TEXAS INSTRUMENTS

User's Guide
SWRU136–November 2007

HCITester User's Guide

This document describes the configuration and use of the HCITester software tool for Texas Instruments' wireless Bluetooth® devices (BRF6150/BRF6300/BRF6350 and BL6450). Specifically, this document reviews how to send and receive scripts and data, and discusses how to control the device sleep mode.

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1 About HCITester

HCITester is a software tool that enables Host-Controller interface (HCI) testing capabilities for these TI Bluetooth devices:

- BRF6150
- BRF6300
- BRF6350
- BL6450

The HCITester enables these capabilities:

- Sending HCI scripts using HCI commands and events
- Sending and receiving asynchronous, connectionless (ACL) data
- Automatic control of the device sleep mode

2 HCI Tester Features

This section summarizes the features of the HCITester software.

2.1 General Requirements

Install the software on a personal computer (PC) that meets these minimum system requirements:

- Microsoft Windows® 2000 operating system or newer
- Pentium® 233-MHz processor or faster
- 64 MB of RAM
- Hard disk drive with at least 100-MB free space
- CD drive
- Available COM port

To install the software, insert the CD into the CD drive (for example, the *D* drive on your system). Follow the on-screen instructions to complete the software installation process.

Once the software is installed, double-click the HCITester icon (see Figure 1) to start the program. The software initializes, and displays the screen shown in Figure 2.

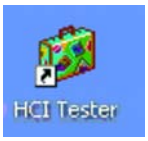

Figure 1. HCITester Desktop Icon

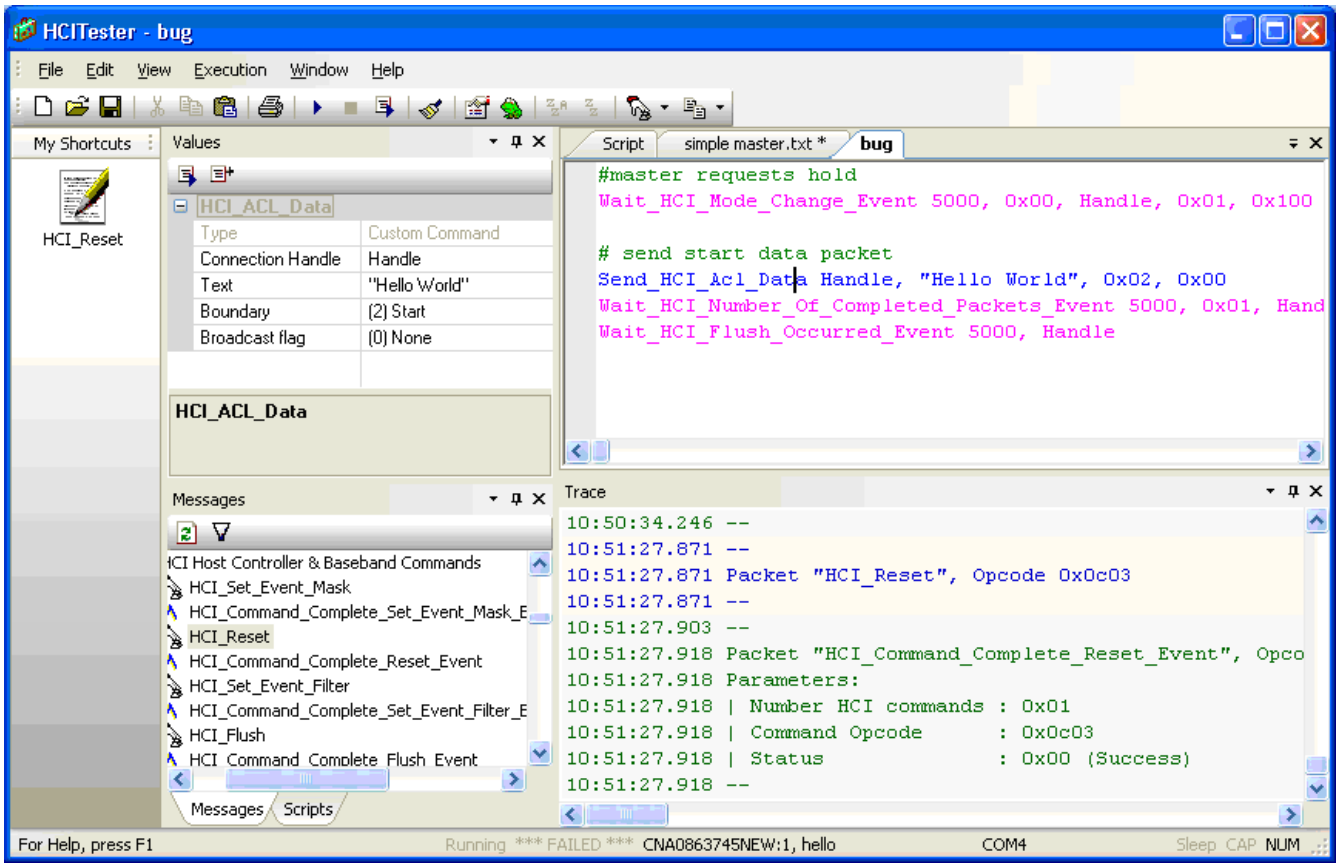

Figure 2. HCITester Interface Screen

2.2 Main Interface Screen Overview

Figure 3 illustrates the areas and functions (that is, the panes) of the HCITester interface screen.

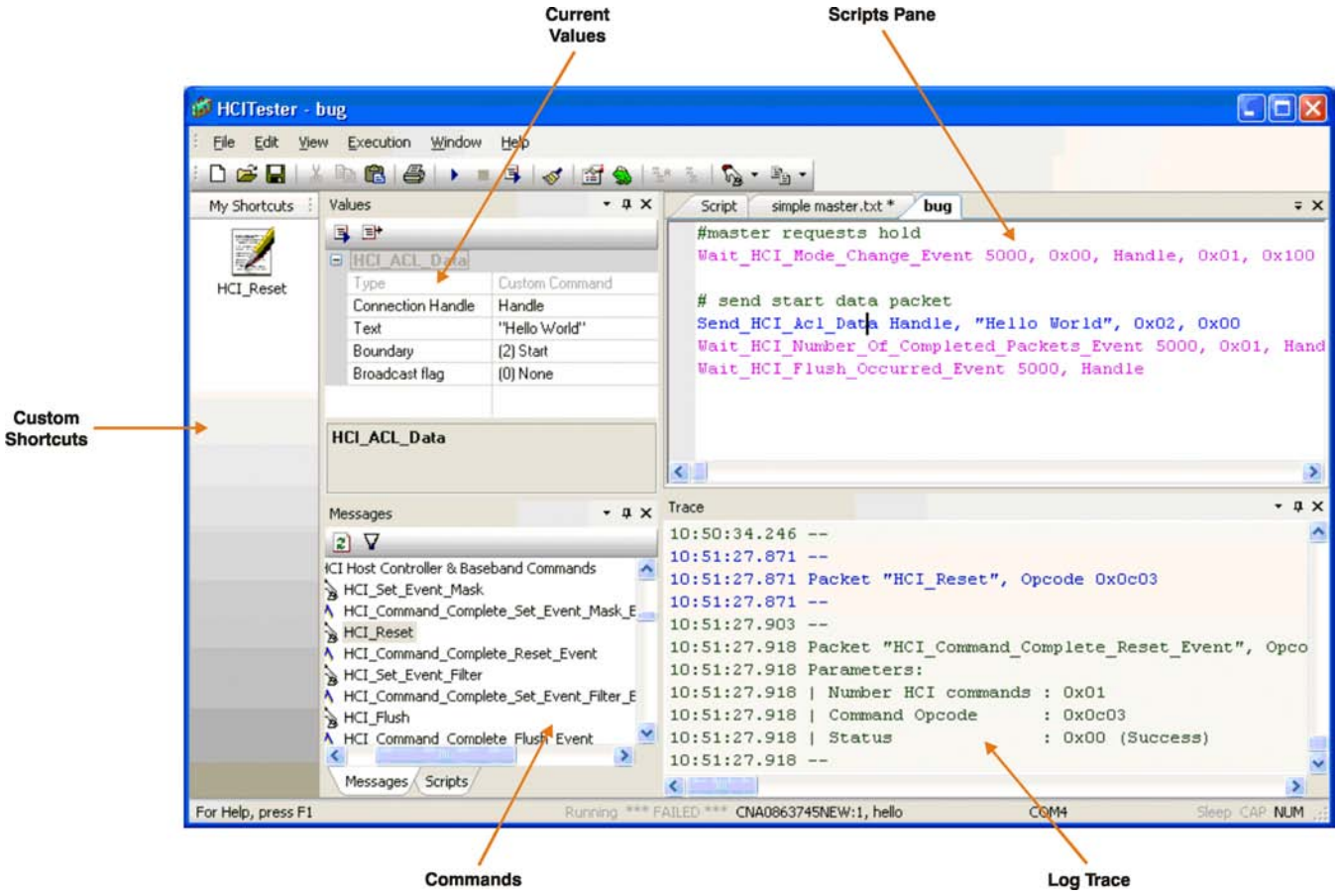

Figure 3. HCITester Main Screen

2.3 ToolBar and Main Menus

2.3.1 Menu Bar and Toolbar

The menu bar and toolbar are shown in Figure 4. Table 1 summarizes the program commands and functions available through the icons in the toolbar.

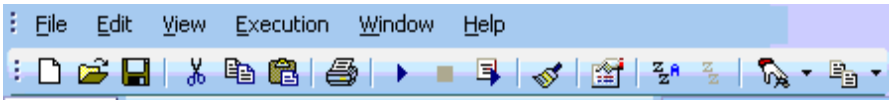

Figure 4. HCITester Menu Bar and Toolbar

Table 1. HCITester Menu Icons

Icon		Description
	New script	Opens a new script in the Scripts pane.
	Open script	Opens a new screen for browsing through files on the PC.
	Save script	Saves the active script.
	Cut	Cuts selected text to the clipboard.
	Copy	Copies selected text to the clipboard.
	Paste	Pastes selected text from the clipboard to the present cursor location.
	Print	Prints the active script or selection.
	Execute (run) script	Executes the active script.
	Stop executing script	Stops executing the active script.
	Run selected (part of script)	Executes a selected part of the active script.
	Clear trace	Clears the Trace pane display.
	Configure connections	Configures various display and command options.
	Automatically wake up device in sleep	Configures the HCITester software to automatically wake up the device from sleep mode.
	Device sleep	Puts the device into sleep mode.
	Execute: Execute most recent commands	Execute the most recent command.
	Load: Execute most recent scripts	Load and execute the most recent script.

2.3.2 Drop-Down Menus

2.3.2.1 File Commands

Figure 5 illustrates the File drop-down menu. File commands and operations are summarized in Table 2.

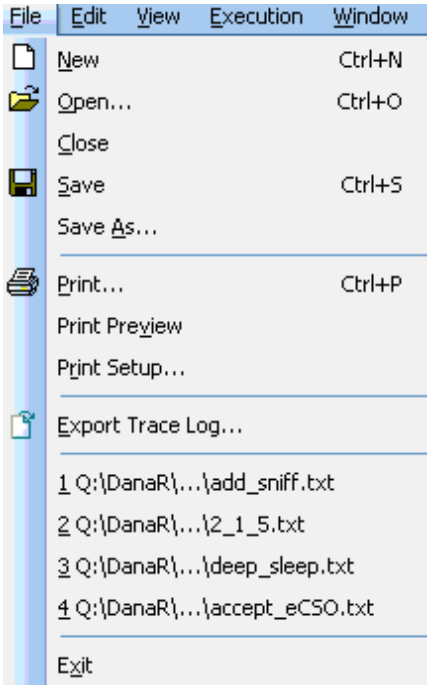

Figure 5. File Command Drop-Down Menu

Table 2. File Command Drop-Down Menu Options

Command	Description
New	CTRL+N Open a new file (script).
Open script	CTRL+O Open an existing (saved) script. This option opens a new screen for browsing through files on the PC.
Close	Close a currently open script.
Save	CTRL+S Save currently active script.
Save As	Save currently active script under a different name. This option opens a new screen for selecting a new name for and location to save the file.
Print	CTRL+P Prints the currently active script.
Print Preview	Previews the file to be printed.
Print Setup	This option opens a new screen for configuring printing options on the PC.
Export Trace Log	Export the Trace log as an HTML file. This option opens a new screen for selecting a new name of and location to export the file.
Exit	Exit the HCITester application.

2.3.2.2 Edit Commands

The Edit menu contains actions that relate to editing scripts. Figure 6 shows the Edit drop-down menu, while Table 3 lists the Edit commands and operations.

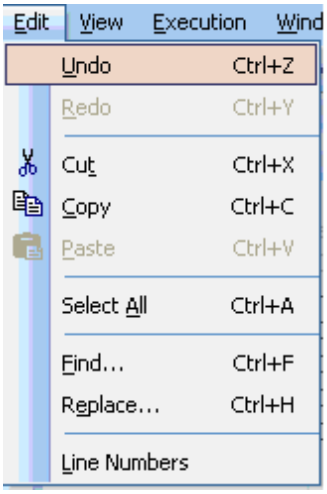

Figure 6. Edit Command Drop-Down Menu

Table 3. Edit Command Drop-Down Menu Options

Command	Description
Undo	CTRL+Z Undo last action.
Redo	Repeat last action.
Cut	CTRL+X Cut selected text.
Copy	CTRL+C Copy selected text to clipboard.
Paste	CTRL+V Paste selected text from clipboard.
Select All	CTRL+A Select all text in currently active script.
Find	CTRL+F Find selected text or item.
Replace	CTRL+H Replace selected text with new text.
Line Numbers	Add line numbers to the currently active script.

2.3.2.3 View Commands

The View menu contains commands related to how the HCITester software displays the currently active script file. Figure 7 illustrates the View menu. Table 4 describes the View commands and operations.

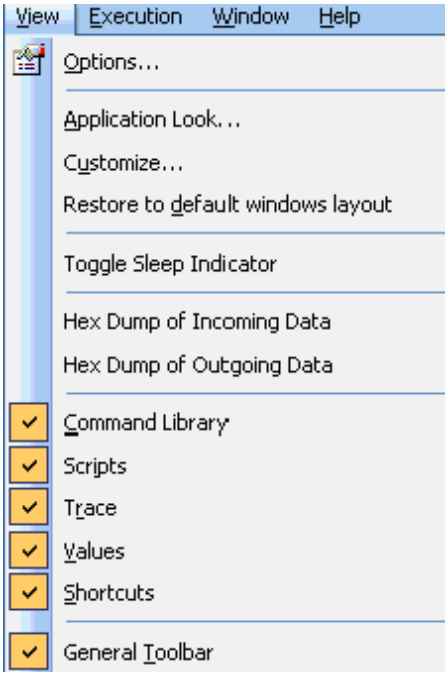

Figure 7. View Command Drop-Down Menu

Table 4. View Command Drop-Down Menu Options

Command	Description
Options	Triggers the Options screen (see Section 3).
Application Look	Enables selecting different looks for the HCITester according to the selection in the screen that is triggered.
Customize	Enables customization of the HCITester menus and buttons according to user-defined parameters.
Restore to default windows layout	Restore the program to the default view options (this option requires exiting and restarting the HCITester software).
Toggle Sleep Indicator	Toggle the sleep state of the connected Bluetooth device (same function as Device Sleep icon in toolbar)
Hex Dump of Incoming Data	Selecting this option enables a hex view of the incoming data from the Bluetooth device to the host
Hex Dump of Outgoing Data	Selecting this option enables a hex view of the outgoing data from the host to the Bluetooth device.
Command Library Scripts Trace Values Shortcuts General Toolbar	Display or hide specific panes in active window.

2.3.2.4 Window Commands

Figure 8 illustrates the Window drop-down menu. Window commands and options are shown in Table 5.

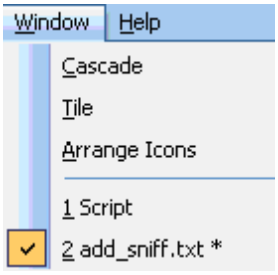

Figure 8. Window Command Drop-Down Menu

Table 5. Window Command Drop-Down Menu Options

Command	Description
Cascade	These commands are not enabled in the current release of the HCITester software.
Tile	
Arrange Icons	
1, 2, etc.	These markers indicate the active panes of the currently active HCITester session.

2.3.2.5 Help Commands

The Help menu contains an option for the user to read about the HCITester software (as shown in Figure 9).

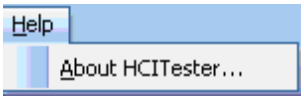

Figure 9. Help Command Drop-Down Menu

2.4 Command Library Pane

The Command Library pane, illustrated in Figure 10, contains a list of all the supported commands and events.

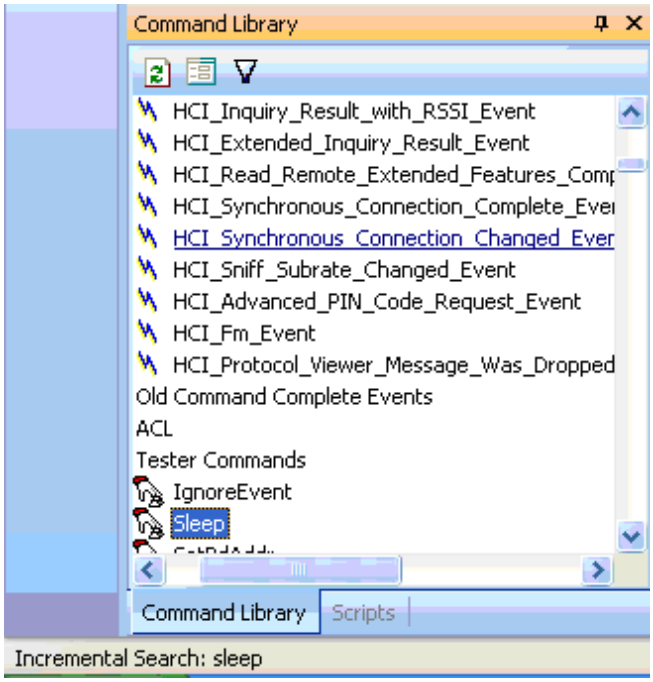

Figure 10. Command Library Pane

Search the Command Library with the incremental search function.

Incremental Search: Type a string of partial text to locate the desired command. Pressing the F3 function key searches forward and Shift+F3 searches back from the present location. (Refer to Section 4.2.1 for further information about the incremental search feature).

Hold down the CTRL key and double-click the left mouse button to add the command (along with any related commands) to the active script. Another option to add commands to the script is to use the right mouse button pop-up menu. (See Section 4.2.2.)

Table 6 summarizes the three Command Library icon controls.

Table 6. Command Library Icon Controls

Icon		Description
	Refresh	Refreshes the contents of the Command Library pane.
	Change	Changes the HCI Library. Use this button to change between different XMLs (refer to Section 3.6).
	Filter	Filters the contents of the Scripts pane. Pressing this icon invokes the Filter Options screen (see Figure 11).

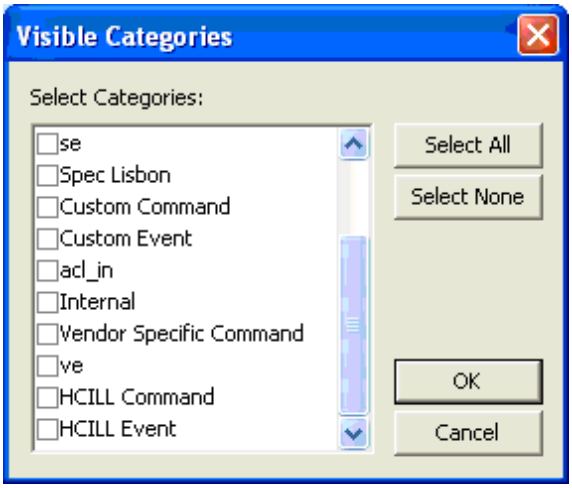

Figure 11. Filter Options Pop-Up Screen

2.5 Values Pane

The Values pane displays the values of the currently selected command. Figure 12 illustrates the Values pane.

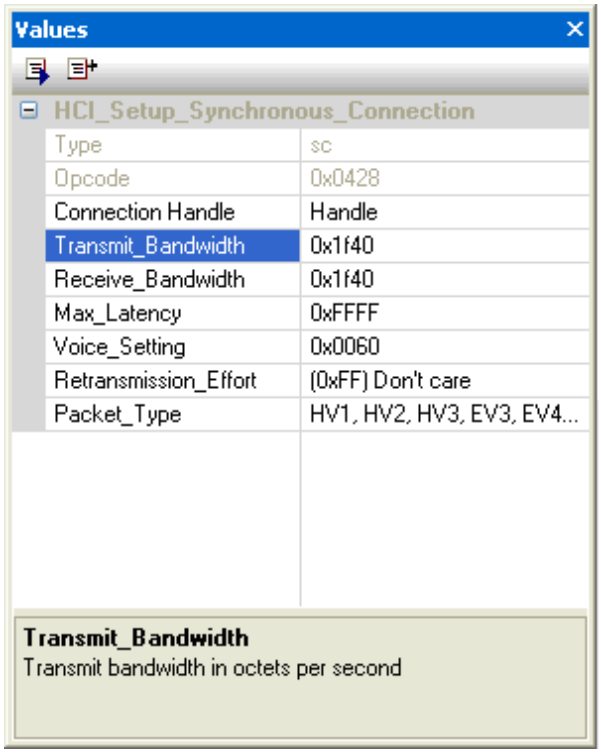

Figure 12. Values Pane

The Values pane either reflects the command selected in the Command Library pane or a selected line in the script Editor pane. When the Values pane shows a script line in the Editor, changing a value in the script also changes the script text.

Table 7 describes the Values pane icon controls.

Table 7. Values Pane Icon Controls

Icon	Description
Execute	CTRL+F5 Executes the listed command.
Add	Adds the listed command to the active script.

2.6 Scripts Pane

The Scripts pane contains all the script files from the chosen root file. Figure 13 illustrates the Scripts pane.

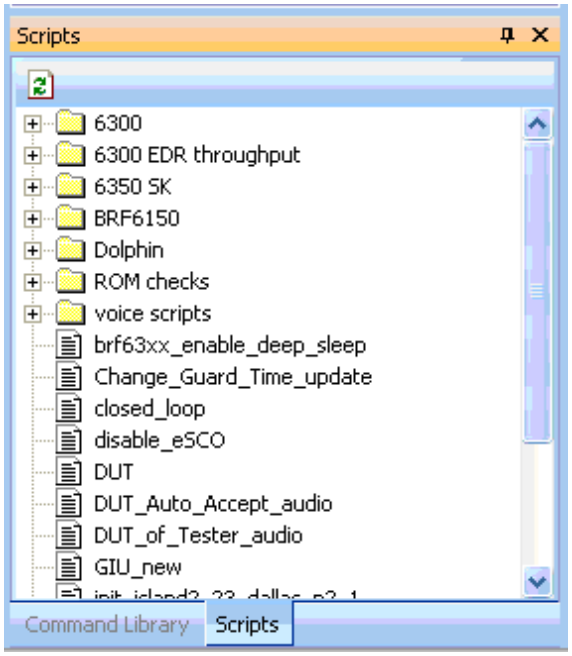

Figure 13. Scripts Pane

Search the Scripts pane with the incremental search function.

Incremental Search: Type a string of partial text to locate the desired script. Pressing the F3 function key searches forward and Shift+F3 searches back from the present location.

Table 8 describes the Scripts pane icon control.

Table 8. Scripts Pane Icon Control

Icon	Description
Refresh	Refreshes the contents of the Script pane.

The Scripts pane lists all the available scripts. The user can choose any script to be loaded, executed, and/or edited. By default, the list of HCITester scripts is empty after software installation. Follow these steps to view the list of available scripts:

Step 1. Create a shortcut to the HCITester program on the PC desktop.

Step 2. Right-click on the shortcut and select *Properties*.

Step 3. In the *Shortcut* tab, in the target line, add the following line:

"location_of _the_HCITester EXE file" -LibFile "location_of_the XML_file" -root "path_to_directory_of_your scripts"

For example:

"C:\Program Files\Texas Instruments\Wireless Tools\HCITester\hcitest20.exe" -LibFile "C:\Program Files\Texas Instruments\Wireless Tools\XML" -root "C:\HCI scripts"

Figure 14 shows the HCITester shortcut properties tab and the target line to direct the software to the Scripts and XML file paths.

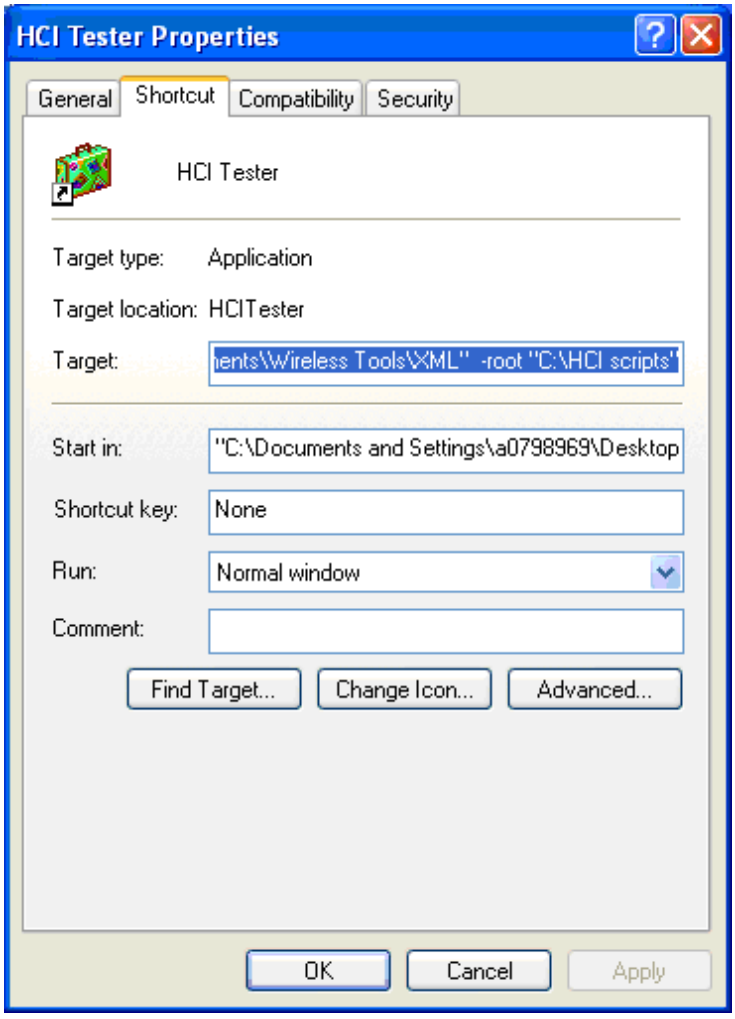

Figure 14. HCITester Shortcut

2.7 My Shortcuts Pane

My Shortcuts pane allows quick access to predefined script files and code fragments. Figure 15 illustrates this pane.

Figure 15. My Shortcuts Pane

To create a shortcut, follow these procedures:

- ***To create a shortcut to a script file:*** Drag the desired script from the Scripts pane or from the Explorer window to the Shortcuts pane.
- ***To create a shortcut to a code fragment:*** Drag the selected code in the Editor to the Shortcuts pane.

There are several commands available from the Shortcut pane.

- **Run and/or Load?:** Right-click and select *Edit*… to specify the desired behavior while clicking on this shortcut.
- **Display name:** Right-click and select *Edit*… to specify a customized label.
- **Right-Click menu:** Explicitly Run, Load, Delete or Edit the shortcut properties.
- **Shift + Click:** Run the selected shortcut.
- **CTRL+ Click:** Load the selected shortcut.

2.8 Edit Script (Script Editor) Pane

The Edit Script pane displays the currently loaded script to be executed. While a script is being executed, the executed line is highlighted at the bottom of the pane.

More than one script can be loaded into the script Editor Pane. Toggle between the scripts by selecting the tab of the desired script. Refer to Section 4.1 for further details regarding loading, editing, and executing scripts.

Figure 16 shows the Script Editor pane.

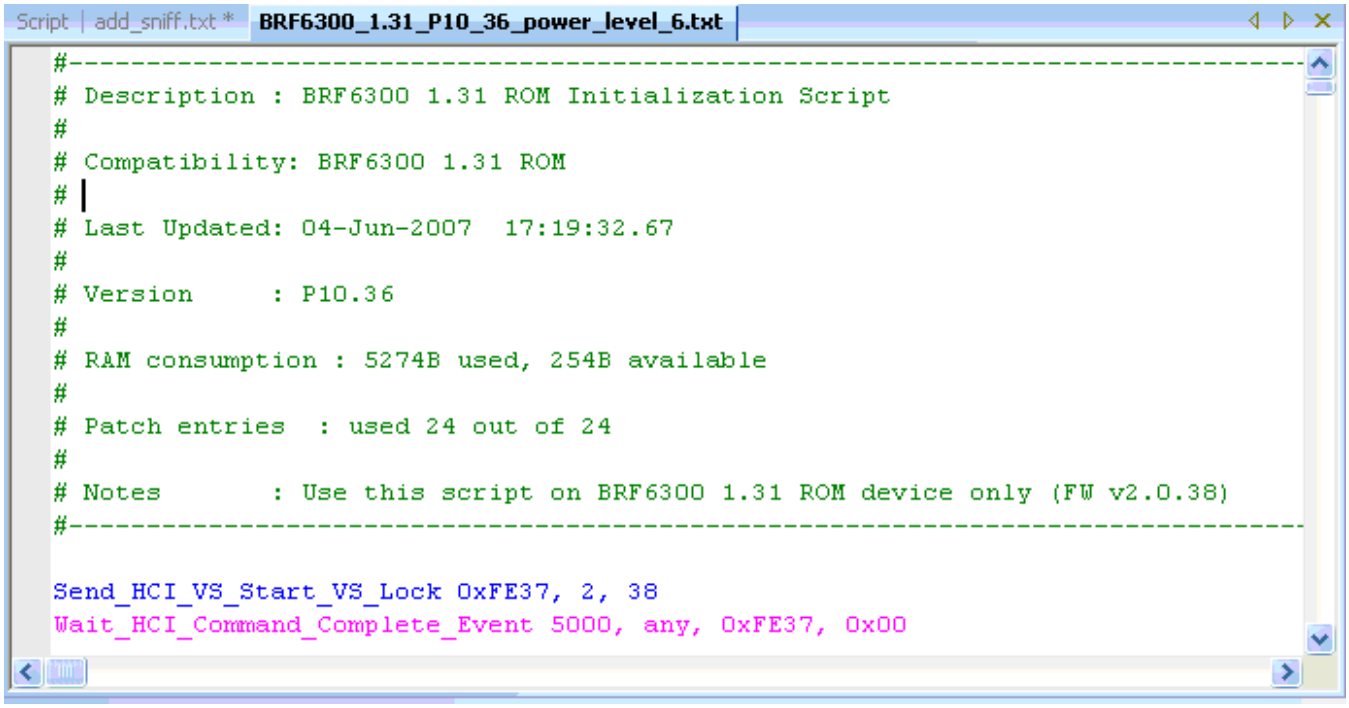

Figure 16. Script Editor

2.9 Trace Pane

The Trace pane displays the commands, events, and raw data communication of the HCITransport program. Figure 17 illustrates the Trace pane.

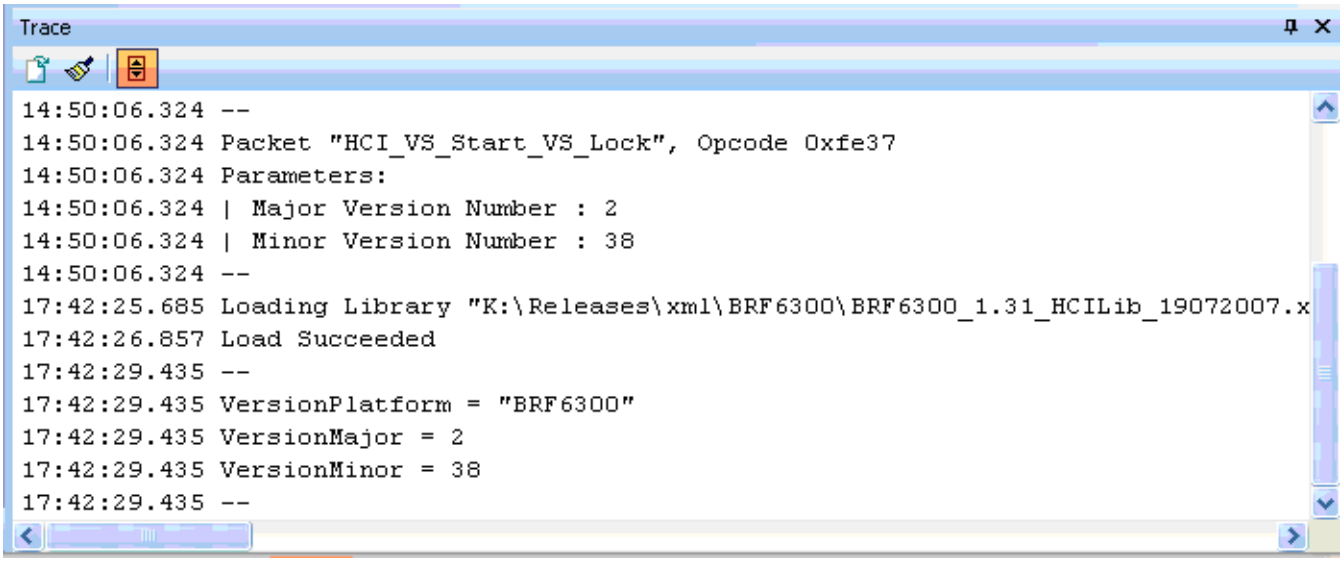

Figure 17. Trace Pane

There are several display options available in the Trace pane.

Customize Colors: Select the *Trace* option in the Options dialog box. (Refer to Section 3.4 for additional information about the Trace function.)

Automatic Save to File: Select the *Log* option in the Options dialog box. (Refer to Section 3.5 for more information about the Log function.)

Table 9 describes the Trace pane icon controls.

Table 9. Trace Pane Icon Controls

Icon		Description
	Export Trace Log	Export the Trace log file to a different location. This option opens a new screen for selecting a new name for and location to save the file.
	Clear Trace Pane	Clear the Trace pane display.
	Automatic Scroll	Automatically scrolls through the active script.

In order to trace the raw data of a running command or script, select *Hex Dump of Incoming Data* or *Hex Dump of Outgoing Data* from the View menu for the selected COM port. Figure 18 illustrates this action.

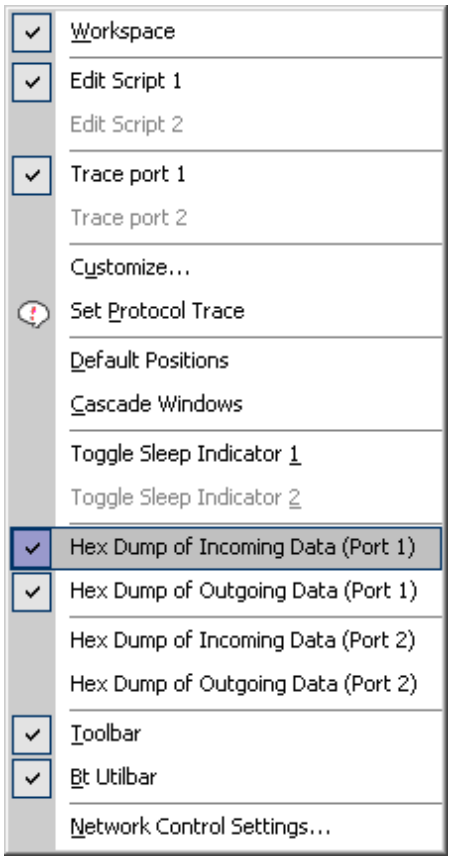

Figure 18. Enabling Tracing Raw HCI Data Transport

Now, all the data transferred via the universal asynchronous receiver/transmitter (UART) interface are visible in the Port Trace View window.

3 Setup and Configuration

Software setup and configurations are controlled via the Options window. The Options window is available through the View menu (View→Options), as described in Section 2.3.2.3.

3.1 Port Connection

The Port Connection option configures the specific type of communication between HCITester and the device. Figure 19 illustrates the Port Connection options.

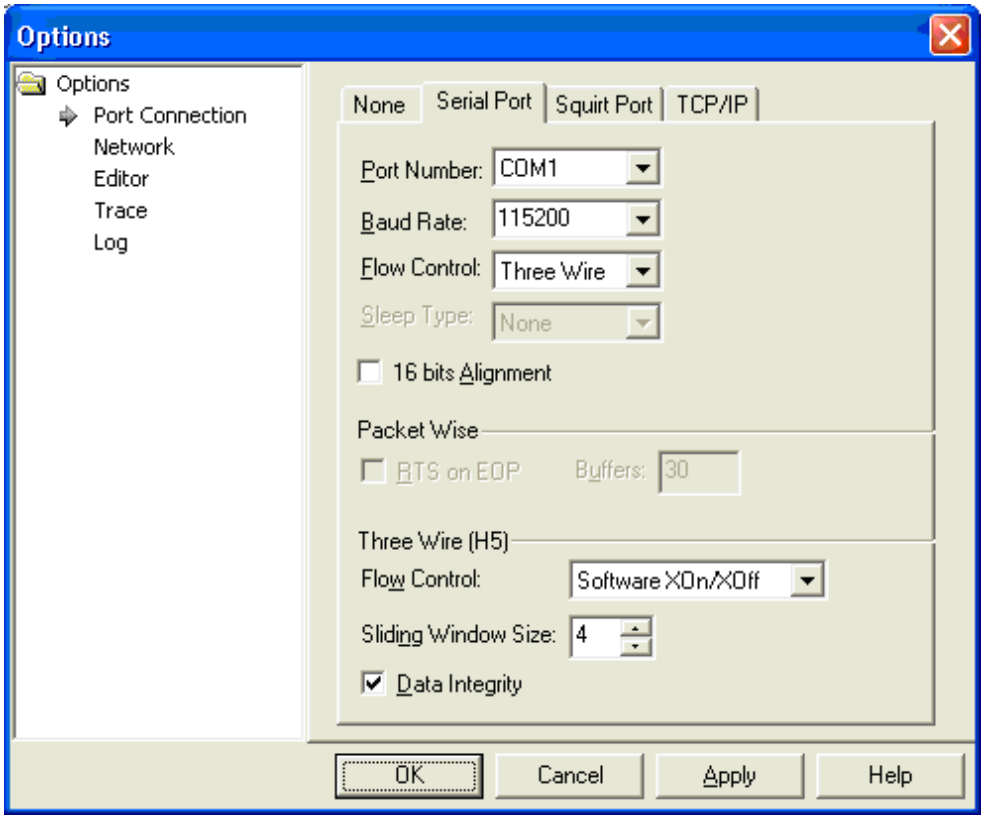

Figure 19. Port Connection Configuration

There are four tabs available under the Port Connection options:

- **None:** Establishes no connection between the HCITester software and the device.
- **Serial:** Creates a serial port connection with the device. This connection supports different types of flow control and power mode (sleep) controls.
- **Squirt:** Connects the software and the device using a squirt serial connection for use in parallel to other applications using a squirt port (such as Logger, etc…).
- **TCP/IP:** Connect to device over TCP/IP protocol of all types (synchronized or not, servers, or clients).

When selecting Serial or Squirt port connections, you must also select the port number, desired baud rate, flow control, and sleep type.

3.1.1 Flow Control Options

Table 10 summarizes the flow control options.

Table 10. Flow Control Options

Option	Result
None	No flow control is used
Hardware	CTS/RTS flow control
Packet Wise	Reserved
Negotiate	Reserved
Segmentation	Reserved
Three Wire	Software flow control (Xon/Xoff)

3.1.2 Sleep Type Options

HCITester supports three sleep protocols:

- HCILL
- Palau
- ThreeWire (set automatically if ThreeWire flow control is selected)

Table 11 describes the sleep type icon controls.

Table 11. Sleep Type Icon Controls

Icon		Description
	Auto Control	HCITester automatically controls the power mode of the device. The software is set to sleep on a timeout and awake if needed. The *SetAutoSuspend* command is a script command that controls this feature. The *SetSuspendTimeout* command sets the idle timeout value. The default value is 2000 ms.
	Manual Control	User manually sets the power mode. Click to set the device into sleep mode or to awake from sleep mode. The *SetAutoState* command is a script command that controls this feature.
	Status	This is a status bar indicator that shows when the Host (HCITester) is in sleep mode.

3.2 Network

The Network configuration enables linking several HCITester applications running on different machines on the same network domain.

To bind multiple HCITester applications, specify the same group name for them and check the Network Control Active box, as shown in Figure 20.

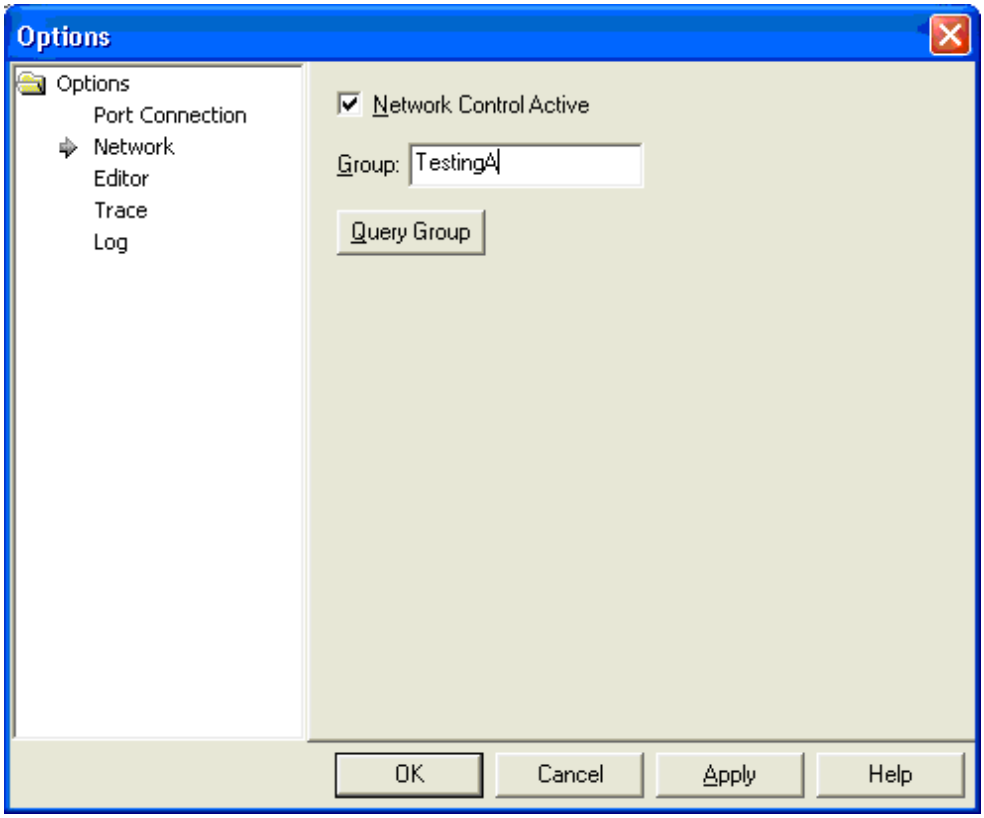

Figure 20. Network Configuration

When multiple HCITester applications are in the same network group, the programs start operating together; all the programs stop together when Stop is clicked on one program.

The status bar indication (as shown in Figure 21) displays a unique name given to the running process and the group name.

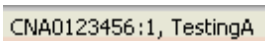

Figure 21. Status Bar Indicator for Network Configuration

3.3 Editor

The font and display colors of the Editor elements can be customized, as Figure 22 shows.

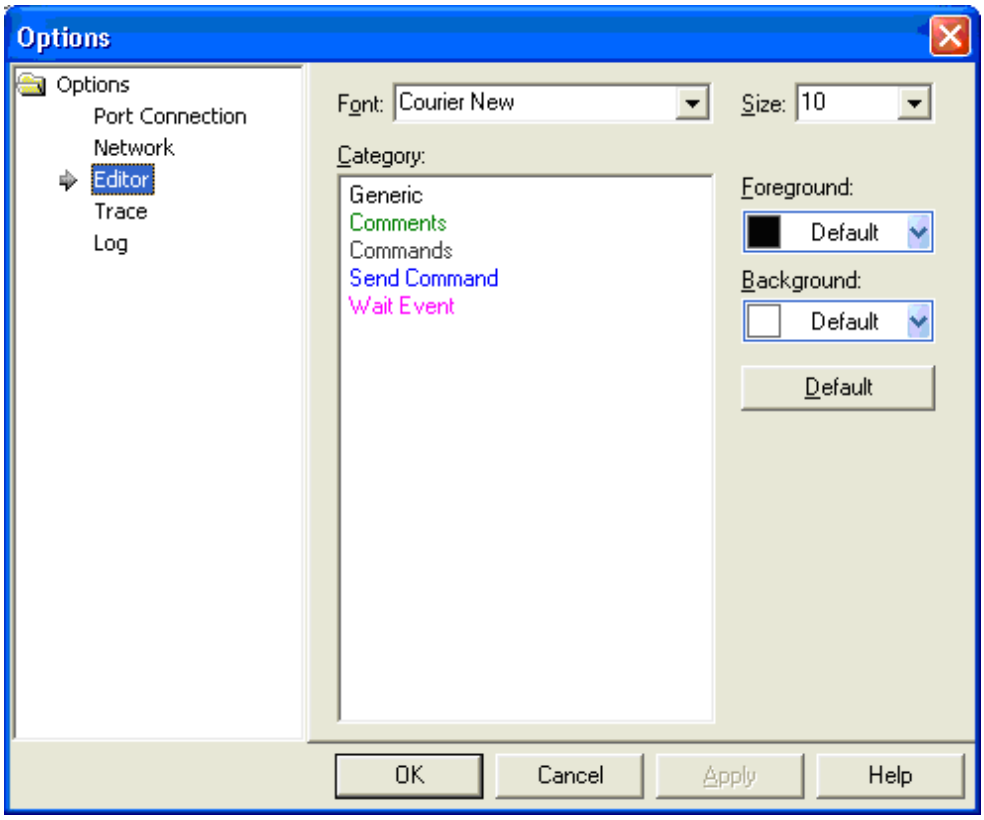

Figure 22. Editor Configuration

3.4 Trace

The font and display colors of the Trace elements can be customized, as Figure 23 illustrates.

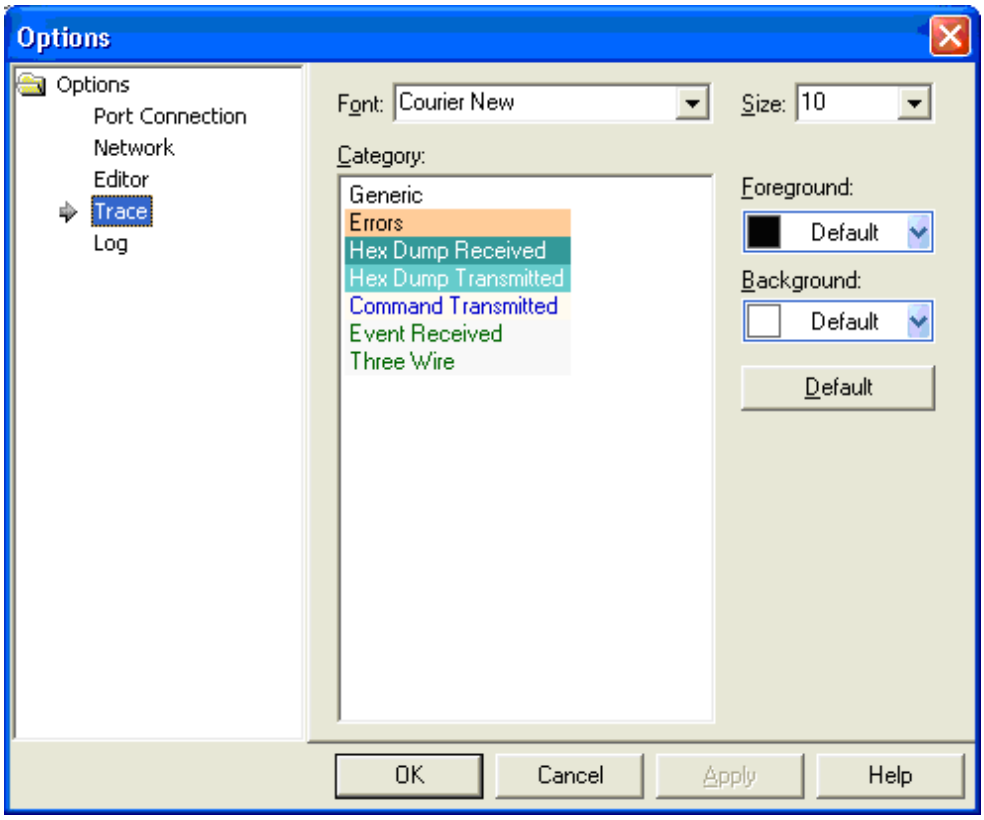

Figure 23. Trace Configuration

3.5 Log

The log file automatically saves the trace window contents while a script is running. Figure 24 shows the log file configuration options.

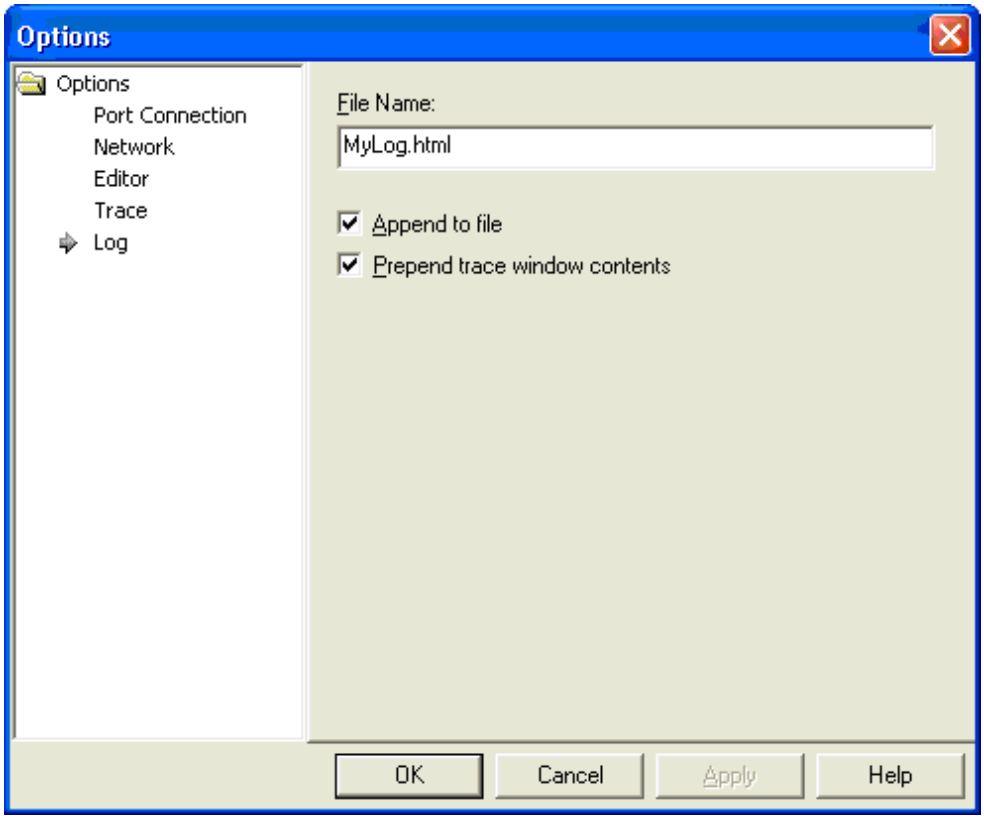

Figure 24. Log Configuration

Table 13 summarizes the log configuration options.

Table 12. Log Configuration Options

Option	Result
File Name	Three types of file extensions are allowed: .txt (plain text file) .htm (HTML formatted file) .xml (XML data file information)
Append	If this box is checked, then new log traces are appended to the existing file. Oterwise, the file is created each time a new script is executed.
Prepend	Add currently displayed events to the active log file.

3.6 Changing the XML File

Different TI Bluetooth devices require different XML files. To change the XML file, press the icon in the Command Library pane The following screen (Figure 25) is invoked:

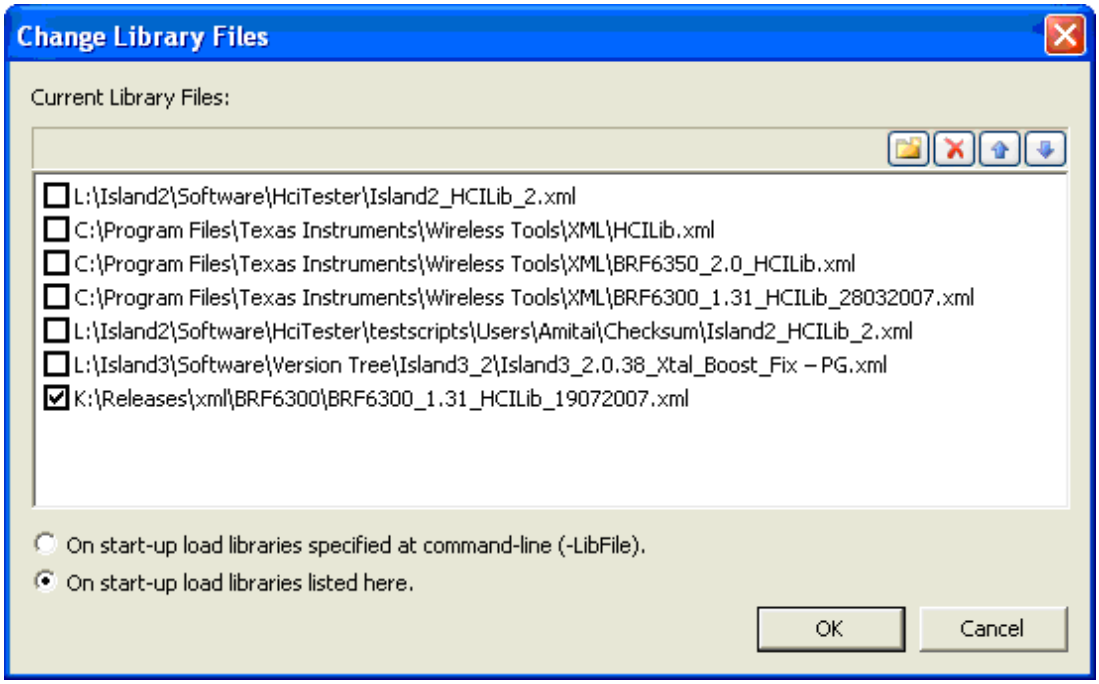

Figure 25. Changing the XML File

Note that only one XML file should be selected at a time, unless the additional XML file contains custom commands in addition to the basic XML contents. Table 11 describes the XML file changing icon controls.

Table 13. XML File Changing Icon Controls

Icon		Description
	Create new	Create a new file
	Browse	Browse to the location of a saved file
	Delete	Deletes a file from the list
	Move up	Moves a file up in the list
	Move down	Moves a file down in the list

4 Executing Scripts or Commands

4.1 Executing Scripts

Executing a script involves three steps: loading a script, editing a script as needed, then running the script.

4.1.1 Loading a Script

A script can be loaded by selecting *Open Script*… from the File menu; pressing the Load icon () from the toolbar button (to select a previously used script); or by double-clicking the requested script in the scripts pane.

4.1.2 Editing a Script

In order to edit a script, select the line in the Edit script View window that you wish to edit; then change the values to the desired ones. Alternatively, you can edit the values in the Values pane. This optoin automatically updates the text in the script.

The Script Editor functions as any other text editor. You can copy, cut and paste lines in the script, or from one script to the other, by right-clicking and then selecting the desired option form the pop-up menu. You can also use the typical CTRL commands to copy, cut, and paste selected text (CTRL+C, CTRL+X, CTRL+V respectively).

4.1.3 Executing a Script

Once a script is loaded to the script Editor Pane, it can be executed pressing the Start icon () from the toolbar button, or click the F5 button on the keyboard.

To stop a running script, click the Stop button () on the toolbar or click F5 again.

The Trace Port view displays the output of the running script.

4.2 Executing Commands

4.2.1 Searching for a Specific Command in the Command Library

To search for a specific command in the Command Library, follow these procedures:

1. Place the curser on any command in the Command Library.
2. Type a key phrase from the command in the Incremental Search field.
3. Press F3 to scroll between all the commands that contain the phrase within them (SHIFT+F3 searches backwards).

Alternatively, use the toolbar button  to select one of the previously used commands for execution.

In Figure 26, the user is searching for the word *sleep*.

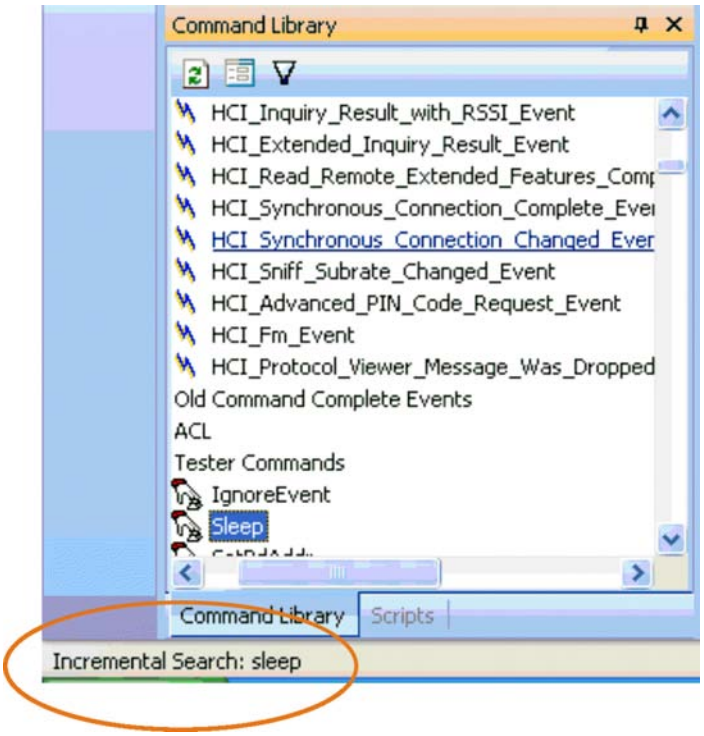

Figure 26. Searching For a Command in the Command Library

4.2.2 Executing a Single Command

Select the desired command in the Command Library pane. Right-click the desired command and select the desired option from the pop-up menu: Execute; Add the command to a currently active script; or Add the command to your list of shortcuts.

Figure 27 shows an example of this selection.

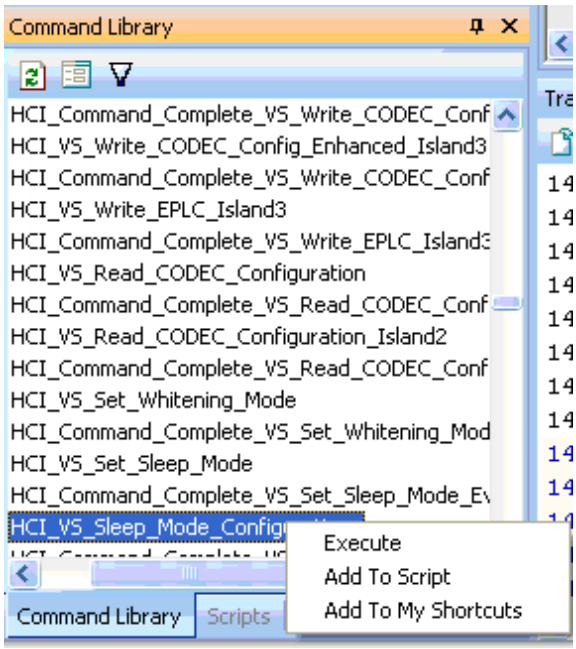

Figure 27. Executing a Single Command from the Command Library

Double-clicking a command line in the Command Library Pane also executes the command. Additionally, a third way to execute a command is to press the icon (as explained in Section 2.5).

Note: Before executing a command, be sure that the values of the command are what you intend.

4.3 *Execution Shortcut-Keys and Status Indicators*

There are three shortcut keys that you can use when working with scripts.

- (F5): Execute current script
- (F5): Stop running current script
- (Ctrl+F5): Execute only current selection:
  - Selected script text
  - Current line (if no text selected)
  - Current command in Values pane

A complete list of shortcuts is provided in Appendix A.

As Figure 28 illustrates, there are also four possible execution status indicators displayed in the status bar. These indicators are summarized in Table 14.

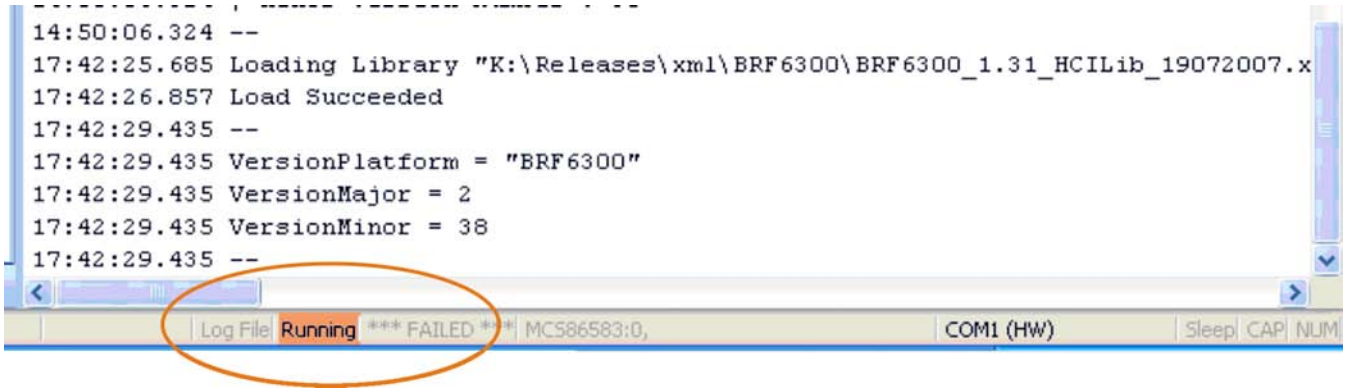

Figure 28. Execution Status Indicators

Table 14. Execution Status Indicators

Icon		Description
Running	Running	Normal indicator; the script or command is running
*** FAILED ***	Failed	Shows that the previous script or command failed
COM1 (HW)	Port	Indicates the COM port that is in use
Sleep	Sleep	Sleep indicator

Appendix A List of Shortcuts

Table A-1. Available HCITester Shortcuts

Command	Action
F5	Execute or Stop script execution
Ctrl+F5	Execute current selection
F11	Execute last command
F12	Switch to last executed script
Ctrl+F11	Pop-up a list of recently-used commands
Ctrl+F12	Pop-up a list of recently executed scripts
F8	Clear Trace
Editor Commands	
Ctrl+C	Copy selection to clipboard
Ctrl+V	Paste from clipboard
Ctrl+X	Cut selection to clipboard
Ctrl+F	Pop-up *Find* dialog box
Ctrl+H	Pop-up *Replace* dialog box
F3	Repeat last search
Shift+F3	Repeat last search backwards
Ctrl+F3	Search for current word
Ctrl+A	Select all text
Ctrl+Z	Undo last action
Ctrl+Y	Redo the previously undone action
File Commands	
Ctrl+N	Create a new script
Ctrl+O	Open an existing script file
Ctrl+P	Print the current script
Ctrl+S	Save the current script
Ctrl+F6	Switch to the next script
Ctrl+Shift+F6	Switch to the previous script
Undocumented Commands	
CTRL + 	Resets the COM port in cases when an error on the H4 protocol causes the port to get stuck
Ctrl+Shift+ Numpad-	Switch RTS on the serial port
Ctrl+Shift+ Numpad+	Switch DTR on the serial port
Ctrl+0..9	Run pre assigned scripts 0 to 9
	Add Shift for 10 to 19
Ctrl+Alt+0..9	Assign a script 0 to 9.
	Add Shift for 10 to 19

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