Dialogic® Brooktrout® Fax Products SDK

Installation and Configuration Guide

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Contents

This chapter provides a series of steps that you can perform to quickly set up and test your installation of the Dialogic® Brooktrout® software and hardware.

This chapter describes how one can install Dialogic® Brooktrout® software on Red Hat Linux operating systems.

This chapter describes how one can install Dialogic® Brooktrout® software on Windows operating systems.

Chapter 4 – Installing the Device Driver on Windows 71

This chapter describes how one can install the device driver on Windows systems.

This chapter describes how one can configure the Dialogic® Brooktrout® Fax Software for your Dialogic® Brooktrout® boards.

This chapter contains tables that show the directory structure used for all installed binary, firmware, and sample source files, both platform-independent and platform-specific for all operating system platforms.

This chapter describes how one can use the Dialogic® Brooktrout® Technology Expansion Capability (TEC) utility to display and upgrade the configured feature set on an installed board.

This chapter describes how one can download the firmware to the board.

This appendix describes how the Dialogic® Brooktrout® boards conform to compliance standards.

This appendix describes how one can create a custom installation program for manual configuration of the driver.

This appendix describes the driver reinitialization utility. This utility is used to return the device driver to a state as close as possible to that of a fresh driver start without stopping the driver.

Preface

Introduction

The Dialogic® Brooktrout® *Fax Products SDK Installation and Configuration Guide* explains how to install the software (firmware, Dialogic® Brooktrout® Bfv APIs, and driver for the Dialogic® Brooktrout® TR1034/SR140/TruFax® products) on your host system. It also describes how to configure the driver, configure call control, and download the firmware to a Brooktrout module.

- Chapter 1 provides a quick start for users experienced with API programming in general and the Dialogic® Brooktrout® Bfv APIs in particular.
- Chapter 2 explains how to install the Dialogic® Brooktrout® software and the device driver on a Red Hat Linux operating system.
- Chapter 3 explains how to install the Dialogic® Brooktrout® software on a Windows operating system.
- Chapter 4 describes how to install the Dialogic® Brooktrout® device driver on Windows operating systems.
- Chapter 5 describes how to configure your software and hardware on Windows systems.
- Chapter 6 lists the directories where files are installed.
- Chapter 7 describes how to use the Dialogic® Brooktrout® TECUpdate Utility.
- Chapter 8 describes the firmware files, how to load them, and how to update the boot ROM.
- Appendix A describes compliance with North American and European standards that includes general telecommunications and safety.
- Appendix B describes how to create a custom installation program for the manual configuration of the driver.
- Appendix C describes how to use the driver reinitialization utility.

- A glossary provides definitions for some of the terms used in the manual.

A copy of this manual in Adobe Acrobat PDF format is included in the *Documents* directory on the Dialogic® Brooktrout® Fax Products SDK CD-ROM.

Refer to *Dialogic® Brooktrout® SR140 Software Windows User Guide* and *Dialogic® Brooktrout® SR140 Software Linux User Guide* for instructions to activate the software using the License Manager.

Operating System Support

See the latest *Dialogic® Brooktrout® Release Notes* for the supported operating systems. A copy of the Dialogic® Brooktrout® Release Notes is found in the *Documents* directory on the Dialogic® Brooktrout® Fax Products SDK CD-ROM.

Compile Compatibility

Applications compiled with Brooktrout SDK 6.0 or newer work with the latest Brooktrout SDK without recompiling as long as the application called the BT_API_SET_VER macro. See the *Dialogic® Brooktrout® Bfv APIs Reference Manual, Volume* 1.

You might also require one of the following:

- Windows libraries, see *Special Considerations on page 92*
- Linux libraries, see *Special Considerations on page 44*

Manual Conventions

This manual uses the following conventions:

- *Italics* denote file names, directory names, and program names within the general text.
- The **`Courier`** font in bold indicates a command sequence entered by the user at the system prompt, for example:

  `cd /boston/bfv.api`

- The `Courier` font not bolded indicates system output, for example:

  ```
  C:>Files installed.
  ```

- The `Courier` font also denotes programming code, such as C and C++. Programming code appears in program examples.
- ***Bold*** indicates names of variables, Dialogic® Brooktrout® Bfv API functions, dialog boxes, dialog box controls, windows, and menu items.
- Square brackets [ ] indicate that the information to be typed is optional.
- Angle brackets < > indicate that you must supply a value with the parameter.

The Caution icon is used to indicate an action that could cause harm to the software or hardware.

The Warning icon is used to indicate an action that could cause harm to the user.

Related Documents

Hardware Documents

These installation cards come with their respective boards:

- *Brooktrout Digital Board (Multiple Spans) Installation* describes how to install the Brooktrout Digital Board (Multiple Spans).
- *Brooktrout TR1034 Analog Loop Start Full-sized PCI Fax Board Installation* describes how to install the Brooktrout TR1034 Analog Loop Start Full-sized PCI Fax Board.
- *Brooktrout TR1034 Analog Loop Start Full-sized PCI Express Fax Board Installation* describes how to install the Brooktrout TR1034 Analog Loop Start Full-sized PCI Express Fax Board.
- *Brooktrout TR1034 BRI Half-sized PCI Fax Board Installation* describes how to install the Brooktrout TR1034 BRI Half-sized PCI Fax Board.
- *Brooktrout TR1034 BRI Half-sized PCI Express Fax Board Installation* describes how to install the Brooktrout TR1034 BRI Half-sized PCI Express Fax Board.
- *Brooktrout TR1034 DID, Combo, & Loop Start Half-sized PCI Fax Board Installation* describes how to install the Brooktrout TR1034 DID, Combo, & Loop Start Half-sized PCI Fax Board.
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- *Brooktrout TR1034 T1/E1/IP Full-sized PCI Fax Board Installation* describes how to install the Brooktrout TR1034 T1/E1/IP Full-sized PCI Fax Board.
- *Brooktrout TR1034 T1/E1/IP Full-sized PCI Express Fax Board Installation* describes how to install the Brooktrout TR1034 T1/E1/IP Full-sized PCI Express Fax Board.
- *Brooktrout TruFax Analog Loop Start Full-sized PCI Fax Board Installation* describes how to install the Brooktrout TruFax Analog Loop Start Full-sized PCI Fax Board.
- *Brooktrout TruFax Analog Loop Start Half-sized PCI Fax Board Installation* describes how to install the Brooktrout TruFax Analog Loop Start Half-sized PCI Fax Board.

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- *Brooktrout TruFax BRI Half-sized PCI Express Fax Board Installation* describes how to install the Brooktrout TruFax BRI Half-sized PCI Express Fax Board.

Software Documents

For product information, white papers, FAQs, and more, access the Dialogic web site at *www.dialogic.com*.

These documents come with the Dialogic® Brooktrout® SDK:

- *Brooktrout Fax Products Linux End User Guide* is for users running either of the following in a Linux environment: Brooktrout SR140 Fax Software or Brooktrout TR1034 Series and Brooktrout TruFax Boards.
- *Brooktrout Fax Products Windows End User Guide* is for users running either of the following in a Windows environment: Brooktrout SR140 Fax Software or Brooktrout TR1034 Series and Brooktrout TruFax Boards.
- *Brooktrout Bfv APIs Reference Manual* provides reference information for Brooktrout Bfv APIs.
- *Brooktrout Fax Products SDK Developer Guide* describes the Bfv API used to create applications to control the Brooktrout Fax Products features.
- *Brooktrout TECUpdate Utility Guide* describes the Brooktrout Technology Expansion Capability (TECUpdate) utility that is used to display and upgrade the configured feature set on an installed Brooktrout board.

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Terminology

Updated Terminology

The current version of this document includes terminology that differs from previous versions. Please note the changes below:

Former Terminology	Replaced with...
Host-based fax Virtual modules Virtual boards Software modules VoIP modules SR140 virtual modules	Dialogic® Brooktrout® SR140 Fax Software or Brooktrout SR140 Fax Software or SR140 Software or SR140
TR1000 Series SDK	Dialogic® Brooktrout® SDK
TR1000 Series Product TR1000 Series Module TR1000 Series Board	Dialogic® Brooktrout® Fax Board or Brooktrout fax board or board
Brooktrout System Software	Dialogic® Brooktrout® Runtime Software

Dialogic® Brooktrout® TR1034 Fax Board Terminology

The Dialogic® Brooktrout® TR1034 Fax Board is also referred to herein by one or more of the following terms, or like terms including “TR1034”:

- Brooktrout TR1034 Fax Board
- Brooktrout TR1034 Board
- TR1034 Fax Board
- TR1034 Board

1 - Quick Start Steps

This chapter provides a series of steps that you can perform to quickly set up and test your installation of the Dialogic® Brooktrout® software and hardware.

Because the installation and configuration procedures can be quite different for Windows systems from those for Linux systems, this chapter gives separate quick start instruction for Windows systems.

This chapter includes the following:

- *Determining the Board Module Number on page 24*
- *Dialogic® Brooktrout® SR140 Fax Software on page 25*
- *Quick Start for Windows Systems on page 26*
- *Quick Start for Linux Systems on page 29*

Determining the Board Module Number

You need to know the module numbers (IDs) and associated channel numbers of each Dialogic® Brooktrout® fax board (for example: TR1034, TruFax®, or Brooktrout SR140 Software) in your system for a variety of tasks, including:

- Installing and identifying multiple modules
- Firmware download
- Telephony and network configuration
- Using some utilities (refer to Sample Applications and Utilities in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide*)

A module is a unit that communicates on a Dialogic® Brooktrout® TR1034, TruFax®, or Brooktrout SR140 Software. In general, each module corresponds to a control processor on the board. Most Dialogic® Brooktrout® boards have one module. Dialogic® Brooktrout® boards have an exact module number on the TR1034 and TruFax® boards and is indicated on the rotary switch on the board, refer to the Hardware installation card that came with you board to locate the rotary switch. Module numbers are normally referred to and displayed in hex. The Dialogic® Brooktrout® board contain a rotary switch that allows selection of a module number in a range from 2 through F.

To find the module numbers of the Dialogic® Brooktrout® boards in your system, run the *modinfo* program. The *modinfo* program provides the number of channels on each module, refer to *Sample Applications and Utilities* in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide* for more information.

The driver assigns other module numbers in addition to those for hardware modules. These can often be seen when running *modinfo*, for example.

- Module 1 represents the driver.
- Module FE is shared by all applications.
- Module 0x41 is the default for Brooktrout SR140.

Dialogic® Brooktrout® SR140 Fax Software

The Dialogic® Brooktrout® SR140 Software is a software-based virtual module that allows you to use T.38 fax or Fax Pass-through without installing a physical board. It is supported on Windows and Linux systems only and uses IP-enabled call control through SIP and H.323 stacks.

If you have a Dialogic® Brooktrout® SR140 Software license, you must install the Dialogic® Brooktrout® software first. Then you can activate the Dialogic® Brooktrout® SR140 Software using the Dialogic® Brooktrout® License Manager. For more information, see:

- *Installing the SDK on Windows on page 55*
- *Activating Dialogic® Brooktrout®SR140 Fax Software* in the *Dialogic® Brooktrout® Fax Products Windows End User Guide*

Quick Start for Windows Systems

If you have Brooktrout SR140 Software, see *Dialogic® Brooktrout® SR140 Fax Software on page 25* for setup information, otherwise continue with Step 1.

Step 1: Install Dialogic® Brooktrout® Software and Hardware

➢ **Do the following to install the Dialogic® Brooktrout® software and hardware:**

1. Before you install a Dialogic® Brooktrout® board, install the Brooktrout SDK by inserting the Dialogic® Brooktrout® Fax Products SDK CD-ROM into the CD-ROM drive. Then follow the directions in *Installing the SDK on Windows on page 55*.

   This procedure places the contents of the CD into a directory on your hard drive. The directory is either one you specify or the default (*\Brooktrout\Boston*).

   See *Directory Structure on page 126* for the list of directories and their contents in this structure.

2. Power down the computer and install the board.

   For installation instructions, see the hardware installation card that came with your board.

   Although you can install the hardware before you install the software, Dialogic recommends that you install the software first.

3. Power up the computer and log on.

   - When the status LED on the board is flashing yellow, the board is ready to have the firmware downloaded (see *Step 2: Configure the Dialogic® Brooktrout® Software and Hardware on page 27*).
   - When the system sees the TR1034/TruFax® board, install the driver on a Windows operating system (see *Installing the Plug-and-Play Driver on page 73*).

Step 2: Configure the Dialogic® Brooktrout® Software and Hardware

➢ **Follow the steps below to run the Dialogic® Brooktrout® software and hardware:**

1. Run the Dialogic® Brooktrout® Configuration Tool to configure the driver and the call control parameters. See *Using the Dialogic® Brooktrout® Configuration Tool on Windows Systems on page 103*.

   The Brooktrout Configuration Tool also starts the driver and downloads the firmware to the module.

Note: For the Dialogic® Brooktrout® Configuration Tool to work with Windows, you must install Internet Explorer 6.0 or higher.

2. Reboot the system after running Dialogic® Brooktrout® Configuration Tool to have the driver configuration take effect.

Step 3: Compile and Run the Sample Application

To test your board and its setup, you can run the voice sample application, found in the *Boston\bfv.api\app.src* directory. However, before you can run the sample application, you must compile it. To compile sample applications, refer to *Sample Applications and Utilities* in the For information on testing your configuration, refer to the *Dialogic® Brooktrout® Fax Products Windows End User Guide.*

To compile sample applications, refer to *Sample Applications and Utilities* in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide*. For information on testing your configuration, refer to the *Dialogic® Brooktrout® Fax Products Windows End User Guide*

Next Steps

After you have verified that your board is functioning properly and can record and play speech, you can run your existing application, test your new application, or create a new application.

For more information, see these chapters in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide:*

- *Introduction to the Bfv API* describes the Bfv API
- *Debugging* describes how to debug your applications
- *Sample Applications and Utilities* describes how to compile and use the sample applications

Quick Start for Linux Systems

Step 1: Install Dialogic® Brooktrout® software and hardware

➢ **Follow the steps below to install Dialogic® Brooktrout® software and hardware:**

1. Power down the computer and install the Dialogic® Brooktrout® board in your computer chassis. For installation instructions, see the hardware installation card that came with your board.
2. Power up the computer and log on.
   - When the status LED on the board is flashing yellow, it is ready to have the firmware downloaded. See *Step 2: Configure the Dialogic® Brooktrout® Software and Hardware on page 27*.
   - Insert the Dialogic® Brooktrout® Fax Products SDK CD-ROM into a CD-ROM drive. Then refer to *Installing the SDK on Red Hat Linux on page 32* or *Installing the SDK on Solaris on page 57*.
   - This procedure places the contents of the CD into a directory on your hard drive. The directory can be one you specify or the default, `/usr/sys/brooktrout/boston`. See *Directory Structure on page 126* for the list of directories and their contents in the /boston directory structure.
3. Start the driver. Linux, if you want, can start the driver, but you can wait until the software is installed before you start the driver. See the appropriate chapter that applies to your operating system.

Step 2: Configure the Dialogic® Brooktrout® Software and Hardware

Create the Configuration files

Dialogic provides two text files to configure the Dialogic® Brooktrout® Products:

- User-Defined Configuration File (*btcall.cfg*)
- Call Control Configuration File (*callctrl.cfg*)

See *Using a Call Control Configuration File on page 124*.

Start Boston Host Service

Boston Host Service (Bostsrv) is used to initialize the modules. Upon startup it detects Dialogic® Brooktrout® modules, loads FW and initializes the call control based on the configuration files. You must use Boston Host Service to run a multi-process application or to use SR140 Fax Software modules.

See *Using Boston Host Service Under Linux on page 42*.

Step 3: Compile and Run the Sample Application

To test your board and its setup, you can run the voice sample application, found in the *bfv.api/app.src* directory. However, before you can run the sample application, you must compile it. To compile sample applications, refer to *Sample Applications* and *Utilities* in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide.*

For information on testing your configuration, refer to the *Dialogic® Brooktrout® Fax Products Linux End User Guide.*

Next Steps

After you have verified that your board is functioning properly and can record and play speech, you can run your existing application, test your new application, or create a new application.

For more information, see these chapters in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide:*

- *Introduction to the Bfv API* describes the Dialogic® Brooktrout® Bfv API.
- *Debugging* describes how to debug your applications.
- *Sample Applications and Utilities* describes how to compile and use the sample applications.

2 - Installing the SDK on Red Hat Linux

This chapter describes how one can install Dialogic® Brooktrout® software on Red Hat Linux operating systems.

This chapter contains the following:

Installation Steps

If you have a Dialogic® Brooktrout® SR140 license, you must install the Dialogic® Brooktrout® SDK software first.

Then you can turn on SR140 Software by either of the following:

- Use the interactive web method
- Create a request for email or fax

See *Activating Dialogic® Brooktrout®SR140 Fax Software* in the *Dialogic® Brooktrout® Fax Products Linux End User Guide.*

➢ **Follow the steps below to install the Dialogic® Brooktrout® software on Linux:**

When running driver installation programs, scripts, or functions, you must be logged in as `root` or have administrative privileges. Dialogic supports only the standard GNU C compiler that ships with Linux.

1. Install the firmware, driver, and Bfv API software onto your computer.

   If you are reinstalling or upgrading software from a previous Brooktrout SDK, you must first remove the previously installed software before installing this software.

   See *Removing the Software on page 36*.
2. Compile the sample applications and utilities (optional). See the chapter on sample applications and utilities in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide*.
3. Run the `dinstall` program to manually configure the driver (optional).

   See *Configuring the Driver Manually on page 38*.
4. Download the firmware, optionally configure the telephony parameters, see:

   - *Downloading Firmware on page 139*
   - *Using a Call Control Configuration File on page 124*).

Installing the Software

The Dialogic® Brooktrout® Fax Products SDK CD-ROM comes with an installation program that uses *rpm* to install the files on your hard drive. To use the program, follow the directions below. You must be logged in as `root` or `su` to install/uninstall the software and configure the driver.

➢ **Use the following procedure to install software files:**

1. Mount the installation CD-ROM:

   ```
   mount -t iso9660 -r /dev/cdrom /mnt/cdrom
   ```

2. Enter the command line to go to the *Linux* directory on the CD-ROM drive:

   ```
   cd /mnt/cdrom/Software/Linux/Redhat
   ```

3. Run the setup program by entering the following at a command prompt:

   ```
   sh ./setup.sh
   ```

   On the *setup.sh* command line, the optional argument -y can be given. This directs *setup.sh* to proceed through all prompts, accepting the defaults (except for the licensing prompt display, which cannot be skipped).

   The program displays a message if it does not detect an Intel microprocessor and terminates. If the processor is Intel, the program then displays a copyright notice and the following information:

```
         Welcome to the Dialogic Brooktrout Setup Program
           to install the Brooktrout Boston SDK Package

*****************************************************************
*                                                               *
*     WARNING:  This program is protected by copyright law      *
*     and international treaties.                               *
*                                                               *
*     Unauthorized reproduction or distribution of this         *
*     program, or any portion thereof, may result in severe     *
*     civil and criminal penalties, and will be prosecuted      *
*     to the maximum extent possible under law.                 *
*                                                               *
*****************************************************************
```

The program then displays:

```
Press ENTER to continue or 'q' then ENTER to quit
setup.
```

4. If there is no Brooktrout Boston SDK package currently installed, the program then displays:

   ```
   Proceed to install
           SDK package BRKTBOSsetup version 6.7.3
   ?
   ```

   If there is already a Brooktrout Boston SDK package installed, the program then displays:

   ```
   SDK package BRKTBOSsetup version 6.7.2 already installed.
   Perform upgrade to
           SDK package BRKTBOSsetup version 6.7.3
           (newer ver)
   ?
   ```

5. If a new installation is being performed, the program then displays:

   ```
   Default install directory is /usr/sys/brooktrout

   Please enter desired install directory or just press
   ENTER to use default directory.
   ```

   If an upgrade is being performed, the new SDK is installed in the same location as the old SDK.

   The upgrade will attempt to migrate configuration files *btcall.cfg*, *callctrl.cfg*, and *BT_CPARM.CFG* from *boston/bfv.api/config* along with driver parameters from the old SDK installation to the new SDK installation.

6. Please read and accept the license agreement to continue:
   Press the spacebar to continue or *q* to quit. (The program named "less" displays the license agreement.)

7. After you choose *q* to quit out of license agreement you get the following message:

   ```
   Do you accept the above agreement?
   ```

8. If you choose *y* or *yes*, your files will install correctly.
   If you choose any other character the installation script will terminate with an error.

9. If the Linux kernel being run is not the base kernel for the version of Linux in use, the program then asks:

   ```
   A driver rebuild for patch kernel is required.

   Would you like to perform the driver rebuild at this
   time?
   ```

10. If Step 9 is not required or if the rebuild is performed, the program then asks:

```
Would you like to install and configure the driver?
```

If you choose the default directory, the directory */usr/sys/brooktrout* contains the directories and files shown in *Directory Structure on page 126*.

After installing the software, you must download the firmware. See *Downloading Firmware on page 139*.

Removing the Software

➢ **Use the following procedure to remove software files:**

1. Run the setup program by entering the following at a command prompt:

   ```
   sh ./setup.sh -remove
   ```

   On the *setup.sh* command line, the optional argument -y can be given. This directs setup.sh to proceed through all prompts, accepting the defaults.

   The program then displays a copyright notice and the following information:

```
                  Welcome to the Dialogic Brooktrout Setup Program
                    to install the Brooktrout Boston SDK Package

*****************************************************************
*                                                               *
*     WARNING:  This program is protected by copyright law      *
*     and international treaties.                               *
*                                                               *
*     Unauthorized reproduction or distribution of this         *
*     program, or any portion thereof, may result in severe     *
*     civil and criminal penalties, and will be prosecuted      *
*     to the maximum extent possible under law.                 *
*                                                               *
*****************************************************************
```

2. The program then asks:

   ```
   Remove currently installed SDK package?
   ```

This will remove the entire SDK installation directory and all of its contents.

Starting or Stopping the Driver

You must start or stop the driver as shown below. You can also add the command lines to system startup scripts, if needed.

➢ **To start the driver, enter:**

```
/etc/startbost
```

➢ **To stop or shut down the driver, enter:**

```
/etc/startbost -r
```

Reinitializing the Driver

You can reinitialize the driver to its starting state in terms of channels assigned to modules and module number assignments using the *driver_reinit* utility located in the *boston/driver/linux/user* directory (see *Reinitializing the Device Driver on page 172*).

Configuring the Driver Manually

To configure the driver manually, change to the */usr/sys/brooktrout/boston/driver/linux/install* directory and run the *dinstall* program.

The configuration dialog is as follows:

```
Installing Brooktrout Boston Device Driver Version 6.7.0
Maximum number of PCI/cPCI hardware modules (default 16):
Physical buffer size (default 32768):
Application buffer size (default 10240):
Machine ID, in hex (default 1):
Do initial reset (default 1):
History enable (default 0):
```

If you enter *1*, *dinstall* asks the following questions:

```
History size (default 1024000):
Number of physical channel histories (default 0):
Number of application channel histories (default 0):
Restrict physical channel histories to admin channel 1
(default 1):
Configure advanced parameters (n)?
```

If you enter *y*, *dinstall* asks the following questions:

```
Stop history on module death (default 0):
Number of I2O frames per module (default 16):
Driver flow control interval (default 250):
Internal memory allocation minimum (default 152):
Internal memory allocation quanta (default 128):
To reserve module numbers, enter mod_id (serial number)
and mod_num, in hex. Mod_num will default as indicated:
mod_id mod_num[F0]:
Configure test parameters (n)?
```

If you enter *y*, two test options are listed:

```
Test2:
Test3:
```

```
Configuring Boston driver:
   Phys buf size 32768
   App buffer size 10240
   Machine ID 1
   History size 1024000
   Num phys hist bufs 0
   Num apl hist bufs 0
```

The maximum number of PCI hardware modules can be left at its default. However, if fewer modules are in use, to conserve memory, this value can be set to a smaller number. Each hardware module uses approximately 60K.

History Logging

When the Dialogic® Brooktrout® driver is installed, history logging is disabled by default. When you manually install the driver using *dinstall*, the default is set to disable history logging (you can choose to override this option). History logging is a powerful debugging tool, especially when working with Dialogic Technical Services and Support. However, it does consume a significant amount of CPU time when running very high call loads. Therefore, leave history logging off for systems that have high call loads and are CPU-bound. For low-load systems or when debugging, enable history logging.

Leave the number of physical and application channel histories at 0 unless you are directed to change this by Dialogic Technical Services and Support. If you change the physical or application buffer size, do not change the value to one smaller than the default.

Advanced Configuration Parameters

If you select advanced configuration parameters, the software prompts you for the number of I2O frames, driver flow control interval, internal memory allocation parameters, module reservations, and test parameters. Do not configure advanced parameters except under the advice of Dialogic Technical Services and Support.

Linux Kernel Versions

Different versions of Linux have different kernel version numbers, and patches to Linux can also change the kernel version number. The binary distribution comes with driver support for a number of kernel versions. Dialogic® Brooktrout® drivers will be installed for all the installed kernel versions that are supported. If the currently installed kernel version is not supported, driver installation aborts.

The driver is configured and ready to be started.

See *Starting or Stopping the Driver on page 37* and *Driver Rebuilding for Patch Linux Kernels on page 50*.

The Dialogic® Brooktrout® SDK supports the Linux Physical Address Extension (PAE) kernels. This support allows greater memory utilization on systems with four gigabytes of memory.

Removing the Manually Configured Driver

➢ **Follow the steps below to uninstall the driver:**

1. Change to the following directory:
   /usr/sys/brooktrout/boston/driver/linux/install
2. Enter the following at the command prompt:

   ```
   ./dinstall -r.
   ```

Using Boston Host Service Under Linux

Boston Host Service (Bostsrv) is used to initialize modules. Upon startup it detects Dialogic® Brooktrout® modules, loads FW and initializes the call control. You must use Boston Host Service to run a multi-process application or to use Brooktrout SR140 Software modules. Boston Host Service is optional for other Dialogic® Brooktrout® modules.

When you use the Boston Host Service (Bostsrv) with a Linux system the following syntax applies:

- Go to following directory:

  ```
  cd /usr/sys/brooktrout/boston/bfv.api/linux/bin/x
  ```

  x depends on the version of Linux in use:

  - Red Hat Enterprise/CentOS Linux 8.0 (4.18.0-80.el8), 64-bit
  - Red Hat Enterprise/CentOS Linux 7.0 (3.10.0-123.el7), 64-bit
  - Red Hat Enterprise/CentOS Linux 6.0 (2.6.32-71.el6), 32-bit and 64-bit

- Use any of the following command line options:

Option	Meaning
-c <file>	Full path to the *btcall.cfg* file and name of the *btcall.cfg* file
-D	Run as daemon (in background)
-f <path>	Full path to board firmware
-k	Stops the daemon
-stop	Stops the daemon
-query	Queries whether the server is running
-debug	Console app/debugging
-v	Enable Bfv API debug mode
-l <file>	Log output to file (can be used with -debug and -D)

Note: **-c** and **-f** are required.

For example:

```
Bostsrv -c /usr/sys/brooktrout/boston/config/btcall.cfg
-f /usr/sys/brooktrout/boston/fw
```

Root login for Linux

When using Linux, you must log in as root to run Bostsrv from the command line in debug mode. Bostsrv creates a process id file in the root `owned/var/run` directory. This prevents multiple copies from running at the same time. It also supports the kill, stop, and query operations.

Special Considerations

When you install the Software on a Red Hat Linux operating system, consider the following:

PCI Considerations

When configuring the device driver, you must select 0 when asked for the number of ISA boards.

The operating system and/or system BIOS assigns base addresses and interrupt numbers to the PCI boards, which can change when the system is rebooted, especially if devices are added or moved.

If multiple PCI boards are in use, it is often not apparent which boards correspond to which module numbers or contain which ordinal channel values. See *Determining the Board Module Number on page 24* for more information about modules and module number assignment.

Dialogic® Brooktrout® Bfv API Libraries and Makefiles

The Dialogic® Brooktrout® Bfv API libraries are supplied in several forms for the appropriate Linux versions. The primary libraries are shared (.so) libraries. In addition, there are static (.a) libraries; their use is deprecated and are supplied for compatibility only.

To run an application compiled with the *.so* libraries, the operating system needs to find the *.so* libraries at runtime. The installation procedure automatically installs these libraries into a known system location: */usr/lib and /usr/lib64*. If you are performing installation manually, you can either copy the libraries there, or add the directory locations containing the *.so* libraries to the environment variable LD_LIBRARY_PATH.

Follow the makefiles supplied in the *app.src* or *bapp.src* directory for all applications. In particular, since all the supplied libraries were compiled as multithreaded, compile all your applications this way. See also, *Reviewing Compiler and Linker Options on page 49*.

Writing Multithreaded Programs

The Bfv API supports multithreaded programs using the *pthreads* package. When developing a multithreaded program, be sure to follow the programming guidelines described in your system documentation.

When new threads are created, often a stack size can be specified. The stack size must be sufficiently large to store all local variables used both by the application and the Bfv API. If the stack size is not large enough, unpredictable behavior can result.

Dialogic usually finds a stack size of 64K to be sufficient but, depending on the application’s stack allocation demands, more memory might be required.

Warning and Error Messages

If the driver has an error or warning to report (often related to driver startup problems), the report always appears on the system console, if such a device exists for that platform. Additionally, a limited amount of messages are sometimes available if you use the `crash` command and select the `panic` option. These messages are logged to the */var/log/messages* text file.

Determining Installation Parameters

Any time after you install the driver (but not removed) you can determine what installation parameters were used by looking at the */etc/startbost* file.

Command Line Configuration for dinstall

When configuring the device driver using *dinstall*, you can specify the command line option `-c` to cause the *dinstall* program to not prompt you for any parameters. Instead, the *dinstall* program uses the responses that you supply following the `-c` option on the command line.

If you use the `-c` option, you must include all the parameters described below, in order, regardless of whether or not the parameter has meaning on the system in question. If a parameter does not apply, it is ignored. The parameters are not checked for validity.

Note: Prompting for removal of old driver versions is not performed.

When configuring the driver using *dinstall*, you must include the following parameters:

Parameter	**Defaults**
Reserved	0
Reserved	-1
Max num PCI/cPCI hw modules	16
Physical buffer size	32768
Application buffer size	10240
Reserved	0
Machine ID	1
Reset option (1 or 0)	1
History Enable	0
History Size	1024000
Num physical histories	0
Num app histories	0
Restrict phys channels (1 or 0)	1
Number of I2O frames	*0
Flow control interval	*0
Memory alloc minimum	*0
Memory alloc quanta	*0
Reserved	0
Stop history on module death	*0
Test parameter 2	*0
Test parameter 3	*0
Reserved module info module id, module number, 0 to terminate	*0
Reserved	0

The advanced parameters, marked with * in the list above, can always be safely set to 0. This tells the driver to use the default values.

There are currently no parameters used with `–c` when removing the driver, but the option might still be given on the command line for future use.

For example, to configure the driver for 0 ISA hardware modules and up to 16 PCI hardware modules, use the following settings:

- physical buffer size 32768
- application buffer size 10240
- machine ID 1
- reset on
- history enabled
- history size 1024000
- physical histories 0
- application histories 0
- restrict physical channels
- all default advanced parameters

Enter the following at the command line:

```
./dinstall -c 0 -1 16 32768 10240 0 1 1 1 1024000 0 0 1 0 0 0 0 0 0 0 0 0 0
```

Driver File Locations

When using *dinstall* to configure the device driver, you need not have all files from the distribution. However, the locations of files used by the installation procedure relative to the directory from which *dinstall* is being run must be the same as that in the normal distribution.

Assuming a directory named *install* from which *dinstall* is being run, the following files must be present:

install/dinstall
install/dinstlib
*kernel/kvers/**

These files and directories appear in the standard distribution under the directory *driver/linux*.

The *kvers* directory contains subdirectories named after each kernel version for which binaries are available. The software supports the standard uni and multiprocessor releases, as well as alternate releases. See the Dialogic® Brooktrout® Release Notes for the supported kernel versions.

Reviewing Compiler and Linker Options

The makefiles contained in the *app.src* and *bapp.src* directories provide a number of command line options to the compiler and linker. Using these options, the compiler and linker produce object files and executables compatible with the Bfv API library.

Dialogic strongly recommends that you use these options for all your Dialogic® Brooktrout® Bfv API applications. But for those who want to change the set of options the compiler and linker use, the following is a list of the nonstandard options and their functions. The options used for compilation are marked with (*C*) and those for linking are marked with (*L*).

`-DBFAX_THREADS` (*C*) Specifies a multithreaded program to the API.

`-lpthreads` (*L*) Multithreaded library.

`-m32/-64` (*C*, *L*) Specify whether to build for 32-bits or 64 bits

SELinux

SELinux prevents bostlib_mt.so and other Dialogic-supplied shared libraries from loading because they require text relocation, which is very common for third-party shared libraries.

Follow one of the methods below to allow shared libraries to load:

- Disable SELinux as follows:
  - In /etc/selinux/config, set SELINUX to `disabled` and reboot.
- Set the SELinux mode to permissive - which will still cause warnings to pop up and appear in the logs, but the programs will work.
  - In /etc/selinux/config, set SELINUX to `permissive`, and reboot.
- Allow the shared library to do text relocation. For each shared library (.so) file that fails to load, run the following program:

  ```
  chcon -t textrel_shlib_t <library name>
  ```

Driver Rebuilding for Patch Linux Kernels

This section provides instructions for recompiling the Dialogic® Brooktrout® driver to support new kernel patches.

Use the instructions below to recompile the Dialogic® Brooktrout® driver on supported Linux platforms so that the driver can operate with any kernel patch for supported Linux versions. Dialogic only supports official kernel patches as released by Red Hat. After you follow the procedure, the driver supports only the exact version of the kernel currently running on your system, including architecture and variant.

Note: This feature only provides support for the Dialogic® Brooktrout® driver, the kernel mode code. Other parts of the Brooktrout SDK (the user mode code) might also need rebuilding and this feature will not help in these situations.

Supported versions include:

- Red Hat Enterprise/CentOS Linux 8.0 (4.18.0-80.el8), 64-bit
- Red Hat Enterprise/CentOS Linux 7.0 (3.10.0-123.el7), 64-bit version

- Red Hat Enterprise/CentOS Linux 6.0 (2.6.32-71.el6), 32-bit and 64-bit versions

The fully precompiled installable driver binaries reside under the *driver/linux/kernel/kvers* directory. This directory contains subdirectories corresponding to each kernel version, variant, and architecture, with a driver binary in each (named *boston.o* or *boston.ko*).

For each Linux OS version supported, the only precompiled driver supplied supports the original kernel that shipped with that version of Linux.

Each of these directories also contains a file named *bostbase.a*, which is a library containing precompiled object files compiled for that same kernel version, variant, and architecture.

The *driver/linux/kernel* directory contains files named *kerndep.c*, *kerndep.h*, and *makefile.kerndep*.

Before building a Dialogic® Brooktrout® driver for a patch version, install the kernel source, the compiler, and other standard development tools on the system.

➢ **To build a driver for a kernel patch version, enter the following at the command prompt:**

```
make -f Makefile.kerndep
```

This command performs several steps.

- Determines what the base Red Hat release is that the booted kernel is based on, what the kernel version is that corresponds to the base release, and what the variant and architecture are.
- Compiles the source file *kerndep.c* on the current booted kernel setup.
- Links the resulting object file with the *bostbase.a* file from the directory corresponding to the base kernel version for the current variant and architecture.
- Puts the resulting driver binary into an appropriate *kvers* subdirectory for the actual kernel version in use.

After compiling the driver, use the standard manual *dinstall* script provided on the CD to manually configure the driver.

If the kernel source is not installed in a standard location, use the optional KERNEL_SOURCE=<dir> command line option to specify the kernel source location to the *make* utility.

The kernel source itself is not required; instead, a *development kit* is required. This kit is in the package whose name is of the form *kernel-devel-<version>*, in the file *kernel-devel-<version>.i686.rpm* or *kernel-smp-devel-<version>.i686.rpm*. This kit is automatically installed if you tell the Linux installation program to install everything. In this case, KERNEL_SOURCE should point to the appropriate subdirectory of */usr/src/kernels* which would normally be one of *<version>-i686* or *<version>-smp-i686*.

Bostsrv Port in Use Error

If Boston host service is started too soon after being stopped, a port remains in use preventing H.323 initialization. As a workaround, wait a few minutes before restarting. This affects applications running Brooktrout H.323 call control on Linux.

Shutting down the Boston host service while TCP connections are active will cause those connections to go into a TIME-WAIT state. The TIME-WAIT state is a period of time equal to double the maximum segment life (MSL) time. This gives enough time to ensure the ACK sent in response to a FIN is received by the remote end.

A problem will be encountered if the Boston Host service is started before all connections in the TIME-WAIT state have completed. In this case the Boston Host service will fail to initialize H.323 call control and the application will be unable to send or receive H.323 calls.

To determine the TIME-WAIT duration in seconds on your Linux system enter the following:

```
cat /proc/sys/net/ipv[46]/tcp_fin_timeout
```

Additional Packages Required for Red Hat Linux 6.0 and Later x64

The following packages are required for the Dialogic Brooktrout SDK to be used on Red Hat Linux 6.0 and later x64 systems. It does not affect any x86 systems, and it does not affect any versions earlier than 6.0. These packages are on your Linux installation media in the Packages directory.

Each of the packages listed has a version number associated with it following the name of the package before additional text about the Linux version and the architecture. The package version will depend on the exact version of Linux being used.

Below, the packages are listed without the exact version number, and "*" is used instead. The version number can be determined by examining the installation media.

	Runtime-only systems	Development systems
RH 6	libstdc++-*.el6.i686	libstdc++-devel-*.el6.i686 glibc-devel-*.el6.i686
RH 7	libstdc++-*.el7.i686	libstdc++-devel-*.el7.i686 glibc-devel-*.el7.i686
RH 8	`libstdc++*.el8.i686`	libstdc++-devel-*.el8.i686 glibc-devel-*.el8.i686
	Required for SR140 only:	
	perl-Digest-MD5-*.el7.x86_64	perl-Digest-MD5-*.el7.x86_64

Ksoftirqd and System Load

On some Linux systems, when examining the system load, a process named ksoftirqd can be seen, which, once the Brooktrout driver is started, may seem to use up a fair amount of CPU. This is most often seen when running 64-bit RH 6.x.

This is due to an artifact of a feature that Linux introduced in 6.0 called the tickless kernel that has been known to cause problems for many timing sensitive software packages. This feature can be disabled, as follows.

As root, edit */boot/grub/grub.conf*. Locate the kernel line in the file corresponding to the kernel being run. Add the following to the end of this line.

```
nohz=off
```

On subsequent boots of the system, the tickless kernel will be disabled.

3 - Installing the SDK on Windows

This chapter describes how one can install Dialogic® Brooktrout® software on Windows operating systems.

This chapter contains the following sections:

- *System Requirements for Installation on page 56*
- *Installing the Dialogic® Brooktrout® SDK on page 58*
- *Removing or Modifying the Software on page 66*
- *64-bit Windows API Libraries on page 68*

System Requirements for Installation

When running the installation, you need the following:

- Administrator privileges
- Sufficient available disk space on the drive that contains the Windows temp directory to extract the *sdk_windows.exe* file.

  By default the Windows operating system sets it to [WINDOWS_VOLUME]\temp, where WINDOWS_VOLUME is the drive where the operating system is installed. If you do not have enough space, you will need to adjust the TEMP environment variable to point to a drive that contains at least 200 MB of free space.
- An Intel computer that contains an Intel x86 or x64 (including Pentium) CPU only.

Installation Packages

There are two installation packages for Windows.

- Dialogic® Brooktrout® SDK (*sdk_windows.exe*)

  This installation is intended for developers. It contains the runtime binaries and tools, API headers and libraries, and samples source code.

- Dialogic® Brooktrout® Runtime Software (*boston.msi*)

  This installation package is intended for end users. It contains only the runtime binaries and tools. Refer to the *Dialogic® Brooktrout® Fax Products Windows End User Guide* for more information.

  You can also integrate the components into your installation by using the merge modules, provided in the Dialogic® Brooktrout® SDK, to give the end user the experience of one installation package. Refer to the section *About the Merge Module Feature* in the Dialogic® *Brooktrout® Fax Products SDK Developer Guide* for more information.

This chapter explains how to install the Dialogic® Brooktrout® SDK.

The SDK contains support for x64 libraries which allow customers to build x64 applications that take full advantage of the Windows x64 performance Refer to *64-bit Windows API Libraries on page 68*.

Installing the Dialogic® Brooktrout® SDK

If you do not have the Dialogic® Brooktrout® Fax Products SDK, contact your sales associate.

Also, although Dialogic recommends that you install the Brooktrout SDK before you install your Computer Telephony, if you choose to install the boards first, the Found New Hardware Wizard searches for and launches the driver installation. If the Wizard cannot find suitable drivers, it prompts you to browse and locate of the drivers.

Note: This installs the drivers but not the runtime components. Dialogic recommends using the Dialogic® Brooktrout® Fax Products SDK CD-ROM installation.

If you have Dialogic® Brooktrout® SR140 Software, you must install the Dialogic® Brooktrout® SDK first. Then you can turn on Dialogic® Brooktrout® SR140 Software using the Dialogic® Brooktrout® License Manager. See the Dialogic® Brooktrout® Fax Products Windows End User Guide.

Note: If you have a previous version of the Dialogic® Brooktrout® SDK installed on your system, you must uninstall it before you can successfully install the latest Dialogic® Brooktrout® SDK. The InstallShield Wizard does not install the latest Dialogic® Brooktrout® SDK if there is a previous version on your system; however, it notifies you of the previous version and suggests corrective action. See *Removing or Modifying the Software on page 66* for more information.

➢ *Follow the steps below to install the Dialogic® Brooktrout® SDK from the CD-ROM:*

1. Insert the SDK CD-ROM into a CD drive.

   The Autorun program starts automatically.

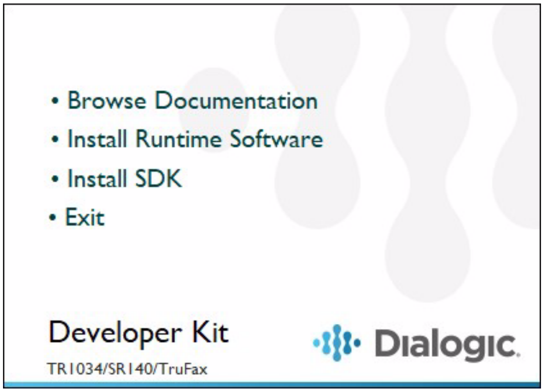
   If the Autorun program does not start automatically:

   a. Go to the CD root directory on the CD-ROM.

   b. Launch *autorun.exe.*

Autorun Menu

The Autorun Menu appears:



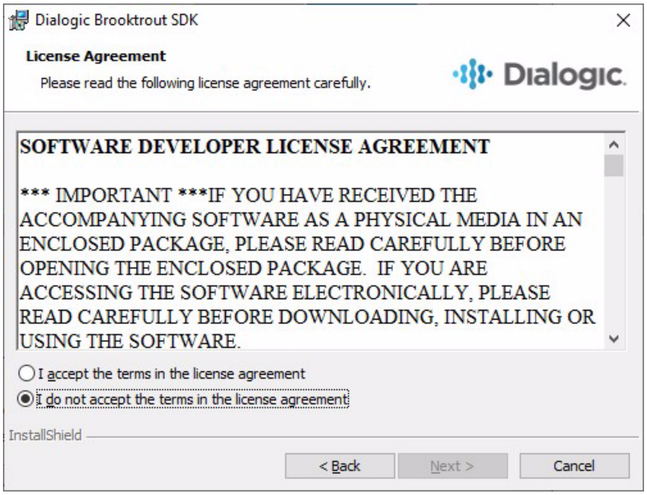
2. Choose Install SDK from the list of options, which starts the setup procedure and runs *InstallShield* to extract the files needed to install the Brooktrout SDK on your system.

   The splash screen followed by the Welcome window appears.

3. Click Next.

   The License Agreement window appears.

4. Read the license agreement and, if you agree, select the appropriate option and click Next.



Dialogic Brooktrout SDK

License Agreement

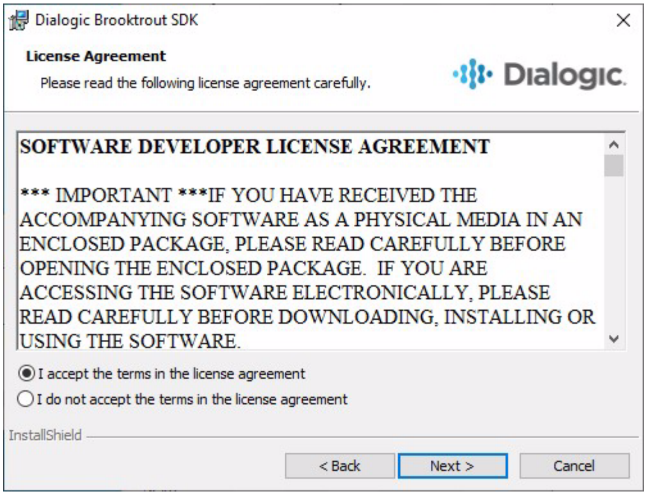
Please read the following license agreement carefully.

SOFTWARE DEVELOPER LICENSE AGREEMENT

*** IMPORTANT ***IF YOU HAVE RECEIVED THE ACCOMPANYING SOFTWARE AS A PHYSICAL MEDIA IN AN ENCLOSED PACKAGE, PLEASE READ CAREFULLY BEFORE OPENING THE ENCLOSED PACKAGE. IF YOU ARE ACCESSING THE SOFTWARE ELECTRONICALLY, PLEASE READ CAREFULLY BEFORE DOWNLOADING, INSTALLING OR USING THE SOFTWARE.

○ I accept the terms in the license agreement

● I do not accept the terms in the license agreement



Dialogic Brooktrout SDK

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● I accept the terms in the license agreement

○ I do not accept the terms in the license agreement

The Destination Folder dialog box appears.

5. Click Change to choose a folder or click Next for the default folder, *C:\Brooktrout\Boston*.

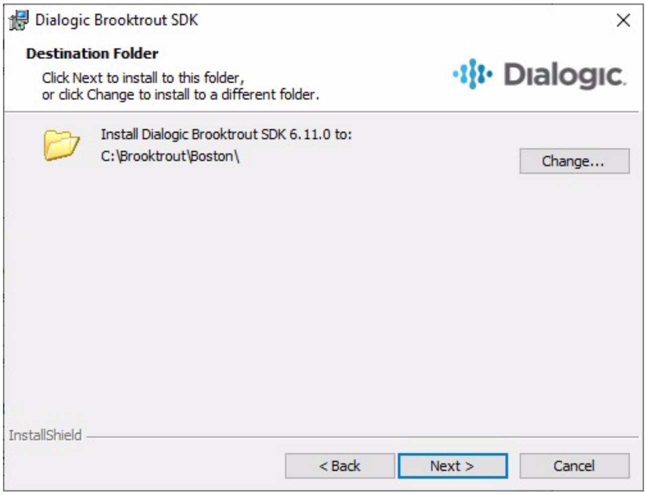
   In the example, *C:\Brooktrout\Boston* is the destination folder where the application software installs the Brooktrout SDK contents.

   If you choose Next, go to *Step 7.*

   If you choose Change, the Change Current Destination Folder dialog box appears.

6. Click OK after selecting a new location for the software, which takes you back to the Destination Folder dialog box.

7. Click Next on the Destination Folder dialog box.



Dialogic Brooktrout SDK

Destination Folder

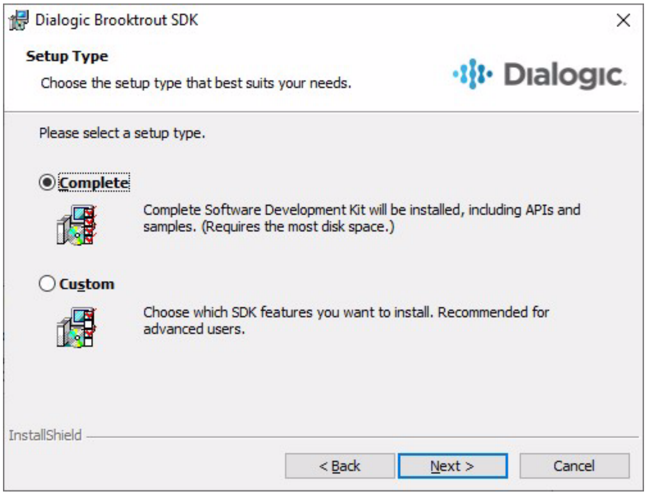
Click Next to install to this folder,
or click Change to install to a different folder.

Install Dialogic Brooktrout SDK 6.11.0 to:
C:\Brooktrout\Boston\

   The Setup Type dialog box appears.

8. Choose one of the setup types:

   - Select Complete for the full software development kit that includes the Bfv and other APIs used for writing your applications, the tool to configure your boards and software, the runtime system, and troubleshooting tools.
   - Select Custom for picking specific software elements that exactly match your development needs.



Dialogic Brooktrout SDK

Setup Type

Choose the setup type that best suits your needs.

Please select a setup type.

● Complete

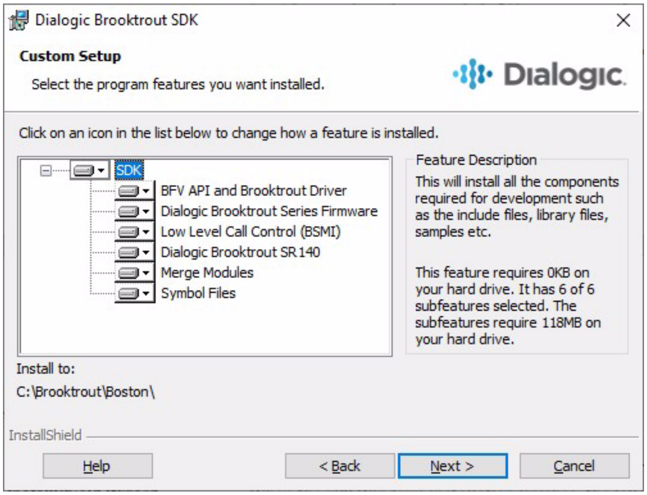
Complete Software Development Kit will be installed, including APIs and samples. (Requires the most disk space.)

○ Custom

Choose which SDK features you want to install. Recommended for advanced users.

Custom Setup

If you choose Custom, the Custom Setup window appears.



Dialogic Brooktrout SDK

Custom Setup

Select the program features you want installed.

Click on an icon in the list below to change how a feature is installed.

- SDK
  - BFV API and Brooktrout Driver
  - Dialogic Brooktrout Series Firmware
  - Low Level Call Control (BSMI)
  - Dialogic Brooktrout SR140
  - Merge Modules
  - Symbol Files

Feature Description

This will install all the components required for development such as the include files, library files, samples etc.

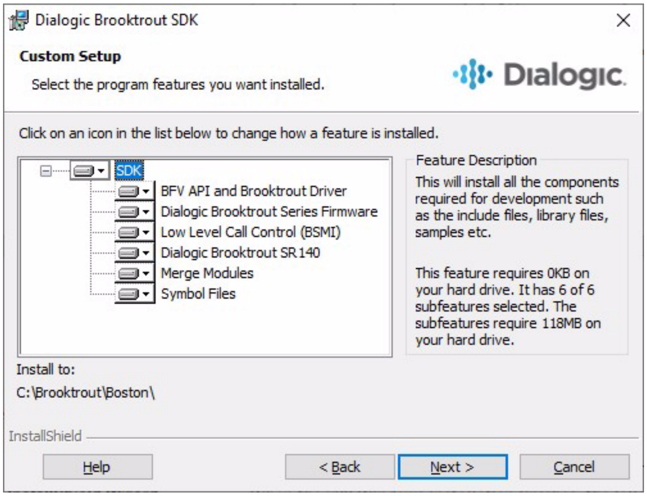
This feature requires 0KB on your hard drive. It has 6 of 6 subfeatures selected. The subfeatures require 118MB on your hard drive.

Install to:

C:\Brooktrout\Boston\

Custom Setup Tips

For help, click Help to see the Custom Setup Tips window.



Dialogic Brooktrout SDK

Custom Setup

Select the program features you want installed.

Click on an icon in the list below to change how a feature is installed.

- SDK
  - BFV API and Brooktrout Driver
  - Dialogic Brooktrout Series Firmware
  - Low Level Call Control (BSMI)
  - Dialogic Brooktrout SR140
  - Merge Modules
  - Symbol Files

Feature Description

This will install all the components required for development such as the include files, library files, samples etc.

This feature requires 0KB on your hard drive. It has 6 of 6 subfeatures selected. The subfeatures require 118MB on your hard drive.

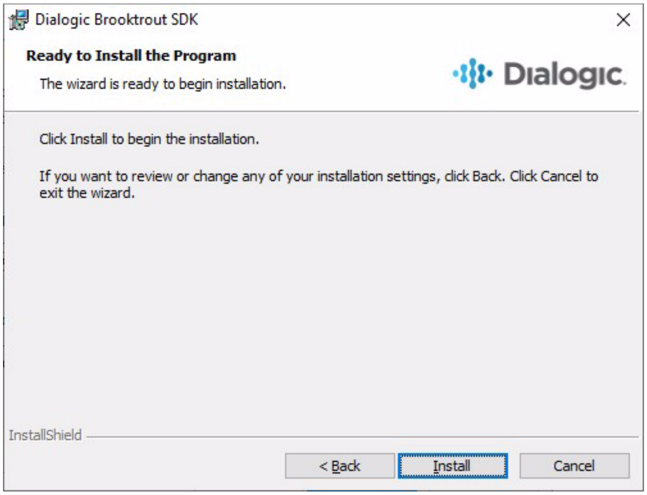
Install to:

C:\Brooktrout\Boston\

9. After reading the Help, click OK to return to the Custom Setup window.

10. Select the components you want to install and click Next.

    If you choose Complete or if you select a custom installation, the Ready to Install window appears.



Dialogic Brooktrout SDK

Ready to Install the Program

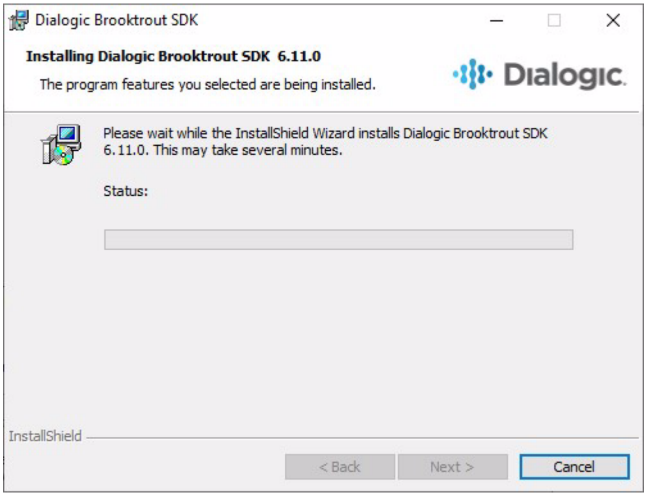
The wizard is ready to begin installation.

Click Install to begin the installation.

If you want to review or change any of your installation settings, click Back. Click Cancel to exit the wizard.

11. Click Install to install the software.

The Installing Dialogic Brooktrout SDK window appears.



Dialogic Brooktrout SDK

Installing Dialogic Brooktrout SDK 6.11.0

The program features you selected are being installed.

Please wait while the InstallShield Wizard installs Dialogic Brooktrout SDK 6.11.0. This may take several minutes.

Status:

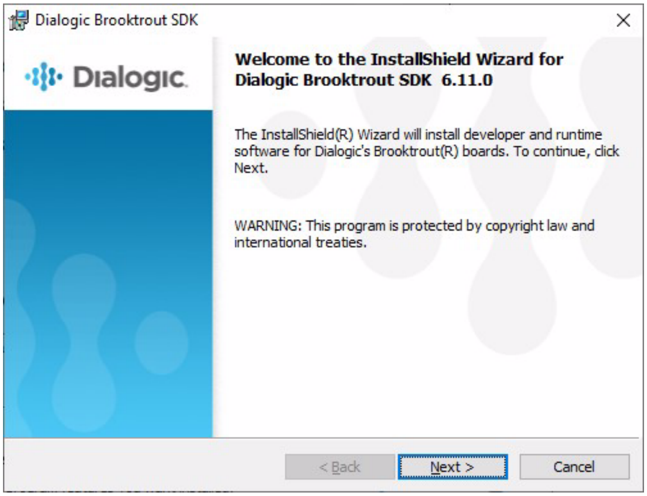
After the software is installed, the InstallShield Wizard Completed windows appears.

The installation program reminds you to activate your Dialogic® Brooktrout® SR140 with the Brooktrout License Manager and to finish configuring using the Brooktrout Configuration Tool.

12. Click Finish.

InstallShield Wizard Completed

When the x32 Windows installation finishes, the following InstallShield Wizard Completed window appears:



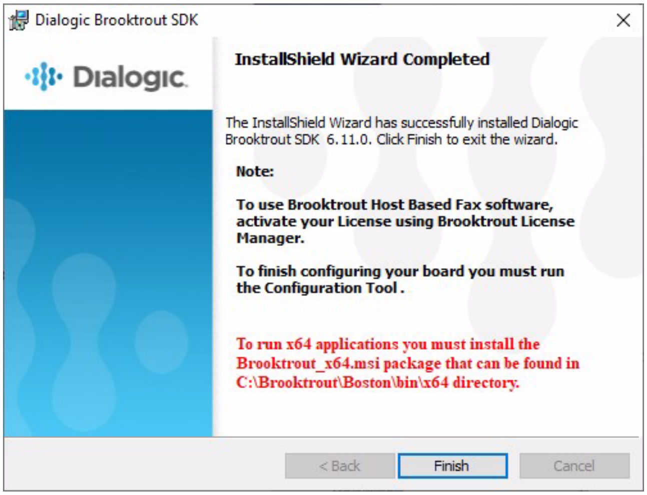
Dialogic Brooktrout SDK

Welcome to the InstallShield Wizard for Dialogic Brooktrout SDK 6.11.0

The InstallShield(R) Wizard will install developer and runtime software for Dialogic's Brooktrout(R) boards. To continue, click Next.

WARNING: This program is protected by copyright law and international treaties.

When the x64 Windows installation finishes, the following InstallShield Wizard Completed window appears:



InstallShield Wizard Completed

The InstallShield Wizard has successfully installed Dialogic Brooktrout SDK 6.11.0. Click Finish to exit the wizard.

Note:

To use Brooktrout Host Based Fax software, activate your License using Brooktrout License Manager.

To finish configuring your board you must run the Configuration Tool .

To run x64 applications you must install the Brooktrout_x64.msi package that can be found in C:\Brooktrout\Boston\bin\x64 directory.

On Windows x64, install the Brooktrout x64 package if you are running a 64-bit applications. The Brooktrout x64.msi package installs all the x64 components required to run x64 applications that use 64-bit Brooktrout libraries. Refer to *Brooktrout_x64 on page 68*. Shut down your computer and install the board using the instructions in the hardware installation card that came with the board.

Installation Directory

When the installation is complete, the resulting directory, *[INSTALLDIR]:* (*C:\Brooktrout\Boston* is the default), contains the directories according to the options you choose. See *Directory Structure on page 126* for the installed directories and files.

Installing Licenses (SR140 Only)

After rebooting your system, you can install your Dialogic® Brooktrout® license. See the *SR140 Fax Software Windows User Guide* for more information.

Sample Applications

You must compile the sample applications if you want to use them. See the chapter in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide* on compiling the sample applications.

Remove Previous Version

The InstallShield Wizard does not install the latest Brooktrout SDK if you have a previous version of the SDK. You must remove it before installing the latest SDK.

See *Removing or Modifying the Software on page 66* and *Removing the Plug-and-Play Driver on page 81*.

Removing or Modifying the Software

After you install the Brooktrout SDK, you can modify, repair, or remove it by running *sdk_windows.exe* again. Modifying or removing the Brooktrout SDK means reinstalling the software to add or delete functionality.

You can also remove or change the Brooktrout SDK or a previous version of the Brooktrout SDK by using Add/Remove Programs from the Control Panel.

➢ *Follow the steps below to uninstall or modify the existing software from the Control Panel:*

- Start →Settings →Control Panel →Programs and Features.

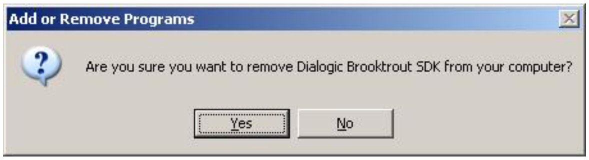
Add/Remove Program

The Add/Remove Programs window appears.

Note: On 64-bit Windows OSes, if installed also remove the Dialogic Brooktrout x64 components. Refer to *Brooktrout_x64 on page 68*.

1. Select Dialogic Brooktrout Boston SDK from the program list.

   If you click Remove, the system asks you if you want to remove the software in the Add/Remove Programs dialog box.



Are you sure you want to remove Dialogic Brooktrout SDK from your computer?

2. Click Yes.
3. If you click Change in the Add/Remove Program window, the Welcome window appears.

4. Click Install.

   The software installs the Dialogic® Brooktrout® SDK.

   If you choose Repair, the Ready to Repair window appears.

5. Click Install to have the wizard install the Dialogic® Brooktrout® SDK again.

   Then the InstallShield Wizard Completed window appears after the software is reinstalled to either modify or repair it.

   If you choose Remove, the Remove the Program window appears.

6. Click Remove.

   The Uninstalling Dialogic® Brooktrout® SDK window appears.

   When the removal of the software is complete, the InstallShield Wizard Complete window appears.

7. Click Finish to complete the operation.

These procedures only remove the files and directories that the installation procedure placed on the system.

64-bit Windows API Libraries

The 64-bit API libraries allow customers to build 64-bit applications that take full advantage of Windows 64-bit performance on x64 systems.

64-bit system

On a 64-bit system, the Brooktrout package installs the 64-bit version of the libraries in the following directory:

```
windows\system32
```

The 32-bit libraries are installed in the following directory:

```
windows\syswow64
```

32-bit system

On a 32-bit system, the Brooktrout package installs the 32-bit version of the libraries in the following directory:

```
windows\system32
```

No 64-bit libraries are installed in the system directory.

All files are available in the Brooktrout folder.

Brooktrout_x64

The *Brooktrout_x64* package installs all of the 64-bit components required to run 64-bit applications that use Brooktrout libraries.

This package installs the following:

- Visual Studio 2015 x64 components
- 64-bit Brooktrout API libraries in system directories

You install this package separately after installing either *sdk_windows.exe* or *boston.msi*. You can remove this package separately as well.

This package is available in two locations:

- On the CD under the directory `Software\Windows`
- Inside of the *sdk_windows.exe* package in the directory `Boston\bin\x64` after the *sdk_windows.exe* package is installed.

System Files

You can install either combination of packages below:

- *sdk_windows.exe* and *Brooktrout_x64.msi*
- *boston.msi* and *Brooktrout_x64.msi*

After installing them, the following configuration will be on the 32- and 64-bit operating systems:

32-bit operating system

A 32-bit operating system will have the following files installed in the `system32` directory:

- system32\bostdlld.dll
- system32\bostsrv.exe
- system32\bostsrv.dll
- system32\bsmidlld.dll
- system32\brkth323.dll
- system32\brktsip.dll
- system32\osidlld.dll

64-bit operating system

A 64-bit operating system will have the following files installed:

64-bit version of the API binaries:

- system32\bostdlld.dll
- system32\bsmidlld.dll
- system32\osidlld.dll

32-bit version of the API binaries:

- syswow64\bostdlld.dll
- syswow64\bostsrv.exe
- syswow64\bostsrv.dll
- syswow64\bsmidlld.dll
- syswow64\brkth323.dll
- syswow64\brktsip.dll
- syswow64\osidlld.dll

All the above files will also be available in the Brooktrout\boston directory.

Note: The system32 directory on a 64-bit system is visible only by using 64-bit applications like Explorer. The 32-bit applications are not able to access that location.

4 - Installing the Device Driver on Windows

This chapter describes how one can install the device driver on Windows systems.

This chapter contains the following:

Installing and Configuring Options

Once the computer telephony hardware and software are installed on your system, you must install and configure the device driver for the Dialogic® Brooktrout® boards. This chapter describes two methods for installing the device driver:

- Automatically by letting the operating system identify the device, find the driver, and install it. See *Installing the Plug-and-Play Driver on page 73*.
  - You must be running on Windows to install the driver automatically using the Plug-and-Play (PnP) feature of the operating system.
  - SR140 (virtual module) users can also use the Dialogic® Brooktrout® Configuration Tool to install the driver.
- Manually running the *install* program from the command line. See *Installing and Configuring the Driver using a Command (cmd) Prompt on page 84*.

  You can install the PnP driver manually using the *install* program with Windows.

Note: For users of Windows 2008 and later: It is strongly recommended to run the driver installation program with Administrative Privileges. Otherwise a dialog box will appear requiring you to respond to continue the installation.

Installing the Plug-and-Play Driver

After you have installed your Dialogic® Brooktrout® board the operating system can automatically install the driver for your board.

➢ *Follow the steps below to install the driver for your board:*

1. Turn on your computer.

   As the operating system finishes booting, the Found New Hardware Wizard window might appear.

Found New Hardware Wizard

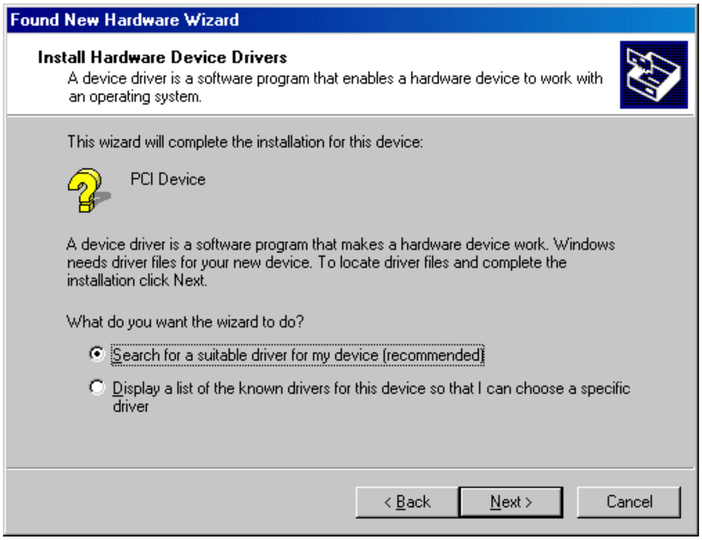
   This window does not appear if the hardware was already detected from a prior boot or if you are upgrading from an older installation.

   See *Updating Computer Telephony and the Plug-and-Play Driver on page 78* for information about upgrading.

2. Click Next to continue the device driver installation.

Installing Hardware Device Driver

   The Install Hardware Device Driver window appears.



Found New Hardware Wizard

Install Hardware Device Drivers

A device driver is a software program that enables a hardware device to work with an operating system.

This wizard will complete the installation for this device:

PCI Device

A device driver is a software program that makes a hardware device work. Windows needs driver files for your new device. To locate driver files and complete the installation click Next.

What do you want the wizard to do?

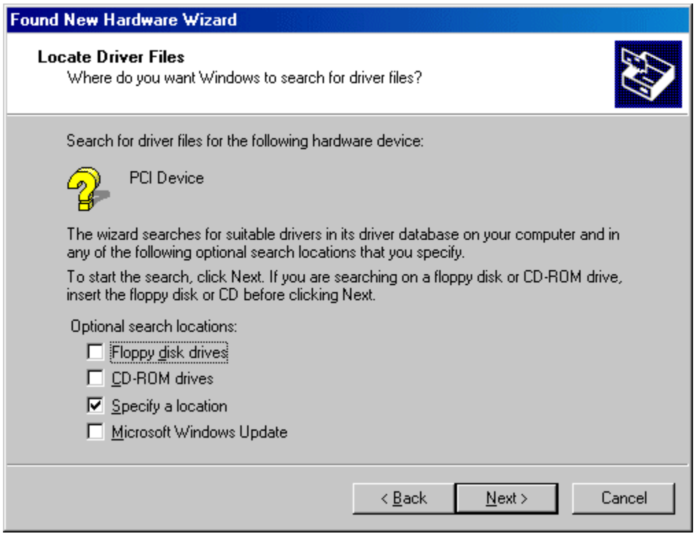
● Search for a suitable driver for my device (recommended)

○ Display a list of the known drivers for this device so that I can choose a specific driver

3. Choose the Search for a suitable driver for my device (recommended) and click Next.

Locating Driver Files

The Locate Driver Files window appears so the wizard can search for a suitable driver.



Found New Hardware Wizard

Locate Driver Files

Where do you want Windows to search for driver files?

Search for driver files for the following hardware device:

PCI Device

The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.

To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.

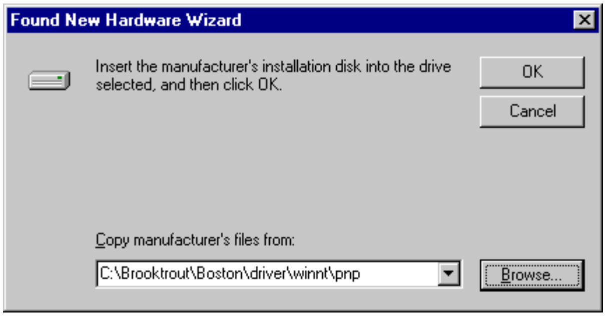
Optional search locations:

- □ Floppy disk drives
- □ CD-ROM drives
- ☑ Specify a location
- □ Microsoft Windows Update

4. Check Specify a Location and click Next.

Browsing for the *.inf* File

5. The following window appears where you can browse to select the *trxstream.inf* file located in the following folder: *C:\Brooktrout\Boston\driver\winnt\pnp*



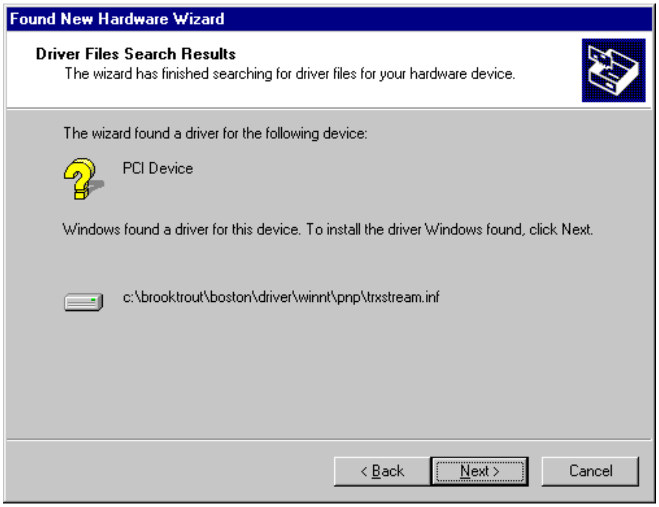
Insert the manufacturer's installation disk into the drive selected, and then click OK.

Copy manufacturer's files from: C:\Brooktrout\Boston\driver\winnt\pnp

6. Click OK.

Finding the Driver File

The Driver File Search Results window appears.



Driver Files Search Results

The wizard has finished searching for driver files for your hardware device.

The wizard found a driver for the following device:

PCI Device

Windows found a driver for this device. To install the driver Windows found, click Next.

c:\brooktrout\boston\driver\winnt\pnp\trxstream.inf

7. The Completing the Found New Hardware Wizard window appears then click Finish.

   The Plug-and-Play installation is complete.

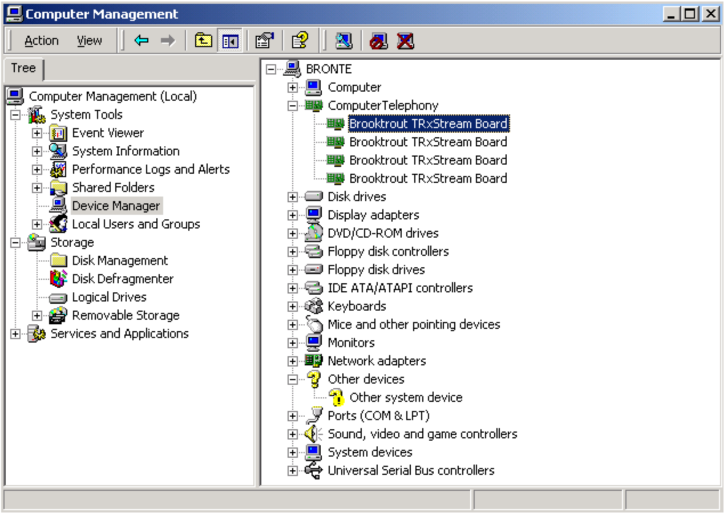
Verifying Dialogic® Brooktrout® Board Integration

➢ *Follow the steps below to verify that the Dialogic® Brooktrout® board is successfully installed on your system:*

1. Click one of either:

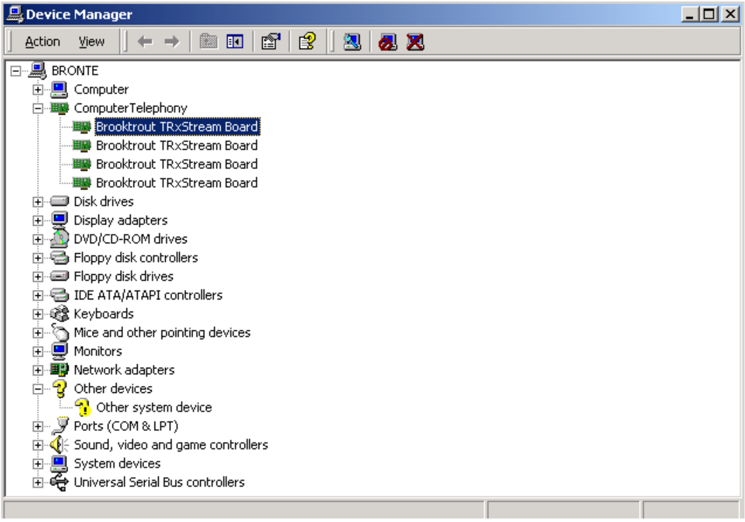
   - Control Panel →Administrative Tools → Computer Management

     The Computer Management window appears:



   - Control Panel →System →Hardware →Device Manager

The Device Manager window appears:



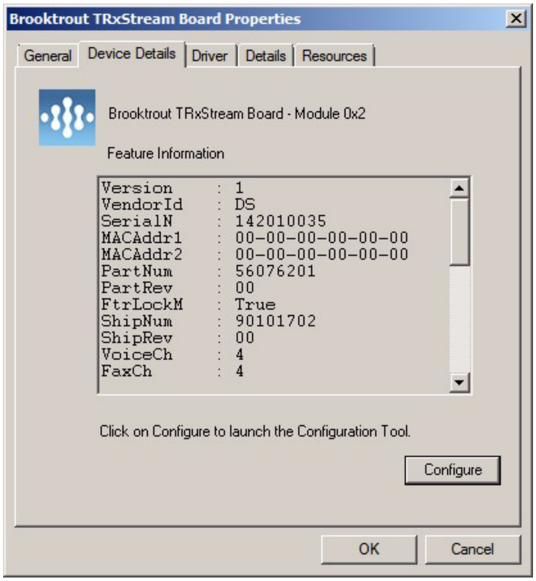
- BRONTE
  - Computer
  - ComputerTelephony
    - Brooktrout TRxStream Board
    - Brooktrout TRxStream Board
    - Brooktrout TRxStream Board
    - Brooktrout TRxStream Board
  - Disk drives
  - Display adapters
  - DVD/CD-ROM drives
  - Floppy disk controllers
  - Floppy disk drives
  - IDE ATA/ATAPI controllers
  - Keyboards
  - Mice and other pointing devices
  - Monitors
  - Network adapters
  - Other devices
    - Other system device
  - Ports (COM & LPT)
  - Sound, video and game controllers
  - System devices
  - Universal Serial Bus controllers

2. To view the properties of the Dialogic® Brooktrout® board in your system, double-click the board name in one of the windows shown above.

Viewing Dialogic® Brooktrout® Board Properties

The Brooktrout TRxStream Board Properties dialog box appears.

3. Click the Device Details tab.



Brooktrout TRxStream Board - Module 0x2

Feature Information

```
Version      :  1
VendorId     :  DS
SerialN      :  142010035
MACAddr1     :  00-00-00-00-00-00
MACAddr2     :  00-00-00-00-00-00
PartNum      :  56076201
PartRev      :  00
FtrLockM     :  True
ShipNum      :  90101702
ShipRev      :  00
VoiceCh      :  4
FaxCh        :  4
```

Click on Configure to launch the Configuration Tool.

4. Click the Configure button to use the Dialogic® Brooktrout® Configuration Tool Wizard to configure the device driver as well as other facilities of the board (for example, telephony).

   For extra help, see *Configuring Software on page 101* for information about configuring your system. The Brooktrout Configuration Tool starts in Wizard mode if the boards are identical, or Advanced Mode if the boards are different.

Updating Computer Telephony and the Plug-and-Play Driver

A Plug-and-Play-compliant device driver cannot be started unless the devices managed by the driver are physically installed in the host system *and* are in an enabled state.

Removing Dialogic® Brooktrout® Hardware

➢ *Follow the steps below to remove the previous version of the Computer Telephony and device driver:*

1. Click Start →Settings →Control Panel.

   Select the Add/Remove Hardware option to remove the previously installed Dialogic® Brooktrout® boards.

   The Add/Remove Hardware Wizard window appears.

2. Click Next.

   The Choose a Hardware Task window appears.

3. Select Uninstall/Unplug a device and click Next.

   The Choose a Removal Task window appears.

4. Select Uninstall a device and click Next.

   The Installed Devices window appears.

5. Select the device labeled PCI Device (or possibly Network Controller for some older digital boards) and click Next.

Note: If you have more than one device named PCI Device listed under Devices, select the first one.

   The Uninstall a Device window appears.

6. Select Yes and click Next.

   The Add/Remove Hardware Complete window appears and informs you that the device was successfully removed.

7. Click Finish.

8. Follow Step 1 through Step 6 to remove each Dialogic® Brooktrout® board that is listed as PCI Device (or possibly Network Controller) in the Devices list in the Installed Devices window.

Once the Plug-and-Play installation process is completed, verify that the Computer Telephony category appears correctly in the Device Manager and contains all installed Dialogic® Brooktrout® hardware.

See *Verifying Dialogic® Brooktrout® Board Integration on page 76*.

Updating Previous Versions of the Plug-and-Play Driver

After you update the driver, reboot your system to ensure that the new driver is used.

➢ *Follow the steps to update the device driver:*

1. Open the Windows Device Manager.
2. Select Start →Settings →Control Panel → Administrative Tools →Computer Management.
3. Select the Device Manager node.
4. Expand the Computer Telephony node.
5. Right-click a Dialogic® Brooktrout® board and select Properties to open the board properties window.
6. Select the Driver tab and look for the Update Driver button.
7. Click Update Driver to start the Update Driver Wizard.
8. Click Next.
9. After the Install Hardware Device Drivers window appears, select Search for a suitable driver for my device.
10. The Locate Driver Files window appears, select Specify a location.
11. On the next window, choose Browse and locate the *trxstream.inf* file located on the CD under the *Windows Plug-and-Play* folder, or if you have already installed the Brooktrout SDK, locate the file under *[INSTALLDIR]\driver\winnt\pnp\*.

    If the specified location for the new *trxstream.inf* file is different from the location for the old *trxsteam.inf* file, and if the file still exists in the old location on your system, the update does not work. The system uses the old file and location instead of the new one. Delete the old copy of the *trxstream.inf* file and its Plug-and-Play components before installing the new one.
12. Click OK and then Next.
13. Click Next and then Finish.

Removing the Plug-and-Play Driver

Installing a Dialogic® Brooktrout® device using the Plug-and-Play Manager (Found New Hardware Wizard) creates some backup files and registry entries. The Windows Plug-and-Play Manager uses this information to automatically install the device on rebooting.

To completely remove the Plug-and-Play driver from the system, you must perform a complete cleanup after you remove the device from the Device Manager.

Make sure you stop all your applications and the Boston Host Service before uninstalling the device driver.

➢ *Follow the steps below to remove the Plug-and-Play driver:*

1. Open Windows Device Manager.
2. Expand the Computer Telephony node.
3. Remove all the Brooktrout boards listed under the Computer Telephony node.
   a. Expand the “Computer Telephony” node.
   b. Right click the Brooktrout board node and select.
4. Open Command Prompt and type “net stop boston” to stop the driver that can still be running.
5. Delete the following files:

   ```
   C:\WINNT\SYSTEM32\DRIVERS\boston.sys
   ```

   ```
   C:\WINNT\SYSTEM32\brktBdevpp.dll
   ```

6. Examine the registry value `InfPath` located under:

   ```
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Control
   \Class\{8CF4CA66-A2CC-48FA-BC1D-6A64E47F6D27}.
   ```

   Search for the first key which contains the following values:

   - DriverDesc=Brooktrout TRxStream Board

   This key should contain the name of the backup copy of the *trxstream.inf* file that Windows created during the device installation under *C:\winnt\INF.*

7. Delete the *INF* file of this name from *C:\WINNT\INF* along with the corresponding *PNF* file. Except for the extension, the *INF* file and the *PNF* file have the same names. For example, if the *INF* file is *oem11.inf*, the name of the *PNF* file is *oem11.pnf*.

8. Delete the following registry keys:

   For 32-bit operating system:

   ```
   HKEY_LOCAL_MACHINE\SOFTWARE\Brooktrout Technology
   \DevicePropertyPage
   ```

   ```
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services
   \Boston
   ```

   For 64-bit operating system:

   ```
   HKEY_LOCAL_MACHINE\SOFTWARE\WOW6432Node
   \Brooktrout Technology\DevicePropertyPage
   ```

   ```
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services
   \Boston
   ```

9. Reboot the system and verify that the Brooktrout TRxStream node(s) is not listed under the Computer Telephony class node in the Device Manager.

Disabling Plug-and-Play Driver Installation

After you install a Dialogic® Brooktrout® board, the Windows operating system might display a window stating that a new PCI device was found and offer to detect/install a driver for it. Proceed with the automatic detection. The operating system will not find a matching driver. Do not attempt to supply a driver when asked.

➢ *The detection of new hardware occurs after each reboot unless you perform the following procedure:*

1. When Welcome to Found New Hardware Wizard appears, click Next.
2. Select Search for a suitable driver for my device (recommended).
3. Click Next, uncheck all choices, then click Next again.
4. Select Disable device
5. Click Finish.

➢ *Another approach is to:*

1. Click Cancel for ALL new devices that are found.
2. Right-click My Computer.
3. Right-click Properties.
4. Right-click Hardware
5. Right-click Device Manager.
6. Look for:? Other Devices.
7. Right-click all devices with:?.
8. Select Disable.

Reinitializing the Driver

You can reinitialize the driver to its starting state in terms of channels assigned to modules and module number assignments using the *driver_reinit.exe* utility located in the *boston\driver\winnt\user* directory (see *Reinitializing the Device Driver on page 172*).

Installing and Configuring the Driver using a Command (cmd) Prompt

To install and configure the driver manually, change to the *[InstallDir]\driver\winnt\install* directory and run the *install* program. You can use this application to install Plug-and-Play drivers.

The configuration dialog is as follows:

```
Installing Brooktrout Boston Device Driver Version 6.7.0
Maximum number of PCI/cPCI hardware modules (default 16):
Physical buffer size (default 32768):
Application buffer size (default 10240):
Machine ID, in hex (default 1):
Do initial reset (default 1):
History enable (default 0):
```

If you enter *1*, *install* asks the following questions:

```
History size (default 1024000):
Number of physical channel histories (default 0):
Number of application channel histories (default 0):
Restrict physical channel histories to admin channel 1
(default 1):
Configure advanced parameters (n)?
```

If you enter *y*, *install* asks the following questions:

```
Stop history on module death (default 0):
Number of I2O frames per module (default 16):
Driver flow control interval (default 250):
Internal memory allocation minimum (default 152):
Internal memory allocation quanta (default 128):
To reserve module numbers, enter mod_id (serial number)
and mod_num, in hex. Mod_num will default as indicated:
mod_id mod_num[f0]:
Configure test parameters (n)?
```

If you enter *y*, two test options are listed:

```
Test2:

Test3:

Configuring Boston driver:

Phys buf size 32768

App buffer size 10240

Machine ID 1

History size 1024000

Num phys hist bufs 0

Num apl hist bufs 0

Load driver with no devices present? (y or n, default y):

When using Boston PCI hardware modules, a system memory
adjustment may be required in order to properly access the
modules. For a small number of modules this is often not
required, but many factors, including other devices that
are or will be in the system, affect this. After this
adjustment is made, the system must be rebooted.

Do you wish to perform this adjustment? (default n):
```

After installing the Plug-and-Play driver, the following message appears:

```
Installing Plug and Play driver.
The Plug and Play driver was successfully installed.
```

The maximum number of PCI hardware modules can be left at its default. However, if fewer modules are in use, this value can be set to a smaller number to conserve memory. Each hardware module uses approximately 60K.

The following exit codes from the install program, either for driver installation or removal, can be used to determine if there was an error and/or if a reboot is required.

0 - No error and no reboot required

1 - No error and reboot required

-1 - Error and no reboot required

-2 - Error and reboot required

For more information, see:

- *Command Line Configuration for Install on page 96*
- *Windows Operating System on page 166*

See notes within *Installing the Plug-and-Play Driver* for information about pop-ups that may appear after installing the driver.

History Logging

When the *install* program installs the driver, history logging is disabled by default (0). When you manually install the driver using *install*, the default is set to disable history logging (which you can choose to override). History logging is a powerful debugging tool, especially when working with Dialogic Technical Services and Support. However, it does consume a significant amount of CPU time when running very high call loads. Therefore, leave history logging off for systems that have high call loads and are CPU bound. For low-load systems or when debugging, enable history logging (1).

Leave the number of physical and application channel histories at 0 unless you are directed to change this by Dialogic Technical Services and Support. If you change the physical or application buffer size, do not change the value to one smaller than the default.

Advanced Configuration Parameters

If you select advanced configuration parameters, the software prompts you for the number of I2O frames, driver flow control interval, internal memory allocation parameters, module reservations, and test parameters. Do not configure advanced parameters except under the advice of Dialogic Technical Services and Support.

Memory Resources

When Dialogic® Brooktrout® PCI hardware modules are installed in the system, a certain type of memory resource might be exhausted or dangerously low if you do not perform a memory adjustment. For small numbers of modules, the adjustment is often not required, but there is no way to predict the point at which it becomes necessary, since each system is different. Need for the adjustment depends on the system configuration, whether other drivers or devices are using this type of memory or will in the future, and possibly other factors. If you choose to perform the system memory adjustment, *install* prompts you for the system memory size.

```
Enter the number of MB of memory in the system[32]?
```

If a memory adjustment has been performed by another program, *install* prompts you as to how to proceed.

```
Do you wish to   (1) skip adjusting,
                 (2) replace adjustment, or
                 (3) add to the adjustment
```

Proceeding with any of the adjustments in this case might not properly succeed or be reversible later, but the *install* program does the best it can to make the adjustment safely.

The program then advises you to reboot.

```
You must reboot the system for the memory
configuration changes to take effect.
```

```
A reboot is recommended. Do you wish to reboot now? [n]
```

The *install* application also prompts you to reboot the system if Windows requires a system restart to complete the Plug-and-Play installation.

Removing the Driver with a Command (cmd) Prompt

To remove the driver, enter the following at the Command Prompt:

```
install -r
```

You must include the following parameter (see *Command Line Configuration for Install on page 96*):

```
Reboot (if needed) after memory readjustment (1 or 0)
```

This option successfully removes all the Dialogic® Brooktrout® PnP devices that are installed using the *trxstream.inf* file that came with your Brooktrout SDK. If you installed the Dialogic® Brooktrout® PnP hardware using some other INF file that registers the Dialogic® Brooktrout® boards under a class other than Computer Telephony, the *-r* option can fail to completely uninstall this device.

Reinitializing the Driver

You can reinitialize the driver to its starting state in terms of channels assigned to modules and module number assignments using the *driver_reinit.exe* utility located in the *Boston\driver\winnt\user* directory (see *Reinitializing the Device Driver on page 172*).

Using the Boston Host Service

The Boston Host Service (Bostsrv) is used to initialize modules. Upon startup it detects Dialogic® Brooktrout® modules, loads FW and initializes the call control. You must use the Boston Host Service to run a multi-process application or to use Dialogic® Brooktrout® SR140 Fax Software. The Boston Host Service is optional for other Dialogic® Brooktrout® modules.

The Boston Host Service is installed and started automatically by the Brooktrout Configuration Tool when you click the Apply button. The command line process is not required.

To run the Boston Host Service with the driver, use any of these commands.

What you can do with Bostsrv	Command Line
To start the service	**`net start bostservice`**
To stop the service	**`net stop bostservice`**
To install the service	**`bostsrv -install`**
To remove the service	**`bostsrv -remove`**
To run as a console application for debugging	**`bostsrv -debug`**
To enable Bfv API debug mode	**`bostsrv -v`**
To log output to file (can be used with -debug and -install)	**`bostsrv -1 <file>`**

Note: You must have administrative privileges to install, remove, start, or stop the Boston Host Service.

Installing Bostsrv

➢ *Follow the steps below to install the Boston Host Service, in a Command Prompt window:*

1. Enter the following at the a command prompt:

   ```
   bostsrv -install
   ```

2. Enter name and location of the btcall configuration file. (default shown)

   ```
   C:\Brooktrout\Boston\bfv.api\winnt\bin\btcall.cfg
   ```

3. Enter the location of the firmware files. (default shown)

   ```
   C:\Brooktrout\Boston\fw
   ```

Starting Bostsrv

➢ *Follow the steps below to start the Boston Host Service, in a Command Prompt window:*

Enter the following at the a command prompt:

```
net start bostservice
The Brooktrout Technology Boston Host Service is
starting...
```

To set the Boston Host Service to start automatically, set startup mode to Automatic using Windows Services window. This initializes the Dialogic® Brooktrout® modules upon machine starter reboot. You can also perform this step through the Options, Preferences....Boston Host Service in Start Mode in the Brooktrout Configuration Tool.

Troubleshooting Bostsrv

System Error 59

When the Boston Host Service fails to start as a service with a system error 59, verify that you correctly entered the configuration file name and path location, as shown in *Installing Bostsrv on page 90* for the *btcall.cfg* file.

If you do not specify the full path to the protocol for the *callctrl.cfg* file, within the *btcall.cfg* file, a system error 59 can also occur.

Special Considerations

When you install the device driver on a Windows operating system, consider the following topics:

- *PCI Considerations on page 92*
- *Dialogic® Brooktrout® Bfv API Libraries and Makefiles on page 93*
- *Writing Multithreaded Programs on page 93*
- *Using BOSTDLLD with Debugging Enabled on page 94*
- *Determining Installation Parameters on page 94*
- *Driver Startup on page 95*
- *Global Variables on page 95*
- *Limits on Open Files on page 95*
- *Process Priority on page 96*
- *Command Line Configuration for Install on page 96*
- *Driver File Locations (install) on page 99*

PCI Considerations

The operating system and/or system BIOS assigns base addresses and interrupt numbers to the PCI boards, that might change when the system is rebooted, especially if devices are added or moved.

If multiple PCI boards are in use, see *Determining the Board Module Number on page 24* to determine the module numbers of boards or ordinal channel values.

Dialogic® Brooktrout® Bfv API Libraries and Makefiles

Dialogic only supplies dynamically linked C runtime libraries (BOSTDLLD).

The *app.src* and *bapp.src* directories contain makefiles that compile using BOSTDLLD.DLL version of the Bfv API libraries. All applications should try to follow the makefiles supplied in the `app.src` or `bapp.src` directory. In particular, since all the supplied libraries were compiled as multi threaded, compile all your applications this way. See also, *Reviewing Compiler and Linker Options on page 73*.

When using a dynamically linked version of the library, either add the directory name containing the DLL to your PATH environment variable, or copy the DLL into a directory already in PATH. For example:

```
\Brooktrout\Boston\bfv.api\winnt\lib
```

Writing Multithreaded Programs

When new threads are created, often a stack size can or must be specified. The stack size must be sufficiently large to store all local variables used both by the application and the Bfv API. If the stack size is not large enough, unpredictable behavior can result.

Dialogic usually finds a stack size of 64k to be sufficient but, depending on the application stack allocation demands, more memory might be required.

Using BOSTDLLD with Debugging Enabled

When using the DLL version of the Bfv API library with a debug version of your application, take special care when handling FILE * file pointers or dynamically allocated memory.

Some functions use FILE * pointers that the application must open. Applications can also access FILE * pointers that the Bfv API has opened (with the `TIFF_FP` macro). There are also some instances where memory is allocated by the Bfv API that must be freed by the application, for example, *BfvLinesAvail* and `PAGE_RES` structures.

The runtime libraries used by BOSTDLLD are separate from the debug ones used by the application. The meanings and applicability of the file pointers and allocated memory differ and are incompatible between the two copies of the runtime libraries. To avoid these kinds of pointer problems, the Bfv API provides a set of *_dll_...* functions. See *Volume 1* of the *Dialogic® Brooktrout® Bfv APIs Reference Manual.*

Determining Installation Parameters

Any time after the driver has been installed (but not removed), you can determine what installation parameters were used.

➢ *Follow the steps below to determine the installation parameters:*

1. Run *regedit* or *regedit32*.
2. Locate the key:

   ```
   HKEY_LOCAL_MACHINE\SYSTEM\CurrentControlSet\Services
   \Boston\Parameters
   ```
3. Look at the values under this key.

Driver Startup

After you install the driver, it has a service associated with it named *boston*, a kernel-mode driver.

If driver startup fails, the error message that appears is almost always unrelated to the actual cause of failure. The Event Log contains an error message supplied by the driver. Using the Event Viewer, look for the most recent entries in the System section labeled *boston*. Occasionally the Event Log fills up. If this happens, set *Action->Properties->Overwrite* events as needed.

Under kernel debugging environments, the debugger also contains a message. Under other conditions, entries can also appear in the Event Log or debugger. If you encounter unusual behavior, check the Event Log or debugger.

Global Variables

If you plan to compile your application for use with the Dialogic® Brooktrout® Bfv API library, do not use local variable names that match any of the names of the global variables defined by the Bfv API library. Such duplications will prevent the application from compiling.

The Bfv API global variables include:

- the variables used by *getopt* (for example, `optind`)
- the `_mill_priority` variable, specific to Windows

Limits on Open Files

The Microsoft Visual C++ compiler library limits the number of files that can be opened. Developers often encounter this limit when developing multithreaded Dialogic® Brooktrout® Bfv API applications. Microsoft has updated their libraries, greatly increasing this limit. For Visual C++ 4.1+, the limit is 512 files. You can increase this limit using the *_setmaxstdio* function from the compiler library.

Process Priority

The Bfv API automatically raises the priority of any process that calls *BfvLineAttach* to `HIGH_PRIORITY_CLASS`. Dialogic recommends using this priority to keep delays to application processes performing fax or speech functions to a minimum. Priority raising occurs the first time the application calls *BfvLineAttach* only, and is controlled by the global variable `_mill_priority`, which contains the new priority for the process.

Command Line Configuration for *Install*

When configuring the device driver using *install* or removing it using *install -r*, you can specify the command line option `-c` to cause the *install* program to not prompt you for any parameters. Instead, the *install* program uses the responses that you supply following the `-c` option on the command line.

If you use the `-c` option, you must include all the parameters described below, in order, regardless of whether or not the parameter has meaning on the system in question. If a parameter does not apply, it is ignored. The parameters are not checked for validity.

Note: The software does not prompt for removal of old driver versions.

When configuring the driver using *install*, you must include the following parameters:

Parameter	Defaults
Reserved	p
Reserved	0
Reserved	-1
Max num PCI hardware modules	16
Physical buffer size	32768
Application buffer size	10240
Reserved	0
Machine ID	1
Reset option (1 or 0)	1
History Enable	0

History Size	1024000
Num physical histories	0
Num app histories	0
Restrict phys channels (1 or 0)	1
Number of I2O frames	*0
Flow control interval	*0
Memory alloc minimum	*0
Memory alloc quanta	*0
Reserved	0
Stop history on module death	*0
Test parameter 2	*0
Test parameter 3	*0
Reserved module info module id, module number 0 to terminate	*0
Load driver with no devices present (y or n) - (n = pnp, y = software only solution)	n
Do mem adjustments (y or n)	n
What to do if already adjusted (1, 2, or 3)	1
Memory in system	0
Reserved	0
Reboot after mem adjustment (1 or 0)	0

The advanced parameters, marked with * in the list above, can always be safely set to 0. This setting tells the driver to use the default values.

For example, to configure the driver for up to 16 PCI hardware modules use the following settings:

physical buffer size 32768
application buffer size 10240
machine ID 1
reset on
history enabled
history size 1024000
physical histories 0
application histories 0
restrict physical channels 0
all default advanced parameters 0
not to start at boot 0
no memory adjustments 0
not reboot 0

Enter the following at the command line:

```
install -c p 0 -1 16 32768 10240 0 1 1 1 1024000 0 0 1 0 0 0 0 0 0 0 0 0 y n
     1 0 0 0
```

For more information, see *Windows Operating System on page 166*.

Driver File Locations (install)

When using *install* to configure the device driver, you do not need all files from the distribution. However, the file locations used by the configuration procedure relative to the directory where *install* is run must be the same as that in the normal distribution.

Assuming a directory named *install* where *install* is being run, the following files must be present:

install\install.exe

pnp\brooktrout.cat
pnp\trxstream.inf
pnp\TRxStream\x86\ (directory for the following 32-bit OS files)
    boston.pdb
    boston.sys
    brktBdevpp.dll
    brktBdevpp.pdb
pnp\TRxStream\x64\ (directory for the following 64-bit OS files)
    boston.pdb
    boston.sys
    brktBdevpp.dll
    brktBdevpp.pdb

These files and directories appear in the standard distribution under the directory *driver\winnt*.

Build Requirements for install

You need the Windows DDK installed to compile the *install.exe* application. For more information about the Microsoft Windows Device Driver Kit, see *microsoft.com*. *install.exe* links to the DDK libraries: *setupapi.lib* and *newdev.lib*. It also links to the *shlwapi.lib* system library.

Version Information

The driver file, *boston.sys*, and the DLL library file, *bostdlld.dll*, contain version resource information. Use the system File Manager or Explorer to view this information.

Reviewing Compiler and Linker Options

The makefiles contained in the *app.src* and *bapp.src* directories provide a number of command line options to the compiler and linker. Using these options, the compiler and linker produce object files and executables compatible with the Bfv API library.

Dialogic strongly recommends that you use these options for all your Bfv API applications. But for those who want to change the set of options the compiler and linker use, the following is a list of the nonstandard options and their functions. The options used for compilation are marked with (*C*) and those for linking are marked with (*L*).

The makefile uses the standard `$(cflags)` from *ntwin32.mak* and `$(cvarsdll)`for the dynamically-linked C runtime libraries. It uses the standard `$(conlflags)` for linking.

`$(cflags)`	(*C*) Options for CFLAGS.
$(cvarsdll)	(*C*) Options defining dynamic runtime library.
$(conlflags)	(*L*) Options for linking console mode program.
`-nologo`	(*C*) Do not print logos.
`-DWINNT`	(*C*) Defines a symbol that identifies the environment.
`-UMSDOS,-U_MSDOS`	(*C*) Undefines symbols that the compiler might define that can cause problems at compilation.
`-DMILL_DLL`	(*C*) Defines a symbol that is required when using the DLL Bfv API library.
`libcpmt.lib`	(*L*) C++ libraries. Required when new call control is used.
NODEBUG=1	**Note:** This is a makefile line, not a compilation or link flag. This line is needed in the makefile when compiling with certain versions of Visual Studio to prevent it from automatically compiling for debugging and producing inappropriate warning messages.

5 - Configuring Software

This chapter describes how one can configure the Dialogic® Brooktrout® Fax Software for your Dialogic® Brooktrout® boards.

Dialogic has created ways to configure the Dialogic® Brooktrout® software including:

- *Using the Dialogic® Brooktrout® Configuration Tool on Windows Systems on page 103*
- *Running the Dialogic® Brooktrout® Configuration Tool on page 106*

  For Windows operating systems, you can use the Brooktrout Configuration Tool in one of several modes:

  - *Configuring in Wizard Mode on page 116*
  - *Advanced Mode on page 117*
  - *Offline Mode on page 118*
  - *Silent Mode on page 123*
- *Using a Call Control Configuration File on page 124*

  For all operating systems, you can configure the call control by creating a call control configuration file that is read by the *BfvLineReset* function.

For more information, see:

- *Volume 6, Appendix A* in the *Dialogic® Brooktrout® Bfv API Reference Manual*
- The Bfv API Function Locator in the *Dialogic® Brooktrout® Bfv API Reference Manual*

Using the Dialogic® Brooktrout® Configuration Tool on Windows Systems

When you use one of the Windows operating systems, you can configure your module with the Dialogic® Brooktrout® Configuration Tool for Windows (*configtool.exe*).

The Dialogic® Brooktrout® Configuration Tool is a graphical user interface program that you can use to create and modify the configuration files, edit and update the driver parameters, and configure and initialize the module. The Brooktrout Configuration Tool also installs the Plug-and-Play driver, if not already installed.

It can be launched in the following modes.

- *Wizard Mode on page 103*
- *Advanced Mode on page 104*
- *Offline Mode on page 104*
- *Timer Mode on page 105*
- *Silent Mode on page 105*

A brief summary of each mode function is highlighted here:

Wizard Mode

Guides you in configuring Dialogic® Brooktrout® software and hardware. To use Wizard mode, all Dialogic® Brooktrout® modules in your system must be of the same type and the Brooktrout Configuration Tool must recognize the modules as Dialogic® Brooktrout® boards.

When the system contains different types of modules or the Brooktrout Configuration Tool does not recognize a module, the Brooktrout Configuration Tool selects Advanced Mode automatically.

See *Configuring in Wizard Mode on page 116*.

Advanced Mode

Requires that you have some knowledge of computer telephony, communications protocols, and Computer Telephony. The Brooktrout Configuration Tool automatically selects Advanced Mode when there are different types of modules installed or when you explicitly indicate Advanced Mode by using a command line switch to start, possibly to configure each module differently (even if the modules are the same kind).

A toolbar provides the following options:

- The Save button:

  Saves the configuration.
- The Apply button:
  - Saves your configuration to the appropriate configuration file.
  - If driver parameters were modified, it dynamically reconfigures the drivers on a PnP operating system.
  - If the Boston Host Service is not installed, installs the Boston Host Service.
  - If the Boston Host Service is running, stops the Boston Host Service.
  - Starts the Boston Host Service.

See *Advanced Mode on page 117*.

Offline Mode

Allows you to create/edit configuration files when no boards are installed. In Offline Mode, the toolbar option Apply is not present and no checks are performed on the existence of the modules specified in the configuration.

The toolbar enables two options that are disabled in Advanced Mode: Add and Remove. These buttons allow you to modify the configuration files to add or remove modules.

See *Offline Mode on page 118*.

Silent Mode

Reads configuration files from the location specified at installation (usually *C:\Brooktrout\Boston\config)*, starts the device driver (if necessary). The graphical user interface is not displayed.

The Brooktrout Configuration Tool creates a log file (*configuration.log*) that contains all the actions that it executed and the results of these actions. This log file is located in the current working directory.

See *Silent Mode on page 123*.

Timer Mode

Sets a timer that launches the Brooktrout Configuration Tool after a specified amount of time. You can override the time and launch the Brooktrout Configuration Tool immediately. You might want to override the timer when you do not need to check on the existence of modules.

Running the Dialogic® Brooktrout® Configuration Tool

You can run the Brooktrout Configuration Tool from:

- The program menu:

  ```
  Start →All Program →Brooktrout →Brooktrout
  Configuration Tool
  ```

- The command line:

  ```
  C:\Brooktrout\Boston\utils\winnt\bin\configtool.exe
  ```

  - To specify the mode on the command line, use one of the following:

    ```
    /a - Advanced Mode
    /o - Offline Mode
    /s - Silent Mode
    /t - Timer Mode
    /w - Wizard Mode
    ```

  - Other command line arguments include:

    `/c (configip)`

    Displays the following note:

    Note: `/c` option brings up the Configure IP Stack dialog box only if there are IP enabled devices installed.

    `/d (debug)`

    Enable the debug flag, which initiates writing of the debug information to the *configuration.log* file.

    `/e (expert)`

    Show all hidden parameters. Use this mode only under the guidance of Dialogic Technical Services and Support personnel. See *Getting Technical Support on page 20*.

    `/i <INF file location>`

    Use the specified INF file to install the PnP driver when it is not installed or installed but not started.

    You must uninstall any previous version of the plug and play driver INF file. See *Removing the Plug-and-Play Driver on page 81* or *Removing the Driver with a Command (cmd) Prompt on page 88*.

`/f <cfgfile>`

Specify the name and location of the user-defined configuration file <cfgfile> while launching the Brooktrout Configuration Tool. For example:

```
/f C:\Brooktrout\Boston\custom\btcall.cfg
```

`/p`

Show the Brooktrout Configuration Tool - Preferences dialog box

`/q`

Do not display the Brooktrout Configuration Tool - Preferences dialog box.

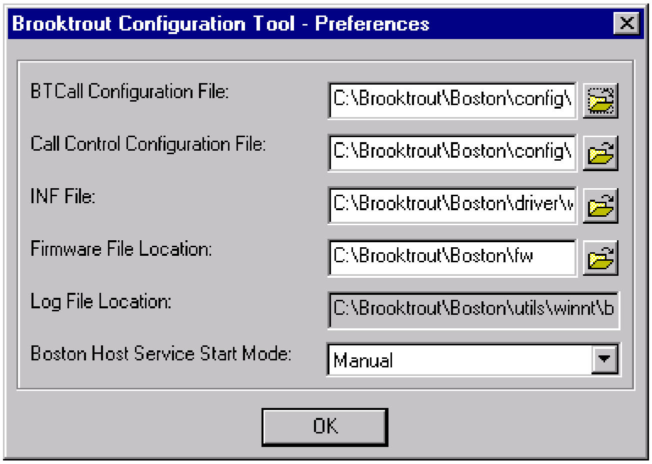
You can use any options in combination with a mode when launching the Brooktrout Configuration Tool. When ran from any mode, including the command line without a mode option switch, the Brooktrout Configuration Tool starts in Wizard Mode, if the modules are of the same type. Otherwise, the Brooktrout Configuration Tool starts in Advanced Mode.

Choosing the File Location

When you start the Brooktrout Configuration Tool for the first time, you can choose the locations for various files using the Brooktrout Configuration Tool - Preferences dialog box.

Note: You might want to set these file locations before you start the Brooktrout Configuration Tool. See *Setting File Locations Prior to First Execution on page 108*.

Preferences Dialog Box



Brooktrout Configuration Tool - Preferences

BTCall Configuration File: C:\Brooktrout\Boston\config\

Call Control Configuration File: C:\Brooktrout\Boston\config\

INF File: C:\Brooktrout\Boston\driver\w

Firmware File Location: C:\Brooktrout\Boston\fw

Log File Location: C:\Brooktrout\Boston\utils\winnt\b

Boston Host Service Start Mode: Manual

Setting File Locations Prior to First Execution

➢ **To suppress the Preference dialog box with specified configuration files locations other than the defaults, before the first use of the application, follow these steps:**

1. Modify the following fields in the *settings.cfg* file (see *Example of settings.cfg File on page 109*):

   - `btcall_cfg_path`
   - `cc_cfg_path`
   - `log_cfg_path`
   - `firmware_dir`

   The *settings.cfg* file must be placed in the same directory as the Brooktrout Configuration Tool program (*configtool.exe*):

   `C:\Brooktrout\Boston\utils\winnt\bin`

2. Launch the Brooktrout Configuration Tool with the /q command line option:

```
C:\Brooktrout\Boston\utils\winnt\bin\configtool.exe /q
```

After launching the Brooktrout Configuration Tool for the first time, you can access the Preferences dialog box only through Advanced Mode by launching the Brooktrout Configuration Tool using /p command line option:

```
C:\Brooktrout\Boston\utils\winnt\bin\configtool.exe /p
```

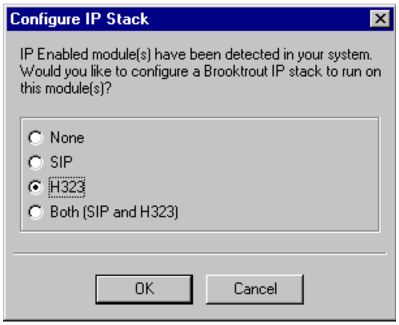
Example of settings.cfg File

```
ip_stack_config=sip
home_dir=C:\Brooktrout\Boston
boston_source_path=C:\Brooktrout\Boston\driver\winnt\kernel\compile\i386
    \boston.sys
inf_source_path=C:\Brooktrout\Boston\driver\winnt\pnp\trxstream.inf
bostsrv_source_path=C:\Brooktrout\Boston\bfv.api\winnt\bin\bostsrv.exe
firmware_dir=C:\Brooktrout\Boston\fw
protocol_dir=C:\Brooktrout\Boston\config
btcall_cfg_path=C:\Brooktrout\Boston\config\btcall.cfg
cc_cfg_path=C:\Brooktrout\Boston\config\callctrl.cfg
log_cfg_path=C:\Brooktrout\Boston\bin\configuration.log
lic_mgr_path=C:\Brooktrout\Boston\bin\brktlicmgr.exe
modules_are_connected=false
vb_fname=C:\Brooktrout\Boston\fw\bostvb.dll
```

Configure IP Stack Dialog Box

When the Brooktrout Configuration Tool detects an IP-enabled device for the first time, it displays the Configure IP Stack dialog box:

Choose the IP stack you want to configure:



Configure IP Stack

IP Enabled module(s) have been detected in your system. Would you like to configure a Brooktrout IP stack to run on this module(s)?

○ None
○ SIP
● H323
○ Both (SIP and H323)

- None: IP stack not installed
- SIP: SIP stack installed (default)
- H.323: H.323 stack installed
- Both (SIP and H.323): Both SIP and H.323 stacks installed. (Not supported on SDK Versions 5.2.0 - 6.2.0).

When any option is selected, all previously added host modules are removed.

The settings for the IP stack can also be made in the *settings.cfg* file, see *Example of settings.cfg File on page 109*.

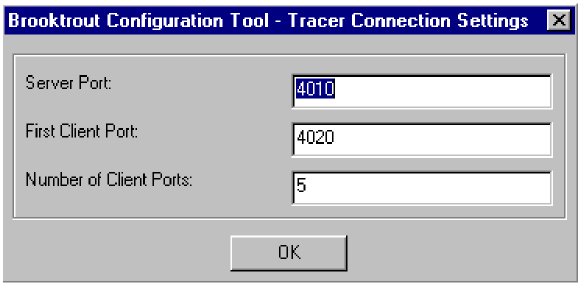
Trace Connection Settings Dialog Box

You use the Trace Connection Setting dialog to configure the connection parameters for the Brktcctrace (server) application, and your end user application (client). See the *Debugging* chapter in your *Dialogic® Brooktrout® Fax Products SDK Developer Guide* for details about the *Brktcctrace* application.

Server Port: Specifies the server port number.

First Client Port: Specifies the client port that the server will first try to connect to.

Number of Client Ports: Specifies the maximum number of clients.



Brooktrout Configuration Tool - Tracer Connection Settings

Server Port: 4010

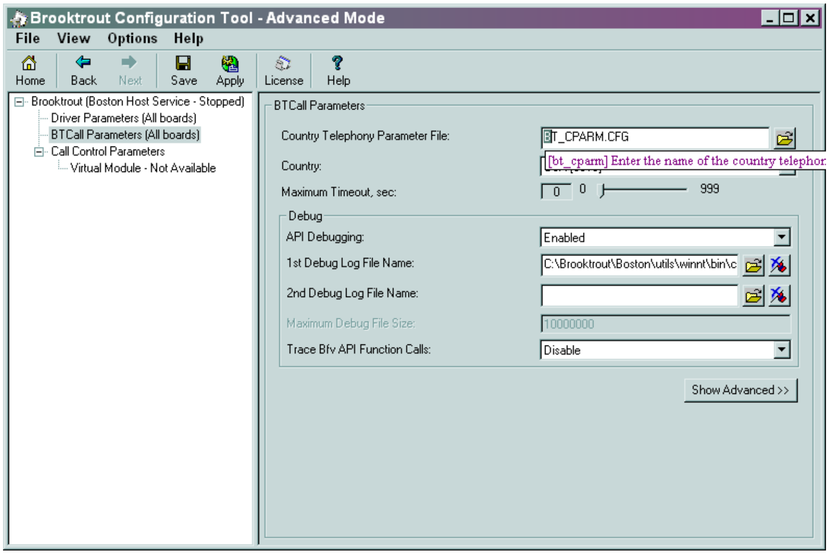
First Client Port: 4020

Number of Client Ports: 5

Getting Help From the Dialogic® Brooktrout® Configuration Tool

The Brooktrout Configuration Tool provides context sensitive online help for parameters. The Help displays the purpose and description of the parameter including the default value and range, if applicable.

- Hold the cursor over the parameter input area to see a brief parameter definition:



Brooktrout Configuration Tool - Advanced Mode

File
View
Options
Help
Home
Back
Next
Save
Apply
License
Help
Brooktrout (Boston Host Service - Stopped)
Driver Parameters (All boards)
BTCall Parameters (All boards)
Call Control Parameters
Virtual Module - Not Available
BTCall Parameters
Debug
Show Advanced >>

Country Telephony Parameter File: BT_CPARM.CFG

Country: [bt_cparm] Enter the name of the country telephon

Maximum Timeout, sec: 0 0 999

API Debugging: Enabled

1st Debug Log File Name: C:\Brooktrout\Boston\utils\winnt\bin\c

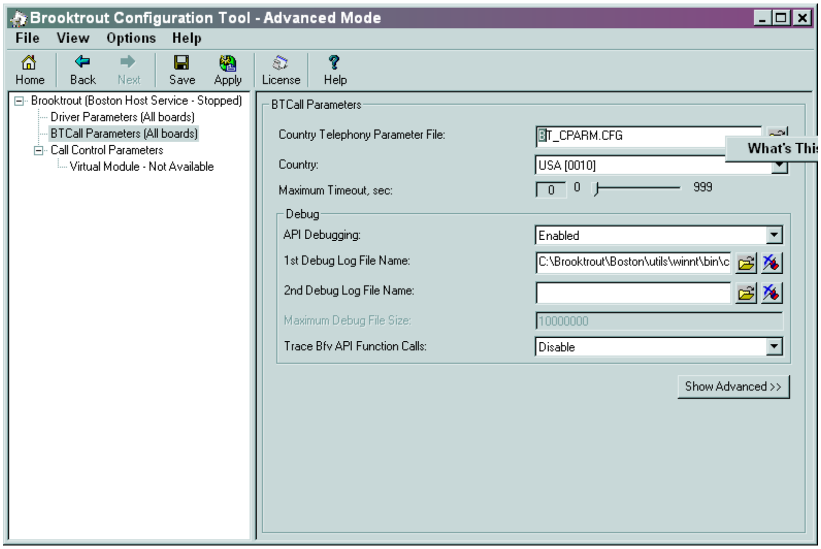
2nd Debug Log File Name:

Maximum Debug File Size: 10000000

Trace Bfv API Function Calls: Disable

- Right-click the parameter drop-down box to get a more complete definition for Brooktrout Configuration Tool parameters.

  The What's This? popup menu appears:



Brooktrout Configuration Tool - Advanced Mode

File
View
Options
Help
Home
Back
Next
Save
Apply
License
Help
Brooktrout (Boston Host Service - Stopped)
Driver Parameters (All boards)
BTCall Parameters (All boards)
Call Control Parameters
Virtual Module - Not Available
What's This
Show Advanced >>

BTCall Parameters

Country Telephony Parameter File: BT_CPARM.CFG

Country: USA [0010]

Maximum Timeout, sec: 0 0 999

Debug

API Debugging: Enabled

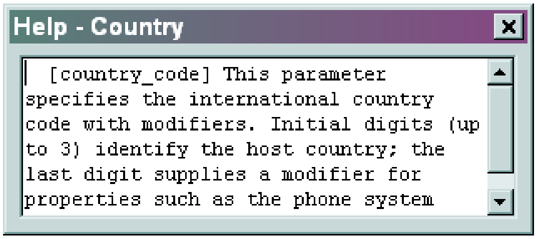
1st Debug Log File Name: C:\Brooktrout\Boston\utils\winnt\bin\c

2nd Debug Log File Name:

Maximum Debug File Size: 10000000

Trace Bfv API Function Calls: Disable

- Left-click the What's This? popup menu for a definition like the following. You can resize this text box, if necessary.



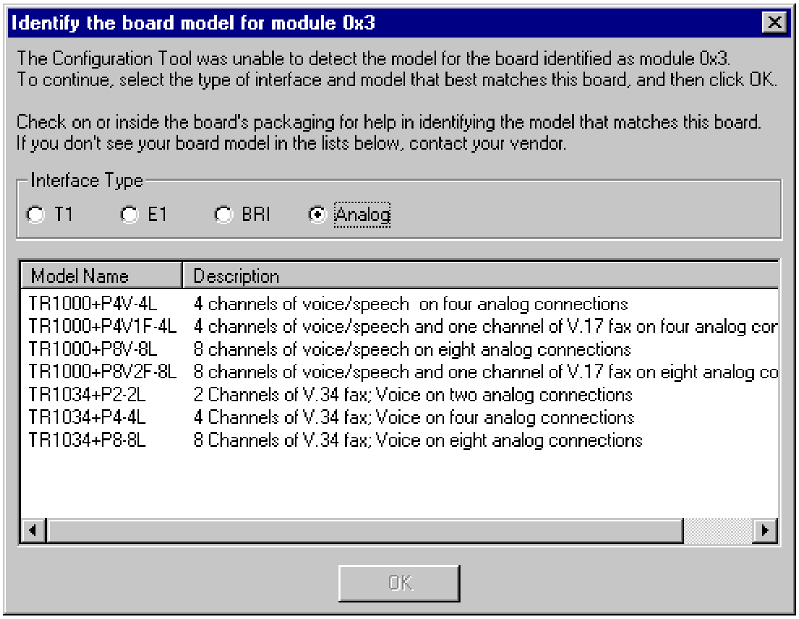
Help - Country

[country_code] This parameter specifies the international country code with modifiers. Initial digits (up to 3) identify the host country; the last digit supplies a modifier for properties such as the phone system

Identifying the Model of the Board

➢ **When you launch the Brooktrout Configuration Tool and it is unable to automatically identify the board:**

1. The Brooktrout Configuration Tool displays a dialog box similar to the following.



Identify the board model for module 0x3

The Configuration Tool was unable to detect the model for the board identified as module 0x3.
To continue, select the type of interface and model that best matches this board, and then click OK.

Check on or inside the board's packaging for help in identifying the model that matches this board.
If you don't see your board model in the lists below, contact your vendor.

Interface Type

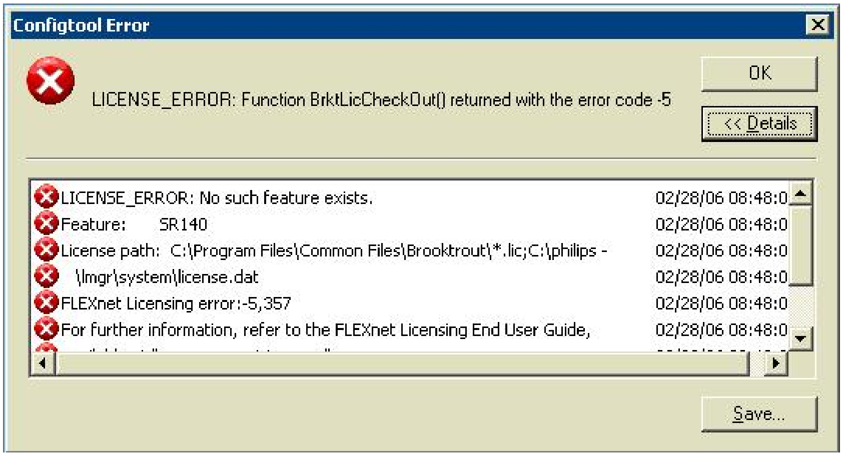
○ T1 ○ E1 ○ BRI ● Analog

Model Name	Description
TR1000+P4V-4L	4 channels of voice/speech on four analog connections
TR1000+P4V1F-4L	4 channels of voice/speech and one channel of V.17 fax on four analog cor
TR1000+P8V-8L	8 channels of voice/speech on eight analog connections
TR1000+P8V2F-8L	8 channels of voice/speech and one channel of V.17 fax on eight analog co
TR1034+P2-2L	2 Channels of V.34 fax; Voice on two analog connections
TR1034+P4-4L	4 Channels of V.34 fax; Voice on four analog connections
TR1034+P8-8L	8 Channels of V.34 fax; Voice on eight analog connections

2. Choose an Interface Type and highlight the board model, then click OK.
3. If the Brooktrout Configuration Tool is not able to detect the board, then it launches the tool in Advanced Mode even if you included the /w parameter on the command line.

Resolving the Configtool Error Message

When you launch the Brooktrout Configuration Tool and the tool displays the Configtool Error screen, use the following instructions to eliminate this licensing conflict.



```
LICENSE_ERROR: Function BrktLicCheckOut() returned with the error code -5
```

```
LICENSE_ERROR: No such feature exists.                                       02/28/06 08:48:0
Feature:      SR140                                                          02/28/06 08:48:0
License path:  C:\Program Files\Common Files\Brooktrout\*.lic;C:\philips -  02/28/06 08:48:0
   \lmgr\system\license.dat                                                  02/28/06 08:48:0
FLEXnet Licensing error:-5,357                                               02/28/06 08:48:0
For further information, refer to the FLEXnet Licensing End User Guide,     02/28/06 08:48:0
```

This error message displays when you have licenses from other vendors installed in a generic location and not in a vendor specific location. This conflict is possible with other products that use Macrovision licensing, and occurs when a Macrovision-protected application uses the `LM_LICENSE_FILE` environment variable rather than a vendor-specific name.

The Macrovision FlexNET licensing module queries for SR140 licenses. The query fails for the licenses that are installed in the generic location due to absence of the necessary vendor information.

This error message can only occur when a Brooktrout SR140 Software license is not installed.

➢ **To resolve this conflict and eliminate the Brooktrout Configuration Tool error message screen:**

1. On the Desktop, right-click on My Computer
2. Select:

   Properties →Advanced →Environment Variables
3. Click New and create an environment variable `<VENDOR_NAME>_LICENSE_FILE`, replacing `<VENDOR_NAME>` with the application or vendor name. For example, `ACME_DLS_LICENSE_FILE`
4. Set the value of the `<VENDOR_NAME>_LICENSE_FILE` variable to the same value as `LM_LICENSE_FILE`.

   For example:

   If `LM_LICENSE_FILE = C:\acme\lmgr\system\license.dat`, then set

   ```
   ACME_DLS_LICENSE_FILE =
   C:\acme\lmgr\system\license.dat
   ```
5. To delete the `LM_LICENSE_FILE` environment variable, highlight the current value with the mouse and click on Delete.
6. Click Start →Run.
7. Enter **`regedit`**, and click OK.
8. Expand:

   `HKEY_LOCAL_MACHINE\SOFTWARE\FLEXlm License Manager` key and verify that there is a registry entry named `LM_LICENSE_FILE` under this key.
9. If the `LM_LICENSE_FILE` registry entry exists, rename the entry to **`<VENDOR_NAME>_LM_LICENSE_FILE`**. Replace `<VENDOR_NAME>` with the application or vendor name. For example, `ACME_DLS_LICENSE_FILE`
10. Verify:

    a. The Brooktrout Configuration Tool no longer displays the error message box.

    b. The other application using Macrovision licensing still runs.

Configuring in Wizard Mode

This section describes how to use the Wizard Mode to configure Dialogic® Brooktrout® Fax Software. You can use Wizard Mode to get most typical systems up and running with minimal effort.

In Wizard Mode, after you answer the basic questions, the Brooktrout Configuration Tool does the following.

- Automatically creates the necessary configuration file
- Installs and starts the drivers, if required
- Starts the Boston Host Service

Wizard Mode requires that all the modules be of the same kind. All modules are configured identically, that is, the modifications to the configuration apply uniformly to all the modules.

You can use Wizard Mode in a homogeneous configuration where:

- all the boards are of an identical type

or

- the system contains only SR140 virtual boards.

In a non-homogeneous configuration, the Brooktrout Configuration Tool will automatically start in Advanced Mode.

Note: To use Wizard Mode refer to *Dialogic® Brooktrout® Fax Products Windows End User Guide.*

Advanced Mode

If you have different types of Dialogic® Brooktrout® modules in your system or you want to configure your identical modules differently, you must use Advanced Mode:

- When the Dialogic® Brooktrout® Configuration Tool detects that you have different modules, it starts in Advanced Mode.
- When you start the Brooktrout Configuration Tool in Wizard Mode, you can move to Advanced Mode immediately by clicking the Advanced Mode button.

The Advanced Settings parameters for all module types are presented in logical groups. The ordering of the groups is alphabetical. The ordering of parameters within a group is according to their relative importance.

Most parameters are hidden unless you click Show Advanced. Generally, a user does not need to change the advanced parameters.

Note: To use Wizard Mode refer to the *Dialogic® Brooktrout® Fax Products Windows End User Guide.*

Offline Mode

With Offline Mode you can:

- Create or edit configuration files such as *btcall.cfg* and *callctrl.cfg*.
- Edit the device driver parameters.
- Add or remove, modules (boards).

Offline Mode allows you to create/edit configuration files when no boards are installed.

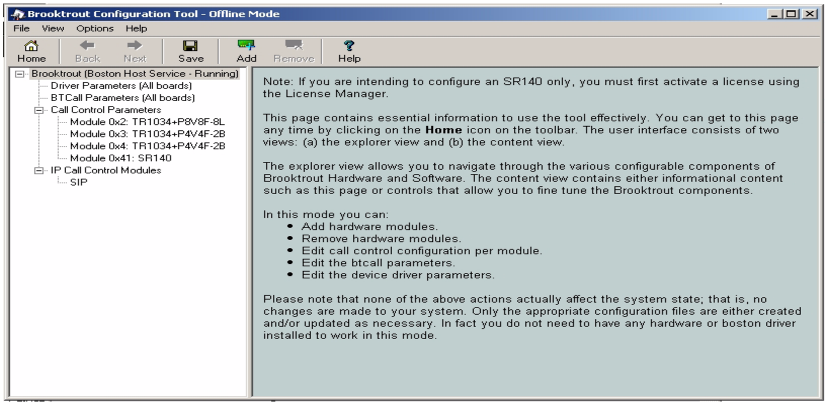
To specify Offline Mode, use command line option /o, for example:

```
C:\Brooktrout\Boston\utils\winnt\bin\configtool.exe /o
```

Offline Mode Window

When you enter Offline Mode, the Brooktrout Configuration Tool - Offline Mode window appears.

To navigate in Offline Mode, use the menus and buttons on the tool bar and the left panel tree view. The buttons are similar to Advanced Mode (see *Advanced Mode on page 117*) except that the Apply button is not present and Add and Remove buttons are available. These buttons allow you to add/remove items to and from the configuration files or add/remove modules from the configuration.



Brooktrout Configuration Tool - Offline Mode
File
View
Options
Help
Home
Back
Next
Save
Add
Remove
Help
Brooktrout (Boston Host Service - Running)
Driver Parameters (All boards)
BTCall Parameters (All boards)
Call Control Parameters
Module 0x2: TR1034+P8V8F-8L
Module 0x3: TR1034+P4V4F-2B
Module 0x4: TR1034+P4V4F-2B
Module 0x41: SR140
IP Call Control Modules
SIP

Note: If you are intending to configure an SR140 only, you must first activate a license using the License Manager.

This page contains essential information to use the tool effectively. You can get to this page any time by clicking on the **Home** icon on the toolbar. The user interface consists of two views: (a) the explorer view and (b) the content view.

The explorer view allows you to navigate through the various configurable components of Brooktrout Hardware and Software. The content view contains either informational content such as this page or controls that allow you to fine tune the Brooktrout components.

In this mode you can:

- Add hardware modules.
- Remove hardware modules.
- Edit call control configuration per module.
- Edit the btcall parameters.
- Edit the device driver parameters.

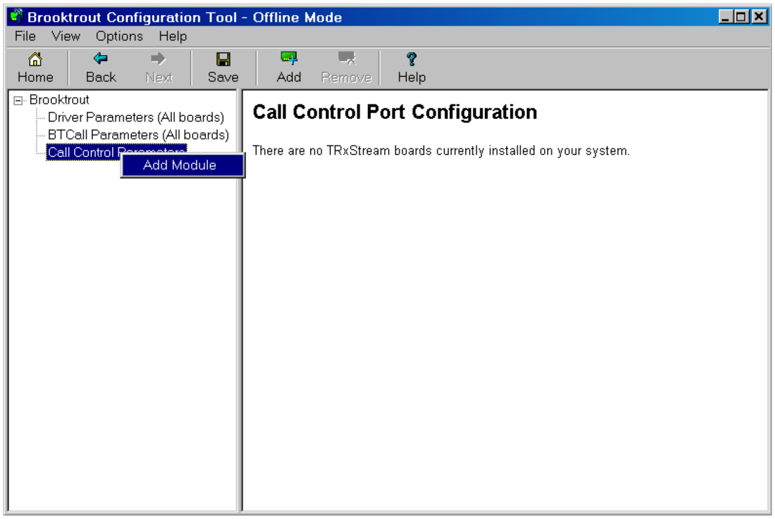
Please note that none of the above actions actually affect the system state; that is, no changes are made to your system. Only the appropriate configuration files are either created and/or updated as necessary. In fact you do not need to have any hardware or boston driver installed to work in this mode.

Adding a Module

➢ **Use the right mouse button to add and remove modules.**

1. Right-click on Call Control Parameters to add a module.

   The following right panel information appears when no modules are installed.



Brooktrout Configuration Tool - Offline Mode
File
View
Options
Help
Home
Back
Next
Save
Add
Remove
Help
Brooktrout
Driver Parameters (All boards)
BTCall Parameters (All boards)
Call Control Parameters
Add Module

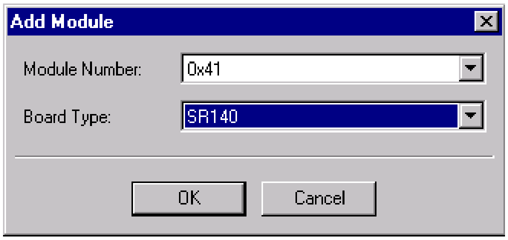
Call Control Port Configuration

There are no TRxStream boards currently installed on your system.

2. The Add Module dialog box appears.

   Select the Module Number and Board Type, then click OK. See *Determining the Board Module Number on page 24* for more information

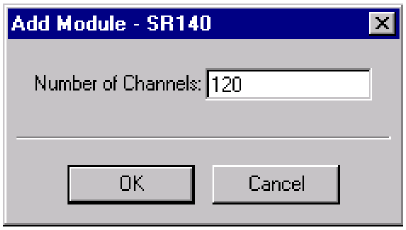
Note: Always set the module number for the SR140 to start with 0x41, because the Brooktrout Configuration Tool Advanced Mode initializes the SR140 module as that default.



Module Number: 0x41

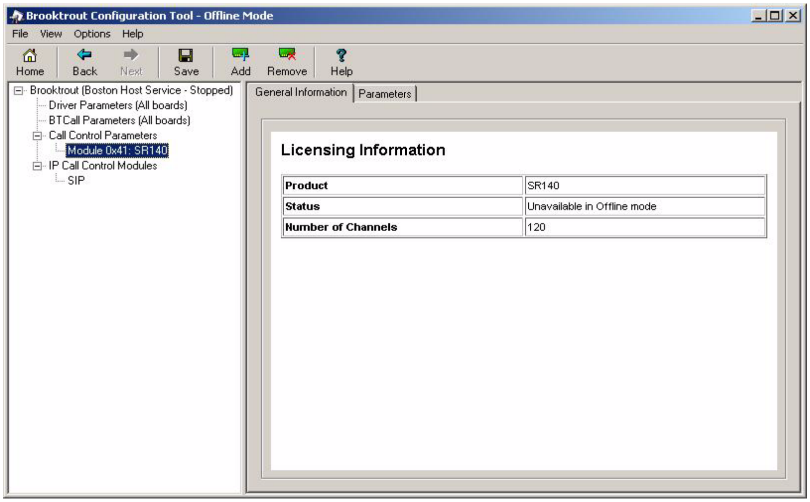
Board Type: SR140

3. Enter the correct Number of Channels when a SR140 module type is selected, then click OK:



Number of Channels: 120

4. Click the General Information tab to see the added information. This example shows information for a SR140 module:



- Brooktrout (Boston Host Service - Stopped)
  - Driver Parameters (All boards)
  - BTCall Parameters (All boards)
  - Call Control Parameters
    - Module 0x41: SR140
  - IP Call Control Modules
    - SIP

Licensing Information

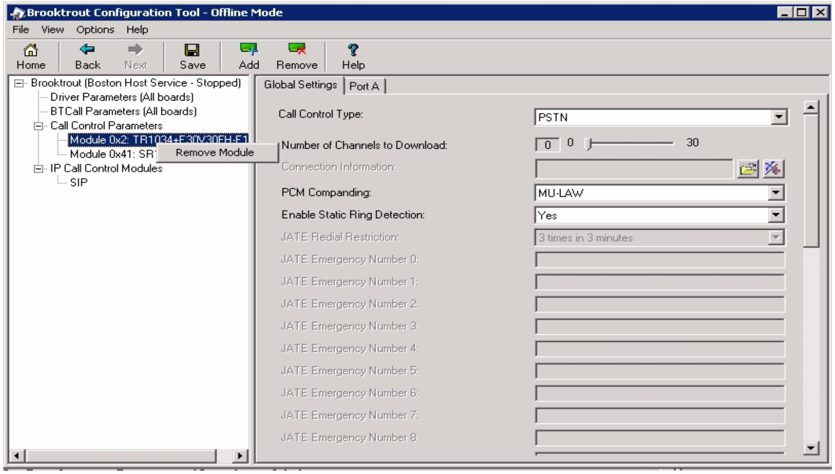
Product	SR140
Status	Unavailable in Offline mode
Number of Channels	120

Note: For SR140 modules, you can edit the Number of Channels parameter entry of the call control configuration file.

Removing a Module

➢ **Right-click on a module name to remove it from the configuration.**

In the left panel, select the Remove Module option to remove the module from the configuration.


Brooktrout Configuration Tool - Offline Mode
File
View
Options
Help
Home
Back
Next
Save
Add
Remove
Help
Brooktrout (Boston Host Service - Stopped)
Driver Parameters (All boards)
BTCall Parameters (All boards)
Call Control Parameters
Module 0x2: TR1034+E30V30EH-E1
Module 0x41: SR
Remove Module
IP Call Control Modules
SIP
Global Settings
Port A

Call Control Type: PSTN

Number of Channels to Download: 0 (0 – 30)

Connection Information:

PCM Companding: MU-LAW

Enable Static Ring Detection: Yes

JATE Redial Restriction: 3 times in 3 minutes

JATE Emergency Number 0:

JATE Emergency Number 1:

JATE Emergency Number 2:

JATE Emergency Number 3:

JATE Emergency Number 4:

JATE Emergency Number 5:

JATE Emergency Number 6:

JATE Emergency Number 7:

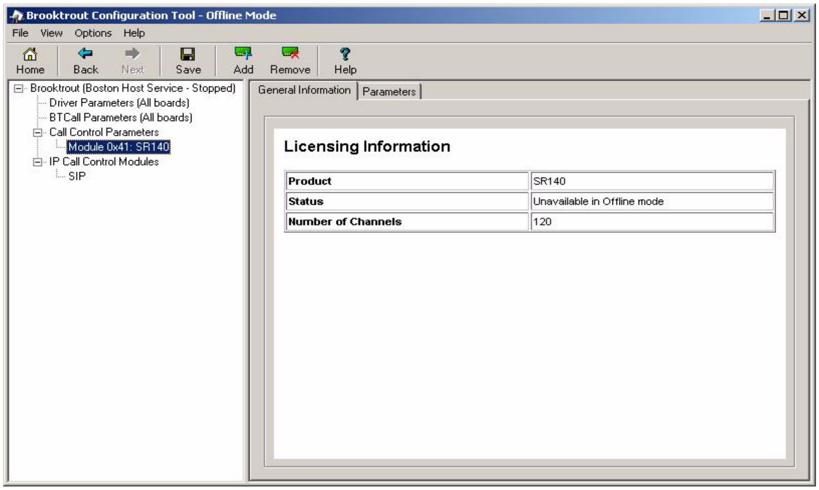
JATE Emergency Number 8:

SR140 Modules in Offline Mode

When a SR140 module is detected in Offline Mode, the feature information is unavailable.

General Information Tab for SR140

The following information is displayed in the General Information panel for SR140 modules:

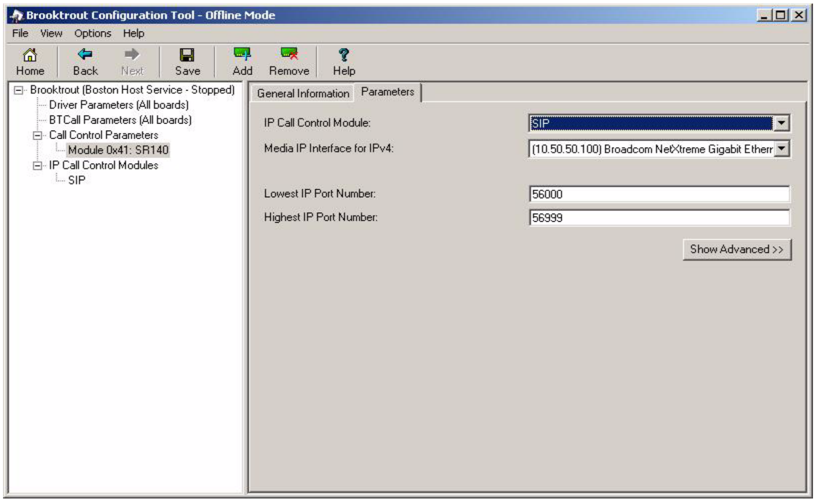

Brooktrout Configuration Tool - Offline Mode
File
View
Options
Help
Home
Back
Next
Save
Add
Remove
Help
Brooktrout (Boston Host Service - Stopped)
Driver Parameters (All boards)
BTCall Parameters (All boards)
Call Control Parameters
Module 0x41: SR140
IP Call Control Modules
SIP
General Information
Parameters

Licensing Information

Product	SR140
Status	Unavailable in Offline mode
Number of Channels	120

Parameters Tab for SR140

The Parameters tab displays the editable parameters for the SR140 module.



IP Call Control Module: SIP

Media IP Interface for IPv4: (10.50.50.100) Broadcom NetXtreme Gigabit Etherr

Lowest IP Port Number: 56000

Highest IP Port Number: 56999

Silent Mode

With Silent Mode you can create the configuration files such as *btcall.cfg* and *callctrl.cfg* with defaults with no graphical user interface.

To specify Silent Mode, use command line option `/s`, for example:

```
C:\Brooktrout\Boston\utils\winnt\bin\configtool.exe /s
```

You have no interaction once you start the Brooktrout Configuration Tool. However, you can find information on the actions that were carried out during Silent Mode by referring to the *configuration.log* file that is located in the current working directory.

To manually configure the configuration file locations without using the Preferences dialog box (see *Preferences Dialog Box on page 108*) in Silent Mode, use the command line `/q` option, for example:

```
C:\Brooktrout\Boston\utils\winnt\bin\configtool.exe /q
```

When SR140 modules are present in Silent Mode, this mode does not display any windows or dialog boxes; however, the following occurs:

- Reads the configuration file
- Boston device driver starts, if stopped
- Validates data
- Writes information to the configuration file
- Boston Host Service starts

See *Volume 6* in the *Dialogic® Brooktrout® Bfv API Reference Manual* for information about the configuration files.

Using a Call Control Configuration File

The call control configuration file (*callctrl.cfg*) contains parameters that define how to configure your Dialogic® Brooktrout® boards for call control. The *callctrl.cfg* file replaces the *teleph.cfg* and *ecc.cfg* files previously used to define the call control configuration.

If you want to configure call control on your Dialogic® Brooktrout® boards, you can create a *callctrl.cfg* file on all supported operating systems (Linux and Windows). On Windows operating systems, you have the option of using the Dialogic® Brooktrout® Configuration Tool to configure the call control, or you can create or edit a call control configuration file that is read by the Brooktrout Configuration Tool. See *Using the Dialogic® Brooktrout® Configuration Tool on Windows Systems on page 103* and *Volume 6, Appendix A* of the *Bfv API Reference Manual*.

About the Call Control Configuration File

The call control configuration file is an ASCII file that contains general configuration parameters for all telephony hardware modules and static telephony connections to be formed for all modules. You can create your own file or edit one of the sample files supplied with the Brooktrout SDK in the *Brooktrout\Boston\config\samples.cfg* directory.

A complete description of the parameters in the call control configuration file along with examples of analog LS, analog DID, BRI, E1 ISDN (PRI), E1 CAS, E1 R2 CAS, T1 ISDN, T1 RBS, and IP call control configuration files is provided in *Volume 6, Appendix A* of the *Bfv API Reference Manual.*

The call_control parameter in the user-defined configuration (*btcall.cfg*) file specifies the path and filename of the call control configuration file. The Bfv API and the Brooktrout Configuration Tool use *callctrl.cfg* as the default value. The application passes the *btcall.cfg* file to the *BfvLineReset* function. *BfvLineReset* uses this information to reset and initialize the system.

The call control configuration (*callctrl.cfg)* file is divided into the following sections:

- Global parameters for call control that select trace options such as the name and size of the trace file and whether to turn tracing on or off.
- Global module parameters that define connections, specify A-law or µ-law, and specify *autoconnect* for the entire module.
- Generic clock configuration parameters that specify clock mode and source and H.100-specific parameters for the entire module.
- Port configuration parameters that describes the signaling protocol of a port and the specific parameters for the port based on the signaling protocol.
- IP call control configuration parameters that describe IP-enabled boards on the system.
- Ethernet interface parameters where you can configure modules with multiple interfaces.

Call Control (*callctrl.cfg*) File Examples

See *Volume 6, Appendix A,* in the *Dialogic® Brooktrout® Bfv API Reference Manual* for configuration file (*callctrl.cfg*) examples, including (but not limited to) the following port-specific configurations:

- Analog ports (loop start (LS) and direct inward dialing DID))
- ISDN BRI ports
- E1 CAS, E1 R2 CAS, and E1 ISDN ports
- T1 ISDN and T1 RBS ports
- SIP ports
- H.323 ports
- T1/E1 QSIG ports

6 - Directory Structure

This chapter contains tables that show the directory structure used for all installed binary, firmware, and sample source files, both platform-independent and platform-specific for all operating system platforms.

Some facilities might not be used with your Brooktrout SDK.

For information on how to compile sample applications using Windows Developer Studio Project files, Dialogic® Brooktrout® files, and makefiles, refer to the *Dialogic® Brooktrout® Fax Products SDK Developer Guide.*

Installed Files Directory Structures

The directory structures created when you install the Bfv API are dependent on the operating system platform that you are using:

- *Table 1 - Platform-Independent Files on page 127*
- *Table 2 - Linux-Specific Files on page 129*
- *Table 3 - Windows-Specific Files on page 130*

See one of the following for the default directory:

- Windows: `\Brooktrout\Boston`
- Linux: `/usr/sys/brooktrout/boston`

Table 1. Platform-Independent Files

Directory	Contents
bfv.api	Sub-directory for the Bfv API files
bfv.api/app.src	Configuration files and sample application source files
bfv.api/app.src/ivr_msg	Specific infopkt files for the IVR sample application
bfv.api/app.src/params	Country parameter file
bfv.api/bapp.src	Configuration files and BOSTON-specific sample application source files
bfv.api/fonts	Fonts for ASCII fax transmission
bfv.api/inc	Bfv API library header files
bfv.api/misc	High-level sample files
bfv.api/samples	Low-level sample files
bfv.api/utils/fonts	Font files
bin	Runtime executable, libraries, IP call control and Dialogic® Brooktrout® License Manager
bin/x64	64-bit libraries and Dialogic Brooktrout x64 components installation package
bsmi.api	Sub-directory for BOSTON Simple Message Interface files

Table 1. Platform-Independent Files (Continued)

Directory	Contents
bsmi.api/bapp.src	BSMI sample source files
bsmi.api/inc	BSMI library header files including country-specific R2 CAS protocol files
config	Sub-directory for call control configuration files and protocol variants
config/samples.cfg	Sample configuration files
driver	Driver directories
driver/common	Files used by low level applications to communicate with driver
driver/inc	Header files used by both driver and low level applications
driver/fw/cmndset	Firmware command set header files
fw	Firmware files
utils/oslib	Sub-directory for operating system independent files
utils/osilib/inc	Operating system independent library header file
utils/oslib/osi.src	Operating system independent source files

Table 2. Linux-Specific Files

Directory	Contents
bfv.api/linux	Sub-directory for Linux-specific compilation areas and utilities for Bfv API
bfv.api/linux/app.src	Makefile and configuration files for sample applications
bfv.api/linux/bapp.src	Makefile, configuration files, and compiled executables for BOSTON-specific sample applications
bfv.api/linux/bin/4.4	Bfv API binary files for Enterprise Linux 6.0
bfv.api/linux/bin/4.8	Bfv API binary files for Enterprise Linux 7.0
bfv.api/linux/bin/8.2	Bfv API binary files for Enterprise Linux 8.0
bfv.api/linux/lib/4.4	32-bit Bfv API libraries for Enterprise Linux 6.0
bfv.api/linux/lib/4.4/64	64-bit Bfv API libraries for Enterprise Linux 6.0
bfv.api/linux/lib/4.8	32-bit Bfv API libraries for Enterprise Linux 7.0
bfv.api/linux/lib/4.8/64	64-bit Bfv API libraries for Enterprise Linux 7.0
bfv.api/linux/lib/8.2	32-bit Bfv API libraries for Enterprise Linux 8.0
bfv.api/linux/lib/8.2/64	64-bit Bfv API libraries for Enterprise Linux 8.0
bfv.api/linux/utils/bin	Compiled G3 utilities
bsmi.api/linux	Sub-directory for Linux-specific BOSTON Simple Message Interface files
bsmi.api/linux/bapp.src	Makefile
bsmi.api/linux/lib/4.4	32-bit library files for BSMI for Enterprise Linux 6.0
bsmi.api/linux/lib/4.4/64	64-bit library files for BSMI for Enterprise Linux 6.0
bsmi.api/linux/lib/4.8	32-bit library files for BSMI for Enterprise Linux 7.0
bsmi.api/linux/lib/4.8/64	64-bit library files for BSMI for Enterprise Linux 7.0
bsmi.api/linux/lib/8.2	32-bit library files for BSMI for Enterprise Linux 8.0
bsmi.api/linux/lib/8.2/64	64-bit library files for BSMI for Enterprise Linux 8.0

Table 2. Linux-Specific Files (Continued)

Directory	Contents
driver/linux	Sub-directory for Linux-specific driver compilation areas and utilities
driver/linux/install	Installation program and library
driver/linux/kernel	Compiled binaries for the driver
driver/linux/user	Compiled binaries for the driver utility programs
utils/linux	Sub-directory for Linux-specific tracing utilities and configuration files
utils/osilib/linux/lib	Sub-directory for compiled OSI libraries for Linux
utils/osilib/linux/lib/4.4	32-bit OSI libraries for Enterprise Linux 6.0
utils/osilib/linux/lib/4.4/64	64-bit OSI libraries for Enterprise Linux 6.0
utils/osilib/linux/lib/4.8	32-bit OSI libraries for Enterprise Linux 7.0
utils/osilib/linux/lib/4.8/64	64-bit OSI libraries for Enterprise Linux 7.0
utils/osilib/linux/lib/8.2	32-bit OSI libraries for Enterprise Linux 8.0
utils/osilib/linux/lib/8.2/64	64-bit OSI libraries for Enterprise Linux 8.0
utils/osilib/linux/osi.src	Makefiles for OSI libraries

Table 3. Windows-Specific Files

Directory	Contents
bfv.api\winnt	Sub-directory for Windows-specific compilation areas and utilities
bfv.api\winnt\app.src	Makefile, configuration files, and sample application files
bfv.api\winnt\bapp.src	Makefile, configuration files, and compiled executables for BOSTON-specific sample applications
bfv.api\winnt\bin	Boston Host Service executable and library
bfv.api\winnt\lib	Compiled 32-bit Bfv API libraries

Table 3. Windows-Specific Files (Continued)

Directory	Contents
bfv.api\winnt\lib\x64	Compiled 64-bit Bfv API libraries
bfv.api\winnt\utils	Sub-directory for G3 utilities
bfv.api\winnt\utils\bin	Compiled G3 utilities
bsmi.api\winnt	Sub-directory for Windows-specific BOSTON Simple Message Interface files
bsmi.api\winnt\lib	Compiled library files for BSMI
bsmi.api\winnt\bapp.src	Makefile
bsmi.api\winnt\bin	Debugging program and configuration file
driver\winnt	Sub-directory for Windows platform-specific compilation areas and utilities
driver\winnt\install	Installation program and associated files for 32- and 64-bit operating systems
driver\winnt\user	Compiled binaries for the driver utility programs
driver\winnt\pnp	Plug-and-Play *.inf* file
driver\winnt\pnp\TRxStream	PnP driver, device property pages, and symbol files for 32- and 64-bit operating systems
utils\winnt\bin	Dialogic® Brooktrout® Configuration Tool, AccuCall, and Call Tracer executables, help and configuration files
utils\osilib\winnt\lib	Compiled 32-bit OSI libraries
utils\osilib\winnt\lib\x64	Compiled 64-bit OSI libraries
utils\osilib\winnt\osi.src	Makefiles for OSI library
%SYSTEMROOT%\system32\	64-bit system: 64-bit version of the libraries 32-bit system: 32-bit version of the libraries
%SYSTEMROOT%\syswow64\	64-bit system only: 32-bit version of the libraries
bin	Runtime executable, libraries, IP call control and Dialogic® Brooktrout® License Manager

Table 3. Windows-Specific Files (Continued)

Directory	Contents
bin/x64	64-bit libraries and Dialogic Brooktrout x64 components installation package
Note: *%SYSTEMROOT%* is usually *C:\windows or C:\winnt*.	

7 - Using the Dialogic® Brooktrout® TECUpdate Utility

This chapter describes how one can use the Dialogic® Brooktrout® Technology Expansion Capability (TEC) utility to display and upgrade the configured feature set on an installed board.

This chapter includes the following:

To successfully perform an upgrade, you need to know the serial number of your board and have an appropriate license key provided by Dialogic.

Use the Dialogic® Brooktrout® TECUpdate utility to record the serial number of your board before you contact Dialogic to order the license file. When you receive an email with your updated license file, you can again use the TECUpdate utility to download the license file and expand the functionality of your board.

Starting Dialogic® Brooktrout® TECUpdate

The Dialogic® Brooktrout® TECUpdate utility is installed as a separate software package. For more information:

- See the chapter on packaging your application in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide*.
- Contact your authorized Dialogic reseller or application partner.

Distribute the TECUpdate utility to your end users even if you do not plan to distribute the Dialogic® Brooktrout® Configuration Tool, so that your customers can update their systems as needed.

The TECUpdate utility assumes that the:

- Firmware is downloaded to the board.
- Dialogic® Brooktrout® driver is started.

You can run the TECUpdate utility from the file system (for example, Windows Explorer), Start Menu or the command line:

- File System:

  [*InstallDIR*]\TECUpdate.exe

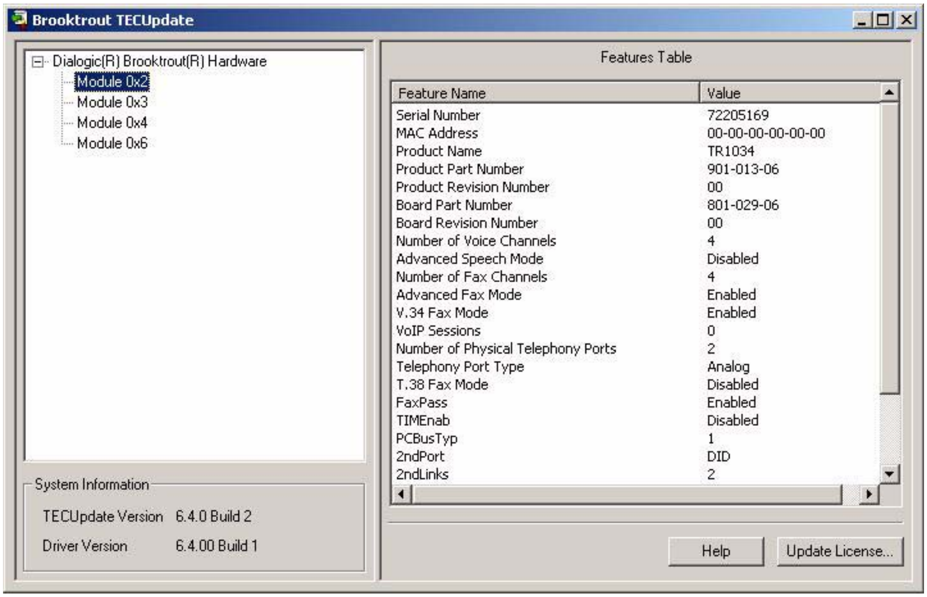
  where: `InstallDIR` is the directory where you installed the utility.
- Start Menu:

  Start →All Programs →Brooktrout →TECUpdate License Upgrade Tool
- Command Line:

  ```
  C:\Brooktrout\Boston\bin\TECUpdate.exe
  ```

The TECUpdate utility queries and displays information for the selected module. TECUpdate operates with Dialogic® Brooktrout® drivers from Brooktrout SDK 2.1.0 and above.

Following a successful start, the Brooktrout TECUpdate window appears. See *Running the Dialogic® Brooktrout® TECUpdate Utility on page 136* for specific steps to obtain module information.



System Information

TECUpdate Version 6.4.0 Build 2

Driver Version 6.4.00 Build 1

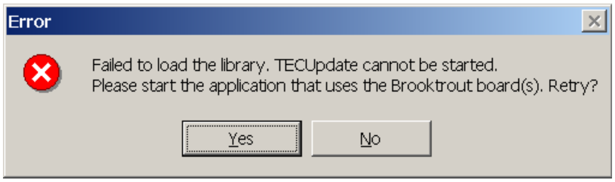
Feature Name	Value
Serial Number	72205169
MAC Address	00-00-00-00-00-00
Product Name	TR1034
Product Part Number	901-013-06
Product Revision Number	00
Board Part Number	801-029-06
Board Revision Number	00
Number of Voice Channels	4
Advanced Speech Mode	Disabled
Number of Fax Channels	4
Advanced Fax Mode	Enabled
V.34 Fax Mode	Enabled
VoIP Sessions	0
Number of Physical Telephony Ports	2
Telephony Port Type	Analog
T.38 Fax Mode	Disabled
FaxPass	Enabled
TIMEnab	Disabled
PCBusTyp	1
2ndPort	DID
2ndLinks	2

When Errors Occur

If an error occurs, it is recorded in the error log file (see *Error Logging on page 138*). Contact Dialogic Technical Services and Support with the error log information if you cannot resolve the problem. If there are firmware or driver errors, the following Error dialogs are possible:

Driver Error

- Click Yes to retry after loading the driver. Before trying to run TECUpdate again, an Error dialog asks you to load the driver:



Error

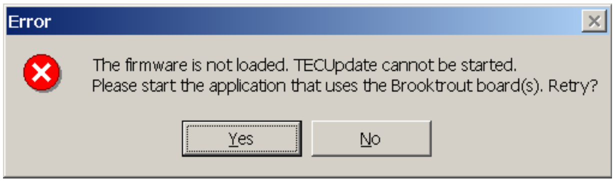
Failed to load the library. TECUpdate cannot be started.
Please start the application that uses the Brooktrout board(s). Retry?

Yes Tries to determine if the driver is started, then proceeds with the TECUpdate initialization process. If an error occurs, the dialog reappears.

No TECUpdate utility exits.

Firmware Error

- Click Yes to retry after downloading the firmware. Before trying to run TECUpdate again, an Error dialog asks you to load the driver:



Error

The firmware is not loaded. TECUpdate cannot be started.
Please start the application that uses the Brooktrout board(s). Retry?

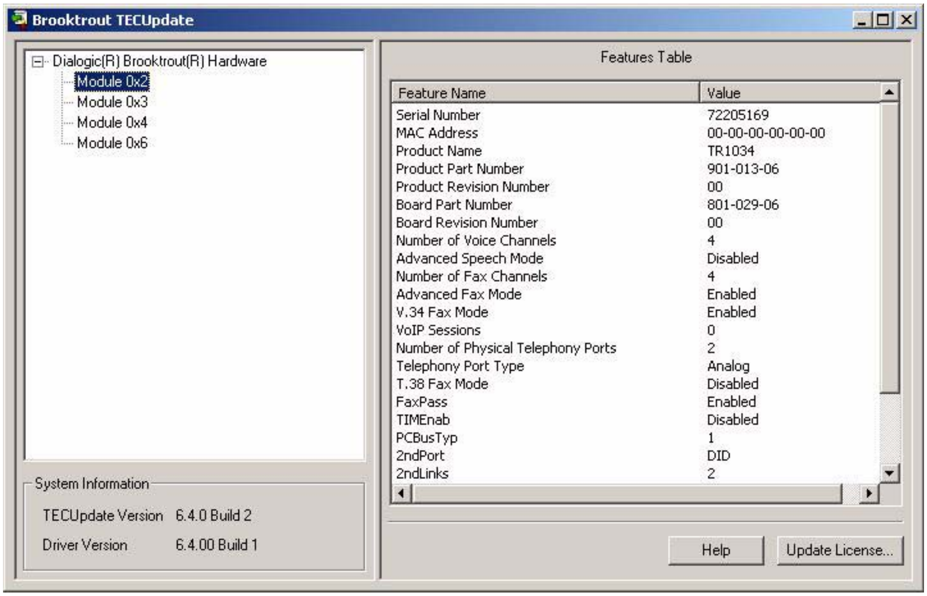
Yes Tries to determine if the firmware is loaded, then proceeds with the TECUpdate initialization process. If an error occurs, the dialog reappears.

No TECUpdate utility exits.

Running the Dialogic® Brooktrout® TECUpdate Utility

➢ *To display and update information for each module in your system, do the following:*

1. Click on a specific module to display its information:
   - The left panel contains the tree for Dialogic® Brooktrout® hardware. All modules installed in your system are shown.
   - The lower left panel contains the TECUpdate Version and Driver Version information.
   - The right panel displays the feature set for the selected module.
   - The lower right panel contains an online Help and Update License buttons. Update License allows you to update the feature configuration for a selected module using a specified license file.



System Information

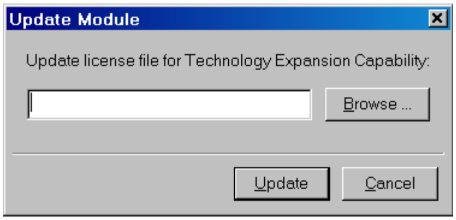
TECUpdate Version 6.4.0 Build 2

Driver Version 6.4.00 Build 1

Feature Name	Value
Serial Number	72205169
MAC Address	00-00-00-00-00-00
Product Name	TR1034
Product Part Number	901-013-06
Product Revision Number	00
Board Part Number	801-029-06
Board Revision Number	00
Number of Voice Channels	4
Advanced Speech Mode	Disabled
Number of Fax Channels	4
Advanced Fax Mode	Enabled
V.34 Fax Mode	Enabled
VoIP Sessions	0
Number of Physical Telephony Ports	2
Telephony Port Type	Analog
T.38 Fax Mode	Disabled
FaxPass	Enabled
TIMEnab	Disabled
PCBusTyp	1
2ndPort	DID
2ndLinks	2

2. Click Update License to load the license file updates.

   The Update Module dialog appears:

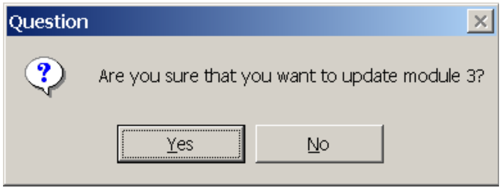


Update Module

Update license file for Technology Expansion Capability:

3. Click Browse to locate the license file (*.*lic*), then click Update to begin the updating process.
4. Click Yes to begin the download of the license file.

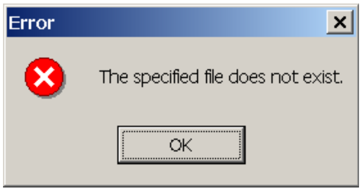
   A Question confirmation dialog appears before the update continues.



Question

Are you sure that you want to update module 3?

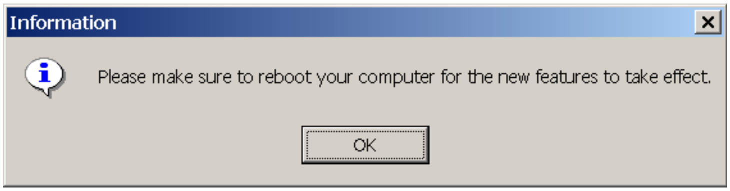
Click OK when an Error dialog appears to return to the Browse process (Step 3) and locate the correct file.



Error

The specified file does not exist.

5. Click OK if boards were updated with the new license information. The Feature Table on the right panel reflects the most current information about the module.



Information

Please make sure to reboot your computer for the new features to take effect.

6. Reboot your computer.

Error Logging

If TECUpdate encounters an error, an Error dialog box is displayed. Please see the error log file for more information. The error log file includes:

- TECUpdate version
- Driver version
- Diagnostic information

Provide the log file to Dialogic Technical Services and Support for more information on solving this error. The ASCII text file is called *TECUpdate.log* and is stored in the current application working directory. Subsequent errors are appended to this log file.

8 - Downloading Firmware

This chapter describes how one can download the firmware to the board.

The chapter includes the following:

Introduction

To install the software, you can download the firmware files and optionally configure call control.

For Linux operating systems, the procedures for downloading firmware are described here.

If your operating system is Windows, you can use the Dialogic® Brooktrout® Configuration Tool to download the firmware and configure the call control parameters.

To configure call control, see *Using a Call Control Configuration File on page 124*) and *Volume 6, Appendix A* of the Dialogic® Brooktrout® *Bfv APIs Reference Manual.*

Firmware Files

Table 4 lists the firmware files. See the Dialogic® Brooktrout® Release Notes that came with your software CD for further information.

Table 4. Firmware and Flash Update Files

File	Use
bostvb.dll	Firmware for the SR140 virtual module
cp.bin	Control processor (PPC) firmware for all platforms
dsp1000.hex	High density DSP firmware for voice and fax modules without V.34 fax (includes V.17 fax)
dsp1000_ld.hex	Low density DSP firmware for TR1034 analog and BRI modules or TruFax® analog and BRI boards (includes V.17 and V.34 fax)
dsp1000_ud.hex	Ultra high density DSP firmware for multi-span voice and fax modules (non-V34)
dsp1000_v34.hex	High density DSP firmware for TR1034 voice and fax with V.34 fax and T.38 fax
dsp1034_ud.hex	Ultra high density DSP firmware for multi-span TR1034 voice and fax modules with V.34 fax and T.38 fax

Updating Boot ROM Flash

Typically, it is not necessary to update your Boot ROM. Use the following procedure to update your Boot ROM Flash firmware only when told to do so by a Dialogic Technical Services and Support Representative.
The Dialogic® Brooktrout® driver must be running when you update the boot ROM flash.

➢ *Use the following procedure to update your Boot ROM Flash firmware.*

1. Ensure that each board has a unique module number. Maintain a current list. See *Determining the Board Module Number on page 24* for more information about modules and module number assignment. You can obtain a list of modules using the *modinfo* program.
2. Use the *firm* program to perform a flash update (do not interrupt the update process):

```
firm -m <module> -t 2 flashupd.bin
```

```
where: <module> is the hardware module number.
```

Note: This process takes less than a minute to complete. It is important not to interrupt the update process. If you interrupt the update process, you cannot reboot your board.

Manually Downloading the Firmware

You must download the firmware each time you boot the machine or restart the device driver.

To download the firmware to a module, you must run the *firmload* or *firm* program, both of which are located in the *brooktrout/boston/bfv .api/<platform>/bapp.src* directory.

The *firmload* program loads the control processor and DSP firmware on all Dialogic® Brooktrout® modules found in the system.

The `-c` option for the *firm* and *firmload* commands or the *config_spec_value* field of *BfvFirmwareDownload* sets the actual number of channels supported on the module.

First, start the driver if it is not already started, and if your operating system platform requires it.

Then, change to the *<install_root>/bfv.api/<platform>/bapp.src directory* and run the *firmload* or *firm* program.

To run the *firmload* program:

```
firmload -c num_channels brooktrout/boston/fw
```

Where `num_channels` is the number of channels configured to receive a firmware download.

For example:

```
firmload -c 48 brooktrout/boston/fw
```

The firmware consists of two types, by number, which must be downloaded in the proper sequence. The *firmload* program automatically takes care of identifying the proper files and downloading them in the correct sequence. If you wish to download the firmware using the *firm* program, you must download each module separately and specify the number of channels (`-c`) in the first *firm* command:

```
firm -m <module> -c <num_channels> -t <firmtype>
<firmname>
```

➢ *The sequence is as follows:*

1. Type 2 (PROC_APP) = Control processor firmware (`cp.bin`)
2. Type 1 (DSP_APP) = DSP firmware, use one of the following DSP firmware files:

`bostvb.dll`	SR140 Software
`dsp1000.hex`	Brooktrout boards in T1 robbed-bit, T1 or E1 ISDN
`dsp1000_ld.hex`	Analog and BRI boards and TruFax® analog and BRI boards
`dsp1000_ud.hex`	Multi-span Series ISDN boards (non-V.34)
`dsp1000_v34.hex`	TR1034 boards with V.34 fax and T.38 fax
`dsp1034_ud.hex`	Multi-span TR1034 boards and single-span PCIe T1/E1 TR1034 boards with V.34 and T.38 fax.

For example:

```
firm -m 2 -c 30 -t 2 cp.bin
firm -m 2 -t 1 dsp1000.hex
```

It takes about 10 seconds per module for the firmware to download and for the module to begin operating. Proper operation is indicated by the module status LED slowly flashing green.

See the descriptions of these programs in the *Dialogic® Brooktrout® Fax Products SDK Developer Guide* chapter about sample applications and utilities.

When the firmware is downloaded to a module for the first time, the assigned ordinal channel numbers start wherever the assignment left off on the previous module. As the system initializes the modules, this numbering process creates a continuous ordering of the channel assignments across all the modules in the system. On later downloads, each module's ordinals begin at the same location, regardless of any decrease or increase in the channel count of a lower-numbered module. Therefore, if you decrease the channel count for a lower numbered module, the process creates gaps in the channel numbering assignments, possibly affecting your application. If you attempt to increase the channel count above any module's initial channel count, the system ignores the added channels.

- *For the following situations, restart the driver whenever you want to:*

1. Get a continuous assignment of channel numbers after decreasing the channel count on any module.
2. Increase the number of channels above a module's initial channel count.

Note: You must reboot the system to restart the driver.

Appendix A
Compliance Information

This appendix describes how the Dialogic® Brooktrout® boards conform to compliance standards.

It has the following sections:

Note to developers and system integrators: The following compliance information and statements must be provided to your customer or end user as part of your system documentation.

Electromagnetic Compatibility Statements

Electromagnetic compliance requirements include country specific statements for:

- *United States of America on page 148*
- *Canada on page 150*
- *European Union on page 150*
- *Japan on page 151*

The Federal Communications Commission (FCC) in the United States and Industry Canada (IC) in Canada regulate all electronic devices that connect to the telephone system and/or generate radio frequency signals. Additionally, all computing devices utilizing clock frequencies in excess of 10 kHz must be tested for compliance with RF emission limits set by the FCC and IC. The Dialogic® Brooktrout® board is such a device and must comply with the Class A or Class B regulations as specified below.

The following statements should be conspicuously located in bold letters in the end user system documentation.

United States of America

Mandatory Statements

Changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

You must also add the following paragraph if shielded cables were used when testing your product:

> In order to maintain compliance with FCC limits, shielded cables must be used with this equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference to radio & television reception.

Class A Statement (for “Class A” products)

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

Class B Statements (for “Class B” products)

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this is equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

You might also find the following booklet helpful, prepared by the FCC: “*How to Identify and Resolve Radio-TV Interference Problems*.” This booklet is available from the U.S. Government Printing Office, Washington, D.C. 20402

Canada

Class A Statements (for “Class A” products)

This Class A digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la class A est conforme à la norme NMB-003 du Canada.

Class B Statements (for “Class B” products)

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la class B est conforme à la norme NMB-003 du Canada.

European Union

Class A Statements (for “Class A” products)

This equipment complies with the requirements of CISPR 22 (EN 55022) for Class A Information Technology Equipment (ITE).

Warning: This is a Class A product. In a domestic environment this product may cause radio interference in which case the user is required to take adequate measures.

Class B Statements (for “Class B” products)

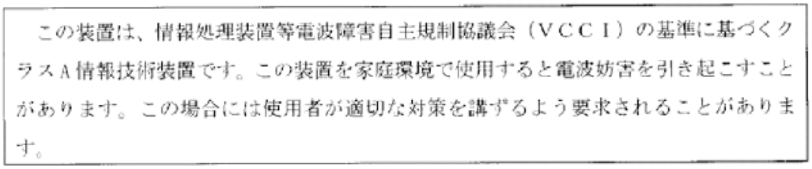
This equipment complies with the requirements of CISPR 22 (EN 55022) for Class B Information Technology Equipment (ITE).

Japan

VCCI Class Statements

Class A ITE

Class A Statement (For Class A Products).



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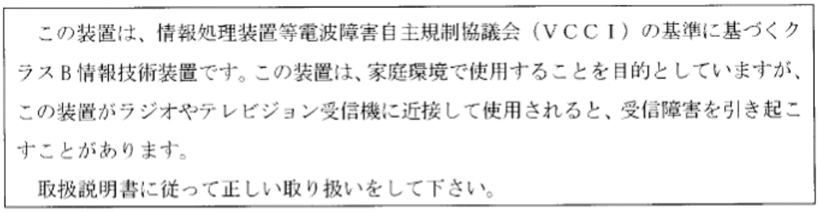
Translation:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

Class B ITE

Class B Statement (For Class B Products).



この装置は、情報処理装置等電波障害自主規制協議会（ＶＣＣＩ）の基準に基づくクラスＢ情報技術装置です。この装置は、家庭環境で使用することを目的としていますが、この装置がラジオやテレビジョン受信機に近接して使用されると、受信障害を引き起こすことがあります。

取扱説明書に従って正しい取り扱いをして下さい。

Translation:

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

Telecommunications Compliance Statements

The following customer information must be provided to customers with each unit of approved terminal equipment.

The statements provided below should be conspicuously located in the end user system documentation:

United States of America

Equipment Approved After July 23, 2001

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the ACTA. On the circuit side (bottom side) of this equipment is a label that contains, among other information, a product identifier in the format USAAAEQ##TXXXX. If requested, this information must be provided to the telephone company.

Ringer Equivalence Number (REN)

The REN is used to determine the number of devices that might be connected to a telephone line. Excessive RENs on a telephone line can result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that can be connected to a line, as determined by the total RENs, contact the local telephone company.

For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##TXXXX. The digits represented by ## are the REN without a decimal point (e.g., 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

Connection to Telecommunications Networks

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant. Please refer to the installation instructions provided with this equipment for details.

Please refer to the installation instructions provided with this equipment for details concerning the Universal Service Order Codes (“USOC”) that are applicable to this equipment.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service might be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company can make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

There are no user replaceable or serviceable components in this equipment. If trouble is experienced with this equipment, for repair or warranty information, please refer to the appropriate section of the general customer instructions for this equipment. If the equipment is causing harm to the telephone network, the telephone company can request that you disconnect the equipment until the problem is resolved.

This equipment must not be used on party lines. Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for further information.

FCC Rules Regarding FAX Branding

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device, including FAX machines, to send any message unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business or other entity, or other individual sending the message and the telephone number of the sending machine or such business, other entity, or individual. (The telephone number provided cannot be a 900 number or any other number for which charges exceed local or long-distance transmission charges.)

To program this information into your FAX machine, you should complete the following steps:

Users: To program this information into your fax machine, follow the procedure described in your user manual.

Developers: You must include facilities in your application to enable the user to enter the required information. Use the *BfvFaxHeader* function with the Dialogic® Brooktrout® board to place this information on each transmitted page as required. You must also include, in your user manual, instructions for entering this information into your system.

Note to OEM Partners (final equipment assemblers):

For information related to power supply source requirements, signal levels, etc., please refer to the installation instructions and general specifications provided with this equipment.

The mounting of the approved unit in the final assembly must be made so that:

- The approved unit is isolated from exposure to any hazardous voltages within the assembly.
- Adequate separation and restraint of cables and cords must be provided.
- The circuitry from the approved unit to the telephone line must be provided in wiring that carries no other circuitry (such as PC or PR leads) unless specifically allowed by the rules.
- PC board traces carrying tip and ring leads shall have sufficient spacing to avoid surge breakdown.
- The final assembler shall provide in the consumer instructions all applicable customer information.
- The approval label shall be placed on the exterior of the cabinet for each type of approved device contained therein if the approved device is enclosed in an assembly, and not readily accessible.

- Modular plugs or jacks shall be provided which comply with TIA-968-A Chapter 6 requirements for dimensions, tolerances and metallic plating.

FCC Regulations For Connecting to a T1 Interface

The Federal Communications Commission (FCC) has established rules that permit a Dialogic® Brooktrout® board to be directly connected to the telephone network:

Standardized jacks are used for connections.

This equipment can not be used on coin service provided by the telephone company. Connection to party lines is subject to state tariffs. (Contact your state public utility commission or corporation commission for information).

A malfunctioning circuit can harm the telephone network.

Disconnect a malfunctioning Dialogic® Brooktrout® board from the telephone network until you determine the cause of the malfunction and repair it. If a malfunctioning Dialogic® Brooktrout® board remains connected, the telephone company can temporarily disconnect service.

The Dialogic® Brooktrout® board is approved as a DSX-1 device. Federal regulations (FCC Part 68) prohibit connection of a DSX-1 device to the network without an FCC approved Channel Service Unit (CSU). Customers connecting this device to the network shall, upon request of the telephone company, inform the telephone company of the particular lines to which such connections are made and the FCC registration of the protection device (CSU).

The CSU has been designed to prevent harm to the T1 network. If the telephone company finds that the equipment is exceeding tolerable parameters, the telephone company can temporarily disconnect service, although they will attempt to give you advance notice if possible.

If the telephone company alters their equipment in a manner that will affect use of this device, they must give you advance warning so as to give you the opportunity for uninterrupted service. You will be advised of your right to file a complaint with the FCC.

Under the FCC rules, no customer is authorized to repair this equipment. This restriction applies regardless of whether the equipment is in or out of warranty.

Before connecting the Dialogic® Brooktrout® board to telephone service, you must give a representative of the local telephone company the following information:

- The telephone numbers (Port ID) to which the Dialogic® Brooktrout® board is connected.
- SOC:

6.0P	HP02
6.0Y	HP03

- FIC:

04DU9-BN	1.544 Mbps SF
04DU9-DN	1.544 Mbps SF+B8ZS
04DU9-1KN	1.544 Mbps ESF
04DU9-1SN	1.544 Mbps ESF+B8ZS

- The type of wall jack required: USOC-RJ-48C
- The FCC Registration number: Labeled on back of board
- FCC registration of the protection device (CSU)

Canada

NOTICE: This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. On certain products, the abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

AVIS: Le présent matériel est conforme aux spécifications techniques d'Industrie Canada applicables au matériel terminal. Cette conformité est confirmée par le numéro d'enregistrement.
Le sigle IC, placé devant le numéro d'enregistrement, signifie que l'enregistrement s'est effectué conformément à une déclaration de conformité et indique que les spécifications techniques d'Industrie Canada ont été respectées. Il n'implique pas qu'Industrie Canada a approuvé le matériel.

NOTICE: The Ringer Equivalence Number (REN) for this terminal equipment is 0.4. The REN is an indication of the number of devices allowed to be connected to a telephone interface. The termination on an interface can consist of any combination of devices subject only to the requirement that the sum of the RENs of all the devices do not exceed 5.

AVIS: L'indice d'équivalence de la sonnerie (IES) du présent matériel est de 0.4. L'IES assigné à chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent être raccordés à une interface téléphonique. La terminaison d'une interface peut consister en une combinaison quelconque de dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas 5.

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions might not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. Any repairs or alterations made by the user to this equipment, or equipment malfunctions, may give the telecommunications company cause to request the user to disconnect the equipment.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Australia

Fail-Safe Operation (AS/ACIF S038-2001).

This equipment will be inoperable when mains power fails.

This equipment will not continue to support emergency dialing after loss of mains power.

Safety Compliance Statements

The following customer information must be provided to customers with each product.

The statements provided below should be conspicuously located in the end user system documentation:

United States of America and Canada

This product is listed by Underwriters Laboratories, a Nationally Recognized Test Laboratory (NRTL). The Listing Mark is located on the bottom surface of the board. The Dialogic® Brooktrout® board has been tested and complies with UL 60950 and CAN/CSA-C22.2 No. 60950, Safety of Information Technology Equipment, Including Electrical Business Equipment.

Install this card only in UL Listed equipment that has instructions stating that the user may install and remove accessory cards.

This product must be mounted in the final assembly so that it is isolated from exposure to any hazardous voltages (voltages greater than 42.4V peak or 60Vdc) within the assembly. Adequate separation and restraint of cables and cords must be provided.

To maintain the safety certification of the system, ensure that the power drawn from the power supply does not exceed its capacity. Please refer to the power usage table on the hardware installation card applicable to your board for information on the voltages and currents required for proper operation.

Models of this card that contain DID interfaces are for use only in equipment that has a permanent connection to protective earth and is installed in a restricted access location.

Users should ensure for their own protection that the electrical ground connections of the power utility, telephone lines and internal metallic water pipe system, if present, are connected together. This precaution may be particularly important in rural areas.

Users should not attempt to make such connections themselves, but should contact the appropriate electric inspection authority, or electrician, as appropriate.

Disconnect any TNV circuit connectors (telephone line cords) from this card before removing the cover of the equipment.

Appendix B
Configuration from a Custom Installation Program

This appendix describes how one can create a custom installation program for manual configuration of the driver.

You can find installation structure and functions for the following operating systems:

- *Linux Operating System on page 162*
- *Windows Operating System on page 166*
- *Windows Operating System on page 166*

Linux Operating System

You can perform configuration from a custom installation program by writing a program that runs *dinstall* with the `-c` option, or by writing a Bourne shell script that calls the provided installation functions described below.

Only write custom installation programs using one of these two mechanisms. Do not write them by directly including and/or modifying any of the supplied source or by writing new code to perform the same underlying system actions. Compatibility with installation functions for later versions cannot be guaranteed, but the up-to-date usage of the functions will always be documented.

The Bourne shell script containing the installation functions is *dinstlib*, located in *usr/sys/brooktrout/boston/driver/linux/install*. The *dinstall* is a particular example of a shell script that makes use of *dinstlib*.

The functions generally use shell variables to pass values in and out. An exhaustive description of these variables is not supplied here. Use the Linux driver installation and the *dinstall* script as guides (see *Installing the SDK on Red Hat Linux on page 32*).

Linux Installation

```
mill_driver_install
```

Required Input Variables

`Reserved`	
`Reserved`	
`Reserved`	
`max_pci_hw_modules`	Maximum number of PCI/cPCI hardware modules.
`physbufsize`	Physical buffer size.
`appbufsize`	Application buffer size.
`machine_id`	Machine ID, in hex (no leading 0x).
`do_reset`	Reset on driver startup.
`history_enable`	Whether to enable history.
`dhsize`	History size.

`num_hists_phy`	Number of physical histories.
`num_hists_apl`	Number of application histories.
`hist_phy_admin_only`	Whether to restrict physical histories to admin channels only.
`num_I2O_frames_per_module`	Number of I2O frames per module.
`fc_interval`	Driver flow control interval, in ms.
`mem_drv_alloc_min`	Min memory allocated per allocation.
`mem_drv_alloc_quanta`	Unit of allocation increment above min.
`num_reserved_modules`	Number of reserved modules.
`init_mod_vals`	A string consisting of the hex representation of pairs of module IDs and module numbers, each with the 0x prefix. Each pair is listed with a comma in between, and commas between each pair. If none, should be set to 0.
`mill_test1`	Driver test value 1
`mill_test2`	Driver test value 2
`mill_test3`	Driver test value 3
`driv_kvers_dir`	Location of all the *boston.o* binaries. This is normally the directory *driver/linux/kernel/kvers*.

Output Variable

`err_msg`	Contains displayable error message. **Note:** If echo is used to display the contents, it might require the -e option to properly display some of the messages.

This variable is not modified except to set to 1 or error message.

Exit Code

0 = success
1 = error

Checking the Installation

```
_mill_driver_install_check
```

Exit Code

0 = not installed
non-0 = installed

Defining Default Symbols

`_mill_driver_defaults`

Defines the symbols that provide defaults for use with getting parameter values.

`DEFAULT_MOD_NUM`	Default starting reserved module number.
`DEFAULTAPPBUFSIZE`	Default application buffer size.
`Reserved`	Default ISA interrupt line. Reserved, no longer in use.
`DEFAULTMACHINEID`	Default machine ID.
`DEFAULTMAXHWMOD`	Default maximum number of PCI/cPCI modules.
`Reserved`	Default number of ISA modules. Reserved, no longer in use.
`DEFAULTPHYBUFSIZE`	Default physical buffer size.
`DHSIZEDEF`	Default history size.
`HIST_PHY_ADMIN_ONLY_DEF`	Default for physical histories admin only.
`MAX_RESERVED_MODULE_NUMS`	Maximum number of module reservations.
`MAXAPPBUFSIZE`	Maximum application buffer size.
`MAXMACHINEID`	Maximum allowable machine ID.
`Reserved`	Maximum number of ISA modules. Reserved, no longer in use.
`MAXPHYBUFSIZE`	Maximum physical buffer size.
`MINAPPBUFSIZE`	Minimum application buffer size.
`MINMACHINEID`	Minimum allowable machine ID.
`MINPHYBUFSIZE`	Minimum physical buffer size.
`NUM_HISTS_APL_DEF`	Default number of application histories.
`NUM_HISTS_PHY_DEF`	Default number of physical histories.

Removing the Driver

```
_mill_driver_remove
```

Input Argument

`partial` (Optional) The function only performs a partial removal. Also used for removal prior to reinstallation.

Output Variable

`err_msg` Contains displayable error message.

Note: If echo is used to display the contents, it might require the `-e` option to properly display some of the messages.

This variable is not modified except to set to 1 or error message.

Exit Code

0 = success
1 = error

Windows Operating System

You can perform configuration from a custom installation program by writing a program that runs *install* with the `-c` option, or by writing a program that calls the Dialogic-provided installation functions, described below, that can be compiled and linked into the program.

Only write custom installation programs using one of these two mechanisms. Do not write them by directly including and/or modifying any of the supplied source or by writing new code to perform the same underlying system actions. Compatibility with installation functions for later versions cannot be guaranteed, but the up-to-date usage of the functions will always be documented.

All files referred to are in the *brooktrout\boston\driver\winnt\install* directory. To use these functions, the custom program must include *instlib.obj* and *pnplib.obj*. The object files must be linked with the custom program. *Install.c* is a particular example of a program that is compiled and linked in this way.

Note: To build a custom program with these object files requires the Windows DDK (2008 or higher).

An exhaustive description of the function parameters is not supplied here. Use the Windows driver configuration and the *install.c* program as guides (see *Installing the Device Driver on Windows on page 71*).

Installing the Windows Driver

Use the following function to install the Windows PnP driver:

```
int _mill_pnp_driver_install(
   struct driver_parameters *drv_parm,
   int    do_adjustments,
   int    already_option,
   int    meg_in_system,
   int    *mem_adjust_stat,
   char   *inf_file,
   int    load_uncond,
   int    *reboot_required,
   char   **failed_win32_call,
   DWORD  *win32_err_val,
   char   **other_msg
);
```

Input Variables

already_option	Action to take if already adjusted.
appbufsize	Application buffer size.
dest_dir_name	Pointer to char * variable to contain the directory name in which the driver files were installed.
dhsize	History size.
do_adjustments	Whether to do PCI memory adjustments.
do_reset	Reset on driver startup.
driver_fname	Name of driver binary *boston.sys* file to install.
drv_parm	Pointer to a structure containing driver parameters.
failed_win32_call	Pointer to char * variable to contain the name of a Windows function that failed.
fc_interval	Driver flow control interval, in ms.
hist_phy_admin_only	Whether to restrict physical histories to administrative channels only.
history_enable	Whether to enable history.
inf_file	Name of driver *.inf* file.
Reserved	ISA interrupt line is no longer used.
load_uncond	Indicates that driver should load regardless of devices being present in the system.
machine_id	Machine ID.
max_pci_hw_modules	Maximum number of PCI/cPCI hardware modules.

`meg_in_system`	Amount of memory in system.
`mem_adjust_stat`	Pointer to `int` variable to contain result of memory adjustment attempt 0 = Memory adjustment not performed 1 = Memory adjustment performed 2 = Previous adjustment detected, action dependent on `already_option`
`mem_drv_alloc_min`	Min memory allocated per allocation.
`mem_drv_alloc_quanta`	Unit of allocation increment above min.
`Reserved`	Pointer to array of ISA addresses is no longer used.
`Reserved`	Size of `mill_isa_addrs` array is no longer used.
`mill_test1`	Driver test value 1.
`mill_test2`	Driver test value 2.
`mill_test3`	Driver test value 3.
`num_hists_apl`	Number of application histories.
`num_hists_phy`	Number of physical histories.
`num_I2O_frames_per_module`	Number of I2O frames per module.
`Reserved`	Number of ISA modules is no longer used.
`num_reserved_modules`	Number of reserved modules.
`other_msg`	Pointer to `char *` variable to contain a possible error message.
`phybufsize`	Physical buffer size.
`pkt_version`	Reserved, must be 0.
`reboot_required`	Pointer to `int` variable to contain indication of whether a reboot is required.
`reserved_modules`	Pointer to array of reserved module information.
`reserved_modules_size`	Size of reserved_modules array.
`win32_err_val`	Win32 error code returned by failing Windows function.

Return Value

0 = success
1 = error

Driver Parameters Structure

Use the driver_parameters structure to install the PnP driver (see *Installing the Windows Driver on page 167*).

For input variable definitions, see *Input Variables on page 167*.

```
struct driver_parameters
{
   int      reserved;
   int      reserved;
   unsigned reserved;
   unsigned reserved;
   unsigned max_pci_hw_modules;
   unsigned phybugsize;
   unsigned appbufsize;
   unsigned machine_id;
   unsigned do_reset;
   unsigned history_enable;
   unsigned dhsize;
   unsigned num_hists_phy;
   unsigned num_hists_apl;
   unsigned hist_phy_admin_only;
   unsigned num_I20_frames_per_module;
   unsigned fc_interval;
   unsigned mem_drv_alloc_min;
   unsigned mem_drv_alloc_quanta;
   unsigned pkt_version;
   unsigned num_reserved_modules;
   struct reserved_module_num *reserved_modules;
   unsigned reserved_modules_size;
   unsigned mill_test1;
   unsigned mill_test2;
   unsigned mill_test3;
};
```

Checking the Installation

Verifies that the driver is installed.

```
int _mill_pnp_driver_install_check(void);
```

Return Value

0 = not installed
1 = installed

Defining Default Symbols

The *instlib.h* file defines the following symbols that provide defaults for use with getting parameter values.

You can find the *instlib.h* file at the following location:

```
C:\Brooktrout\Boston\driver\winnt\install\
```

DEFAULT_MOD_NUM	Default starting reserved module number.
DEFAULTAPPBUFSIZE	Default application buffer size.
DEFAULTINTRLINE	Default ISA interrupt line. Reserved, no longer in use.
DEFAULTMACHINEID	Default machine ID.
DEFAULTMAXHWMOD	Default maximum number of PCI/cPCI modules.
DEFAULTNMILL	Default number of ISA modules. Reserved, no longer in use.
DEFAULTPHYBUFSIZE	Default physical buffer size.
DFLT_FC_INTERVAL	Default number of FC intervals.
DFLT_I2O_FRAMES_PER_MODULE	Default number of I2O frames per module.
DHSIZEDEF	Default history size.
DHSIZEMIN	Minimum history size.
HIST_PHY_ADMIN_ONLY_DEF	Default for physical histories admin only.
I2O_FRAMES_PER_MODULE	Number of I2O frames per module.
MAX_RESERVED_MODULE_NUMS	Maximum number of module reservations.
MAXAPPBUFSIZE	Maximum application buffer size.
MAXMACHINEID	Maximum allowable machine ID.
MAXNMILL	Maximum number of ISA modules. Reserved, no longer in use.
MAXPHYBUFSIZE	Maximum physical buffer size.

MEM_DRV_ALLOC_MIN	Minimum allocation of memory.
MEM_DRV_ALLOC_QUANTA	Number of allocation of memory.
MIN_FC_INTERVAL	Minimum number of FC intervals.
MINAPPBUFSIZE	Minimum application buffer size.
MINMACHINEID	Minimum allowable machine ID.
MINPHYBUFSIZE	Minimum physical buffer size.
NUM_HISTS_APL_DEF	Default number of application histories.
NUM_HISTS_PHY_DEF	Default number of physical histories.

This file also defines `SYSDIR`, a string that represents the type of platform being compiled on, and a component of the subdirectory path needed to find the compiled driver binary.

It also provides the `struct reserved_module_num` definition, used by `_mill_pnp_driver_install`.

Removing the Driver

Uninstalls the driver service and removes files. For input variable definitions, see *Input Variables on page 167*.

```
int _mill_pnp_driver_remove(
   int    *mem_adjust_stat,
   int    *reboot_required,
   char   **failed_win32_call,
   DWORD  *win32_err_val,
   char   **other_msg
);
```

Return Value

0 = success
1 = error

Appendix C
Reinitializing the Device Driver

This appendix describes the driver reinitialization utility. This utility is used to return the device driver to a state as close as possible to that of a fresh driver start without stopping the driver.

Introducing the Driver Reinitialization Utility

The driver can be reinitialized close to its starting state in terms of channels assigned to modules and module number assignments using the *driver_reinit* program located in the *boston/driver/<platform>/user* directory.

Use of this program may avoid the need to stop and restart the driver. This is especially useful for a Windows PnP system as the driver cannot be easily started and stopped.

Using the driver_reinit Utility

When you execute the *driver_reinit* program, this utility will return the driver to a state as close as possible to that of a fresh driver start without stopping the driver.

The utility will:

- Clear all ordinal channel assignments
- Remove all stored information about the modules
- Reset all the hardware modules

The utility fails if any application sessions currently exist.

Glossary

API

Application Programming Interface

ASR

Automatic Speech Recognition

Channel

A logical channel of operations provided by a Boston module. See *logical channel number, ordinal channel number, work channel.*

EC

Echo cancellation

Facility

A software entity responsible for a set of related functions that provide services to the host, e.g., fax facility and voice facility.

ISDN

Integrated Services Digital Network

IVR

Interactive Voice Response

lapdid

The term *lapdid* has its origins with the LAP-D protocol used for call control, but has an extended meaning for Dialogic products. For call control with the ISDN protocol (Q.931), *lapdid* refers to a trunk-specific HDLC controller (trunk 1 = lapdid 0, trunk 2 = lapdid 2, trunk 3 = lapdid 4 and trunk 4 = lapdid 6). For call control with the LEC protocols (RBS, etc.), *lapdid* refers to a specific 0-based trunk number (trunk 0 = lapdid 0, trunk 1 = lapdid 1,..., trunk 6 = lapdid 6 and trunk 7 = lapdid 7).

Line

A T1/E1 slot or a single analog slot. Lines are numbered starting at 1.

Logical channel number

A number used with the hardware module number to reference a channel in a system. Channel 0 is reserved and channel 1 is the administrative channel. Other channels are numbered from 2 to n+1 (where n is the number of work channels defined for the module).

Millennium Address

An address of a communicating BOSTON or Millennium entity, a facility and channel on a BOSTON module, or the driver. Each address consists of 4 components, the facility, the channel, the module, and the machine. It is possible to make use of most features of the firmware and the APIs without requiring direct use of these addresses.

Module

A communicating Boston entity that usually represents a CPU on a Dialogic® Brooktrout® board, a host application, a software telephony module (SR140) or the driver. See *Determining the Board Module Number on page 24* for more information about modules and module number assignment.

NVRAM

Non-Volatile RAM. Random Access Memory that is not erased when the board is powered off or when the firmware is downloaded again.

Ordinal channel number

A number in the range 0 to n-1 where n is the total number of work channels on all the boards in the system.

Packet

In the BOSTON architecture, a sequence of bytes containing a BOSTON destination address, source address, and one or more commands.

PCI

Peripheral Component Interconnect

PDF

Portable Document Format

Plug-and-Play

Hardware or software that, after installation, can be used immediately without configuration. Also PnP.

Port

A TDM bus (for example: MVIP, H110), DS-1 (T1/E1), BRI or analog interface.

Stream

A logical data entity that corresponds to a physical data line on a TDM bus

T1/E1 span

The set of slots that comprises one T1 (24) or one E1 (30) line. The spans are numbered starting at 1.

TCP

Transmission Control Protocol

Time slot

A logical entity that corresponds to one telephone call.

Unit number

1. In telephony configuration files and functions, a unit is a hardware port on a Dialogic® Brooktrout® board and is numbered starting at 0 (to denote a TDM bus); from 1 to n (for a specific T1/E1 interface).

2. In some Bfv functions (for example, *BfvLineAttach*), an ordinal channel number. Its range is 0...n-1, where n is the number of channels in a system.

VAD

Voice Activity Detection

Work channel

One of the channels on a module that is available for non-administrative purposes as a result of downloading firmware. A module configured for 48 channels when firmware download is performed has 48 work channels and one administrative channel. Logical work channel numbers start at 2 on each module.

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