Intel® Dialogic® System Release Version 5.1.1 Feature Pack 1 on PCI and CompactPCI for Microsoft* Windows NT/2000/XP on Intel® Architecture

Installation and Configuration Guide

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About This Information

The following topics provide information about this guide:

- Purpose
- Intended Audience
- How to Use This Information
- Related Information

Purpose

This guide provides information about installing Intel® Dialogic® System Release Version 5.1.1 Feature Pack 1 on PCI and CompactPCI for Microsoft* Windows NT/2000/XP on Intel® Architecture, configuring Intel Dialogic boards with the software, installing the BRI/2 ISDN network adapter driver, reserving TDM bus resources for third party devices, administration of the software, and installing and configuring the SCX160 SCxbus Adapter.

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, “Overview of the Installation and Configuration Procedures” describes the major installation and configuration steps in the order in which they are performed, giving an overview of the process.

- Chapter 2, “Intel® Dialogic® System Release 5.1.1 Installation Procedures” gives the procedure for installing System Release 5.1.1, which must be installed before you install Feature Pack 1. If you have already installed System Release 5.1.1, skip this chapter and go to **Chapter 3**.
- Chapter 3, “Intel® Dialogic® System Release 5.1.1, Feature Pack 1 Installation Procedures” gives the procedure for installing Feature Pack 1. You must install System Release 5.1.1 (refer to **Chapter 2**) before you install Feature Pack 1.
- Chapter 4, “Configuration Procedures” gives the full procedure to follow for each major configuration step.
- Chapter 5, “Administration Reference” provides information about starting and stopping the Intel Dialogic System, running demo programs, performance monitoring, and troubleshooting.
- Chapter 6, “Installing and Configuring the SCX160 SCxbus Adapter” provides instructions for installing and configuring the SCX 160 SCxbus Adapter in a multi-node system.
- Chapter 7, “Uninstalling the Software” tells you how to uninstall Intel® Dialogic® System Release 5.1.1, Feature Pack 1. You must uninstall Feature Pack 1 before uninstalling System Release 5.1.1.
- Chapter 8, “Technical Support” describes how to get help.

Related Information

For additional information about related installation and configuration publications, see the following sections:

- Online Bookshelf
- Online Help
- Release Information
- Hardware Installation
- Installation of Springware TAPI Service Provider
- Installation of Restricted Access Products

Online Bookshelf

The following installation and configuration information is available in the online bookshelf included with this release. You can access the online bookshelf by clicking the **Online Documentation** option from the **Intel Dialogic System Software** program group, and then clicking **Online Bookshelf**.

- *DM3 Configuration File Reference* provides instructions for editing configuration files and using the FCDGEN, DM3 PDK Config, and PDK Manager configuration utilities. It also provides reference information about DM3 configuration file parameters.
- *SNMP Agent Software for Windows Operating Systems Administration Guide* discusses the configuration and deployment of SNMP agent software (formerly called BoardWatch).

  NOTE: This document was formerly called the *BoardWatch User's Guide*. BoardWatch is now known as SNMP agent software. However, the name BoardWatch still appears as an option in the 5.1.1 installation.
- *GDK Installation and Configuration Guide* discusses the configuration of Intel Dialogic CP Fax products. (Note that you install GDK during installation of the Intel Dialogic System Software.)
- *SCX160 SCxbus Adapter User's Guide* provides an overview of the Intel Dialogic SCX160 SCxbus Adapter, defines the information required for configuring a multi-node system interconnected via the SCxbus, describes the functions used to control SCX160 SCxbus Adapter operations, provides error handling information, and describes the data structures used by the functions. (**Chapter 6** of this document covers installation and configuration of the SCX 160 SCxbus Adapter.)
- *Customization Tools for Installation and Configuration* explains how to develop customized installation and configuration routines.

Online Help

For detailed information about using the Intel Dialogic Configuration Manager (DCM) and understanding system level and certain board level configuration parameters, invoke the online help for DCM by clicking **Help** or pressing **F1** at any DCM window.

Release Information

For timely information that may affect installation and configuration, refer to the *Release Guide* and *Release Update*.

Hardware Installation

For more information about hardware installation, see the *Quick Install Card* shipped with each board.

NOTE: Antares boards are no longer supported.

Installation of Springware TAPI Service Provider

The Springware TAPI Service Provider (Gen2 TSP) software is installed with the Intel Dialogic System Software. If your system uses the **R2 CAS Protocols**, you must install the protocols from the Global Call Protocols CD-ROM, which is orderable from Customer Engineering. The *Readme* file found on that diskette provides installation instructions.

Installation of Restricted Access Products

Some of the software components on the Intel Dialogic System Software CD-ROM may have restricted access. Instructions for accessing these components will be provided by customer support as required.

1. Overview of the Installation and Configuration Procedures

1.1. Installation Procedures

This section provides a high-level overview of the installation procedures. The details are provided in Chapter 2, “Intel® Dialogic® System Release 5.1.1 Installation Procedures” and Chapter 3, “Intel® Dialogic® System Release 5.1.1, Feature Pack 1 Installation Procedures”.

To install Intel® Dialogic® System Release 5.1.1, Feature Pack 1, you must first install Intel Dialogic System Release 5.1.1. If you have already installed System Release 5.1.1, you can skip to the last step in the following procedure.

NOTE: If you have also installed Service Pack 1 (in addition to System Release 5.1.1), you can install Feature Pack 1 on top of it.

The first five steps in this procedure are covered in Chapter 2, “Intel® Dialogic® System Release 5.1.1 Installation Procedures”. The last step is covered in Chapter 3, “Intel® Dialogic® System Release 5.1.1, Feature Pack 1 Installation Procedures”.

1. Installing and Configuring the Hardware - This step provides a sequence of hardware configuration and installation tasks.
2. Determining Which Components to Install - This step involves reviewing the options available for the current release and deciding what you need before beginning the software installation. Links to general product information are provided to help you understand the options.
3. Saving Existing Configuration Data - If you’re upgrading from a previous release of the Intel Dialogic System Software, you can save your existing configuration data.
4. Uninstalling the Previous Version of the Software - If you’re upgrading from a previous release of the Intel Dialogic System Software, you must uninstall the previous version.
5. Installing Intel Dialogic System Release 5.1.1 Software - This step is required before you install Feature Pack 1.

NOTE: To install the software, you must have administrative privileges. Contact your network administrator to set up administrative privileges as required.

6. Installing Feature Pack 1 - This installation will overwrite existing files, so you must save any configuration files you may have changed and do not want overwritten before you proceed. After you install Feature Pack 1, you can go on to the configuration procedures.

1.2. Configuration Procedures

System level parameters and certain board level parameters are configured using the Intel Dialogic Configuration Manager (DCM). DCM provides a graphical user interface for viewing and modifying configuration data. The Intel Dialogic System uses this data to run the Intel Dialogic boards on your system.

The following list summarizes the configuration process (some steps may not apply to your configuration). The details are given in Chapter 4, “Configuration Procedures”.

1. Starting the Intel Dialogic Configuration Manager (DCM) - This step involves starting DCM and selecting the node you want to configure.
2. Selecting the DM3 Configuration Files - The first time you run DCM with DM3 boards in your system, you have to select configuration files. This step involves selecting and downloading the Product Configuration Description (PCD) and Feature Configuration Description (FCD) files. PCD and FCD configuration files must be downloaded to each DM3 board in your system. The purpose of the PCD file is to determine the software components your system will use. The purpose of the FCD file is to adjust the settings of the components that make up each product. For example, the FCD file contains instructions to configure network interface protocols.
3. Configuring and Installing Hardware Configurable Boards - This step involves using the DCM **Add Hardware Wizard** to enter a unique identifier for each hardware configurable board. As you assign an identifier to each board, you view the property sheet for the board. The property sheet gives you the parameter values to use when setting the jumpers and switches on the board prior to installing the board in your system.

NOTES: **1.** If you don't use the DCM-provided parameters when setting the jumpers and switches on these boards, you may not be able to successfully start the System Service.

2. Antares boards are not supported in Feature Pack 1.

4. Designating the Clock Source - This step involves using DCM to access the TDM Bus Configuration property sheet and setting the clock source. The source for clocking depends on the bus mode in which the system runs. The bus mode is determined by the capability of the devices installed in your system. The system automatically determines the bus mode on the basis of installed devices.
5. Setting the Encoding Method for DM3 E-1 Applications - This step involves changing the PCM encoding method to A-law for DM3 boards in E-1 applications.
6. Configuring Digital Network Interface Parameters (Springware Boards) - The digital network interface (DNI) parameter file, *Spandti.prm*, is an ASCII text file used by the Intel Dialogic System Software to initialize the firmware configuration for the front end of digital network interface Springware boards. If the default settings in *Spandti.prm* aren't appropriate for your application, you can change them.
7. Adjusting Voice Parameters (Springware Boards) - This optional step involves adjusting parameters in the *Voice.prm* file for signal delay adjustments, frequency shift keying (FSK), and silence compressed record. The *Voice.prm* file is downloaded to all Springware voice boards during the installation and configuration process.
8. Configuring DM3 IPLink Network Interface Connector - This step involves using DCM to access each board's Network property sheet and setting the following parameters: IPAddress, SubnetMask, TargetName, HostName, UserName, and GatewayIPAddress.
9. Modifying Other DCM Property Sheet Parameters - Within DCM, each board has a set of property sheets that display the board's configuration parameters, grouped together on tabs according to the type of board functionality they affect (version, network, TDM bus configuration, system, logical, telephony bus, driver, etc.).

   This optional step involves viewing and modifying additional parameters on the DCM property sheets.

10. Selecting Different DM3 Configuration Files - At the beginning of the configuration process, you downloaded Product Configuration Description (PCD) and Feature Configuration Description (FCD) files to each DM3 board in your system. If you need to select a different set of DM3 configuration files, follow this procedure.

    If the default settings in the FCD file are not appropriate for your configuration, you can modify the default settings. The *DM3 Configuration File Reference* provides instructions for modifying these parameters.
11. Verifying Device Names - This optional step consists of examining the *Voxcfg* file against the device name assignment rules.
12. Installing the BRI/2 ISDN Network Adapter Driver - To use the Intel Dialogic BRI/2 board as an ISDN network interface card and work with Windows dial-up networking applications, you must complete the procedures in this step.
13. Reserving TDM Bus Resources for Third Party Devices - This optional step uses the DCM's Add Hardware Wizard to reserve TDM bus resources, that is, time slots reservation and master/slave capabilities assigned to third party devices.
14. Configuring the H.323 Stack - This step allows you to modify the H.323 stack applicable to DM3 IPLink T-1 and E-1 boards that contain a network interface card.

2. Intel® Dialogic® System Release 5.1.1 Installation Procedures

If you have already installed Intel® Dialogic® System Release 5.1.1, skip to Chapter 3. If you have not installed System Release 5.1.1, follow the procedures in this chapter because you must install System Release 5.1.1 before installing Feature Pack 1.

The following information provides detailed procedures for each major step in the installation process:

1. Installing and Configuring the Hardware
2. Determining Which Components to Install
3. Saving Existing Configuration Data
4. Uninstalling the Previous Version of the Software
5. Installing Intel Dialogic System Release 5.1.1 Software

For an overview of the process, see Section 1.1, “Installation Procedures”, on page 1.

NOTES: **1.** To install the software, you must have administrative privileges. Contact your network administrator to set up administrative privileges as required.

2. Instructions for uninstalling System Release 5.1.1 are given in Chapter 7, “Uninstalling the Software”.

2.1. Installing and Configuring the Hardware

This section provides a sequence of hardware configuration and installation tasks to complete before you install the Intel Dialogic System Software. The topics covered in this section are as follows:

- Checking the Power and Cooling Requirements - tells where to find these requirements.

- Determining the Board Types - describes the different types of boards and explains how hardware configurable boards cannot be installed until after the Intel Dialogic System Software is installed because the Intel Dialogic Configuration Manager (DCM) must be used to determine the hardware interrupt level and base memory address parameters for these boards.
- Selecting the Slot Location in the Chassis - reminds you to make sure your chassis has enough slots for the boards you want to install.
- Configuring a Mixed CT Bus/SCbus System - gives guidelines for this type of system.
- Understanding the CT Bus - gives background information on CT Bus.
- Configuring and Installing BLT, PCI, and cPCI Boards - provides configuration and installation instructions for BLT, PCI, and cPCI boards.

  NOTE: Hardware configurable boards are not installed until **after** you install the Intel Dialogic System Software and run DCM. For this reason, the procedure for configuring and installing these boards is not given until later, in Section 4.3, "Configuring and Installing Hardware Configurable Boards", on page 46.
- Interconnecting Boards via CT Bus or SCbus - discusses how to interconnect the boards.
- Connecting to External Equipment - is a reminder to connect cables to external equipment at this point in the installation procedure if applicable to your board. Details on external cabling are given in the *Quick Install Card* provided with each board.

For more specific information about hardware switch and jumper settings, and connecting to external equipment, refer to the *Quick Install Card* provided with each board.

For a list of boards supported by the current release, refer to the *Release Guide* and *Release Update*.

NOTE: Antares boards are not supported in Feature Pack 1.

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 Intel Dialogic board for further information. Electrostatic discharge can damage your board.

The hardware configuration and installation procedure is different depending on the board type. Be sure to follow the correct procedure for your board.

NOTE: If you plan to use the SCX160 SCxbus Adapter, do not install the adapter at this time. First, perform all the hardware and software installation and configuration steps for all the nodes in your multi-node system. When you install the Intel Dialogic System Software, use the **Complete** install or make sure you select **SCx** during the **Custom** install. When you have successfully started the Intel Dialogic System on all nodes without the SCX160 SCxbus Adapter, proceed to Chapter 6, "Installing and Configuring the SCX160 SCxbus Adapter".

2.1.1. Checking the Power and Cooling Requirements

Before installing Intel 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 (go to *http://www.intel.com/design/network/products/telecom/index.htm* and search for the product).

2.1.2. Determining the Board Types

It is important to know the types of boards you'll be using because some are installed before you install the Intel Dialogic System Software and some are installed after the Intel Dialogic System Software. To determine the type of board you are installing, refer to the *Quick Install Card* accompanying the board.

The following types of boards are installed **before** the Intel Dialogic System Software:

- **BLT**: Board Locator Technology (BLT) boards are uniquely identified by means of a rotary switch on the board. Boards in this category interface to the host through the ISA bus.

  When you run DCM, it automatically detects BLT boards and synchronizes the stored configuration data with the boards it finds in the system.
- **PCI**: Peripheral Component Interconnect (PCI) boards are uniquely identified by means of their board ID using PCI bus technology. Boards in this category interface to the host through the PCI bus.

  When you run DCM, it automatically detects PCI boards and synchronizes the stored configuration data with the boards it finds in the system.
- **cPCI**: CompactPCI (cPCI) boards are uniquely identified by means of their board ID using cPCI bus technology. Boards in this category interface to the host through the cPCI bus.

  When you run DCM, it automatically detects cPCI boards and synchronizes the stored configuration data with the boards it finds in the system.

Hardware configurable boards are installed **after** the Intel Dialogic System Software. Hardware configurable boards are uniquely identified by means of their hardware interrupt level (IRQ), which is set with jumpers, and their base memory address, which is set with DIP switches. Boards in this category interface to the host through the ISA bus.

NOTE: You **must** use DCM to determine the hardware interrupt level and base memory address parameters for hardware configurable boards before you install them. If the values for these boards do not correspond to the values in DCM or if another device in the system is attempting to use the same interrupt, port, or address, the Intel Dialogic System will not start successfully.

For this reason, the configuration and installation procedure for these boards is given *after* the software installation procedure. It is covered in Section 4.3, “Configuring and Installing Hardware Configurable Boards”, on page 46.

2.1.3. Selecting the Slot Location in the Chassis

Be sure that your chassis has enough slots for each of the boards that you intend to install. Some boards (with daughterboards) require two slots to accommodate the extra width of the daughterboard(s).

With mixed H.100 (CT Bus)/SCbus systems, the location of boards within the chassis can be significant. For a discussion of hardware configuration in mixed systems, refer to Section 2.1.4, "Configuring a Mixed CT Bus/SCbus System", on page 9.

After considering the slot location issues, you can configure and install BLT, PCI, and cPCI boards as described in Section 2.1.6, "Configuring and Installing BLT, PCI, and cPCI Boards", on page 19. The configuration and installation of hardware configurable boards is not done until after you've installed the Intel Dialogic System Software and started DCM. Instructions for this are given in Section 4.3, "Configuring and Installing Hardware Configurable Boards", on page 46.

2.1.4. Configuring a Mixed CT Bus/SCbus System

This section provides guidelines for configuring a mixed SCbus/CT Bus (H.100) system. The following subjects are discussed:

- Board Placement
- Cabling
- Clock Master Selection and Location
- Cable Adapter
- Terminations

In this discussion, the following terminology is used to refer to different board types:

- H.100 boards with H.100 connectors (68-pin): **H**.100/**P**CI/**68**-pin, referred to as board type **HP68**
- SCbus boards with H.100 connectors: referred to as board type **SP68**
- SCbus boards with SCbus connectors (26-pin): referred to as board type **SP26**

Note that these board types are not officially recognized but merely created as identifiers for this discussion.

Board Placement

Use the following guidelines when selecting board slot locations within the chassis:

1. Place the SP26 boards (if any) in the PCI slots closest to the chassis ISA slots.

   If there are no ISA slots, then use the PCI slots toward the right side of the chassis, when viewed from the board faceplates, with the PCI/ISA backplane (or motherboard) oriented horizontally.
2. Place the HP68 boards in the next available PCI slots closest to the SP26 boards (to the left of the SP26 boards when viewed from the faceplates).
3. Place the SP68 boards (if any) in the next available PCI slots closest to the HP68 boards (to the left of the HP68 boards when viewed from the faceplates).

In addition, note the following:

- Be sure that your chassis has enough PCI (and ISA) slots for the boards that you intend to use. Some boards (with daughterboards) may consume the space of an adjacent board.
- A mixed H.100 (CT Bus)/SCbus (or H.100 only) system can have any combination of boards, up to 20 total.
- H.100 boards will **not** work with PEB-only boards or with SCbus/PEB boards operating in PEB mode.

Cabling

While the SCbus uses a 26-lead flat ribbon cable, the H.100 bus uses a 68-lead finer pitch flat ribbon cable. Also, new connectors are used on both the H.100 boards and the H.100 cables. The maximum length of the H.100 cable is 20 inches. (SCbus is 21 inches.)

Be aware of the following guidelines for cabling:

- An H.100 cable can have no more than 20 connectors (drops).

  The H.100 cables currently available come in 4, 8, 12, and 16 drop configurations, each drop 1.1 inches apart.

- The maximum length of a combined H.100 cable and SCbus cable (or H.100 cable alone in an H.100-only system) is 20 inches. In practice, this will be less due to the need for a cable adapter, discussed below.
- Ensure that no more than 7 inches of unconnected cable (5 unused drops on a standard Intel Dialogic H.100 cable) exists between any two boards. Rearrange the boards in your system and/or use a cable with fewer drops to meet this requirement.
- **Both ends** of an H.100 cable (and SCbus cable) must be connected to a device, for example, a board or a cable adapter.

Clock Master Selection and Location

The system's clock master is one of the boards in a system that is designated to provide reference timing for all boards attached to the H.100 bus (and/or SCbus). This board must derive timing from a digital network (for example, a T-1 or E-1 line), from a secondary reference (for example, the H.100 or H.110 CT_NETREF or SCbus SREF8K), or, as a last alternative, from its own local oscillator (that is, independent) on the board. For detailed information about bus clocking, see Section 2.1.5, "Understanding the CT Bus", on page 13.

Use the following guidelines for clock master selection and location:

- In the current release, any system that contains an SCbus-only board (such as Springware boards and v1.5 DM3 PCI boards) must operate in SCbus mode, even though you may have one or more H.100 compliant boards in your system. Because all boards in your system will therefore operate in SCbus mode, it is possible to designate any of these boards as the SCbus clock master.
- It is highly recommended that 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 system's clock master can do the following:
  - Derive timing from a digital network and/or secondary reference
  - Provide both H.100 core signals and compatibility bus signals.
- Typically, the clock master board is located at either end of the 68-lead H.100 cable. This is much more important for H.100 than it is for SCbus.

- In systems that include at least one board with a 26-pin (SCbus) connector, the HP68 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 location of the clock master is less important.

Cable Adapter

When configuring a mixed H.100 (CT Bus)/SCbus system that uses SCbus boards with the 26-pin SCbus connector, a transition adapter or cable adapter must be used. The CT Bus/SCbus Adapter, available from Intel, is a small printed circuit board that becomes part of the cable assembly. This 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.

Use the following guidelines for installing the CT Bus/SCbus Adapter:

- The HP68 board closest to the SP26 boards should be connected to the adapter if SP26 and/or ISA-based SCbus boards with the 26-pin SCbus connector are used in the system.

  Also, this same HP68 board should have termination enabled as discussed below; and it is highly recommended that this HP68 board also be designated as the system's clock master. (Another HP68 board could be the clock master, although it is best to source both SCbus and H.100 clocks from the board that uses the adapter.)
- As with all similar adapters, use of this device will reduce the total number of boards that can be reliably operated in a mixed system to less than 20.
- Use of this adapter may create a physical clearance problem with the side or top of some types of PC chassis.
- When installing the adapter onto a board with H.100 connectors, the proper orientation is such that the SCbus connector is to the side facing the ISA board slots (to the right when viewed from the board faceplates).
- Only one adapter should be used in order to preserve electrical signal integrity on the bus.

Terminations

Unlike SCbus, the H.100 CT Bus specification requires terminations for four signals on the bus. Terminations are enabled on boards located at **both ends** of the H.100 cable, but never in between the ends. Note that the board at the end of the SCbus cable (if used) opposite the cable adapter is never terminated.

Termination techniques may include physical jumpers and/or using a soft-jumper technique. Soft jumpering eliminates the need for a user to install physical jumpers by using programmable registers (to jumper these signals), controlled through a user interface.

Be aware of the following guidelines for terminations:

- The HP68 board nearest the chassis ISA bus (the furthest right when viewed from the board faceplates) should have termination enabled. Check the documentation supplied with your board to determine the appropriate method to terminate the H.100 bus.
- The last PCI board, which should be an SP68 board, must also be terminated.

  If no termination provisions exist on this board, then rearrange the boards within this group to allow you to do so.
- If no SP68 boards are used in the system, then the HP68 board furthest from the board with the first termination must also be terminated.

2.1.5. Understanding the CT Bus

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 (boards). Features include redundant clocking (H.100 and H.110) and the ability to stop, start, and remove individual boards without interrupting the operation of other boards sharing the bus (H.110 only).

This section covers the following topics:

- H.100/H.110 Bus Concepts
- Default Configuration
- Fault Recovery
- H.100/H.110 Bus Features

- Restrictions and Limitations

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. Figure 1 illustrates the CT Bus clocking concepts.

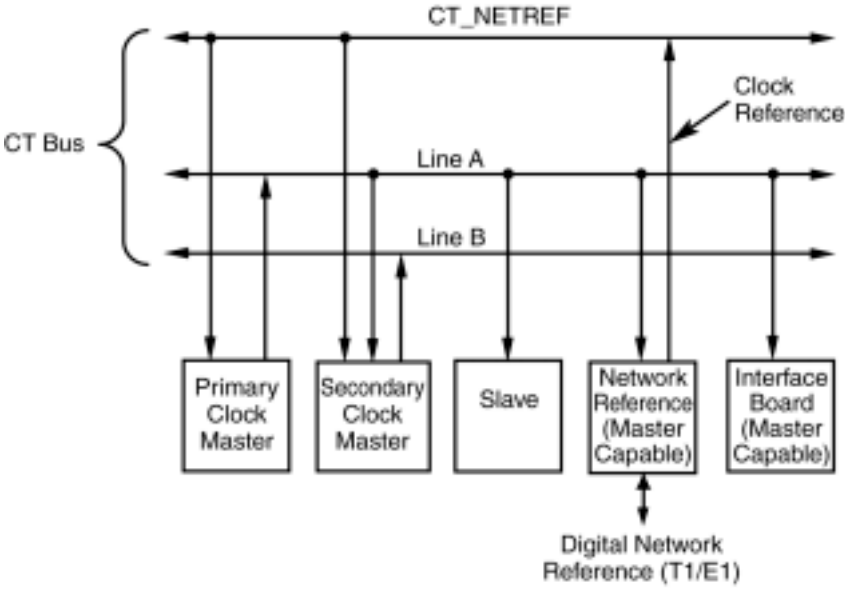


Figure 1. CT Bus Clocking

- **Clock Master(s)**: A Clock Master is a board that provides timing for all other boards connected to the bus. The H.100/H.110 Bus has two types of Clock Masters: Primary Clock Master and Secondary Clock Master.
  - **Primary 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 (recommended) 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).

- **Secondary Clock Master:** 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 lines 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 boards that are not Clock Masters are defined as (CT Bus) slaves. Slaves 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 FRU (field replaceable unit), also known as the **Network Reference**, is a 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.
- **CT_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 board 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. In the current

implementation, failure of a network interface on the NETREF FRU is not detected as a reference signal failure.

- **Compatibility Clocks**: The Compatibility Clocks are a feature of the H.100/H.110 CT Bus that enables H.100/H.110 boards to interoperate with SCbus boards 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 Intel® Dialogic® System 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 comprised 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:
  - 8 MHz (for H.110 CT Bus only), or
  - 4 MHz (for H.100 CT Bus interoperability with SCbus products, or for SCbus mode only)

Default Configuration

When the Intel Dialogic System is initiated, it performs a number of configuration tasks to set up an operating H.100 or H.110 Bus. This process includes the following tasks:

- One board is designated as the Primary Clock Master driving the Primary Line from its internal oscillator.
- Another board is designated as the Secondary Clock Master driving the Secondary Line from its internal oscillator.
- All boards on the bus, including the Primary Clock Master and Secondary Clock Master, derive timing from the Primary Line.
- The TDM Bus Type is set to H.100 or H.110, and the group clock rates are all set at 8 MHz. (If SCbus products are present, then the default clock rate is 4MHz.)

It is recommended that you derive clocking from a digital network trunk, if available, rather than the board's internal oscillator. For further details, see Section 4.4, "Designating the Clock Source", on page 50.

Fault Recovery

Failure of the Primary Clock Master or NETREF FRU is handled in the following ways:

- **Failure of Primary Clock Master**: If the Primary Clock Master fails, the boards 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.

Most of the steps that occur when setting up and recovering the H.100/H.110 CT Bus clocking scheme can be carried out explicitly by the user or automatically by the Intel Dialogic System Software. For example, the system automatically selects a Primary Clock Master, but this choice can be overridden by the user by changing the **Primary Master FRU** parameter in the Intel Dialogic Configuration Manager (DCM). For more information, see Section 4.4, "Designating the Clock Source", on page 50.

H.100/H.110 Bus Features

The current implementation supports the following H.100/H.110 CT Bus features:

- Automatic assignment of Primary Clock Master and Secondary Clock Master
- Bus mode support for:
  - H.100 (for PCI form factor)
  - H.110 (for cPCI form factor)

  - SCbus compatibility of H.100/H.110 running at 4 MHz
  - Pure SCbus
- Starting and stopping the Intel Dialogic System and individual boards locally through DCM and remotely through DCM or BoardWatch version 2.0
- Modification of all H.100/H.110 CT Bus configuration parameters through the DCM GUI
- Configuration of both Springware SCbus boards and DM3 PCI/cPCI boards in the same bus
- Starting, stopping, and removing a single H.110 board
- Automatic reassignment to Secondary Clock Master when Primary Clock Master is stopped
- Removing stopped CompactPCI boards from the bus with no effect on other running boards (for more information, refer to Section 5.6.2, “Replacing CompactPCI Boards”, on page 135).

Restrictions and Limitations

The current implementation is subject to the following restrictions and limitations with respect to the H.100/H.110 CT Bus:

- If all the boards in your system are capable of both A-law and µ-law, the default encoding method is µ-law; E-1 users must explicitly set A-law using the **Media Type** parameter through DCM. See Section 4.5, “Setting the Encoding Method for DM3 E-1 Applications”, on page 56.
- Each physical chassis can support only one physical TDM bus.
- When a stopped board is removed and replaced, it must be replaced with an identical model, which must be inserted into the same slot.
- Notification of Intel Dialogic System Software errors is generally limited to an indication that one or more errors occurred; additional information can be retrieved from the Windows Event Viewer.
- 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 (see Section 4.4, “Designating the Clock Source”, on page 50).

- 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).

2.1.6. Configuring and Installing BLT, PCI, and cPCI Boards

For information on identifying board types and determining when to install a type of board, refer to Section 2.1.2, "Determining the Board Types", on page 7.

This section provides the following information:

- Configuration Guidelines
- Installation Guidelines
- Installing Third-Party Network Interface Card (NIC) for DM3 IPLink Configurations
- Interconnecting Boards via CT Bus or SCbus

Configuration Guidelines

When you start Intel Dialogic boards, each board is assigned a sequential number for identification and use by the application program. The board number is based on the board ID that is set through a rotary switch on BLT, PCI, and cPCI boards:

- For BLT boards, the rotary switch setting determines the value of the **BLTId** parameter, which can be viewed through the **System** property sheet in DCM.
- For PCI/cPCI boards, the rotary switch setting determines the value of the **PciID** parameter, which can be viewed through the **System** property sheet in DCM.

For information about viewing these parameters on the DCM property sheets, see Section 4.9, "Modifying Other DCM Property Sheet Parameters", on page 70.

Set the board ID switches using one of the board sequencing methods as follows:

- **Geographical sequence (by PCI/cPCI bus and slot number)**: All Intel Dialogic PCI/cPCI boards can keep the factory default switch setting of board ID 0. Board numbers will be assigned in ascending order based on the PCI/cPCI bus and slot number. Note that, if you add a board to the system, it

could change the Intel Dialogic board numbering depending on the PCI/cPCI bus and slot number where you install it.

The geographical sequence method is not applicable to ISA bus boards.

- **Programmable sequence (by Intel Dialogic board ID)**: If you change the factory default switch setting of board ID 0 to any other number, the board numbering will be in ascending order based on the board ID. When the programmable sequence method is used, each board must have a **unique** switch setting. You should assign sequential numbers starting at 1.

  The programmable sequence method is used for all ISA bus boards and may also be used for PCI/cPCI bus boards.
- **Precedence in mixed systems**: In systems using both sequencing methods, PCI/cPCI boards that use geographical sequencing (board ID 0) will be numbered before boards that use programmable sequencing (unique board IDs.).

Installation Guidelines

Refer to the *Quick Install Card* provided with each board for detailed information about switch settings and installing the boards in your system. Note the following:

- **BRI/2 Boards** - When installing multiple BRI/2 boards in a Windows 2000 system, install only one board at a time. Then, after installing the Intel Dialogic System Software, install the ISDN network adapter driver for that board. Instructions for this are provided in Section 4.12, “Installing the BRI/2 ISDN Network Adapter Driver”, on page 86.
- **DM3 IPLink Boards** - When installing DM3 IPLink boards, be sure to install the third-party Network Interface Card (NIC) and Intel Dialogic Public Switched Telephone Network (PSTN) interface Springware board if required for your configuration. Refer to the following for more information:
  - Installing Third-Party Network Interface Card (NIC) for DM3 IPLink Configurations
  - Interconnecting Boards via CT Bus or SCbus.
- **PCI and cPCI Boards** - When scanning the bus, Windows 2000 uses an *inf* file to correlate a discovered device with a driver binary file that would be loaded for the scanned device. In this case, you need to direct the system to the *inf* file. The *inf* file makes the system aware of the name and manufacturer of the Intel® Dialogic board. The *inf* file also keeps track of the board in the

device manager. If you don't point the system to the *inf* file, a **Found New Hardware Wizard** will appear every time you reboot your computer. The procedure is given in Section 5.6.4, "Installing a DM3 PCI or CompactPCI Board on a Windows 2000 System", on page 142.

After the boards are installed (and NIC or PSTN interface, if needed), continue with the instructions in Section 2.1.7, "Interconnecting Boards via CT Bus or SCbus", on page 21.

Installing Third-Party Network Interface Card (NIC) for DM3 IPLink Configurations

A third-party Network Interface Card (NIC) is required for any system containing DM3 IPLink boards to maintain the connection between the DM3 IPLink board and the IP network. Although the DM/IPLink-T1_NIC and DM/IPLink-E1_NIC boards provide their own NIC functionality, a third-party NIC installed in the same host is still required. The Intel Dialogic System Software employs this additional NIC to verify the integrity of the built-in NIC.

Follow the instructions included with the NIC to install the board in your system. Connect the NIC to a 10Base-T network using TCP/IP.

You also have to set the **Network** property sheet parameter when you run DCM. This step is discussed in Section 4.8, "Configuring DM3 IPLink Network Interface Connector", on page 69.

2.1.7. Interconnecting Boards via CT Bus or SCbus

In order for the Intel 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 other Intel Dialogic boards, determine whether they have H.100 connectors or SCbus connectors. To determine which connector your board uses, consult the *Quick Install Card* included with your board.

Connect the boards as follows:

- **All boards that have H.100 connectors**: Connect the boards with a CT Bus cable.

- **All boards that have SCbus connectors**: Connect the boards with an SCbus cable.

For a **mixed chassis**, additional cabling is required:

- **PCI SCbus boards with ISA SCbus boards**: In a PCI/ISA mixed chassis, 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 Intel.
- **PCI CT Bus boards with SCbus boards**: When combining CT Bus and SCbus products within the same chassis, a CT Bus/SCbus Adapter is needed to connect the two buses together. The CT Bus/SCbus Adapter, available from Intel, is a small printed circuit board that becomes part of the cable assembly. This 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*.

For a discussion of hardware configuration in mixed systems, including use of the CT Bus/SCbus Adapter, refer to Section 2.1.4, “Configuring a Mixed CT Bus/SCbus System”, on page 9. Additional information about cabling may be found on the Intel® Networking & Communications Telecom Support Resources Web site in the document *Cabling Issues in a PCI and Mixed ISA/PCI System* (*http://resource.intel.com/telecom/support/tnotes/tnbyos/winnt/tn206.htm*).

2.1.8. Connecting to External Equipment

Refer to the *Quick Install Card* provided with each board for detailed information about connecting the board to external equipment, for example, to a Channel Service Unit (CSU) or Digital Service Unit (DSU).

When your hardware installation and cabling is complete (except for installing hardware configurable boards, which comes later), continue with the instructions in Section 2.2, “Determining Which Components to Install”, on page 23.

2.2. Determining Which Components to Install

During the install, you'll be asked to choose one of four setup options. The following sections describe each of these options:

- Typical Installation
- Complete Installation
- Compact Installation
- Custom Installation

Review this section now, and refer to it while you are installing the Intel Dialogic System Software.

2.2.1. Typical Installation

Typical installs options that support Springware products and includes the development library and sample programs. **Typical** does not include DM3 products or the other products listed under **Complete**.

Typical includes the following items:

Drivers, Firmware & Configuration Files - These programs are necessary for Intel Dialogic board(s) to operate in your system.

Development SDK- The library provides source (*.C), header (*.H), and library (*.LIB) files to provide telephony functions for your applications.

Sample Programs - These programs provide a means to test the functionality of the platform.

Springware TAPI Service Provider - The Telephony API service provider for Springware. Springware is the embedded software that provides the signal processing features available on Intel Dialogic voice and intelligent network interface boards.

NOTE: You must activate the Springware TAPI Service Provider (Gen2 TSP) and the WAVE Driver before using the Gen2 TSP. Activate the TAPI Service Provider through the Telephony applet in the Control Panel. Activate the

WAVE Driver through the Multimedia applet in the Control Panel. For more information, see the online help for the Springware TSP Configuration Reference, in *C:\winnt\system32\d41mt.hlp* or *C:\Program Files|Dialogic\lib\d41mt.hlp*.

Online Documentation - Installs documentation on your local drive unless you choose to use it from the CD-ROM. The documentation is in PDF format. To access it, you will need to install Adobe Acrobat Reader (v3.01 or later). A version of the Adobe Reader is available on the CD. For the latest version, visit Adobe's Web site at *http:\\www.adobe.com*.

2.2.2. Complete Installation

Complete installs everything. In addition to the items listed above under Section 2.2.1, "Typical Installation", on page 23, **Complete** installs the following items (listed alphabetically):

BoardWatch - This provides remote (or local) monitoring and limited control of Intel Dialogic boards over an IP network using Simple Network Management Protocol (SNMP). For more information, go to *http://www.intel.com/network/csp/products/4443web.htm*.

NOTE: BoardWatch is now known as SNMP agent software. When you install Feature Pack 1, the information about using SNMP agent software is documented in the *SNMP Agent Software for Windows Operating Systems Administration Guide*.

BRI - This option supports the Intel Dialogic Basic Rate Interface (BRI) products, which incorporate a variety of analog devices like local 2500-type telephones, modems, and fax machines into SCbus-based CT systems. Select this option if you plan to use BRI/PCI and BRI/SC boards.

Continuous Speech Processing (CSP) - This option supports CSP for Springware. CSP consists of software and firmware features for Intel Dialogic communications boards which, when packaged with open, computing platforms, support high-performance, speech-enabled applications.

DM3 Component Selection - These options support DM3 products. DM3 is a flexible CT architecture that allows developers to rapidly adapt to changing technologies and market demands.

You will be prompted to choose DM3 technologies:

- **IPLink** - This component downloads the firmware needed for IPLink digital boards. The DM3 IPLink product, a proven, high-performance, open development platform, supports the H.323 standard for communication across Internet Protocol (IP) networks and a wide variety of vocoder algorithms. For more information about IPLink, go to *http://www.intel.com/network/csp/products/3940web.htm*.
- **QuadSpan** - Select this component for all DM3 QuadSpan and DualSpan (Media Span) technologies and features, including ISDN, CSP, and conferencing. There is no need to select the ISDN and CSP packages separately - those are specific to Springware. For more information, go to *http://www.intel.com/design/network/products/telecom/index.htm#boards.*
- **DM3Fax** - Select this component for DM3 Fax boards. For more information, go to *http://www.intel.com/design/network/products/telecom/boards/mediaprocessing.htm*.
- **HDSI** - Select this component for HDSI (High Density Station Interface) boards. HDSI Series Modular Station Interface products incorporate a variety of analog devices, such as local 2500-type touchtone telephones, modems, and fax machines, into CT systems that are based on the open, industry-standard CT Bus architecture.
- **Integrated Products** - This family of products provides an optimized mix of trunk, station and media resources on which to build converged communication platforms for switching applications.

GDK - This option supports GDK, the GammaLink Developer's Kit. GDK consists of a fax channel and communication software, which provides many features and capabilities for fast, convenient fax transactions. The GDK system software provides the subsystems required to develop a fax application with some boards.

Global Call API Package - Global Call development software provides a common signaling interface for network-enabled applications, regardless of the signaling protocol needed to connect to the local telephone network. You must select this

option if you are using DM3 products. For more information about Global Call software, go to *http://www.intel.com/network/csp/products/2557web.htm*.

NOTE: If you plan to use TAPI Service Provider or the Standalone Fax demo or Synchronous Multithreaded demo, you *must* install the Global Call API Package via the **Complete** or the **Custom** install.

ISDN Package - These files provide support for ISDN (for Springware). You will be prompted to select the ISDN protocols you want to install. The options are 1TR6, 4ess, 5ess, Ctr4, DASS2, DMS, ETN, ETU, NE1, NI2, NT1, NTT, TPH, VN, TPHNT, VNNT, QNT, QTE, QTN, and QTU.

Performance Monitors - This enables you to monitor the performance of Intel Dialogic boards using the Windows NT Performance Monitor. For more information, refer to Section 5.4, “Performance Monitoring”, on page 122.

SCx - This option provides support for the SCxbus Adapter. For more information, refer to Chapter 6, “Installing and Configuring the SCX160 SCxbus Adapter” or go to *http://www.intel.com/network/csp/products/2335web.htm*.

Third Party Support - This option installs Third Party Support software, which allows the Intel Dialogic Configuration Manager (DCM) to reserve TDM bus resources for third party use.

NOTE: Although Third Party Support software is included as an option in the System Release 5.1.1 installation procedure, the Third Party Support files will be deleted when Feature Pack 1 is installed. Feature Pack 1 transitions Third Party Support functionality to the DCM’s Add Hardware Wizard. Refer to Section 4.13, “Reserving TDM Bus Resources for Third Party Devices”, on page 99 for more information.

2.2.3. Compact Installation

Compact installs only the following (a basic runtime environment):

Drivers, Firmware & Configuration Files - These programs are necessary for your Intel Dialogic board(s) to operate in your system.

2.2.4. Custom Installation

Custom lets you choose the software components to install. When you select **Custom**, the **Typical** options (refer to Section 2.2.1, "Typical Installation", on page 23) already are selected because most are required options. **Sample Programs** is optional and **Online Documentation** is optional but strongly recommended.

NOTE: Selecting all the options during a **Custom** installation is equivalent to doing a **Complete** installation.

All the options listed in Section 2.2.2, "Complete Installation", on page 24, are available for you to select during a custom install. Refer to the descriptions in "*Complete Installation"* for information on all the options.

NOTE: Although the options **Antares** and **IPLink Analog** appear during the System Release 5.1.1 **Custom** installation, these products are not supported in Feature Pack 1.

2.3. Saving Existing Configuration Data

If you want to save existing configuration data from a previous release of the Intel Dialogic System Software, follow these steps:

1. Identify the directories containing the following files (the default location is *\Program Files\Dialogic\Data*):
   - **.prm*
   - **.config*
   - **.fcd*

2. Copy the files you located in step 1 to a disk or to any directory that is **not** a subdirectory of the Intel Dialogic installation directory (the default installation directory is *\Program Files\Dialogic*).

3. If an old version of the System Software is installed on your system, uninstall it according to the procedures in Section 2.4, "Uninstalling the Previous Version of the Software", on page 28.

4. Install the new release of the Intel Dialogic System Software according to Section 2.5, “Installing Intel Dialogic System Release 5.1.1 Software”, on page 30.

   NOTE: Do not run DCM until you complete the rest of this procedure.

5. Copy the files you preserved in step 2 above to the corresponding subdirectories in the new installation.

   The procedure for integrating previous board configuration data with DCM is now complete.

Continue the configuration process with Chapter 4, “Configuration Procedures”, which describes the use of DCM.

2.4. Uninstalling the Previous Version of the Software

To uninstall an existing version of the software:

1. If the Intel Dialogic System is currently running, close all telephony applications that are currently running in the system and stop the Intel Dialogic system service. The system service is stopped using the Intel® Dialogic® Configuration Manager (DCM) . From the DCM main window, click the **Stop System** option from the System pull-down menu or click the **Stop All Enabled Devices** icon.

2. Uninstall any Point Releases and Service or Feature Packs before uninstalling the System Release (if none of these are installed, skip to the next step). You can uninstall these in either of the following ways:

   - **Add/Remove Programs:** Go to the Control Panel and select **Add/Remove Programs**. In the list of currently installed programs, select the name of the Point Release or Service or Feature Pack (refer to Table 1 for names) and click the **Remove** button.

NOTES: **1.** Some programs will not be listed in Add/Remove Programs. You must remove these via the Start menu. See Table 1 for details.

2. If you have installed System Release 5.1.1, Service Pack 1, you can install Feature Pack 1 on top of it.

- **From the Start menu:** Start > Programs > Dialogic System Software > [*name of the Point Release or Service or Feature Pack*] > [*sometimes a name here*] Uninstall

Table 1. Names of Point Releases, Service Packs, and Feature Packs

Name	How to Uninstall
System Release 5.1, Service Pack 1	Add/Remove Programs or from Start menu
5.02 for Windows	From Start menu
5.01 Win Point Release	From Start menu

3. You can uninstall the System Release software using either of the following methods:
   - **Add/Remove Programs:** Go to the Control Panel and select **Add/Remove Programs**. In the list of currently installed programs, select the name of the System Release and click the **Remove** button.
   - **From the Start menu:** Start > Programs > Intel Dialogic System Software > Uninstall

NOTE: In System Release 5.1 and older, the software name is “Dialogic System Software” in the Start menu.

4. Follow the prompts from either tool to uninstall the software.
5. When the uninstall process has completed, reboot the system.
6. Remove any subdirectories or files that may remain in the **Dialogic** program directory.
7. Check the registry and delete any leftover entries. At a minimum, you should make sure that HKEY_LOCAL_MACHINE\SOFTWARE\DIALOGIC has been removed.

To install the new version of the Intel Dialogic System Software, use the procedure in Section 2.5, “Installing Intel Dialogic System Release 5.1.1 Software”, on page 30.

2.5. Installing Intel Dialogic System Release 5.1.1 Software

If you have not already reviewed Section 2.2, “Determining Which Components to Install”, on page 23, please do so now and refer to it during the following installation procedure.

NOTE: If you are going to do a silent installation on a Windows NT 4.0 machine, check to see if *msvcrt.dll* is version 5 or less. This DLL file is located in the winnt\system32 directory under the drive on which Windows resides. To check, right click on the file name, select **Properties**, and select the **Version** tab. If *msvcrt.dll* is version 5 or less, you must run *VC60redist.exe* (located on the Intel Dialogic System Software CD-ROM) and reboot the system before you proceed with the install.

VC60redist.exe updates the MFC (Microsoft Foundation Classes) 6.2 runtime files, along with the redistributable DLLs, for Visual C/C++ 6.0 to make them compatible with the Intel Dialogic System Software. If you do a manual install as described below, the Setup program will check the version and prompt you to run *VC60redist.exe* if necessary.

To install the Intel Dialogic System Release 5.1.1 software, follow these steps:

1. Exit all other programs you may have running.

2. Insert the Intel Dialogic System Release 5.1.1 software CD-ROM in your system.

3. If the installation process does not start automatically when you insert the CD-ROM, locate the *Setup.exe* program on the CD-ROM and double-click it.

   NOTE: If you are running Terminal Services on Windows 2000, you must put a terminal server in install mode before you install a program. To do this, you must use **Add/Remove Programs** in the **Control Panel**. For full instructions on how to do this, refer to Section 5.6.3, “Installing the Intel® Dialogic System Software with Terminal Services Running on Windows 2000”, on page 138.

   The installation process displays a series of windows prompting you to make selections for the installation options. The **Setup Options** dialog box

(Figure 2) gives several setup options: **Typical**, **Complete**, **Compact**, and **Custom**.

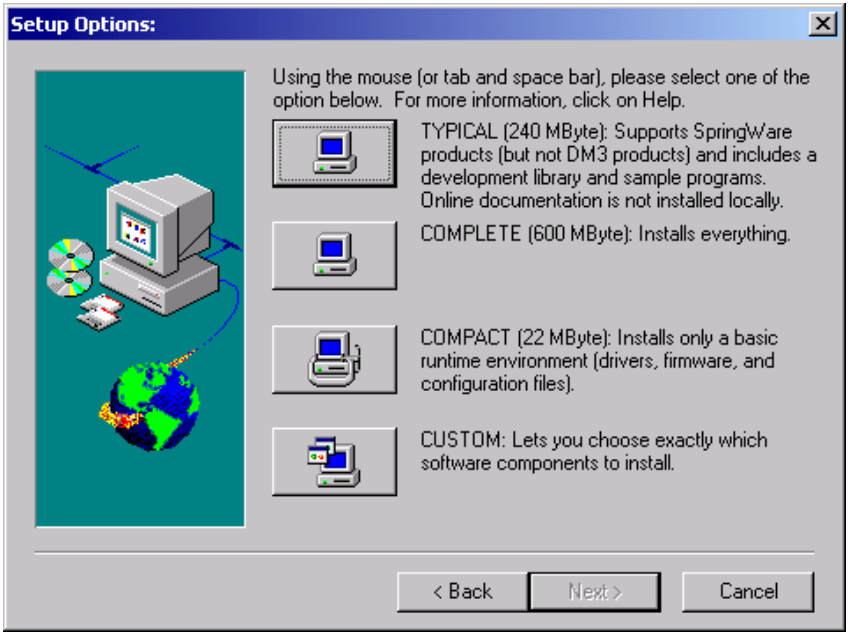


Figure 2. Setup Options

For a description of what is included in each of these options and guidelines for selecting them, refer to Section 2.2, “Determining Which Components to Install”, on page 23.

4. Select **Typical, Complete, Compact,** or **Custom** on the **Setup Options** dialog box (Figure 2). For more information on each option, refer to the following:
   - Section 2.2.1, “Typical Installation”, on page 23
   - Section 2.2.2, “Complete Installation”, on page 24
   - Section 2.2.3, “Compact Installation”, on page 26
   - Section 2.2.4, “Custom Installation”, on page 27

5. Follow the instructions provided by the installation screens. The screens you see will vary based on the setup option and subsequent options you choose. For help at any time during the installation process, click **Help** or press **F1**.

   Near the end of the installation process, you'll see the **Please Make Your Selection Now** screen (Figure 3).

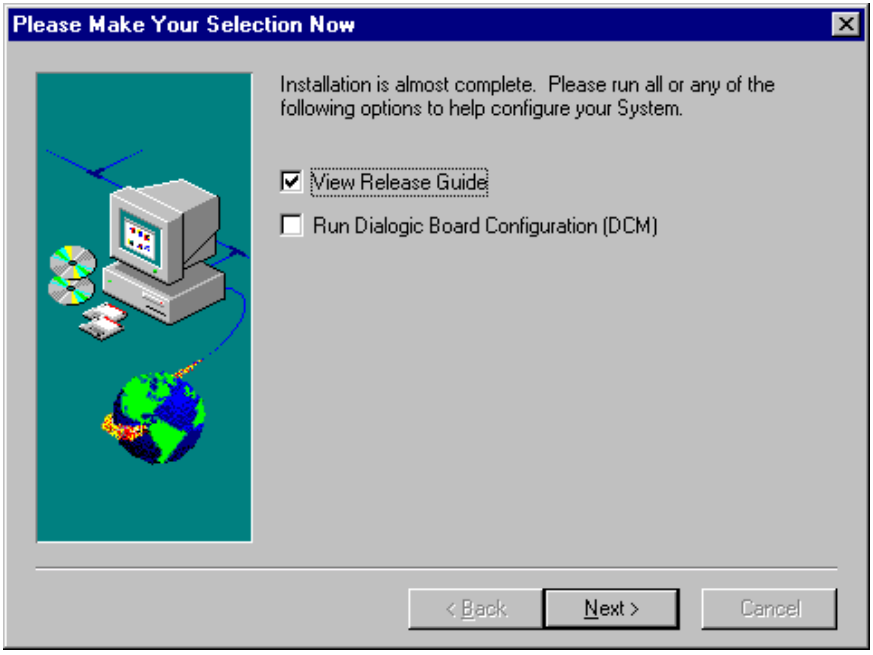


Figure 3. Please Make Your Selection Now (Setup Finish Options)

6. Select View *Release Guide* if you want to refer to it now (you can refer to it later from the Start menu as follows: **Start > Programs > Intel Dialogic System Software > Release Guide**).

   Although it is possible to choose to run the Intel Dialogic Configuration Manager (DCM) now, do *not* choose this option. You *must* reboot your computer first. You can run DCM later from the Start menu as follows: **Start >**

Programs > Intel Dialogic System Software > Configuration Manager - DCM.

7. Click **Next**. The **Reboot Windows** screen will appear.

8. Reboot your computer by selecting **Yes** and clicking **Finish** on the **Reboot Windows** screen.

9. If you saved configuration information from a previous System Release, complete the procedure outlined in Section 2.3, “Saving Existing Configuration Data”, on page 27.

10. Start the configuration process with Chapter 4, “Configuration Procedures”, which describes the use of DCM.

3. Intel® Dialogic® System Release 5.1.1, Feature Pack 1 Installation Procedures

If you have not yet installed Intel Dialogic System Release 5.1.1, go back to Chapter 2, “Intel® Dialogic® System Release 5.1.1 Installation Procedures” because you must install System Release 5.1.1 before installing Feature Pack 1.

NOTE: If you have installed Service Pack 1 (in addition to System Release 5.1.1), you can install Feature Pack 1 on top of it.

The following information provides detailed procedures for each major step in the installation process:

1. Saving Existing Configuration Data
2. Installing Feature Pack 1

For an overview of the process, see Section 1.1, “Installation Procedures”, on page 1.

NOTES: **1.** To install the software, you must have administrative privileges. Contact your network administrator to set up administrative privileges as required.

2. Instructions for uninstalling Intel Dialogic System Release 5.1.1, Feature Pack 1 and Intel Dialogic System Release 5.1.1 are given in Chapter 7, “Uninstalling the Software”.

3.1. Saving Existing Configuration Data

If you want to save existing configuration data, follow these steps:

1. Identify the directories containing the following files (the default location is *\Program Files\Dialogic\Data*):
   - **.prm*

- **.config*
- **.fcd*

2. Copy the files you located in step 1 to a disk or to any directory that is **not** a subdirectory of the Intel Dialogic installation directory (the default is *\Program Files\Dialogic*).

3. Document any DCM settings you want to preserve.

4. Install Feature Pack 1 according to Section 3.2, “Installing Feature Pack 1”, on page 36.

   NOTE: Do not run DCM until you complete the rest of this procedure.

5. Copy the configuration files you preserved in step 2 to the corresponding subdirectories in the new installation.

6. Proceed with Chapter 4, “Configuration Procedures”, which describes the use of DCM. Reset the DCM configuration settings preserved in in step 3 by following the procedure described inSection 4.9, “Modifying Other DCM Property Sheet Parameters”, on page 70 .

3.2. Installing Feature Pack 1

NOTE: If you are going to do a silent installation on a Windows NT 4.0 machine, check to see if *msvcrt.dll* is version 5 or less. This DLL file is located in the winnt\system32 directory under the drive on which Windows resides. To check, right click on the file name, select **Properties**, and select the **Version** tab. If *msvcrt.dll* is version 5 or less, you must run *VC60redist.exe* (located on the Intel Dialogic System Software CD-ROM) and reboot the system before you proceed with the install.

VC60redist.exe updates the MFC (Microsoft Foundation Classes) 6.2 runtime files, along with the redistributable DLLs, for Visual C/C++ 6.0 to make them compatible with the Intel Dialogic System Software. If you do a manual install as described below, the Setup program will check the version and prompt you to run *VC60redist.exe* if necessary.

To install Intel Dialogic System Release 5.1.1, Feature Pack 1, follow these steps:

1. Exit all other programs you may have running.

2. Insert the Intel Dialogic System Release 5.1.1, Feature Pack 1 CD-ROM in your system.

3. If the installation process does not start automatically when you insert the CD-ROM, locate the *Setup.exe* program on the CD-ROM and double-click it.

   NOTE: If you are running Terminal Services on Windows 2000, you must put a terminal server in install mode before you install a program. To do this, you must use **Add/Remove Programs** in the **Control Panel**. For full instructions on how to do this, refer to Section 5.6.3, "Installing the Intel® Dialogic System Software with Terminal Services Running on Windows 2000", on page 138.

4. The installation process displays windows prompting you to accept the **License Agreement** and accept default or supply new **Customer Information**. When you click **Next** on the **Start Copying Files** screen, the Feature Pack 1 installation will begin.

5. At the end of the installation process, the **InstallShield Wizard Complete** screen will appear. Reboot your computer by selecting **Yes, I want to restart my computer now** and clicking **Finish** on this screen.

6. Start the configuration process with Chapter 4, "Configuration Procedures", which describes the use of DCM.

4. Configuration Procedures

The following information provides detailed procedures for each major step in the configuration process (some steps may not apply to your configuration):

1. Starting the Intel Dialogic Configuration Manager (DCM)
2. Selecting the DM3 Configuration Files
3. Configuring and Installing Hardware Configurable Boards
4. Designating the Clock Source
5. Setting the Encoding Method for DM3 E-1 Applications
6. Configuring Digital Network Interface Parameters (Springware Boards)
7. Adjusting Voice Parameters (Springware Boards)
8. Configuring DM3 IPLink Network Interface Connector
9. Modifying Other DCM Property Sheet Parameters
10. Selecting Different DM3 Configuration Files
11. Verifying Device Names
12. Installing the BRI/2 ISDN Network Adapter Driver
13. Reserving TDM Bus Resources for Third Party Devices
14. Configuring the H.323 IP Stack

For an overview of the process, see Section 1.2, “Configuration Procedures”, on page 2.

NOTE: To use DCM, you must have administrative privileges on your local computer and on any remote computer you connect to. Contact your network administrator to set up administrative privileges as required.

4.1. Starting the Intel Dialogic Configuration Manager (DCM)

To start DCM, follow these steps:

1. Access the Intel Dialogic Configuration Manager (DCM). From the **Start** menu, select **Programs > Intel Dialogic System Software > Configuration Manager-DCM.**

2. From the DCM main screen, click on the Help button and select About Configuration Manager. Look for "Intel Dialogic System Software" and verify the system release installed. See Figure 4.

Figure 4. Verifying the System Release

3. When DCM starts, specify the computer to connect to in the **Computer Name** dialog box (Figure 5). It will display automatically the first time you run DCM. If the **Computer Name** dialog box isn't already displayed, you can get it by selecting the **Connect** option from the **File** pull-down menu or by clicking the **Connect** icon on the DCM Main Window.

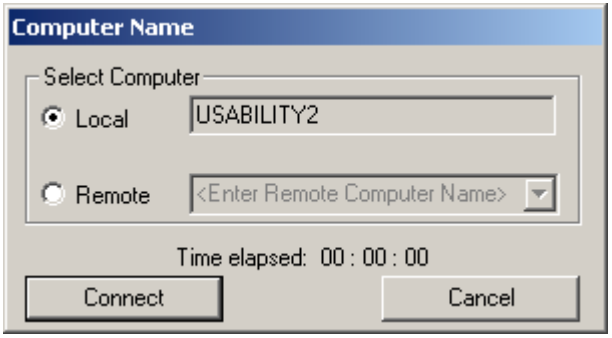


Figure 5. Computer Name Dialog Box - Local

4. The local computer name is displayed by default. To connect to the local computer, click **Connect**. To connect to a remote computer, select the **Remote** radio button (Figure 6), enter the remote computer name, and click **Connect**. For TCP/IP networks, you can enter the IP address instead of the remote computer name.

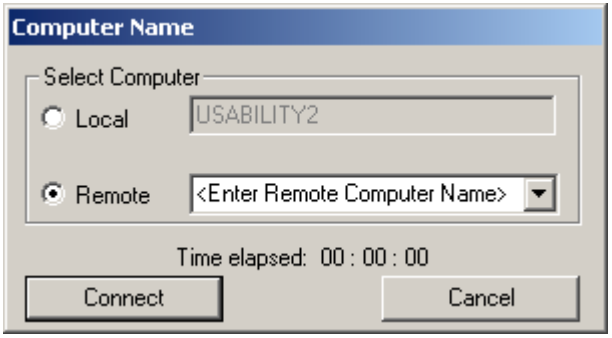


Figure 6. Computer Name Dialog Box - Remote

NOTE: The Intel Dialogic System uses DCOM objects to run Intel Dialogic software on remote computers. The Intel Dialogic software internally sets up the DCOM security level programmatically. Do *not* use the

Windows DCOM configuration utility *dcomcnfg.exe* to change the security settings. If you do, the Intel Dialogic System may not work properly.

After you connect to a computer, a window will appear that indicates that boards are being detected. Then the **Assign Firmware File** dialog box (Figure 7) appears.

NOTE: The Assign Firmware File dialog box only appears if DM3 boards are installed in the system. It will not appear if only Springware boards are installed.

Now you can select the configuration files. For details, refer to Section 4.2, "Selecting the DM3 Configuration Files", on page 43.

4.2. Selecting the DM3 Configuration Files

Two configuration files, a Product Configuration Description (PCD) file and a Feature Configuration Description (FCD) file, must be downloaded to each DM3 board in your system. The purpose of the PCD file is to determine the software components your system will use. The purpose of the FCD file is to adjust the settings of the components that make up each product. For example, the FCD file contains instructions to configure network interface protocols. Each PCD and FCD file for a configuration has the same name; only the extensions (*.pcd* and *.fcd*) differ.

For reference information about DM3 configuration files, including configuration files applicable to each DM3 board, see the *DM3 Configuration File Reference*. This document provides instructions for editing configuration files if the default settings in the FCD file are not appropriate for your configuration.

If you are configuring DM3 IPLink T-1 and E-1 boards that contain a network interface card (NIC), refer to section Section 4.14, "Configuring the H.323 IP Stack", on page 105 before stating this procedure.

NOTE: The following procedure applies to selecting configuration files **the first time you run DCM** with a DM3 board in your system. If you want to select different configuration files (PCD and FCD files) later, follow the procedure in Section 4.10, "Selecting Different DM3 Configuration Files", on page 72.

The first time you run DCM with a DM3 board in your system, the **Assign Firmware File** dialog box appears (Figure 7). The system will download the DM3 board with the PCD and FCD files corresponding to the configuration name you select.

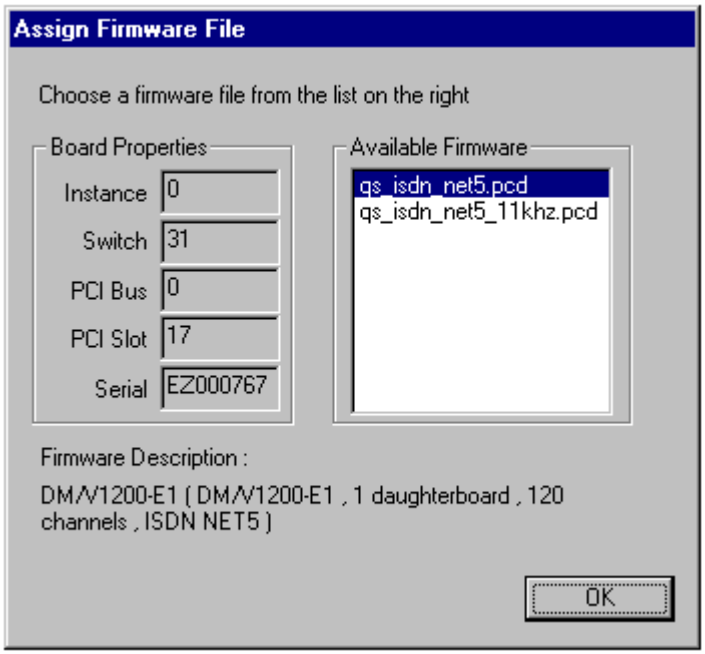


Figure 7. Assign Firmware File Dialog Box

1. Select the configuration file name corresponding to the board you are configuring and the functionality you require.

2. Click the **OK** button. The **PCDFileName** parameter will be assigned the filename you selected. In addition, the **FCDFileName** parameter also will be assigned the same filename, but with an *.fcd* extension.

3. Repeat the process for each DM3 board in your system.

When no more DM3 boards are detected, the DCM Main Window appears (Figure 8).

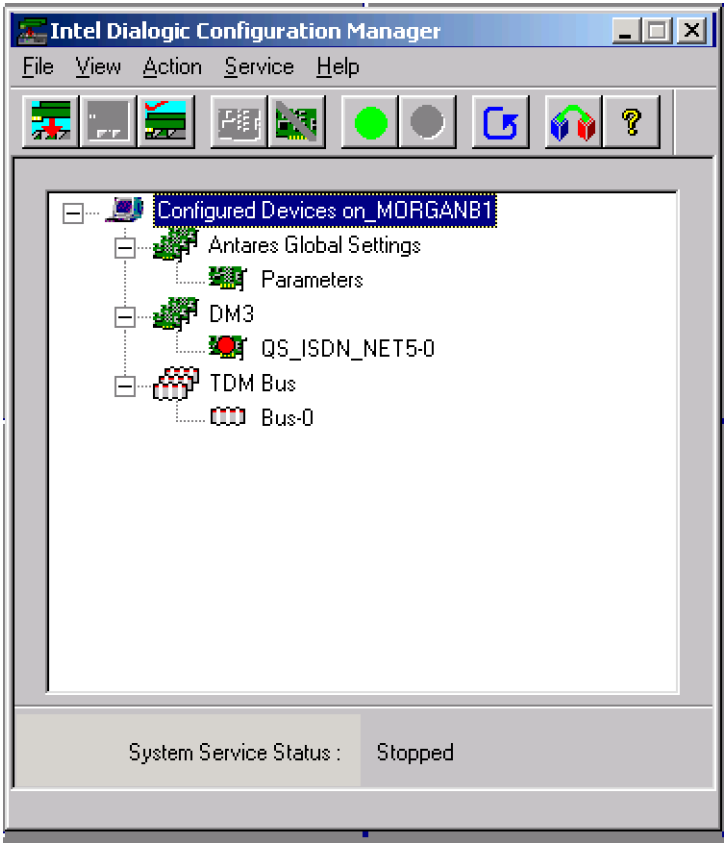


Figure 8. DCM Main Window

NOTE: Antares is not supported in this release.

When DCM starts, the DCM Main Window displays the boards installed in your system in a tree structure. This display is for the computer you specified using the **Computer Name** dialog box (Figure 5, “Computer Name Dialog Box - Local”, on

page 42 or Figure 6, “Computer Name Dialog Box - Remote”, on page 42). The top branch of the tree structure, Configured Devices on..., includes the name of the computer you connected to. If you entered an IP address in the **Computer Name** dialog box, the IP address is shown instead of the computer name.

The first level of the tree structure shows the board families or categories of Intel Dialogic boards currently installed in your system, and also shows the TDM bus, which refers to the resource bus used to carry information between boards. The next level displays the model names of the boards in your system. If the board model names are not displayed, click the family name node(s) to expand the tree structure.

Now that you selected the configuration files for the boards already installed (BLT, PCI, and cPCI boards), you can configure and install hardware configurable boards. If you don’t have any boards of this type, you can go on to Section 4.4, “Designating the Clock Source”, on page 50.

4.3. Configuring and Installing Hardware Configurable Boards

Unlike BLT, PCI, and cPCI boards, hardware configurable boards must be installed **after** installing the Intel Dialogic System Software and running DCM. This is because you must first use DCM to determine the values for the memory and interrupt parameters for hardware configurable boards. You can then configure the board’s jumpers or switches to use these values.

NOTE: If you don’t use the DCM-provided parameters when setting the jumpers and switches on these boards, you may not be able to successfully start the Intel Dialogic system. To determine the values of these parameters, DCM follows the standard procedure for requesting resources from Windows. However, if another device on your system does not comply with this procedure, a conflict may occur. For more information, see Section 5.6.1, “Resolving Hardware Conflicts”, on page 132.

After you’ve installed the Intel Dialogic System Software and DCM is running, follow this procedure to configure and install hardware configurable boards:

1. From the DCM Main Window (Figure 8, “DCM Main Window”, on page 45), click **Add Device** from the **Action** pull-down menu.

2. At the first **Add Hardware** screen (Figure 9), select the board you want to install, then click **Next**.

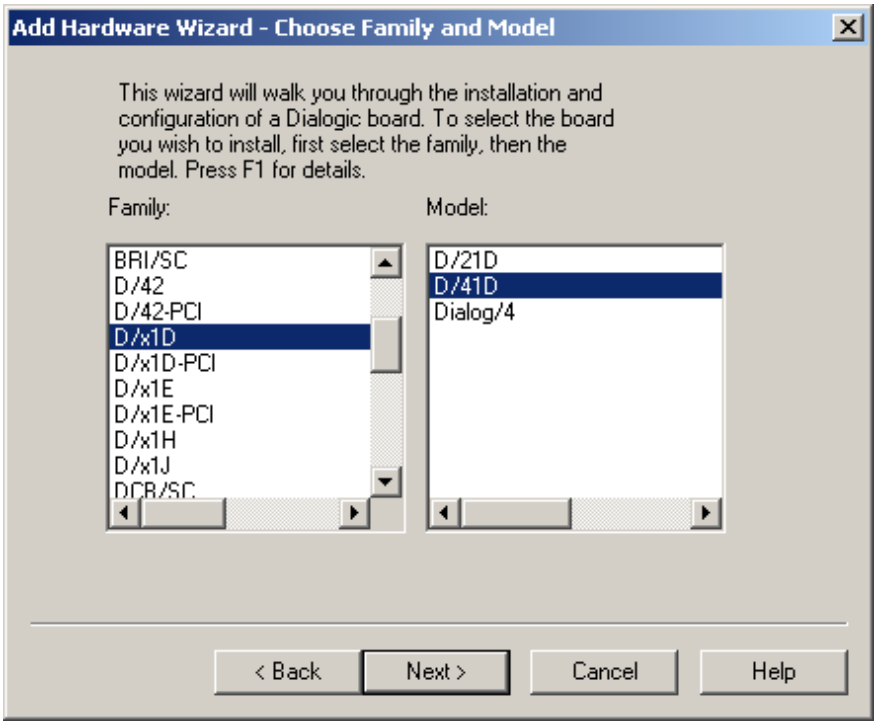


Figure 9. Add Hardware Wizard Step 1

3. At the second **Add Hardware** screen (Figure 10), enter a unique identifier for the board. This identifier will appear with the board name on the DCM Main Window.

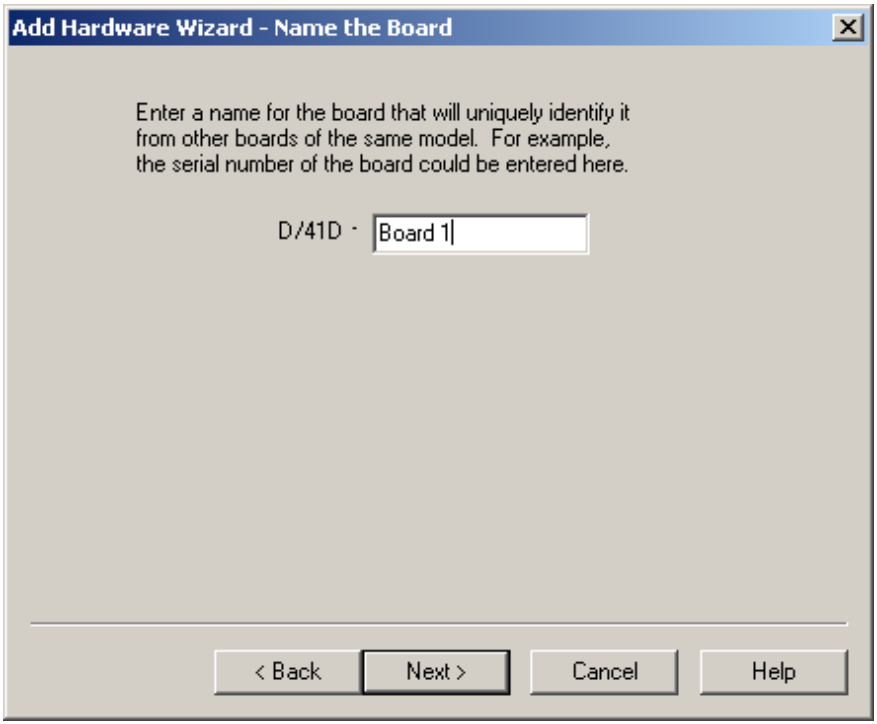


Figure 10. Add Hardware Wizard Step 2

4. Click the **Next** button to display the DCM property sheets for the board (Figure 11). The property sheets display the board's configuration parameters, grouped together on tabs according to the type of board functionality they affect.

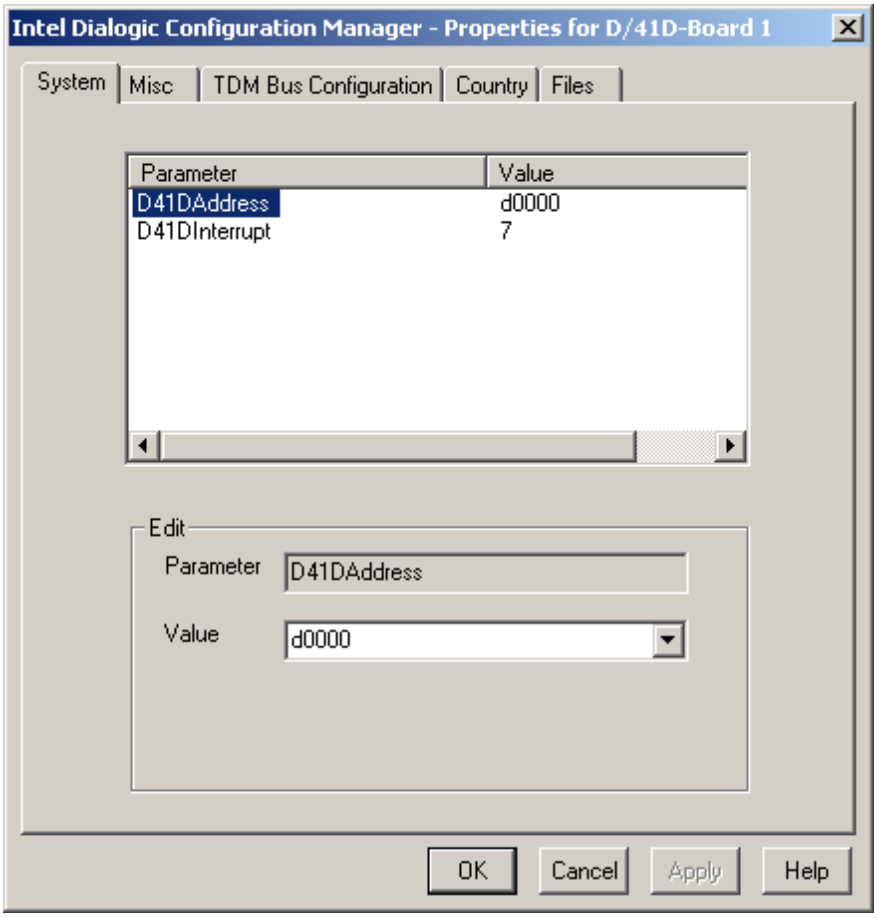


Figure 11. DCM Property Sheets

5. Take note of the **D41DAddress** and **D41DInterrupt** parameters, which are on the **System** property sheet.

   DCM sets these parameters to the value appropriate for the board you are installing. You have to know these values when you set the jumpers and switches on the board.

6. Click the **OK** button.

7. Repeat steps 2 through 6 for all hardware configurable boards you are installing.

8. Exit DCM.

9. Follow the instructions in the *Quick Install Card* provided with each board to set the hardware switches and jumpers to the value you recorded in step 5.

10. Power down your system.

11. Follow the instructions in the *Quick Install Card* to install the boards in your system.

As long as the hardware configurable board jumper and switch settings correspond to the values in DCM, and as long as no other device in the system is attempting to use the same interrupt or address, the Intel Dialogic System will start successfully with the installed hardware.

After the boards are installed, refer to the instructions in Section 2.1.7, "Interconnecting Boards via CT Bus or SCbus", on page 21. Once all the boards have been installed and connected, proceed with "Designating the Clock Source."

4.4. Designating the Clock Source

The DCM automatically determines the bus mode of the system based on the TDM bus capabilities of installed devices: for H.100 capable boards, the bus mode is H.100; for H.110 capable boards, the bus mode is H.110; for SCbus capable boards, the bus mode is SCbus.

NOTE: In the current system software release, any system that contains an SCbus-only board must operate in SCbus mode.

The DCM selects default clock source settings for H.100 and H.110 systems as follows:

- The DCM automatically selects the primary master, as indicated by the **Primary Master FRU (Resolved)** parameter.

- If the primary master is capable of deriving the clock signal from a CT Bus network reference signal, then the default clock source will be the output signal from the network reference board. The **NETREF One FRU (Resolved)** parameter indicates the network reference board.

  NOTE: In the current release, the network reference board will be the same board as the primary master (that is, the value of the P**rimary Master FRU (Resolved)** parameter will be the same as the value of the **NETREF One FRU (Resolved)** parameter).
- If the primary master is not capable of deriving the clock signal from a CT Bus network reference signal, then the default clock source will be the first network interface trunk on the primary master board. (The network reference board derives its signal from the first network interface trunk. This is indicated by the **Derive NETREF One From (Resolved)** parameter.)

Refer to Section 4.4.1, “Setting the Clock Source for H.100 and H.110 Mode Systems”, on page 52 for information about changing the default clock source settings for H.100 and H.110 systems

In addition, refer to "Section 2.1.4, "Configuring a Mixed CT Bus/SCbus System", on page 9" for information about mixed systems and refer to "Section 2.1.5, "Understanding the CT Bus", on page 13" for general information about H.100/H.110 CT Bus concepts.

The DCM selects default clock source settings for SCbus systems as follows:

- The DCM automatically selects the primary master, as indicated by the **Primary Master FRU (Resolved)** parameter.
- The default clock source is the internal oscillator of the primary master, as indicated by the **Derive Primary Clock From (Resolved)** parameter. However, the internal oscillator should only be used as the clock source in the following cases:
  - Internal testing purposes
  - If the primary master is an analog board without a digital network interface.
  - If the primary master is a resource-only board without a digital network interface.

You should set the system to derive clocking from a digital network trunk that is connected to the primary master's front end. Refer to Section 4.4.2, “Setting the Clock Source for SCbus Systems”, on page 55 for information about changing the default clock source settings for SCbus systems.

4.4.1. Setting the Clock Source for H.100 and H.110 Mode Systems

Perform the procedure described below to change the default clock settings for H.100 and H.110 mode systems:

1. To access the clocking settings in DCM, double-click **Bus-0** under the **TDM Bus** in the DCM tree structure of configured devices (see Figure 8, “DCM Main Window”, on page 45). This displays the TDM Bus Configuration property sheet for Bus-0 (Figure 12).

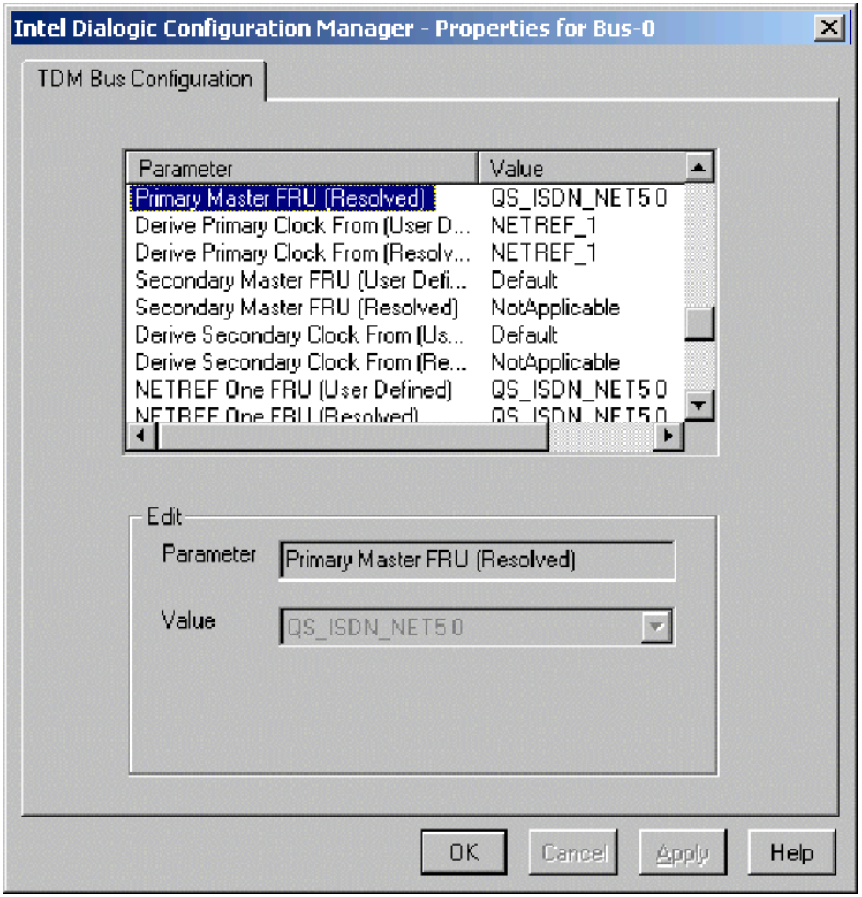


Figure 12. TDM Bus Configuration Property Sheet

2. Ensure that the **TDM Bus Type (Resolved)** parameter is set to the proper bus mode for your system: H.100 or H.110. If the current setting is incorrect, change the TDM bus type by highlighting the **TDM Bus Type (User Defined)** parameter and selecting the appropriate value from the **Value** list. Then, click the **Apply** button.

3. Highlight the **Primary Master FRU (User Defined)** parameter.

4. From the **Value** list, select the board you would like to make the Primary Master.

5. Click the **Apply** button.

   If you are using the primary master board's internal oscillator or front-end network interface (Springware boards only) as the clocking source, continue with step 11. If the primary master board is deriving system clocking from a digital network trunk connected to a Network Reference (NETREF) board, continue with step 6.

6. In the TDM Bus Configuration property sheet, highlight the **NETREF One FRU (User Defined)** parameter.

7. In the **Value** field, type the name of the board that contains the network interface that will provide a network reference clock to the system. This should be the same name as displayed in the DCM Main Window.

8. Click the **Apply** button.

9. Specify the source of the network reference clock (specifically, the trunk on the board containing the digital network interface providing the NETREF clock) via the **Derive NETREF One From (User Defined)** parameter.

10. Click the **Apply** button.

11. Highlight the **Derive Primary Clock From (User Defined)** parameter. Select the appropriate option from the **Value** list:
    - Internal Oscillator: the primary master derives clocking from its own internal circuitry.
    - FrontEnd_1: the primary master derives clocking from its own front end network interface (span 1 of a DualSpan board).

      NOTE: The FrontEnd_1 value is only valid when the Primary Master FRU is a Springware board. This value cannot be used when the Primary Master FRU is a DM3 board.
    - FrontEnd_2: the primary master derives clocking from its own front end network interface (span 2 of a DualSpan board).

NOTE: The FrontEnd_2 value is only valid when the Primary Master FRU is a Springware board. This value cannot be used when the Primary Master FRU is a DM3 board.

- NETREF_1: the primary master derives clocking from CT Bus NETREF_1 line.

NOTE: The NETREF_2 drop-down list option is not supported by the current Intel Dialogic System Software release.

12. Click the **OK** button. This will apply the **Derive Primary Clock From (User Defined)** parameter modification and return to the DCM main window.

To designate a board as the secondary clock master, carry out the same procedure as above, but select the name of the board in the **Value** list of **Secondary Master FRU (User Defined)** parameter instead of **Primary Master FRU (User Defined)** parameter and set the **Derive Secondary Clock From (User Defined)** parameter instead of **Derive Primary Clock From (User Defined)** parameter.

4.4.2. Setting the Clock Source for SCbus Systems

Perform the procedure described below to change the default clock settings for an SCbus mode system:

1. To access the clocking settings in DCM, double click **Bus-0** under the **TDM Bus** in the DCM tree structure of configured devices. This displays the TDM Bus Configuration property sheet for Bus-0 (Figure 12).

2. Ensure that the **TDM Bus Type (Resolved)** parameter is set to SCbus. If the current setting is incorrect, change the TDM bus type by highlighting the **TDM Bus Type (User Defined)** parameter and selecting SCbus from the **Value** list. Then, click the **Apply** button.

3. Highlight the **Primary Master FRU (User Defined)** parameter.

4. From the **Value** list, select the board you would like to make the Primary Master.

5. Click the **Apply** button.

6. Highlight the **Derive Primary Clock From (User Defined)** parameter. Select the appropriate option from the **Value** list:
   - Internal Oscillator: the primary master derives clocking from its own internal circuitry.
   - FrontEnd_1: the primary master derives clocking from its own front end network interface (span 1 of a DualSpan board)

     NOTE: NOTE: The FrontEnd_1 value is only valid when the Primary Master FRU is a Springware board. This value cannot be used when the Primary Master FRU is a DM3 board.
   - FrontEnd_2: the primary master derives clocking from its own front end network interface (span 2 of a DualSpan board)

     NOTE: The FrontEnd_2 value is only valid when the Primary Master FRU is a Springware board. This value cannot be used when the Primary Master FRU is a DM3 board.

   NOTE: NETREF_1 and NETREF_2 values are not applicable to SCbus mode systems.

7. Click the **OK** button. This will apply the **Derive Primary Clock From (User Defined)** parameter modification and return to the DCM main window.

4.5. Setting the Encoding Method for DM3 E-1 Applications

The PCM encoding method for DM3 boards is defined using the **Media Type (User Defined)** parameter in DCM. Initially, the value selected is Default. This causes the system to default to the initial value of μ-law which is determined by the **Media Type (Resolved)** parameter. To change the PCM encoding method to A-law for DM3 boards in E-1 applications, perform the following:

1. On the DCM Main Window (Figure 8, “DCM Main Window”, on page 45), double-click **Bus-0** under **TDM Bus** in the DCM tree structure of configured devices. This displays the **TDM Bus Configuration** property sheet for Bus-0.

2. Set the **Media Type (User Defined)** parameter to **ALaw**.

3. Click the **Apply** and then the **OK** button to set the parameter and return to the DCM Main Window.

Go to the next relevant configuration activity.

4.6. Configuring Digital Network Interface Parameters (Springware Boards)

The digital network interface (DNI) parameter file is an ASCII text file used by the Intel Dialogic System Software to initialize the firmware configuration for the front end of digital network interface Springware boards. The DNI parameter file is named *Spandti.prm* and is installed in the *Data* subdirectory of the Intel Dialogic home directory (normally *C:\Program Files\Dialogic\Data*).

If the default settings in *Spandti.prm* are not appropriate for your application, you can modify this file or create your own version of this file. In either case, you must enter the name of the file in DCM using the **ParameterFile** parameter, which appears on the **Misc** property sheet for Springware boards.

Table 2 shows the parameter ID, name, and default settings for DNI parameters. The comments in the *Spandti.prm* file provide further details about the parameters. Comments in the parameter file are preceded by a semicolon (;) in the first column of a line. Keep a record of the parameter settings that you change. All values are in hexadecimal.

In order for the modified DNI parameters to take effect, specify the name of the file that contains them with the **ParameterFile** parameter in DCM.

Table 2. Digital Network Interface Configuration Parameters

ID	Parameter Name	Default Setting
0005	Receive Wink Definition	T-1: Detect wink with positive polarity on A bit E-1: Detect wink with negative polarity on A bit
0006	Transmit National and International Bits	E-1 only: All national and international bits set to 1

Table 2. Digital Network Interface Configuration Parameters

ID	Parameter Name	Default Setting
0007	Transmit Extra Bits	E-1 only: All extra bits set to 1
0008	Initial Signaling Insertion Pattern	T-1: A and B bits = 0 E-1: A, B, and D bits = 1, C bit = 0 (blocking)
0009	Signaling Mode	Insertion mode
000A	Idle Mode	Do not transmit idle
000B	Transmit Idle Pattern	T-1: 7Fh E-1: 54h
000C	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
000D	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
000E	Number of Pulses Per Digit	0 represented by 10 pulses
000F	CRC Enable Switch	E-1 only: Turn CRC off
0011	Receive Pulse Digit Definition	T-1: Detect digit with negative polarity on A bit E-1: Detect digit with positive polarity on A bit
0012	Line Length	0 to 110 feet
0013	CCTS16 (Clear Channel Time Slot 16)	E-1 only: E-1 signaling on time slot 16 (CCTS16 not enabled)
0020	Zero Code Suppression Mode	No zero code suppression

The *Spandti.prm* file can also be modified to configure T-1 span cards, such as the D/240SC-T1 running in robbed bit mode, to run ESF.

NOTE: There is no externalization of the error checking or network diagnostic capabilities of the ESF format.

To operate a T-1 span card in robbed bit ESF mode, add the following lines to the *Spandti.prm* file:

```
0014 01   ;ESF framing
0020 01   ;B8ZS
```

Parameter 0014 sets the ESF framing; parameter 0020 sets the T-1 line for B8ZS.

T-1 span card revision numbers less than the following board and component level part numbers do not support ESF:

SpanCard Board	Part Numbers
D/240SC-T1	99-0392-009, 96-0064-008
D/240SC-2T1	99-2111-xxx (xxx=any suffix)
D/480SC-2T1	99-2028-xxx (xxx=any suffix)
DTI/240SC	99-0944-001, 96-0292-001
DTI/241SC	99-0947-004, 96-0295-003
DTI/480SC	99-2112-004, 96-0324-004
DTI/481SC	99-2420-003, 96-0455-003

4.7. Adjusting Voice Parameters (Springware Boards)

This chapter describes how to adjust parameters in the *Voice.prm* file for signal delay adjustments, frequency shift keying (FSK), and silence compressed record. The *Voice.prm* file is downloaded to all voice boards (Springware products only, not DM3 products) during the installation and configuration process. The default location for this file is *\Program Files\Dialogic\Data*.

The parameters have been grouped as follows:

- Frequency Shift Keying (FSK)
  - Adjusting the FSK Receiver Carrier Detect Threshold
  - Adjusting Runtime Volume Control
- Signal Delay
  - Setting the Firmware Buffer Size
  - Setting the Driver Buffer Size
- Silence Compressed Record
  - Silence Compressed Record Parameters
  - Encoding Algorithms
  - Enabling Silence Compressed Record on Only One Board

4.7.1. Frequency Shift Keying (FSK)

Two-way Frequency Shift Keying (FSK) allows applications to send and receive character or binary data at 1200 bits/second between a server and Analog Display Services Interface (ADSI) compatible devices. The two-way FSK feature supports applications such as off-line Email editing and sending FSK caller ID data to a Customer Premises Equipment (CPE) device through an MSI/SC board.

Adjusting the FSK Receiver Carrier Detect Threshold

Host applications can change the receiver carrier detect threshold from the default value (-44 dBm) to any value in the range of -22 dBm to -44 dBm. Values are adjusted in 2 dB intervals with a hysteresis of +/- 2 dB at each step. Odd numbers are valid values, but they will be rounded up to the next even number, for example, -27 becomes -26.

To edit the *Voice.prm* file to set the receiver carrier detect threshold, proceed as follows:

1. Open the file *\Program Files\Dialogic\Data\Voice.prm* using Windows Notepad* (or another text editor).
2. Add parameter 255 and the appropriate value (26 in this example) as shown in bold text in the following example:

```
#beginning of voice.prm

AREA=VOICE
SIZE=WORD
BASE=DECIMAL
. . .
PARAM 255 : 26  # set receiver carrier detect threshold

#end of voice.prm
```

3. Save the file.

In order for the added parameter to take effect, run DCM and specify the *Voice.prm* file as the value for the **ParameterFile** parameter, which appears on the **Misc** property sheet for Springware boards.

Adjusting Runtime Volume Control

With analog boards such as the D/41ESC, FSK output volume levels can exceed FCC part 68 specifications. The maximum permitted average volume level is -9.5 dBm for analog boards (D/41ESC, D/160SC-LS) and -13.5 dBm for SCbus operation and T-1 or E-1 network interface boards, in order to have an acceptable margin for compliance purposes. In the case of analog boards, the default transmit output volume level for FSK is approximately -2 dBm.

In order to maintain overall server output signal level compliance, applications need to attenuate the transmit level by approximately -8 dB to comply with FCC part 68 specifications. This 8 dB attenuation applies universally to analog boards (D/41ESC, D/160SD-LS) as well as SCbus operation and also to T-1 or E-1 voice processing boards.

To adjust the output volume level in your application, use the **dx_adjsv( )** function, which is documented in the *Voice Software Reference - Programmer's Guide*. The **dx_adjsv( )** function lets applications modify the speed or the volume of playback dynamically. Once the speed or volume level is modified, the new setting holds until **dx_adjsv( )** executes again or the system is downloaded again.

The **dx_adjsv( )** function uses the Speed and Volume Modification Table to adjust the settings. There are 21 entries that represent different levels of speed or volume. You can specify either an absolute position in this table or a relative position to the current value in the table. You can also toggle between table values. Detailed information about this table is in the *Voice Software Reference - Features Guide*.

NOTE: If the default Speed and Volume Modification Table does not provide enough granularity, you can modify the table with the **dx_setsvmt( )** function, which is also documented in the *Voice Software Reference - Programmer's Guide*.

4.7.2. Signal Delay

Previously, data buffers on Intel Dialogic voice boards (called firmware buffers) had a fixed size of 512 bytes. To reduce voice latency in Internet telephony applications, the firmware buffer size is now programmable from 128 to 512 bytes.

Intel Dialogic voice API functions stream voice data between the Intel Dialogic voice board firmware buffers and the telephony application via driver buffers. The size of these driver buffers can be set to any value between 256 bytes and 16 KB. Overall signal delay can be reduced by adjusting both the firmware and driver buffers.

NOTE: When adjusting the buffer sizes, keep the following in mind:

- The driver buffer size must always be at least twice the firmware buffer size.
- Simply reducing the driver buffer size does **not** guarantee better performance. In fact, if the value is poorly chosen, the exact opposite may result.
- The smaller you make the driver buffer size, the more interrupts are generated to handle the buffers, and consequently, there will be an associated degradation of system performance.
- Therefore, you must choose this value carefully to maximize throughput while minimizing system load.

The speed of the host processor, as well as other concurrent processing, has an impact on how low the buffers can be set.

Setting the Firmware Buffer Size

To edit the *Voice.prm* file to set the firmware play and record buffer sizes, proceed as follows:

1. Open the file *\Program Files\Dialogic\Data\Voice.prm* using Windows Notepad (or another text editor).

2. Add the appropriate play and record parameters as shown in bold text in the example below:

```
#beginning of voice.prm

AREA=VOICE
SIZE=WORD
BASE=DECIMAL
. . .
PARAM 246 : 256  # set firmware play buffer size to 256 bytes
PARAM 247 : 256  # set firmware record buffer size to 256 bytes

#end of voice.prm
```

3. Save the file.

In order for the modified parameters to take effect, run DCM and specify the *Voice.prm* file as the value for the **ParameterFile** parameter, which appears on the **Misc** property sheet for Springware boards.

Setting the Driver Buffer Size

Two voice API functions are available to control low latency buffer sizing. The **dx_getparm( )** function obtains the current firmware or driver buffer size setting, and the **dx_setparm( )** function sets only the driver buffer size.

NOTE: The **dx_setparm( )** function cannot be used to set the firmware buffer size parameters (**DXBD_TXBUFSIZE** and **DXBD_RXBUFSIZE**). The only way to set the firmware buffer size parameters is in the download parameter file *Voice.prm* (for details, see Section , “Setting the Firmware Buffer Size”, on page 63).

Refer to the *Voice Software Reference - Programmer’s Guide* for more information about these and other voice API functions.

4.7.3. Silence Compressed Record

The Silence Compressed Record (SCR) feature enables a 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 Intel Dialogic voice API.

The *Voice.prm* file is downloaded by default to all voice boards during the installation and configuration process. As such, SCR is available to all voice channels in the system.

The SCR parameters specify the silence threshold, the duration of silence at the end of speech before silence compression begins, the duration of a glitch in the line which does not stop silence compression, and more. Details on the parameters are provided in Section , “Silence Compressed Record Parameters”, on page 64. 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.

Silence Compressed Record Parameters

As distributed, the SCR parameters in the *Voice.prm* file appear as comments (each line is preceded with #). To enable the silence compressed record feature, edit this file and remove the # from the beginning of each line containing an SCR parameter. Recommended values for the SCR parameters are provided in the file.

```
# ================================================================
# 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 ----
#
```

Figure 13 and Table 3 illustrate and describe the use of the SCR parameters.

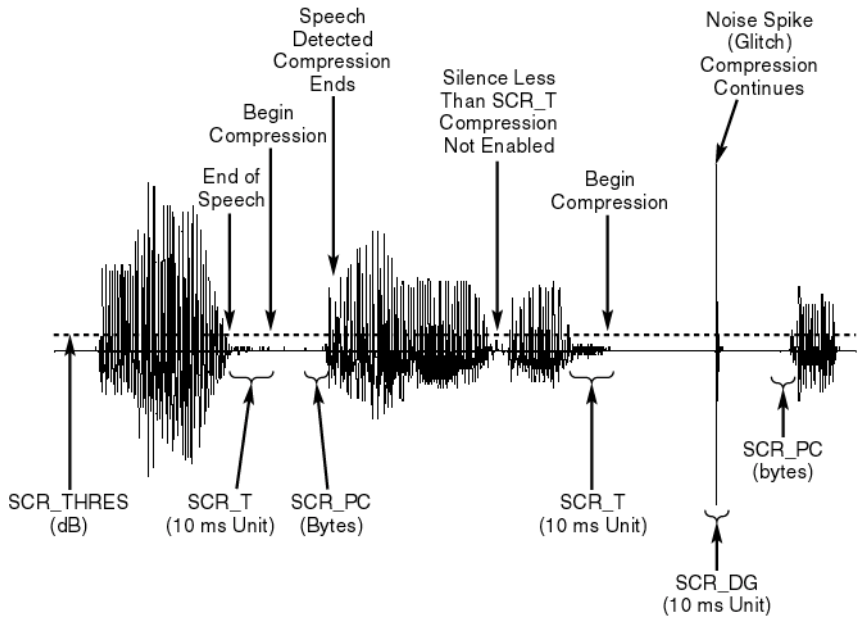


Figure 13. SCR Parameters Illustrated

Table 3. SCR Parameters

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. **NOTE:** For best performance, use the recommended value of 100 bytes. Otherwise, the recording may become garbled.

Table 3. SCR Parameters (Continued)

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.

Table 3. SCR Parameters (Continued)

ID	Parameter Name	Description
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

Encoding Algorithms

The following encoding algorithms and sampling rates are supported in silence compressed record:

- 6 kHz and 8 kHz OKI ADPCM
- 8 kHz and 11 kHz linear PCM
- 8 kHz and 11 kHz A-law PCM
- 8 kHz and 11 kHz μ-law PCM

Enabling Silence Compressed Record on Only One Board

The silence compressed record feature is enabled in the *Voice.prm* file. When this file is downloaded during initialization, SCR is enabled on all boards in your 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 desired board by specifying it in DCM with the **ParameterFile** parameter. See Section 4.9, “Modifying Other DCM Property Sheet Parameters”, on page 70 for information about setting parameters in DCM.

4.7.4. Parameter File Order of Precedence

As a general rule, values in the last parameter file downloaded to the board take precedence.

For information about the order of precedence of the various parameter files, refer to *Specification of both COUNTRY and PARAMETERFILE in NT* on the Telecom Support Resources web site (*http://resource.intel.com/telecom/support/tnotes/tnbyos/winnt/tn192.htm*).

4.8. Configuring DM3 IPLink Network Interface Connector

To configure the Network Interface Connector (NIC) for DM3 IPLink applications, perform the following procedure:

1. Double-click the DM3 IPLink board's entry in the DCM Main Window and then click the **Network** property sheet.

2. Set the following parameters on the Network property sheet as described below.

   NOTE: All parameters on the **Network** property sheet must be filled in for successful functioning of the DM3 IPLink board.

   If any parameter setting is incorrect, an IPTCONF.EXE error may occur.

   - **IPAddress**: Specify the IP address to be assigned to the NIC on the DM/IPLink-T1_NIC or DM/IPLink-E1_NIC. Use the format xxx.xxx.xxx.xxx (for example, 146.152.187.42).

     Incoming calls to this DM3 IPLink board should be directed to the IP address specified by this parameter.

     NOTE: Each DM/IPLink-T1_NIC or DM/IPLink-E1_NIC board in the system must have a unique IPAddress parameter setting.

   - **SubnetMask**: Set this parameter to the IP address where Ethernet packets are to be sent (and according to site IP procedures) Use the format xxx.xxx.xxx.xxx, for example, 255.255.255.10. This parameter determines whether Ethernet packets are sent directly to a particular address or sent to a default router.

- **TargetName**: Set this parameter to the name of the NIC on the DM/IPLink-T1_NIC or DM/IPLink-E1_NIC. You can choose any name.

  NOTE: Although the DM/IPLink-T1_NIC and DM/IPLink-E1_NIC boards provide their own NIC functionality, a third-party NIC installed in the same host is required. The Intel Dialogic System Software employs this additional NIC to verify the integrity of the built-in NIC. This verification is performed automatically every time you start the Intel Dialogic System.
- **HostName**: Specify the name of the host machine.
- **UserName**: Specify any name with valid log-in access to the host machine named using the **HostName** parameter.
- **GatewayIPAddress**: Set this parameter to the IP address of the default router for the Ethernet interface using the xxx.xxx.xxx.xxx format.

3. Click the **Apply** and then the **OK** button to set the parameters and return to the DCM Main Window.

4. Repeat this procedure for each DM3 IPLink board in your system as required.

At this point, you are finished with the configuration process unless you need to modify other DCM property sheet parameters or modify the FCD parameters.

4.9. Modifying Other DCM Property Sheet Parameters

Within DCM, each board has a set of property sheets that display the board's configuration parameters, grouped together on tabs according to the type of board functionality that they affect. To change a board's configuration parameters, follow this procedure:

1. Display the board's property sheets by double-clicking the board model name on the DCM Main Window (Figure 8, "DCM Main Window", on page 45). This brings you to the DCM Property Sheets. The sample DCM Property Sheets window in Figure 14 shows property sheets for a DM3 IPLink board. Click each tab to view all of the board's parameters.

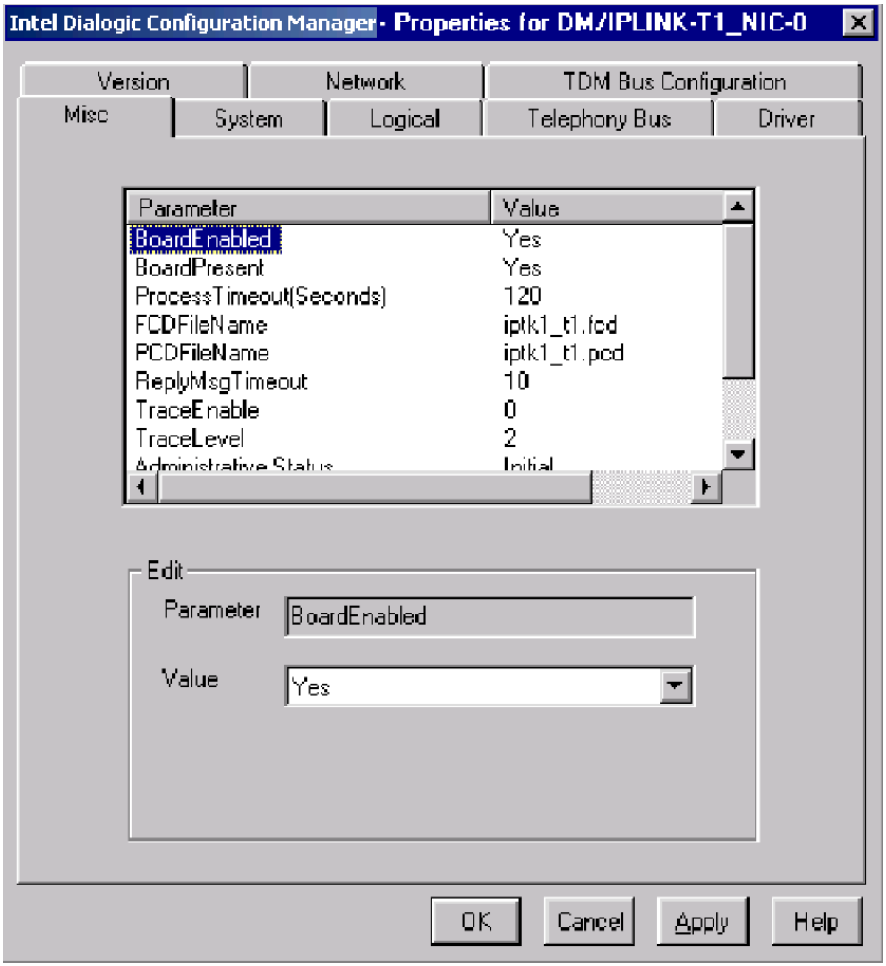


Figure 14. DCM Property Sheets

2. If the Intel Dialogic System is running (indicated by the status line at the bottom of the DCM Main Window), click the **Stop Service** option on the Service pull-down menu or the **Stop Service** icon on the DCM Main Window before changing parameter values.

3. To change the value of a parameter, select the parameter from the list at the top of the property sheet; the selected parameter and its current value are displayed on the bottom of the property sheet. Then type or select a value for the parameter in the drop-down list box. If you need information on DCM parameters, go to DCM Help by pressing **F1**.

4. Click the **Apply** or the **OK** button. Clicking the **Apply** button saves all the changes you have made without closing the dialog box. Clicking the **OK** button saves all your changes and closes the dialog box.

5. When you're finished changing parameters, restart the Intel Dialogic System by clicking the **Start Service** option on the Service pull-down menu or the **Start Service** icon on the DCM Main Window.

NOTE: It is possible to assign a different PCD file to a board by using the above procedure and changing the value of **PCDFileName** on the board's **Misc** property sheet. However, if you do not select the correct PCD file, the board will not start. Further, you also must select the appropriate FCD file. Therefore, this approach should only be used by an experienced System Administrator. Instead, use the procedure in "Section 4.10, "Selecting Different DM3 Configuration Files", on page 72."

4.10. Selecting Different DM3 Configuration Files

Section 4.2, "Selecting the DM3 Configuration Files", on page 43 explains how to select configuration files the first time you run DCM with a DM3 board in your system. If you want to select different configuration files, follow this procedure.

NOTE: If the default settings in the FCD file are not appropriate for your configuration, you can modify the default settings. Refer to the *DM3 Configuration File Reference*. This document provides instructions for editing configuration files and using the FCDGEN, PDK Configuration, and PDKManager configuration utilities. It also provides reference information about DM3 configuration parameters.

To select different DM3 configuration files, perform the following:

1. On the DCM Main Window (Figure 8, “DCM Main Window”, on page 45) click the **Stop Service** option from the **Service** pull-down menu or click the **Stop Service** icon.

2. From the DCM **Action** pull-down menu, click **Restore Device Defaults**.

   NOTE: Clicking **Restore Device Defaults** will reset *all* of the DM3 board’s modified parameters to their default values. If you need to reset any of these parameters, refer to Section 4.9, “Modifying Other DCM Property Sheet Parameters”, on page 70 after you complete this procedure.

3. From the DCM **Action** pull-down menu, click **Auto Detect Devices**. The Assign Firmware File dialog box will appear.

4. Follow the procedure in Section 4.2, “Selecting the DM3 Configuration Files”, on page 43.

NOTE: It is possible to assign a different PCD (configuration) file to a board by using the procedure in “Section 4.9, “Modifying Other DCM Property Sheet Parameters”, on page 70” and changing the value of **PCDFileName** on the board’s **Misc** property sheet. However, if you don’t select the correct PCD file, the board will not start. Further, you also may need to update the FCD file (by changing the value of **FCDFileName** on the board’s **Misc** property sheet). Therefore, this approach should only be used by an experienced System Administrator.

4.11. Verifying Device Names

This section describes how to verify the device names assigned to the boards in your system.

- Device Overview
- Device Types
- Sorting Devices on DM3 Boards
- Sorting Devices on Springware Boards
- Constructing Device Names

4.11.1. Device Overview

The following concepts are key to understanding Intel® Dialogic devices:

device
: A computer component controlled through a software device driver. An Intel® Dialogic resource board, such as a voice resource, fax resource, and conferencing resource, and network interface board contain one or more logical board devices. Each channel or time slot on the board is also considered a device.

device channel
: A data path that processes one incoming or outgoing call at a time (equivalent to the terminal equipment terminating a phone line). The first two numbers in the product naming scheme identify the number of device channels for a given product. For example, there are 24 voice device channels on a D/240JCT-T1 board, 30 on a D/300JCT-E1.

device name
: A literal reference to a device, used to gain access to the device via an xx_open( ) function, where "xx" is the prefix defining the device to be opened. The "xx" prefix is "dx" for voice device, "fx" for fax device, "ms" for modular station interface (MSI) device, and so on. For more information on device names, see Section 4.11.5, "Constructing Device Names", on page 81.

physical and virtual boards
: Intel® Dialogic API functions distinguish between physical boards and virtual boards. The device driver views a single physical voice board with more than four channels as multiple emulated D/4x boards. These emulated boards are called virtual boards. For example, a D/120JCT-LS with 12 channels of voice processing contains 3 virtual boards. A DM/V480A-2T1 board with 48 channels of voice processing and 2 T-1 trunk lines contains 12 virtual voice boards and 2 virtual network interface boards.

The Intel Dialogic System Software creates standard device and channel names for boards. These names are input as the **namep** parameter to, for example, the **dx_open( )** and **fx_open( )** functions, which return the device handles necessary for many essential API calls, such as **dx_play( )** and **dx_rec( )**.

When assigning device names, the Intel Dialogic System Software first groups the devices into device types and then sorts the devices within each group. Each

groups' sort order depends on what kind of boards are installed in your system. Each device is then named according to its device type (group) sort number.

You can verify the Springware device names assigned to the boards in your system as follows:

1. Go to *\Program Files\Dialogic\Cfg*. This is the default location for configuration files. You may have specified a different location when installing the Intel Dialogic System Software.

2. Examine the *Voxcfg* file against the device naming rules described in Section 4.11.5, "Constructing Device Names", on page 81. Do NOT modify this file.

4.11.2. Device Types

The Intel Dialogic System Software designates devices as the following types:

- **Voice and fax**. Device names for this type receive the prefix **dxxx**.
- **Digital network interface**. Device names for this type receive the prefix **dti**.
- **Modular station interface**, including MSI/80SC, MSI/160SC, and MSI/240SC. Device names for this type receive the prefix **msi**.
- **Audio conferencing**, including DCB/320, DCB/640, DCB/960. Device names for this type receive the prefix **dcb**.
- **IP network interface**. Device names for this type are prefixed **ipt**.
- **IP media** (for example, DM3 IPLink boards). Device names for this type are prefixed **ipm**.

Voice boards with an integrated digital network interface are assigned both voice devices and one or two digital network interfaces.

4.11.3. Sorting Devices on DM3 Boards

All DM3 board devices are numbered **after** the Springware board devices (for example, Dialog/HD boards) have been numbered. Refer to the example in Figure 4.

Table 4. Device Numbering Example

	Voice Devices	Digital Network Interface Devices
Springware	dtiB1	dxxxB1 to dxxxB6
DM3	dtiB2 to dtiB5	dxxxB7 to dxxxB30

DM3 board devices are numbered in ascending order based on the logical Board ID assigned by the DM3 driver (the board with the lowest logical Board ID will be assigned the next board number, and so on).

For details regarding device naming, refer to Section 4.11.5, “Constructing Device Names”, on page 81.

4.11.4. Sorting Devices on Springware Boards

Once the devices are divided by device type, the Intel Dialogic system sorts the devices within each division. The sort order determines how the device names are constructed. The following topics describe the sorting rules for Springware boards.

- Hardware Configurable Boards Only
- BLT Boards Only
- PCI Boards Only
- Hardware Configurable and BLT Boards
- BLT and PCI Boards
- Hardware Configurable and PCI Boards
- Hardware Configurable, BLT, and PCI Boards
- Due to the manner in which PCI boards are sorted with respect to hardware configurable and BLT boards, sort order anomalies may occur when adding a third type of board in the system. For example, inserting a BLT board into a system that contains hardware configurable and PCI boards has the potential to change the ordering of boards.

Hardware Configurable Boards Only

Hardware configurable boards are sorted in ascending order of memory address. Refer to Table 5 for an example.

Table 5. Device Sorting Example: Hardware Configurable Boards

Sort Order	Board	Address	Rotary Switch	Slot Number
1	D/41D	CC000	N/A	N/A
2	ProLine/2V	D0000	N/A	N/A
3	D/41H	D8000	N/A	N/A

BLT Boards Only

BLT boards are sorted in ascending order of the rotary switch setting. Refer to Table 6 for an example.

Table 6. Device Sorting Example: BLT Boards

Sort Order	Board	Address	Rotary Switch	Slot Number
1	VFX/40ESC	N/A	0	N/A
2	D/240SC-T1	N/A	1	N/A
3	D/41ESC	N/A	1F	N/A

PCI Boards Only

The way in which PCI boards are sorted depends on how the boards' rotary switches are set.

- Rotary switch settings are unique: The PCI boards are sorted in ascending order of rotary switch setting.
- Rotary switches are set to zero: The PCI boards are sorted in ascending order of bus and slot number.

NOTE: Both of these methods may be used in the same system.

Refer to Table 7 for an example.

Table 7. Device Sorting Example: PCI Boards

Sort Order	Board	Address	Rotary Switch	Slot Number
1	VFX/PCI	N/A	0	2
2	D/41EPCI	N/A	0	3
3	D/240PCI-T1	N/A	1	1

Hardware Configurable and BLT Boards

When hardware configurable and BLT boards are used together in a system, the sort order is as follows:

- Both hardware configurable and BLT boards are sorted in ascending order of memory address.
- Since BLT boards share the same base memory address, BLT boards are further sorted in ascending order of the rotary switch settings.

Refer to Table 8 for an example.

Table 8. Device Sorting Example: Hardware Configurable and BLT Boards

Sort Order	Board	Address	Rotary Switch	Slot Number
1	D/41D	CC000	N/A	N/A
2	VFX/40ESC	D0000	0	N/A
3	D/240SC-T1	D0000	1	N/A
4	D/41H	D8000	N/A	N/A

BLT and PCI Boards

When BLT and PCI boards are used together in a system, the order in which the boards are sorted depends on how the PCI rotary switches are set:

- All BLT and PCI rotary switches are set to unique values: The boards are all sorted together in ascending order of rotary switch setting.
- BLT rotary switches are set to unique values and PCI rotary switches are set to zero: The PCI boards are sorted in ascending order of bus and slot number before the BLT boards. The BLT boards are then sorted in ascending order of rotary switch setting.
- BLT and PCI rotary switches are set to zero: The PCI boards are sorted first in ascending order of bus and slot number. The BLT boards follow in order of ascending bus and slot number.

Refer to Table 9 for an example.

Table 9. Device Sorting Example: BLT and PCI Boards

Sort Order	Board	Address	Rotary Switch	Slot Number
1	VFX/PCI	N/A	0	2
2	D/41EPCI	N/A	0	3
3	VFX/40ESC	N/A	0	N/A
4	D/240PCI-T1	N/A	1	1

Hardware Configurable and PCI Boards

When hardware configurable and PCI boards are used together in a system, the sort order is as follows:

- PCI boards are sorted before hardware configurable boards with the sort order the same as for PCI boards alone:
  - Rotary switch settings are unique: The PCI boards are sorted in ascending order of rotary switch setting.
  - Rotary switches are set to zero: The PCI boards are sorted in ascending order of bus and slot number.

- Hardware configurable boards are then sorted in ascending order of memory address.

Refer to Table 10 for an example.

Table 10. Device Sorting Example: Hardware Configurable and PCI Boards

Sort Order	Board	Address	Rotary Switch	Slot Number
1	VFX/PCI	N/A	0	2
2	D/240PCI-T1	N/A	1	1
3	D/41D	CC000	N/A	N/A
4	D/41H	D8000	N/A	N/A

Hardware Configurable, BLT, and PCI Boards

When hardware configurable, BLT, and PCI boards are used together in a system, the boards are sorted in ascending order of memory address. Since PCI boards do not require a memory setting, for sorting purposes, they are artificially assigned the BLT memory address. The BLT and PCI boards are then sorted further as follows:

- PCI rotary switches are set to unique values: The BLT and PCI boards are all sorted together in ascending order of rotary switch setting.
- A PCI rotary switch is set to the same value as that of a BLT board: The PCI board is ordered before the BLT board.
- PCI rotary switches are set to zero: The PCI boards are sorted first by bus and slot number. The BLT boards follow in order of ascending rotary switch setting.

Refer to Table 11 for an example.

Table 11. Device Sorting Example: Hardware Configurable, BLT, and PCI

Sort Order	Board	Address	Rotary Switch	Slot Number
1	D/41D	CC000	N/A	N/A

Table 11. Device Sorting Example: Hardware Configurable, BLT, and PCI

Sort Order	Board	Address	Rotary Switch	Slot Number
2	VFX/PCI	N/A	0	2
3	VFX/40ESC	D0000	0	N/A
4	D/240PCI-T1	N/A	1	1
5	D/41H	D8000	N/A	N/A

Due to the manner in which PCI boards are sorted with respect to hardware configurable and BLT boards, sort order anomalies may occur when adding a third type of board in the system. For example, inserting a BLT board into a system that contains hardware configurable and PCI boards has the potential to change the ordering of boards.

For an illustration of this type of scenario, compare the following examples:

- Table 10, “Device Sorting Example: Hardware Configurable and PCI Boards”, on page 80
- Table 11, “Device Sorting Example: Hardware Configurable, BLT, and PCI”, on page 80

Before the BLT board is installed, as illustrated in the first example, the two PCI boards are placed before the two hardware configurable boards, which are then sorted according to their memory address. In the second example, a BLT board (VFX/40ESC) is installed. This board's memory address falls between that of the two hardware configurable boards. Because the PCI boards are grouped together with the BLT board for sorting purposes, the D/41D board, which has the lowest memory address, now occurs first in the sort order.

4.11.5. Constructing Device Names

Once the Intel Dialogic System Software sorts the devices, it assigns names to both devices and channels within devices. The following topics discuss how to construct device names:

- Overview of Device Naming

- Board-Level Names
- Channel-Level Names
- Device Naming and Numbering for DM3 Boards

Overview of Device Naming

Although there is a great deal of consistency among different types of compatible Intel Dialogic hardware in how devices are numbered, device mapping (device naming or device numbering) is hardware dependent. If a programmer "hard-codes" an application to use device names based on specific Intel Dialogic boards, some of those device names may need to be changed if a different model board is used as a replacement.

A programmer can achieve the greatest degree of backward compatibility among Intel Dialogic boards by making the device mapping in the application program hardware independent. The method for achieving this, along with sample application code, is provided in the technical note entitled "Identifying the number and type of Intel Dialogic boards in a Windows NT system from within an application," (*http://resource.intel.com/telecom/support/tnotes/tnbyos/winnt/tn193.htm*). This technical note also is available from the Intel® Networking & Communications Telecom Support Resources web site *http://developer.intel.com/design/telecom/support/* by selecting Technical Notes, and then the operating system, Windows NT.

Board-Level Names

A device name is assigned to each device or each component in a board as follows:

- **dxxxBn**, where **n** is the device number assigned in sequential order down the list of sorted voice boards. A device corresponds to a grouping of two or four voice channels.

  For example, a D/240SC board employs 24 voice channels; the Intel Dialogic System Software therefore divides the D/240SC into six voice devices, each device consisting of four channels. Boards with an E-1 interface, such as the D/300SC-E1, employ 30 voice channels. The Intel Dialogic System Software divides the D/300SC-E1 into seven voice devices consisting of four channels each and one voice device consisting of two voice channels.

- **dtiBn**, where **n** is the device number assigned in sequential order down the list of sorted digital network interface devices. A device consists of one digital network interface. A DTI/240SC contains one dti device. A D/240SC-2T1 contains two dti devices. Note that the D/240SC-2T1 also contains six dxxx devices.
- **msiBn**, where **n** is the device number assigned in sequential order down the list of sorted modular station interface boards. A device corresponds to one MSI board.
- **dcbBn**, where **n** is the device number assigned in sequential order down the list of sorted audio conferencing boards. A device corresponds to one DCB board.
- **iptBn**, where **n** is the logical board number that corresponds to a NIC or NIC address when using IP technology. These devices are used by the Global Call API.
- **ipmBn**, where **n** is the board device number assigned to a media board. These devices are used by the Global Call API and the IP Media Library API.
- **brdBn**, where **n** is a physical board name assigned to each board in the system. Given the opaque identifier (AUID) for a board, the **SRLGetPhysicalBoardName( )** function can be used to retrieve the physical board name.

Channel-Level Names

A board device name can be appended with a channel or component identifier. The following channel-level devices are used:

- **dxxxBnCy**: where **y** corresponds to one of the voice channels. Examples of channel device names for voice boards are dxxxB1C1 and dxxxB1C2.
- **dtiBnTy**: where **y** corresponds to one of the digital time slots. Examples of channel device names for digital network interface boards are dtiB1T1 and dtiB1T2.
- **msiBnCy**: where **y** corresponds to one of the conferencing channels.
- **dcbBnDy**: where **y** corresponds to one (DCB/320), two (DCB/640), or three (DCB/960) DSP(s).
- **iptBnTy**: where **y** corresponds to the logical channel number over which call signaling is transmitted when using IP technology. These devices are used by the Global Call API.

- **ipmBnTy**: where **y** corresponds to a media resource on a media board and is used to control media streaming and related functions when using IP technology. These devices are used by the Global Call API and the IP Media Library API.

Device Naming and Numbering for DM3 Boards

The following conventions apply to DM3 board naming and numbering:

- All DM3 board devices are assigned standard device names, for example, dxxxB1, dxxxB2, dtiB1, dtiB2 etc.
- All DM3 channel and timeslot devices are assigned standard device names, for example, dxxxB1C1, dxxxB1C2, dtiB1T1, dtiB1T2.
- A single physical DM3 board device can contain multiple virtual boards that are each numbered in sequential order; for example, a DM/V960-4T1 board with four digital network interfaces contains four virtual network interface boards that would follow a sequential numbering pattern such as dtiB1, dtiB2, dtiB3, dtiB4.
- All DM3 board devices are numbered in sequential order based on the logical Board ID assigned by the DM3 driver (the board with the lowest logical Board ID will be assigned the next board number, and so on).
- The SRL device mapper functions can be used to return information about the structure of the system including the number of boards in the system and so on. See the *Standard Runtime Library API Library Reference* for more information.

Table 12 provides an example of the device naming and numbering conventions used for DM3 boards.

Table 12. Device Naming and Numbering Example for DM3 Boards

Hardware	Resource Type	Device Type	Logical Device Names and Numbers
D/480SC-2T1 (BLT board ID 5)†	Voice	Board Channels ... Channels	dxxxB1 to dxxxB12 dxxxB1C1 to dxxxB1C4 to dxxxB12C1 to dxxxB12C4
	Digital Network Interface	Board Timeslots Timeslots	dtiB1 to dtiB2 dtiB1T1 to dtiB1T24 ‡ dtiB2T1 to dtiB2T24 ‡
DMV/V960-4T1 (logical board ID 1)†	Voice	Board Channel ... Channel	dxxxB13 to dxxxB36 dxxxB13C1 to dxxxB13C4 to dxxxB36C1 to dxxxB36C4
	Digital Network Interface	Board Timeslots Timeslots Timeslots Timeslots	dtiB3 to dtiB6 dtiB3T1 to dtiB3T24 ‡ dtiB4T1 to dtiB4T24 ‡ dtiB5T1 to dtiB5T24 ‡ dtiB6T1 to dtiB6T24 ‡

† All Springware board devices are assigned device numbers (for example, dxxxB1) before all DM3 board devices.

‡ T23 when using ISDN.

For a given physical board, devices are enumerated sequentially, but there are differences in the way devices are enumerated in Springware and DM3. For example:

For a Springware D/600JCT board, devices are enumerated as follows:

- dxxxB1C1-dxxxB8C2 (span 1) then
- dxxxB9C1-dxxxB16C2 (span 2)

For a DM3 DM/V600A board, devices are enumerated as follows:

- dxxxB1C1-dxxxB8C2 (span 1) then

- dxxxB8C3-dxxxB15C4 (span 2)

  Note: The device enumeration scheme described above applies to the DM/V600A, DM/V1200, and DM/V1200A boards also.

4.12. Installing the BRI/2 ISDN Network Adapter Driver

To use the Intel Dialogic BRI/2 board as an ISDN network interface card and work with Windows dial-up networking applications, you must complete the procedures given in this chapter. The procedures are different for Windows NT and Windows 2000. Refer to the instructions in the appropriate section:

- Procedure for Windows NT
- Procedure for Windows 2000

4.12.1. Procedure for Windows NT

The basic steps for installing the BRI/2 ISDN network adapter driver are as follows. More detailed procedures are given in the following sections.

1. Install the BRI/2 ISDN network adapter driver.
2. Install the Windows NT Remote Access Service (RAS) - this only needs to be done once.
3. Add the BRI/2 devices to RAS.
4. Configure RAS devices.
5. Install/configure network protocols.
6. After the last BRI/2 board is configured, install/reinstall the Windows NT Service Pack (whatever Service Pack is supported by the Intel Dialogic System Software Release) and reboot the computer.

If you have more than one BRI/2 board in your computer, you must repeat some of these steps for each BRI/2 board installed. Refer to Step 6: Adding Multiple BRI/2 ISDN Network Adapter Drivers (Windows NT).

Step 1: Installing the BRI/2 ISDN Network Adapter Driver (Windows NT)

Follow these steps to install the Intel Dialogic BRI/2 ISDN network adapter driver for each BRI/2 board installed in your computer:

1. In the **Windows NT Control Panel**, double-click the **Network** icon to display the **Network** window.

2. On the **Adapters** tab, click the **Add** button to begin installation of the Intel Dialogic BRI/2 ISDN network adapter driver.

3. From the **Select Network Adapter** window, click **Have Disk.**

4. When prompted, type *C:\Program Files\Dialogic\Drvr*, which is the default location of the BRI/2 ISDN network adapter driver, and click the **OK** button. The **Select OEM Option** window (Figure 15) is displayed.

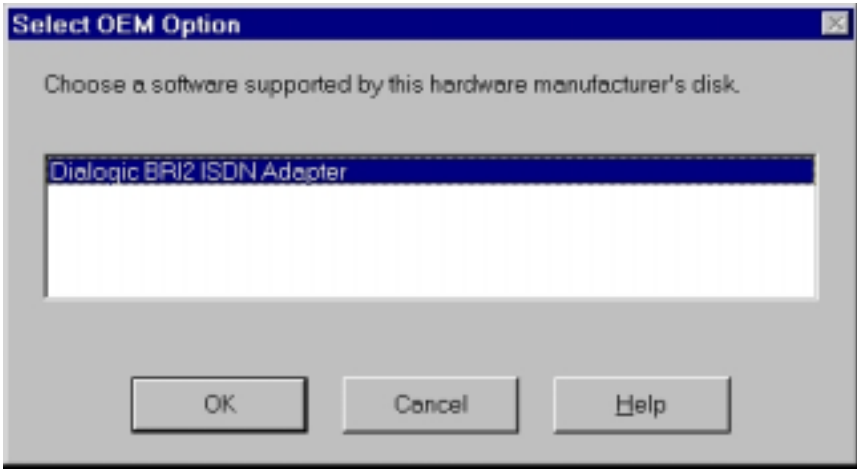


Figure 15. Select OEM Option

5. Select the **BRI/2 ISDN Adapter** option and click the **OK** button. A progress window is displayed while the BRI/2 ISDN network adapter driver files are copied to your hard disk.

If RAS is not installed on your computer, you are prompted to install it now. Continue with the procedure in Step 2: Installing the Windows NT Remote Access Service (RAS). Otherwise, if RAS has already been installed on your computer, continue with the procedure in Step 3: Adding Devices to RAS (Windows NT).

Step 2: Installing the Windows NT Remote Access Service (RAS)

If RAS is not installed on your computer, perform the following procedure:

1. After completing the procedure in Step 1: Installing the BRI/2 ISDN Network Adapter Driver (Windows NT), a **Setup Message** is displayed prompting you to install RAS. Click the **OK** button to close that prompt.

2. In the **Windows NT Setup** window, type the location of your Windows NT installation files and click the **Continue** button. For example, if the Windows NT CD-ROM is inserted in drive D, type *d:\i386*.

A progress window is displayed while the RAS files are copied to your computer. After the files are copied, add the BRI/2 ports (RAS devices) to RAS. Continue with the procedure in Step 3: Adding Devices to RAS (Windows NT).

Step 3: Adding Devices to RAS (Windows NT)

After RAS is installed (or if RAS was already installed), the Add RAS Device window (Figure 16) is displayed.

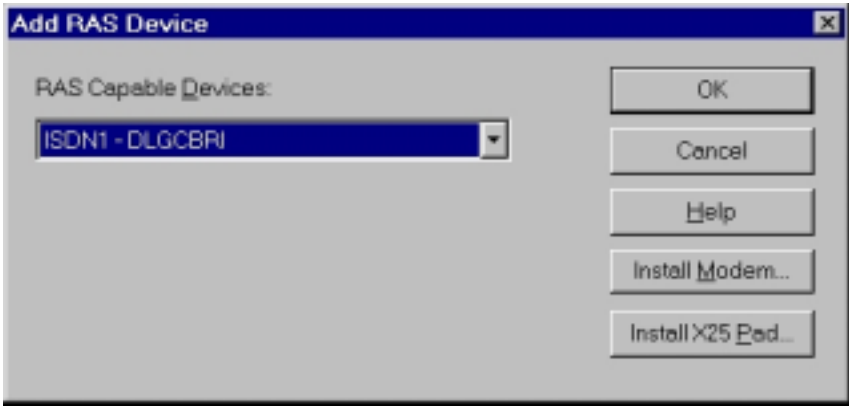


Figure 16. Add RAS Device Window

Complete the following procedure to add devices to RAS:

1. In the **Add RAS Device** window, select **ISDN1-DLGCBRI** (representing port 1 of the first BRI/2 board in the computer) and click the **OK** button. The **Remote Access Setup** window is displayed showing the DLGCBRI device for port 1.

2. Click the **Add** button to add another port (port 2). The **Add RAS Device** window is displayed again.

3. Select **ISDN2-DLGCBRI** from the **Add RAS Device** window and click the **OK** button.

4. Repeat steps 2 and 3 to add ports 3 and 4.

After all ports are added, the **Remote Access Setup** window contains an entry for each port as shown in Figure 17. Continue with the procedure in Step 4: Configuring RAS Devices (Windows NT).

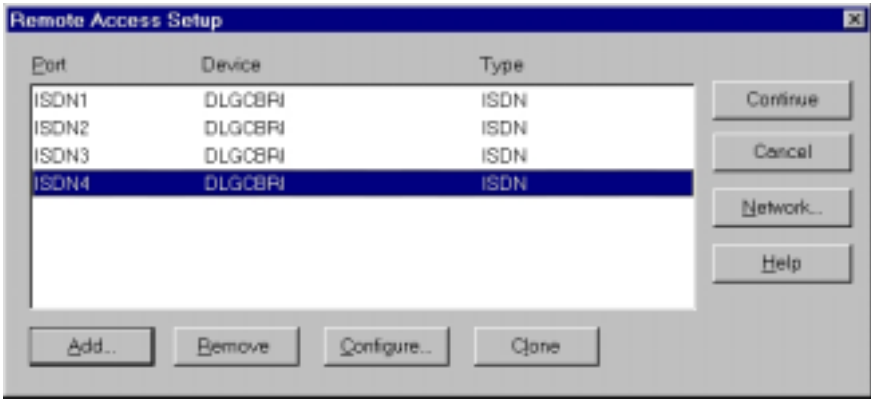


Figure 17. Remote Access Setup Window after Adding Four Ports

Step 4: Configuring RAS Devices (Windows NT)

After adding the ports, configure each port using the following procedure:

1. In the **Remote Access Setup** window (Figure 17, “Remote Access Setup Window after Adding Four Ports”, on page 90) select one of the ISDN ports and click the **Configure** button. The **Configure Port Usage** dialog box is displayed (Figure 18).

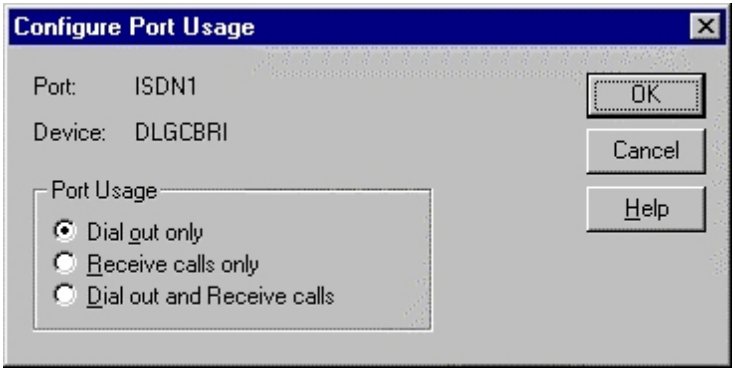


Figure 18. Configure Port Usage Dialog Box

2. Choose one of the options under **Port Usage** and click the **OK** button to return to the **Remote Access Setup** window.

   NOTE: If you are running Windows NT Workstation, you can assign the third option (Dial out and Receive calls) on only one of the four ISDN ports. If you are running Windows NT Server, you may select more than one port to receive calls or dial out and receive calls.

3. Repeat steps 1 and 2 for all ports listed in the **Remote Access Setup** window.

After configuring the port usage, continue with the procedure in Step 5: Configuring Network Protocols (Windows NT).

Step 5: Configuring Network Protocols (Windows NT)

All ports on a BRI/2 board use the same network protocols and configuration. To select and configure network protocols for the BRI/2 board, complete the following procedure:

1. In the **Remote Access Setup** window (Figure 17, “Remote Access Setup Window after Adding Four Ports”, on page 90) click the **Network** button to configure the network protocols for all BRI/2 ISDN ports. The **Network Configuration** dialog box (Figure 19) is displayed.

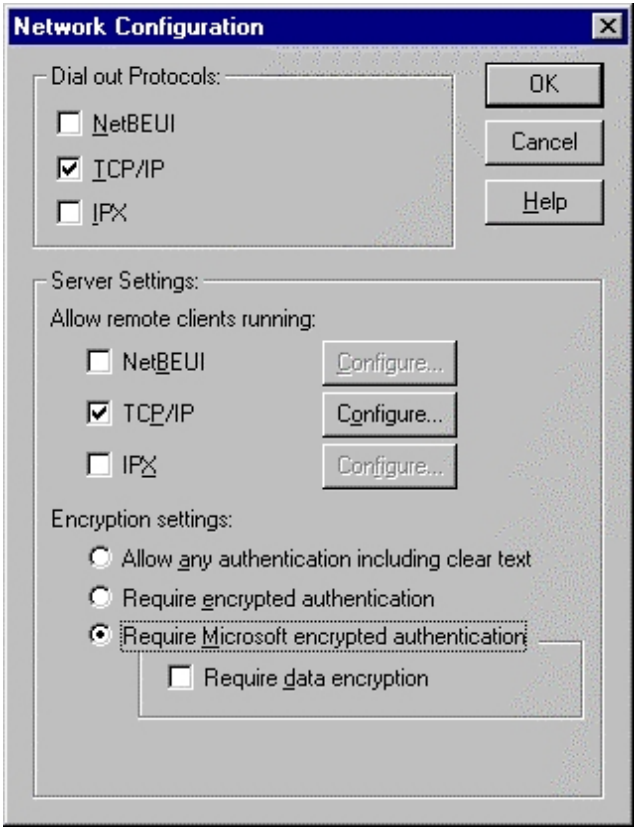


Figure 19. Network Configuration Dialog Box

NOTE: This dialog box is displayed only if you configured a port to dial out and receive calls on the **Configure Port Usage** dialog box (Figure 18, "Configure Port Usage Dialog Box", on page 91). If you configured the ports to dial out only, the **Network Configuration** dialog box includes only the Dial out Protocols area. If you configured the ports to receive calls only, the **Network Configuration** dialog box includes only the Server Settings area.

2. If you are connecting to an Internet Service Provider (ISP), select **TCP/IP** in the Dial out Protocols area. If TCP/IP is not yet installed, return to this configuration after you have installed the TCP/IP protocol.

3. If you set up a port to receive calls, configure the Server Settings for the protocols you selected. In the **Network Configuration** dialog box, Select **TCP/IP** in the Server Settings area, and click the **Configure** button to configure the TCP/IP remote client options. The **RAS Server TCP/IP Configuration** dialog box (Figure 20) is displayed.

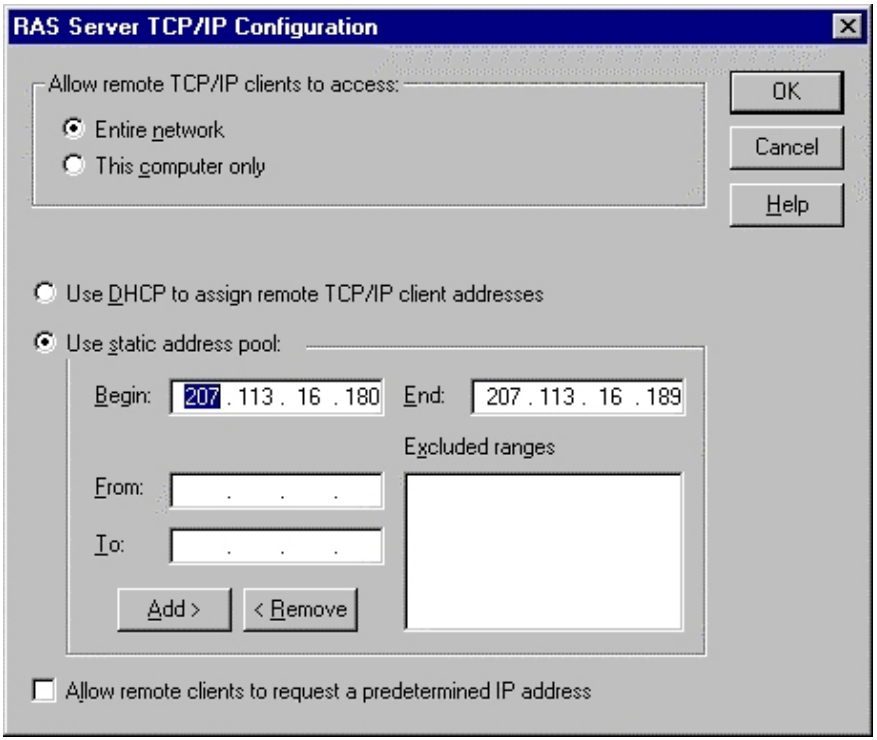


Figure 20. RAS Server TCP/IP Configuration Dialog Box

4. If a dynamic host configuration protocol (DHCP) server is attached to the network, you can use it to dynamically assign TCP/IP addresses to remote

clients. You can also specify a range of TCP/IP addresses to assign to remote clients.

NOTE: Consult your network administrator or Internet Service Provider for the proper setting of options in the RAS Server TCP/IP Configuration dialog box.

When you are done, click the **OK** button to close the **RAS Server TCP/IP Configuration** dialog box and return to the **Network Configuration** dialog box.

5. Click the **OK** button to close the **Network Configuration** dialog box, then click the **Continue** button to close the **Remote Access Setup** window and finish the port configuration. The **Network** window (Figure 21) is displayed showing the Intel Dialogic BRI/2 ISDN Adapter you just installed.

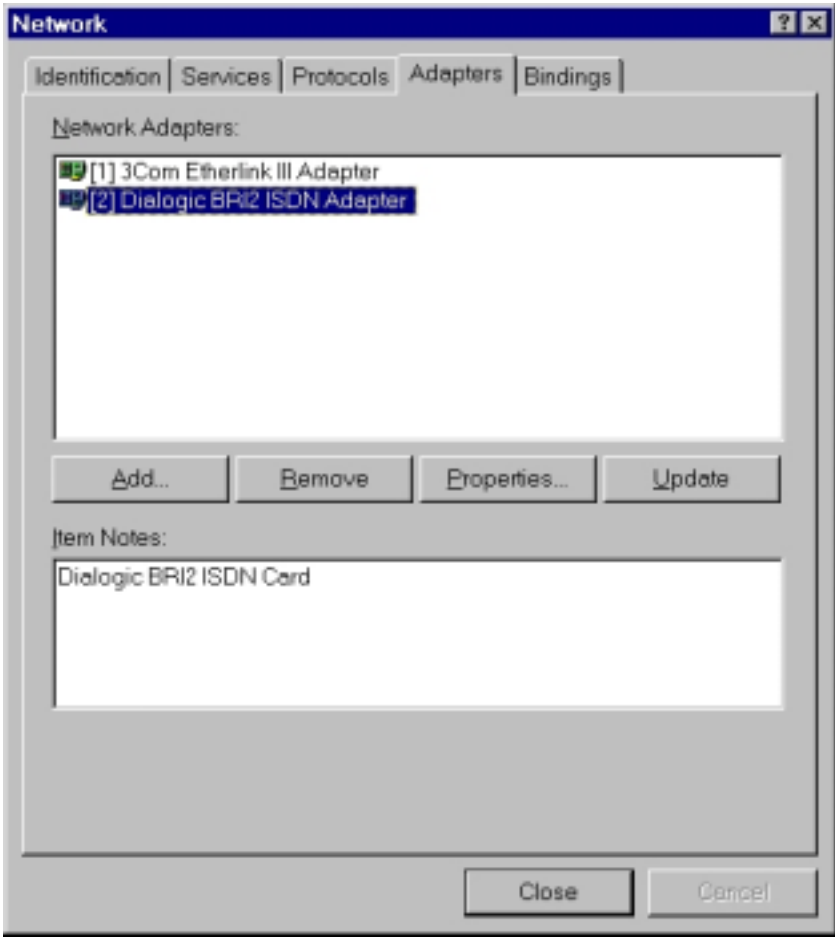


Figure 21. Network Window Showing Intel Dialogic BRI/2 ISDN Adapter

6. Click the **Close** button. Windows will bind the protocols you selected in your configuration. After you have finished installation, you are prompted to restart your computer. Do **not** restart your computer yet.

7. Install the Windows NT Service Pack (whatever Service Pack is supported by the Intel Dialogic System Release). This is required to update RAS components.

8. After installing the Service Pack, restart your computer in order for the installation process to complete and the new settings to take effect.

Step 6: Adding Multiple BRI/2 ISDN Network Adapter Drivers (Windows NT)

After you have installed the first BRI/2 ISDN network adapter driver and restarted your computer, you can install additional BRI/2 ISDN network adapter drivers to enable you to use other BRI/2 boards installed in your computer for ISDN dial-up networking.

Repeat the steps listed below for each additional BRI/2 board installed in your computer:

1. Install the BRI/2 ISDN network adapter driver using the procedure in Step 1: Installing the BRI/2 ISDN Network Adapter Driver (Windows NT).

2. At the end of the procedure, the **Remote Access Setup** window is displayed showing any previously installed devices. Click the **Add** button to add the additional BRI/2 devices to RAS.

3. Add the additional BRI/2 devices to RAS using the procedure in Step 3: Adding Devices to RAS (Windows NT). Note that the port numbers are different as you add BRI/2 boards; the port numbers for the first board are ISDN1-ISDN4; the port numbers for the second board are ISDN5-ISDN8, and so on.

4. At the end of the procedure, the **Remote Access Setup** window contains an entry for each installed port.

5. Configure the RAS devices using the procedure in Step 4: Configuring RAS Devices (Windows NT).

After configuring the port usage, click the **Continue** button to close the **Remote Access Setup** window. The **Network** window is displayed showing the Intel Dialogic BRI/2 ISDN Adapter you just installed.

6. Click the **Close** button. Windows will bind the protocols you selected in your configuration. After you have finished installation, you will be prompted to restart your computer.

7. Restart the computer in order for the installation process to complete and the new settings to take effect.

8. If you need to add BRI/2 ISDN network adapter drivers for a third or fourth BRI/2 board, repeat steps 1 through 5.

4.12.2. Procedure for Windows 2000

Before performing these procedures, ensure that only one BRI/2 board is installed in your computer, even if you will eventually be installing multiple BRI/2 boards. Then, after installing the Intel Dialogic System Software, install the ISDN network adapter driver for that board.

The basic steps for installing the BRI/2 ISDN network adapter driver are as follows. More detailed procedures are given in the following sections.

1. Install the BRI/2 ISDN network adapter driver for the first board.

2. If a multiple-board configuration is required, shut down the system and install the next BRI/2 board. Be sure to install one board at a time, and then install the driver for that board.

3. Create a dial-up connection.

Step 1: Installing the BRI/2 ISDN Network Adapter Driver (Windows 2000)

Make sure that the files *netdbri.inf* and *dlgcbri.sys* are in *C:\Program Files\Dialogic\Drvr* after the Intel Dialogic System Software is installed, then follow these steps to install the driver for the BRI/2 board:

1. In the **Windows 2000 Control Panel**, double-click **Add/Remove Hardware** to start the **Add/Remove Hardware Wizard**.

2. On the **Choose a Hardware Task** screen, select **Add/Troubleshoot a device**, and follow the prompts to add a new device.

3. When prompted, select the option **Search for a suitable driver for my device (recommended)**, and specify the directory location of the driver files (default is *C:\Program Files\Dialogic\Drvr*). This is the location of the *netdbri.inf* and *dlgcbri.sys* files.

   Following the **Add/Remove Hardware Wizard**, the system copies the *dlgcbri.sys* driver file to the *winnt\system32\drivers* directory, then presents a series of screens prompting you to configure the Intel Dialogic BRI/2 ISDN Adapter.

4. Select the ISDN switch type or D-channel protocol that your phone company uses (for example, European ISDN DSS1). Continue to follow the prompts, entering the appropriate information for your network. For example, you could set the ISDN phone number at this time. Consult your network administrator for the proper settings.

5. Shut down the system and install the next BRI/2 board if multiple-board configuration is required. Be sure to install one board at a time, and then install the driver for that board.

6. Repeat steps 1 through 5 until you finish the installation of all BRI/2 boards.

Step 2: Creating a Dial-Up Connection (Windows 2000)

Follow these steps to set up a dial-up connection and establish a call:

1. In the **Windows 2000 Control Panel**, double-click **Network and Dial-up Connections**, then **Make a New Connection** to start the **Network Connection Wizard**.

2. On the **Network Connection Type** screen, select the configuration type (for example, Dial-up to private network), and follow the prompts to enter the information appropriate for your network. Consult your network administrator for the proper settings.

   Following the **Network Connection Wizard**, the system displays the **Connect Dial-up Connection** window.

3. Click the **Properties** button and set the dial-up connection options appropriate for your network. Consult your network administrator for the proper settings.

4. After setting the dial-up connection options, click the **OK** button to return to the **Connect Dial-up Connection** window.

At this time, you can make a dial-up connection and establish the ISDN call connection with a remote ISDN device.

4.13. Reserving TDM Bus Resources for Third Party Devices

In order for a third party device to share TDM bus resources with Intel® Dialogic and/or Intel® NetStructure boards, the system software needs to identify the third party device's TDM bus status (primary master, slave) and the TDM bus time slots the device will be using. This prevents Intel® Dialogic and/or Intel® NetStructure boards from using time slots that you would like to reserve for third party devices. The DCM's Add Hardware Wizard allows third party devices to share TDM bus resources with Intel® Dialogic and/or Intel® NetStructure boards by providing the following features:

- reserving a range of time slots that can be used exclusively by third party devices

- setting the TDM bus capability (SCbus master, SCbus slave, H.100 master, H.100 slave, H.110 master, H.110 slave) for each third party device
- indicating whether or not a third party device is defined as the current primary master or secondary master for the system

NOTE: The Add Hardware Wizard only reserves TDM bus resources for third party devices. Actual configuration of the third party device(s) must be carried out according to the vendor's documentation.

Use the following procedure to reserve TDM bus resources for a third party device:

NOTE: You must perform this procedure for each third party device you are adding to the system.

1. In the DCM Main Window, click **Add Device** from the **Action** pull-down menu. This activates the Add Hardware Wizard.

2. At the first Add Hardware Wizard screen, select **ThirdPartyTech** from the list of device families (as shown in Figure 22). Then click **Next**.

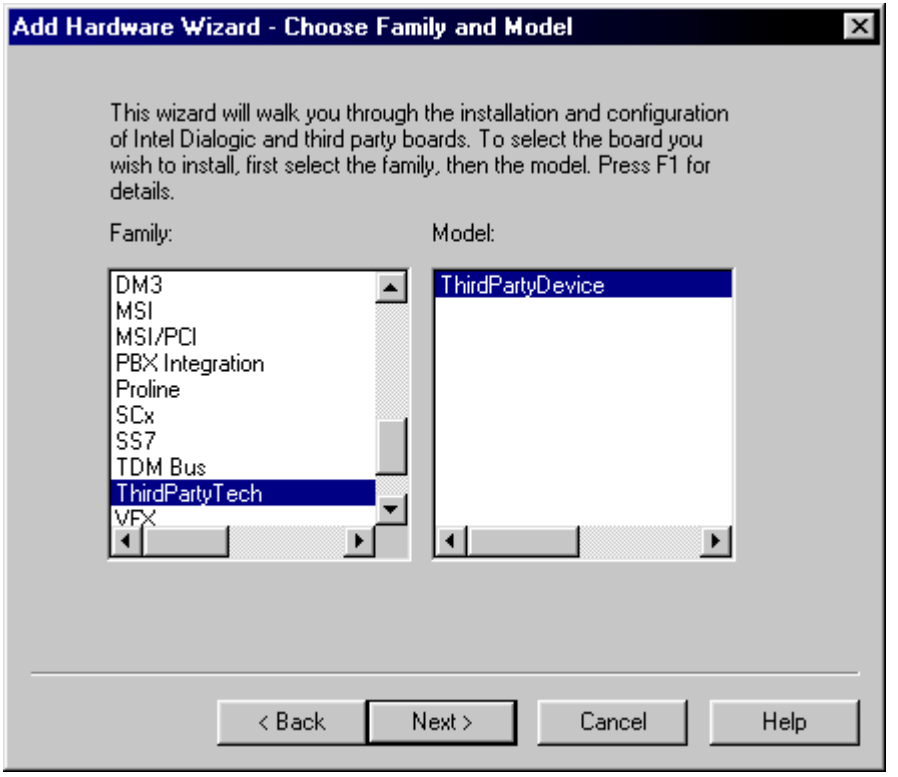


Figure 22. Add Hardware Wizard for Third Party Devices

3. At the second Add Hardware Wizard screen, enter a unique identifier for the third party device. This identifier will appear in the DCM Main Window.

4. Click the **Next** button to display the **Third Party TDM Bus Capabilities** screen. This screen allows you to define the TDM bus capabilities of the third party device and indicate if the third party device will serve as the TDM bus primary master, the secondary master or a slave.

5. In the **Third Party TDM Bus Capabilities** screen, select the check boxes in the **TDM Bus Master/Slave Capabilities** section as follows:

5.a. If the third party device will *always* operate as a slave in your system, select the **Slave capable** checkbox appropriate for your system and proceed with step 7:

- **SC Slave capable**
- **H.100 Slave capable**
- **H.110 Slave capable**

5.b. To make the third party device *capable* of being the Primary Master, select the **Master capable** checkbox appropriate for your system.

- **SC Master capable**
- **H.100 Master capable**
- **H.110 Master capable**

NOTE: Any board that is capable of being a Primary Master must also be capable of being a slave. Therefore, the system automatically selects the appropriate **Slave capable** checkbox whenever a **Master capable** checkbox is selected. For example, the system automatically selects the **H.110 Slave capable** checkbox whenever the **H.110 Master capable** checkbox is selected.

6. Use the **TDM Bus Master/Slave Assignment** section of the screen to define the third party device as the system's current primary master, secondary master or a slave. The default value is slave.

NOTE: If you assign a third party device as the current primary master for the system, you must start the third party device before using the DCM to start the Intel® Dialogic system service.

Figure 23 displays the **Third Party TDM Bus Capabilities** screen for a third party device that is H.100 Master capable, (**TDM Bus Master/Slave Capabilities** section of the screen), but is defined as a TDM bus slave in the current system (**TDM Bus Master/Slave Assignment** section of the screen):

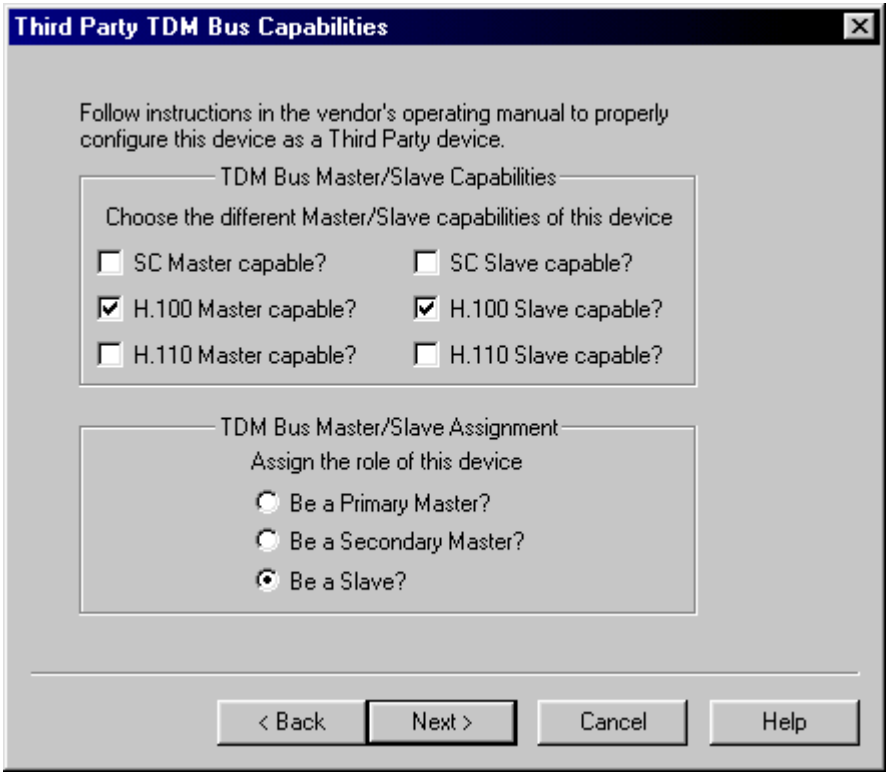


Figure 23. Third Party TDM Bus Capabilities Screen

7. Click the **Next** button to display the **Third Party Tim Slot Allocation** screen. Figure 24 shows the initial **Third Party Time Slot Allocation** screen (i.e. when you haven't added any third party devices yet):

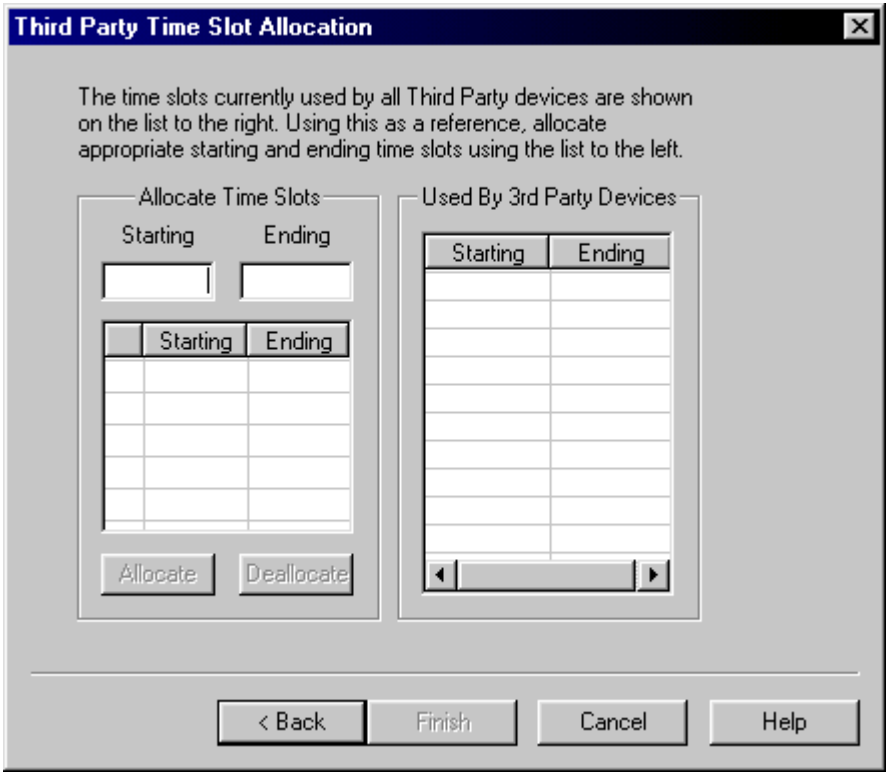


Figure 24. Third Party Time Slot Allocation Screen

8. Use the **Starting** and **Ending** boxes in the **Allocate Time Slots** section to enter a range of time slots for use by the third party device. For example, if you would like to reserve time slots 1-100 for a third party device, enter 1 in the **Starting** box and 100 in the **Ending** box.

9. Click the **Allocate** button. The system reserves time slots within the range specified in step 8 for exclusive use by the third party device. Intel® Dialogic and/or Intel® NetStructure devices will not use the reserved time slots.

NOTE: An allocated time slot range can be deallocated by highlighting the range of time slots in the Allocate Time Slots section of the screen and clicking the **Deallocate** button.

10. Click the **Finish** button to close the **Third Party Time Slot Allocation** screen.

11. The third party device appears in the DCM Main Window.

To deallocate the time slots reserved for a third party device, use the following procedure:

1. Highlight the third party device in the DCM Main Window.

2. Select **Configure Device** from the DCM's Action pull-down menu. This allows you to access the **Third Party TDM Bus Capabilities** screen and the **Third Party Time Slot Allocation** screen.

NOTE: Settings in the **Third Party TDM Bus Capabilities** screen cannot be modified when the screen is accessed from the DCM in this way. To change a third party device's TDM bus settings, you must delete the third party device from the DCM Main Window and re-add it to the system using the Add Hardware Wizard.

3. Click the **Third Party Time Slot Allocation** tab.

4. In the **Allocate Time Slots** section of the screen, highlight the range of time slots you want to deallocate.

5. Click the **Deallocate** button.

6. Click the **Close** button to exit.

4.14. Configuring the H.323 IP Stack

The H.323 IP stack is applicable to DM3 IPLink T-1 and E-1 boards that contain a network interface card (NIC). There are two ways to use the H.323 IP stack: embedded or host-based. To use the embedded stack, select PCD/FCD files prefaced with *ipt* . To use the host-based stack, select PCD/FCD files prefaced with *ipvs.*

NOTE: The procedure for selecting the PCD/FCD files the first time you run DCM is described in Section 4.2, "Selecting the DM3 Configuration Files", on page 43. If you have already selected PCD/FCD files and need to select a new set of files, refer to Section 4.10, "Selecting Different DM3 Configuration Files", on page 72.

In addition to selecting the appropriate PCD/FCD files (filenames prefaced with *ipt*), refer to the following procedures:

- Modify the Embedded H.323 IP Stack Configuration File (config.val)
- Run the Embedded H.323 Stack Configuration Utility (IPTConf.exe)

For more information about developing or porting application using the H.323 stack, refer to the following documents supplied with this release:

- *Global Call IP over Embedded Stack Technology User's Guide for Linux and Windows*
- *Global Call IP over Host-Based Stack Technology User's Guide for Linux and Windows*
- *Porting Global Call H.323 Applications from Embedded Stack to Host-Based Stack Application Note*.

4.14.1. Modify the Embedded H.323 IP Stack Configuration File (config.val)

The *config.val* configuration file, located in \Program Files\Dialogic\bin\ , is used to configure the embedded H.323 stack on DM3 IPLink T-1 and E-1 NIC boards. By default, the system software assigns the same *config.val* file to all the boards in the system. To configure the H.323 stack differently on each board, use the default file to create a unique **.val* file for each board in your system (for example, *config_1.val*). Once the *config.val* file is updated, following the procedures described in *Section 4.14.2, "Run the Embedded H.323 Stack Configuration Utility (IPTConf.exe)"*, on page 115. Modifiable *config.val* components include the following:

- Describe Coder Capabilities
- Enable Gatekeeper Registration
- Broadcast General Requests For a Gatekeeper
- Identify the Gateway

- Supply Vendor Specific Information
- Disable H.245 Tunneling

CAUTION

Do not change any settings in the *config.va*l file, except for those explained here. The H.323 stack will not function properly if other changes are made.

Describe Coder Capabilities

Each supported coder's capabilities are described in the *config.val* file. You may adjust certain Rx parameters for each coder. These capabilities are broadcast during the capability exchange at call setup. For a list of supported coders, refer to the release guide supplied with your Intel® Dialogic® release.

NOTE: The Fast Start Element broadcasts maximum capability. The actual capabilities are defined in detail in the Slow Start section of the *config.val*. A maximum of 40 coder capabilities may be defined.

G.711 muLaw

You may set the maximum frame size that this coder can receive. It can be set for either 30, 20, or 10 milliseconds. The larger frame size also allows the smaller frame sizes, that is, the default 30 milliseconds frame size also allows the 20 milliseconds and 10 milliseconds frame sizes. The line to be changed is highlighted in the code fragment below:

```
4  capabilityTable = 0
5   * = 0 #Sequence
6    capabilityTableEntryNumber = 1 # INTEGER [1..65535]
6    capability = 0
7     receiveAudioCapability = 0
8      g711Ulaw64k = 30 # INTEGER [1..256]
```

Values:

- 30 = 30, 20, and 10 millisecond frames
- 20 = 20 and 10 milliseconds frames
- 10 = 10 milliseconds frames

G.723.1

You may designate the number of frames per packet that the coder can receive, and enable or disable silence suppression (VAD). The lines to be changed are highlighted in the code fragment below:

```
5   * = 0 #Sequence
6    capabilityTableEntryNumber = 2 # INTEGER [1..65535]
6    capability = 0
7     receiveAudioCapability = 0
8      g7231 = 0
9       maxA1-sduAudioFrames = 3 # INTEGER [1..256]
9       silenceSuppression = 1 # INTEGER [1..256]
```

Values:

- 0 = Disabled
- 1 = Enabled

NOTE: The **capabilityTableEntryNumber** 1must be sequential starting from 1. If you make any changes, make sure that the numbers are correct. In addition, the capabilityDescriptors section must contain the same number of capabilities. Comment out non-applicable lines:

```
4  capabilityDescriptors = 0
5   * = 0 #Sequence
6    capabilityDescriptorNumber = 0 #INTEGER [1..255]
6    simultaneousCapabilities = 0
7     * = 0
8      * = 1 # INTEGER [1..65535]
8      * = 2 # INTEGER [1..65535]
#8     * = 3 # INTEGER [1..65535]
#8     * = 4 # INTEGER [1..65535]
```

G.711 Alaw

You may set the maximum frame size that this coder can receive. It can be set for either 30, 20, or 10 milliseconds. The larger frame size also allows the smaller frame sizes, that is, the default 30 millisecond frame size also allows the 20 millisecond and 10 millisecond frame sizes. The line to be changed is highlighted in the code fragment below:

```
4  capabilityTable = 0
5   * = 0 #Sequence
6    capabilityTableEntryNumber = 3 # INTEGER [1..65535]
6    capability = 0
7     receiveAudioCapability = 0
8      g711Alaw64k = 30 # INTEGER [1..256]
```

Values:

- 30 = 30, 20, and 10 millisecond frames
- 20 = 20 and 10 milliseconds frames
- 10 = 10 milliseconds frames

GSM

You may designate the number of frames per packet that the coder can receive, and enable or disable silence suppression (VAD). The lines to be changed are highlighted in the code fragment below:

```
# Standard GSM Full Rate
5     * = 0
6      capabilityTableEntryNumber = 4
6      capability = 0
7       receiveAndTransmitAudioCapability = 0
8        gsmFullRate = 0
9         audioUnitSize = 99
9         comfortNoise = 1
9         scrambled = 0
```

Values:

- audioUnitSize: (number of frames per packet) x 33
- comfortNoise:
  0 = VAD Disabled
  1 = VAD Enabled

GSM-EFR

You may designate the number of frames per packet that the coder can receive, and enable or disable silence suppression (VAD). The lines to be changed are highlighted in the code fragment below:

```
# Standard GSM Full Rate
5     * = 0
6      capabilityTableEntryNumber = 5
6      capability = 0
7       receiveAndTransmitAudioCapability = 0
8        gsmFullRate = 0
9         audioUnitSize = 93
9         comfortNoise = 1
9         scrambled = 0
```

Values:

- audioUnitSize: (number of frames per packet) x 31
- comfortNoise:
  0 = VAD Disabled
  1 = VAD Enabled

G.729

Standard G.729 coder support includes G.729 without Annex A and B, Annex A only, Annex B only, and Annex A + B. Each configuration is listed in the *config.val* as a separate coder. The Fast Start Element reports a maximum coder capability of 4 frames per packet. The exact configuration is defined in the Slow Start section (G.729 channels) of the *config.val* as either 3 or 4 frames per packet. You may change this setting, keeping in mind that a maximum of 40 coder definitions may appear. For each number of frames per packet to be added, copy an existing section and paste it into the *config.val*. Change the coder name (line 2) and the number of frames per packet (line 5). The lines to be changed are highlighted in the code fragment below:

```
# G.729  channels

3   * = 0
4    name = 'g729VD3'
4    dataType = 0
5     audioData = 0
6      g729 = 3

3   * = 0
4    name = 'g729VD4'
4    dataType = 0
5     audioData = 0
6      g729 = 4
```

```
3   * = 0
4    name = 'g729VD2'
4    dataType = 0
5     audioData = 0
6      g729 = 2
```

Enable Gatekeeper Registration

A gatekeeper serves as a directory of Internet addresses and telephone numbers. The IPLink platform can be configured to register with a gatekeeper. By default, the IPLink platform is configured for no gatekeeper as shown in the following fragment from the *config.val* file:

```
1 RAS = 0
2 responseTimeOut = 1
#2 gatekeeper = 1
2 manualRAS = 1
#2  manual Discovery = 0
#3   defaultGatekeeper = 0
#4    ipAddres = 0
#5     ip = <200.202.200.200>
#5     port = 1719
```

To register with a gatekeeper, comment line 4 (of this section of code). It should appear as follows:

```
1 RAS = 0
2 responseTimeOut = 1
#2 gatekeeper = 1
#2 manualRAS = 1
#2  manual Discovery = 0
#3   defaultGatekeeper = 0
#4    ipAddres = 0
#5     ip = <200.202.200.200>
#5     port = 1719
```

In addition, you must either insert a specific gatekeeper IP address, or enable discovery (broadcasting a request for a gatekeeper).

If you know the IP address of the gatekeeper you want to register with, uncomment lines 5 - 9 and insert the correct IP address in line 8. It should appear as follows:

```
1 RAS = 0
2 responseTimeOut = 1
#2 gatekeeper = 1
#2 manualRAS = 1
2  manual Discovery = 0
3   defaultGatekeeper = 0
4    ipAddres = 0
5     ip = <insert IP address of gatekeeper here>
5     port = 1719
```

Broadcast General Requests For a Gatekeeper

Applications built using a DM3 IPLink T-1 or E-1 board or a DM/IP040-LSI board can broadcast a general request for a gatekeeper. If you want to broadcast a general request for a gatekeeper, you can choose to either:

- broadcast to those gatekeepers registered for Multicasting or,
- broadcast a general request to all gatekeepers

To broadcast to a Multicast address, there is no need to change the default settings:

```
#Not applicable when manualDiscovery is enabled !
2  rasMulticastAddress = 0
3   ipAddress = 0
4    ip = <224.0.1.41>
4    port = 1718
#Broadcast address
#4   ip = <255.255.255.255>
#4   port = 1718
#station ras port (reply from gatekeeper)
2  rasPort = 1719
```

To broadcast to all gatekeepers, comment lines 4 and 5 and uncomment lines 7 and 8 as shown below:

```
#Not applicable when manualDiscovery is enabled !
2  rasMulticastAddress = 0
3   ipAddress = 0
#4    ip = <224.0.1.41>
#4    port = 1718
#Broadcast address
4   ip = <255.255.255.255>
4   port = 1718
#station ras port (reply from gatekeeper)
2  rasPort = 1719
```

Identify the Gateway

The gateway may identify itself by name and/or by phone number. If you wish to identify your gateway by only one characteristic, comment out the pair of lines that are not used (lines 7 and 8 or lines 9 and10):

```
2  registrationInfo = 0
3   terminalType = 0
4    mc           = 0
4    undefinedNode = 0
4    terminal = 0
4    vendor = 0
5     vendor = 0
6      t35CountryCode  =  181  #USA
# 88 Israel
6      t35Extension    = 11
6      manufacturerCode  = 11
5     productId = 'IPLink'
5      versionId = 'Dialogic Corp.'
3   terminalAlias = 0
4    * = 0
5     h323-ID = "Insert Gateway Name Here"
4    * = 0
5     e164 = 'Insert Gateway Phone Number Here'!
```

NOTE: The *config.val* syntax requires that the gateway name string be contained within double quotes and the gateway phone number string be contained within single quotes, followed by an exclamation point.

Supply Vendor Specific Information

Vendor specific information can be sent during call setup. Upon receiving a call offering event, this information can be retrieved by the application using the **TSC_MsgGetCallInfo** command with **CallInfo_VendorInfo** as the information (Direct Interface) or **gc_Extension( )** function with **IPPARM_VENDOR_PRODUCT_ID** as the information (Global Call). The event is defined as:

Typedef struct {
    Uint32 CountryCode;
    Uing32 Ext;
    Uint16 ManufacturerCode;
    Char   ProductId[64]

```
    char       VersionId[32];
}NetTSC_VendorInfo_t;
```

Change the information in the highlighted rows according to the vendor specific information to be sent.

```
2  registrationInfo = 0
3   terminalType = 0
4    mc           = 0
4    undefinedNode = 0
4    terminal = 0
4    vendor = 0
5     vendor = 0
6      t35CountryCode  =  181  #USA
# 88 Israel
6      t35Extension    = 11
6      manufacturerCode  = 11
5     productId = 'IPLink'
5      versionId = 'Dialogic Corp.'
3   terminalAlias = 0
4    * = 0
5     h323-ID = "Insert Gateway Name Here"
4    * = 0
5     e164 = 'Insert Gateway Phone Number Here'!
```

Disable H.245 Tunneling

H.245 Tunneling is enabled by default. To disable, comment out the line in the config.val as illustrated below:

```
1 Q931 = 0
2  responseTimeOut = 50
2  connectTimeOut = 500
2  callSignalingPort = 1720
#2  h245Tunneling = 0
2  maxCalls = 60
#2  notEstablishControl = 0
2  manualAccept = 1
```

4.14.2. Run the Embedded H.323 Stack Configuration Utility (IPTConf.exe)

The *IPTConf.exe* utility converts the H.323 stack configuration file (*config.val*) from text format to a binary file and downloads it to the H.323 component on the PowerPC daughterboard. This is required in systems containing DM3 IPLink T-1 or E-1 NIC boards. The *IPTConf.exe* utility is automatically invoked by the downloader, but also can be invoked on a per board basis.

- Edit IPTConfig.cfg File
- Run IPTConfig.exe File

Edit IPTConfig.cfg File

The *IPTConf.exe* utility uses the configuration file *IPTConf.cfg* to specify the stack configuration file (*config.val*) to be downloaded to each applicable board in the system. The default *IPTConf.cfg* file assigns the same *config.va*l file to all the boards in the system. The default location of the *IPTConf.cfg* file is C:\Program Files\Dialogic\cfg.

Each destination board must have an entry in the *IPTConf.cfg* file. The following is an example of a multiple board entry in the *IPTConf.cfg* file, using a different H.323 stack configuration file for each board:

```
BoardId = 0
{
ConfigValFile = config_1.val
CreateBufFile = TRUE
}
BoardId = 1
{
ConfigValFile = config_2.val
CreateBufFile = TRUE
}
BoardId = 3
{
ConfigValFile = config_3.val
CreateBufFile = TRUE
}
```

BoardId - The ID of the destination DM3 board to download the stack configuration file. Open DCM to verify the board ID.

ConfigValFile - The name of the H.323 stack configuration text file for the relevant board.

CreateBufFile - Indicates to the application whether or not to convert the stack configuration text file (*config.val*) to a binary file before starting the download process. This flag can be useful when the configuration text file has not changed and the binary configuration file already exists. The values for this flag are:

- TRUE - convert the file to binary. A stack configuration file is created for each board. The file name is *config<bdID>.buf*, where <bdID> is the board ID.
- FALSE - use the existing binary file

NOTE: The H.323 stack cannot be reconfigured on the fly. It must be redownloaded.

Run IPTConfig.exe File

The *IPTConf.exe* utility is automatically invoked by the downloader, but also can be invoke on a single board. After the first download is completed, a table of all of the existing boards in the gateway is created. In this table every board has a unique id called **AUID** that can be used to download a single board.

1. Run `detect` to see this table.

2. Using DCM, stop or start a single board without interfering with the other boards' status.

3. After starting the board, it is possible to manually run *IPTConf.exe* on a single board. First run `listboards` to get the board's **CfgId**, and then run:

   ```
   iptconf -b<cfgId>
   ```

   This will redownload the H.323 stack configuration information.

5. Administration Reference

This chapter describes the following administration tasks associated with using the Intel® Dialogic® System Software:

- Starting and Stopping the Intel® Dialogic System
- Running Demo Programs
- Performance Monitoring
- Managing a System Remotely Using Windows 2000 Terminal Services
- Troubleshooting - This section provides the following troubleshooting information:
  - Resolving Hardware Conflicts
  - Replacing CompactPCI Boards
  - Installing the Intel® Dialogic System Software with Terminal Services Running on Windows 2000
  - Installing a DM3 PCI or CompactPCI Board on a Windows 2000 System

5.1. Starting and Stopping the Intel® Dialogic System

After you install and configure Intel® Dialogic boards, you can start the Intel® Dialogic System. This downloads firmware with configuration parameter settings to the Intel® Dialogic boards and initiates their device drivers. Following this, you can use some of the tools provided by Intel to verify that your system is operating properly, before starting work on your applications. This information is provided as follows:

- Initiating the Intel® Dialogic System
- Automatic Startup Mode

5.1.1. Initiating the Intel® Dialogic System

To start the Intel® Dialogic System, click the **Start Service** option from the **Service** pull-down menu or click the **Start Service** icon on the Dialogic Configuration Manager (DCM) Main Window (Figure 25).

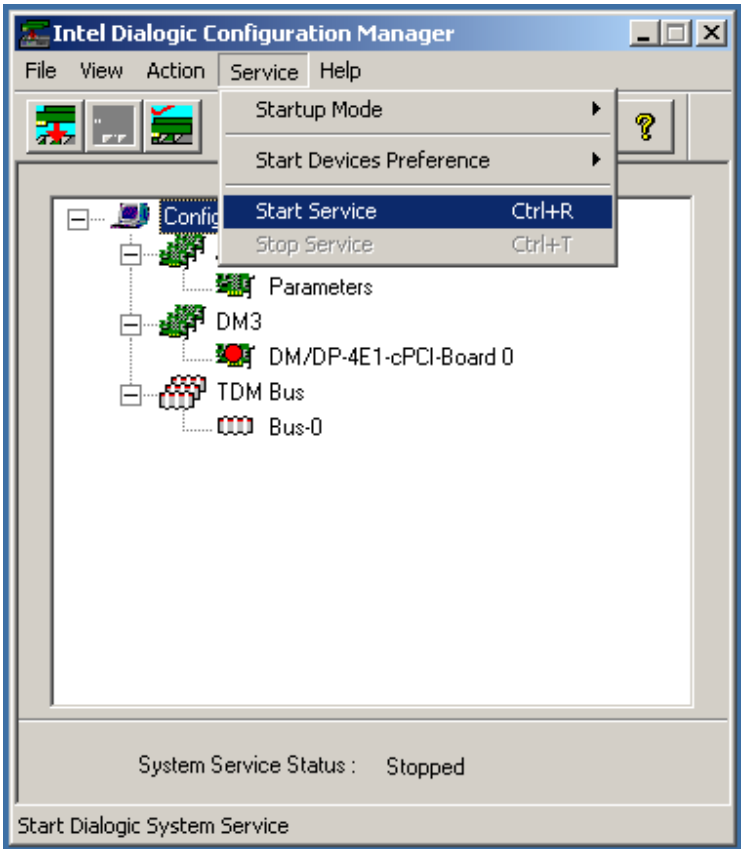


Figure 25. Start the Intel Dialogic System

You also have the option of selecting the **Start Devices Preference** option (Figure 26). This allows you to select from two modes:

- Start All Device(s) or Start None - starts all the boards in the system or does not start any boards.
- Start Selective (Good Devices Only) - starts only those boards that the system considers good.

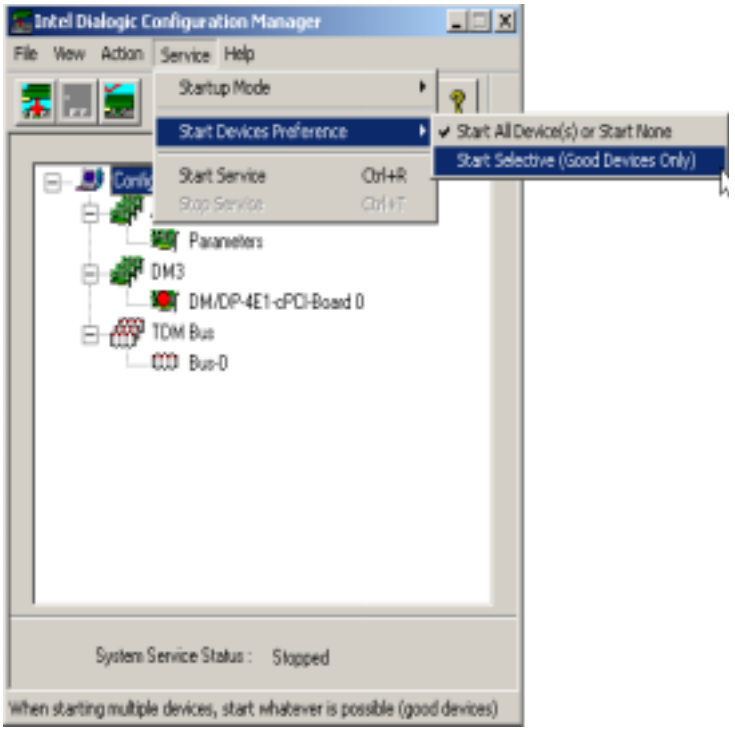


Figure 26. Start Devices Preference

It may take several minutes for the Intel® Dialogic System to start. DCM displays a progress bar in the upper right corner of the screen during the wait time. When the Intel® Dialogic System starts, the **Intel Dialogic System Service Status** indicator at the bottom of the DCM Main Window indicates **Running**.

The progress bar is normally displayed until the Intel® Dialogic System is started. However, when connected to a remote node, for example, the time to download boards and start the Intel® Dialogic System could be extended because of network latency. If the progress bar is no longer displayed but the **Intel Dialogic System Service Status** indicator does not indicate the **Running** state yet, this does not necessarily indicate a problem. Click the **Refresh** icon on the DCM Main Window

periodically to update the **Intel Dialogic System Service Status** indicator. Eventually, it should indicate **Running**. If not, check the Windows Event Viewer to see if an error occurred.

You cannot start the Intel® Dialogic System while all the boards are disabled. Also, you should not start the Intel® Dialogic System Service from the Windows Control Panel.

If you need to detect devices, use the DCM **Action** pull-down menu options or the **Control Panel** to stop the Intel Dialogic System and initiate device detection.

NOTE: When scanning the PCI bus, Windows 2000 uses an *inf* file to correlate a discovered device with a driver binary file that would be loaded for the scanned device. In this case, you need to direct the system to the *inf* file. The *inf* file makes the system aware of the name and manufacturer of the Intel® Dialogic board. The *inf* file also keeps track of the device in the device manager.

If you don't point the system to the *inf* file, a **Found New Hardware Wizard** will appear every time you reboot the computer. Refer to the procedure in Section 5.6.4, "Installing a DM3 PCI or CompactPCI Board on a Windows 2000 System", on page 142.

5.1.2. Automatic Startup Mode

Setting Startup Mode to Automatic

There are cases where the Intel® Dialogic System has to be started automatically (without human assistance). Users with administrative privileges can set the **Startup Mode** to **Automatic** using the DCM **Service** pull-down menu (Figure 25) or programmatically using the NCM API library (described in the *Customization Tools for Installation and Configuration Guide*). If the **Startup Mode** is set to **Automatic**, the Intel® Dialogic System restarts automatically when the system reboots.

NOTE: Do *not* use the Windows Services applet to set the Intel® Dialogic System startup mode to **Automatic**. You must use the DCM GUI or the NCM API to do this because they internally set the startup mode of the Intel® Dialogic drivers to **Automatic**. If you use the Windows Services applet, you will not set up the driver dependencies properly.

NOTE: If you set the **Startup Mode** to **Automatic**, and you want to reconfigure boards through DCM after rebooting the computer, you should use DCM to stop the Intel® Dialogic System and then do the normal operations through DCM. (It is possible to use Windows Services applet to stop the Intel® Dialogic System but it is not recommended.)

Setting Startup Mode to Manual Before Making Hardware Changes

Do not make changes to the Intel® Dialogic hardware in the system while the Intel® Dialogic System is set to **Automatic Startup Mode**. This is because in **Automatic Startup Mode**, the Intel® Dialogic System does **not** run the detection routine. If you intend to change hardware, set the **Startup Mode** to **Manual** first. Then, after you've completed the changes and the detection routine has run, you can set the **Startup Mode** to **Automatic** again.

5.2. Verifying that DM3 Boards are Operating

To verify that a DM3 board in your system is running, follow these steps:

1. Start the DCM and check that System Service is running.

2. In the DCM Main Window, locate the name of the board that you wish to verify.

3. Observe the icon to the left of the board name. If the icon is green, the board is running. If the icon is red, the board has been stopped and is, therefore, not running.

5.3. Running Demo Programs

The demo programs can be used to verify that your system is working properly. After completing all of the installation steps required for your configuration, run any demos that are applicable to your configuration. Check the online bookshelf included with this release for demo code documentation. For example, for DM3 IPLink products, see the *IPT/TSP Gateway Demo User's Guide*, *IPTGate Demo User's Guide*, and *IPTMail Demo User's Guide*.

NOTE: To use the Standalone Fax demo or Synchronous Multithreaded demo, you *must* have the Global Call API Package installed. See Section 2.2, “Determining Which Components to Install”, on page 23 and Section 2.5, “Installing Intel Dialogic System Release 5.1.1 Software”, on page 30.

5.4. Performance Monitoring

The Intel® Dialogic performance counters enable you to track Intel® Dialogic® board performance statistics through the Windows Performance Monitor.

NOTE: Running the Intel® Dialogic performance counters mildly degrades the performance of the Intel® Dialogic drivers.

5.4.1. Initially Enabling Intel® Dialogic Performance Counters - Windows NT

To use the Intel® Dialogic performance counters, you must include them when you install the Intel® Dialogic System Software by selecting either the **Complete** or **Custom** install option. (**Performance Counters for Win NT Perf. Monitor** should already be selected on the **Custom Component Selection** screen.)

When the installation is complete and you have rebooted the system, perform the following steps:

1. Invoke the Windows command line.
2. Make the current directory *<Install Directory>\Dialogic\Bin*.
3. Execute *perfcctl.exe*.
4. Check the **Enabled** box.
5. Start the Intel Dialogic System.

   For information about starting and stopping the Intel Dialogic System, see Section 5.1, “Starting and Stopping the Intel® Dialogic System”, on page 117.
6. Click **Performance Monitor** from the **Administrative Tools (Common)** program group.

The Performance Monitor's main window appears.

7. Click **Add To Chart** from the **Edit** menu.
   The **Add to Chart** dialog box appears.

8. Select **DlgcSram** from the **Object** drop-down list.

9. Highlight the counter(s) you want to monitor from the **Counter** list. The counters are:
   - **Interrupts/sec**: rate of device's interrupts to the driver per second
   - **Driver Commands/sec**: rate of commands to the driver per second
   - **Firmware Commands/sec**: rate of commands to the board(s) per second
   - **Bytes Written/sec**: rate of bytes written to the board(s) per second
   - **Bytes Read/sec**: rate of bytes read from the board(s) per second
   - **Total Bytes Transferred/sec**: rate of bytes transferred to and from the board(s) per second
   - **Total Bytes of Record Data Lost**: total number of bytes of data lost whenever there was some data ("recorded" data) read from the SRAM but no pending read request.
   - **Busy Waits/sec**: rate at which the driver waits for firmware to respond per second
   - **Record Overflows:** number of times the firmware sent a data packet (through the DL_BOFULL/DL_B1FULL interrupt) but there was no read request pending from the user. In this case, this data packet is lost and there is no way for the data to be recovered.

10. Click **Add** to add the selected counter(s) to the Performance Monitor chart.

11. Click **Done** to exit the **Add to Chart** dialog box.

5.4.2. Disabling Intel Dialogic Performance Counters - Windows NT

To disable the Intel® Dialogic performance counters, perform the following procedure:

1. Exit the Windows Performance Monitor.

2. Close any application that writes to or reads from the Intel® Dialogic drivers.

3. Stop the Intel® Dialogic System.
   For information about starting and stopping the Intel Dialogic System, see Section 5.1, “Starting and Stopping the Intel® Dialogic System”, on page 117.

4. Invoke the Windows command line.

5. Make the current directory *<Install Directory>\Dialogic\Bin*.

6. Execute *perfcctl.exe*.

7. Uncheck the **Enabled** box.

8. Start the Intel Dialogic System.

After this is done, **DlgcSram** will no longer appear in the **Object** drop-down list of the Performance Monitor’s **Add To Chart** dialog box.

5.4.3. Re-enabling Intel Dialogic Performance Counters - Windows NT

To re-enable Intel Dialogic performance counters, perform the same procedure given in Section 5.4.2, “Disabling Intel Dialogic Performance Counters - Windows NT”, on page 123, but check the **Enabled** box when you run *perfcctl.exe*.

5.4.4. Initially Enabling Intel® Dialogic Performance Counters - Windows 2000/Windows XP

To use the Intel® Dialogic performance counters, you must include them when you install the Intel® Dialogic System Software by selecting either the **Complete** or **Custom** install option. (**Performance Counters for Win NT Perf. Monitor** should already be selected on the **Custom Component Selection** screen.)

When the installation is complete and you have rebooted the system, perform the following steps:

1. Invoke the Windows command line.

2. Make the current directory *<Install Directory>\Dialogic\Bin*.

3. Execute *perfcctl.exe*. The Dialogic Performance Counters dialog box appears.

4. Check the **Enabled** box and then click **OK**. A Warning box appears that contains the following instructions:

   "To Enable the performance counters:

   1. Stop the Dialogic System Service (via DCM).

   2. Stop the drivers by typing NET STOP DLGCSRAM at the Command Prompt.

   3. Start the Dialogic System Service (via DCM)."

5. Perform steps 1 and 2 of the above instructions and then click **OK**. The following message is then displayed:

   "The Dialogic SRAM Protocol Driver Service was stopped successfully."

   For information about starting and stopping the Intel® Dialogic System, see Section 5.1, "Starting and Stopping the Intel® Dialogic System", on page 117.

6. Perform step 3 of the above instructions (Start the Dialogic System Service.)

   The performance counters are now enabled.

7. For Windows 2000 - From the Windows Control Panel, double-click on **Administrative Tools** in the program group then double-click on **Performance** in the Administrative Tools group. The Performance main window appears.

   For Windows XP - From the Windows Control Panel, double-click on **Performance and Maintenance**, double-click on **Administrative Tools** in the Performance and Maintenance group, and finally double-click on **Performance** in the Administrative Tools group. The Performance main window appears.

5.4.5. Disabling Intel Dialogic Performance Counters - Windows 2000/Windows XP

To disable the Intel Dialogic performance counters, perform the following procedure:

1. Exit the Windows Performance Monitor.

2. Close any application that writes to or reads from the Intel® Dialogic drivers.

3. Stop the Intel Dialogic System.

   For information about starting and stopping the Intel Dialogic System, see Section 5.1, “Starting and Stopping the Intel® Dialogic System”, on page 117.

4. Invoke the Windows command line.

5. Make the current directory *<Install Directory>\Dialogic\Bin*.

6. Execute *perfcctl.exe*. The Dialogic Performance Counters dialog box appears.

7. Uncheck the **Enabled** box and then click **OK**. A Warning box appears that contains the following instructions:

   “To Disable the performance counters:

   1. Stop the Dialogic System Service (via DCM).

   2. Stop the drivers by typing NET STOP DLGCSRAM at the Command Prompt.

   3. Start the Dialogic System Service (via DCM).”

8. Perform steps 1 and 2 of the above instructions and then click **OK**. The following message is then displayed:

   “The Dialogic SRAM Protocol Driver Service was stopped successfully.”

   For information about starting and stopping the Intel® Dialogic System, see Section 5.1, “Starting and Stopping the Intel® Dialogic System”, on page 117.

9. Perform step 3 of the above instructions (Start the Dialogic System Service.)

   The performance counters are now disabled.

5.4.6. Re-enabling Intel Dialogic Performance Counters - Windows 2000/Windows XP

To re-enable Intel Dialogic performance counters, perform the same procedure given in Section 5.4.5, “Disabling Intel Dialogic Performance Counters - Windows 2000/Windows XP”, on page 126, but check the **Enabled** box when you run *perfcctl.exe*.

5.5. Managing a System Remotely Using Windows 2000 Terminal Services

By using Windows 2000 Terminal Services, you can manage a system containing the Intel® Dialogic System Software and associated boards from a remote computer. In this application of Terminal Services, the computer containing the Intel® Dialogic System Software and associated boards is the Server and the computer providing the remote access is the Client. The Server is required to run the Windows 2000 Terminal Services in the Application Server mode.

When the Client computer communicates with the Server computer using Terminal Services, the DCM graphical interface is displayed on the monitor of the Client computer. And the Client keyboard and mouse allow you to perform configuration tasks remotely by interfacing with the DCM installed on the remote Server that contains the Intel® Dialogic System Software and associated boards.

For additional information about using Terminal Services, refer to the Microsoft Web site.

5.5.1. Special Configuration Considerations for Non-Plug and Play Drivers

To remotely start and configure the Intel® Dialogic System using Terminal Services for a Server that uses non-Plug and Play drivers, you will need to perform the following procedure at the Terminal Services Client computer.

1. From the Terminal Services client computer, connect and log on as Administrator to the remote Intel® Dialogic System residing on the Windows 2000 Server. Invoke the Computer Management console from the Start menu.

Start>Programs>Administrative Tools>Computer Management

2. Select the Device Manager as shown in Figure 27, “Computer Management Display”, on page 129.

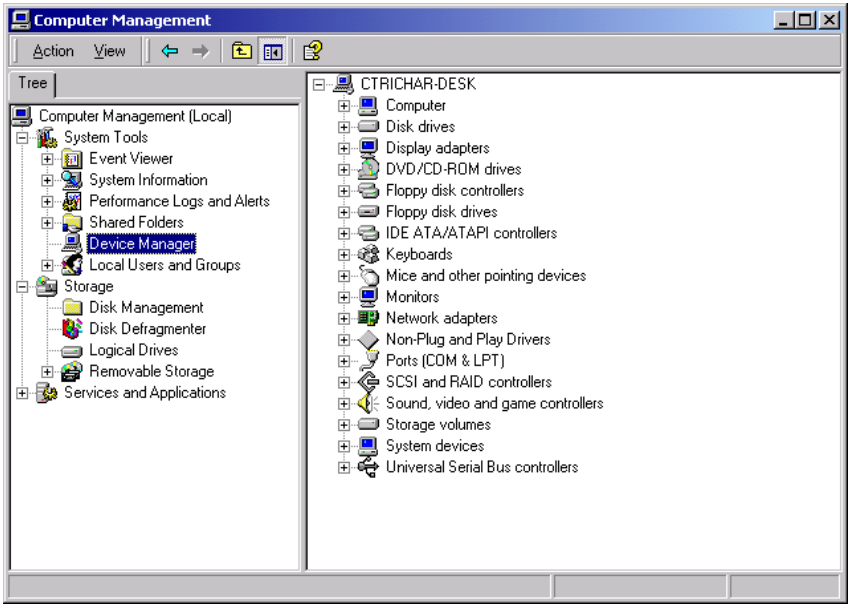
3. From the View menu, check “Show hidden devices.” The non-Plug and Play Drivers will now be displayed in the right-hand pane. See Figure 28, “Non-Plug and Play Drivers Display”, on page 130.

4. Double click on the Dialogic Configuration Driver to display the Dialogic Configuration Driver Properties dialog box. See Figure 29, “Dialogic Configuration Driver Properties”, on page 131.

5. From the Driver tab, select Automatic as the Startup Type and then click OK.

6. Repeat steps 4 and 5 to change the Startup Type to Automatic for the Dialogic SRAM Protocol Driver and the driver labeled “dlgcmcd.”

Figure 27. Computer Management Display



7. Reboot the Terminal Services Server computer. After re-establishing the connection between the Client and Server computers, start up DCM from the Client computer and configure the system to auto-detect Springware and DM3 devices. If there are no DM3 devices installed, the DM3 device driver will log errors in the Event Properties log. These errors are non-fatal and may be ignored.

Figure 28. Non-Plug and Play Drivers Display

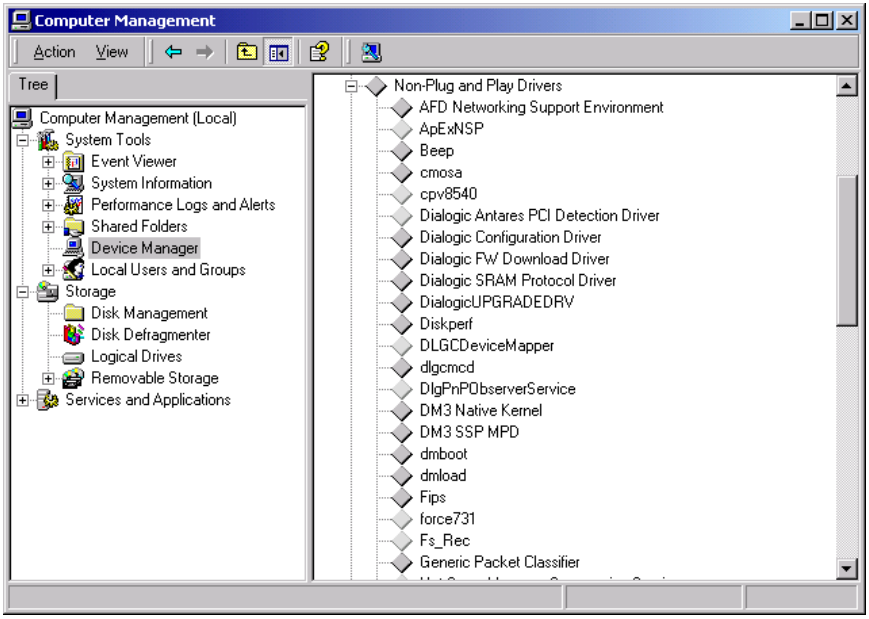
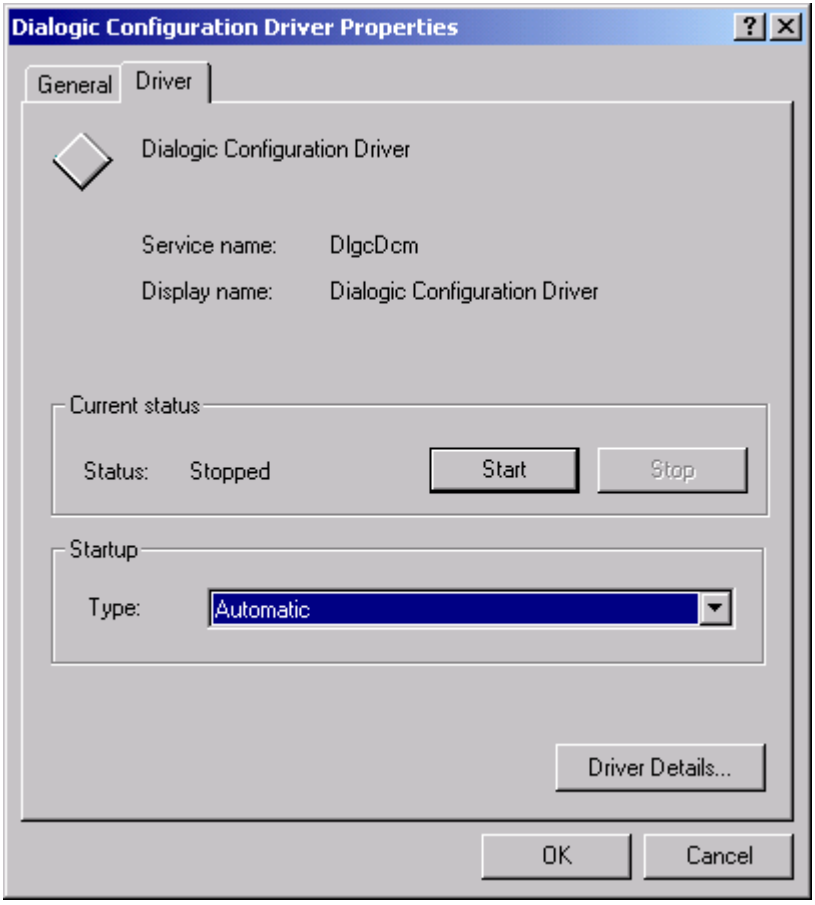


Figure 29. Dialogic Configuration Driver Properties



5.6. Troubleshooting

This section gives information about the following:

- Resolving Hardware Conflicts
- Replacing CompactPCI Boards
- Installing the Intel® Dialogic System Software with Terminal Services Running on Windows 2000
- Installing a DM3 PCI or CompactPCI Board on a Windows 2000 System

5.6.1. Resolving Hardware Conflicts

Intel® Dialogic Board Locator Technology (BLT) and Hardware Configurable boards must be configured to interface to the host through interrupts, shared RAM addresses, and ports. Intel® Dialogic Configuration Manager (DCM) maintains configuration parameters that store the values of these settings.

This section describes how these configuration parameters are set in DCM, discusses how conflicts causing problems with your system may occur, and explains how to resolve these conflicts.

Automated Maintenance of System Parameters in DCM

In order for the Intel® Dialogic System Software to download to the boards in the system, the parameters specified in Table 13 must be set appropriately.

Table 13. DCM System Parameters

Board Type	Parameters	Property Sheet
Hardware Configurable	D41DAddress D41DInterrupt	System System
BLT	BLTAddress BLTInterrupt	System System

The DCM system parameters are set during the installation process as follows:

- **For BLT boards**: Install BLT boards in the system before running DCM (refer to Section 2.1.6, “Configuring and Installing BLT, PCI, and cPCI Boards”, on page 19). When you run DCM, it automatically detects the BLT boards, queries the Windows kernel for available interrupts and memory, and sets the values of **BLTInterrupt** and **BLTAddress** accordingly.
- **For Hardware Configurable boards**: Run DCM before installing Hardware Configurable boards. When you add configuration data for the Hardware Configurable boards, DCM queries the Windows kernel and sets the values of **D41DInterrupt** and **D41DAddress** accordingly. You can then configure the jumper and switch settings on the boards and install the boards in your system. This process is described in detail in Section 4.3, “Configuring and Installing Hardware Configurable Boards”, on page 46.

As long as the Hardware Configurable board jumper and switch settings correspond to the values in DCM, and as long as no other device in the system is attempting to use the same interrupt, port, or address, the Intel® Dialogic System will start successfully with the installed hardware.

System Parameter Conflicts

Problems with the system parameter settings typically result in a system lockup. These problems include:

- Conflicts between DCM system parameter values and the board’s jumper and switch settings (for Hardware Configurable boards)
- Conflicts between the system parameter settings and another device in the system

The accuracy of the system settings in DCM depends on the non-Intel® Dialogic devices in your system adhering to the standard Windows procedures for requesting the use of system resources. If they do not, then the system settings that DCM retrieves from the Windows kernel may be in use by another device. In this case, a conflict may occur.

To check the system for these problems, perform the following procedure:

1. If you have Hardware Configurable boards in your system:

1.a. Power down the system.

1.b. Remove the Hardware Configurable board(s) from the system.

1.c. Restart the system.

2. If the system is not locked, access DCM by clicking the **Intel Dialogic Configuration Manager (DCM)** icon from the **Intel Dialogic System Software** folder.

3. Record the current system parameter settings as follows:
   - BLT boards: The system parameters for all BLT boards are the same, so you can double-click the model name for only one BLT board and make note of the values of the appropriate system parameters (see Table 13, “DCM System Parameters”, on page 132).
   - Hardware Configurable boards: The memory and port parameters differ for each Hardware Configurable board in the system, so you must double-click the model name for every Hardware Configurable board and make a note of the values of the appropriate system parameters (see Table 13, “DCM System Parameters”, on page 132).

4. For Hardware Configurable boards, verify that the board jumper and switch settings correspond to the values of the system parameters. If there is a mismatch, correct the board settings and proceed to step 7. Otherwise, proceed to the next step.

5. Determine which interrupt, port, or memory resources you recorded in step 3 are being used by another device in the system, as follows:

   5.a. Invoke the **Windows Diagnostics** from the **Administrative Tools (Common)** program group.

   5.b. Click the **Resources** tab.

   5.c. Then, by clicking the buttons at the bottom of the **Resources** tab, you can determine what IRQs, ports, and memory addresses are being used by other devices in the system.

6. Change the Intel® Dialogic system parameters in DCM to values that do not conflict with the other devices in the system.

For Hardware Configurable boards, reset the boards' jumpers and switches to the new values.

NOTE: If system resources are not available, your system administrator may need to allocate resources on the computer. Refer to *General PC Troubleshooting Tips* on the Intel® Networking & Communications Telecom Support Resources Web site (*http://resource.intel.com/telecom/support/tnotes/gentnote/dl_hard/tn169.htm*).

7. If Hardware Configurable boards were removed in step 1:

   7.a. Power down the system.

   7.b. Reinstall the boards.

   7.c. Restart the system and run DCM.

If you are unable to resolve the problem with this procedure, contact customer support (see Chapter 8, "Technical Support").

5.6.2. Replacing CompactPCI Boards

DM3 H.110 capable boards can be individually stopped and started, allowing you to replace CompactPCI boards without shutting down the system or application. This process has the following restrictions:

- You must stop the board before removing it.
- The replacement board must be the same type as the replaced board (like-for-like).
- You cannot add a board to the system.

NOTE: DM3 H.100 (PCI) boards also can be individually stopped and started, but not for the purpose of performing a like-for-like replacement. For example, you can stop and start a DM3 PCI board to re-download the firmware to the board.

To perform a like-for-like replacement using the Intel® Dialogic Configuration Manager (DCM), use the following procedure:

1. Invoke DCM.

You can access DCM by clicking the **Intel Dialogic Configuration Manager** icon from the Intel® Dialogic System Software folder.

When DCM starts, the DCM Main Window displays the board configuration data for your system in a tree structure. The first level of the structure shows the board families or categories of Intel® Dialogic boards. If necessary, expand the first level of the tree structure by clicking the family name node(s). The next level displays the model names of the Intel® Dialogic boards configured in your system.

2. Click the device (board) that you want to stop.

3. Right-click the device name.

   The context menu appears.

4. Select **Stop Device** from the Action Menu or right click on the device and select **Stop Device** from the context menu (see Figure 30, “Start/Stop Boards”, on page 137).

   For instructions on physically removing the H.110 board from the system and installing the H.110 board in the system, consult the *Quick Install Card* accompanying the board. The replacement board *must* be the same model as the removed board. The new board will assume the configuration settings of the board it replaces.

   NOTE: If you do not replace the removed board with the same type of board, re-detection of the board will be necessary because the board entry isn’t deleted when the board is removed. You must re-detect the board before restarting the Intel® Dialogic System by either running the re-detect from the DCM menu or rebooting. If you reboot, the **Startup Mode** must be set to **Manual**. See Section 5.1.2, “Automatic Startup Mode”, on page 120.

5. Select **Start Device** from the Action Menu or right click on the device and select **Start Device** from the context menu to start the new board.

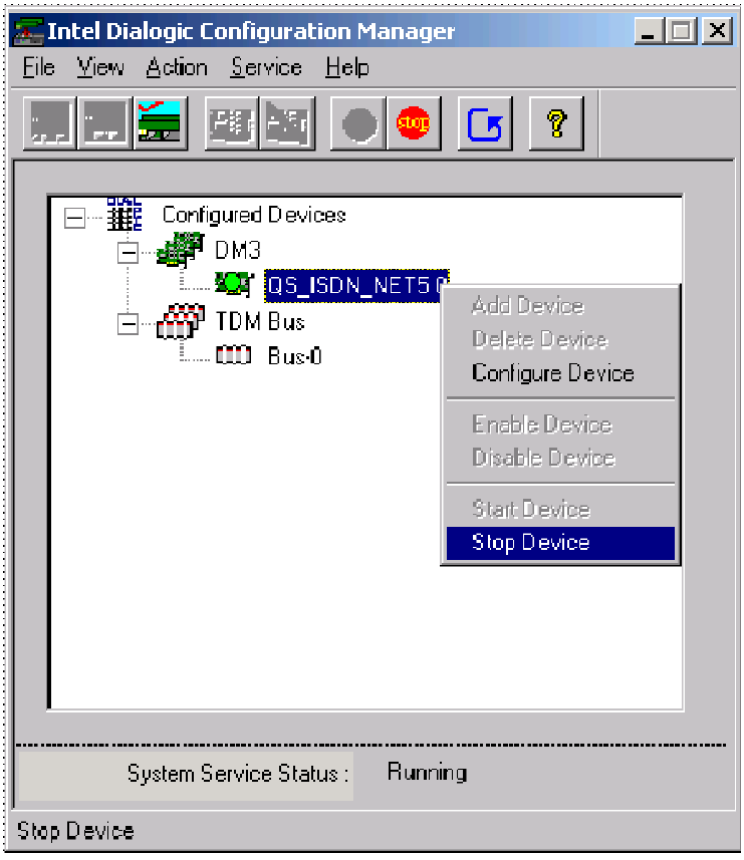


Figure 30. Start/Stop Boards

In addition, see the *SNMP Agent Software for Windows Operating Systems Administration Guide* (formerly called *BoardWatch User's Guide*) for information about stopping and starting boards, the Intel® Dialogic® SNMP-based remote administration product.

5.6.3. Installing the Intel® Dialogic System Software with Terminal Services Running on Windows 2000

The installation procedure in Section 2.5, “Installing Intel Dialogic System Release 5.1.1 Software”, on page 30 tells you to begin the install by inserting the CD-ROM and by locating and double-clicking the *Setup.exe* file if the installation doesn’t begin automatically.

However, if you have Terminal Services running on Windows 2000, a terminal server must be in install mode before you can install a program. When you try to double-click a *setup*, you will receive a message that explains this (Figure 31):

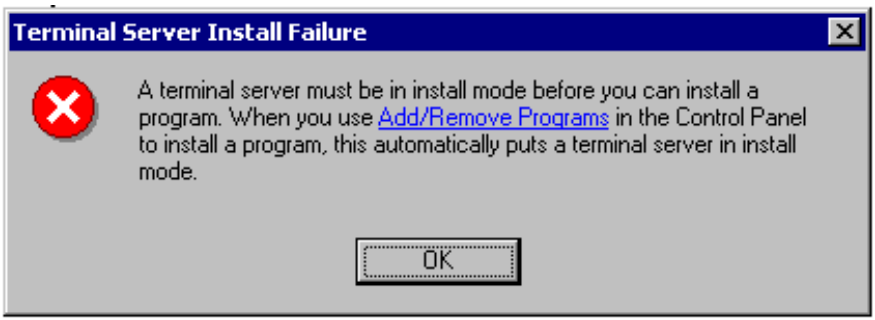


Figure 31. Terminal Server Install Failure

Follow these steps to start the installation of the Intel® Dialogic System Software:

1. Go to the **Control Panel** by clicking the link (Add/Remove Programs) on the message box (Figure 31).

   Or you can click **OK** (this simply closes the message box but doesn’t start the install) and go to **Start > Settings > Control Panel**. Then select **Add/Remove Programs**.

   The **Add/Remove Programs** screen appears (Figure 32).

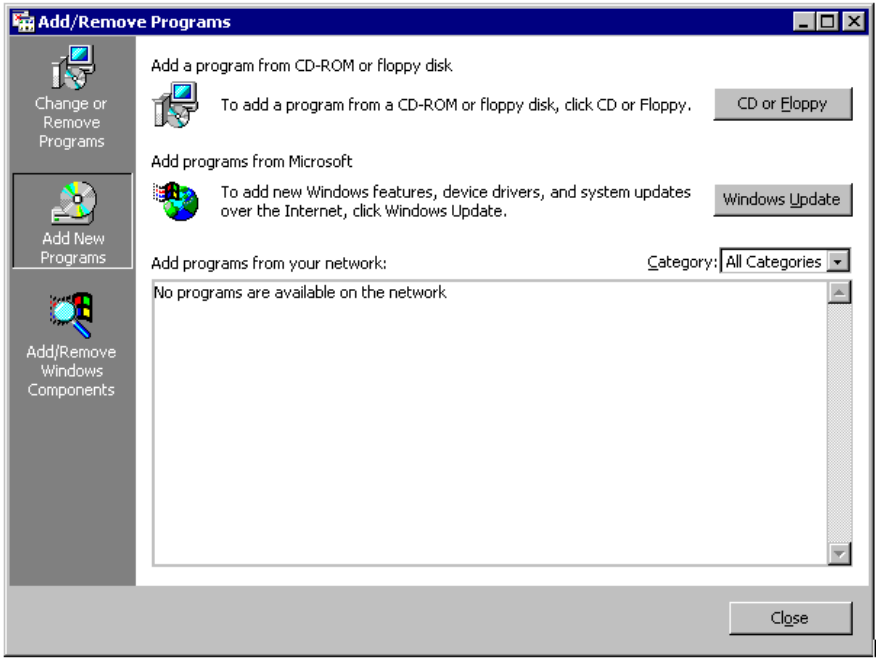


Figure 32. Add/Remove Programs

2. Select **Add New Programs** on the left and then select **CD or Floppy** (Figure 32). The I**nstall Program From Floppy Disk or CD-ROM** screen appears (Figure 33).

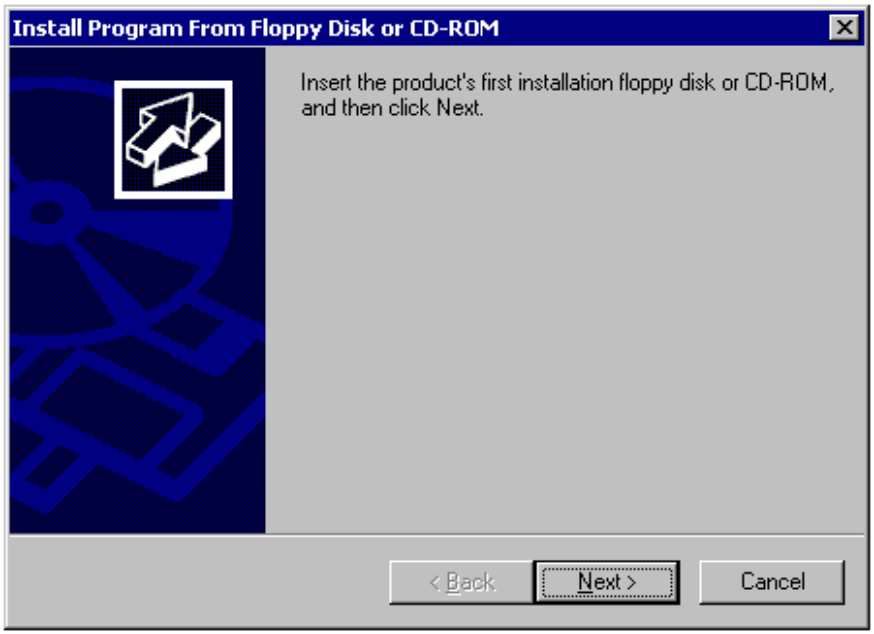


Figure 33. Install Program Screen

3. Click **Next**. A screen will appear to prompt for the path to the *setup.exe* file (Figure 34).

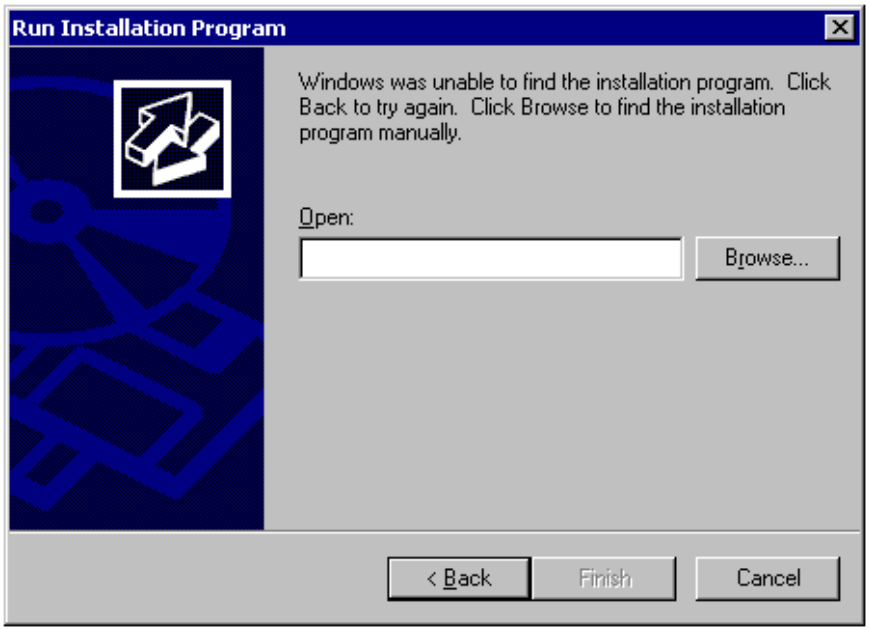


Figure 34. Run Installation Program - Browse

4. Click **Browse** to select the path to *Setup.exe*.

5. Click **Next**. The install will now run.

6. Follow the instructions given in Section 2.5, “Installing Intel Dialogic System Release 5.1.1 Software”, on page 30.

7. When the installation is complete, you will be prompted to click **Next** and **Finish** on the last two “install mode” screens in the Terminal Server install sequence.

5.6.4. Installing a DM3 PCI or CompactPCI Board on a Windows 2000 System

When scanning the PCI bus, Windows 2000 uses an *inf* file to correlate a discovered device with a driver binary file that would be loaded for the scanned device. In this case, you need to direct the system to this *inf* file. The *inf* file makes the system aware of the name and manufacturer of the Intel® Dialogic board. The *inf* file also keeps track of the device in the device manager. If you don't point the system to the *inf* file, a **Found New Hardware Wizard** will appear every time you reboot the computer.

The following procedure describes how to point the system to the *inf* file when installing a DM3 PCI or CompactPCI board. The following steps need only be followed for Windows 2000 systems that have a system release that does not support Plug and Play drivers.

1. Install the Intel® Dialogic System Software (refer to Chapter 2, "Intel® Dialogic® System Release 5.1.1 Installation Procedures" and Chapter 3, "Intel® Dialogic® System Release 5.1.1, Feature Pack 1 Installation Procedures").

2. After installation, make sure that the following file is included in the *DRVR* directory under the Intel® Dialogic system directory: *dlgcdm3_nt4.inf*

3. Insert the Intel® Dialogic PCI or cPCI board following the instructions in the hardware *Quick Install Card*. Make sure that this is the only new PCI device that is being added to the system.

4. Reboot the system and log on. After the login is completed the system automatically detects the presence of the Intel® Dialogic board and starts the **Found New Hardware Wizard**. The purpose of the wizard is to give you an opportunity to direct the system towards the *inf* file for the new hardware you have just added.

5. Click **Next** on the **Welcome** dialog box. The **Install Hardware Device Drivers** dialog box appears. It asks you to choose a location for the driver.

6. Select the radio button **Search for a suitable driver for my device (recommended)**.

7. Click **Next**. The **Locate Driver Files** dialog box appears. It has a series of check boxes.

8. Check the box next to **Specify a location**.

9. Click **Next**.

10. Click the **Browse** button and point to the *dialogic\drvr* directory under the Intel® Dialogic system directory.

11. Click **OK**.

12. In the **Driver Files Search Results** dialog box, verify that the file *dlgcdm3_nt4.inf* was found by Windows as a driver for the new device.

13. The **Completing the Found New Hardware Wizard** dialog box appears and it displays the name of the Intel® Dialogic board that it finished installing. Make sure the correct name appears.

14. Click **Finish**. This finishes the installation of this board.

To add subsequent supported Intel® Dialogic PCI or cPCI boards, you can shut down the system, insert the board, and reboot the system. Upon booting up, the system will:

- scan the new board
- automatically locate the *inf* file
- find the name of the newly inserted board.

This can be checked inside the device manager.

6. Installing and Configuring the SCX160 SCxbus Adapter

This chapter provides instructions for installing and configuring the SCX160 SCxbus Adapter into a multi-node system. To do this, you must plan ahead and carefully follow the step-by-step instructions in this chapter. It is advisable to read the entire chapter once before attempting to perform any of the steps described.

The overall procedure is as follows:

- Preparation
- Determining Installation Requirements
- Installing the SCX160 SCxbus Adapter
- Initiating the Node Configuration Process
- Modifying a Multi-Node System
- Removing the SCX160 SCxbus Adapter

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 Intel Dialogic board for further information. Electrostatic discharge can damage your board.

6.1. Preparation

Before you install and configure the SCX160 SCxbus Adapter, you must complete these preparatory steps:

1. Install the Intel Dialogic System Software with the SCX160 SCxbus Adapter feature selected in the **Custom** options window (or choose the **Complete** install).

For more information about the Intel Dialogic System Software installation process, refer to Section 2.5, “Installing Intel Dialogic System Release 5.1.1 Software”, on page 30, Section 2.2, “Determining Which Components to Install”, on page 23, or consult the installation online help by pressing the **F1** key from any installation window.

2. Install and configure all Intel Dialogic hardware **except** the SCX160 SCxbus Adapter on every node in the multi-node system.

3. Stop the Intel Dialogic System.

   For information about stopping and starting the Intel Dialogic System, see Section 5.1, “Starting and Stopping the Intel® Dialogic System”, on page 117.

4. Set the Intel Dialogic System startup mode to **Manual**. You can set the Startup Mode using the DCM **Service** pull-down menu.

5. Close any open applications.

6. Remove previous SCX160 SCxbus Adapter files from system.

   If you have previously used the SCX160 SCxbus Adapter on any one of the nodes you are configuring, remove the files listed in Table 14.

Table 14. SCX 160 SCxbus Adapter Files

File Name	Description	Default Location
Sctsbase	Base time slot assignment	*\Program Files\Dialogic\Cfg*
Scxnode.ini	Node configuration information	*\Program Files\Dialogic\Cfg*
Sctscustom	Data stream blocking configuration	*\Program Files\Dialogic\Cfg*
Scxmap.dat	Cumulative node information	Map file directory and backup map file directory

6.2. Determining Installation Requirements

Refer to the **Applicability** column in Table 15, “Steps Required for Installing and Configuring the SCX 160 SCxbus Adapter”, on page 148, to determine the steps required for installing and configuring the SCX160 SCxbus Adapter. The user-categories described in the applicability column are:

- **Map File:**
  - **Local**: Each node in the multi-node system has its own copy of the *Scxmap.dat* file, accessible only on that node’s hard drive. The local map file contains the information for the node being configured as well as the configuration information of all previously configured nodes. This information is stored on a disk and is transferred to other nodes by copying the local map file from the node just installed to the disk, and then copying the local map file from the disk to the directory of the next node.
  - **Global**: The *Scxmap.dat* file is kept on a network server accessible to each node during configuration and whenever a node is initialized. If the global map file is not available, the backup map file in the backup directory on the local node is used for subsequent reinitializations.
- **Data Streaming:**
  - **Non-Blocked**: In a non-blocked data streaming configuration, all SCbus data streams (bundles of time slots) in each node are transmitted onto the SCxbus. All resources (voice, analog, digital) are available to any node within the multi-node system.
  - **Blocked**: In a blocked data streaming configuration, some SCbus data streams are blocked from being transmitted onto the SCxbus. This option is necessary if the total time slot requirement of your multi-node system exceeds the 1024 time slot limitation of the SCxbus. In the blocked data streaming scenario, up to 4,096 time slots can be made available in the multi-node system. The resources for which the time slots are blocked can be shared locally within their local node, but not with other nodes. For more information, see the *SCX160 SCxbus Adapter User’s Guide*.

Table 15. Steps Required for Installing and Configuring the SCX 160 SCxbus Adapter

Step	Applicability
Section 6.2.1, “Registering Network Server Share Name”, on page 149	• Map File: Global • Data Streaming: all SCX users
Section 6.2.2, “Analyzing Node Configuration Requirements”, on page 150	• Map File: all SCX users • Data Streaming: all SCX users
Section 6.3, “Installing the SCX160 SCxbus Adapter”, on page 154	• Map File: all SCX users • Data Streaming: all SCX users
Section 6.4, “Initiating the Node Configuration Process”, on page 154	• Map File: all SCX users • Data Streaming: all SCX users
Section 6.4.1, “Configuring Global Map File”, on page 156	• Map File: Global • Data Streaming: all SCX users
Section 6.4.2, “Configuring the Local Map File”, on page 158	• Map File: Local • Data Streaming: all SCX users
Section 6.4.3, “Selecting Data Streaming (First Node Only)”, on page 159	• Map File: all SCX users • Data Streaming: all SCX users
Section 6.4.4, “Configuring Data Streams - Non-Blocked”, on page 161	• Map File: all SCX users • Data Streaming: Non-Blocked
Section 6.4.5, “Configuring Data Streams - Blocked”, on page 161	• Map File: all SCX users • Data Streaming: Blocked
Section 6.4.6, “Configuring Clocking”, on page 163	• Map File: all SCX users • Data Streaming: all SCX users
Section 6.4.7, “Completing Node Configuration”, on page 164	• Map File: all SCX users • Data Streaming: all SCX users

6.2.1. Registering Network Server Share Name

This step is for users in the following categories:

- Map File: Global
- Data Streaming: all SCX users

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

To make the global map file directory accessible to all nodes, the following modification must be made to the registry on the network server that contains the map file.

CAUTION

Incorrect manipulation of the Windows registry can render your system unusable, requiring that you reinstall Windows. This procedure should be carried out only by a system administrator qualified to modify the registry.

1. Invoke the Windows run program menu by selecting **Run** from the **Start** menu.
2. Type `regedt32` and press **Enter** to invoke the Windows registry editor.
3. Double-click **HKEY_LOCAL_MACHINE**.
4. Double-click **System**.
5. Double-click **CurrentControlSet**.
6. Double-click **Services**.
7. Double-click **LanmanServer**.
8. Double-click **Parameters**.

9. Double-click **NullSessionShares** to invoke the key value editor.

10. Type the share name of the directory that contains the global map file.

11. Click **OK**.

12. Exit the registry editor.

This modification allows requests to access this share from null sessions to succeed.

6.2.2. Analyzing Node Configuration Requirements

This step is for users in the following categories:

- Map File: all SCX users
- Data Streaming: all SCX users

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

In this step, you gather the configuration information for each node in the SCX160 SCxbus Adapter multi-node system in the Node Configuration Chart (Figure 35). The Node Configuration Chart provides an opportunity to collect all the information you need for configuring the SCX160 SCxbus Adapter. It also enables you to plan how each node will use time slots, data streaming, and TDM bus clocking. The following descriptions of each item in the chart provide the reference and conceptual information for planning and analysis:

- **Sequential number of node**: This number represents the number of the node in the sequence of nodes. The sequence is determined by the order in which each node is configured. When you run the software installation for each node, follow the order you record for each node.
- **Network name of node**: This value corresponds to the Windows machine name.
- **BLT Interrupt**: This value can be determined by examining the DCM **BLTInterrupt** parameter for any one of the boards installed in the system.
- **BLT Address**: This value can be determined by examining the DCM **BLTAddress** parameter for any one of the boards installed in the system.

- **Map type**: Check **Global** if the *Scxmap.dat* file will be kept on a network server accessible to each node during configuration and whenever a node is initialized. Check **Local** if each node has its own copy of the *Scxmap.dat* file, accessible only on that node's hard drive.
- **Map file path**: This item is for the path in which the *Scxmap.dat* file is kept, whether it is on a local or network drive.
- **Backup map file path**: This item is for the path in which the backup copy of the *Scxmap.dat* file is kept. A backup global map file is required in case the network directory cannot be accessed during boot time. Each node can have its own backup map file path.
- **SCbus Clocking**: See next item.
- **SCxbus Clocking**: In the typical configuration, one node in the multi-node system would provide clocking to all other nodes. This node is designated as the **Master**, and all other nodes would be designated as **Slave**. The SCX160 SCxbus Adapter in the master node would derive its clocking from a network interface on an SCbus board. The SCbus clocking on that node would be designated as **Master**. The SCbus on the slave nodes would derive their clocking from the SCX160 SCxbus Adapter, and hence would be designated as **Slave**. Additional configurations are possible; for more information, see the extensive discussion in the *SCX160 SCxbus Adapter User's Guide*.
- **Time Slot Calculations**: List each board in the system along with its BLT ID (see the DCM **BLTId** parameter for each board in the node) and the time slots required by each board.
- **Total Node Time Slots**: Add the time slots required by all boards.
- **Total Blocked Time Slots**: This number represents the number of time slots to be blocked from the SCxbus. These slots will be subtracted when deriving the subtotal.

  In a non-blocked data streaming configuration, all SCbus data streams (bundles of time slots) in each node are transmitted onto the SCxbus. All resources (voice, analog, digital) are available to any node within the multi-node system In this case, no time slots would be blocked.

  In a blocked data streaming configuration, some SCbus data streams are blocked from being transmitted onto the SCxbus. This option is necessary if the total time slot requirement of your multi-node system exceeds the 1024 time slot limitation of the SCxbus. In the blocked data streaming scenario, up to 4,096 time slots can be made available in the multi-node system. The

resources for which the time slots are blocked can be shared locally within their local node, but not with other nodes. For additional information, see the *SCX160 SCxbus Adapter User's Guide*.

- **Time Slots for Future Expansion**: This number represents the time slots required by any additional hardware you plan to install in the future. More SCbus time slots than are actually required to support the installed boards may be reserved in bundles of 64 time slots (a data stream) so that additional boards can be added to a node without reconfiguring the system. This number will be added when the subtotal is calculated.
- **Total Data Streams**: The total data streams is the number you provide to the configuration utility. (If you are not blocking data streams or reserving time slots for future expansion, the number should be equal to that which is calculated by the configuration utility.) To derive this number, divide the subtotal by 64 and then round the quotient up to the next highest integer.

Node Configuration						
Sequential number of node:			Network name of node:			
BLT Interrupt:			BLT Address:			
Map type (select one):		Map file path:				
Global	Local	Backup map file path:				
SCbus Clocking (select one):			SCxbus Clocking (select one):			
Master	Slave	Fallback	Master	Slave	Fallback	
Time Slot Calculation						
Boards		**Time Slots Bound for SCxbus**				
Board Type	**BLT ID**	**Voice/ Tone**	**Digital**	**Analog**	**Total**	
Total Node Time Slots:						
Total Blocked Time Slots (subtract):						
Time Slots for Future Expansion (add):						
Subtotal:						
Total Data Streams ((Subtotal ÷/64) ->⟹ round up to integer):						

Figure 35. Node Configuration Chart

6.3. Installing the SCX160 SCxbus Adapter

This step is for users in the following categories:

- Map File: all SCX users
- Data Streaming: all SCX users

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

For each node in the multi-node system, you have to power-down the system and install the SCX160 SCxbus Adapter. Follow the instructions provided in the SCX160 SCxbus Adapter’s *Quick Install Card*. Before you power-down the system, be sure to set the Intel Dialogic System mode to **Manual**. You can set the Startup Mode using the DCM **Service** pull-down menu.

When you have installed the board, power-up the system. Do not run DCM until you read the instructions that follow.

6.4. Initiating the Node Configuration Process

This step is for users in the following categories:

- Map File: all SCX users
- Data Streaming: all SCX users

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

To initiate the node configuration process, follow this procedure:

1. Run the Intel Dialogic Configuration Manager (DCM). For instructions, see Section 4.1, “Starting the Intel Dialogic Configuration Manager (DCM)”, on page 40.

   When DCM detects the SCX160 SCxbus Adapter, it invokes the SCX160 SCxbus Adapter configuration program. The program initially prompts the user whether to configure the SCX160 SCxbus Adapter.

2. At the SCX160 SCxbus Adapter configuration program prompt, click **Yes** to begin the SCX160 SCxbus Adapter configuration process.

   The SCX160 SCxbus Adapter configuration program displays a window requesting the user to select either a global map file or local map file (Figure 36).

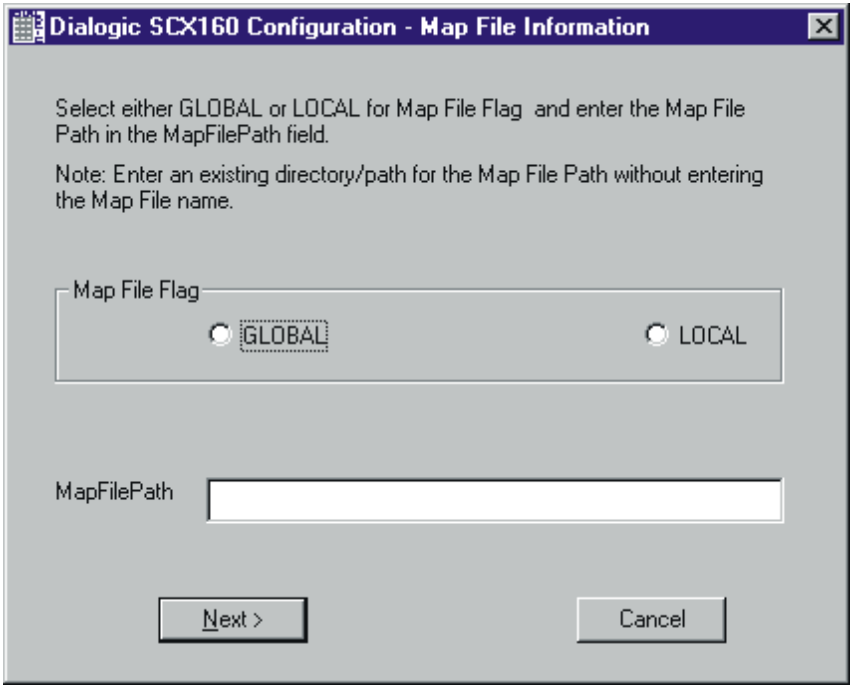


Figure 36. Map File Information

3. Select either **Global** or **Local** and enter the map file path name in the **MapFilePath** field. The directory must already exist.

   Only one map file path is allowed in an SCxbus multi-node system. Ensure that the path is entered correctly when configuring each node.

4. Click **Next** to continue.

- If you selected global map file, proceed to Section 6.4.1, “Configuring Global Map File”, on page 156.
- If you selected local map file, proceed to Section 6.4.2, “Configuring the Local Map File”, on page 158.

NOTE: If the next screen requests that you enter the Node Name for Node 1 and you are not configuring the first node, then the path designated at the first node is inaccessible due to either a typing error or an access error. If this happens, exit the program and start again.

6.4.1. Configuring Global Map File

This step is for users in the following categories:

- Map File: Global
- Data Streaming: all SCX users

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

Once you have selected the **Global** option, the **SCX160 Configuration - Node Name** window is displayed (see Figure 37, “Node Name”, on page 157).

Referring to the Node Configuration Chart you completed (see Section 6.2.2, “Analyzing Node Configuration Requirements”, on page 150), type a name for the current node and a path for the backup map file.

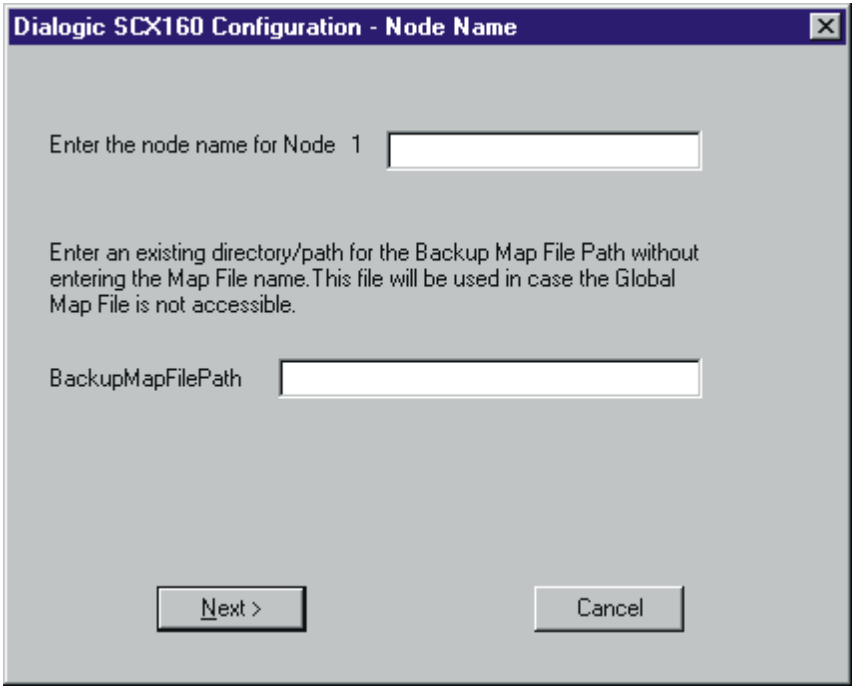


Figure 37. Node Name

NOTES: **1.** The path must be for a directory that already exists.

2. The SCX160 SCxbus Adapter configuration program assigns a node number to the current node. Verify that this number is accurately recorded on the Node Configuration Chart (Figure 35).

The next step in the SCX160 SCxbus Adapter configuration processes depends on whether:

- The current node is the first node being configured: in this case, proceed to Section 6.4.3, “Selecting Data Streaming (First Node Only)”, on page 159.

- The current node is not the first node being configured, and the configuration is non-blocked: in this case, proceed to Section 6.4.4, “Configuring Data Streams - Non-Blocked”, on page 161.
- The current node is not the first node being configured, and the configuration is blocked: in this case, proceed to Section 6.4.5, “Configuring Data Streams - Blocked”, on page 161.

6.4.2. Configuring the Local Map File

This step is for users in the following categories:

- Map File: Local
- Data Streaming: all SCX users

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

To configure the local map file, follow this procedure:

1. When the SCX160 SCxbus Adapter configuration program prompts you to indicate whether this node is the first node being installed in the multi-node system, click **Yes** or **No** accordingly.
   - If this is the first node being installed, click **Yes** and then skip to step 3 below.
   - If this is not the first node being installed, click **No**.

     The SCX160 SCxbus Adapter configuration program prompts you whether to copy the map file from the previous node to the map file path directory that you specified in Section 6.4, “Initiating the Node Configuration Process”, on page 154.

2. The next action depends on whether you have copied the map file from the previous node to a disk for transfer:
   - If you have copied the map file from the previous node to a transfer disk, click **Yes**.

     The program prompts you to insert the disk containing the map file into the disk drive.

- If you have not copied the map file from the previous node, click **No**.

  The program exits. You must copy the map file from the previous node onto a disk for transfer and then rerun the configuration program by starting DCM.

3. When you are prompted to enter a name for the current node and a path for the backup map file, refer to the Node Configuration Chart you completed above (see Section 6.2.2, “Analyzing Node Configuration Requirements”, on page 150).

   Note that:

   - The path must be for a directory that already exists.
   - The SCX160 SCxbus Adapter configuration program assigns a node number to the current node. Verify that this number is accurately recorded on the Node Configuration Chart.

The next step in the SCX160 SCxbus Adapter configuration processes depends on whether:

- The current node is the first node being configured: in this case, proceed to Section 6.4.3, “Selecting Data Streaming (First Node Only)”, on page 159.
- The current node is not the first node being configured, and the configuration is non-blocked: in this case, proceed to Section 6.4.4, “Configuring Data Streams - Non-Blocked”, on page 161.
- The current node is not the first node being configured, and the configuration is blocked: in this case, proceed to Section 6.4.5, “Configuring Data Streams - Blocked”, on page 161.

6.4.3. Selecting Data Streaming (First Node Only)

This step is for users in the following categories:

- Map File: all SCX users
- Data Streaming: all SCX users

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

After you have carried out the instructions in either Section 6.4.1, “Configuring Global Map File”, on page 156 or Section 6.4.2, “Configuring the Local Map File”, on page 158, the SCX160 SCxbus Adapter configuration program prompts you to choose either non-blocking (standard) configuration or blocking configuration (Figure 38). Make your selection on the basis of the planning and analysis you conducted in Section 6.2.2, “Analyzing Node Configuration Requirements”, on page 150.

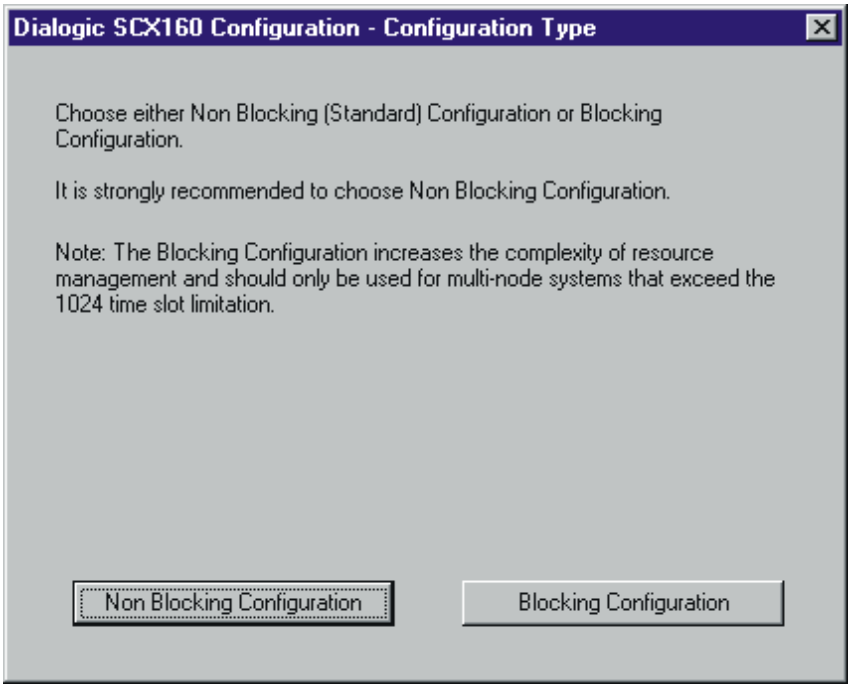


Figure 38. Configuration Type

The next step in the SCX160 SCxbus Adapter configuration process depends on whether you selected non-blocked or blocked data streaming:

- For the non-blocking configuration, continue with Section 6.4.4, “Configuring Data Streams - Non-Blocked”, on page 161.

- For the blocking configuration, continue with Section 6.4.5, “Configuring Data Streams - Blocked”, on page 161.

6.4.4. Configuring Data Streams - Non-Blocked

This step is for users in the following categories:

- Map File: all SCX users
- Data Streaming: Non-Blocked

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

After you select non-blocked data streaming, the SCX160 SCxbus Adapter configuration program automatically calculates and displays the number of time slots and minimum data streams required for the node. Refer to the Node Configuration Chart you completed in Section 6.2.2, “Analyzing Node Configuration Requirements”, on page 150:

- Compare the number of time slots and data streams you recorded on the Node Configuration Chart with those reported by the SCX160 SCxbus Adapter configuration program to verify your calculations.
- If you have planned to reserve additional data streams for future use, change the number to the new value.

If the configuration is acceptable, click **Finish**. Otherwise, click **Cancel** to exit the program.

Continue with Section 6.4.6, “Configuring Clocking”, on page 163.

6.4.5. Configuring Data Streams - Blocked

This step is for users in the following categories:

- Map File: all SCX users
- Data Streaming: Blocked

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

After you select blocked data streaming, the SCX160 SCxbus Adapter configuration program prompts you to select a resource to block at this node (Figure 39). If the particular resource is not available, the program requests that another resource be selected.

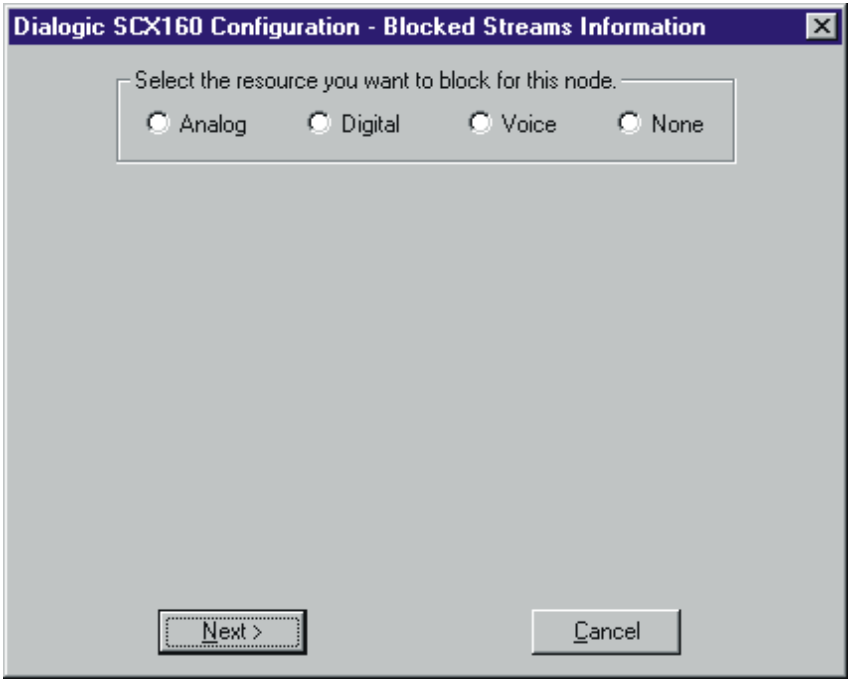


Figure 39. Blocked Resource

The program's next action depends on whether the current node is the first node:

- If the current node is the first node being configured, the program calculates the time slots required to block the resource and displays the number on the screen. It suggests the minimum number of streams that need to be allocated to block the resource. This number can be accepted or a greater number of streams may be allocated for future expansion.

  Verify the accuracy of the Node Configuration Chart you completed in Section 6.2.2, "Analyzing Node Configuration Requirements", on page 150.

- If the current node is not the first node, the SCX160 SCxbus Adapter configuration program determines whether the streams blocked at Node 1 are enough to block the resource on this node. If it is not enough, the program prompts the user to select another resource or to exit the program, remove a board for that resource, and rerun the configuration program. If no resources will be blocked at this node, choose **None**.

The configuration program then calculates the number of time slots required for the non-blocked resources by node and displays this value on the screen. The minimum number of streams that need to be allocated for the non-blocked resources are also suggested. The value may be accepted as is, or a greater number of streams may be allocated to allow for future expansion.

Finally, a summary screen shows the data streams transmitted from the SCX160 board onto the SCbus, the data streams transmitted from the SCX160 board onto the SCxbus, and the data streams blocked on the node. If the configuration is acceptable, click **Finish**. Otherwise, click **Cancel** to exit the program.

Compare the number of time slots and data streams you recorded on the Node Configuration Chart (Figure 35) with those reported by the SCX160 SCxbus Adapter configuration program to verify your calculations.

Continue with Section 6.4.6, “Configuring Clocking”, on page 163.

6.4.6. Configuring Clocking

This step is for users in the following categories:

- Map File: all SCX users
- Data Streaming: all SCX users

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

When the SCX160 SCxbus Adapter configuration program completes, the DCM Main Window appears. (For more information about the DCM Main Window, see Figure 8, “DCM Main Window”, on page 45). At this time, you can set the configuration parameters that determine the clocking configuration for the multi-node system.

The clocking parameters you need to set are:

- **SCxClockMode**: this parameter determines whether the SCX160 SCxbus Adapter in a given node functions as the **Slave**, **Master**, or **Fallback Master**.
- **SCxClockReference**: this parameter is used only when the **SCxClockMode** parameter for the node is set to **Master** or **Fallback Master**. It indicates what clocking source the SCX160 SCxbus Adapter will use to drive clocking for the SCxbus. The possible sources are the SCX160 SCxbus Adapter's internal clock, the SCbus, or the SCxbus clock.
- **SCbusClockMaster**: this parameter indicates the board ID of the board that serves as the SCbus clock master. All other boards on the SCbus derive clocking from this board through the SCbus.
- **SCbusClockMasterSource**: this parameter indicates the source from which the SCbus clock master derives clocking, whether from the board's digital network interface, or from its internal clock.

Refer to the Node Configuration Chart you completed in Section 6.2.2, "Analyzing Node Configuration Requirements", on page 150 to determine how to configure the clocking configuration for the multi-node system.

At system initialization, the SCxbus interface of the SCX160 SCxbus Adapter defaults to slave mode, thus initially the SCxbus is NOT clocked and the nodes cannot communicate with one another.

If the Master Clock node is not set up at system initialization, then the application must set up SCX160 SCxbus Adapter clocking by designating an SCxbus Master Clock node, an SCxbus Fallback Clock node, and a clock reference for each SCX160 SCxbus Adapter. The application can also change the SCbus interface clock mode of the SCX160 SCxbus Adapter. See the *SCX160 SCxbus Adapter User's Guide* for clocking and programming information required when developing application programs.

6.4.7. Completing Node Configuration

NOTE: This step is for users in the following categories:

- Map File: all SCX users

- Data Streaming: all SCX users

For more information about user categories, see Section 6.2, “Determining Installation Requirements”, on page 147.

If the current node is the last node in the multi-node system, the configuration for your multi-node system is now complete. Otherwise, return to Section 6.1, “Preparation”, on page 145. If your system employs a local map file, you have to copy *Scxmap.dat* to a disk for transfer.

6.5. Modifying a Multi-Node System

Once you have installed and configured the SCX160 SCxbus Adapter, you can add new nodes and reconfigure nodes as needed.

6.5.1. Adding New Nodes

If your system employs a local map file, copy the *Scxmap.dat* file from the last node in the system to a disk drive and then follow the instructions beginning with Section 6.1, “Preparation”, on page 145, at the new node. If your system employs a global map file, it is not necessary to copy *Scxmap.dat*.

6.5.2. Reconfiguring Nodes

The procedure for reconfiguring a multi-node system depends on whether your system employs a global map file or a local map file.

Global Map Reconfiguration Procedure

To reconfigure a multi-node system that employs a global map:

1. Verify that all nodes use the same global map file path.

2. Delete the following files from each node:
   - *Scxmap.dat*
   - *Scxnode.ini*
   - *Scxmap.dat* (from the backup map file directory)

- *Sctscustom* (if your system employs data blocking)

For further details about these files, see Table 14, “SCX 160 SCxbus Adapter Files”, on page 146.

3. Set the Intel Dialogic System **Startup Mode** to **Manual** (if it isn’t already set this way).

4. Stop the Intel Dialogic System (for details, see Section 5.1, “Starting and Stopping the Intel® Dialogic System”, on page 117).

5. Turn off the power at each node.

6. Make any hardware modifications (removing or adding boards) you require.

7. For every node in the system - starting with the first node and continuing through all the nodes in sequential order - power up each node and carry out the instructions beginning with Section 6.2, “Determining Installation Requirements”, on page 147.

Local Map Reconfiguration Procedure

In order to reconfigure a system employing a local map file, the following steps must be carried out for the lowest numbered node to be reconfigured and for every higher node through the last node in the multi-node system. For example, if you want to reconfigure node number 5, you would need to reconfigure node 5 and all higher nodes.

1. The first step depends on whether the current node is the first node to be reconfigured or a subsequent higher node:
   - **Current node is first node to be reconfigured**: At the n-1 node, where n is the lowest numbered node to be reconfigured, copy the *Scxmap.dat* file to a disk.

     For example, if you want to reconfigure node number 5, copy the *Scxmap.dat* file from node number 4.

- **Current node is a subsequent higher node**: Copy the *Scxmap.dat* file from the previously configured node to a disk.

  For example, if you have already configured node 6, copy the *Scxmap.dat* file from node number 6.

2. Delete the following files from the current node:
   - *Scxmap.dat*
   - *Scxnode.ini*
   - *Scxmap.dat* (from the backup map file directory)
   - *Sctscustom* (if your system employs data blocking)

   For further details about these files, see Table 14, "SCX 160 SCxbus Adapter Files", on page 146.

3. Set the Intel Dialogic System **Startup Mode** to **Manual** (if it isn't already set this way).

4. Stop the Intel Dialogic System (for details, see Section 5.1, "Starting and Stopping the Intel® Dialogic System", on page 117).

5. Power down the current node.

6. Make any hardware modifications (removing or adding boards) you require.

7. Power up the node.

8. Carry out the instructions beginning with Section 6.2, "Determining Installation Requirements", on page 147.

   Copy the *Scxmap.dat* file from step 1 to the current node's local map file directory from the disk.

9. Repeat steps 1 through 7 for all nodes higher than the first node to be reconfigured.

6.6. Removing the SCX160 SCxbus Adapter

When the SCX160 SCxbus Adapter is initially installed, a number of the standard files from the Intel Dialogic System Software are modified. To remove the SCX160 SCxbus Adapter in such a way as to restore these files, perform the following procedure:

1. Insert the Intel Dialogic System Software CD-ROM in your system. If the installation process does not start automatically when you insert the CD-ROM, locate the *Setup.exe* program on the CD-ROM and double-click it.

   NOTE: If you have Terminal Services running on Windows 2000, see Section 5.6.3, “Installing the Intel® Dialogic System Software with Terminal Services Running on Windows 2000”, on page 138.

2. When the **Setup Options** dialog box appears, select **Custom** install.

3. In the **Custom Component Selection** dialog box, select all features you want to retain **except** for the SCX160 SCxbus Adapter.

4. Follow the instructions provided by the installation process. For help at any time during the installation process, click **Help**.

   When the installation process is complete, the SCX160 SCxbus Adapter files will have been removed from the system.

5. Manually delete the files listed in Table 14, “SCX 160 SCxbus Adapter Files”, on page 146.

6. Copy the saved versions of the installed files for the Intel Dialogic System Software as follows:

   - Copy *\Program Files\Dialogic\Bin\Scx_Sav*.** to *\Program Files\Dialogic\Bin*.
   - Copy *\Program Files\Dialogic\Lib\Scx_Sav*.** to *\Program Files\Dialogic\Bin* and *\Program Files\Dialogic\Lib*.
   - Copy *Msintf.dll* from *\Program Files\Dialogic\Lib\Scx_Sav* to *Winnt\System32*.

   Copying these files restores your system to the Intel Dialogic System Software base setup.

7. Repeat the process described in this section for each node in the multi-node system.

7. Uninstalling the Software

This chapter tells you how to uninstall Intel® Dialogic® System Release 5.1.1, Feature Pack 1. You must uninstall Feature Pack 1 before uninstalling System Release 5.1.1. You can uninstall this software from either the Start menu or **Add/Remove Programs** on the Control Panel. This procedure covers both methods.

To uninstall Feature Pack 1, follow these steps:

1. You can uninstall Feature Pack 1 using either of the following methods:
   - **Add/Remove Programs:** Go to the Control Panel and select **Add/Remove Programs**. In the list of currently installed programs, select **System Release 5.1.1, Feature Pack 1** and click the **Remove** button.
   - **From the Start menu:** Start > Programs > Intel Dialogic System Software > System Release 5.1.1 Feature Pack 1 Uninstall > System Release 5.1.1 Feature Pack 1 Uninstall

2. A popup asking if you want to completely remove the application and all of its components appears. Click **OK** to proceed.

3. You will see status messages about stopping system services and uninstalling system services and then a status bar will appear. When the uninstall is complete, the Maintenance Complete screen appears.

4. The Maintenance Complete screen offers you the choice of rebooting your computer now or later. You must reboot in order for the uninstall to take effect. Make your selection (reboot now or later) and click **Finish**.

To uninstall System Release 5.1.1, follow these steps:

1. You can uninstall System Release 5.1.1 using either of the following methods:
   - **Add/Remove Programs:** Go to the Control Panel and select **Add/Remove Programs**. In the list of currently installed programs, select **Dialogic System Software** and click the **Remove** button.

- **From the Start menu:** Start > Programs > Intel Dialogic System Software > Uninstall

2. A popup message explaining what the uninstall will do and asking if you want to continue appears. Click **Yes** to proceed.

3. Another popup asks you to close any open Dialogic program group windows. Close any open Dialogic program group windows. Click **OK** to proceed.

4. You will see status messages and then a status bar will appear. After a while, you will be asked to make a decision about removing shared files. Click on your response.

5. When the uninstall is complete, click **OK** on the status screen.

6. The Reboot screen asks if you want to reboot your computer now. You should reboot the system to ensure complete removal of the package. Click **Yes** to reboot now or click **No** to reboot later.

8. Technical Support

Before contacting technical support, you should:

- Verify that you have correctly carried out the installation and configuration procedures.
- Ensure that each board is securely installed in its slot. Check that the correct cables are used and that they are connected properly. Refer to the Quick Install Card supplied with your board.

Solutions to many problems can be found in the technical notes and other resources on the Intel® Networking & Communications Telecom Support Resources web site at *http://developer.intel.com/design/telecom/support/*. You can also check the online Release Update for the latest information about any issues, restrictions, or limitations that may affect the installation.

If you are still unable to resolve the difficulty, contact technical support as described here: *http://resource.intel.com/telecom/support/contact.htm.*

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