board (inclusive). A board is specified using one of the following methods:

- Board ID number: The unique Board Locator Technology (BLT) identification number assigned to a BLT board through hardware switch settings when the board was installed. The board ID number must be in the range 00 to 1F (hexadecimal).
- Board shared RAM address: The unique base memory address in shared RAM assigned to a hardware configurable board. The memory address must be in the range A0000 to DE000 (hexadecimal).

For example:

- **DownloadOnly = 00, 01** downloads firmware to activate the boards that are set to the board IDs 00 and 01.
- **DownloadOnly = 0-1F** downloads firmware to all boards with a board ID between 0 and 1FH. No other boards are downloaded.

For boards that have one or more spans, you must specify the ID of the board and its daughterboard(s) with the **DownloadOnly** parameter as follows:

- For a D/240SC-T1, D/240PCI-T1, D/240JCT-T1, D/300SC-E1, D/300PCI-E1, D/300JCT-E1, D/320JCT: **DownloadOnly = *n,2n***
- For a D/240SC-2T1, D/300SC-2E1: **DownloadOnly = *n,2n,1n***
- For a D/480SC-2T1, D/480PCI-2T1, D/480JCT-2T1, D/600SC-2E1, D/600PCI-2E1, D/600JCT-2E1: **DownloadOnly = *n,2n,1n,3n***

For example, for a D/480JCT-2T1 board, you might specify **DownloadOnly = 2,22,12,32**, where 2 is the ID of the first span, 22 is the ID of the first daughterboard, 12 is the ID of the second span, and 32 is the ID of the second daughterboard. (The ID of the daughterboard is derived from the board ID plus 20.)

Guidelines: For SCbus installations, if you have downloaded Dialogic boards using Genload and then change the *dialogic.cfg* board configuration through the **DownloadOnly** or **SkipBoards** parameter, the system must be rebooted before performing another download. Otherwise, the assigned SCbus time slots may be in conflict, and this can cause corrupt data or other adverse effects.

The **SkipBoards** parameter takes precedence over the **DownloadOnly** parameter.

Values: Valid values for **DownloadOnly** are:

- Board IDs from 00 to 1F (00 to 0F for DIALOG/HD boards).
- Board shared RAM addresses (as described for the **D41DAddress** parameter).

Default value: All boards are downloaded.

3.3.12. EC_Resource = <ON | OFF>

Usage: Board parameter, optional, applies to DIALOG/HD boards.

Description: Enables the echo cancellation resource (ECR) feature on a supported board. The purpose of the echo canceller is to sufficiently reduce the magnitude of the echo component, such that it does not interfere with further processing or analysis of the echo canceled data stream. The echo cancellation capability becomes a system-wide resource that may be applied to any SCbus PCM stream.

Guidelines: To activate ECR after it is enabled, use the **dx_listenecr( )** or **dx_listenecrex( )** function in your application. When a channel is in ECR mode, the following voice operations are unavailable on that channel: play, dial, tone generation, R2MF, and transaction record. For record operations, only 8K PCM is supported.

Although DIALOG/HD Revision 1 boards and Revision 2 boards can coexist in a system, the ECR feature is not supported on DIALOG/HD Revision 1 boards. To identify a DIALOG/HD Revision 1 board, locate the serial number of the board. This number has the format *xxyyyyyy*, where *x* is a letter and *y* is a number. Serial numbers of DIALOG/HD Revision 1 boards begin with CV, CW, or CZ (for example, CZ005000).

Values: Valid values for **EC_Resource** are:

- ON: ECR feature is enabled for this board.
- OFF: ECR feature is not enabled for this board.

Default value: OFF

3.3.13. Features = <feature-list>

Usage: Global or board parameter, optional, applies when country specific parameters are used.

Description: Specifies the features to use from the country specific parameter file.

When entering this parameter, the <feature-list> can be a single feature name or a comma-separated list of feature names.

Guidelines: The available features depend on the parameter file used. Parameter files are located in the */usr/dialogic/data* directory; available feature names are listed in each file. See Section 3.3.4, "Country = <country-code>", on page 43 for information about specifying the country specific parameter file to download.

You can specify features on a board-by-board basis by including **Features** as a board parameter.

Values: Valid values for **Features** are:

CEPT1	The board uses the default DTMF output level, -11 dBm Lo-tone, -9 dBm Hi-tone.
CEPT2	Selects DTMF output level of -8 dBm Lo-tone, -6 dBm Hi-tone.
DPD_GENERIC	Activates dial pulse detection. Uses generic set of parameters.
DPD_NONE	Deactivates dial pulse detection. No DPD parameters specified. This is the default.
FREQRES_HIGH	This is the default for D/41ESC, D/41EPCI boards.
FREQRES_LOW	Selects a lower frequency resolution for D/41E boards. If this feature is specified, D/41ESC and D/41EPCI boards use the low frequency resolution.
PPS_10	The board uses the default 10 PPS for pulse dialing. This feature is used in Japan and Korea.
PPS_20	The board uses 20 PPS for pulse dialing instead of the default 10 PPS. This feature is used in Japan and Korea.

PROT_ BTCALLSTREAM	The board uses the default BT CallStream signaling. This feature is used only with digital front end boards and only in the United Kingdom.
PROT_ MERCURYCAS	The board uses the Mercury Channel Associated Signaling instead of the default BT CallStream signaling. This feature is used only with digital front end boards and only in the United Kingdom.
RXGAIN_0	The board uses the default value of 0 dB receive gain. This feature is available on SCbus analog interface boards in the United States and Japan only.
RXGAIN_N1	The board has a negative receive gain of -1 dB instead of the default value of 0 dB. This feature is available on SCbus analog interface boards in the United States and Japan only.
RXGAIN_N2	The board has a negative receive gain of -2 dB instead of the default value of 0 dB. This feature is available on SCbus analog interface boards in the United States and Japan only.
RXGAIN_N3	The board has a negative receive gain of -3 dB instead of the default value of 0 dB. This feature is available on SCbus analog interface boards in the United States and Japan only.
RXGAIN_P1	The board has a positive receive gain of +1 dB instead of the default value of 0 dB. This feature is available on SCbus analog interface boards in the United States and Japan only.
RXGAIN_P2	The board has a positive receive gain of +2 dB instead of the default value of 0 dB. This feature is available on SCbus analog interface boards in the United States and Japan only.
RXGAIN_P3	The board has a positive receive gain of +3 dB instead of the default value of 0 dB. This feature is available on SCbus analog interface boards in the United States and Japan only.

SIG_ER	The D/41ESC, D/41EPCI board uses Earth Recall signaling instead of the default Hook Flash. This feature is used mostly in European countries
SIG_HF	The D/41ESC, D/41EPCI board uses the default Hook Flash signaling. This feature is used mostly in European countries.
TS16_CLEAR	Selects Clear Channel Time Slot 16 (CCTS16) for E-1 interface boards, ignores E-1 signaling received from the network on time slot 16, and transmits FFH. Access to time slot 16 is not available. If CCTS16 is used, the corresponding network parameter must be set in the digital network interface parameter file (*spandti.prm*).
TS16_SIG	The E-1 interface board uses the default of E-1 signaling on time slot 16.

Default value: If the **Features** parameter is not specified, the default value depends on the country specific parameter file and the feature as listed above.

3.3.14. FirmwareFile = <fwl-file-name>

Usage: Board parameter, optional, applies to all baseboards.

Description: Specifies the name of a firmware load file for the system software to download to the board. This firmware file takes the place of the file that is normally downloaded.

For specifying the firmware load file of the second span on boards that have two spans, use the **FirmwareFile2** parameter.

Guidelines: When you execute Genload, the file that you specify here is located according to the following sequence:

- If a full pathname is specified (for example, **FirmwareFile = /usr/dialogic/data/d4x.fwl**), that file is used.
- If only a file name is specified (for example, **FirmwareFile = d4x.fwl**) and the file is in the directory from which Genload is executed, that file is used.
- Otherwise, the default firmware file location is */usr/dialogic/data*.

If you use the **ISDNProtocol** parameter to download an ISDN protocol firmware file to a board, the **FirmwareFile** parameter must use its default value.

For SpringWare boards that support Continuous Speech Processing (CSP), a special firmware file is required. To enable CSP capability for SpringWare boards, you must explicitly specify the CSP firmware file. See the **FirmwareFile2** parameter for a list of standard (default) and CSP-specific firmware files.

Values: The firmware load files are installed in */usr/dialogic/data* and most have the extension *.fwl*. All DIALOG/HD boards use the *span.fwl* firmware load file, except for the DTI/SC boards which use the *spandti.fwl* firmware load file.

Voice Boards	Network Boards
d4x.fwl	*dmx.fwl*
span.fwl	*msi.fwl*
	spandti.fwl

Default value: Without this parameter, Genload automatically selects the correct firmware file to download.

3.3.15. FirmwareFile2 = <fwl-file-name>

Usage: Board parameter, optional, applies to boards with two spans (for example, D/480JCT-2T1) and to enable Continuous Speech Processing (CSP) capability on SpringWare boards that support this feature.

Description: Specifies the name of a firmware load file for the system software to download to the second span of an applicable board. This firmware file takes the place of the file that is normally downloaded.

Specify the firmware load file for the first span using the **FirmwareFile** parameter.

Guidelines: For SpringWare boards that support CSP, a special firmware file is required. To enable CSP capability for SpringWare boards, you must explicitly specify the CSP firmware file.

For **D/480JCT-1T1** and **D/600JCT-1E1** boards, you can provide for ISDN support on one span and CSP support on the other by using two separate firmware files, one for each span.

- On the first span, you can specify an ISDN protocol and then the specific firmware file required for that ISDN protocol will be automatically downloaded to the board for that span. CSP capability is not available on this span.
- On the second span, you can enable CSP capability, without ISDN support, by specifying the CSP firmware file for that span and setting the ISDN protocol parameter value to **none**.

  NOTE: For E-1 and T-1 boards that support CSP, specifying both an ISDN protocol (with **ISDNProtocol** or **ISDNProtocol2** parameter) and a CSP firmware file (with **FirmwareFile** or **FirmwareFile2** parameter) for the same span results in a download failure to that span. The Dialogic System Service will not start.

Table 5 summarizes CSP and ISDN interoperability for D/480JCT-1T1 and D/600JCT-1E1 boards.

Table 5. CSP and ISDN Interoperability for D/480JCT-1T1 and D/600JCT-1E1 Boards

D/480JCT-1T1 or D/600JCT-1E1	ISDN Protocol Setting	Firmware File Setting	Result
First span	None	Standard firmware file	First span does not support ISDN.
	Specific ISDN protocol selected using the **ISDNProtocol** parameter	Firmware file specific to **ISDNProtocol** parameter automatically downloaded	First span supports ISDN.
Second span	None	CSP firmware file	Second span supports CSP.

For **D/480JCT-2T1** boards, you can provide for CSP support on one span and ISDN support on the other as follows:

- For CSP on the first span and ISDN on the second span:

```
[Genload - PCI ID xx]
FirmwareFile=spcsp.fwl /*for CSP on first span*/
ISDNProtocol2=DMS /*or other ISDN protocol for ISDN on second span*/
```

- For ISDN on the first span and CSP on the second span; note that the **ISDNProtocol2** parameter must explicitly be set to **none** in this case:

```
[Genload - PCI ID xx]
#FirmwareFile= (no FirmwareFile specified for first span)
ISDNProtocol=DMS /*or other ISDN protocol for ISDN on first span*/
FirmwareFile2=spcsp.fwl /*for CSP on second span*/
ISDNProtocol2=NONE /*must be set to none or else Genload will try to force
                    ISDNProtocol value to ISDNProtocol2 and this is not
                    supported with CSP*/
```

Values: Table 6 lists both the standard (default) firmware files and the CSP firmware files for SpringWare boards that support the CSP feature.

Table 6. Firmware Files for Default and CSP Configurations

	Standard (Default) Configuration		CSP Configuration	
Board Type	**Firmware File**	**Firmware File2**	**Firmware File**	**Firmware File2**
D/120JCT-LS	*spanplus.fwl*	not applicable	*d120csp.fwl*	not applicable
D/240JCT-T1	*spanplus.fwl*	not applicable	*spcsp.fwl*	not applicable
D/480JCT-2T1	*spanplus.fwl* or **ISDNProtocol** parameter value	*spanplus.fwl* or **ISDNProtocol2** parameter value	*spcsp.fwl*	*spcsp.fwl*
D/480JCT-1T1	*spanplus.fwl* or **ISDNProtocol** parameter value	*spanplus.fwl*	*spanplus.fwl* or **ISDNProtocol** parameter value	*spcsp.fwl*
D/600JCT-1E1	*spanplus.fwl* or **ISDNProtocol** parameter value	*spanplus.fwl*	*spanplus.fwl* or **ISDNProtocol** parameter value	*spe1csp.fwl*

Default value: See Table 6.

3.3.16. FrontEnd = <ANALOG | DIGITAL>

Usage: Global or board parameter, optional, applies only to DIALOG/HD voice boards that use an external network interface board (for example, D/80SC, D/160SC, D/240SC, D/320SC, D/640SC). Does not apply to 2- or 4-channel voice boards (for example, D/41H) or to voice boards that contain an integrated network interface (for example, D/240SC-T1, D/300SC-E1, or D/160SC-LS).

Description: For boards that do not have their own front end, specifies whether the PSTN connection provided via the SCbus is digital or analog. For example, **FrontEnd = ANALOG** specifies that the board is connected to a board with an analog interface (such as the D/160SC-LS).

Guidelines: If you select DIGITAL, error correction is used. If you select ANALOG, echo cancellation is used.

If a voice board is connected to an E-1 network interface board, do **not** set this parameter to ANALOG; this causes an error when downloading the firmware.

If an 8- or 12-channel voice board is connected to an LSI, you must specify ANALOG.

Values: Valid values for **FrontEnd** are:

- ANALOG: Board is connected to analog lines; echo cancellation is used.
- DIGITAL: Board is connected to digital lines; error correction is used.

Default value: DIGITAL (error correction)

3.3.17. IgnoreMissingBoards = <YES | NO>

Usage: Global parameter, optional.

Description: Specifies whether to ignore missing boards when downloading firmware.

Guidelines: When this parameter is set to YES (ignore missing boards), if a board is specified in the *dialogic.cfg* configuration file (by **D41DAddress**) but has not been physically installed in the computer, Genload will not attempt to download

firmware to the board and therefore will not produce error messages indicating a failed download to the board.

Values: Valid values for **IgnoreMissingBoards** are:

- YES: Ignore missing boards.
- NO: Do not ignore missing boards.

Default value: NO (do not ignore missing boards)

3.3.18. ISABusWidth = <8-BIT | 16-BIT>

Usage: Global parameter, optional, applies to Industry Standard Architecture (ISA) Board Locator Technology (BLT) boards.

Description: Specifies the ISA bus access width for all BLT boards.

Guidelines: The ISA PC bus requires that all boards installed in a memory segment pair (A/B, C/D, E/F; see the **BLTAddress** parameter) use the same bus access width (8-bit or 16-bit). Installing a board in a memory segment pair that contains a device using a different bus access width may cause the board to malfunction or the system to lock up.

Using a wide bus access width nearly doubles the speed of data transfers to all installed Dialogic boards, greatly increasing data throughput.

Values: Valid values for **ISABusWidth** are:

- 8-BIT: 8-bit access.
- 16-BIT: 16-bit access.

Default value: 8-BIT

3.3.19. ISDNProtocol = <protocol-name>

Usage: Global or board parameter, optional, applies to boards with a digital network interface.

Description: Specifies that the board's digital network interface should be configured for ISDN using the selected ISDN protocol.

For specifying the ISDN protocol of the second span on boards that have two spans, use the **ISDNProtocol2** parameter.

Guidelines: The ISDN PRI Protocols package (DLGCpri) is installed with the SpringWare Software.

If you use the **ISDNProtocol** parameter to download an ISDN protocol firmware file to a board, the **FirmwareFile** parameter must use its default value.

NOTE: For E-1 and T-1 boards that support Continuous Speech Processing (CSP), specifying an ISDN protocol and a CSP firmware file for the same span results in a download failure to that span. The Dialogic System Service will not start.

For additional information about CSP interaction with ISDN operation, see Section 3.3.15, "FirmwareFile2 = <fwl-file-name>", on page 56.

Values: Valid values for **ISDNProtocol** are:

NONE	No ISDN protocol is used
1TR6	German National ISDN
4ESS	AT&T 4ESS custom switch TR41449/TR41459
5ESS	AT&T 5ESS custom switch 505-900-322
CTR4	EURO-ISDN ETSI300-102
DASS2	British National BTNR-190-1985
DMS	Northern Telecom custom switch A211-1 and A211-4
DPNSS (separately ordered)	British Private Branch Exchange DASS2 extension
ETN	EURO-ISDN ETSI300-102 for T-1
ETU	EURO-ISDN ETSI300-102 for T-1
NE1	EURO-ISDN ETSI300-102

NI2	National ISDN-2 Bellcore Special Report SR-NWT-002343
NT1	T-1 Network Emulation TR41449/TR41459
NTT	Japanese National ISDN INS-Net 1500
QNT	Q.SIG ISO 11572, ISO 11574
QTE	Q.SIG ISO 11572, ISO 11574
QTN	Q.SIG ECMA-142/143 for T-1
QTU	Q.SIG ECMA-142/143 for T-1
TPH	Australian National ISDN TS-0141 1990
TPHNT	Australian National ISDN TS-0141 1990
VN	French National ISDN VN3
VNNT	French National ISDN VN3 (Network Termination)

Default value: NONE (no ISDN protocol is used)

3.3.20. ISDNProtocol2 = <protocol-name>

Usage: Board parameter, optional, applies to digital network interface boards with two spans (for example, D/480JCT-2T1).

Description: Specifies that the board's second digital network interface should be configured for ISDN using the selected ISDN protocol.

Specify the ISDN protocol for the first span using the **ISDNProtocol** parameter (which may be a global and/or board parameter).

Guidelines: The ISDN PRI Protocols package (DLGCpri) is installed with the SpringWare Software.

If you use the **ISDNProtocol2** parameter to download an ISDN protocol firmware file, the **FirmwareFile2** parameter must use its default value.

NOTE: For E-1 and T-1 boards that support Continuous Speech Processing (CSP), specifying an ISDN protocol and a CSP firmware file for the same span results in a download failure to that span. The Dialogic System Service will not start.

For additional information about CSP interaction with ISDN operation, see Section 3.3.15, “FirmwareFile2 = <fwl-file-name>”, on page 56.

Values: See Section 3.3.19, “ISDNProtocol = <protocol-name>”, on page 60.

Default value: NONE (no ISDN protocol is used)

3.3.21. Katakana = <ON | OFF>

Usage: Global or board parameter, optional, applies to VFX/40ESC boards.

Description: Specifies whether to use the Japanese Katakana character set for the fax board.

Guidelines: When **Katakana** is enabled for a board, the standard character set is disabled for the board.

The **Katakana** parameter is not supported for the VFX/40ESCplus board. You must either use the `loadfont` utility to load the Katakana character set or call the **fx_loadfont( )** function in your application.

Values: Valid values for **Katakana** are:

- ON: Katakana character set is enabled.
- OFF: Katakana character set is disabled.

Default value: OFF

3.3.22. LogFile = <file-name>

Usage: Global parameter, optional, applies to all boards.

Description: Specifies whether to copy screen information generated by Genload to a log file.

Guidelines: The **LogFile** parameter should be the first line in the [Genload - All Boards] section of *dialogic.cfg* to ensure that all download information is captured in the log file. For example:

```
[Genload - All Boards]  /* global parameters */
LogFile = genload.log
BLTAddress = D8000
.
.
.
[Genload - PCI ID 0]    /* board parameters */
.
.
.
```

Values: A file name or full pathname. If a full pathname is given, the directory must exist. If a file name with no path is given, the log file is stored by default in */usr/dialogic/log*.

Default value: No log file is generated.

3.3.23. Netref1Provider = <board-id>

Usage: Global parameter, optional, applies to systems with NETREF_1 as a clock source.

Description: Specifies the board ID for the board that serves as the network reference signal provider. See also Section 3.3.24, “Netref1ProviderSource = <clock-source>”, on page 65.

Guidelines: With H.100 CT Bus, the CT_NETREF signal (NETREF_1) carries a network clock signal that may be used by the primary clock master and secondary clock master as their reference. If the **PrimaryMasterClockSource** or **SecondaryMasterClockSource** parameter is set to NETREF1, use the **Netref1Provider** parameter to specify the board ID for the board providing this signal.

If a DM3 board rather than a SpringWare board is the network reference signal provider, do not use the **Netref1Provider** parameter; you use a parameter in the DM3 configuration file (*pyramid.scd*) instead. The **Netref1Provider** parameter is only applicable when a SpringWare board is the network reference signal provider.

Values: Valid values for **Netref1Provider** are:

- <board-id>: A board ID in hexadecimal. The specified board serves as the network reference signal provider.
- NONE: NETREF_1 is not used as a clock source.

Default value: NONE

3.3.24. Netref1ProviderSource = <clock-source>

Usage: Global parameter, optional, applies to systems with NETREF_1 as a clock source.

Description: Specifies where the network reference signal provider (specified by the **Netref1Provider** parameter) derives its signal.

Guidelines: Clocking should be derived from a digital network trunk if available, not from a board's internal oscillator. The internal oscillator should be used as the clock source only for internal testing purposes.

If a DM3 board rather than a SpringWare board is the network reference signal provider, do not use the **Netref1ProviderSource** parameter; you use a parameter in the DM3 configuration file (*pyramid.scd*) instead. The **Netref1ProviderSource** parameter is only applicable when a SpringWare board is the network reference signal provider.

Values: Valid values for **Netref1ProviderSource** are:

- INTERNAL: Board uses its internal oscillator.
- EXTERNAL1: Board uses the clock signal from its front end.

  To specify the second front end on boards that have two spans, specify 0x1n as the **Netref1ProviderSource**, where 0x0n is the board ID of the baseboard.

Default value: EXTERNAL1

3.3.25. ParameterFile = <file-name>

Usage: Global or board parameter, optional, applies to boards with a digital network interface. Also applicable to MSI boards and sometimes needed for voice boards.

Description: Specifies the name of a parameter file containing initialization data for customizing the network firmware for various communication parameters.

Guidelines: Specify a parameter file name only if you have changed the network parameters from the default values. The sample network parameter files are installed in */usr/dialogic/data*.

When you execute Genload, the file that you specify here is located according to the following sequence:

- If a full pathname is specified (for example, **ParameterFile = /usr/dialogic/data/spandti.prm**), that file is used.
- If only a file name is specified (for example, **ParameterFile = spandti.prm**) and the file is in the directory from which Genload is executed, that file is used.

If *dialogic.cfg* contains a **Country** parameter as well as a **ParameterFile** parameter, Genload selects the parameter file based on the following precedence: the **ParameterFile** board parameter takes precedence, followed by the **ParameterFile** global parameter, and then by the **Country** parameter.

Values: Sample parameter files are installed in */usr/dialogic/data* and include:

- *spandti.prm*: Sample parameter file for digital network interface boards.
- *msiSAMPL.prm*: Sample parameter file for MSI boards.

User customized files may also be used.

Default value: No parameter file

3.3.26. ParameterFile2 = <file-name>

Usage: Board parameter, optional, applies to digital network interface boards with two spans (for example, D/480JCT-2T1).

Description: Specifies the name of a parameter file containing initialization data for customizing the network firmware for various communication parameters for the second span of an applicable board.

Specify the parameter file for the first span using the **ParameterFile** parameter.

Guidelines: The parameter file used by the second span of a board is determined by the **ParameterFile** parameter unless you override it using the **ParameterFile2** parameter.

See the **ParameterFile** parameter for additional guidelines.

Values: See the **ParameterFile** parameter.

Default value: Value specified by the **ParameterFile** parameter (or no parameter file).

3.3.27. PBXswitch = <PBX-switch-type>

Usage: Board parameter, optional, applies to PBX integration boards (for example, D/xxJCT-U type boards).

Description: Specifies the PBX (make and model) that the PBX integration board will interface to, so that the correct firmware is downloaded to the board.

Guidelines: Select the appropriate PBX make and model.

Values: Valid values for **PBXswitch** are:

- Lucent_2_wire.fwl
- Lucent_4_wire.fwl
- Mitel_DNIC_M420.fwl
- Mitel_DNIC_M430.fwl
- NEC_DTerm_III.fwl
- Nortel_Meridian_1.fwl
- Nortel_Norstar.fwl
- Siemens_Hicom.fwl

- Siemens_Rolm.fwl

Default value: Nortel_Norstar.fwl

3.3.28. PCMEncoding = <pcm-encoding-method>

Usage: Global or board parameter, required in mixed E-1/T-1 systems; otherwise optional, applies to boards that contain a network interface.

Description: Specifies the pulse code modulation (PCM) encoding method.

Guidelines: When **BusType = NONE** (by default or by explicit setting), the **PCMEncoding** parameter has no effect on D/xxE boards. A-law encoding is used.

If you have downloaded Dialogic boards using Genload and then change the *dialogic.cfg* board configuration through the **PCMEncoding** parameter, the system must be rebooted before performing another download.

Values: Valid values for **PCMEncoding** are:

- ALAW: A-law encoding; normally used by CEPT administrations (E-1 areas).
- ULAW: Mu-law encoding; normally used in North America and Japan (T-1 areas).
- AUTOMATIC: The type of board and country specific support determine the method as follows:
  - A-law is used if a board with an E-1 interface is installed, or if country specific support has been installed for a country other than the United States or Japan.
  - Mu-law is used if a board with a T-1 interface is installed, or if country specific support has been installed for the United States or Japan, or if the board does not use T-1 or E-1.

Default value: AUTOMATIC

3.3.29. PrimaryMaster = <board-id>

Usage: Global parameter, required for systems with H.100 SpringWare boards.

Description: Specifies the board ID for the board that serves as the primary clock master. A clock master is one of the boards in a system that is designated to provide reference timing for all boards attached to the bus. This board must derive timing from a network reference which ultimately derives clock from a T-1 or E-1 line (for example, the H.100 CT_NETREF), or else must derive timing directly from a digital network interface or, as a last alternative, from its own internal oscillator. See Section 3.3.30, "PrimaryMasterClockSource = <clock-source>", on page 70.

The H.100 bus has two types of clock masters: primary clock master and secondary clock master. The secondary clock master becomes the clock master if the primary clock master fails or is removed from the system. See Section 3.3.33, "SecondaryMaster = <board-id>", on page 72.

Guidelines: If your system contains H.100 SpringWare boards, use the **PrimaryMaster** and **PrimaryMasterClockSource** parameters instead of the **SCbusClockMaster** and **SCbusClockMasterSource** parameters. **PrimaryMaster** and **PrimaryMasterClockSource** must be added to the *dialogic.cfg* file manually. For example:

```
#BusType=SCBus
#SCBusClockMaster=AUTOMATIC
#SCBusClockMasterSource=AUTOMATIC
BusType=H100
PrimaryMaster=0
PrimaryMasterClockSource=EXTERNAL1
```

If your system contains both DM3 boards and SpringWare boards, and if a DM3 board is the clock master, do not use the **PrimaryMaster** and **PrimaryMasterClockSource** parameters, and set **SCbusClockMaster = NONE** and **SCbusClockMasterSource = NONE**.

For additional reference information about the H.100 bus, see Section 7.6, "H.100/H.110 CT Bus Reference", on page 136.

NOTE: When both DM3 and SpringWare boards are installed in the same system, the technology (board type) that is to provide the clock master must be downloaded first. By default, this is assumed to be DM3. If you want a SpringWare board to be the clock master in a mixed DM3/SpringWare system, you have to use the `dlorder` command (or edit the *.order* file) to

specify that a SpringWare board is the clock master and should be downloaded first. For further information, see Section 5.2, “Changing the Board Download Order When a SpringWare Board Is Clock Master in a Mixed DM3/SpringWare System”, on page 109.

Values: Valid values for **PrimaryMaster** are:

- AUTOMATIC: Genload selects a board for the primary clock master.
- NONE: Genload does not select a board as the primary clock master.
- <board-id>: A board ID in hexadecimal. The specified board serves as the primary clock master.

Default value: No default value. If an H.100 SpringWare board is to serve as the clock master, a value for **PrimaryMaster** must be specified. Otherwise, clocking defaults to **SCbusClockMaster = AUTOMATIC**.

3.3.30. PrimaryMasterClockSource = <clock-source>

Usage: Global parameter, optional, applies to systems with H.100 SpringWare boards.

Description: Specifies where the primary clock master board (specified by the **PrimaryMaster** parameter) gets the clocking for the bus.

Guidelines: A clock master board must derive timing from a network reference which ultimately derives clock from a T-1 or E-1 line (for example, the H.100 CT_NETREF), or else must derive timing directly from a digital network interface or, as a last alternative, from its own internal oscillator. The internal oscillator should be used as the clock source only for internal testing purposes.

Values: Valid values for **PrimaryMasterClockSource** are:

- INTERNAL: Board uses its internal oscillator.
- EXTERNAL1: Board uses the clock signal from its front end.

  To specify the second front end on boards that have two spans, specify 0x1n as the **PrimaryMasterClockSource**, where 0x0n is the board ID of the baseboard.

- NETREF1: Board derives clocking from NETREF_1. See Section 3.3.23, “Netref1Provider = <board-id>”, on page 64.

Default value: EXTERNAL1

3.3.31. SCbusClockMaster = <board-id>

Usage: Global parameter, optional, applies to all SCbus boards.

Description: Specifies the board ID for the board that serves as the master clock source for the SCbus. See also Section 3.3.32, “SCbusClockMasterSource = <clock-source>”, on page 71.

Guidelines: If your system contains H.100 SpringWare boards, use the **PrimaryMaster** and **PrimaryMasterClockSource** parameters instead of the **SCbusClockMaster** and **SCbusClockMasterSource** parameters.

If your system contains both DM3 boards and SpringWare boards, and if a DM3 board is the clock master, set **SCbusClockMaster = NONE** and **SCbusClockMasterSource = NONE**.

For SCbus installations, if you have downloaded Dialogic boards using Genload and then change the *dialogic.cfg* board configuration through the **SCBusClockMaster** parameter, the system must be rebooted before performing another download.

Values: Valid values for **SCbusClockMaster** are:

- AUTOMATIC: Genload selects a board for the SCbus clock master.
- NONE: Genload does not select a board as the SCbus clock master.
- <board-id>: A board ID in hexadecimal from 00 to 1F (00 to 0F for DIALOG/HD boards). The specified board serves as the SCbus clock master.

Default value: AUTOMATIC

3.3.32. SCbusClockMasterSource = <clock-source>

Usage: Global parameter, optional, applies to all SCbus boards.

Description: Specifies where the SCbus clock master board (specified by the **SCbusClockMaster** parameter) gets the clocking for the bus.

Guidelines: Clocking should be derived from a digital network trunk if available, not from a board's internal oscillator. The internal oscillator should be used as the clock source only for internal testing purposes.

If your system contains H.100 SpringWare boards, use the **PrimaryMaster** and **PrimaryMasterClockSource** parameters instead of **SCbusClockMaster** and **SCbusClockMasterSource**.

If your system contains both DM3 boards and SpringWare boards, and if a DM3 board is the clock master, set **SCbusClockMaster = NONE** and **SCbusClockMasterSource = NONE**.

Values: Valid values for **SCbusClockMasterSource** are:

- AUTOMATIC: Genload selects the clock source (LOOP for a board with a digital interface or INDEPENDENT for a board without a digital interface).
- INDEPENDENT: Board uses its internal oscillator.
- LOOP: Board uses the clock signal from its front end. This value is not available if the SCbus clock master board has an analog interface.
- NONE: An SCbus board is not the clock master board.

Default value: AUTOMATIC

3.3.33. SecondaryMaster = <board-id>

Usage: Global parameter, optional, applies to H.100 CT Bus applications only.

Description: Specifies the board ID for the board that serves as the secondary clock master. A clock master is one of the boards in a system that is designated to provide reference timing for all boards attached to the bus. This board must derive timing from a network reference which ultimately derives clock from a T-1 or E-1 line (for example, the H.100 CT_NETREF), or else must derive timing directly from a digital network interface or, as a last alternative, from its own internal oscillator. See Section 3.3.34, "SecondaryMasterClockSource = <clock-source>", on page 73.

The H.100 bus has two types of clock masters: primary clock master and secondary clock master. The secondary clock master becomes the clock master if the primary clock master fails or is removed from the system. See Section 3.3.29, "PrimaryMaster = <board-id>", on page 68.

Guidelines: Use this parameter if you want to specify a secondary clock master for H.100 CT Bus applications. The **SecondaryMaster** parameter must be added to the *dialogic.cfg* file manually, because the default is no secondary clock master.

Values: Valid values for **SecondaryMaster** are:

- <board-id>: A board ID in hexadecimal. The specified board serves as the secondary clock master.
- NONE: No secondary clock master.

Default value: No secondary clock master.

3.3.34. SecondaryMasterClockSource = <clock-source>

Usage: Global parameter, optional, applies to H.100 CT Bus applications only.

Description: Specifies where the secondary clock master board (specified by the **SecondaryMaster** parameter) gets the clocking for the bus.

Guidelines: A clock master board must derive timing from a network reference which ultimately derives clock from a T-1 or E-1 line (for example, the H.100 CT_NETREF), or else must derive timing directly from a digital network interface or, as a last alternative, from its own internal oscillator. The internal oscillator should be used as the clock source only for internal testing purposes.

Values: Valid values for **SecondaryMasterClockSource** are:

- INTERNAL: Board uses its internal oscillator.
- EXTERNAL1: Board uses the clock signal from its front end.

  To specify the second front end on boards that have two spans, specify 0x1n as the **SecondaryMasterClockSource**, where 0x0n is the board ID of the baseboard.

- NETREF1: Board derives clocking from NETREF_1. See Section 3.3.23, “Netref1Provider = <board-id>”, on page 64.

Default value: EXTERNAL1

3.3.35. SkipBoards = <board-list>

Usage: Global parameter, optional, applies to all boards.

Description: Specifies the boards that you want Genload to skip when downloading firmware to the boards. Any board in this list does not get firmware downloaded.

When entering this parameter, the <board-list> can be a single board or a comma-separated list of boards. A board is specified using one of the following methods:

- Board ID number: The unique Board Locator Technology (BLT) identification number assigned to a BLT board through hardware switch settings when the board was installed. The board ID number must be in the range 00 to 1F (hexadecimal).
- Board shared RAM address: The unique base memory address in shared RAM assigned to a hardware configurable board. The memory address must be in the range A0000 to DE000 (hexadecimal).

For example, with **SkipBoards = 03** Genload does **not** download firmware to the board with board ID 03.

For boards that have one or more spans, you must specify the ID of the board and its daughterboard(s) with the **SkipBoards** parameter as follows:

- For a D/240SC-T1, D/240PCI-T1, D/240JCT-T1, D/300SC-E1, D/300PCI-E1, D/300JCT-E1, D/320JCT: **SkipBoards = *n,2n***
- For a D/240SC-2T1, D/300SC-2E1: **SkipBoards = *n,2n,1n***
- For a D/480SC-2T1, D/480PCI-2T1, D/480JCT-2T1, D/600SC-2E1, D/600PCI-2E1, D/600JCT-2E1: **SkipBoards = *n,2n,1n,3n***

For example, for a D/480JCT-2T1 board, you might specify **SkipBoards = 2,22,12,32**, where 2 is the ID of the first span, 22 is the ID of the first

daughterboard, 12 is the ID of the second span, and 32 is the ID of the second daughterboard. (The ID of the daughterboard is derived from the board ID plus 20.)

Guidelines: For SCbus installations, if you have downloaded Dialogic boards using Genload and then change the *dialogic.cfg* board configuration through the **DownloadOnly** or **SkipBoards** parameter, the system must be rebooted before performing another download. Otherwise, the assigned SCbus time slots may be in conflict, and this can cause corrupt data or other adverse effects.

The **SkipBoards** parameter takes precedence over the **DownloadOnly** parameter.

Values: Valid values for **SkipBoards** are:

- Board IDs from 00 to 1F (00 to 0F for DIALOG/HD boards).
- Board shared RAM addresses (as described for the **D41DAddress** parameter).

Default value: All boards are downloaded.

4. Configuring DM3 Boards

This chapter covers the following topics about configuring DM3 boards:

4.1. DM3 Configuration Overview

When the `install.sh` installation procedure is completed, you can configure Dialogic boards. You start the procedure by executing `config.sh` as explained in Section 2.4, “Starting the Board Configuration Procedure”, on page 25. For DM3 boards, a utility called `DM3_cfg.sh` is automatically invoked, which displays a series of menus and prompts for configuration information. The procedure is described in Section 4.2, “Using the DM3 Board Configuration Menus”, on page 78. Reference information about the parameters, including configuration guidelines, is given in Section 4.3, “DM3 Board Configuration Parameter Reference”, on page 82.

Completing this procedure results in the creation of an ASCII text file named *pyramid.scd* containing the DM3 configuration parameters that you selected. The file is saved in */usr/dialogic/cfg* and is used by the downloader to initialize the system when the Dialogic boards are started. The *pyramid.scd* file identifies the product configuration description (PCD) and feature configuration description (FCD) files to be used during firmware download of the boards, as well as the clocking setup, the network interface connector (NIC) parameters for IPLink boards, and other parameters.

It is sometimes necessary to adjust the parameters within the FCD file; this is done by editing the associated CONFIG file. (All *.pcd*, *.fcd*, and *.config* files are in */usr/dialogic/data*.) It is beyond the scope of this document to describe how to modify an FCD file by editing the CONFIG file. For detailed information about all of the parameters in the FCD file and how to change them, refer to the *DM3 Configuration File Reference*.

4.2. Using the DM3 Board Configuration Menus

When you start the `config.sh` procedure, if you have any SpringWare boards installed, you are prompted to configure them first. The DM3 part of the configuration begins with the following message:

```
Starting DM3-specific configuration...
```

followed by the DM3 Board Configuration - Main Screen. The Main Screen lists all DM3 boards that are installed (note that any SpringWare boards that are installed are not shown in this display). For example:

```
            ....................................
             DM3 Board Configuration - Main Screen
            ....................................
   This is a summary of the current DM3 board configuration
-------------------------------------------------------------
PCI   Board                      Logical PCD
Slot  Enabled    Model           ID      File Name
0       Yes      DM/V1200-4E1    1       NOT_SET
1       Yes      DM/V960-4T1     2       NOT_SET
2       Yes      DM/IPxxxx-T1    3       NOT_SET
4       Yes      DM/IP301-1E1    5       NOT_SET
-------------------------------------------------------------
.     You must configure or disable each board shown.       .
.     When a board is configured a valid PCD file name      .
.     is displayed in the PCD File Name column.             .
-------------------------------------------------------------
Enter the slot number of the board to configure,
or enter S to save or Q to quit:
```

Proceed as follows:

1. Enter the slot number of the board to configure. (Slot numbers are displayed on the left of the Main Screen.)

   The current board settings for the specified board are displayed. For example:

```
                      ......................
                        Modify Board Settings
                      ......................
      These are the current settings for the board selected.
-------------------------------------------------------------------
(read only)..........PCI Slot: 0
(read only).............Model: DM/V1200-4E1
-------------------------------------------------------------------
. A PCD file must be selected. The corresponding FCD file will    .
```

```
. be automatically selected. Other parameters can be modified, or .
. the default values shown will be used. To view default values   .
. for TDM Bus Configuration and NIC Configuration, select them.   .
-------------------------------------------------------------------
1) ..............Logical ID: 1
2) ............Board Enabled: Yes
3) ............PCD File Name: NOT_SET
4) ............FCD File Name: NOT_SET
5) ............PCM Encoding: ALAW
6) .....TDM Bus Configuration
7) .........NIC Configuration   (IPLink w/onboard NIC only)
-------------------------------------------------------------------
Enter the number of the parameter to modify, S to save and return to
the Main Screen, or C to cancel and return to the Main Screen.
```

2. Enter the number (1-7) of the parameter to modify, then follow the prompts to enter the new value for that parameter. Online help for each parameter is available.

   NOTE: A value for the **PCD File Name** parameter must be selected, because the default value of NOT_SET cannot be used. For all other parameters, you can use the default values if appropriate, or modify them if required.

   Refer to the following sections for information about each parameter:

   - Section 4.3.2, “Logical ID”, on page 83
   - Section 4.3.3, “Board Enabled”, on page 84
   - Section 4.3.4, “PCD File Name”, on page 85
   - Section 4.3.5, “FCD File Name”, on page 86
   - Section 4.3.6, “PCM Encoding”, on page 87
   - Section 4.3.7, “TDM Bus Configuration”, on page 88. This displays a menu of the following clocking parameters:
     - TDM Clock Function
     - TDM Bus Type
     - Clock Source
     - Primary CT Bus Clock Line
   - Section 4.3.8, “NIC Configuration”, on page 93. This displays a menu of the following network interface connector (NIC) parameters for IPLink boards:
     - Board IP Address

- Board Subnet Mask
- Board Name
- Host IP Address
- Host Name
- Host User ID
- Gateway IP Address

3. When you're finished with the board settings for this board, enter S to save and return to the Main Screen (or C to cancel and return to the Main Screen).

   The current DM3 board configuration is displayed on the Main Screen again, and you can:

   - Enter another slot number to configure another board. The current board settings for that board are displayed as shown in step 1.
   - Enter S to save the current configuration and quit.
   - Enter Q to quit without saving. (The previously saved or default parameter values will be used.)

   When you quit, configuration continues as follows:

   - If you have the BoardWatch SNMP Software installed, the following message is displayed:

     ```
     SNMP configuration...
     ```

     For information about configuring BoardWatch, go to Chapter 5, "Additional Configuration Procedures".
   - When the configuration procedure is complete, the following messages are displayed:

     ```
     Configuration is complete.

     You must reboot the system to start the software for the first time.
     Thereafter, you may use the dlstop and dlstart scripts found in
     /usr/dialogic/bin
     ```

4. To verify the configuration, check the *pyramid.scd* file that was generated (in */usr/dialogic/cfg*).

   The parameters for each DM3 board are in a separate section enclosed in curly braces and preceded by the board logical ID. NIC parameters, if applicable, are nested within the board parameters. For example:

```
NumStreams       : 4000            ; size of driver stream table
NumBindHandles   : 4000            ; size of driver bind table
[Board 1] {
PCDName     : ml1_qs_net5.pcd
FCDName     : ml1_qs_net5.fcd
   .
   . (other board parameters go here)
   .
   [NIC 1] {
      .
      . (NIC parameters go here)
      .
   }
}

[Board 2] {
   .
   .
   .
 }
```

Refer to Section 4.3, “DM3 Board Configuration Parameter Reference”, on page 82 for information about the *pyramid.scd* file and all of the configuration parameters.

5. If necessary, edit the *pyramid.scd* file. You have to edit *pyramid.scd* if the Clock Source parameter was set to NETREF_1 or NETREF_2. For further information, see the description of the Clock Source parameter in Section 4.3.7, “TDM Bus Configuration”, on page 88.

6. Check Chapter 5, “Additional Configuration Procedures” to see if any of these procedures are applicable to your configuration. (For example, additional configuration procedures are needed for using BoardWatch.) Perform the applicable procedures before you start the software.

When you are satisfied with all configuration information (including SpringWare configuration if applicable), you must reboot to start the software for the first time. Rebooting the system initializes all the Dialogic products in the system. For information about system startup, see Chapter 6, “Starting and Stopping the Dialogic System Service”.

4.3. DM3 Board Configuration Parameter Reference

The following sections provide general information about the *pyramid.scd* file and detailed descriptions of all DM3 board configuration parameters used in the *pyramid.scd* file:

4.3.1. General Information about the pyramid.scd File

The *pyramid.scd* file, located in */usr/dialogic/cfg*, is an ASCII file that contains board information required by the Dialogic board drivers and downloader. The

pyramid.scd file is created when you run the `DM3_cfg.sh` utility. You can update *pyramid.scd* by rerunning the `DM3_cfg.sh` utility or by editing the file manually if you prefer.

When editing *pyramid.scd*, use the following conventions:

- The *pyramid.scd* file contains a board parameter section for each DM3 board.

  NOTE: The **NumStreams** and **NumBindHandles** parameters, which appear at the beginning of the *pyramid.scd* file (before the board parameters), have default values that should not be changed.

- Each board parameter section begins with the section head:

  `[Board <logical-ID>]`

  The parameters for each board immediately follow and are enclosed in curly braces.

- Network interface connector (NIC) parameters for IPLink boards are nested within the board parameters. Each NIC section begins with:

  `[NIC <NIC-ID>]`

  The NIC parameters immediately follow and are enclosed in curly braces.

- Comments can be added to *pyramid.scd*. If you use the pound sign (#) or semicolon (;) anywhere on a line, all text to the right of the character until the end of the line is treated as a comment (ignored). C code style comments are also allowed. If you use /* anywhere on a line, all text that follows is treated as a comment (ignored) until the */ character sequence is encountered.

  NOTE: If you chose to disable any boards (by setting the **Board Enabled** parameter to No when running `DM3_cfg.sh`), the board information will appear as comments.

4.3.2. Logical ID

Description: User-assigned ID used by the drivers to identify a board.

Guidelines: Logical IDs help you keep track of which board is which. It is frequently easiest to assign logical IDs that match the physical location of the board, although this is not a requirement. Giving the first board in the system

logical ID 1 and sequentially numbering the rest from left to right makes it easy to remember without having to check the configuration file.

Since some chassis have slot numbers beginning with 0 rather than 1, and a logical ID of 0 is not a valid value, the default value for logical ID is PCI slot number + 1. So if the default logical IDs for your boards begin with 2 and you would prefer 1, change the default values.

If you want to change your configuration and specify new logical IDs **after** the software has been started, perform the following steps:

1. Enter the `dlstop` command.

2. Enter the `drvunload` command.

3. Edit the *pyramid.scd* file to specify the desired board logical IDs.

4. Enter the `dlstart` command to start the software and use the new board logical IDs.

Values: Must be a unique positive integer from 1-16.

Default value: PCI slot number + 1

SCD file syntax: 'Board' followed by the logical ID, enclosed in square brackets. Board-specific information follows enclosed in curly braces.

Example:

```
[Board 1] {
.
.  (board-specific info goes here)
.
}
```

4.3.3. Board Enabled

Description: Specifies whether the Dialogic System Service should download firmware to activate the board.

Guidelines: Enter Yes if you want to download this board.

Enter No if you want to temporarily suspend the use of a board in your system. Entering No will comment out the board parameters in the configuration file (*pyramid.scd*).

Values: Yes to enable this board, or No to disable this board.

Default value: Yes

SCD file syntax: The **Board Enabled** parameter is not in the SCD file. It exists within the `DM3_cfg.sh` configuration tool to allow you to easily create an SCD that will only download a few boards in a multi-board system. If you disable a board, its parameters are written as comment lines in the SCD file.

4.3.4. PCD File Name

Description: Specifies the name of the product configuration description (PCD) file. The PCD file lists object files and maps them to specific processors, configures the kernel for each processor, and sets the number of component instances to run on each processor.

When you select the parameter to change a board's PCD file name, a list of valid PCD files for that particular board are displayed. For example:

```
.....................................................................
.                    Specify the PCD File                           .
.....................................................................
---------------------------------------------------------------------
A Product Configuration Description (PCD) file must be selected
in order to configure your board. The corresponding Feature
Configuration Description (FCD) file will be automatically selected.
For features available in specific PCD files, see the Release Guide.
The following PCD files are valid for your board:
---------------------------------------------------------------------
1 - ml1_qs_net5.pcd
2 - ml1_qs_qsige1.pcd
3 - ml1_qs_r2mf.pcd
4 - qs_isdn_net5.pcd
5 - qs_isdn_qsige1.pcd
```

```
6 - qs_r2mf.pcd
Currently: NOT_SET
------------------------------------------------------------------------
Enter a new value or press ? for help or
press Enter to return to the previous screen:
```

Guidelines: Select the PCD file according to the feature set (media load) and protocol that this board will use. In the prompt shown above, for example, enter 1 to select the *ml1_qs_net5.pcd* file, which is used for media load 1 and NET5 protocol. For information about the media loads and PCD files available in this release, see the *Release Guide*.

Values: Any valid PCD file name. The valid PCD file names for the board being configured will be displayed as shown above.

Default value: NOT_SET. Note that a value for the PCD file name parameter **must** be selected, because the default value cannot be used.

SCD file syntax: 'PCDName' followed by a colon and a valid PCD file name.

Example:

```
PCDName             : ipt_isdn_5ess.pcd
```

4.3.5. FCD File Name

Description: Specifies the name of the feature configuration description (FCD) file. The FCD file adjusts the settings of the components that make up each product. For example, an FCD file may contain instructions to set certain country-specific codes or configure network interface protocols.

Guidelines: The PCD file should be selected first, because this determines the default FCD file. The default FCD file has the same name as the PCD file but has the extension *.fcd* instead of *.pcd*.

The default value is appropriate for most configurations, although there are cases where different *.fcd* files can be used for the same *.pcd* file. If you don't want to use the default, you have to enter the FCD file name manually. (Valid file names will not be displayed as they are for the PCD file.) For information about the FCD files available in this release, see the *Release Guide*.

Values: Any valid FCD file name.

Default value: Same as the PCD file name (with *.fcd* extension)

SCD file syntax: 'FCDName' followed by a colon and a valid FCD file name.

Example:

```
FCDName            : ipt_isdn_5ess.fcd
```

4.3.6. PCM Encoding

Description: Specifies the pulse code modulation (PCM) encoding method as either ALAW or MULAW.

Guidelines: The default value (based on the board's network interface) should be appropriate: ALAW for E-1 boards or MULAW for T-1 boards.

Some boards (such as resource-only boards) have no network interface; in this case the default value is NOT_SET, and you must make sure that you select the correct value. All boards connected via a telephony bus cable (CT Bus or SCbus) must use the same encoding method.

Values: ALAW or MULAW.

Default value: Whatever is appropriate for the board: ALAW for E-1 boards or MULAW for T-1 boards. NOT_SET is the default if the appropriate setting cannot be determined (for example, for resource-only boards), and this must be changed to either ALAW or MULAW.

SCD file syntax: 'PCMEncoding' followed by a colon and a valid encoding method.

Example:

```
PCMEncoding        : MULAW
```

4.3.7. TDM Bus Configuration

When you select **TDM Bus Configuration** to change a board's clocking parameters, the following menu is displayed:

```
                ..............................
                 Modify TDM Bus Configuration
                ..............................
  These are the current settings for the board selected.
-----------------------------------------------------------------------
(read only).............PCI Slot: 0
(read only)................Model: DM/V1200-4E1
(read only).......Bus Clock Rate: 8
-----------------------------------------------------------------------
1) ..........TDM Clock Function: PRIMARY
2) ................TDM Bus Type: H100
3) ................Clock Source: OSC (PRIMARY Only)
4) ...Primary CT Bus Clock Line: CT_A (PRIMARY, CT Bus Only)
-----------------------------------------------------------------------
Enter the number of the parameter to modify.
S to Save and return to the Modify Board Settings Screen, or
C to Cancel and return to the Modify Board Settings Screen.
```

Enter the number (1-4) of the parameter to modify, then follow the prompts to enter the new value for that parameter. Refer to the following sections for information about each parameter:

- TDM Clock Function
- TDM Bus Type
- Clock Source
- Primary CT Bus Clock Line

NOTE: The **Bus Clock Rate** is displayed on the TDM Bus Configuration menu as a read-only parameter. You do not have to set this parameter; its value depends on the **TDM Bus Type**. When the **TDM Bus Type** is H100 or H110, the **Bus Clock Rate** is automatically set to 8 MHz. When the **TDM Bus Type** is SCBUS, the **Bus Clock Rate** is automatically set to 4 MHz.

For additional reference information about H.100/H.110 CT Bus concepts, especially regarding clocking, see Section 7.6, "H.100/H.110 CT Bus Reference", on page 136.

When you're finished with the clocking parameters for this board, enter S to save and return to the Modify Board Settings screen (or C to cancel and return to the Modify Board Settings screen).

TDM Clock Function

Description: Specifies whether this board is a clock master or slave. A clock master is one of the boards in a system that is designated to provide reference timing for all boards attached to the bus. This board must derive timing from a network reference which ultimately derives clock from a T-1 or E-1 line (for example, the H.100 CT_NETREF), or else must derive timing directly from a digital network interface or, as a last alternative, from its own internal oscillator.

The H.100/H.110 bus has two types of clock masters: **Primary** Clock Master and **Secondary** Clock Master. The Secondary Clock Master becomes the clock master if the Primary Clock Master fails or is removed from the system.

Guidelines: Only one board in a system can be the Primary Clock Master.

NOTE: Since the default value for the **TDM Clock Function** parameter is PRIMARY, you must change the default for all boards that are **not** the Primary Clock Master. One of the boards can be the Secondary Clock Master, and all other boards must be slaves. The Secondary Clock Master is used in CT Bus applications only, so this setting is not applicable when the TDM Bus Type parameter is SCBUS.

H.100 boards require certain signals that can only be provided by another H.100 board and routed over the H.100 cable. Make sure that the board that you intend to use as the clock master can do the following:

- Derive timing from a network reference or directly from a digital network interface
- Provide both H.100 core signals and compatibility bus signals

In addition, the placement of the clock master board within the chassis is significant in mixed CT Bus/SCbus systems. Typically, the clock master board is located at either end of the 68-lead H.100 cable. In systems that include at least one board with a 26-pin (SCbus) connector, the H.100 board to the furthest right (when viewed from the faceplate) should be designated as the clock master.

For additional reference information about the H.100/H.110 CT Bus, see Section 7.6, “H.100/H.110 CT Bus Reference”, on page 136.

If your system contains both DM3 boards and SpringWare boards, and if a SpringWare board is the clock master, set the **TDM Clock Function** parameter to SLAVE for all DM3 boards. (All other TDM bus configuration parameters for the DM3 boards will use the H.100 defaults.) However, if a SpringWare board is the clock master and a DM3 board is providing the NETREF_1 signal, you have to manually edit the *pyramid.scd* file to specify the board that is providing the NETREF_1 signal. See the descriptions of the **NetRef1**, **NetRef1From**, and **NetRef1CR** parameters in Section 4.3.9, “Additional Parameters in the pyramid.scd File”, on page 98.

NOTE: When both DM3 and SpringWare boards are installed in the same system, the technology (board type) that is to provide the clock master must be downloaded first. By default, this is assumed to be DM3. If you want a SpringWare board to be the clock master in a mixed DM3/SpringWare system, you have to use the `dlorder` command (or edit the *.order* file) to specify that a SpringWare board is the clock master and should be downloaded first. For further information, see Section 5.2, “Changing the Board Download Order When a SpringWare Board Is Clock Master in a Mixed DM3/SpringWare System”, on page 109.

If you want to use a third-party board as the clock master, instructions are given in Section 5.3, “Using a Third-Party Board as Clock Master”, on page 110.

Values: PRIMARY, SECONDARY, or SLAVE. Only one board can be PRIMARY, one board can be SECONDARY, and all others are SLAVEs. SECONDARY is valid only in CT Bus applications.

Default value: PRIMARY. Since only one board can actually be the Primary Clock Master, the default must be changed for all boards that are **not** the Primary Clock Master.

SCD file syntax: 'MasterStatus' followed by a colon and either PRIMARY, SECONDARY (CT Bus only), or SLAVE.

Example:

```
MasterStatus       : PRIMARY
```

TDM Bus Type

Description: Specifies the bus mode for the TDM bus as either H100, H110, or SCBUS. H100 is CT Bus on PCI systems, and H110 is CT Bus on cPCI systems.

Guidelines: This parameter only has to be set for the board that is the Primary Clock Master. The value NA (not applicable) will be displayed for all other boards.

If your system contains an SCbus-only board (such as some of the SpringWare boards), then the **TDM Bus Type** parameter must be set to SCBUS, even though you may have one or more H.100 compliant boards in the system. (SCBUS is not supported on cPCI.)

Values: H100, H110, or SCBUS.

Default value: H100

SCD file syntax: 'TDMBusType' followed by a colon and either H100, H110, or SCBUS.

Example:

```
TDMBusType          : H100
```

Clock Source

Description: Specifies the clock source used to drive the Primary Line.

Guidelines: This parameter only has to be set for the board that is the Primary Clock Master. The value NA (not applicable) will be displayed for all other boards.

The default clock source is the internal oscillator of the Primary Clock Master board. However, clocking should be derived from a network reference or directly from a digital network interface if available, not from a board's internal oscillator. The internal oscillator should be used as the clock source only for internal testing purposes.

If the clock source is set to NETREF_1, you must **manually edit** the *pyramid.scd* file to specify the board that is providing the NETREF_1 signal. Add the following

parameters to the board parameter section for the board providing the NETREF_1 signal:

```
NetRef1            : Yes
NetRef1From:       : <network interface trunk number 1-4>
NetRef1CR          : 1
```

where:

- **NetRef1: Yes** specifies that this board is providing the NETREF_1 signal.
- **NetRef1From: *<network interface trunk number 1-4>*** specifies the network interface source of the reference, for example, **NetRef1From: 1** to derive NETREF_1 from network interface trunk 1.
- **NetRef1CR: 1** specifies the rate of the outbound speed at which the NETREF should be generated on the NETREF bus line. Currently, only 8 kHz is supported and this is indicated by entering **NetRef1CR: 1** as shown.

Likewise, if the clock source is set to NETREF_2, you must **manually edit** the *pyramid.scd* file to specify the board that is providing the NETREF_2 signal. In this case, use the parameters **NetRef2**, **NetRef2From**, and **NetRef2CR**.

Values: Valid values for the **Clock Source** parameter are:

- OSC: derive clocking from the board's internal oscillator
- NETREF_1: derive clocking from NETREF_1

  NOTE: When NETREF_1 is selected, be sure to add the **NetRef1**, **NetRef1From**, and **NetRef1CR** parameters to the *pyramid.scd* file in the board section for the board providing the NETREF_1 signal.
- NETREF_2: derive clocking from NETREF_2 (H.110 only)

  NOTE: When NETREF_2 is selected, be sure to add the **NetRef2**, **NetRef2From**, and **NetRef2CR** parameters to the *pyramid.scd* file in the board section for the board providing the NETREF_2 signal.

The following are valid values for SCbus mode only:

- 1: derive clocking from network interface trunk 1
- 2: derive clocking from network interface trunk 2
- 3: derive clocking from network interface trunk 3

- 4: derive clocking from network interface trunk 4

Default value: OSC

SCD file syntax: 'DeriveClockFrom' followed by a colon and a valid clock source.

Example:

```
DeriveClockFrom    : NETREF_1
```

Primary CT Bus Clock Line

Description: Specifies whether the Primary Line is Line A or Line B. Line A and Line B are the two pairs of clock signals that the CT Bus sets aside for clock synchronization. Either Line A or Line B can be assigned as the Primary Line; the remaining line is assigned as the Secondary Line. The Primary Line is driven by the Primary Clock Master, and the Secondary Line is driven by the Secondary Clock Master.

Guidelines: This parameter only has to be set for the board that is the Primary Clock Master. The value NA (not applicable) will be displayed for all other boards.

Since this parameter is used for CT Bus only, it is not applicable when the **TDM Bus Type** parameter is SCBUS.

Values: CT_A for Line A or CT_B for Line B.

Default value: CT_A

SCD file syntax: 'PrimaryLines' followed by a colon and either CT_A or CT_B.

Example:

```
PrimaryLines       : CT_A
```

4.3.8. NIC Configuration

When you select **NIC Configuration** to change an IPLink board's onboard network interface connector (NIC) parameters, the following menu is displayed:

```
   ..............................................
    Modify Network Interface Connector Configuration
   ..............................................
  These are the current settings for the board selected.
-----------------------------------------------------------------------
(read only).....PCI Slot: 4
(read only).....Model: DM/IP301-1E1
-----------------------------------------------------------------------
1) .....Board IP Address: 000.000.000.000
2) .....Board Subnet Mask: FFFFFF00
3) .....Board Name: board5
4) .....Host IP Address: 000.000.000.000
5) .....Host Name: buzzed
6) .....Host User ID: nobody
7) .....Gateway IP Address: 000.000.000.255
-----------------------------------------------------------------------
Enter the number of the parameter to modify.
S to Save and return to the Modify Board Settings Screen, or
C to Cancel and return to the Modify Board Settings screen.
```

Enter the number (1-7) of the parameter to modify, then follow the prompts to enter the new value for that parameter. If you are unsure about how to set these parameters, contact your network administrator. Refer to the following sections for information about each parameter:

- Board IP Address
- Board Subnet Mask
- Board Name
- Host IP Address
- Host Name
- Host User ID
- Gateway IP Address

When you're finished with the NIC parameters for this board, enter S to save and return to the Modify Board Settings screen (or C to cancel and return to the Modify Board Settings screen).

Board IP Address

Description: Specifies the IP address to be assigned to the NIC on this IPLink board. Incoming calls to this IPLink board should be directed to the IP address specified by this parameter.

Guidelines: Each IPLink board in the system must have a unique value for the **Board IP Address** parameter. Use the format xxx.xxx.xxx.xxx (for example, 146.152.187.42).

Values: A valid IP address.

Default value: 000.000.000.000

SCD file syntax: 'IPAddress' followed by a colon and a valid IP address.

Example:

```
IPAddress        : 255.255.255.255
```

Board Subnet Mask

Description: A number used as a filter (mask) to determine a subnet address. IP addresses have two components: the network address and the host address. Subnetting is a way to further divide the host part of the address so that an IP address can be shared on a LAN. With IPLink applications, for example, subnetting can be used to determine whether Ethernet packets are sent directly to a particular address or sent to a default router. The board subnet mask and IP address are ANDed to identify the subnet address.

Guidelines: Set this parameter according to site IP procedures. Use the format FFFFFFFF, where each pair of Fs represents one segment of the mask. For example, use FFFFFF0A for 255.255.255.10.

Values: A valid subnet mask in hexadecimal.

Default value: FFFFFF00

SCD file syntax: 'SubnetMask' followed by a colon and a valid subnet mask in hexadecimal.

Example:

```
SubnetMask       : ffffff00
```

Board Name

Description: Specifies the name of the NIC on the IPLink board. This is the name by which you will refer to the board, for example, in the Domain Naming System (DNS).

Guidelines: You can choose any name.

Values: Any specified name.

Default value: board<*logical ID*> (for example, board1)

SCD file syntax: 'TargetName' followed by a colon and the name specified for the NIC (e.g., in DNS).

Example:

```
TargetName       : board1
```

Host IP Address

Description: Specifies the IP address of the third-party NIC on the host.

Systems using an IPLink board with an onboard NIC do not require a third-party NIC, because this functionality is provided on the board itself. Even for these boards, however, installing a third-party NIC in the same host provides a means for verifying the integrity of the built-in NIC.

Guidelines: Use the format xxx.xxx.xxx.xxx (for example, 146.152.187.42).

Values: A valid IP address.

Default value: 000.000.000.000

SCD file syntax: 'HostIPAddress' followed by a colon and a valid IP address.

Example:

```
HostIPAddress    : 000.000.000.000
```

Host Name

Description: Specifies the name of the host system whose IP address is defined using the **Host IP Address** parameter.

Guidelines: Enter the name of the host system.

Values: Any specified name by which the system is known to a communications network.

Default value: The value returned by `uname -n`

SCD file syntax: 'HostName' followed by a colon and the name of the host machine in which the board is installed.

Example:

```
HostName        : myhost
```

Host User ID

Description: Specifies the name of a valid user on the host system named using the **Host Name** parameter.

Guidelines: Enter any name with valid log-on access to the host system.

Values: A valid user name.

Default value: nobody

SCD file syntax: 'UserName' followed by a colon and the name of a valid user on the host machine in which the board is installed.

Example:

```
UserName        : nobody
```

Gateway IP Address

Description: Specifies the IP address of the default router for the Ethernet interface.

Guidelines: Use the format xxx.xxx.xxx.xxx (for example, 146.152.187.42).

Values: A valid IP address.

Default value: 000.000.000.255

SCD file syntax: 'GatewayIPAddress' followed by a colon and a valid IP address.

Example:

```
GatewayIPAddress : 255.255.255.255
```

4.3.9. Additional Parameters in the pyramid.scd File

The following parameters cannot be edited using the DM3 board configuration menus. These parameters appear in the *pyramid.scd* file, but they use default values that should not be changed.

Parameter	Description
NumStreams and NumBindHandles	These driver parameters appear at the beginning of the *pyramid.scd* file before the board-level parameters. Use default values of 4000 for each parameter. **Note:** Do **not** change the default values. Incorrect settings can cause download or run-time problems.
BusCR	Bus clock rate; use default value of 8 for CT Bus or 4 for SCbus. This parameter is read-only in the `DM3_cfg.sh` script.
BusType	Bus type; use default value of PCI (for PCI and cPCI).
DisplayConfig	Display configuration; use default value of YES to display configuration information during download.
Group1CR - Group4CR	Group 1-4 clock rates; use default value of 8 MHz.

Parameter	Description
LogFile	Name of the log file created for each DM3 board; default value is board<*logical ID*>.log, for example, *board1.log*.
SlotNumber	Physical location on the PCI (or cPCI) bus; default value is the value returned by `listboards`. The user is not allowed to change this value in the `DM3_cfg.sh` script. Physically moving the board or changing its device ID selector will cause this value to change and require an SCD update.
TimeToSendMsg	Time to send message; use default value of 50 ms.

The following parameters cannot be edited using the DM3 board configuration menus. These parameters must be added to the *pyramid.scd* file manually if the Clock Source (DeriveClockFrom) parameter is set to NETREF_1 or NETREF_2.

Parameter	Description
NetRef1	When set to Yes, indicates that this board is providing the NETREF_1 signal. For all other boards, No is the default and can be omitted.
NetRef1From	This parameter is required only for the board that has **NetRef1** set to Yes and indicates the network interface source of the reference: • 1: derive NETREF_1 from network interface trunk 1 • 2: derive NETREF_1 from network interface trunk 2 • 3: derive NETREF_1 from network interface trunk 3 • 4: derive NETREF_1 from network interface trunk 4
NetRef1CR	This parameter is required only for the board that has **NetRef1** set to Yes and specifies the rate of the outbound speed at which the NETREF should be generated on the NETREF bus line: • 1: 8 kHz (this is the only value that is currently supported) • 2: 1.536 MHz (not currently supported) • 3: 1.544 MHz (not currently supported) • 4: 2.048 MHz (not currently supported)

Parameter	Description
NetRef2	When set to Yes, indicates that this board is providing the NETREF_2 signal. For all other boards, No is the default and can be omitted.
NetRef2From	This parameter is required only for the board that has **NetRef2** set to Yes and indicates the network interface source of the reference: • 1: derive NETREF_2 from network interface trunk 1 • 2: derive NETREF_2 from network interface trunk 2 • 3: derive NETREF_2 from network interface trunk 3 • 4: derive NETREF_2 from network interface trunk 4
NetRef2CR	This parameter is required only for the board that has **NetRef2** set to Yes and specifies the rate of the outbound speed at which the NETREF should be generated on the NETREF bus line: • 1: 8 kHz (this is the only value that is currently supported) • 2: 1.536 MHz (not currently supported) • 3: 1.544 MHz (not currently supported) • 4: 2.048 MHz (not currently supported)

5. Additional Configuration Procedures

This chapter covers additional configuration procedures that may not be required on all systems:

In addition, see the *DM3 Configuration File Reference* for information about changing the parameters in feature configuration description (FCD) files used with DM3 boards.

5.1. Configuring BoardWatch

The following sections provide general information about configuring BoardWatch, and detailed configuration procedures. These procedures are applicable when the BoardWatch SNMP Software has been installed.

5.1.1. General Information about BoardWatch Configuration

BoardWatch provides monitoring and administration of Dialogic boards using the Simple Network Management Protocol (SNMP). Before using BoardWatch, Net-SNMP must be installed. After the Dialogic software (including the BoardWatch SNMP Software) has been installed, Net-SNMP must be configured to use the Dialogic SNMP agent extension software.

When the `install.sh` installation procedure is completed, you can configure BoardWatch. You start the procedure by executing `config.sh` as explained in Section 2.4, “Starting the Board Configuration Procedure”, on page 25. SpringWare and DM3 board configuration come first, and then a utility called `dlgcsnmpconf` is automatically invoked to start the Dialogic SNMP Configuration Tool.

This configuration tool provides two methods of configuration: automatic and manual. Both methods configure SNMP communities and SNMP v1 trap destinations. The *admin* community is a mandatory configuration requirement that is needed by the Dialogic SNMP agent extension to properly operate with the Net-SNMP master agent.

The automatic configuration method creates the *admin* community, giving it both read and write access on the local host. If the manual configuration method is used, then the user is responsible for creating the *admin* community with read and write privileges.

The automatic method configures the Net-SNMP agent by creating the read-write *admin* community and the *dialogic* community, which is set to read-only for all external managers.

The manual method allows the user to enter communities; it does not create any communities automatically. If the *admin* community already exists in the

Net-SNMP configuration, the configuration tool indicates that the community is detected and does not require configuration.

Both the automatic and manual configuration methods provide an opportunity to configure trap destinations. Trap destinations are machines that are configured to receive SNMP v1 traps from managed nodes. Trap destinations are also called **trap sinks**. The configuration tool allows as many trap sinks as required by the user. If a trap sink is not reachable by the managed node, the configuration tool displays a warning message and allows the user to back out of the configuration.

Once the configuration tool has completed, it writes the configuration changes to */usr/share/snmp/snmpd.conf*. A backup of the original configuration file is created as */usr/share/snmp/snmpd.conf.backup*.

The Dialogic SNMP Configuration Tool is normally used after installing the Dialogic software, as part of the `config.sh` configuration procedure. When your configuration is done and you reboot to start the Dialogic System Service for the first time, the Dialogic SNMP agent extension software is started.

If you need to use the configuration tool again at a later time (for example, to add an additional management station to receive trap notifications), you can invoke the tool by entering:

```
/usr/dialogic/lib/snmp/dlgcsnmpconf
```

After using the `dlgcsnmpconf` tool to modify the configuration, enter the following command to restart the Dialogic SNMP agent extension software in order to apply the changes made:

```
/etc/init.d/dlgcsnmpd restart
```

To begin the BoardWatch configuration process, follow the instructions in either Section 5.1.2, “Configuring SNMP Communities Automatically”, on page 104 or Section 5.1.3, “Configuring SNMP Communities Manually”, on page 105.

5.1.2. Configuring SNMP Communities Automatically

Use this procedure to automatically create the *admin* community with read-write privileges and the *dialogic* community with read-only privileges for all external managers. This procedure is applicable when you are configuring BoardWatch for the first time, as part of the `config.sh` procedure. For information about subsequently running the Dialogic SNMP Configuration Tool at a later time, see Section 5.1.1, "General Information about BoardWatch Configuration", on page 102.

When you start the `config.sh` procedure, you are prompted to configure SpringWare and DM3 boards first. The BoardWatch part of the configuration begins with the following messages:

```
SNMP configuration...
Dialogic SNMP Agents Configuration Tool
(C)2000-2001 Intel Corp.

You may choose to manually configure all communities and trap
sinks(destinations), or you may select an automatic configuration.  If the
automatic configuration is chosen, this tool will create the required
'admin' community and prompt you to enter trap sinks.  Selecting the manual
configuration allows you to easily create custom communities and configure
trap sinks.  If the 'admin' community does not exist yet, it may be created
the same way as other communities using the manual configuration.  Note, the
'admin' community MUST be assigned read-write priviledges or else abnormal
behavior will occur when the Intel Dialogic SNMP Agents are loaded.

Would you like to proceed with automatic configuration? (no will select
manual configuration) (y)es or (n)o?
```

Proceed as follows:

1. Enter y for automatic configuration.

2. You are asked for confirmation; enter y again.

   The configuration tool creates and configures the *admin* and *dialogic* communities.

   Configuration continues with the following prompt:

   ```
   Configure trap sink(destination) (y)es or (n)o?
   ```

Continue with the instructions in Section 5.1.4, “Configuring Trap Destinations (Sinks)”, on page 107.

5.1.3. Configuring SNMP Communities Manually

Use this procedure to enter and configure communities manually. This procedure is applicable when you are configuring BoardWatch for the first time, as part of the `config.sh` procedure. For information about subsequently running the Dialogic SNMP Configuration Tool at a later time, see Section 5.1.1, “General Information about BoardWatch Configuration”, on page 102.

When you start the `config.sh` procedure, you are prompted to configure SpringWare and DM3 boards first. The BoardWatch part of the configuration begins with the following messages:

```
SNMP configuration...
Dialogic SNMP Agents Configuration Tool
(C)2000-2001 Intel Corp.

You may choose to manually configure all communities and trap
sinks(destinations), or you may select an automatic configuration.  If the
automatic configuration is chosen, this tool will create the required
'admin' community and prompt you to enter trap sinks.  Selecting the manual
configuration allows you to easily create custom communities and configure
trap sinks.  If the 'admin' community does not exist yet, it may be created
the same way as other communities using the manual configuration.  Note, the
'admin' community MUST be assigned read-write priviledges or else abnormal
behavior will occur when the Intel Dialogic SNMP Agents are loaded.

Would you like to proceed with automatic configuration? (no will select
manual configuration) (y)es or (n)o?
```

Proceed as follows:

1. Enter n for manual configuration.

   The following prompt is displayed:

   ```
   Configure communities (access control)? (y)es or (n)o?
   ```

2. Enter y to create and configure communities. (Entering n skips community configuration and proceeds to the trap destination configuration prompt shown in step 7 of this procedure.)

   If you enter y, you are prompted for the community name:

```
Enter community name (leave blank to cancel):
```

3. If the *admin* community hasn't been created yet, either manually or by the automatic configuration method, then enter *admin* as the community name.

   You are prompted to enter the access privileges for the community:

   ```
   Make this community read-write? (y)es or (n)o?
   ```

4. Enter y if the community will allow write requests, or n if the community will allow only read requests.

   NOTE: For the *admin* community, access **must** be read-write.

   The next prompt asks if external managers will be allowed to use this community to access the Dialogic MIB:

   ```
   Allow external managers access with this community? (y)es or (n)o?
   ```

5. Enter y to grant access to the Dialogic MIB using this community, or n to grant only the local host access to the MIB using this community.

   NOTE: For the *admin* community, local access only is recommended.

   The following prompt asks you to confirm the community configuration, for example:

   ```
   Prepared to add "rwcommunity yourcommunityname localhost" to config file.
   Proceed (y)es or (n)o?
   ```

   where *yourcommmunityname* is the community name that you entered.

6. Enter y to write the community to the configuration file (*/usr/share/snmp/snmpd.conf*).

   The configuration tool then allows you to configure additional communities:

   ```
   Add another community? (y)es or (n)o?
   ```

7. Enter y to add another community or n to continue with trap destination configuration.

   If you enter y, the prompt shown in step 2 is repeated, allowing you to configure another community.

   If you enter n, the following prompt is displayed:

   ```
   Configure trap sink(destination) (y)es or (n)o?
   ```

Continue with the instructions in Section 5.1.4, “Configuring Trap Destinations (Sinks)”, on page 107.

5.1.4. Configuring Trap Destinations (Sinks)

After starting the Dialogic SNMP Configuration Tool and using either the automatic or manual method to configure communities, configuration continues with the following prompt:

```
Configure trap sink(destination) (y)es or (n)o?
```

Proceed as follows:

1. Enter y to configure a trap destination or n to exit the configuration tool.

   If you enter y, the following prompt is displayed:

   ```
   Type host name to be trap sink:
   ```

2. Enter the name of the management station that is configured to receive traps.

   The following prompt is displayed:

   ```
   Allow agent to send SNMPv1 traps to 'hostname' (y)es or (n)o?
   ```

   where *hostname* is the name of the management station that you entered.

3. Enter y to add the specified host as a trap destination.

   The prompts are repeated, allowing you to configure additional trap destination(s). When done, enter n to exit the configuration tool.

   When you exit the configuration tool (when run as part of `config.sh`), the following messages are displayed:

   ```
   Configuration is complete.

   You must reboot the system to start the software for the first time.
   Thereafter, you may use the dlstop and dlstart scripts found in
   /usr/dialogic/bin
   ```

Continue with Section 5.1.5, “Installing BoardWatch MIBs and Documentation on the Network Management Station”, on page 108 and Section 5.1.6, “Configuring the Community String”, on page 109 if applicable.

When you are satisfied with all configuration information, you must reboot to start the software for the first time. Rebooting the system initializes all the Dialogic products in the system. Rebooting also starts the Dialogic SNMP agent extension software. For information about system startup, see Chapter 6, "Starting and Stopping the Dialogic System Service".

5.1.5. Installing BoardWatch MIBs and Documentation on the Network Management Station

Monitoring and controlling the Dialogic boards on the managed node requires the use of a third-party network management application such as HP OpenView, Novell NMS, IBM NetView, or Sun Net Manager on the network management station.

The BoardWatch management information base (MIB) files, which are stored in */usr/dialogic/cfg* when the BoardWatch SNMP Software is installed on the managed node, must be installed on the network management station. The files can be sent from the managed node to the network management station using any method you are familiar with, such as e-mail or FTP.

The MIBs are:

- *DLGHWINF.MIB*
- *DLGREG.MIB*
- *DLGSRPRF.MIB*
- *DLGISDN.MIB*
- *DLGDS1.MIB*

Copy the BoardWatch MIBs to the directory from which they will be accessible to your network management application. For more information, consult the network management application installation instructions.

The *BoardWatch User's Guide for Linux* should also be made available at the network management station. If the Dialogic documentation was installed on the managed node, documentation files (*.html* and *.pdf* versions) are stored in */usr/dialogic/docs*.

Continue with Section 5.1.6, "Configuring the Community String", on page 109. If that procedure is not applicable, then BoardWatch configuration is complete.

5.1.6. Configuring the Community String

SNMP v1 uses community strings to provide simple access control for MIB objects. If a management software tool uses the Dialogic SNMP MIB, it must use identical community strings that the agent is configured to use. Agent community strings are configured with the Dialogic SNMP Configuration Tool (`dlgcsnmpconf`). When running `dlgcsnmpconf`, you can use either an automatic or manual configuration process.

If the automatic configuration process was used, the *dialogic* community was created. This community grants external management stations **read-only** access to the Dialogic MIB. However, if the external management station requires **write** access to writable SNMP objects in the Dialogic MIB, then use the instructions in Section 5.1.3, "Configuring SNMP Communities Manually", on page 105 to create a community string that grants external managers read-write access. After completing this procedure, BoardWatch configuration is complete.

Management software executed on the managed node may use community strings configured for local-access only (such as the *admin* community).

5.2. Changing the Board Download Order When a SpringWare Board Is Clock Master in a Mixed DM3/SpringWare System

When both DM3 and SpringWare boards are installed in the same system, the technology (board type) that is to provide the clock master must be downloaded first. By default, this is assumed to be DM3.

If you want a SpringWare board to be the clock master in a mixed DM3/SpringWare system, you set the relevant clocking parameters as discussed in Chapter 3, "Configuring SpringWare Boards" and Chapter 4, "Configuring DM3 Boards". In addition, you have to use the `dlorder` command (or edit the *.order* file) to specify that a SpringWare board is the clock master and should be downloaded first.

You have to do this before you reboot to start the system for the first time. Or, if you are restarting the system, you do this after stopping applications and entering the `dlstop` command, before the `dlstart` command. (For information about starting

and stopping the system, see Chapter 6, “Starting and Stopping the Dialogic System Service”.)

To use the `dlorder` command, just enter:

```
dlorder
```

The following message and prompt are displayed:

```
The type of the board that provides the TDM Bus Clock Master can be
specified now. This will determine the startup order of the Dialogic system
components.

Do you want to use the DM3 board as the TDM Bus Clock Master Provider ?
```

Respond with n or N when using a SpringWare board as the clock master. The following confirmation message is displayed:

```
You have chosen to use an R4 board to provide the TDM Bus Clock
Master. The Dialogic startup scripts will now be configured to
start the R4 board(s) first.
```

Instead of using the `dlorder` command, you can edit the */usr/dialogic/cfg/.order* file. By default, this file contains the string “DM3” in a mixed DM3/SpringWare system. When using a SpringWare board as the clock master, change “DM3” to “R4”.

5.3. Using a Third-Party Board as Clock Master

The following sections provide background information and configuration procedures necessary when using a third-party board as clock master:

- Section 5.3.1, “Editing Clock Master Settings and Bus Configuration in pyramid.scd File”, on page 111
- Section 5.3.2, “Background Information about Time Slot Assignment”, on page 112
- Section 5.3.3, “Modifying Time Slot Assignment for DM3 Boards”, on page 112

NOTES: 1. This information is applicable to systems with DM3 boards, not SpringWare boards.

2. It is assumed that the third-party technology can use a range of time slots starting at 0.

5.3.1. Editing Clock Master Settings and Bus Configuration in pyramid.scd File

To use a third-party board as a clock master:

- Dialogic boards must be configured as slaves.
- The telephony bus configuration must be the same on all boards in the system sharing the bus. This includes both the Dialogic boards and the third-party boards.

Use the following procedure to set these configuration parameters:

1. Edit the *pyramid.scd* file (in */usr/dialogic/cfg*).
   The file contains a section of board parameters for each DM3 board.

2. Edit the parameters for each board as follows:

   2.a. Set the **TDM Clock Function (MasterStatus)** parameter to **SLAVE**:

   ```
   MasterStatus   : SLAVE
   ```

   2.b. For H.100 or H.110 bus mode, ensure that parameters pertaining to bus configuration are set as follows:

   ```
   TDMBusType     : H100  ; or H110
   BusCR          : 8     ; bus clock rate
   Group1CR       : 8
   Group2CR       : 8
   Group3CR       : 8
   Group4CR       : 8
   PrimaryLines   : CT_A
   ```

   2.c. For SCbus mode, ensure that parameters pertaining to bus configuration are set as follows:

   ```
   TDMBusType     : SCBUS
   BusCR          : 4     ; bus clock rate
   ```

3. After repeating step 2 for all boards, save the *pyramid.scd* file.

5.3.2. Background Information about Time Slot Assignment

Third-party boards and Dialogic boards must not transmit data on the same telephony bus time slots. There is no configuration file that specifies the time slots that DM3 boards use; the DM3 boards are assigned transmit time slots automatically at download time.

The startup script */etc/rc.d/init.d/dialogic* performs the following steps during initialization to assign time slots:

1. Deletes the file */usr/dialogic/cfg/.sctsbase*
2. Executes *clusterpkg* which:
   - Reads */usr/dialogic/cfg/.sctsbase* to get the number to start assigning time slots from. If the file does not exist, the number is 0.
   - Writes */usr/dialogic/cfg/.sctsbase* with the last time slot used by DM3 boards plus 1. The file will now contain the next free time slot.

The third-party board should not use time slots that have been allocated automatically to Dialogic boards. To prevent this, the startup script */etc/rc.d/init.d/dialogic* can be modified so that DM3 boards are assigned time slots starting from a value greater than time slot 0; then, the third-party board can use time slots in the beginning of the time slot range.

5.3.3. Modifying Time Slot Assignment for DM3 Boards

The third-party technology must execute before Dialogic in the startup sequence. This is required since the primary clock master must start before slave boards, and all Dialogic boards are slaves in this configuration.

Use the following procedure to modify time slot assignment for DM3 boards so that the third-party board can be the clock master:

1. Edit */etc/rc.d/init.d/dialogic*.

2. Remove or comment out the line that deletes the time slot base file. Change:

```
rm -f $DLGCROOT/cfg/.sctsbase
```

to:

```
# rm -f $DLGCROOT/cfg/.sctsbase
```

3. Add a line to */etc/rc.d/init.d/dialogic* that will cause the starting time slot for Dialogic boards to use to be written into the file */usr/dialogic/cfg/.sctsbase*. This must be done in the *dialogic* script rather than in the *.sctsbase* file itself, because *clusterpkg* overwrites the *.sctsbase* file when it is executed.

   For example, if the third-party board uses time slots 0 through 1023, write the value "1024" to */usr/dialogic/cfg/.sctsbase* by adding the line:

   ```
   echo "1024" > /usr/dialogic/cfg/.sctsbase
   ```

   to the beginning of */etc/rc.d/init.d/dialogic*.

4. Save the */etc/rc.d/init.d/dialogic* file.

Dialogic boards will now use time slots above those in *.sctsbase*.

5.4. Configuring GlobalCall Protocols

GlobalCall Protocols are installed from a separately ordered CD, which includes protocol modules (*.so*), protocol configuration files (*.cdp*), and firmware parameter files (*.prm*). No firmware parameter files are required for the North American Analog Protocol.

Depending on which technology you are using, follow the configuration instructions for protocols in the applicable GlobalCall Technology User's Guide (for example, the *GlobalCall Analog Technology User's Guide*). In addition, the *GlobalCall Country Dependent Parameters (CDP) Reference*, which comes with the GlobalCall Protocol Package CD, contains information about modifying the country dependent parameters associated with a protocol.

You must configure your system to download the correct parameter files before downloading the firmware. The downloader looks for the firmware parameter files in the default */usr/dialogic/data* directory.

For SpringWare boards, set the **ParameterFile** parameter in the *dialogic.cfg* file to specify the correct parameter file for each board, for example, **ParameterFile = ar_300.prm** for the Argentina R2 protocol.

For information about using protocols with DM3 boards, see the *DM3 Configuration File Reference*.

5.5. Changing Digital Network Interface Parameters for SpringWare Boards

The digital network interface parameter file, *spandti.prm*, is an unformatted ASCII file that the firmware downloader uses to initialize the basic firmware configuration for the digital network interface on SpringWare boards. This file contains a description of all possible values with comments, as well as examples of the parameters set to the default values. Table 7 summarizes the parameters in *spandti.prm*.

To change a parameter from the default setting:

1. Preserve the original parameter file (*/usr/dialogic/data/spandti.prm*) by copying it to another file name such as *spandti.old* and do not modify the copy.

2. Modify *spandti.prm* to contain a list of the parameters and values that you want to change. It is not necessary to specify parameters that use the default values.

   To include comments in the file, place a semicolon (;) in the first column of a line used for comments. You should keep a record of the parameter settings that you change by using comments in the parameter file.

   NOTE: Do not change any settings unless you are sure of what you are doing. Settings must match those of your provider. If you are uncertain of the correct settings, ask your provider.

3. Set the **ParameterFile** parameter in the *dialogic.cfg* file to **ParameterFile = spandti.prm** for the boards that use the modified parameter settings. If a **ParameterFile** value is not specified, the default values shown in Table 7 are used.

Table 7. spandti.prm File Parameters

Parameter ID	Parameter Name	Default Value
05H	Receive Wink Definition	T-1: Detect wink with positive polarity on A bit E-1: Detect wink with negative polarity on A bit
06H	Transmit National and International Bits	E-1 only: All national and international bits set to 1
07H	Transmit Extra Bits	E-1 only: All extra bits set to 1
08H	Initial Signaling Insertion Pattern	T-1: A and B bits = 0 E-1: A, B, and D bits = 1, C bit = 0 (blocking)
09H	Signaling Mode	Insertion mode
0AH	Idle Mode	Do not transmit idle
0BH	Transmit Idle Pattern	T-1: 7FH E-1: 54H
0CH	Transmit Wink Definition	T-1: A bit toggles OFF to ON to OFF, B bit stays OFF E-1: A bit toggles ON to OFF to ON, B and C bits stay OFF, D bit stays ON
0DH	Transmit Pulse Digit Make/Break State Definition	T-1: A bit pulses ON to OFF to ON, B bit stays OFF E-1: A bit pulses OFF to ON to OFF, B and C bits stay OFF, D bit stays ON
0EH	Number of Pulses Per Digit	0 represented by 10 pulses
0FH	CRC Enable Switch	E-1 only: Turn CRC off
11H	Receive Pulse Digit Definition	T-1: Detect digit with negative polarity on A bit E-1: Detect digit with positive polarity on A bit
12H	Line Length	0 to 110 feet
13H	Clear Channel Time Slot 16	E-1 only: E-1 signaling on time slot 16 (CCTS16 not enabled)
20H	Zero Code Suppression Mode	AMI, no zero code suppression

NOTE: Detailed descriptions of all parameters are in the *spandti.prm* file.

5.6. Configuring Silence Compressed Record for SpringWare Boards

The silence compressed record (SCR) feature allows recording with silent pauses eliminated. This results in smaller size recorded files with no loss of intelligibility. The SCR feature is enabled in the *voice.prm* file, which is downloaded during initialization. You must edit this file and set appropriate values for the SCR parameters for your working environment before initializing the board(s). You cannot enable this feature through the Dialogic voice API.

The *voice.prm* file is in */usr/dialogic/data*. The section of the file dealing with SCR parameters is:

```
# ======================================================================
# SILENCE COMPRESSED RECORD Parameters
# To turn on SCR uncomment all of the lines in the block below.
# Recommended values are given.
# ======================================================================

# --- For Silence Compressed Record, uncomment the block below ---

#PARAM 134 : 100  # SCR_T = 1 second SCR trailing silence
#PARAM 135 : 100  # SCR_PC = 100 bytes of pre-compensation
#PARAM 136 : 43   # SCR_THRES = -43dB silence threshold
#PARAM 137 : 4    # SCR_DG = 40ms of non-silence deglitch
#PARAM 138 : 1    # SCR_ON = SCR is on
# ---- End of SCR block ----
```

As distributed, the SCR parameters in the *voice.prm* file appear as comments (each line is preceded with #). To enable SCR, remove the # from the beginning of each line containing an SCR parameter and adjust the parameters if needed. The meaning of each SCR parameter is illustrated and described in Figure 1 and Table 8.

After SCR is enabled in the *voice.prm* file, SCR is automatically activated through use of voice record functions such as **dx_rec( )**. When the audio level is at or falls below the silence threshold for a minimum duration of time, silence compressed record begins. When a short burst of noise (glitch) is detected, the compression does not end unless the glitch is longer than a specified period of time.

The *voice.prm* file is downloaded by default to all SpringWare voice boards. As such, SCR is available to all voice channels in the system. To enable SCR on only one board in a multi-board system configuration, perform the following steps:

1. Disable the SCR parameters in the *voice.prm* file.

2. Create a new parameter file that contains the SCR parameters, for example, by copying and renaming *voice.prm* to *voicescr.prm*, and then edit the SCR parameters in the new parameter file.

3. Download this new parameter file to the appropriate board by specifying it with the **ParameterFile** parameter in the *dialogic.cfg* file. For further information, see Section 3.3.25, "ParameterFile = <file-name>", on page 66.

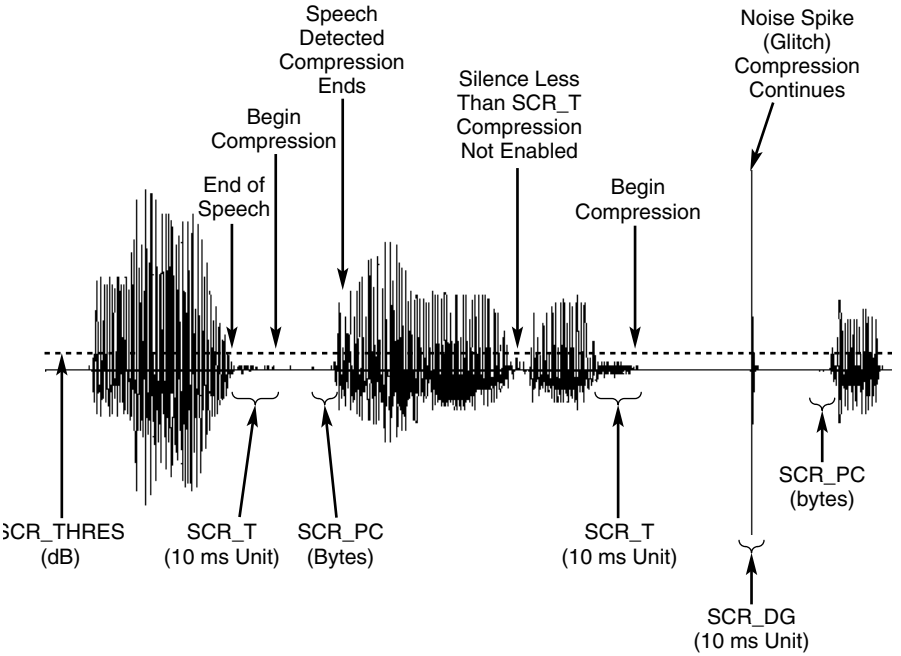

Figure 1. Illustration of Silence Compressed Record Parameters

Table 8. Silence Compressed Record Parameters

Parameter ID	Parameter Name	Description
134	SCR_T (trailing silence)	Units: 10 milliseconds Range 0-100 Default: 100 (corresponds to 1 second) The duration of silence following the end of speech before silence compression begins. This value impacts the amount of compression to be performed and thus the final file size. As you decrease the value, the amount of silence recorded between speech is decreased. You can adjust this value to suit your environment. For example, increase this value if words or sentences run together, and decrease it if the intervals of silence are too long.
135	SCR_PC (pre-compensation)	Units: bytes Range 0-512 Default: 512 bytes Recommended: 100 bytes The number of bytes of pre-compensation. Pre-compensation specifies the maximum length of silence that is recorded on the leading edge of speech. This prevents the beginning of speech that activates recording from being dropped (clipped) after a period of silence. When silence compressed record is in use, two buffers of 512 bytes of shared RAM are allocated to store incoming audio. Data fills one buffer and is passed to the driver. If the audio is below the silence threshold (thus considered to be silence) for a specified period of time, data in the buffer is not passed to the driver but is discarded. **Note:** For best performance, use the recommended value of 100 bytes. Otherwise, the recording may become garbled.

Table 8. Silence Compressed Record Parameters (Continued)

Parameter ID	Parameter Name	Description
136	SCR_THRES (silence threshold)	Units: a numeric value converted to dB Range: 20 to 50 Default: 43 (corresponds to -43 dB) The audio level in the phone line below which the signal is considered noise and above which it is considered speech. When the audio level is at or below the value set in SCR_THRES for a minimum duration of time set in SCR_T, silence compression begins. The SCR_THRES numeric value is converted to a negative dB value by the firmware: 20 represents -20 dB, 21 represents -21 dB, and so on up to 50 which represents -50 dB. You can adjust this value to suit a particular environment; for example, the threshold might be higher in a noisy environment. If you specify an invalid value, it is ignored and the default value is used.
137	SCR_DG (de-glitch)	Units: 10 milliseconds (ms) Range: 0-20 Default: 4 (corresponds to 40 ms) The maximum non-silence period (glitch) that is ignored. A glitch may be a spike or short burst of noise on the line that is not speech. Silence compression continues if a glitch less than or equal in duration to SCR_DG occurs. You can increase this value if the recording includes too much noise, or decrease it if you are losing speech.
138	SCR_ON	Default: 0 Controls whether SCR is enabled. Valid values are: 0 - silence compressed record is not enabled 1 - silence compressed record is enabled

5.7. Editing the NFAS Configuration File for SpringWare Boards

For applications that need Non Facility Associated Signaling (NFAS) capability, you must edit the NFAS configuration file */usr/dialogic/cfg/nfas.cfg* to list boards that use NFAS. Instructions for doing this are in the *nfas.cfg* file. Do not enable entries in this file if NFAS is not used.

5.8. Editing the Antares Configuration File

Configuration information for Antares boards is supplied by the *antares.cfg* file, which is not modified by the `mkcfg` utility.

The following procedure is applicable when Antares boards and the SpringWare Antares Software are installed.

1. Edit the *antares.cfg* file (in */usr/dialogic/cfg*).

   The file contains a block of uncommented lines that should be copied so that you have one block of lines for each Antares PCI board.

2. Copy the lines for each board and edit them as follows:

   2.a. Set the **Port=** parameter to correspond to the Technology Identifier Switch (TIS) on the board. The TIS can be set to a value of 0 to F; corresponding **Port=** parameter settings are 0x00 to 0xF0. See the *Quick Install Card* for your Antares board for further information about the TIS and **Port=** parameter settings.

   2.b. Ensure that the **PCMConfig=** parameter is set to **SCSA** if using the SCbus.

   2.c. Set the **LineConfig=** parameter to **E1** or **T1** depending on the type of network connection that is used. (This parameter is ignored when using SCbus.)

   2.d. Set the **Encoding=** parameter to **A_Law** for E-1 or **Mu_Law** for T-1. This parameter determines the silence bit pattern the Antares kernel generates, that is, the bit pattern transmitted on a time slot when no data is being sent to the SCbus by a resource class unit (RCU).

3. After repeating step 2 for all Antares boards that are installed, save the *antares.cfg* file.

5.9. Updating the PCI ID in the dialogic.cfg File for D/xxJCT Boards

NOTE: Perform this procedure **after** you reboot to start the system for the first time as described in Section 6.1, "Starting the Dialogic System Service for the First Time", on page 123.

After initial configuration and download, the *dialogic.cfg* file shows PCI ID 0 for any D/xxJCT boards that are installed (for example, D/42JCT-U, D/82JCT-U). This has to be updated with the correct PCI IDs.

Use the following procedure to determine the PCI IDs for D/xxJCT boards and to update the *dialogic.cfg* file. It is assumed that you have already installed the boards, installed the Dialogic software, configured the boards using `mkcfg`, and rebooted.

1. To determine the PCI IDs of D/xxJCT boards, run the tool:

   ```
   /usr/dialogic/bin/DxxJCT_id
   ```

   The following shows sample output from this tool:

   ```
   Determining the D/xxJCT series board ID(s)
   Please standby...

   D/82JCT-U  (PCI ID 1) Download .. d82u Firmware Version 6.65 Build 0016
   D/82JCT-U Rev 2 (PCI ID 2) Download .. d82u Firmware Version 6.65 Build 0016

   Please edit /usr/dialogic/cfg/dialogic.cfg
   Set the respective IDs to those just displayed
   ```

   Note that the ID(s) shown will be a function of what boards are in the system and their location.

2. Edit the file */usr/dialogic/cfg/dialogic.cfg*. Look for the board section for each D/xxJCT board. The section head will show PCI ID 0, for example:

   ```
   [Genload - PCI ID 0]  /* D/XXJCT-U  */
   PBXswitch=Nortel_Norstar.fwl

   [Genload - PCI ID 0]  /* D/XXJCT-U  */
   PBXswitch=Nortel_Norstar.fwl
   ```

3. Change the zeros to the PCI IDs returned by the `DxxJCT_id` tool.

4. Run the `dlstart` command. For further information about `dlstart`, see Section 6.2, “Starting the Dialogic System Service after the Initial Startup”, on page 125.

6. Starting and Stopping the Dialogic System Service

This chapter covers the following topics about starting and stopping the Dialogic System Service:

NOTE: When both DM3 and SpringWare boards are installed in the same system, the technology (board type) that is to provide the clock master must be downloaded first. By default, this is assumed to be DM3. If you want a SpringWare board to be the clock master in a mixed DM3/SpringWare system, you have to use the `dlorder` command (or edit the *.order* file) to specify that a SpringWare board is the clock master and should be downloaded first. For further information, see Section 5.2, “Changing the Board Download Order When a SpringWare Board Is Clock Master in a Mixed DM3/SpringWare System”, on page 109.

6.1. Starting the Dialogic System Service for the First Time

After you install Dialogic software with the `install.sh` command and configure the system with the `config.sh` command, the following messages are displayed when you exit from the configuration script:

```
Configuration is complete.

You must reboot the system to start the software for the first time.
Thereafter, you may use the dlstop and dlstart scripts found in
/usr/dialogic/bin
```

Before rebooting the system to start the software, make sure you perform all of the necessary configuration procedures as discussed in Chapter 3, “Configuring

SpringWare Boards", Chapter 4, "Configuring DM3 Boards", and Chapter 5, "Additional Configuration Procedures".

NOTE: If you have D/xxJCT boards installed (for example, D/42JCT-U, D/82JCT-U), an additional procedure is needed **after** you reboot the system. See Section 5.9, "Updating the PCI ID in the dialogic.cfg File for D/xxJCT Boards", on page 121.

When you are satisfied with your configuration, shut down the system and restart it. Rebooting the system initializes all the Dialogic products in the system.

Upon startup, check the screen or system log file for startup messages. The messages vary depending on the boards and software packages you installed. DM3 boards are downloaded before SpringWare boards (unless you changed the download order by using the `dlorder` command or editing the *.order* file).

For DM3 boards, you should see:

```
Parsing SCD file /usr/dialogic/cfg/pyramid.scd succeeded
```

followed by messages for individual boards. For each board, look for a message that says:

```
Configuring and downloading board succeeded boardNumber=n
```

For SpringWare boards, you should see:

```
Using /usr/dialogic/cfg/dialogic.cfg to configure Dialogic Boards

System Download
.................................................................
```

followed by a list of boards that were detected and then:

```
n Dialogic Boards Successfully Installed
```

Finally, the system services are started. Once completed, the startup script will exit.

To ensure that the startup script has completed, enter the command:

```
ps -ef | grep S90dialogic | grep -v grep
```

When no output is seen, the startup script has completed.

To display information about boards that are present in the system and recognized by the device driver, enter the command:

```
detect
```

The `detect` command displays the board type (DM3 or SpringWare), PCI bus and slot number, logical ID, and other useful information for each board. For more information about the `detect` command, see Section 7.3, "Displaying Board Information", on page 129.

After starting the system for the first time, you may want to use some of the tools provided by Dialogic to verify that your system is operating properly. Look in the */usr/dialogic/demos* directory for demo programs.

If you have problems, refer to Chapter 9, "Troubleshooting". Problems on initial startup are typically caused by errors in your configuration settings or in IRQ selection.

6.2. Starting the Dialogic System Service after the Initial Startup

Startup should only be performed when the system is stopped, that is, after a `dlstop` command.

You only have to reboot the system for the **initial** startup. To restart the Dialogic System Service at any time after the initial startup, enter the commands:

```
dlstop

dlstart
```

For information about startup messages, see Section 6.1, "Starting the Dialogic System Service for the First Time", on page 123.

6.3. Stopping the Dialogic System Service

Before you stop the Dialogic System Service, the application must be stopped and the application must ensure that all channels have been closed.

To stop the Dialogic System Service, enter the command:

```
dlstop
```

The messages displayed depend on the boards you installed and may include the following:

```
REGVOX: Deleting DM3 Devices ...

REGVOX: Delete DM3 Devices Done.

Deleting SW devices ....

Deleting SW devices Done

Shutting down dm3clump Server

Shutting down DeviceMapper Server
```

7. Administration Procedures and Reference

This chapter provides procedures for system administration following the initial installation and configuration of Dialogic system release software:

This chapter also includes reference information about the H.100/H.110 CT Bus:

7.1. Installing Additional Packages

If you want to install additional packages from the Dialogic system release software after your initial installation, you can rerun the `install.sh` command. Follow the instructions in Section 2.2, “Installing the Dialogic Software”, on page 19. You just have to install the new packages that you want—you don’t have to reinstall packages that you already have.

7.2. Changing the Configuration

NOTE: Adding new SpringWare boards may require reinstallation of the Dialogic software. Dialogic systems can include any or all of three SpringWare board types:

- ISA compatible boards configurable with jumpers (referred to below as ISA-HW)
- ISA compatible boards configurable with Board Locator Technology (ISA-BLT)

- PCI compatible boards configurable with Board Locator Technology (PCI-BLT)

For the following SpringWare board installation change scenarios, Dialogic software must be uninstalled, board installation changes made, and Dialogic software reinstalled:

- Initially no SpringWare boards installed, now changing to some SpringWare boards installed.
- Initially some SpringWare boards installed, now changing to no SpringWare boards installed.
- Initially no ISA-HW boards installed, now changing to include one or more ISA-HW boards installed.
- Initially no ISA-BLT boards installed, now changing to include one or more ISA-BLT boards installed.
- Initially only PCI-BLT boards installed, now changing to include one or more ISA-HW and/or ISA-BLT boards installed.

For all other scenarios, Dialogic software need not be uninstalled and reinstalled when SpringWare board installation changes are made.

If you add new hardware or otherwise need to change existing configuration parameters after the initial configuration, you can do this in a number of ways:

- Rerun any of the configuration tools. The configuration tools are:
  - `config.sh`, which is the overall configuration tool for all boards; it invokes the tools for DM3 board configuration, SpringWare board configuration, and BoardWatch configuration if applicable. See Section 2.4, “Starting the Board Configuration Procedure”, on page 25.
  - `DM3_cfg.sh` for DM3 boards only. See Section 4.2, “Using the DM3 Board Configuration Menus”, on page 78.
  - `mkcfg` for SpringWare boards only. See Section 3.2, “Using the mkcfg Utility”, on page 29.
  - `dlgcsnmpconf` for BoardWatch only. See Section 5.1, “Configuring BoardWatch”, on page 101.
- Edit configuration files manually. The main configuration files (in */usr/dialogic/cfg*) are:

- *pyramid.scd* for DM3 boards. See Section 4.3, "DM3 Board Configuration Parameter Reference", on page 82.
- *dialogic.cfg* for SpringWare boards. See Section 3.3, "SpringWare Board Configuration Parameter Reference", on page 35.

NOTES:

1. When you rerun `DM3_cfg.sh`, the existing *pyramid.scd* file is overwritten. If you want to save the previous version, rename it.
2. When you rerun `mkcfg`, the existing *dialogic.cfg* file is saved as *dialogic.01* (or *dialogic.02*, etc.).
3. When you rerun `mkcfg`, you must use the same IRQs as originally specified.
4. When you run `mkcfg` as part of the overall `config.sh` procedure, ISA IRQ value and SRAM address are stored in the files *dialogic.cfg*, *.bltirq*, and *.veclist* (all in */usr/dialogic/cfg*). But if you run `mkcfg` separate and apart from `config.sh`, the *.veclist* file is not set up properly. In this case, you must manually edit *.veclist* to change the SRAM IRQ value.
5. If you change your configuration from ISA to PCI boards only, delete the */usr/dialogic/cfg/.bltirq* file.

For the new configuration to take effect, enter the `dlstop` and `dlstart` commands. See Chapter 6, "Starting and Stopping the Dialogic System Service". When changing DM3 board logical IDs, you also have to enter the `drvunload` command after `dlstop`. For further information, see Section 4.3.2, "Logical ID", on page 83.

7.3. Displaying Board Information

The `detect` command displays information about boards that are present in the system and recognized by the device driver. When entered without arguments, the `detect` command output shows the following information:

```
|AUID|CT Platform|Bus|Slot|Wheel|Log ID|Serial Num|Name
 2    DM3          2   9    2     2      KS123456   <un>
 3    SPRINGWARE   2   11   4     4      EL123456   <un>
```

where:

- **AUID** (addressable unit identifier) is a unique identifier for a component with which communications may be initiated (for example, a board). The AUID is used as an argument to the `dm3stopboard` and `dm3startboard` commands when stopping and starting individual boards.
- **CT Platform** is either DM3 or SPRINGWARE.
- **Bus** is the PCI bus number.
- **Slot** is the PCI slot number.
- **Wheel** is the board thumbwheel switch setting. (For DM3 cPCI boards, the physical slot number is displayed.)
- **Log ID** is the board logical ID.
- **Serial Num** is the board serial number (for the entire board assembly—not the baseboard serial number or daughterboard serial number).
- **Name** is not currently used and displays "<un>" for unavailable.

The `detect` command can also be entered with arguments to output specific physical board attributes based on matching input criteria. Possible arguments are:

- `-iPCISlot <`*`PCI slot number`*`>` to find board with matching PCI slot
- `-iPCIBus <`*`PCI bus number`*`>` to find board with matching PCI bus
- `-iAUID <`*`AUID`*`>` to find board with matching AUID
- `-oAUID` to output AUID of found board
- `-oLID` to output logical ID of found board

For example, the following command provides the PCI bus and slot as input, and outputs the AUID for the board that matches those criteria:

```
$ detect -iPCIBus 2 -iPCISlot 9 -oAUID
2
```

7.4. Changing TDM Bus Settings

The `tbmodify` command allows you to reconfigure the TDM bus settings on a DM3 board. You can display bus information, remove boards from the bus, or adjust a board's settings. It might be necessary to remove a board from the bus or adjust a board's settings, for example, before stopping an individual board with the

`dm3stopboard` command or after starting an individual board with the `dm3startboard` command.

Changes specified by the `tbmodify` command take effect immediately.

The following sections explain the options for using the `tbmodify` command:

- Section 7.4.1, “Displaying Bus Information for all DM3 Boards”, on page 131
- Section 7.4.2, “Removing a DM3 Board from the TDM Bus”, on page 132
- Section 7.4.3, “Adjusting the TDM Bus Parameters”, on page 132

7.4.1. Displaying Bus Information for all DM3 Boards

To display bus information for all DM3 boards, enter the command:

```
tbmodify -i
```

The following information is displayed:

```
Brd Role Bus BusStat ClkLine ClkSrc   ClkSrcSpeed  NetRefSrc  NetRefSrcSpeed
================================================================================
1     1  SC     ON      A    INTERNAL    8KHz        -----      -----
2     S  SC     ON      A                           -----      -----
```

where:

- **Brd** is the board logical ID.
- **Role** is 1 for Primary Clock Master, 2 for Secondary Clock Master, or S for Slave.
- **Bus** is the TDM bus type, SC (for SCbus), H100, or H110.
- **BusStat** indicates the board status, ON or OFF the bus.
- **ClkLine** is the Primary Line, A or B.
- **ClkSrc** is the clock source, INTERNAL or NETREF. For SCbus, can also be Trunk 1, 2, 3, or 4.
- **ClkSrcSpeed** is the master clock source rate, e.g., 8KHz.
- **NetRefSrc** indicates the source of the reference (Trunk 1, 2, 3, or 4); displayed only when NETREF is the clock source.

- **NetRefSrcSpeed** is the NETREF clock source rate; displayed only when NETREF is the clock source.

7.4.2. Removing a DM3 Board from the TDM Bus

To remove a board from participating in the TDM bus, enter the command:

```
tbmodify -e <board>
```

where <*board*> is the board's logical ID.

The following example shows the removal of a board from the bus with `tbmodify -e` and the resulting display from `tbmodify -i`:

```
$ tbmodify -e 2
Board removed from Telephony Bus.

$ tbmodify -i
Brd Role Bus BusStat ClkLine ClkSrc   ClkSrcSpeed  NetRefSrc  NetRefSrcSpeed
================================================================================
1     1  SC     ON      A    INTERNAL    8KHz        -----      -----
2     S  SC     OFF     A                           -----      -----
```

7.4.3. Adjusting the TDM Bus Parameters

To adjust a board on the TDM bus, enter the command:

```
tbmodify -a <board> <adjustment-options>
```

where <*board*> is the board's logical ID and <*adjustment-options*> may be any of the following (note that some are required):

Required adjustment-options with `tbmodify -a`:

- `-m <1|2|S>` specifies the master role:
  - 1: primary
  - 2: secondary
  - S: slave
- `-p <A|B>` specifies the primary line (for H100/H110 only):
  - A: CT_A

- B: CT_B

Optional adjustment-options with `tbmodify -a`:

- `-s <N|I>` specifies the master clock source:
  - N: NETREF
  - I: internal oscillator
  - For SCbus only, can also be 1, 2, 3, or 4 (for trunk 1-4)

  Defaults to NETREF for primary and secondary if not specified.
- `-r <1|2|3|4>` specifies the master clock source rate:
  - 1: 8 kHz (this is the only value that is currently supported)
  - 2: 1.536 MHz (not currently supported)
  - 3: 1.544 MHz (not currently supported)
  - 4: 2.048 MHz (not currently supported)

  Defaults to 8 kHz.
- `-S <1|2|3|4|N>` specifies the NETREF clock source:
  - 1-4: trunk 1-4
  - N: none, don't drive NETREF oscillator

  Defaults to N (none).
- `-R <1|2|3|4>` specifies the NETREF clock source provide rate:
  - 1: 8 kHz (this is the only value that is currently supported)
  - 2: 1.536 MHz (not currently supported)
  - 3: 1.544 MHz (not currently supported)
  - 4: 2.048 MHz (not currently supported)

  Defaults to 8 kHz.

Some examples:

`tbmodify -a 4 -mS -pA`
: Puts board 4 on the TDM bus as a slave using CT_A.

`tbmodify -a 4 -m1 -pA`
: Puts board 4 on the TDM bus as a primary master using NETREF as the clock source, 8 kHz as the speed, and CT_A as the primary line.

```
tbmodify -a 5 -mS -pA -S1
```

Puts board 5 on the TDM bus. It will generate NETREF using trunk 1 as the clock source, 8 kHz as the clock rate, and CT_A as the primary line.

7.5. Like for Like Replacement of CompactPCI Boards

DM3 H.110 boards can be individually stopped and started, allowing you to replace CompactPCI (cPCI) boards without shutting down the system or application.

The board replacement could be driven by an application (for example, if statistics are showing a degradation of service) or could be driven by an operator (for example, if a board failed). In the latter situation, the application must be informed to stop using the board that needs to be replaced.

The replacement process has the following restrictions:

- The application must stop using the board.
- You must stop the board before removing it.
- The replacement board must be the same type as the replaced board, and it must be installed in the same slot.
- You cannot add additional boards to the system.

The following sections provide more information about like for like replacement:

- Section 7.5.1, “Like for Like Replacement Application Design Considerations”, on page 134
- Section 7.5.2, “Like for Like Replacement Procedure”, on page 135

7.5.1. Like for Like Replacement Application Design Considerations

When writing an application that supports like for like replacement, use the function **SRLGetAllPhysicalBoards( )** to determine which physical boards are in the system. Physical boards are represented by addressable unit identifier (AUID) that is guaranteed to be unique within a given node.

Once the application has a board’s AUID, the functions **SRLGetVirtualBoardsOnPhysicalBoard( )** and **SRLGetSubDevicesOnVirtualBoard( )** can be used to retrieve the list of virtual

devices on a board, allowing the application to cross reference physical boards with virtual devices. For information about these functions, see the *Voice Software Reference - Standard Runtime Library for Linux*.

7.5.2. Like for Like Replacement Procedure

The following procedure describes the basic steps for removing and replacing a DM3 H.110 board. The procedure can also be used to stop and restart a DM3 H.100 board, without physically removing and replacing the board. This procedure can be automated or entirely user driven.

1. Determine the board to be replaced. This can be done via the application or by the user entering the `detect` utility to obtain the board's AUID.

2. If necessary, reassign the TDM bus resources (for example, if the board to be replaced is providing NETREF). This can be done with the `tbmodify` utility.

3. Inform the application to stop all activity on the board and close all open device handles. This can be done in the application itself or by user intervention as designed in the application.

   The Standard Runtime Library (SRL) functions can be used to determine the devices on the board with the specified AUID, and the devices can be closed using **dx_close( )**, **dt_close( )**, etc.

4. When the application has stopped using devices associated with the board, use the utility:

   `dm3stopboard <auid>`

   to stop and reset the specified board. The `dm3stopboard` utility can be entered via the application or by the user from the command line. The AUID can be determined via function calls or from the `detect` utility.

   The board and all virtual devices associated with the board must not be used until the board is restarted.

5. Physically remove and replace the H.110 board according to the instructions in the *Quick Install Card* that came with the board.

6. Ensure that the board's Power On Self Test (POST) is completed. POST has completed when the lights on the board have gone out.

7. Use the `detect` utility again to get the board's AUID.

8. Restart the board with the utility:

   ```
   dm3startboard <auid>
   ```

   to download and initialize the stopped board. The `dm3startboard` utility can be entered via the application or by the user from the command line. The AUID can be determined via function calls or from the `detect` utility.

   The board and all virtual devices associated with the board can be used when `dm3startboard` is complete.

9. If necessary, reconfigure the TDM bus settings for the replaced board. This can be done with the `tbmodify` utility.

10. Inform the application to start using the board. This can be done in the application itself or by user intervention as designed in the application.

    The SRL functions can be used to determine the devices that are in service again on the board with the specified AUID, and the devices can be opened using **dx_open( )**, **dt_open( )**, etc.

7.6. H.100/H.110 CT Bus Reference

The Enterprise Computer Telephony Forum (ECTF) standard H.100/H.110 CT Bus provides a fault-tolerant hardware interface for H.100 PCI and H.110 cPCI telephony hardware devices. Features include redundant clocking (H.100 and H.110) and the ability to stop, start, and remove individual devices without interrupting the operation of other devices sharing the bus (H.110 only).

The following sections provide reference information about the H.100/H.110 CT Bus:

- Section 7.6.1, "H.100/H.110 Bus Concepts", on page 137
- Section 7.6.2, "Fault Recovery", on page 140
- Section 7.6.3, "Restrictions and Limitations", on page 140

For information about the configuration tasks and parameters for setting up an operating H.100 or H.110 Bus for initial download, see Section 4.3.7, “TDM Bus Configuration”, on page 88. Modifications can be made using the `tbmodify` command as explained in Section 7.4, “Changing TDM Bus Settings”, on page 130.

7.6.1. H.100/H.110 Bus Concepts

A number of concepts and definitions, especially regarding clocking, are central to understanding the H.100/H.110 CT Bus. For the following discussion, refer to Figure 2 for an illustration of these clocking concepts.

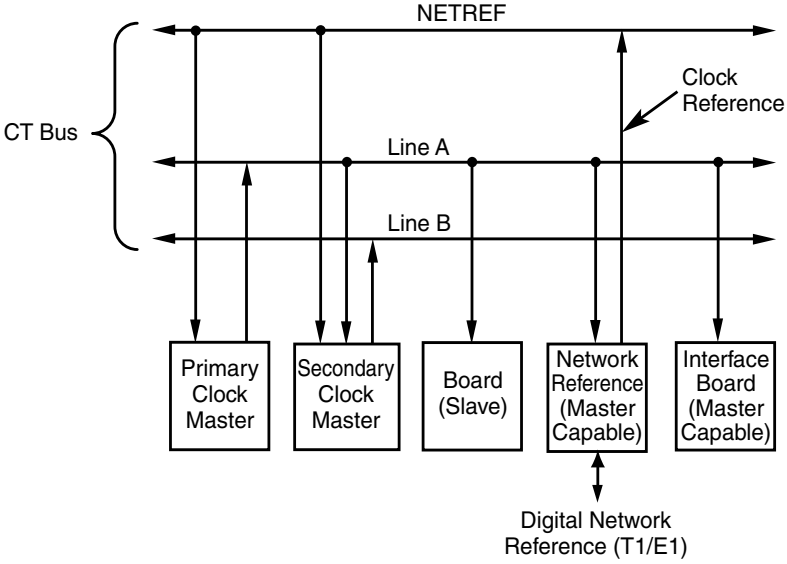

Figure 2. CT Bus Clocking

The terminology used to describe CT Bus clocking concepts includes:

- **Clock Master(s):** A clock master is a device (board) that provides timing for all other devices attached to the bus. The H.100/H.110 CT Bus has two types of clock masters: Primary Clock Master and Secondary Clock Master.

  - The **Primary Clock Master** drives bit and framing clocks onto one of two pairs of (primary) lines of the CT Bus. The Primary Clock Master can provide clocking derived from either a network interface (optimum) or from its internal oscillator. When clocking is derived from the network, the Primary Clock Master synchronizes its output to the CT Bus CT_NETREF signal (NETREF).
  - Under normal conditions, the Primary Clock Master's output is redriven on a second (secondary) pair of lines by the **Secondary Clock Master**, providing a redundant backup set of clocks for all boards in the system if the Primary Clock Master fails.
- **Line A, Line B:** Line A and Line B are the two pairs of clock signals that the H.100/H.110 CT Bus sets aside for clock synchronization. Either Line A or Line B can be assigned as the Primary Line; the remaining line is assigned as the Secondary Line. The Primary Line is driven by the Primary Clock Master and the Secondary Line is driven by the Secondary Clock Master.
- **Slave:** All devices that are not clock masters are defined as (CT Bus) slaves. Slave devices normally derive their timing from the Primary Line but will switch to the Secondary Line if the integrity of the signals on the Primary Line degrades.
- **NETREF FRU:** The NETREF field replaceable unit (FRU), also known as the **Reference Master**, is a device (board) that is used to drive a reference clock onto the CT Bus. The system's Primary Clock Master board normally uses the NETREF FRU's output (CT_NETREF signal) as its input reference. (The Secondary Clock Master is normally configured to use CT_NETREF as its reference only during a primary failure situation.) Note that H.100 uses one NETREF FRU. For H.110, there may be two NETREF FRUs in the system. Any digital network interface to the NETREF FRU can be used to generate the NETREF signal. The current implementation provides NETREF operation at 8 kHz, although in the future 1.536 MHz, 1.544 MHz, or 2.048 MHz may be used.
- **NETREF:** The CT_NETREF signal carries a network clock signal that may be used by the Primary Clock Master and Secondary Clock Master as their reference. The NETREF FRU is the device that drives the reference signal CT_NETREF. The H.100 version of the CT Bus uses one CT_NETREF signal, while the H.110 version uses two independent CT_NETREF signals (_1 and _2).

- **Holdover Clock:** The Holdover Clock emulates the NETREF reference signal used as a reference by the Primary Clock Master to provide clocking to the bus. If the NETREF reference signal fails, the H.100/H.110 CT Bus Holdover Clock takes over as the temporary reference signal provider until a new reference is connected. The Holdover Clock is ideally engaged only for as long as it takes to switch to a different reference signal, although it can operate indefinitely with minimal degradation in bus performance.

  NOTE: In the current implementation, failure of a network interface on the NETREF FRU is not detected as a reference signal failure and does not result in the engagement of the Holdover Clock. If the NETREF FRU detects failure of the network interface driving NETREF, it switches to derive the NETREF signal from an internal oscillator.

- **Compatibility Clocks**: The Compatibility Clocks are a feature of the H.100/H.110 CT Bus that enables H.100/H.110 devices to interoperate with SCbus devices in the same system.

  NOTE: The current implementation gives you the option to operate the system in pure SCbus mode. However, when used in SCbus mode, the Dialogic software does not support the fault recovery features discussed in this section, such as Primary Clock Master and Secondary Clock Master and NETREF.

- **Group One Through Five:** The data streams in the H.100/H.110 CT Bus are divided into two sets of 16 streams. The first (lower) set of 16 data streams is composed of four groups of four streams. The second (upper) set of 16 data streams comprises group 5. The current implementation limits all groups of the lower set (1-4) to run at the same clock speed, either:
  - 8 MHz, or
  - 4 MHz (for H.100 CT Bus interoperability with SCbus products, or for SCbus mode only)

  In the future, each of the first four groups will be able to operate independently at different clock speeds of 2 MHz, 4 MHz, or 8 MHz. The group 5 data streams always operate at 8 MHz, though no data would be written to this group if operating in SCbus mode.

7.6.2. Fault Recovery

Failure of the Primary Clock Master device or NETREF FRU is handled in the following ways:

- **Failure of Primary Clock Master:** If the Primary Clock Master fails, the devices listening to the Primary Line detect the failure and automatically switch to the Secondary Line, at which point the Secondary Clock Master becomes the Primary Clock Master. At this time, a new Secondary Clock Master is selected automatically if another board is available. (If the board that served as Primary Clock Master comes back online, it is not automatically designated again as the Primary Clock Master.)
- **Failure of network interface driving NETREF:** If the NETREF FRU detects failure of the network interface driving NETREF, it switches to derive the NETREF signal from an internal oscillator. In the current implementation, the network interface failure does not result in the engagement of the Holdover Clock.

7.6.3. Restrictions and Limitations

The current implementation is subject to the following restrictions and limitations with respect to the H.100/H.110 CT Bus:

- Each physical chassis can support only one physical TDM bus. Future releases will support multiple buses per chassis.
- When a stopped device is removed and replaced, it must be replaced with an identical model, which must be inserted into the same slot.
- If any single board in the system is run in SCbus mode, then all boards in the system must run in SCbus mode as well.
- To derive clocking from an SCbus board, the entire system must be in SCbus mode.
- The network interface from which the NETREF FRU derives clocking must be selected by the user. (The default clock source is the Primary Clock Master's internal oscillator.)

8. Uninstalling the Software

This chapter describes how to uninstall Dialogic software.

Before installing this Dialogic system release, you must remove any previous versions of Dialogic software and Linux STREAMS (LiS) from your system.

Before uninstalling, ensure that any user-created files stored in */usr/dialogic* directories are preserved and that configuration data is noted so you will know what parameter values to use when configuring boards with the new Dialogic system release. Files normally used to store configuration data include *pyramid.scd* (for DM3 boards), and *dialogic.cfg* (and the *dialogic.xx* backup files *01*, *02*, etc.), *.veclist*, and *.bltirq* (for SpringWare boards).

Perform the following steps to uninstall Dialogic software:

1. Log in as root.

2. Stop all applications that are using Dialogic services.

3. Stop all Dialogic boards:

   ```
   dlstop
   ```

4. Using Red Hat Package Manager (`rpm`), remove the Dialogic development packages that you have installed.

   4.a. You can see which packages you have installed by entering:

   ```
   rpm -qa | grep DLGC
   ```

4.b. Remove the installed packages **in the order shown** by entering commands similar to the following (your installed packages may be different, but remove the packages that you do have installed in this order):

```
rpm -e DLGCsnmp
rpm -e DLGCqspan
rpm -e DLGCgc
rpm -e DLGCdmfax
rpm -e DLGChdsi
rpm -e DLGCiplnk
rpm -e DLGCdmdev
rpm -e DLGCcsp
rpm -e DLGCant
rpm -e DLGCparms
rpm -e DLGCpri
rpm -e DLGCdev
rpm -e DLGCooc
rpm -e DLGCcom
rpm -e DLGCdocs
```

NOTE: Removing individual packages (as opposed to the entire set of installed packages in the order listed) is not recommended. Removing an individual package may cause problems if the resulting dependencies for each remaining package are not met. For a list of package dependencies, see Table 9, “Package Dependencies”, on page 144.

5. Remove any remaining files in the Dialogic directory:

```
rm -fr /usr/dialogic
```

6. If the contents of the Dialogic CD were copied to a directory on your computer's hard drive, enter the following commands from that directory:

```
rm dlgcinstall
rm install.sh
rm config.sh
rm buildinfo
rm checkfiles
rm license.txt
rm DLGC*
```

NOTE: If LiS Version 2.13.9 is installed, you must now reboot before performing the following steps to uninstall LiS.

7. Assuming that you used the **default values** for the previous installation of LiS, enter the following commands to uninstall LiS:

```
cd /usr/src/LiS
make very-clean
cd ..
ls -l  (note the directory where LiS is located)
rm -rf <directory where LiS is located>
rm /usr/src/LiS
```

NOTE: You **must** execute these commands to ensure a correct uninstall or reinstall. For more detailed information about uninstalling LiS, see *http://www.gcom.com/home/linux/lis/removal.html*.

8. To make sure that LiS is uninstalled properly, enter the following command:

```
/sbin/lsmod | grep streams
```

There should not be any output from this command if LiS is uninstalled properly.

If there is output from this command, reboot the system.

To install new Dialogic software, refer to Chapter 2, "Installing the Software".

Table 9. Package Dependencies

Package	Dependencies
DLGCcom	None
DLGCooc	DLGCcom
DLGCdev	DLGCcom, DLGCooc
DLGCdmdev	DLGCcom, DLGCooc
DLGCcsp	DLGCcom, DLGCooc, DLGCdev
DLGCiplnk	DLGCcom, DLGCooc, DLGCdmdev
DLGCant	DLGCcom, DLGCooc, DLGCdev
DLGCparms	DLGCcom, DLGCooc, DLGCdev
DLGCgc	None
DLGCqspan	DLGCcom, DLGCooc, DLGCdmdev, DLGCdev, DLGCgc
DLGChdsi	DLGCcom, DLGCooc, DLGCdmdev
DLGCpri	DLGCcom, DLGCooc, DLGCdev
DLGCdmfax	DLGCcom, DLGCooc, DLGCdmdev
DLGCdocs	None
DLGCsnmp	None

9. Troubleshooting

This chapter covers the following topics about troubleshooting:

9.1. General Troubleshooting Information

Solutions to many problems can be found in the technical notes on the Dialogic FirstCall InfoServer Web site at *http://support.dialogic.com*. In addition, check the online *Release Update* for the latest information about any issues, restrictions, or limitations that may affect the installation.

Problems on initial startup are typically caused by errors in your configuration or in IRQ selection. Hardware related problems are also a possibility. The following sections provide some general information for troubleshooting these problems:

In addition, refer to Section 2.1, “Prerequisites for Software Installation”, on page 3 and make sure that all of the necessary procedures were performed. For example, if your */etc/hosts* file is not configured properly, you will have problems when downloading Dialogic boards.

9.1.1. Checking Configuration Files

The main configuration files are *pyramid.scd* for DM3 boards and *dialogic.cfg* for SpringWare boards. (Both files are in */usr/dialogic/cfg*.) Depending on your configuration, additional files may be applicable. Refer to the parameter information in Chapter 3, “Configuring SpringWare Boards”, Chapter 4, “Configuring DM3 Boards”, and Chapter 5, “Additional Configuration Procedures”, and check all configuration files.

If you need to change parameter settings, you can edit configuration files manually or rerun any of the configuration tools. (With *dialogic.cfg*, however, some parameters are not set by the configuration tool, so manual editing of the file may be required.) The configuration tools are:

- `config.sh`, which is the overall configuration tool for all boards; it invokes the tools for DM3 board configuration and SpringWare board configuration. See Section 2.4, "Starting the Board Configuration Procedure", on page 25.
- `DM3_cfg.sh` for DM3 boards only. See Section 4.2, "Using the DM3 Board Configuration Menus", on page 78.
- `mkcfg` for SpringWare boards only. See Section 3.2, "Using the mkcfg Utility", on page 29.

NOTES: 1. When you rerun `DM3_cfg.sh`, the existing *pyramid.scd* file is overwritten. If you want to save the previous version, rename it.

2. When you rerun `mkcfg`, the existing *dialogic.cfg* file is saved as *dialogic.01* (or *dialogic.02*, etc.).

3. When you rerun `mkcfg`, you must use the same IRQs as originally specified.

4. When you run `mkcfg` as part of the overall `config.sh` procedure, ISA IRQ value and SRAM address are stored in the files *dialogic.cfg*, *.bltirq*, and *.veclist* (all in */usr/dialogic/cfg*). But if you run `mkcfg` separate and apart from `config.sh`, the *.veclist* file is not set up properly. In this case, you must manually edit *.veclist* to change the SRAM IRQ value.

For the new configuration to take effect, enter the `dlstop` and `dlstart` commands. See Chapter 6, "Starting and Stopping the Dialogic System Service".

9.1.2. Checking Which Packages Are Installed

Ensure that you installed all of the packages that you need. For a list and description of all system release software packages, see Table 1, "Software Packages Installed", on page 23 and Table 2, "Software Package Descriptions", on page 23. To check which packages were installed, enter:

```
rpm -qa | grep DLGC
```

If you need to install any additional packages, rerun the `install.sh` script and select the additional package(s) you need.

9.1.3. Checking IRQ Selection

If a board does not start or does not respond, it may have been configured with an incorrect hardware interrupt level (IRQ). When the Dialogic drivers are being loaded, if the IRQ value is wrong or that IRQ is assigned to a PCI board, the SCbus time slot assignment program (*sctsassign*) hangs for several minutes. Although the system ultimately continues on through the bootup sequence with no indication of failure, when your program attempts to open the device, it will also hang.

To check IRQ assignment and assign a valid interrupt to Dialogic devices, use the following procedure:

1. To see the IRQs that are currently used on your system, enter the command:

   ```
   cat /proc/interrupts
   ```

   /proc/interrupts is a pseudo file system that maps IRQ lines to devices. The second column shows the number of interrupts that have been processed.

   If the second column of the line for the Dialogic driver indicates zero, then the IRQ selected for the Dialogic board is incorrect.

2. If step 1 revealed the IRQ for the Dialogic board to be incorrect, edit the files */usr/dialogic/cfg/.bltirq* and */usr/dialogic/cfg/.veclist* and designate a new IRQ.

   For information about IRQ selection, see Section 2.1.1, “General Guidelines for Installing Dialogic Hardware”, on page 5.

3. For the new setting to take effect, enter the `dlstop` and `dlstart` commands. See Chapter 6, “Starting and Stopping the Dialogic System Service”.

4. Repeat step 1 to verify that interrupts to the Dialogic board are being processed.

   Interrupts are needed for SCbus time slot assignment during Dialogic startup, so the Dialogic interrupt count must be greater than zero.

9.1.4. Checking Hardware

Ensure that each board is securely installed in its slot. Check that the correct cables are used and that they are connected properly.

For hardware testing information, see the *DM3 Diagnostic Utilities Reference Guide* (for DM3 boards) and the *Dialogic Universal Hardware Diagnostics Guide* (for SpringWare boards).

9.2. Troubleshooting BoardWatch

Table 10 lists common BoardWatch problems and suggested corrective actions.

Table 10. Troubleshooting BoardWatch

Problem	Corrective Action
Dialogic SNMP agent extension reports FAILED during the boot process.	Make sure the *admin* community exists and has read/write access for the local host. Dialogic system software must be started before the SNMP agent is started. If the system software has been shut down and restarted, then the SNMP agent must also be restarted.
Dialogic SNMP agent extension is running, but no entries appear in the tables.	The boards may not have been properly initialized. Check the board configuration and download logs for errors. A community that allows access to the Dialogic MIBs may not exist. If the management station is not collocated with the managed node, then use the manual configuration mode of the `dlgcsnmpconf` configuration tool to add a community that grants access to non-local host machines. (See Section 5.1.3, "Configuring SNMP Communities Manually", on page 105.) If the automatic configuration method was used, then a community called *dialogic* was created that allows access to the Dialogic MIBs.
A community exists that allows access to an external management station, but the station cannot contact the agent.	Check the community string on the external manager. It should match one of the configured communities of the SNMP agent created using the `dlgcsnmpconf` configuration tool.

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