Dialogic®

Dialogic® Brooktrout® Fax Products

Linux End User Guide

SDK 6.5

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www.dialogic.com

Copyright and Legal Notice

Hardware Limited Warranty

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Contents

About this Publication

Introduction

This ***Dialogic® Brooktrout® Fax Products Linux End User Guide*** is for users running either of the following in a Linux environment:

- Dialogic® Brooktrout® Fax SR140 Software
- Dialogic® Brooktrout® TR1034 Series and Dialogic® Brooktrout® TruFax® boards.

Refer to the ***Dialogic® Brooktrout® Fax Products Windows® End User Guide*** if you operate in a Windows® environment

This document contains the following chapters:

- Chapter 1 explains how you get started installing and configuring Dialogic® Brooktrout® software and hardware in a Windows® environment.
- Chapter 2 explains how to install your Dialogic® Brooktrout® TR1034 Series and Dialogic® Brooktrout® TruFax® boards.
- Chapter 3 describes how to activate Dialogic® Brooktrout® SR140 Fax Software.
- Chapter 4 describes how to configure the Dialogic® Brooktrout® Fax Software with Dialogic® Brooktrout® SR140 Software and TR1034/TruFax boards.
- Chapter 5 explains testing the Dialogic® Brooktrout® SR140 Fax Software and Dialogic® Brooktrout® TR1034/TruFax® boards.

- Chapter 6 provides specifications for Dialogic® Brooktrout® SR140 Fax Software and Dialogic® Brooktrout® TR1034/TruFax® boards..

Manual Conventions

This manual uses the following conventions:

- ***Italics*** denote the names of variables in the prototype of a function, and 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 /usr/sys/brooktrout/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 the data type of the prototype of a function, 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

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

Telephony Requirements

Physical	*Media*	*Call Control*
Ethernet 10/100	T.38 v0 or v3 RTP V2 G.711	H.323 SIP

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	Dialogic® Brooktrout® SR140 Fax Software or Brooktrout SR140 Fax Software or SR140 Software or SR140
Virtual modules	
Virtual boards	
Software modules	
VoIP modules	
SR140 virtual modules	
TR1000 Series SDK	Dialogic® Brooktrout® SDK
TR1000 Series Product	Dialogic® Brooktrout® Fax Board or Brooktrout fax board or board
TR1000 Series Module	
TR1000 Series 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
- TR1034

Related Documents

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

Getting Technical Support

Dialogic provides technical services and support for purchasers of our Dialogic® Pro service contracts.

If you purchased a support contract from a reseller, please contact the reseller for technical support.

To obtain technical support, please use the following web site:

www.dialogic.com/support/

1 - Getting Started

This chapter provides an introduction and quick start installation instructions for installing the Dialogic® Brooktrout® software and hardware in a Linux environment.

Fax Board and Virtual Modules (SR140)

Dialogic's intelligent fax board platform, the Dialogic® Brooktrout® TR1034 Fax Board, provides Dialogic ISV (Integrated Software Vendor) partner's fax application with the capability to communicate from their application to the telephone or IP network.

For software-only systems using IP only, Dialogic has implemented the SR140 as a virtual module. Although it is software, the SR140 appears to the fax application just like a board. That helps simplify your fax application publisher to provide a single product that works for hardware and software.

SR140 Product Family

There are two major SR140 products, the original full SR140 and the SR140-L. Each product differs in the available functionality, with the full SR140 having the highest functionality. The tables below summarize the feature set available for the different SR140 products over the course of their release history.

Note: Full SR140 and SR140-L licenses cannot co-exist in the same system.

Table 1. Full SR140 Release History

Release	Date	Example Model Name	Feature Set
R1	March 2008	SR140-4F	■ T.38 V.17 ■ Advanced Fax (Very High Res, MMR, JBIG/Color pass-through)
R2	February 2009	SR140-4F-V.34	■ T.38 V.34 ■ T.38 V.17 ■ Advanced Fax (Very High Res, MMR, JBIG/Color pass-through
R3	April 2010	SR140-4-R3	■ G.711 RTP ■ IVR ■ T.38 V.34 ■ T.38 V.17 ■ Advanced Fax (Very High Res, MMR, JBIG/Color pass-through

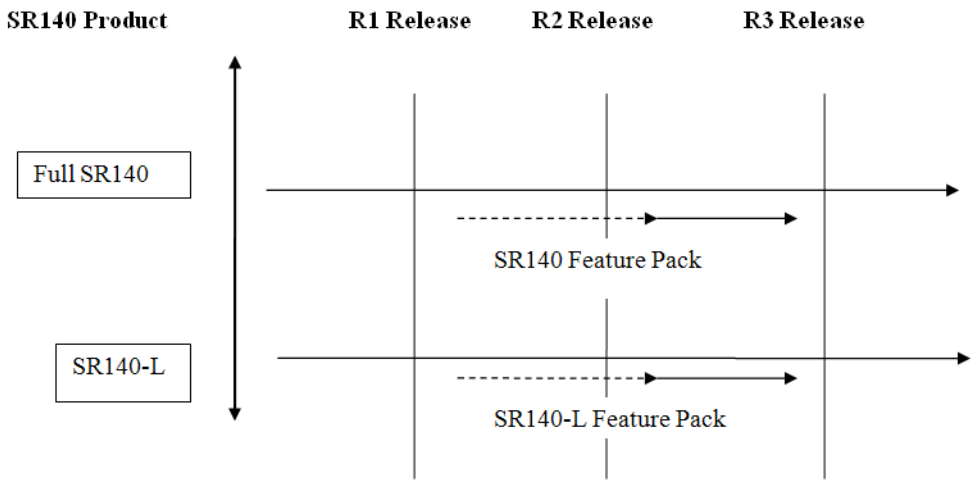
Table 2. SR140-L Release History

Release	Date	Example Model Name	Feature Set
R1	April 2010	SR140-L-4-R1	■ Maximum eight channels per system ■ T.38 V.17 ■ Advanced Fax (Very High Res, MMR, JBIG/Color pass-through)

Feature Pack Licenses

Feature pack licenses are available to allow you to add features matching a later release. The feature pack license is added to your existing license to bring you up to the latest set of available features.

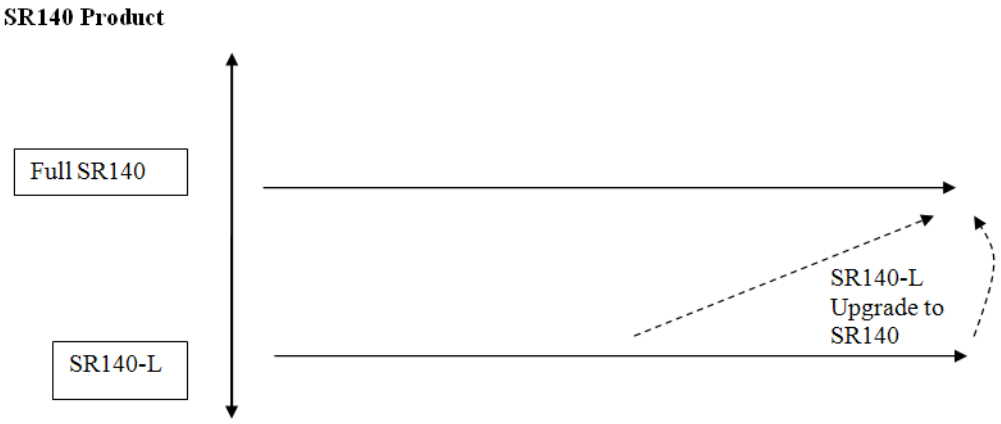
For example, if you currently own an original SR140 R1 (SR140-4F), you can obtain an upgrade pack license (SR140-FeaturePack-4-R3) that will add in the new features, without first requiring an R2 feature pack license.



Upgrade Licenses

Upgrade licenses allow you to add the feature set of the full SR140 to the SR140-L.

For example an SR140-L-2-R1 together with a SR140-L-UPGRADE-SR140-2-R3 will have the same features as an SR140-2-R3.



Demonstration Licenses

Demonstration licenses are available for both the SR140 and SR140-L. Demonstration licenses will cause each transmitted or received page to be overlaid with the word 'Demonstration'. Only one demonstration license can be installed in a system at any time and cannot be used together with non-demonstration licenses.

Demonstration licenses expire after some time period, typically 30 days from when the license was first activated. If a demonstration license expires, it will cause the SR140 to stop functioning. You will need to delete any demonstration licenses that have expired before you can use a nondemonstration license..

Software Licenses

The SR140 is delivered inside your fax application. The SR140 license is the right to use the software products in an entitlement purchased from Dialogic. The license is represented by the contents of a License File that is used by the software to restrict use to that entitlement. When you install the software, you acknowledge the License Agreement that governs SR140 licensing.

A License Key is delivered in paper form or electronic form and shows you what your entitlement is and allows you to apply your entitlement to a computer system when you install the SR140 Fax Software.

Make sure to keep your License Key certificate in a safe place, where you can find it easily.

Product Activation

As well as helping you stay within your entitlement, your SR140 Fax Software product uses copy protection technology. Following installation of the software, Product Activation is a process for tying a license to a particular system, limiting use of that licensed software to one computer system. Product Activation is simple and may be completed via the Internet, email or by fax and involves supplying your License Key shown on the License Key certificate and a unique identifier of the computer system that can be used to lock a license to a computer (known as node-locking).

Configuration

All modules - virtual modules or real boards - need to know how to handle call control over the IP network. Once you have installed the software and activated your product, you need to enter settings that control how connections are made between the IP network and the virtual module. This process is called configuration.

Getting it Working

- *Before Installing*

  Things to know before you begin the installation

  See ***Before Installing on page 22***
- *Hardware Installation*

  See ***Installing TR1034 and TruFax® Hardware on page 23***
- *Product Activation*

  See ***Activating Dialogic® Brooktrout® SR140 Fax Software on page 26***.
- *Configuration*

  See ***Configuring Dialogic® Brooktrout® SR140 Fax Software and Dialogic® TR1034 Series / TruFax® Boards on page 47***.
- *Test*

  See ***Testing Dialogic® Brooktrout® SR140 Software and TR1034 / TruFax® Boards on page 79***.

Before Installing

When doing the installation, you need the following:

- Root privileges for the server

and either of the following:

- Enterprise Linux ES/AS 4.0
- Enterprise Linux ES/AS 5.0
- Enterprise Linux 6.0

Use the installation program provided with your application software to install the software for the SR140.

2 - Installing TR1034 and TruFax® Hardware

This chapter applies to users of the Dialogic Brooktrout® TR1034 Series and Dialogic Brooktrout® TruFax® boards. This chapter does not apply to users of the Dialogic Brooktrout SR140 Fax Software.

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

Installation Overview

This section describes how to install your fax board on a Linux system.

- Check your system to verify the minimum system requirements.
- Install your Brooktrout System Software.
- Install your fax board. Refer to ***Installing Your Board on page 25***.
- Configure your Brooktrout board. Refer to ***Configuring Dialogic® Brooktrout® SR140 Fax Software and Dialogic® TR1034 Series/TruFax® Boards on page 47***
- Verify the installation. Refer to ***Testing Dialogic® Brooktrout® SR140 Software and TR1034/TruFax® Boards on page 79***

Installing Your Board

Before installing your board, make sure you have assigned the board a unique module number.

➢ *Follow these instructions to install your Brooktrout board into your computer:*

1. Power off your PC and any peripheral equipment connected to it.
2. Unplug your PC power cord.
3. Remove the outside cover of your computer.
4. Open your computer and locate a free PCI slot in the computer chassis.
5. Remove the slot cover.
6. Carefully align the Brooktrout board with the PCI slot and firmly seat the board into the slot.
7. Tighten the mounting bracket screw to secure the board to the chassis.

Warning: When installing the board, be sure that the mounting bracket is securely fastened to the chassis and the chassis is plugged into a grounded three prong plug. Improper chassis or bracket grounding can result in harmful or fatal electrical shock as well as component damage.

8. Replace the outside cover of your computer.
9. Use the cable supplied with your board and connect one end of the cable into the RJ-45 telephone connector on the board's mounting bracket.
10. Plug the other end of the cable into the connector for your telephone service.
11. Reconnect your PC power cord, and power on your computer.

3 - Activating Dialogic® Brooktrout® SR140 Fax Software

This chapter describes how to activate a license for the Brooktrout SR140.

The Brooktrout SR140 functionality is protected against piracy and abuse by licensing technology that uses product activation. A License Key is sold to the user who exchanges the key for a license file during or after installing the software. The license file is tied to the system during activation by imprinting a unique system signature (a node ID) on the license file, and is based on the machine's MAC address.

The License Key can either be a unique, paid-for license key that provides a perpetual license or a demo license key that results in software that provides limited support for a limited time. Both types of product - licensed as demo or paid-for - require activation. You have several ways to activate the product.

The licensing software also verifies the following:

- The signature of the license is not broken.
- The license is not expired.
- The node ID of the license matches the node ID of the compute (sometimes referred to as the “Node Lock” of the computer).
- The system clock is not set back.

Please contact Dialogic Technical Support if you are unable to use the license. See ***Getting Technical Support on page 14***.

This document has the following sections:

Preparing for Activation

Because Dialogic® Brooktrout® SR140 Fax Software is an IP-based technology, Dialogic uses the IP network and the Internet to perform Product Activation. Ideally, the system you are installing on should be connected to an IP Network and to the Internet.

Archive the License Key Certificate and the License File once the product has been activated.

Note: Because the license software verifies if the system clock has been set back, you should ensure that the system date is set correctly.

Displaying Node IDs

You can run the listnodeid utility to print out the node ID. You need root privileges to run the utility.

The following is an example of the output:

```
$ listnodeid
ID value (vendor defined): UYPWK6XWO1BGEKODJO4MLQ
```

The following is the default installation location for the listnodeid:

```
/usr/sys/brooktrout/boston/fw
```

To execute the lisnodeid you have to enter the following:

```
./listnodeid
```

Methods to Activate a License

- Using the interactive web method

  Activates licenses using the Dialogic License Activation website. After successfully processing activation information, you can choose to download the file immediately or have the license emailed to you. Within a couple of minutes Dialogic sends an email containing a license file, if you select the email option. See ***Activating a License Using the Web on page 30***.

- Create a request for email or fax

See ***Activating a License Using Email or Fax on page 34***. After successfully processing activation information, Dialogic sends an email containing a license file. Dialogic sends a license in about one working day.

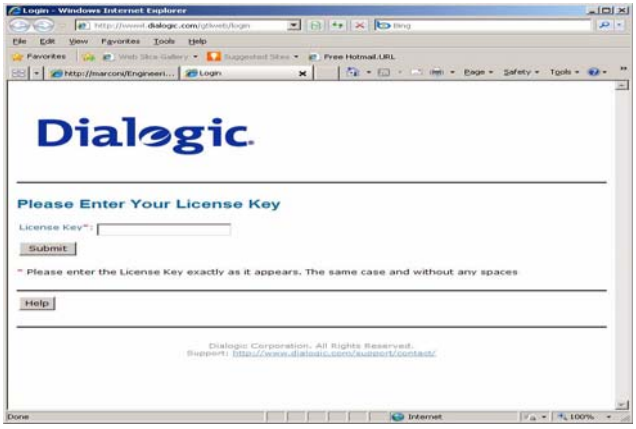
Activating a License Using the Web

You can activate your Dialogic® Brooktrout® SR140 Fax Software license on the web using a computer that has web access. This can be a different computer than the server on which you are installing the Brooktrout SR140.

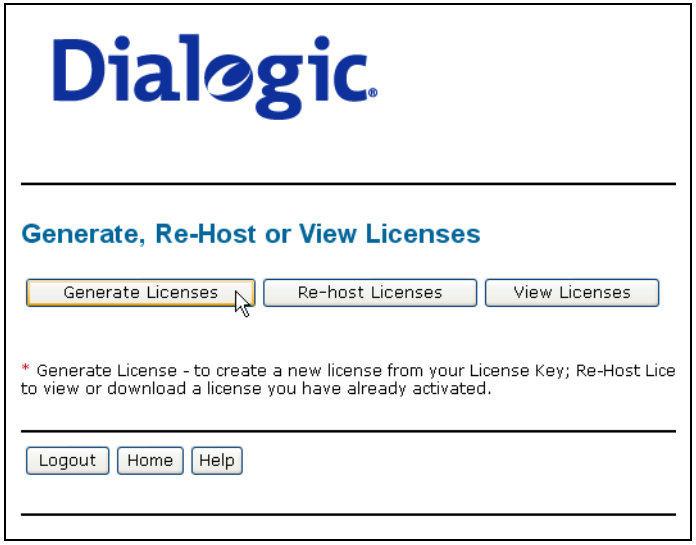
It is critical that you enter the node ID information on the website without errors. The software generates an unusable license when you enter incorrect node ID information. The second attempt to obtain the license using the corrected node ID information is considered a re-hosting. In this case, you to refer to ***Re-Hosting License Files on page 42***.

➢ *Follow the steps below:*

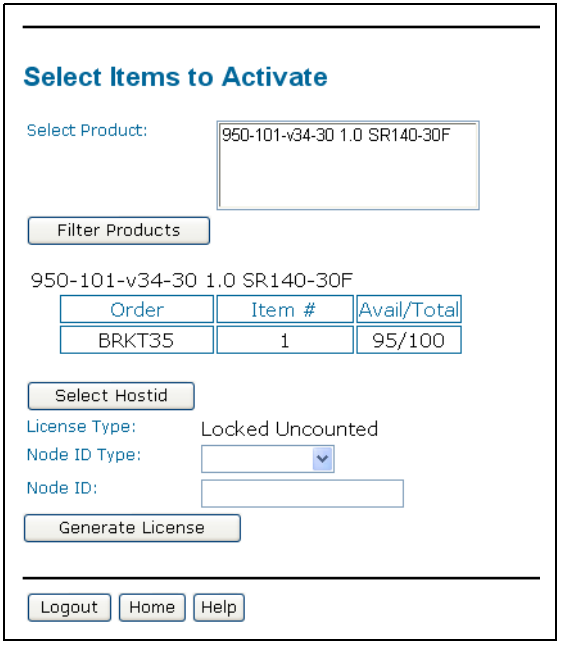
1. On a computer that has Internet Access, enter the web address ***www.dialogic.com/activation***, which directs you to a secure server. The following screen appears.



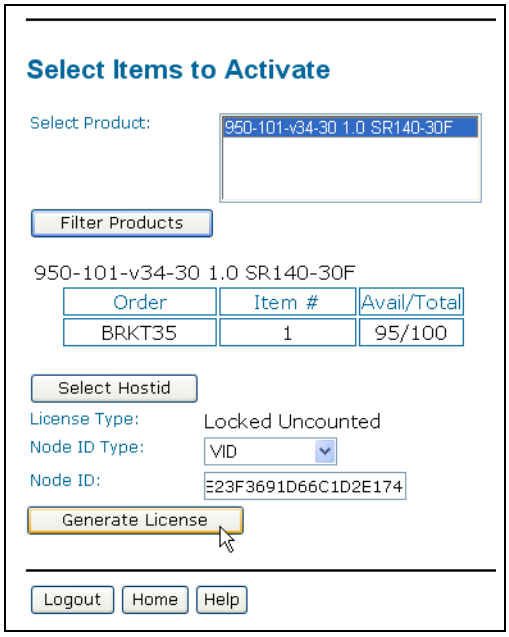
2. Enter your original License Key (this can be found on your License Key certificate) and click Submit. The following screen appears.



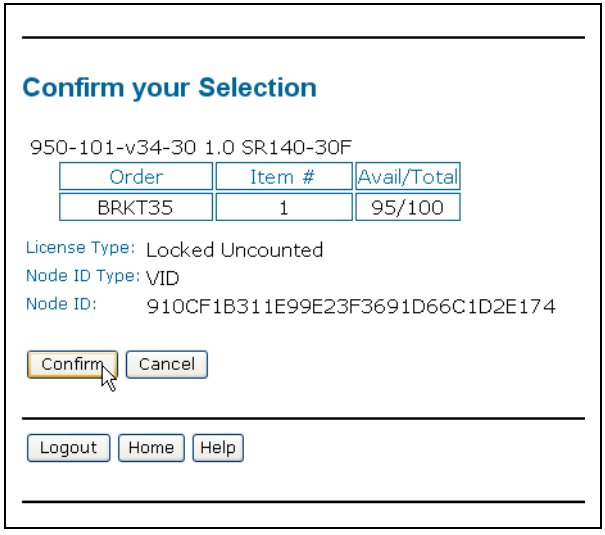
3. Click Generate Licenses. The following screen appears.



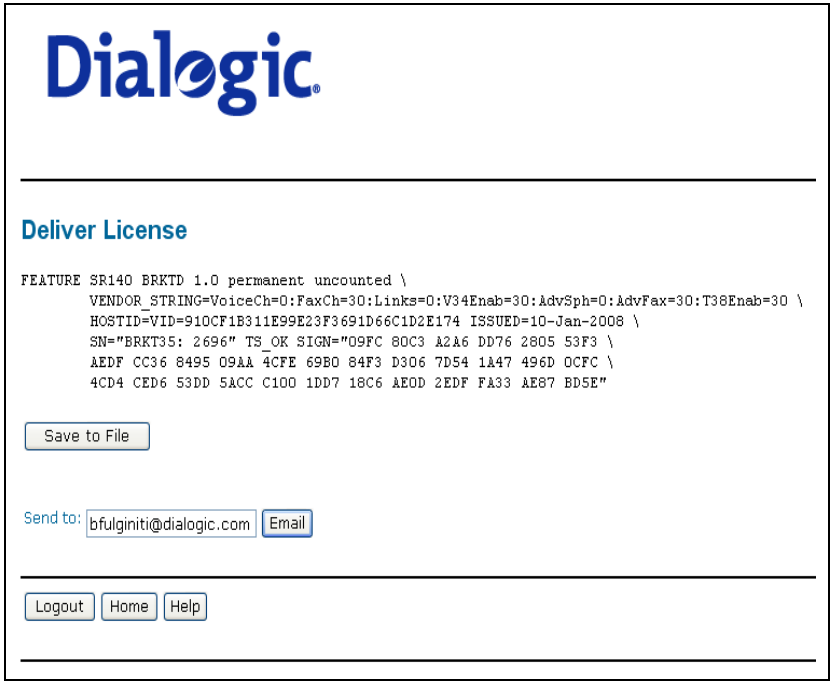
4. Select the Product you are activating. Select the Node ID Type and enter the Node ID.



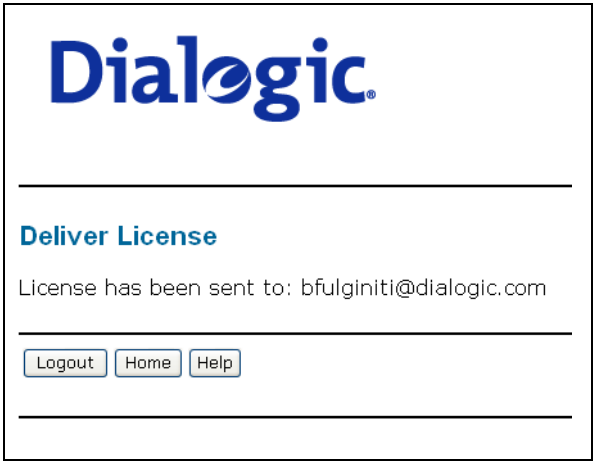
5. Click Generate License.



6. Verify that the information on this screen is correct and click Confirm. The following screen appears.



7. Click Save to File or enter your email address and click Email to have the License emailed to you.
8. Follow the instructions ***Installing Licenses on page 36*** to install the license file.



Activating a License Using Email or Fax

When your system cannot support the previous options (for example, you have no Internet connections) you can activate your license by sending the information to Dialogic using email or fax.

Note: If you activate your license by email or fax, Dialogic will send you the license file in about one business day.

➢ *To activate a Brooktrout license by Email or Fax, follow the steps below:*

1. Create a Software License Request text file with the following information.
   - Node ID Type
   - Node ID
   - License Key
   - First Name
   - Last Name
   - Email
   - Phone
   - Company
   - Address
   - City
   - State
   - Zip
   - Country
   - Application
2. Email the saved file to activation@dialogic.com as an attachment, or fax this information to +1 781-433-2350 at the Dialogic License Activation Center for processing.
3. When you receive the license file from Dialogic, go to ***Installing Licenses on page 36*** to install it in the correct location. The following is a sample Software License Request file that you can use as a guide.

Figure 3-1 Sample Software License Request

```
Software License Request
Node Lock Type: VID
Node Lock: 910CF1B311E99E23F3691D66C1D2E174
License Key: brktxx-xxxxxx
First Name: Steve
Last Name: Boyle
Email: techsupport@dialogic.com
Phone: 781-292-3000
Company: Dialogic Corporation
Address: 15 Crawford St.
Address 2:
City: Needham
State: MA
Zip: 02494
Country: USA
Application: test
```

Note: A special demonstration license is available in either a single- or two-channel configuration that will run for a 30 day period. Contact your Dialogic sales representative to obtain this license.

Products with demonstration licenses run with limited functionality. Please note that only one demonstration license may be used at a time. Domonstration licenses have incoming and outgoing fax pages overlaid with a Demonstration watermark.

Installing Licenses

The following environment variable must be set to the directory where the license files are located.

```
BRKTD_LICENSE_FILE
```

You can set the environment variable to point to any directory. Place a copy of your license files in the directory that you have chosen. The licensing software will automatically use the licenses when required.

Managing License Files

The section contains the following instructions to manage the license files:

If you remove or add Ethernet network cards to your system, the license files may become invalid. To activate the products, re-host the licenses (see *Re-Hosting License Files on page 42*).

Naming License Files

All license files end with the ***.lic*** extension. One file can contain one or more licenses. The license file name is usually in either form:

dd-mmm-yyyy.lic

dd-mmm-yyyy-x.lic (next available number)

However, the license file name can be any file name with a ***.lic*** extension.

Backing Up Licenses

To back up licenses, copy all ****.lic*** files from the directory into a safe location. Copying the license files back to the same directory restores the licenses.

The path to the directory containing the license files can be found in the environment variable:
`BRKTD_LICENSE_FILE`

Removing Licenses

To remove a license follow the steps below. (You need to know the license serial number.)

1. You can find the path to ***.lic*** file in the environment variable:

   `BRKTD_LICENSE_FILE`

2. Open each ***.lic*** file until you find the file that includes the one with the serial number in it.
3. Delete the license containing that serial number.

   If there are no more entries in the ***.lic*** file, you can delete the file.

Replacing Lost or Unrecoverable Licenses

When a license is lost or not recoverable, get a new copy by going through the web activation process again. See ***Activating a License Using the Web on page 30***.

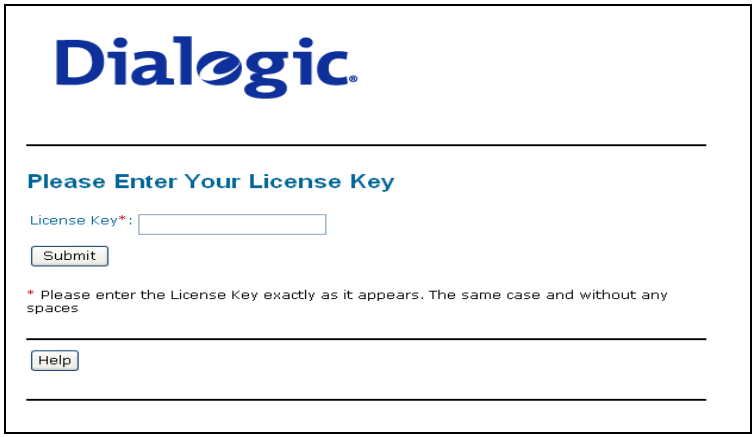
Re-Installing Your Product

If you want to simply re-install your product on the same computer system after upgrading or replacing your hard disk or any other upgrade that maintains the your network card's MAC address, you can use the same license file without having to re-activate your product.

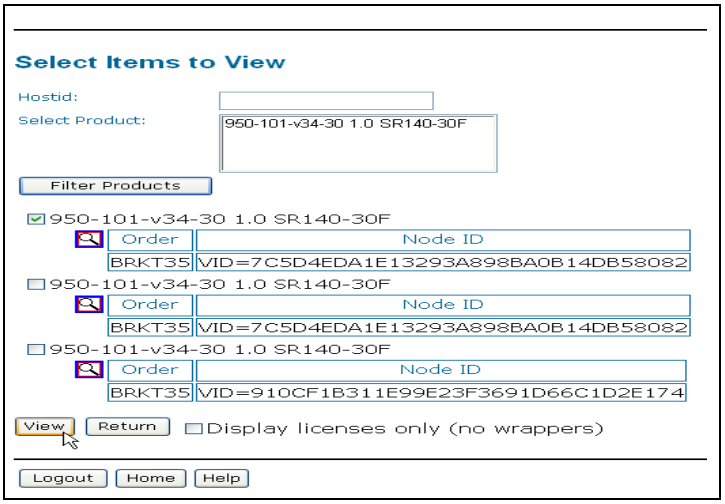
Restoring License Files

If anything ever happens to your computer that leads to corruption of your software and the License File, retrieving another copy is a simple procedure. To retrieve another copy of your License File, follow the steps below:

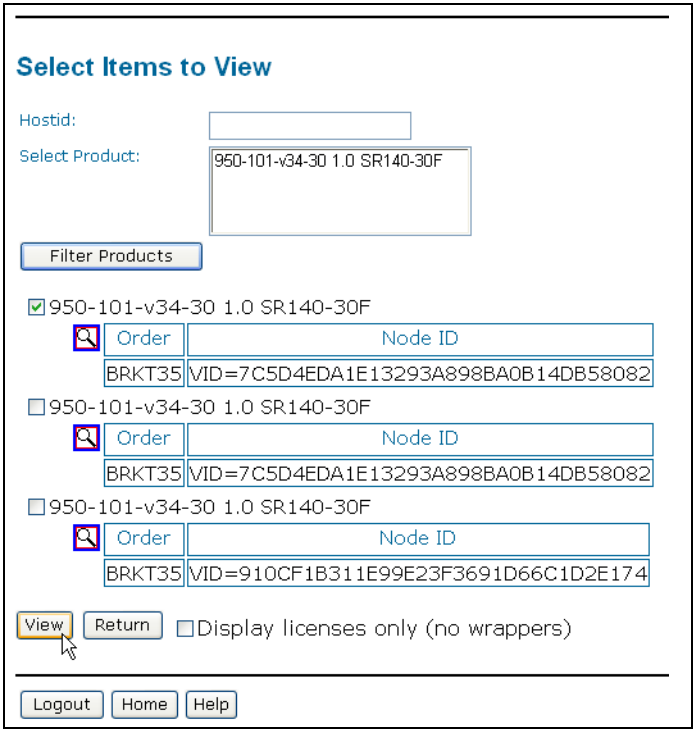
1. Visit the Dialogic activation website at: ***www.dialogic.com/activation***. The following screen appears.



2. Enter your original License Key (this can be found on your License Key certificate) and click Submit. The following screen appears.



3. Click View Licenses. The following screen appears.



4. In the Select Product window, select your product and then select the appropriate Node ID. Click View. The following screen appears.

5. Click Save to File or enter your email address and click Email to have the License emailed to you.
6. Follow the instructions ***Installing Licenses on page 36*** to install the license file.

Re-Hosting License Files

To allow you to upgrade your computer to a new system or recover from a network card failure, Dialogic allows you to "re-host" your licensed software from one computer system to another. This process involves returning your current license and receiving another one.

The activation center web site allows you to automatically re-host your licensed software one time without technical support. For subsequent re-hosts you will need to contact Dialogic Technical Services and Support.

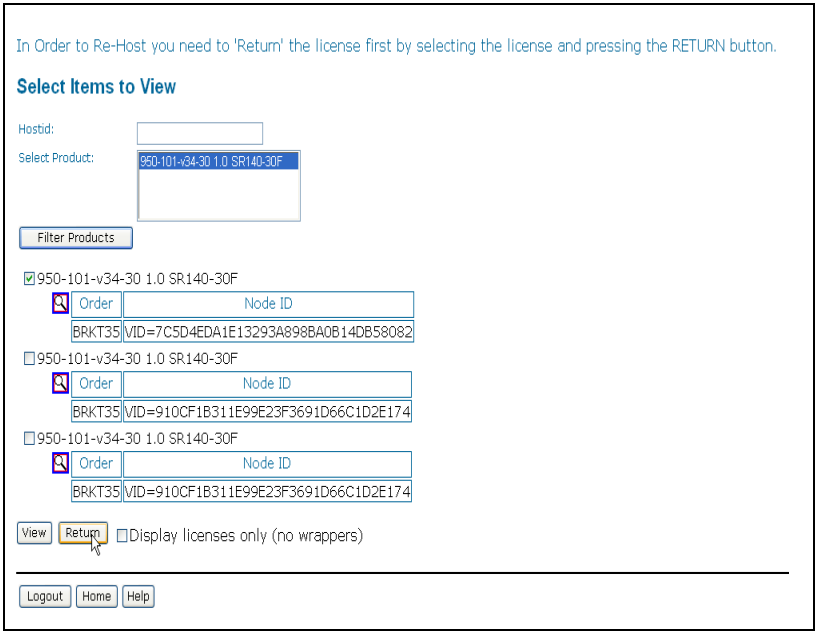
➢ *Follow the steps below:*

1. Visit the Dialogic activation website at:
   www.dialogic.com/activation

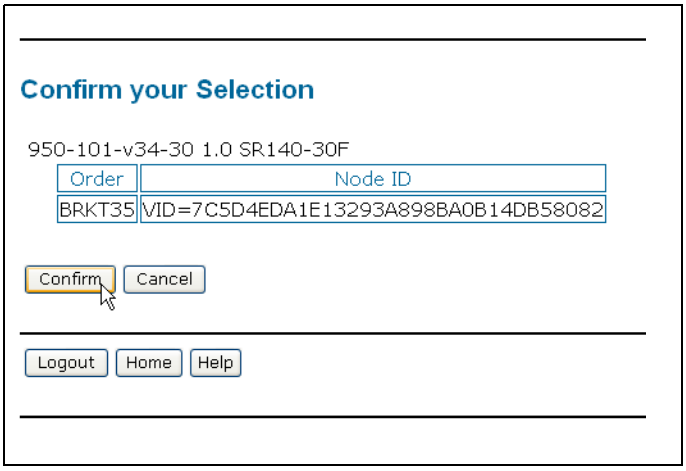
   The following screen appears.

2. Enter your original License Key (this can be found on your License Key certificate) and click Submit. The following screen appears

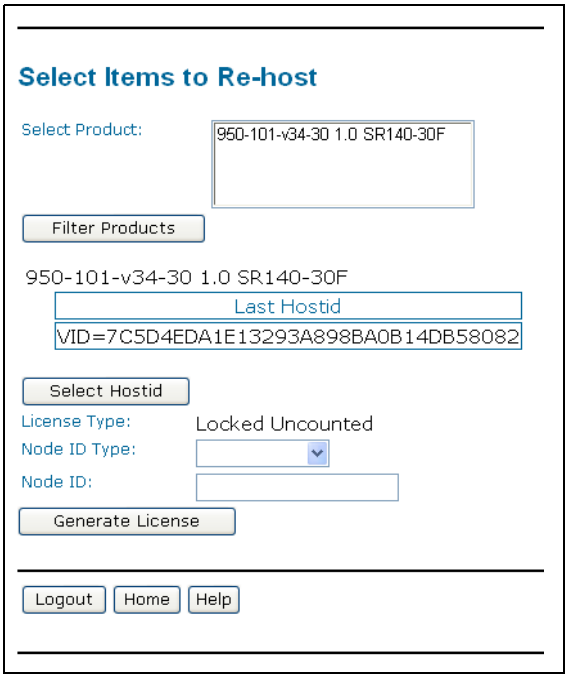
3. Click Re-host Licenses. The following screen appears.



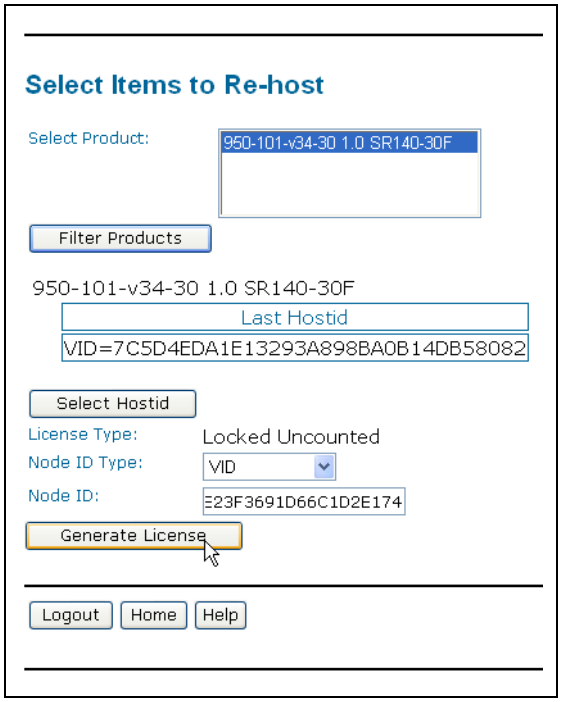
4. Select your product and click Return to return the license to Dialogic. The following screen appears.



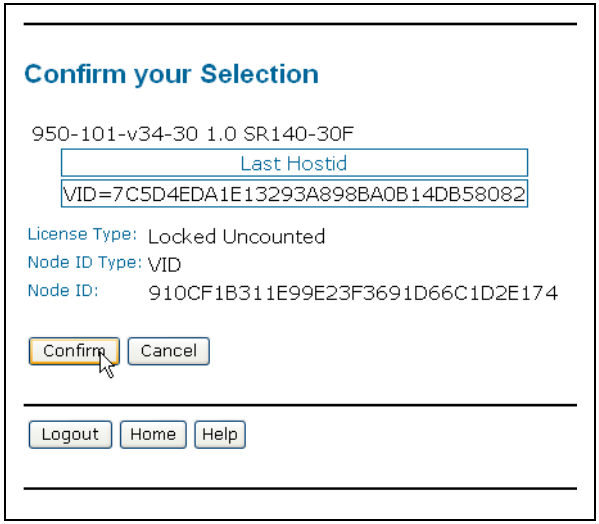
5. Verify that the information on this screen is correct and click Confirm. The following screen appears.



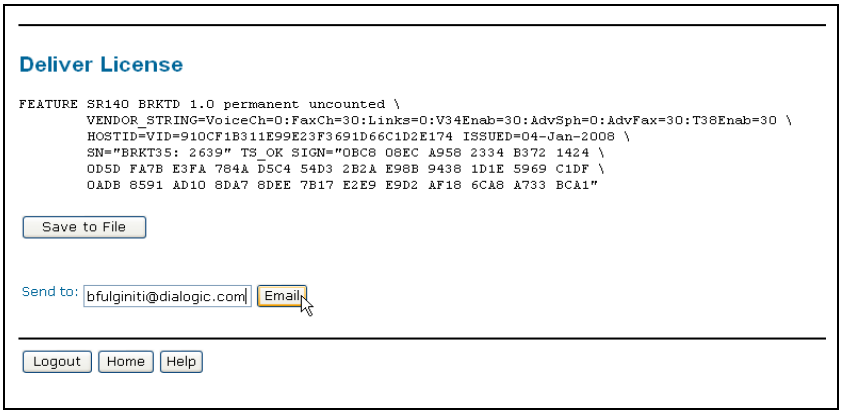
6. In the Select Product box click the product for which you are re-hosting. Select the Node ID Type and enter the Node ID. The Node ID Type must be VID (Vendor Defined Node ID).



7. Click Generate License. The following screen appears.



8. Click Confirm. The following license appears.



9. Click Save to File or enter your email address and click Email to have the License emailed to you.
10. Follow the instructions ***Installing Licenses on page 36*** to install the license file.

4 - Configuring Dialogic® Brooktrout® SR140 Fax Software and Dialogic® TR1034 Series/TruFax® Boards

This chapter describes how to configure the following products:

- Dialogic® Brooktrout® SR140 Fax Software
- Dialogic Brooktrout® TR1034 Series and Dialogic Brooktrout® TruFax® boards

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

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

However, this method has not been adapted by every ISV software package. Instead, when this method is not used by your ISV application, please skip this chapter and consult the documentation that comes with your ISV application.

User-Defined Configuration File

The user-defined configuration file is an ASCII file that contains parameters that set values such as specific fax formatting. The Bfv API supplies a default configuration file named ***btcall.cfg*** in the ***app.src*** directory. The programs in ***app.src*** use ***btcall.cfg***.

You can edit the ***btcall.cfg*** file with a standard text editor. Refer to the ***Dialogic®Brooktrout®Bfv APIs Reference Manual*** for detailed information.

The following are the bare minimum set of parameters that must be set on your configuration file.

```
call_control /usr/sys/brooktrout/boston/config/callctrl.cfg
bt_cparm /usr/sys/brooktrout/boston/config/BT_CPARM.CFG
```

The parameters are described below:

Parameter	Value
call_control	Specifies the name of the call control configuration file to use. The ***callctrl.cfg*** file replaces the ***teleph.cfg*** and ecc.cfg files. *Value Type*: character string *Default:* ***callctrl.cfg***

font_file

Specifies the name of the file that contains the transmit/convert font for ASCII. An optional font number, indicating the downloadable font to use, can be specified (if no font number is specified, 0 is assumed). The font file must be located in the current directory, or the correct path must be included with its name. The file is opened, and the contents downloaded to the module when BfvLineReset is called using the mill_load_fonts option. Multiple occurrences of font file parameters with different font numbers are permitted in the configuration file.

When a font number that is specified for ASCII conversion has not been downloaded, a default font is used. This is font 255. Font 255 may be specified using the font_file keyword. If not, it defaults to ibmpcps.fz8 (no path). When font downloads are done as described above, font 255 is always downloaded regardless of whether other font numbers are listed using this keyword.

Some font numbers may be reserved for preloaded fonts. Range for font number: 0 – 6,255

Value Type: character string; decimal can be included and is optional

Default: ibmpcps.fz8 (no path) and 0

bt_cparm

Specifies the path and name of the country telephony parameter file to use.

- *Value Type:* character string
- *Default:* ***BT_CPARM.CFG***

Call Control Configuration File

The call control configuration file is an ASCII file that contains configuration parameters for all telephony modules. The call_control parameter in the user-defined configuration file specifies the path and file name of the call control configuration file (the Bfv API uses ***callctrl.cfg*** as the default value). The ***callctrl.cfg*** file contains configurations for ISDN layer 1 and layer 2 regardless of the selected protocol.

You can edit the ***callctrl.cfg*** file with a standard text editor.

The following sections must be present in the call control configuration file to configure your Dialogic®Brooktrout® Products.

- Global
- Module
- Host Module

Refer to the ***Dialogic®Brooktrout® Bfv APIs Reference Manual*** for detailed information about the configuration parameters. Sample files to configure analog, BRI, DID, E1, T1, SIP, and H.323 are located in the default installation directory /usr/sys/brooktrout/config/samples.cfg.

Global

The following parameters affect operation of the entire call control and enable tracing. Specify these parameters at the beginning of your call control configuration file. Modified only under the direction of Dialogic Technical Services and Support.

```
l3l4_trace=verbose
l4l3_trace=verbose
api_trace=verbose
internal_trace=verbose
host_module_trace=verbose
ip_stack_trace=verbose
trace_file=ecc.log
max_trace_files=1
max_trace_file_size=10
```

Module

Defines the configuration of each module. Create a set for each TR1034, TruFax, and SR140 module installed in your system. If your system contains more than 120 SR140 channel. Create one SR140 module for each set of 120 channels.

Each module may contain one or more of the following sections:

- Global Module Parameters
- Clock Module Parameters
- Ethernet Module Parameters
- Host Call Control Module Parameters
- Port Module Parameters

Global Module Parameters

Set the following parameters to define configuration information that applies to the whole module [module.#]. The # represent the module id assigned to the hardware via the rotary switch. For SR140 number your modules starting at 41 hex.

The following are the bare minimum set of parameters that must be set on your configuration file.

```
[module.2]
  channels=30
  vb_firm=\usr\sys\brooktrout\boston\fw\bostvb.so
```

These parameters are described below:

Parameter	Value
channels	Specifies the number of channels on either a hardware or virtual module configured to receive a firmware download. **Note:** This parameter only applies when using the Boston Host Service (Bostsrv). If you use the service, you must start it before you start any applications (see your installation and configuration guide for instructions). 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. Set this parameter as follows: `0` Specifies downloading the firmware to the default value of the number of channels on the module. `1 – 1024` Specifies a value defining the number of channels on the module configured to receive a firmware download. *Range:* `1 – 1024` (not to exceed the maximum number of available channels on the module). *Value Type:* decimal *Default:* `0`

vb_firm Indicates that the module is a virtual module and specifies the file name of the shared library that contains the loadable firmware for the virtual module.

Note: This parameter only applies when using the Boston Host Service (Bostsrv). If you use the service, you must start it before you start any applications (see your installation and configuration guide for instructions).

Default: No default. Absence of the parameter indicates that the module is not a virtual module.

Clock Module Parameters

Set the following parameters to define configuration information that applies to a module's clock [module.#/clock_config]. The # represent the module id assigned to the hardware via the dip switch. The SR140 does not require this section.

Note: Set only for TR1034 and TR1034-N (IP capable) models. TR1034 non IP models and TruFax do not use these configuration parameters.

The following are the bare minimum set of parameters that must be set on your configuration file.

```
[module.2/clock_config]
  clock_mode=master
  clock_source=trunka
```

These parameters are described below:

Parameter **Value**

clock_mode Specifies a value that determines whether the module drives the clock on the CT bus or receives its clocking from the CT bus. Set this parameter to:

`MASTER`	Configures the module to drive the clock on the CT bus.
`SLAVE`	Configures the module to receive clocking from the CT bus.

Default: `MASTER`

clock_source

Specifies the source of the clock used to drive the CT bus. Set this parameter only if you set the value for ***clock_mode*** to `master`. The module derives its clock from:

`Internal`	The internal oscillator.
`TrunkA`	The network trunk, port A.
`TrunkB`	The network trunk, port B.
`TrunkC`	The network trunk, port C.
`TrunkD`	The network trunk, port D.
`TrunkE`	The network trunk, port E.
`TrunkF`	The network trunk, port F.
`TrunkG`	The network trunk, port G.
`TrunkH`	The network trunk, port H.
`Netref1`	The H.100/H.110 network reference (1) clock.
`Netref2`	The H.100/H.110 network reference (2) clock.
`clock_a`	The H.100/H.110 A clock.
`clock_b`	The H.100/H.110 B clock.

Default: `TrunkA`

Note: If you configure a port as `inactive` and inadvertently select it as the ***clock_source***, the system cannot operate.

Ethernet Module Parameters

Set the following parameters to define configuration information that applies to a module's ethernet port [module.#/ethernet.1]. The # represent the module id assigned to the hardware via the dip switch. For SR140 number your modules starting at 41 hex.

Note: Set only for SR140 and TR1034, TruFax does not use these configuration parameters.

The following are the bare minimum set of parameters that must be set on your configuration file.

- SR140

```
[module.41/ethernet.1]
  ip_preference=ipv4_only
  ip_interface=eth0
  ip_interfaceV6=
  media_port_min=56000
```

```
  media_port_max=56999
```

- TR1034-N

```
[module.2/ethernet.1]
  ip_address=0.0.0.0
  ip_netmask=0.0.0.0
  ip_gateway=0.0.0.0
  ip_broadcast=0.0.0.0
  media_port_min=56000
  media_port_max=56999
```

The parameters are described below:

Parameter	Value
ip_address	Specifies the IP address of the module's Ethernet interface. Set this parameter only if you set the value in the ***dhcp*** parameter to DISABLED.
	xxx.xxx.xxx.xxx — Configures the Ethernet interface to use the specified IP address.
	Value Type: dotted decimal
	Default: None
	Note: The Dialogic® Brooktrout® module does not support the domain naming system (DNS) data base. Your application has the responsibility of converting domain names into resolved dotted-decimal notation IP addresses.
ip_broadcast	Specifies the IP broadcast address of the module's Ethernet interface. Set this parameter to:
	xxx.xxx.xxx.xxx — Configures the Ethernet interface to use the specified broadcast address.
	Value Type: dotted decimal
	Default: None
ip_gateway	Specifies the gateway address of the module's Ethernet interface. Set this parameter to:
	xxx.xxx.xxx.xxx — Configures the Ethernet interface to use the specified gateway address.
	Value Type: dotted decimal
	Default: None

Parameter	Value

ip_interface	Specifies the identity of the device on the PC with the IP interface that the virtual module can use for sending IP messages.
	Note: This parameter applies only to the SR140.
	Set the value of this parameter to the name of any device in the PC with an IP interface. If you do not provide a value (blank string), the virtual module chooses the first interface in the PC to send its messages.
	Note: The format for the value provided by this parameter is operating system dependent.
	The Windows® format for the value provided in this parameter is:
	■ The name of the IP device (Global Unique IDentifier (GUID)) followed by
	■ A colon (:) character followed by
	■ The index number of the device's IP address
	For example:
	`{4D36E96E-E325-11CE-BFC1-08002BE10318}:0`
	The Linux format is the ethernet device name.
	For example:
	`ip_interface=eth0`
	Value Type: character string (up to 256 characters)
	Default: `<blank>` (the virtual module uses the first interface in the PC for sending IP messages)

ip_netmask	Specifies the netmask address of the module's Ethernet interface. Set this parameter only if you set the value in the ***dhcp*** parameter to `DISABLED`. `xxx.xxx.xxx.xxx` Configures the Ethernet interface to use the specified netmask address. *Value Type:* dotted decimal *Default:* `0.0.0.0`

Parameter	Value
ip_preference	Specifies the IP family preference that should be used by the virtual module for sending IP messages. The following are the allowable parameter values: ipv4_only — Only IPv4 supported ipv6_only — Only IPv6 supported ipv4_preferred — IPv4 and IPv6 both supported. For outbound SIP calls, the specific IP family type used for the IP messages sent by the virtual module will be determined by the SIP Call Control stack. ipv6_preferred — IPv4 and IPv6 both supported. For outbound SIP calls, the specific IP family type used for the IP messages sent by the virtual module will be determined by the SIP Call Control stack. *Value Type*: character string *Default*: ipv4_only
media_port_max	Specifies the highest IP port number that the module can use. Set this value to a value 1000 above the value specified for the ***media_port_min*** parameter. 57000 — Sets this value as the highest port number. *Range:* 2024 – 65535 *Value Type:* decimal *Default:* 57000
media_port_min	Specifies the lowest IP port number that the module can use for media transmissions. Set this value to a value 1000 below the value specified for the ***media_port_max*** parameter. 56000 — Sets this value as the lowest port number. *Range:* 1024 – 64535 *Value Type:* decimal *Default:* 56000

Host Call Control Module Parameters

Set the following parameters to configuration the module to use a specific ip stack [module.#/host_cc.1]. The # represent the module id assigned to the hardware via the dip switch. For SR140 number your modules starting at 41 hex. Each IP stack is configured using a host module [host_module.y].

Note: Set only for SR140 and TR1034, TruFax does not use these configuration parameters.

The following are the bare minimum set of parameters that must be set on your configuration file.

```
[module.41/host_cc.1]
  host_module=1
  number_of_channels=120
```

The parameters are described below:

Parameter	Value
host_module	Specifies the number that identifies the IP call control stack that the module can use. Set this parameter to match the `host_module` number identifier associated with the third party IP call control stack the module can use. Valid values are: *Range:* `1 – 9` *Value Type:* decimal *Default:* `1`
number_of_channels	Specifies the number of channels enabled to use the specified stack. This number must not exceed the number of available channels on the module. The Bfv API allocates the first available channels on the module to this stack. When the module can use multiple stacks, the Bfv API maps the channels to the stacks in the order that the stacks appear in the configuration file. If you configure a module to use telephony ports and an IP call control stack, the Bfv API allocates channels to the telephony interface first. *Range:* `1 – 1024` (not to exceed the maximum number of available channels on the module) *Value Type:* decimal *Default:* `1`

Port Module Parameters

Set the following parameters to configure the module to use a specific port type [module.#/port.y]. The # represent the module id assigned to the hardware via the dip switch.

Note: Set only for TR1034 and TruFax. The SR140 does not use these configuration parameters.

Specific the configuration parameters for the following protocols and line interfaces:

- Analog Direct Inward Dialing (DID)
- Analog Loop Start
- ISDN Basic Rate Interface (BRI)
- E1 ISDN Primary Rate Interface (PRI)
- E1 CAS
- E1 CAS R2
- E1 and T1 QSIG
- T1 ISDN Primary Rate Interface (PRI)
- T1 Robbed Bit Signaling (RBS)

Refer to the Dialogic®Brooktrout® Bfv APIs Reference Manual for detailed information about the configuration parameters. Sample files to configure the port are located in the default installation directory /usr/sys/brooktrout/config/samples.cfg.

The following are the bare minimum set of parameters that must be set on your configuration file.

```
[module.2/port.1]
  port_config=T1_ROBBED_BIT
  protocol_file=/usr/sys/brooktrout/boston/config/winkstart.lec
  did_timeout=5
  max_did_digits=0
  num_rings=2
```

The parameters are described below:

Parameter	Value
port_config	Specifies one of the following values that defines the CT bus or line type to configure for the port.

INACTIVE	Disabled port
ANALOG	Analog Loop Start line
ANALOG_DID	Analog Direct Inward Dialing (DID) line
BRI	Basic Rate Interface
E1_ISDN	E1 ISDN
E1_CAS	E1 CAS
E1_R2_CAS	E1 CAS R2
E1_DPNSS	E1 DPNSS (not supported in this release)
E1_QSIG	E1 QSIG
T1_QSIG	T1 QSIG
T1_ISDN	T1 ISDN
T1_ROBBED_BIT	T1 RBS

Default: INACTIVE

Note: Any port defined as INACTIVE completes configuration requirements for the port. The configuration-specific parameters do not apply to inactive or disabled ports.

protocol_file

Specifies the full path and name of the protocol file to load for the E1 CAS port. Most of the time a path should be used for this file name. Set this parameter to:

fxo_groundstart.lec

fxo_loopstart.lec

fxs_groundstart.lec

fxs_loopstart.lec

Default: fxs_loopstart.lec

did_timeout

Specifies a value that defines the maximum timeout allowed before processing the call after assuming receipt of the last DID digit. Set this parameter to:

0	Indicates no waiting time.
1 – 20	Specifies the number of seconds to allow after receiving the last DID digit before processing the call.
Unit:	second
Range:	0 through 20
Default:	10 (used when the Bfv API does not find another value for this parameter)

Parameter	Value
max_did_digits	Specifies a value that defines the maximum number of DID digits to expect before accepting an incoming call. Set this parameter to: `0` Disables waiting for DID digits. `1 – 255` Specifies the number of digits to expect before accepting an incoming call. *Range:* `0` through `255` *Default:* `0` **Note:** The system can report all of the DID digits it received from the network to the application even if the number of received DID digits exceeds the number specified for ***max_did_digits***. To remove the excess digits, set the ***did_offset*** parameter so that the system only passes the expected number of digits to the application.
num_rings	Specifies a value that defines the number of rings the system must detect before the system reports a new incoming call to the application. Set this parameter to: *Range:* `1` to `255` *Default:* `2` **Note:** In North America and some other locations, the system sends the caller ID signal between the first and second rings. To detect the caller ID correctly, you must set the ***num_rings*** parameter to a value of 2 or greater to prevent the system from reporting the call to the application before the caller ID has been sent by the Central Office.

Host Module

Defines the configuration of each host module [host_module.y]. Create a host module for each IP stack installed your system; SIP or H.323. The # represent the host module id starting at index 1.

Note: Set only for SR140 and TR1034-N (IP-capable) models. TR1034 non-IP models and TruFax do not use these configuration parameters.

Each host module may contain one or more of the following sections:

- Global Host Module Parameters
- Stack Host Module Parameters
- T.38 Host Module Parameters
- RTP Host Module Parameters

Global Host Module Parameters

Set the following parameters to define configuration information that applies to the whole host module [host_module.#]. The # represent the host module id starting at index 1.

The following are the bare minimum set of parameters that must be set on your configuration file.

```
[host_module.1]
  module_library=/usr/lib/brktsip_mt.so
```

The parameters are described below:

Parameter **Value**

module_library

Specifies the full path and file name of the third party IP call control stack. The Bfv API attempts to load this library dynamically. Set this parameter to:

`FULLPATH` Contains the full path to the named library containing the third party IP call control stack.

Value Type: character string
Default: None

Stack Host Module Parameters

Set the following parameters to configure the host module to use a specific IP Stack values [host_module.x/parameters]. The # represent the host module id starting at index 1.

The following are the bare minimum set of parameters that must be set on your configuration file.

- SIP

```
[host_module.1/parameters]
  # Automatic routing to a Gateway or IP-PBX
  sip_default_gateway=

  # Dynamic routing by a Proxy server
  sip_proxy_server1=

  # Registering with a SIP Registrar
  sip_registration_server1=
  sip_registration_server1_aor=
  sip_registration_server1_username=
  sip_registration_server1_password=
  sip_registration_server1_expires=3600
  sip_registration_interval=60
  sip_registration_interval_delta=5

  # Local preferences
  sip_max_sessions=256
  sip_From=Anonymous<sip:no_from_info@anonymous.invalid>
  sip_Contact=0.0.0.0:0
  sip_ContactV6=
  sip_ip_preference=ipv4_only
  sip_ip_interface=
  sip_ip_interfaceV6=
  sip_ip_interface_port=5060
  sip_ip_interface_portV6=5060
```

- H.323

```
[host_module.1/parameters]
  # Automatic routing to a Gateway or IP-PBX
  h323_default_gateway=0.0.0.0:0

  # Registering with a Gatekeeper
  h323_register=0
```

```
h323_gatekeeper_id=
h323_gatekeeper_ip_address=0.0.0.0:0
h323_support_alternate_gk=1
h323_e164alias=
h323_h323IDalias=

# Local preferences
h323_max_sessions=256
h323_local_ip_address=0.0.0.0:0
h323_ip_interface=
h323_ip_interface_port=1720
h323_h245Tunneling=1
h323_FastStart=1
h323_H245Stage=3
```

Parameter	Description
sip_contact	Indicates the value provided in the SIP header for the ***Contact*** parameter. The ***Contact*** parameter contains a SIP uniform resource identifier (URI) or SIPS (secure SIP) URI that defines the address of the sender. When this parameter is set to its default value (`sip_Contact=0.0.0.0:0`), the SIP stack automatically attempts to find the IP address of the local host during initialization. If the host has not registered its host name, the SIP initialization process will fail and SIP calls will not be processed. To process SIP calls in this case, the value in the ***sip_Contact*** parameter must be specifically set to an IP address of one of the host network interface boards. When set, this parameter must contain an IP address in the form: `xxx.xxx.xxx.xxx:PortNumber` (port number is optional) `10.128.22.6:5060` (port number specified) `10.128.22.6` (no port number specified) **Note:** For the SIP protocol, the port defaults to 5060 if not specified. *Range:* `0 – 255` for each dotted decimal position of the IP address. 1 – 65535 for the port number *Value Type:* dotted decimal *Default:* `0.0.0.0:0` (system uses the IP address of the local host and port 5060)

Parameter	Description
sip_default_gateway	Indicates the IP address of a default gateway to use for outbound calls. If a user only specifies a phone number when making a SIP call and the application is not using a SIP proxy server, the Bfv API forwards the call to the gateway specified with this parameter. The Bfv API forwards the specified phone number to the gateway for routing purposes. When set, this parameter must contain an IP address in the form: `xxx.xxx.xxx.xxx:PortNumber` (port number is optional) `10.128.22.6:5060` (port number specified) `10.128.22.6` (no port number specified) **Note:** For the SIP protocol, the port defaults to 5060 if not specified. *Range:* `0` – `255` for each dotted decimal position of the IP address. 1 – 65535 for the port number *Value Type:* dotted decimal *Default:* `0.0.0.0:0` (no default gateway defined) **Note:** The Bfv API does not use this parameter if the configuration file specifies a ***sip_registration_server*** or ***sip_proxy_server*** (see ***page 67***).
sip_from	Indicates the value provided in the SIP header for the ***From*** parameter. The ***From*** parameter contains a display name and a SIP uniform resource identifier (URI) or SIPS (secure SIP) URI that identifies the originator of the session request. *Range:* `1` – `255` characters *Value Type:* character string (up to 256 characters) *Default:* `"Anonymous <sip:no_from_info@ anonymous.invalid>"`
sip_max_sessions	Indicates the maximum number of concurrent session initiation protocol (SIP) call control sessions. Set this value to a number that at least doubles the number of channels in the system because the system can be tearing down a call while processing the next call. *Range:* `1` through `1000` *Value Type:* decimal *Default:* `256`

Parameter	Description
sip_proxy_server1 ***sip_proxy_server2*** ***sip_proxy_server3*** ***sip_proxy_server4***	Indicates the address (IPv4 or IPv6) of the specified SIP proxy server. The user can define a maximum of 4 proxy servers. `DHCP` — Causes the system to use the SIP DNS server locator capability to discover the domain name of the SIP proxy server. Domain name — Indicates the name or IP address of the proxy server. *Range:* 1 – 4 proxy servers specifying any valid domain name (for example, **`www.my_sip_server.com, 192.168.1.45, or [2000::201:1ef])`** *Value Type:* character string (up to 256 characters) *Default:* `<blank>` (empty string indicating no proxy server defined) **Note:** Do not use the `DHCP` value. It is reserved for future use.
sip_registration_server1 ***sip_registration_server2*** ***sip_registration_server3*** ***sip_registration_server4***	Indicates the address of the specified SIP registration server. The user can define a maximum of 4 registration servers. `DHCP` — Causes the system to use the SIP DNS server locator capability to discover the domain name of the SIP registration server. Domain name — Indicates the name or IP address of the registration server (up to 256 characters). *Range:* 1 – 4 registration servers specifying any valid domain name (for example, `www.my_registration_server.com` or `192.168.1.45`) *Value Type:* character string (up to 256 characters) *Default:* `<blank>` (empty string indicating no registration server defined) **Note:** Do not use the `DHCP` value. It is reserved for future use.

Key Name	Description
h323_default_gateway	Indicates the IP address of a default gateway to use for outbound calls. If a user only specifies a phone number when making an H.323 call and the application is not using an H.323 gatekeeper, the Bfv API forwards the call to the gateway specified with this parameter. The Bfv API forwards the specified phone number to the gateway for routing purposes. When set, this parameter must contain an IP address in the form: `xxx.xxx.xxx.xxx:PortNumber` (Port number is optional) *Examples* `10.128.22.6:1720` (port number specified) `10.128.22.6` (no port number specified) **Note:** For the H.323 protocol, the port defaults to 1720 if not specified. *Range:* `0` – `255` for each dotted decimal position of the IP address. 1 – 65535 for the port number *Value Type:* dotted decimal *Default:* `0.0.0.0:0` **Note:** The Bfv API does not use this parameter if the configuration file specifies a value of 1 for the ***h323_register*** parameter (see ***page 70***).

h323_e164alias	Specifies the E.164 alias of the H.323 terminal. The system uses this alias during gatekeeper registration and call establishment. The alias identifies the phone number of the H.323 terminal.
	You can specify multiple aliases, each starting on a new line using the same parameter name. For example:
	`h323_e164alias 123456`
	`h323_e164alias 4084839648`
	`h323_e164alias 5102987468`
	`h323_e164alias 9627842899`
	When you specify multiple values, the system registers every value with the gatekeeper.
	Range: `1` – `128` characters (each)
	Value Type: character string restricted to numbers 0 through 9 and the star (*) and pound (#) symbols
	Default: `<blank>`

Key Name	Description
h323_gatekeeper_id	Specifies the ID of the H.323 gatekeeper that the H.323 terminal expects to find during the gatekeeper discovery routine. If you do not set this parameter, the H.323 terminal attempts to register with the first gatekeeper it finds. `<blank>` Uses the first gatekeeper the H.323 terminal locates. *Value Type:* Unicode character string (up to 256 characters) *Default:* `<blank>`
h323_gatekeeper_ip_address ***h323_gatekeeper_ip_address2*** ***h323_gatekeeper_ip_address3*** ***h323_gatekeeper_ip_address4*** ***h323_gatekeeper_ip_address5*** ***h323_gatekeeper_ip_address6***	Specifies the IP address of up to six H.323 gatekeepers that receive the registration request from the H.323 terminal. When set to the default value (0.0.0.0:0), the H.323 terminal performs a multicast gatekeeper discovery routine to find the gatekeeper using port number 1719. `xxx.xxx.xxx.xxx` Configures the system to use the specified H.323 gatekeeper. Set the gatekeeper IP address in the form: `xxx.xxx.xxx.xxx:PortNumber` `0.0.0.0:0` Configures the system to use a multicast process to discover the H.323 gatekeeper using port number 1719. *Range:* `0` – `255` for each dotted decimal position of the IP address. 1 – 65535 for the port number *Value Type:* dotted decimal *Default:* `0.0.0.0:0` (uses multicast discovery process and port number 1719)

h323_h323IDalias	Specifies the H.323 ID of the H.323 terminal. The system uses this alias during gatekeeper registration and call establishment. The alias identifies the name of the H.323 terminal.
	You can specify multiple aliases, each starting on a new line using the same parameter name. For example:
	`h323_h323IDalias andrew`
	`h323_h323IDalias bob`
	`h323_h323IDalias charles`
	`h323_h323IDalias david`
	When you specify multiple values, the system registers every value with the gatekeeper.
	Range: Up to 256 characters (each)
	Value Type: Unicode character string
	Default: `<blank>`

Key Name	Description
h323_local_ip_address	Specifies the transport address of the H.323 terminal. The transport address can be an IP address or a combination of the IP address and the port number that the H.323 call control stack uses. When set to the default value (0.0.0.0:0), the system uses the IP address of the first Ethernet module in the system and port number 1720. Valid values are: `xxx.xxx.xxx.xxx` — Configures the system to use the specified IP address for H.323 calls. Set the transport address in the form: `xxx.xxx.xxx.xxx:PortNumber` `0.0.0.0:0` — Configures the system to use the address of the first Ethernet module and port number 1720. *Range:* `0` – `255` for each dotted decimal position of the IP address. 1 – 65535 for the port number *Value Type:* dotted decimal *Default:* `0.0.0.0:0` (uses first Ethernet module and port number `1720`)
h323_max_sessions	Indicates the maximum number of concurrent H.323 calls that the host module can support at one time. Set this value to a number that at least doubles the number of channels in the system because the system can be tearing down a call while processing the next call. *Range:* `1` through `65535` (inclusive) *Value Type:* decimal *Default:* `256`
h323_register	Specifies an integer value that determines whether to register with an H.323 gatekeeper. `0` — Does not register with an H.323 gatekeeper. `1` — Registers with an H.323 gatekeeper. *Value Type:* integer *Default:* `0`

Key Name	Description
h323_support_ alternate_gk	Specifies whether to support alternate gatekeepers. The gatekeeper receiving the registration request from the H.323 terminal must also support alternate gatekeepers. When the H.323 terminal sends a registration request to its primary gatekeeper, the primary gatekeeper sends the H.323 terminal a list of alternate gatekeepers that it knows about. If, for some reason, the H.323 terminal can no longer communicate with its primary gatekeeper, it goes through this list of alternate gatekeepers and attempts to register with one of them. When the system does not support alternate gatekeepers and the H.323 terminal can no longer communicate with its primary gatekeeper, the H.323 terminal goes through the multicast gatekeeper discovery routine to find an available gatekeeper. `0` Does not support alternate gatekeepers. `1` Supports alternate gatekeepers when necessary. *Value Type:* integer *Default:* `0`
h323_FastStart	Determines outbound H.323 fast start call setup. The following are the allowable parameter values: 0 Outbound calls use H.323 slow start call setup. 1 Outbound calls use H.323 fast start call setup. *Value type:* integer *Default:* 1

Key Name	Description
h323_h245Stage	The stage at which the local endpoint is allowed to transfer the H.245 address to the remote endpoint. This parameter is in effect when H.245 tunneling is disabled. Refer to the h323_h245Tunneling parameter. The following are the allowable parameter values: 0 Earliest H.245 possible can send and act on addresses in all messages. 1 Can send the address in the Call Proceeding message. 2 Can send the address in only the Alerting message. 3 Wait for the Connect message. 4 Early H.245 send addresses in Setup and Connect messages only. 5 No automatic sending of the address. 6 No support for H.245 and the NoH245 Facility message is sent. *Value type:* integer *Default:* 5

T.38 Host Module Parameters

Set the following parameters to configure the host module to use specific T.38 values [host_module.x/t38parameters]. The # represent the host module id starting at index 1.

The following are the bare minimum set of parameters that must be set on your configuration file.

```
[host_module.1/t38parameters]
  fax_transport_protocol=t38_only
  rtp_ced_enable=true
  # Configure V.17
  t38_max_bit_rate=14400
  t38_fax_version=0

  # Configure V.34. Note not all gateways, IP-PBX, or SIP
Proxies support this feature
  t38_max_bit_rate=33600
  t38_fax_version=3
```

The the parameters are described below:

Parameter	Value
fax_transport_protocol	Specifies the method for transporting fax media.
	t38_never — Fax will use G.711 pass-through only.
	t38_only — Fax will use T.38 only and the call will fail if T.38 cannot be negotiated.
	t38_first — Fax will attempt T.38 and fall back to G.711 pass-through if T.38 cannot be negotiated.
	Value Type: Character string *Default:* t38_only

Parameter	Value

rtp_ced_enable	Specifies whether to play the CED/ANSam tone for inbound IP calls. If set to true, channels will generate CED/ANSam tone using the RTP protocol for SIP and H.323 fax calls which do not immediately start as a T.38 fax call. If set to false, the CED/ANSam tone is not generated.
	`FALSE` `CED/ANSam tone is not generated`
	`TRUE` `Channels generate CED/ANSam tone`
	Value Type: Boolean
	Default: `TRUE`
	
	Note: Setting this parameter to true can cause some gateways to attempt an RTP fax rather than a T.38 fax.

t38_fax_version	Controls the maximum T.38 ASN.1 version the IP Call Control offers or accepts from a remote party. Versions 0, 1, 2 support a maximum bit rate of 14,400 bps. Version 3 supports V.34 and the following are the possible bit rates: 33,600 (default), 31,200, 28,800, 26,400, 24,000, 21,600, 16,800 *Unit:* not applicable *Range:* 0,1,2,3 *Value Type:* decimal *Default:* 3

Parameter	Value
t38_max_bit_rate	Specifies a value that defines the maximum bit rate for fax packetization onto the network. Set this parameter to:
	`2400` Represents the maximum bit rate that can be negotiated for fax packetization.
	`4800` Represents the maximum bit rate that can be negotiated for fax packetization.
	`7200` Represents the maximum bit rate that can be negotiated for fax packetization.
	`9600` Represents the maximum bit rate that can be negotiated for fax packetization.
	`12000` Represents the maximum bit rate that can be negotiated for fax packetization.
	`14400` Represents the maximum bit rate that can be negotiated for fax packetization.
	`16800` Represents the maximum bit rate that can be negotiated for fax packetization.
	`19200` Represents the maximum bit rate that can be negotiated for fax packetization.
	`21600` Represents the maximum bit rate that can be negotiated for fax packetization.
	`24000` Represents the maximum bit rate that can be negotiated for fax packetization.
	`26400` Represents the maximum bit rate that can be negotiated for fax packetization.
	`28800` Represents the maximum bit rate that can be negotiated for fax packetization.
	`31200` Represents the maximum bit rate that can be negotiated for fax packetization.
	`33600` Represents the maximum bit rate that can be negotiated for fax packetization.
	Unit: bits per second
	Range: `2400, 4800, 7200, 9600, 12000, 14400, 16800 19200, 21600, 24000, 26400, 28800, 31200, 33600`
	Value Type: decimal
	Default: `14400 if T38 Fax Version is 0, 1 33600 if T38 Fax Version is 2, 3 (See t38_fax_version above.)`

RTP Host Module Parameters

Set the following parameters to configure the host module to use specific RTP values [host_module.x/rtp]. The # represent the host module id starting at index 1.

The following are the bare minimum set of parameters that must be set on your configuration file.

```
[host_module.1/rtp]
  rtp_codec=pcmu pcma
  rtp_frame_duration=20
  t38_offer_as_ced=true
```

The parameters are described below:

Parameter	Value
rtp_codec	Defines the codecs supported and codec order offered to a remote device during call negotiation. This parameter may be set to only one codec and the top most instance is given the highest order of priority. For example, rtp_codec=PCMU followed by rtp_codec=PCMA on the next line will offer both codecs but PCMU will be the preferred one. *Unit*: none *Range:* PCMU, PCMA *Value Type:* nul-terminated case insensitive string *Default:* PCMU followed by PCMA
rtp_frame_duration	Specifies the duration of outbound RTP packets in multiple of 10ms. SR140 virtual modules do not support outbound 10ms packets. *Unit*: ms *Range:* 10 - 30 *Value Type:* decimal *Default:* 20
t38_offer_as_ced	Specifies whether to generate a CED detected event when receiving a T.38 offer. A T.38 offer is a SIP re-Invite or H.323 requestMode message indicating an IP endpoint wishes to switch the IP call to T.38. This allows applications performing call progress to detect the T.38 offer and transition to fax. false - Don't send CED tone detected. true - Send CED tone detected. *Value Type*: Boolean *Default:* TRUE

Example of Call Control Configuration Files (*callctrl.cfg*)

This section provides example settings in a call control configuration file for the Single Virtual Module, Single Stack configuration:

```
[module.41]
# This parameter should be modified to point to the correct location of the
# bostvb.so
    vb_firm=/usr/sys/brooktrout/boston/fw/bostvb.so
# This parameter should be set to the number of channels licensed for the
# SR140 product
    channels=4


[module.41/ethernet.1]
    ip_interface=
    media_port_min=56000
    media_port_max=57000
[module.41/host_cc.1]
    host_module=1
    number_of_channels=4
[host_module.1]
    module_library=brktsip_mt.so
    enabled=true
[host_module.1/t38parameters]
    t38_fax_rate_management=transferredTCF
    t38_fax_version=0
    t38_max_bit_rate=14400
    t38_fax_udp_ec=t38UDPRedundancy
    media_renegotiate_delay_inbound=4000
    media_renegotiate_delay_outbound=-1
    t38_fax_fill_bit_removal=false
    t38_fax_transcoding_jbig=false
    t38_fax_transcoding_mmr=false
    t38_t30_fastnotify=true
    t38_UDPTL_redundancy_depth_control=5
    t38_UDPTL_redundancy_depth_image=2

[host_module.1/rtp]
   rtp_frame_duration=20
   rtp_jitter_buffer_depth=100
   rtp_silence_control=inband
   rtp_type_of_service=0
   rtp_voice_frame_replacement=0
   rtp_codec=pcmu
   rtp_codec=pcma
```

```
[host_module.1/parameters]
    sip_Contact=0.0.0.0:0
    sip_description_URI=http:www.dialogic.com
    sip_default_gateway=0.0.0.0:0
    sip_email=
    sip_From=from@brooktrout.com
    sip_Max-Forwards=70
    sip_max_sessions=256
    sip_phone=+1-4085551212
    sip_proxy_server1=
    sip_proxy_server2=
    sip_proxy_server3=
    sip_registration_interval=60
    sip_registration_server1=
    sip_registration_server2=
    sip_registration_server3=
    sip_session_description=description_brooktrout
    sip_session_name=session_brooktrout
    sip_username=brooktrout
```

5 - Testing Dialogic® Brooktrout® SR140 Software and TR1034/TruFax® Boards

Dialogic includes a large collection of sample application programs and utilities with the Dialogic®Brooktrout® Software.

The source code for the sample applications is located in the installation directory, from the default directory it would be ***/usr/sys/Brooktrout/boston/bfv.api/app.src***
or
/usr/sys/brooktrout/boston/bfv.api/bapp.src depending on the sample.

Samples use a configuration file ***btcall.cfg*** which needs to be configure and present in the same location as the executable.

The following sample applications allow you to test your setup.

- modinfo
- feature
- tfax

If you do not have access to these sample applications you can request them from your software supplier.

modinfo

The modinfo program is located in the ***bapp.src*** directory. This program queries the system for installed modules and shows the ordinals or channels assigned to the module.

Command Syntax

```
modinfo [-p] [-c] [-s] [-h] [-H] [-a] [mod]
```

Arguments

```
  -p = list PCI configuration information
  -c = list firmware config options
  -s = list cPCI slot and CPU information
  -h = list hardware resource info
  -H = list hardware info reported by FW
  -a = all previous options
```

If the driver has been started successfully, this program will display the module's information. The ordinals or channel indexes will be assigned when the Boston Host Service is started.

```
[bapp.src]# ./modinfo
01: not hw;   1 chan.
02: hw;   1 chan; ordinals    none; bus type PCI; hw type
0046; hw ID 2017734.
```

If the driver and Boston Host Service have been started successfully, this program will display the module's information and ordinals that have been assigned. The following is a sample output showing ordinals 0-29 as the channel numbers that can be used with this module.

```
[bapp.src]# ./modinfo
01: not hw;   1 chan.
02: hw;  31 chans; ordinals   0- 29; bus type PCI; hw type
0046; hw ID 2017734.
FE: not hw;   3 chans.
```

If the driver has not been installed or started successfully, this program will display the following error.

```
[bapp.src]# ./modinfo
BfvModuleInfo: Misc error: Driver open failed - invalid
channel/driver incorrectly installed.
```

feature

The feature program is located in the ***bapp.src*** directory. This program queries the installed modules for the features like number of fax and voice channels and the type of port. Use only the -q action to query the modules features.

Command Syntax

```
feature [-m mod] [-v] <action>
```

Arguments

```
  -m mod  Apply action to specified module (dflt 2)
  -v      Enable API debug mode
```

Actions

```
  -q = Query loaded feature set
```

If the driver has been started successfully, this program will display the module's information. The following is a sample output shows a TR1034 E1 with 30 channels of voice and fax. Use this information to create your ***callctrl.cfg*** file.

```
[bapp.src]# ./feature -q
Feature: Version = 1
Feature: VendorId = BT
Feature: SerialN = 23500968
Feature: MACAddr1 = 00-A0-8A-01-00-6F
Feature: MACAddr2 = 00-00-00-00-00-00
Feature: PartNum = 80100952
Feature: PartRev = 00
Feature: FtrLockM = T
Feature: ShipNum = 90100052
Feature: ShipRev = 00
Feature: VoiceCh = 30
Feature: FaxCh = 30
Feature: Links = 1
Feature: V34Enab = T
Feature: T38Enab = T
Feature: FaxPass = T
```

```
Feature: TIMEnab = F
Feature: PktSess = 0
Feature: AdvFax = T
Feature: AdvSph = F
Feature: Product = TR1034
Feature: PCBusTyp = 0
Feature: Port = E1
Feature: 2ndPort = None
Feature: 2ndLinks = 0
Feature: Exclusiv = 0
Feature: MaxMods = 0
Feature: RestUse = 0
Feature: AltVceC = 0
Feature: AltFaxC = 0
```

If the driver has not been installed or started successfully or the module number is invalid, this program will display the following error.

```
[bapp.src]# ./feature -q
Specified module (2) doesn't exist.
```

tfax

The tfax program is located in the ***app.src*** directory. This program uses the low-level TIFF-F file fax sending and receiving routines to send and receive facsimiles.

Use the -v option to turn on the Bfv API debug from the command line. This will aid Dialogic Technical Services and Support with troubleshooting.

Command Syntax

```
tfax [-u <unitno>] [-v] -s <phoneno> <tiff_file>
```

or

```
tfax [-u <unitno>] [-v] -r <tiff_file>
```

Arguments

```
-r                Receive mode.
-s <phoneno>      Send mode.
<tiff_file>       Name of the file to send or receive.
```

```
-u <unitno>        Channel number.
-v                 Turn on Bfv API debug mode.
```

If the driver has not been installed or started successfully, this program will display the following error.

```
[app.src]# ./tfax -r a.tif
BfvLineAttach: Misc error: Driver open failed - invalid
channel/driver incorrectly installed.
```

6 - Dialogic® Brooktrout® SR140 Software and TR1034/TruFax® Specifications

Fax

- ITU T.30; ITU T.38; IETF RTP; Group 3
- ASN.1 (2002)
- V.17, V.29, V.27ter, V.21, V.34 modulation
- Up to 33.6 Kbps with auto fallback
- Normal and fine resolution: 1200x1200
- MH, MR, MMR compression
- Transparent image conversion
- A4, A3 and B4 page sizes with scaling
- A4 and B4 TIFF F file widths
- Enhanced ASCII conversion support with headers
- Error Correction Mode (ECM)
- Line error detection/repeat good line
- G.711 pass-through

RTP

- G.711 20ms and 30ms Packets

Voice

- Prompt Playback
- Prompt Record
- Playback Gain Control
- Inbound and Outbound Silence Suppression
- Dynamic Range Control
- High Frequency Preemphasis

Signal Generation/Detection

- G.711 Single Frequency Tone Generation
- G.711 DTMF Tone Generation
- G.711 DTMF Tone Detection
- Adaptive Call Progress Analysis

System Requirements

Minimum System Requirements

The minimum system requirements for running any number of SR140 channels is a Pentium P4 2.66 GHz with 512MB RAM. Refer to the ***System Configurations*** section of the ***Dialogic® Brooktrout® Release Notes*** for a table describing the CPU utilization for this and other system types.

Supported and Tested Devices for Interoperability

For the latest listing of Dialogic® Brooktrout® FoIP interoperability information refer to the following site:

http://www.dialogic.com/interoperability/fax.htm

This list includes the following hardware devices (and their respective software revisions) that have been tested for interoperability with the SR140 Fax Software:

- IP PBX
- Gateways
- Other devices

Telephony Requirements

- *Physical*: Ethernet 10/100
- *Media* T.38, RTP v2, G.711
- *Call Control:*
  - *IP:* H.323, SIP
  - *PSTN*: Analog, DID, BRI, T1, E1

Supported Operating Systems

A supported operating system is one for which the SR140 Fax Software has been designed and tested.

- Red Hat Enterprise Linux AS/ES 4.0 (2.6.9-5.EL)
- Red Hat Enterprise Linux ES 5.0 (2.6.18-8.el5)
- Red Hat Enterprise Linux 6.0

Application Programming Interface

- Dialogic® Brooktrout® Fax and Voice (BFV)