

Verification Continuum™

Synopsys
Identify® Debugging
Environment for Microsemi
Edition Reference Manual

December 2019

SYNOPSYS®

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CHAPTER 1

Introduction

The tool set consists of an instrumentor and a debugger. These two tools allow you to debug your HDL design:

- In the target system
- At the target speed
- At the VHDL/Verilog RTL Source level

The tool set increases your debugging capabilities of high-end FPGA designs, FPGA-based prototypes, and system-on-a-chip designs. For the first time you will be able to debug live hardware with the internal design visibility you need while using intuitive debugging techniques.

To efficiently use the system and its underlying tools, this manual provides you with an alphabetical listing of all the commands that the tool set accepts in the next chapter. The remainder of this chapter describes the conventions used within this manual to convey command usage.

Syntax Conventions

There are several conventions this manual uses to convey command syntax. These conventions are:

This convention...	Organizes this information...
bold	Commands and literal arguments entered as shown.
<i>italics</i>	User-defined arguments or example command information.
[]	Optional information or arguments for command use. Do not use these brackets with the command within the command line.
...	Items that can be repeated any number of times.
	Choices you can make between two items or commands. The items are located on either side of this of this symbol.
#	Comments concerning the code or information within the command line.
{ }	Escape characters for search strings; also entered in bold font as a literal in some commands

Symbol Conventions

This manual contains symbol conventions detailing the tools that use these commands. These symbols are located adjacent to the command name. These symbols are:

This convention...**Organizes this information...**

Any command that is used in the instrumentor only. This symbol is located following any instrumentor command in the command listing chapter.



Any command that is used in the debugger only. This symbol is located following any debugger command in the command listing chapter.



Any command that is used in both the instrumentor and debugger tools. This symbol is located following the commands that have applications in both tools in the command listing chapter.

Tool Conventions

There are tool concepts you must familiarize yourself with when using the tool set. These concepts help you to decipher structural and HDL-related information.

File System Conventions

The term file system refers to any command that uses file, directory, or path name information in its argument. A file system command must contain specific conventions.

Path Separator “/”

All file system commands that contain a directory name use only forward slashes, regardless of the underlying operating system:

```
/usr/data.dat
```

```
c:/Synopsys/data.dat
```

Wildcards

A wildcard is a command element you can use to search for specific file information. You can use these wildcards in combination with the file system commands. Conventions for wildcards are as follows:

Syntax	Description
*	Matches any sequence of characters
?	Matches any single character

Square brackets are used in pattern matching as follows:

Syntax	Description
[abcd]	Matches any character in the specified set.
[a-d]	Matches any character in a specified range.

To use square brackets in wildcard specifications, you must delimit the entire name with curly braces {}. For example

```
{[a-d]1}
```

matches any character in the specified range (a-d) preceding the character 1.

Design Hierarchy Conventions

Design hierarchy refers to the structure of your design. Design hierarchy conventions define a way to refer to objects within the design hierarchy.

The tool set supports VHDL and Verilog. These languages vary in their hierarchy conventions. The VHDL and Verilog languages contain design units and hierarchies of these design units. In VHDL, these design units are entity/architecture pairs, in Verilog they are modules. VHDL and Verilog design units are organized hierarchically. Each of the following HDL design units creates a new level in the hierarchy:

VHDL

- The top-level entity
- Architectures
- Component instantiation statements
- Process statements
- Control flow statements: if-then-else, and case
- Subprogram statements
- Block statements

Verilog

- The top-level module
- Module instantiation statements
- Always statements
- Control flow statements: if-then-else, and case
- Functions and tasks

Design Hierarchy References

A reference to an element in the design hierarchy consists of a path made up of references to design units (similar to a file reference described earlier). Regardless of the underlying HDL (VHDL or Verilog) the path separator character is always “/”:

```
/inst/reset_n
```

Absolute path names begin with a path separator character. The top-level design unit is represented by the initial “/”. Thus, a port on the top-level design unit would be represented:

```
/port_name
```

The architecture of the top-level VHDL design unit is represented:

```
/arch
```

Relative path names do not start with the path separator, and are relative to the current location in the design hierarchy. Initially, the current location is the top-level design unit, but commands exist that allow you to change the location.

Note: Design unit and hierarchy information can be case sensitive depending on the HDL language. VHDL names are not case sensitive. In contrast, all Verilog names are case sensitive.

Wildcards

A wildcard is a command element you can use to search for specific design hierarchy information. You can use these wildcards in combination with the design hierarchy commands. Conventions for wildcards are as follows:

Syntax	Description
*	Matches any sequence of characters
?	Matches any single character

Square brackets are used in hierarchy pattern matching as follows:

Syntax	Description
[abcd]	Matches any character in the specified set.
[a-d]	Matches any character in a specified range.

To use square brackets in pattern matching, you must delimit the entire name with curly braces {}. For example

```
{[a-d]1}
```

matches any character in the specified range (a-d) preceding the character 1.

CHAPTER 2

Startup Modes

The instrumentor and the debugger can be started in any of three execution modes as outlined below:

- `identify_instrumentor`

Opens the instrumentor in the graphical interface

- `identify_instrumentor -f fileName.tcl`

Runs a Tcl startup file and then opens the instrumentor in the graphical user interface.

- `identify_instrumentor_shell [-version]`

Opens the instrumentor in the shell and/or script mode. If the optional `-version` argument is included, reports the software version without opening the instrumentor.

- `identify_debugger`

Opens the debugger in the graphical interface.

- `identify_debugger -f fileName.tcl`

Runs a Tcl startup file and then opens the debugger in the graphical user interface.

- `identify_debugger_shell [-version]`

Opens the debugger in the shell and/or script mode. If the optional `-version` argument is included, reports the software version without opening the debugger.

Note: Depending on the command shell, you may be required to provide the full path name to the program executable as well as the full path name to the files specified in any of the filename arguments.

Synthesis Tool Pointers

When the instrumentor or the debugger is started from the command line, two additional arguments can be passed to the tool to identify the location and type of the synthesis tool associated with the project.

Note: The path to the synthesis tool and the tool type can also be defined after the instrumentor or debugger has been started as described in [Command Line Configuration, on page 18](#).

The syntax of the two command-line arguments is:

-synplify_install *synthesisToolPath*

-synplify_tool *synplify_pro*

The arguments are entered on the same command line in any order.

Configuring the Synthesis Tool

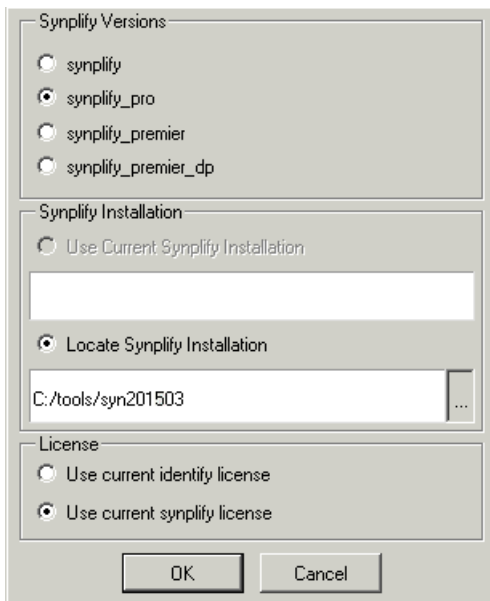
When the instrumentor or debugger is launched from the synthesis tool GUI, the path to the synthesis tool and its tool type are defined. When the instrumentor or debugger is started independently and then opens a synthesis project file, the path to the synthesis tool executable and the tool type must be defined either when starting the instrumentor or the debugger (see [Synthesis Tool Pointers](#) above) or after the tool is started as defined in the following subsections.

Note: The instrumentor uses the synthesis tool compiler to compile the design.

GUI Configuration

To set the path to the synthesis tool from the instrumentor GUI:

1. Select Options->Configure Synplify from the menu to display the Configure Synplify dialog box.



2. In the dialog box:

- Select the appropriate tool radio button in the Synplify Versions section.
- Select the Locate Synplify Installation radio button and enter the path to the synthesis tool installation in the Synplify Installation section. The path to the Synplify installation is saved in the `userprefs.cfg` file located in one of the following directories based on your platform:

`c:\Users\userName\AppData\Roaming\Identify\userprefs.cfg` (Windows)

`userHome/.identify` (Linux)

On Windows platforms, the AppData directory may be hidden.

- Select the appropriate license radio button in the License section.

3. Click the OK button to accept the values and close the dialog box.

Command Line Configuration

The path to the synthesis tool can also be set from the command line with a `set_synplify_configuration` command. The syntax for the command is:

```
set_synplify_configuration -type synToolVersion {-locate installPath |-current}  
-license identify|synplify [-help]
```

In the syntax, *synToolVersion* is `synplify_pro` and *installPath* is the path to the synthesis tool installation directory.

License Types

All of the startup execution mode commands accept an optional `-licensetype` argument to specify a license type other than the default. The license type can be either a vendor-specific license or a full license.

Note: The `-licensetype` argument or pre-defined license-type environment variable is required when initially starting the instrumentor or debugger in the shell mode.

The following values are accepted by the `-licensetype` argument:

<code>identinstructor</code>	requests a full instructor license
<code>identinstructor_microsemi</code>	requests a Microsemi-only instructor license

The following examples illustrate using the `-licensetype` argument.

```
identify_debugger_shell -licensetype identdebugger
```

To verify the license currently being used by the instructor or debugger, enter the command `licenseinfo` in the console window or at the shell prompt. Changing the license type with the `-licensetype` argument is valid only for the current session and does not change the default license type defined in the Select available license dialog box or set with a license-type environment variable.

License-Type Environment Variables

License-type environment variables can be used in place of the `-licensetype` argument to set the default license type and offer the advantage of not having to specify a license type for each session. The *licenseType* argument in the below environment variables is the same as the `-licensetype` arguments listed in the previous table. The following environment variables are supported:

```
IDENTIFYINSTRUCTOR_LICENSE_TYPE=licenseType
```

```
IDENTIFYDEBUGGER_LICENSE_TYPE=licenseType
```

Synthesis Tool Command-Line Options

When starting the synthesis tool from the command line, an additional argument can be included to specify the location of the instrumentor/debugger installation directory. For example, the command

```
pathToSynplifyInstall/synplify_pro -identify_dir pathToIdentifyInstall
```

starts Synplify Pro in the GUI and sets the default installation path in the synthesis tool for launching the instrumentor/debugger tool set. The installation path specified appears in the Configure Identify Launch dialog box (Options->Configure Identify Launch) in the synthesis tool GUI. The `-identify_dir` argument overrides any `SYN_IDENTIFY_EXE` environment variable default setting.

Custom Initialization Script

The instrumentor/debugger tool set can be customized using a TCL-style initialization script. This script is sourced on tool startup and allows you to define custom procedures and variables, or to program start-up behavior.

Script Locations

The software first looks for initialization scripts, titled `synrc.tcl`, in the `/etc` directory of the installation path and then in the user's home directory. On a Linux-based platform, this is the standard home directory. On Windows, the value of the environment value `USERPROFILE` is used. On a standard Windows installation, this path is generally represented as:

```
c:/Documents and Settings/userName/synrc.tcl
```

Scripting Priority

The script is first sourced from the installation directory and then from the home directory. Since the format is Tcl, a second user-specific script overrides Tcl procedures and variables previously defined.

Sample Initialization File

A sample `synrc` file is distributed with the software. The file resides in the `/etc` directory of the installation path. The file is named `synrc.template.tcl` and must be renamed to `synrc.tcl` to enable its functionality. This file contains some sample functions and can be used as an example of how to provide a custom waveform viewer for use in the debugger. If you are interested in interfacing and using your own waveform viewer with the debugger, refer to the application note “Interfacing Your Waveform Viewer” available on the Synopsys website.




CHAPTER 3

Command Description

All commands are listed alphabetically in this chapter. Each command contains syntax, argument return values, default values, and examples. The table below is linked to the individual command descriptions.

activation	breakpoints	cd	chain
clear	com	condition info	device
encryption	exit	fpga	haps
help	hierarchy	idcode	iice
instrumentation	jtag_server	licenseinfo	log
project	pwd	remote_trigger	run
searchpath	setsys	show	signals
source	statemachine	stop	transcript
verdi	watch	waveform	write fsdb
write instrumentation	write samples	write vcd	write vhdlmodel

The commands are divided into several specific categories. These categories separate the commands in terms of which tool (instrumentor or debugger) utilizes the command. These symbols are:

-  Command available only in the instrumentor
-  Command available only in the debugger
-  Command available in both the instrumentor and the debugger

activation

Allows you to save or reload a set of trigger settings (enabled watchpoints and breakpoints). Including the `-sample` option causes the sample data to be loaded or saved with the trigger settings. If the optional *activationName* argument is included, the named activation is loaded or saved; if *activationName* is omitted, `last_run.adb` is used as the default activation name. The `activation clear` and `activation list` commands clear the current trigger settings and list all of the saved activations for the current instrumentation, respectively.

Syntax

```
activation load|save [-sample] [activationName]
```

```
activation clear|list
```

Command Example

```
activation load -sample instr_trial1
```


breakpoints

Instructs the instrumentor to add or delete special debug logic to or from the specified IICE™. This debug logic implements breakpoint-style RTL source-level trigger conditions.

Syntax

```
breakpoints add|delete [-iice iiceID|all] breakpointName [breakpointName ...]
```

```
breakpoints map breakpointName MictorPinName
```

```
breakpoints preconfigure [-iice iiceID|all] breakpointName [breakpointName ...]  
-condition {integer}all -state [0|1]
```

Arguments and Options

For the add and delete options, one or more breakpoints can be added or deleted at the same time.

```
add breakpointName [breakpointName ...]
```

```
delete breakpointName [breakpointName ...]
```

The map option is used exclusively with the real-time debugging feature to assign a breakpoint to a Mictor connector pin. In the above syntax, *MictorPinName* is the concatenation of the Mictor board HapsTrak® connector location, the Mictor connector name, and the Mictor pin name separated with periods. For example, 3.M1.D3e is the D3e pin of Mictor connector M1 on the Mictor board installed in HapsTrak connector J3.

The preconfigure option specifies the trigger conditions to enable for the specified breakpoints. The -condition argument is a Tcl list of conditions or all, and the -state argument specifies the state (0 or 1).

Breakpoint names consists of two components:

- The full hierarchical path of the HDL design unit that denotes the underlying control statement of the breakpoint.
- The HDL source code location given by the filename and the line number of the breakpoint.

These two components together ensure that each breakpoint has a unique name for identification purposes.

-iice *iiceID*|all

Used when more than one IICE is defined to specify the IICE (*iiceID*) where the breakpoint is to be added, deleted, or preconfigured. If the argument *all* is specified, the corresponding breakpoint action applies to each IICE.

Command Example

```
breakpoints add /beh/arb_inst/beh/process_83/case_88/arb.vhd:90
breakpoints delete -iice trap2
    /beh/blk_xfer_inst/beh/process_85/case_97/xfer.vhd:107
breakpoints map /beh/process_50/case_88/if_90/alu.v:72 3.M1.D5e
breakpoints preconfigure /beh/process_10/case_88/if_90/alu.v:72
    -condition {1 3} -state 0
```

See Also

- [stop, on page 89](#)

cd 

Changes the present working directory in the file system to a different designated directory.

Syntax

```
cd directory
```

Arguments and Options

directory

Specifies the designated directory name. You must use forward slashes to describe relative and absolute path names irrespective of the operating system. On a Windows-based platform, the directory may include a drive letter followed by a colon.

Command Example

```
cd c:/temp  
cd ../homedirs/adam
```

See Also

- [pwd, on page 72](#)

chain

Sets up and manipulates the UMRBus and JTAG chain of devices. Because more than one device can be connected in a chain, the commands allows you to setup the chain representation in the debugger to select the particular device to be debugged.

Syntax

chain add *deviceName instructionRegisterWidth*

chain clear

chain info [-raw /-active]

chain replace *position chipID instructionRegisterLength*

chain select *chipID*

Arguments and Options

add *deviceName instructionRegisterWidth*

Creates and labels a device and assigns that device with an instruction register width. Every device attached to the chain must be identified by a unique name. This device name can include any alpha-numeric characters. Spaces and other characters cannot be used.

The instruction register is an N-bit register that holds the OPCODE for the JTAG controller. Every device has a specific instruction register width, which can be found in the device's Data Book.

clear

Deletes the current chain description.

info

Displays the chain description.

info -raw

Returns a machine readable JTAG chain description. The chain is represented by a Tcl list of chain elements where each element is a two-item Tcl list specifying the device name and instruction register width. Example:

```
{{device_a 8} {device_b 10}}
```

info -active

Returns the name of the device that is currently selected for debugging.

chain replace *position chipID instructionRegisterLength*

Changes the name or register length of a device that has been previously defined using the chain add command. In the command syntax, *position* is the value shown by the chain info command for the device to be replaced.

select *deviceName*

Selects a device for system debugging. Only devices added and labeled using chain add can be selected.

Command Example

```
chain add fpga 5
chain select fpga
chain info -active
chain replace 1 new_fpga 8
```

See Also

- [device](#), on page 35
- [com](#), on page 30

clear

Removes all the console output in the graphical user interface. This command is only supported in the graphical modes.

Syntax

clear

Arguments and Options

none

com

Sets up and manipulates communication settings between the debugger and the Intelligent In-Circuit Emulator (IICE).

Syntax

com cabletype [*type*]

com cableoptions *option* [*value*]

com check

com port [*lpt1|lpt2|lpt3|lpt4*]

Arguments and Options

cabletype [*type*]

Describes the type of cable connecting the system to the hardware being analyzed. The supported cable types are `byteblaster`, `Microsemi_BuiltInJTAG`, `JTAGTech3710`, `Catapult_EJ1`, `Digilent_JTAG_HS1`, and `demo`. A `umrbus` selection is also available to indicate that the UMRBus is to be used as the communication interface between the hardware and the host machine running the Identify debugger.

cableoptions *option* [*value*]

Specifies or reports cable-specific option settings:

catapult_ip_address [*address*] – specifies the IP address/hostname for the Catapult EJ-1 cable.

Microsemi_builtinJTAG_port [*portID*|auto] – specifies which port to use when multiple cables are connected (use auto for single cable configuration).

flashPro_trst [*string*] – specifies the setting of the TRST (tristate) pin. Accepted values (*string*) are off, toggle, low, and hi; the default is off.

flashProLite_trst [*string*] – specifies the setting of the TRST (tristate) pin. Accepted values (*string*) are off, toggle, low, and hi; the default is off.

flashPro3_trst [*string*] – specifies the setting of the TRST (tristate) pin. Accepted values (*string*) are off, toggle, low, and hi; the default is off.

flashPro5_trst [*string*] – specifies the setting of the TRST (tristate) pin. Accepted values (*string*) are off, toggle, low, and hi; the default is off.

JTAGTech_type [**PCI**|**USB**] – specifies the type of computer interface connection (parallel or USB); the default is PCI (parallel).

JTAGTech_port [*integer*] – specifies the interface card address (0 to 255). The default address is 0.

JTAGTech_tapnum [*integer*] – specifies the active tap port on the JTAG Technologies tap pod. Values (*integer*) range from 1 to 4; the default is 1.

byteblaster_port [*integer*] – specifies the parallel port number; default is 1 (lpt1).

Digilent_JTAG_HS1_speed [*commSpeed*] – specifies the communication speed for the Digilent JTAG HS1/HS3 cable.

check

Performs a connectivity check on the JTAG cable connection.

port [**lpt1**|**lpt2**|**lpt3**|**lpt4**]

Specifies the host computer parallel port connected to the JTAG cable. The supported ports are lpt1, lpt2, lpt3, and lpt4.

Command Example

```
com cabletype byteblaster
com cableoptions byteblaster_port 2
com port lpt1
```

See Also

- [chain, on page 28](#)

condition info

Lists the information about the conditions defined in state-machine triggering for the instrumented signals along with the trigger values.

Syntax

```
condition info [-iice <value>]
condition info [-condition | -cond <value>]
condition info [-raw]
condition info [-help]
```

Arguments and options

[-iice <value>]

Specifies the IICE Name for which the signals' condition values are defined.

[-condition | -cond <value>]

State machine conditions to be specified in integer format.

`[-raw]`

Creates machine readable format.

`[-help]`

Provides the command help information.

Note: If no arguments and options are provided, the command results all conditions by default.

Command Examples

```
condition info -iice IICE_0 -cond 0
```

```
-----
IICE 0          "1"                /reset_n
=====
```

```
condition info -iice IICE_1 -condition 1
```

```
-----
IICE 1          "000100"
/SRS/gen_add\.6\.count6bit\.counter_inst/count[5:0]
=====
```

condition info

IICE Condition From Value To Value Signal Name

IICE 0	"1"	/reset_n
IICE 1	'1'	/reset_n
IICE 2	'1'	/reset_n

=====

device

Defines device-specific parameters used to implement the instrumented HDL design.

Instrumentor Syntax

```
device estimate [-iice all|iiceName] [-resources |-noresources |-raw]
```

```
device jtagport [builtin|soft |umrbus]
```

```
device prepare_incremental [0|1]
```

```
device skewfree [0|1]
```

```
device technologydefinitions [0|1]
```

```
device capimbaseaddr integer
```

Arguments and Options

estimate or **estimate -iice all**

Reports total number of instrumented signals and estimated resource utilization for the current implementation.

estimate -iice *iiceName*

Reports total number of instrumented signals and estimated resource utilization for the named IICE (*iiceName*) for the current implementation.

estimate -resources or **estimate -resources -iice all**

Reports only the estimated resource utilization for current implementation.

estimate -resources -iice *iiceName*

Reports only estimated resource utilization for the named IICE (*iiceName*) for the current implementation.

estimate -noresources or **estimate -noresources -iice all**

Reports only the number of instrumented signals for current implementation.

estimate -resources -iice *iiceName*

Reports only the number of instrumented signals for the named IICE (*iiceName*) for the current implementation.

estimate -raw

Displays the instrumented signal information and estimated resource utilization for the current implementation in a machine-readable format.

jtagport [builtin|soft|umrbus]

Determines if the built-in JTAG port of the target device is used for the IICE connection or if the Synopsys test port is used. Selection can only be set in the instrumentor. With no argument specified, the current setting is displayed. The following selections are available:

Specifies that the UMRBus is to be used as the communication interface between the hardware and the host machine running the debugger (the JTAG port is not used).

builtin

Specifies that the JTAG port built into the target device is the port used. No extra user pin is required. This is the default value when the device family specified is other than generic.

soft

Specifies that the IICE communicates through a JTAG TAP controller that is automatically inserted by the instrumentor. The Synopsys JTAG port requires four additional user pins.

umrbus

Specifies that the UMRBus is to be used as the communication interface between the hardware and the host machine running the debugger (the JTAG port is not used).

prepare_incremental

Sets up the instrumentor to support incremental changes to the instrumented signals.

skewfree [0|1]

Causes the IICE to be built using skew-resistant hardware when no global clock resources are available for the JTAG clock. When this option is enabled (1), master-slave flip-flops are used on the JTAG chain to prevent clock skew from affecting the logic. This setting also causes the instrumentor to NOT explicitly define the JTAG clock as requiring global clock resources. The skewfree option is disabled (0) by default.

technologydefinitions [0|1]

Disables/enables the generation of black boxes for undefined module definitions. This option is available only in the instrumentor and is enabled by default.

Note: Valid values must be set for the above options before you instrument your design.

capimbaseaddr *baseAddress*

Specifies or reports the base address of a CAPIM inserted for UMRBus communication. In a multi-FPGA debugging environment, different FPGAs on the same UMRBus require unique CAPIM addresses when using post partitioned instrumentation (by default, FPGAs on the same board share the same CAPIM address which would disrupt communications with the debugger). The `capimbaseaddr` argument is used to assign different CAPIMs when two or more FPGAs have independent instrumentations. The CAPIM base address value ranges up to 63 with a default base address of 57. This value is decremented with each CAPIM added (user CAPIM addresses are incremented beginning with 1).

Debugger Syntax

The following device options report settings available from the debugger.

family – Shows the device family in use

jtagport – Shows the device JTAG interface selected

skewfree – Shows the device skewfree option setting

Command Example

```
device estimate -iice IICE -noresources  
device jtagport builtin  
device skewfree 1
```

See Also

- [chain](#), on page 28
- [com](#), on page 30

encryption

Sets the current password to use before encrypting or decrypting a file. In the instrumentor, this command sets the password to be used when writing out an encrypted file with the write instrumentation command. In the debugger, this command is used to set the password to enable encrypted files to be displayed.

Note: Setting the password with this command displays the password on the screen and in any log files that you create. If this is a concern, use only the graphical interface when instrumenting and debugging designs that use the encryption feature.

Syntax

```
encryption set_passwd password
```

Arguments and Options

set_passwd *password*

The `set_passwd` argument requires a single string (*password*) entry. The new password is stored for decrypting/encrypting until it is changed or until the instrumentor or debugger is shut down.

Note: Passwords are the user's responsibility; Synopsys cannot recreate a lost or forgotten password.

Command Example

```
encryption set_passwd xyzyy
```

See Also

- [write instrumentation, on page 99](#)
- [project, on page 71](#)

exit 

Exits the program and closes the window.

Syntax

`exit`

Arguments and Options

None

Command Example

```
exit
```

fpga 

Adds an FPGA for distributed instrumentation.

Syntax

```
fpga add [fpga [fpga ...]] [-iice iiceID] -type fpgaType -master_dtd2_reset
```

```
fpga [fpga ...]
```

A list of the FPGAs to be added.

```
-iice iiceID | all
```

Used when more than one IICE is defined to specify which IICE (*iiceID*) to use for distributed instrumentation. If the argument `all` is specified, the FPGA type applies to each IICE unit.

```
-type fpgaType
```

The type of FPGA to use for distributed instrumentation.

```
-master_dtd2_reset
```

Identifies the FPGA as the source of the master-reset signal.

haps

Queries the hardware to generate the requisite Tcl file for board generation and performs the verification tests.

Syntax

```
haps
  boardstatus [boardID]
  settings {setting value [setting value ...]}
  prog binFile devID
  setvcc voltage [region]
  setclk clockName frequency
  clear
  vbgen tclFile
  hstdm_report [{hstdmReportList} |ALLFPGAS |poll [{interval}]]
    [verbose] [device {index}]
  clock_check
  con_check [connectivityFileName] [logFileName]
  con_speed speed {fast|sweep} [connectivityFileName] [logFileName]
  umr_check fpgaID
```

Arguments and Options

boardstatus [boardID]

Displays the board status to the console window. Status includes clock and voltage settings, reset condition, daughter card connections, firmware version, and board serial number.

settings {setting value [setting value ...]}

Specifies the HAPS port (PORT_NAME), device (DEV_ID), and bus (BUS_NUM) settings. With no arguments, reports the current settings. The curly braces enclosing the arguments are required.

prog binFile devID

Programs the FPGA identified by *devID* with the specified bin file. The *devID* value ranges from 1 to 32 with 1 corresponding to the first FPGA on the board.

setvcc voltage [region]

Sets the I/O voltage for the board regions. The voltage value and region are selected from the corresponding drop-down menus and differ with the board/system selected. Multiple regions can be selected using the Ctrl key. If *region* is omitted, all regions are set to *voltage*.

setclk *clockName frequency*

Sets the frequency for the global input clock identified by *clockName* to the specified frequency. The *frequency* value is in kHz unless specified otherwise. For example, the command `haps setclk GCLK1 150MHz` specifies a clock frequency of 150 MHz for GCLK1.

restart

Clears the entire board/system configuration including the FPGA configuration, voltage, and clock settings.

confscr *scriptFileName*

Runs `confprosh tcl` scripts. For example, the `confscr` option can be used to source a HAPS clock and voltage-region configuration script; the user could then run clock checks to verify the on-board clock configuration.

tssgen *tclFile*

Queries the HAPS system and generates a Tcl file that describes the hardware setup. Use this file to check the hardware setup.

hstmd_report [*{hstmdReportList}*]**ALLFGAS****poll** [*{interval}*]
[**verbose**] [**device** *{index}*]

Queries and reports the current training status of the HSTDM blocks running in the user design.

hstmdReportList – a Tcl list of training report files to query.

ALLFGAS – query the training report files from all FPGAs.

poll [*interval*] – poll the FPGAs for the specified interval in seconds; the `poll` argument is not supported from the GUI.

verbose – include additional content in the training report.

device *index* – list training status for the FPGAs on the indexed board device.

clock_check – reports the clock frequency of each GCLK output to allow of all of the GCLK frequencies to be verified. When the All argument is used, runs all local tests with the individual test parameter defaults.

con_check [*connectivityFileName*] [*logFileName*] – verifies that the cabling between HapsTrak connectors is consistent with the defined connectivity file.

connectivityFileName – specifies the Tcl script that describes the connections between HapsTrak connectors in your current system set-up. The default script in the current working directory is named `connectivity.tcl`.

logFileName – specifies the name of the log file. The default file in the current working directory is named `hapstest.log`. Note that if you use a non-default log file, you must also explicitly specify the connectivity file even if you intend to use the default; for example:

```
haps run con_check {} ./logfiles/hapstest2.log
```

con_speed *speed* {**fast**|**sweep**} [*connectivityFileName*] [*logFileName*] – verifies the connectivity between HapsTrak connectors as well as the hypothetical speed at which HSTDM can run. In the syntax:

speed – the raw data transfer speed in Mbps; the acceptable values are 840, 960, 1080, or ALL (the ALL selection scans a range of speeds to determine the highest rate possible).

fast|**sweep** – sets the run mode. The default is fast mode. When mode is set to sweep, the test sweeps every channel of the connection which can require up to four hours to complete.

connectivityFileName – specifies the Tcl script that describes the connections between HapsTrak connectors in your current system set-up. The default script in the current working directory is named `connectivity.tcl`.

logFileName – specifies the name of the log file. The default file in the current working directory is named `hapstest.log`. If you use a non-default log file, you must also explicitly specify the connectivity file even if you intend to use the default.

umr_check *fpgaID* – verifies the basic functionality of the UMRBus. In the syntax:

fpgaID – indicates which FPGA device is to be tested. The default is 1, which is the first FPGA device on the first board.

Command Example

```
haps run umr_check 2 180
haps setclk GCLK1 150MHz
haps setvcc 1v8
haps help con_speed
haps settings {PORT_NAME emu:1 DEV_ID 4}
haps hstgm_report mb74_uD_hstgmreport.txt verbose
```

help

Displays the online help system and a help topic about a command.

Syntax

```
help [commandName]
```

Arguments and Options

commandName

Displays help text about the specified command. If the *commandName* argument is omitted, help descriptions for all commands are printed to the screen.

hierarchy

Navigates through the design hierarchy and shows design and hierarchy elements in the HDL design. These design elements include the following types, depending on the HDL language used to describe the design:

- Entity – VHDL design unit type.
- Module – Verilog design unit type.
- Instance – VHDL or Verilog design unit type.

Syntax

hierarchy add [*options*] *element* [*element ...*]

hierarchy cd *hierarchyPath*

hierarchy ls [-long] [-recursive] [-all] [*hierarchyPath*]

hierarchy pwd

hierarchy toplevel

hierarchy find [*options*] [*hierarchyPath*]

hierarchy delete [*options*] *element* [*element ...*]

hierarchy load [-bg] [-ls] [*path* [*path ...*]]

Arguments and Options

add [*options*] *element* [*element ...*]

Connects all signals or breakpoints in the specified hierarchical element to the IICE. The add argument applies only to the instrumentor.

The following add argument options are available:

-iice *iiceID* | all

Used when more than one IICE is defined to specify which IICE (*iiceID*) to connect. If the argument **all** is specified, the signals or breakpoints are connected to each IICE.

-sample

Connects all signals in the specified hierarchical element to the IICE sample buffer.

-trigger

Connects all signals in the specified hierarchical element to the IICE trigger logic.

-breakpoint

Connects all breakpoints in the specified hierarchical element to the IICE.

-recursive

Allow hierarchies to be traversed when a wildcard is included in the *element* argument.

Note: The **-sample**, **-trigger**, **-breakpoint**, and **-recursive** options can be combined in a single add argument.

cd *hierarchyPath*

Changes the current design hierarchy to the one specified by *hierarchyPath*. Either a relative or an absolute hierarchical path name can be used.

cd /

Changes the current design hierarchy to the top level of the hierarchy.

cd ..

Changes the current design hierarchy to next higher level.

ls [-long] [-recursive] [-all] [*hierarchyPath*]

Displays all information about the HDL design units within the current design hierarchy. You can display this design unit information in a long listing using the `-long` option or you can display this information recursively using the `-recursive` option. The `-all` option shows all HDL elements including hidden elements.

pwd

Lists the current HDL design hierarchy.

toplevel

Shows top-level hierarchy name.

find [*options*] [*hierarchyPath*]

Searches for specific HDL design units and lists those elements. Use this command to locate specified design units in the compiled HDL design file. The search is started from the specified hierarchical path. If you do not provide *hierarchyPath*, the search starts from the current working hierarchy.

The following find options are available:

-iice *iiceID*|all

Used when more than one IICE is defined to specify the IICE (*iiceID*) to be searched. If the argument `all` is specified, each IICE is searched.

-name *elementName*

The HDL element name to be located.

-noequiv

Limits the search to named path only and does not search equivalent paths.

-type *instance*|*breakpoint*|*signal**

The type of HDL element for the target search. If `*` is entered, search includes all elements.

-ls

Prints verbose information for each HDL element found.

-stat *status*|*

Serves as a filter to search for an HDL element with a specific instrumentation status. If * is entered, any instrumentation status is included in the search. The *status* argument takes the following options:

- **disabled** – limits search to disabled watchpoints, breakpoints, and other disabled HDL design units (available only in the debugger).
- **enabled** – limits search to enabled watchpoints, breakpoints, and other enabled HDL design units (available only in the debugger).
- **instrumented** – limits search to the sampling clock, and watchpoints and breakpoints that have been marked as instrumented (available only in the instrumentor).
- **not-instrumented** – limits search to watchpoints and breakpoints that have not been instrumented (available only in the instrumentor).
- **sample_only** – limits search to sample-only watchpoints (available only in the instrumentor).
- **trigger_only** – limits search to trigger-only watchpoints (available only in the instrumentor).

-maxdepth *integer*

Limits search to a maximum depth within the hierarchy tree.

-all

Lists “hidden” HDL design units, such as signals/breakpoints within dead code or, in the debugger, breakpoints that were not instrumented. By, default, HDL elements with enabled status are searched.

delete [*options*] *element* [*element* ...]

Disconnects all signals or breakpoints in the specified hierarchical element from the IICE. The delete argument applies only to the instrumentor.

The following delete argument options are available:

-iice *iiceID*|all

Used when more than one IICE is defined to specify which IICE (*iiceID*) to disconnect. If the argument all is specified, the signals or breakpoints are disconnected from each IICE.

-signal

Disconnects all sample and trigger signals in the specified hierarchical element from the IICE.

-breakpoint

Disconnects all breakpoints in the specified hierarchical element from the IICE.

Note: The `-signal` and `-breakpoint` options can be combined in a single delete argument.

load [-bg] [-ls] [*path* [*path* ...]]

Loads sub-hierarchy of all listed paths. The `-bg` argument runs the command in the background. The load argument applies only to the instrumentor.

Command Example

```
hierarchy cd ..
hierarchy cd /top/u1/arui
hierarchy ls -recursive
hierarchy find -type breakpoint -stat instrumented
```

See Also

- [show, on page 78](#)

idcode

Sets up and maintains a table of device ID codes. The ID code information is used for auto-detection of the devices on the JTAG chain during debugging. If the chain can be successfully detected, you do not need to manually specify the chain using the chain command.

Syntax

```
idcode add [-quiet] idcode deviceName instructionRegisterWidth
```

```
idcode clear
```

```
idcode info [-raw]
```

Arguments and Options

```
add [-quiet] idcode deviceName instructionRegisterWidth
```

Creates an entry in the device table for a given device.

The *idcode* argument should be a binary representation of a 32-bit number in the form of a string. The string can contain 'x' entries for bits that are irrelevant.

The *deviceName* argument can be any descriptive string. The string must be quoted if it includes spaces.

The *instructionRegisterWidth* argument takes an integer value. Every device has a specific instruction register width, which can be found in the device's Data Book.

The -quiet option adds the device, but does not display a user notification.

clear

Deletes the entire ID code table.

info [-raw]

Returns a description of the device table. The table is represented by a Tcl list of device elements where each element is a three item Tcl list specifying the ID code, device name, and instruction register width. Example:

```
{11001100110011001100110011001100 device_a 8}  
{00001100110011001100110011001111 device_b 10}
```

The optional `-raw` option generates the description in a machine-readable format.

Command Example

```
idcode add 0010000000111000100010001000 device_type 8  
idcode add -quiet 0010000000111000100010001000 "device type" 8  
idcode clear
```

See Also

- [device](#), on page 35
- [chain](#), on page 28

iice

Duplicates the functionality of the IICE Configuration dialog box.

Syntax

```
iice new|rename|list|delete|current|info|clock|controller|preconfigure|
sampler|assignmentsreport [option]
```

Arguments and Options

iice new [*iiceID*] [-type rtd|regular]

Creates a new IICE with the name *iiceID*. If the *iiceID* argument is omitted, the new IICE is named IICE_ *n* where *n* is the next sequential integer. The -type option indicates if the IICE is to be configured for real-time debugging (rtd) or normal debugging (regular). For more information on the real-time debugging feature, see the *User Guide*. The **iice new** command is only available in the instrumentor.

iice rename *iiceID*

Renames the currently active IICE to the name specified (*iiceID*). The **iice rename** command is only available in the instrumentor.

iice list

Lists the IDs (names) of each defined IICE.

iice delete *iiceID*

Deletes the specified IICE (*iiceID*). The **iice delete** command is only available in the instrumentor.

iice current [*iiceID*]

Used when more than one IICE is defined to select the active IICE (*iiceID*). If the *iiceID* argument is omitted, reports the ID of the currently active IICE. Note that *iiceID* is case sensitive.

iice info [*iiceID*]

Reports the status of the specified IICE (*iiceID*). If the *iiceID* argument is omitted, reports the status of the currently active IICE.

iice clock [*options*] [*signalName*]

Defines the signal to be used for the IICE sample clock. The *signalName* is the full hierarchical path name to the signal. You can select any signal within the HDL design as the sample clock. However, this signal cannot be sampled itself while used as the sample clock. This option can only be used during instrumentation. If *signalName* is not specified, the option returns the name of the IICE clock.

-edge positive/negative

Specifies the active edge of the clock (positive or negative) when an IICE sample clock is specified. The **-edge** option is only available in the instrumentor; the default edge is rising (positive).

-iice *iiceID*|all

Used when more than one IICE is defined to specify/report the controller parameters for the specified IICE (*iiceID*). If the argument **all** is specified, the controller parameters apply to each IICE.

iice controller [*options*] [**none|counter|statemachine**]

Specifies IICE controller configuration; simple triggering (**none**), complex triggering (**counter**), or state machine. The following options are supported:

-iice *iiceID*|all

Used when more than one IICE is defined to specify/report the controller parameters for the specified IICE (*iiceID*). If the argument **all** is specified, the controller parameters apply to each IICE.

-countermode [**events|cycles|watchdog|pulsewidth**]

Selects the complex counter mode. The value *n* referenced below is the value set by the **-counterval** option (applies only to the debugger).

events

Stops sampling after the trigger condition occurs for the *n*+1'th time. This is the default value for **-countermode**.

cycles

Stops sampling *n* cycles after the trigger condition occurs.

watchdog

Stops sampling if the trigger condition does not occur for n consecutive cycles.

pulsewidth

Stops sampling when the trigger condition has met n consecutive cycles. The number n is controlled by the current setting of `-counterval`.

-counterval *unsignedInteger*

Sets a value for the complex counter and loads that value into the complex counter (applies only to the debugger). The value must fit into the complex counter width as defined in the instrumentor. The default value for the complex counter is 16.

-counterwidth *integer*

Instrument a versatile counter of variable size for triggering (applies only to the instrumentor). An integer parameter in the range between 1 and 32 specifies a new counter width, and 0 suppresses the creation of a state-machine counter (a `-counterwidth` value of 0 is not recognized for complex-counter triggering). All other values are invalid. The default value for the counter width is 16 for both complex and state-machine counter triggering.

-triggerconditions *integer*

Used when instrumenting a design for state-machine triggering (applies only to the instrumentor). This command specifies the number of trigger conditions available for state-machine triggering. The range is from 1 to 16. The default value is 4. If no argument is given, the command shows the current pattern-tree setting.

This option is a critical setting with respect to instrumentation cost. Choosing a trigger setup with the minimum amount of trigger conditions is recommended to reduce resource usage in the instrumentation. Choosing a trigger-condition value greater than 1 requires that multiple trigger states be created. Use the `triggerstates` option to specify the desired number of states.

-triggerstates [*integer*]

Used when instrumenting a design to use state-machine triggering (applies only to the instrumentor). This option specifies the maximum number of states instrumented in the state machine. The range is 2 to 16; powers of 2 are preferable as other integers limit functionality and

do not provide any cost savings. The default is 4. If no argument is given, the option shows the current triggerstates setting.

-crosstrigger 0|1 [-iice *iiceID*]

Enables (1) or disables an IICE to include trigger signals from other IICE units when determining its trigger condition (applies only to the instrumentor). If the *-iice* argument is omitted, the command applies to the current IICE.

-exporttrigger 0|1

Determines if the master trigger signal of the IICE hardware is exported to the top-level of the instrumented design (applies only to the instrumentor). Enables (1) or disables the creation of a trigger port. Export trigger port creation is disabled by default.

-importtrigger *integer*

Determines if the master trigger signal of the active IICE hardware includes any triggers received from external sources (applies only to the instrumentor). Specifying a value between 1 and 8 creates a corresponding number of input ports.

Note: When using an external trigger, the pin assignment for the corresponding input port must be defined in the synthesis or place and route tool.

-crosstriggermode disabled|any|all|after -crosstriggeriice *iiceID*|all

Determines the trigger conditions in the debugger when the IICE controller is set to simple or complex-counter triggering. The following options are supported:

disabled

Destination IICE triggers normally (triggers from source IICE units are ignored).

any

Destination IICE triggers when any source IICE triggers or on its own internal trigger.

all

Trigger occurs when all events, irrespective of order, occur at all IICE units including local IICE unit.

after -crosstriggeriice *iiceID*|all

Trigger occurs after source IICE triggers coincident with next destination IICE trigger. The -crosstriggeriice argument specifies a specific source IICE unit (*iiceID*) or all source IICE units (all).

iice preconfigure [options]

Pre-configures a set of common instrumentor IICE options.

-iice *iiceID*|all

Used when more than one IICE is defined to identify the IICE unit; if all is specified, effective for all IICE units.

-countermode *events*|*cycles*|*pulsewidth*|*watchdog*

Pre-configures the mode for the counter.

-counterval *integer*

Pre-configures the value for the counter.

-crosstriggermode *disabled*|*any*|*after*|*all*

Pre-configures the cross-triggering mode.

-crosstriggeriice *iiceID*

IICE to be used when crosstriggermode is set to after.

-triggertime *early*|*middle*|*late*

Sets/gets trigger time for next run.

-samplemode *normal*|*qualified_fill*|*qualified_intr*|*always_armed*

Sets/gets the iice sample mode.

-datacompression *0*|*1*|*off*|*on*|*false*|*true*

Sets data compression.

-group *1*|*2*|*3*|*4*|*5*|*6*|*7*|*8*

Sets the specified sample group for sampling.

-notification 0|1|off|on|false|true

Disables/enables notification of a trigger event via an LED. If enabled, a top-level port `identify_trig_notification_LED_n_iiceID` (active low) will be added. It is then the user's responsibility to set up an appropriate location constraint for this port.

iice sampler [*options*]

The following iice sampler options are supported in the instrumentor:

-iice {*iiceID*|all} **internal_memory|haps_DTD**
-compression 0|1
-ram *option* [*value*]
-rtd {*mictorlocs* {*location* [*location ...*]}|**board** *boardType*}
-depth *depthValue*
-qualified_sampling 0|1
-always_armed 0|1

The following iice sampler options are supported in the debugger:

-triggertime *early*|*middle*|*late*
-samplemode *normal*|*qualified_fill*|*qualified_intr*|*always_armed*
-runselftest 0|1
-datacompression 0|1
-enablemask 0|1 [**-msb** *integer* **-lsb** *integer*] *signalName*
-group *interger*

Instrumentor iice sampler Options

-iice *iiceID*|all

Used when more than one regular IICE is defined to specify/report the IICE sampler parameters for the specified IICE (*iiceID*). If the argument `all` is specified, the IICE sampler parameters apply to each qualified IICE.

internal_memory|hapsDTD

The `internal_memory/haps_DTD` argument specifies the type of RAM used to capture the sample data; `internal_memory` uses local FPGA memory (the default) and `haps_DTD` uses an external RAM daughter board.

-compression 0|1

The `-compression` option determines if data compression is to be applied when the sample data is unchanged between cycles (the data is

automatically decompressed when viewed). A value of 1 enables data compression. An internal default is set to force an update after 64 cycles of unchanging data. The `-compression` option applies only to regular IICE units and is not supported by real-time debug IICE.

`-ram {option value}`

The `-ram` (or `-sram`) option applies only when the `bufferType` is set to `happssram` and an external RAM daughter board is installed. The `-ram` options are described below. The `-ram` option applies only to regular IICE units and is not supported by real-time debug IICE.

`{board type}`

Specifies the board type for HAPS-60 Series systems; recognized values are HAPS-61, HAPS-62, and HAPS-64.

`{ramlocations location}`

The connector location or locations where the daughter board is physically installed. For a HAPS-60 Series system, `location` is one or more integers between 1 and 6 that identify the J1 through J6 HapsTrak II connectors on the mother board. For a HAPS-70 Series system, `location` is a set of three adjacent HapsTrak 3 connectors on the mother board where the daughter board is installed. Multiple daughter boards can be installed, but only one daughter board can be dedicated to deep trace debug (additional daughter boards are allocated to user data memory).

`{numberboardstack integer}`

The number of SRAM daughter cards stacked at the specified RAM location. `Integer` is 1 or 2 for an SRAM installed on a HAPS-70 Series system and 1, 2, or 4 for an SRAM installed on a HAPS-60 Series system. The integer value specified applies to all connector locations (the stack depth must be the same at all locations).

`{type value}`

The RAM daughter card type according to the following table:

Type Value	Memory Daughter Board	System Type
6	SRAM_1x_HTII	HAPS-60 Series
7	SRAM_HT3	HAPS-70 Series

{clockfreq value}

Specifies the frequency of the clock source in MHz for the SRAM.

{clocktype external|internal clockName}

Specifies the source of the SRAM clock. When internal is specified, the clock source must be identified.

-rtd arguments

The **-rtd** option applies only when the IICE type is set to **rtd**. The **-rtd** arguments for the real-time debugging feature are described below. The **-rtd** option applies only to real-time debug IICE and is not supported by regular IICE units.

mictorlocs location [location ...]

Specifies the location of the Mictor board (or boards) installed in the HapsTrak connectors. Values range from 1 through 6 and more than one location can be specified by separating the values with spaces.

board boardType

Specifies the HAPS board type. The *boardType* entered must be in all caps.

-depth depthValue

Changes the default sample depth of the IICE sample buffer to an assigned value *depthValue*. This option can only be used during instrumentation and is only supported by regular IICE units. The default setting for *depthValue* is 128.

-qualified_sampling 0|1

Enables/disables qualified sampling. When enabled (1), a single sample of all sampled signals is collected each time the trigger condition is true. When a trigger condition occurs, instead of filling the entire buffer, the IICE collects the single sample and then waits for the next trigger to acquire the next sample to allow design operation to be monitored over an extended period of time.

Qualified sampling is impacted by the **-samplemode** setting; selecting the **qualified_fill** mode allows single samples to be acquired at each trigger event until the sample buffer is full, and selecting the **qualified_intr** mode

allows samples to continue to be acquired (and possibly overwriting existing samples) until interrupted.

The `-qualified_sampling` option applies only to regular IICE units and is not supported by real-time debug IICE. Using qualified sampling includes a minimal area and clock-speed penalty.

-always_armed 0|1

Enables/disables always-armed sampling. When enabled (1), the instrumentor saves the sample buffer for the most recent trigger and waits for the next trigger or until interrupted. With always-armed sampling, a snapshot is taken each time the trigger condition becomes true so that you always acquire the data associated with the last trigger condition prior to the interrupt. The `-always_armed` option applies only to regular IICE units and is not supported by real-time debug IICE. Using always-armed sampling includes a minimal area and clock-speed penalty.

Debugger ice sampler Options

-triggertime [early|middle|late]

Controls how a detected trigger affects data sampling (applies only to the debugger).

early

Approximately 10 percent of the sample data is pre-trigger and approximately 90 percent is post-trigger.

middle

Approximately 50 percent of the sample data is pre-trigger and approximately 50 percent is post-trigger. This is the default sample trigger.

late

Approximately 90 percent of the sample data is pre-trigger and approximately 10 percent is post-trigger.

-samplemode [normal|qualified_fill|qualified_intr|always_armed]

Selects the trigger mode (applies only to the debugger).

qualified_fill

Performs qualified sampling until the buffer is full.

qualified_intr

Performs qualified sampling until interrupted.

always_armed

Always-on triggering.

-runselftest 0|1

)Runs self-test to verify the deep trace debug hardware configuration. The self-test writes data patterns to the external memory and reads back the data pattern written to detect configuration errors, connectivity problems, and frequency mismatches.

-datacompression 0|1

Compresses debugger data when the sample data is unchanged between cycles (the data is automatically decompressed when viewed). A value of 1 enables data compression. An internal default is set to force an update after 64 cycles of unchanging data.

-enablemask 0|1 [-msb *integer* -lsb *integer*] *signalName*

Used when -datacompression option is enabled to selectively mask individual bits or buses from being considered as changing values within the sample data.

-group *integer*

Selects multiplexed group of instrumented signals defined in the instrumentor for activation in the debugger. *Integer* is the number of the multiplexed group which ranges from 1 to 8.

iice assignmentsreport [-filename *fileName*]

Prints the real-time debugging IICE assignments report showing signal, breakpoint, and connector assignment information. Executing this command prior to assigning logic analyzer pods to Mictor pin groups lists only the signals/breakpoints assignments information. Executing the command after assigning logic analyzer pods to Mictor pin groups additional lists the pod assignments. Including the optional -filename argument writes the report to the specified file instead of to standard out.

Command Example

```
iice clock -edge falling clk2
iice controller -counterwidth 8 statemachine
iice current IICE_2
iice sampler -triggertime late
iice sampler -datacompression 1
iice sampler -enablemask 1 -msb 3 -lsb 0 ctrlbus1a
iice sampler -iice IICE_2 -rtd {mictorloc {1 3 5}}
iice sampler -ram {ramlocations {7_8_9}}
```

instrumentation

Manipulates incremental instrumentations.

Syntax

instrumentation info [-raw] *name*

instrumentation list

instrumentation new -instr {*baseName*}
-ncdfile {*pathToFile.ncd* [*fpgaName*]} |
-dcpfile {*pathToFile.dcp* [*fpgaName*]}

instrumentation current

instrumentation load *name*

instrumentation save

Arguments and Options

info [*options*] *name*

Shows information about the specified instrumentation. If the -raw option is included, returns information in a machine readable format.

list

Lists the existing instrumentations (applies only to the instrumentor).

new -instr {*baseName*}
-ncdfile {*pathToFile.ncd* [*fpgaName*]} |
-dcpfile {*pathToFile.dcp* [*fpgaName*]}

current

Returns a key value-pair TCL list with information of current instrumentation.

load *name*

Loads an existing instrumentation into the instrumentor.

save

Saves the current instrumentation settings (applies only to the instrumentor).

Command Example

```
instrumentation load instr_2  
  
instrumentation new -instr {rev_1} -dcpfile  
{./proto/pr_1/post_route.dcp}
```

jtag_server

Configures the JTAG server.

Syntax

```
jtag_server set -addr {hostName|IP_address} -port {serverPort} -logf {logFileName}  
-usecs 1|0
```

```
jtag_server get
```

```
jtag_server stop -forced 0|1
```

Arguments and Options

set

Configures the JTAG server

-addr {hostName|IP_address}

The IP address or the name of the server.

-port {serverPort}

The port number over which the client and server communicate.

-logf {logFileName}

The name of the log file.

-usecs 1|0

Enables or disables the client-server configuration for the USB-based UMRBus.

get

Returns the server host name or IP address, port number, and log file name.

start

Selects the server startup mode.

-standalone 0|1

Selects the server startup mode. If set to 1, the debugger application is closed, and the JTAG server runs in the background.

Selects the cable type.

stop

Stops the server.

-forced 0|1

A value of 1 immediately stops all communications.

licenseinfo

Displays information about the product version and license status.

Syntax

licenseinfo

logicanalyzer

Configures the logic analyzer for real-time debugging (RTD). The scan options define the target logic analyzer, the assignpod option describes the analyzer interface, and the submit option sends the data to the logic analyzer. Additional options display the most recently used logic analyzer scan settings (lastscansettings option) and show the logic analyzer's presently scanned pod and module information (pods option).

Syntax

logicanalyzer scan -latype tla -hostname *hostName* -username *userName* -script *scriptName* -assignpodsauto yes|no

logicanalyzer scan -latype la16700|la16900 -hostname *hostName* -assignpodsauto yes|no

logicanalyzer assignpod -micconpingrp *groupName* -module *moduleNumber* -pod *podIdentifier*

logicanalyzer submit

logicanalyzer lastscansettings

logicanalyzer pods

Arguments and Options

-latype

The type of logic analyzer interfaced to the Mictor connector. Recognized types are tla, la16700, and la16900.

-hostname

The name or IP address (*hostName*) for the debugger host.

-username

The user name (*userName*) on the logic analyzer (Tektronix only).

-script

The name of the script (*scriptName*) to run to set up logic analyzer (Tektronix only).

-assignpodsauto

Determines if pods are automatically assigned to the Mictor connectors.

-micconpingrp

The Mictor connector pin group (*groupName*). The connector pin group is identified by the concatenation of the Mictor board HapsTrak connector location, the Mictor connector name, and the Mictor odd/even pin bank separated with periods. For example, 3.M1.e addresses the even bank of Mictor connector M1 on the Mictor board installed in HapsTrak connector 3.

-module

The module name.

-pod

The connector pod (slot) on the logic analyzer.

Command Examples

```
logicanalyzer scan -latype la16900 -hostname sisyphus  
-assignpodsauto yes
```

```
logicanalyzer assignpod -micconpingrp 2.M1.e -module 1  
-pod A2A3CK0
```

log

Allows logging the console output in the graphical user interface to a file.

Syntax

```
log fileName|on|off
```

Arguments and Options

fileName

Starts logging to the specified file.

on

Starts logging to the last specified file or to the default files `syn_di.log` or `syn_hhd.log`.

off

Stops logging.

Command Example

```
log on  
log off  
log mylog.log
```

See Also

- [transcript](#), on page 91

Note: This command is not supported in the command-line tools. Use the operating system capability to pipe the console input into a file.

project

Opens existing projects and displays project information.

Syntax

```
project import projectFile
```

```
project open [-password password] [fileName]
```

```
project name [-path]
```

Arguments and Options

```
import projectFile
```

Imports the specified project file.

```
open [-password password] SynopsysFPGAprojectFile
```

Performs a simple import of a project (`.prj`) file by extracting the design files, the device technology, and the design top level. This data is used to create an implementation (applies only to the instrumentor). After extracting the files, the design is automatically compiled.

```
-password password
```

Specifies the password to use to decrypt an encrypted source file (applies only to the debugger). Note that setting the password with this command displays the password on the screen and in any log files that you create. If this is a concern, use only the graphical interface when instrumenting and debugging designs that use the encryption feature.

```
name [-path]
```

Returns the name of the current project. If the `-path` option is specified, includes the full path to the project.

Command Example

```
project open C:/space/designs/mydesign.prj
```

```
project open -password xyzzy demo_design.prj
```

See Also

- [encryption, on page 40](#)

pwd

Displays the current working directory.

Syntax

```
pwd
```

See Also

- [cd, on page 27](#)

remote_trigger

Triggers the event (stops data collection and downloads data).

Syntax

```
remote_trigger [-all|-info|-pid processID|-iice iiceID]
```

```
remote_trigger -set|-reset [-pid processID|-iice iiceID]
```

Arguments and Options

-all

Triggers the event for every IICE in all debugger instantiations on the corresponding machine.

-info

Lists the names of the triggers in the current debugger instantiation.

-pid *processID*

Triggers every IICE on the debugger instantiation identified by *processID*. To identify the process ID of the active debugger instantiation, enter *pid* at the command prompt. The default is to trigger every IICE in all debugger instantiations (-all).

-iice *iiceID*

Triggers the event only on the specified IICE in the current debugger instantiation. The default is to trigger every IICE in all debugger instantiations (-all).

-set [-*pid processID*] **-iice** *iiceID*]

Sets the trigger. If the *-pid* argument is specified, sets the trigger on every IICE on the debugger instantiation identified by *processID*; if the *-iice* argument is specified, sets the trigger only on the IICE unit specified by *iiceID*.

-reset [-*pid processID*] **-iice** *iiceID*]

Clears the trigger. If the *-pid* argument is specified, resets the trigger on every IICE on the debugger instantiation identified by *processID*; if the *-iice* argument is specified, resets the trigger only on the IICE unit specified by *iiceID*.

Command Example

```
remote_trigger
remote_trigger -info
remote_trigger -set -pid 12
remote_trigger -reset -pid 12
remote_trigger -set -iice IICE0
```

See also

- triggermode option – [iice, on page 53](#)
- triggertime option – [iice, on page 53](#)

run 

Arms the IICE with the current trigger settings and waits until the trigger condition has occurred and has been detected by the IICE. Once the trigger condition has occurred, the sample data is downloaded from the IICE and is displayed on the screen.

Syntax

```
run -iice iiceID|all  
run -timeout integer  
run -wait  
run -skip_config  
run -wait_for_trigger integer
```

Arguments and Options

-iice *iiceID*|all

Used when more than one IICE is defined to specify the active IICE (*iiceID*) for triggering. If the argument `all` is specified, triggering applies to each IICE.

-timeout *integer*

Specifies the number of seconds that the debugger waits for a trigger before stopping. Whenever a time-out occurs, the data buffer is automatically updated. A value of 0 disables the time-out feature.

-wait

Causes the IICE to wait for the hardware to stop running before returning.

-skip_config

Used with a pre-configured trigger to bypass the normal IICE trigger setup configuration.

-wait_for_trigger *integer*

Initializes the clock control module and waits *integer* seconds for interrupt.

Note: The run command does not stop running until the trigger occurs. If the trigger does not occur, the run command does not stop. To cancel the run command, you must click the Stop button in the debugger menu bar. There is no stop command in the command shell.

Command Example

```
run -wait_for_trigger 15
```

searchpath

Sets a search path to find HDL design files during instrumentation or debugging.

Syntax

```
searchpath [{directoryList}]
```

Arguments and Options

Without an argument, the current search path is displayed.

[{directoryList}]

Searches the specified directories, in order, for design files. *DirectoryList* can take the form of the following:

- On a Windows platform: a semicolon-separated list of valid directories. Note that the Windows “\” separator is not allowed in path names.
- On a Linux platform: a colon-separated list of valid directories.

Default Value

By default, the search path is the current working directory.

Command Example

```
searchpath {C:/temp;D:/user/joe}
searchpath {/home/john:/home/designs}
```

setsys

Sets and queries user customization variables.

Syntax

setsys list

setsys variables

setsys set lpt_address [*value*]

Arguments and Options

list

Lists all available variables with their respective values.

variables

Lists all available variables with a short description explaining their function.

set lpt_address [*value*]

Specifies the device address for the parallel port. This setting overrides the operating system defaults. *Value* ranges from 0 to 65535; the default value is "0". If no value is supplied, returns the current value.

Command Example

```
setsys set lpt_address 4095
```

show

Displays an HDL source code context on the command line.

Syntax

```
show [-integer] [+integer] fileName:lineNumber
```

Arguments and Options

[-integer]

Displays a designated number (*integer*) of lines before the *lineNumber* listed. The default number of lines displayed is 5.

[+integer]

Displays a designated number (*integer*) of lines after the *lineNumber* listed. The default number of lines displayed is 5.

fileName:lineNumber

Displays an HDL design file at the selected *lineNumber*.

Command Example

```
show -8 +16 cpu.vhd:29
```

signals

Instructs the instrumentor to create special debug logic for the IIICE to sample a signal from your HDL design or to delete the debug logic and return the signal to its “not instrumented” status. The group options assign and report signals in multiplexed groups.

Syntax

```

signals add [options] sigName [sigName ... ]
signals add [options] -msb value [-lsb value] sigName

signals delete [options] sigName [sigName ... ]
signals delete [options] -msb value [-lsb value] sigName

signals group {groupNumber} sigName [sigName ...]
signals group -show all|sigName [sigName ...]
signals group -show_tab all|sigName [sigName ...]

signals map {sigName} connectorPin

signals map_fpga [options] sigName [sigName ...] [-show_tab value]
    [-fpga value]

signals preconfigure [options]

```

Arguments and Options

```

add sigName [sigName ...]
add -msb value [-lsb value] sigName

```

SigName is the full hierarchical path name of the signal. In the first syntax statement, more than one signal can be specified for sampling or triggering by including additional signal names separated by spaces. In the second syntax statement, the **-msb** and **-lsb** arguments specify a bit or bit range of a bus. Note that when specifying partial buses:

- Use the **-msb** argument (without an **-lsb** argument) to specify a single bit
- Observe the index order of the bus. For example, when defining a partial bus range for bus [63:0] (or “63 downto 0”), the MSB value specified must be greater than the LSB value. Similarly, for bus [0:63] (or “0 upto 63”), the MSB value specified must be less than the LSB value.

The following options are available with the add argument:

-iice *iiceID*|all

Used when more than one IICE is defined to specify the active IICE (*iiceID*) for signal sampling/triggering. If the argument all is specified, signal sampling/triggering applies to each IICE.

-sample

Connects the specified signal or signals to the IICE sample buffer.

-silent

Suppresses resource estimation display when a signal is added (by default, adding a signal automatically updates the total instrumentation requirements in the console window).

-field *fieldName*

Instrument the named field or record for the specified signal (partial instrumentation).

-trigger

Connects the specified signal or signals to the IICE trigger logic.

Note: The -sample and -trigger options can be combined or both options can be omitted to specify a signal for both sampling and triggering.

delete *sigName* [*sigName* ...]
delete -msb *value* [**-lsb** *value*] *sigName*

SigName is the full hierarchical path name of the signal. In the first syntax statement, more than one signal can be specified for deletion by including additional signal names. In the second syntax statement, the -msb and -lsb arguments identify a previously specified bit or bit range of a bus.

Note: When a partial bus is defined, you must explicitly delete the individual bus segments to return their status to non-instrumented.

The following options are available with the `delete` argument:

-iice *iiceID*|**all**

Used when more than one IICE is defined to specify the active IICE (*iiceID*) for sample signal deletion. If the argument `all` is specified, sample signal deletion applies to each IICE.

-field *fieldName*

Removes the instrumentation from the named field or record for the specified signal (partial instrumentation).

group {*groupNumber* [*groupNumber*]} *sigName* [*sigName* ...]

group -show all|*sigName* [*sigName* ...]

group -show_tab all|*sigName* [*sigName* ...]

In the first syntax statement, *groupNumber* is an integer value specifying the assigned multiplexed group number from 1 through 8, and *sigName* is the full hierarchical path name of the instrumented signal to be assigned to that group. Multiple signals can be assigned to a group by separating the signal names with spaces, and signals can be assigned to more than one group by including additional group numbers separated by spaces and enclosed in curly braces.

The following options are available with the `group` argument:

-show all|*sigName* [*sigName* ...]

Lists the group or groups assigned to *sigName*. If the `all` argument is included, lists all of the signals that have been assigned to groups and their group numbers.

-show_tab all|*sigName* [*sigName* ...]

Lists the group or groups assigned to *sigName* in tabular format. If the `all` argument is included, lists all of the signals that have been assigned to groups and their group numbers.

map {*sigName*} *connectorPin*

Assigns *sigName* to the specified Mictor connector pin location. In the above syntax, *sigName* is the full hierarchical path name to the signal or bus and *MictorPinName* is the concatenation of the Mictor board HapsTrak connector location, the Mictor connector name, and the Mictor pin name separated with periods. For example, 3.M1.D3e is the D3e pin of Mictor connector M1 on the Mictor board installed in HapsTrak connector 3.

signals map_fpga [*options*] *sigName* [*sigName* ...] [-**show_tab** *value|all*] [-**fpga** *fpga*]

Maps signals to the specified FPGA. The following options are available with the `map_fpga` argument:

-iice *iiceID|all*

The IICE unit to use or all IICE units.

-show_tab [*all*]

Shows the FPGA mapping for the specified the signals listed in tabular form; specifying `all` shows the mapping for all signals.

-fpga *fpga*

The target FPGA for the mapping.

preconfigure [*options*] *signalName* [-**msb** *integer* -**lsb** *integer*] [-**field** *argument*]

Sets/gets preconfigured trigger conditions for the specified signal.

-iice *iiceID|all*

The IICE unit to use or all IICE units.

-condition {*triggerCondition*}|**all**

Specifies the trigger conditions to enable. Accepts a Tcl list of conditions (e.g., {1 2 5}) or `all` for all conditions.

-msb *integer*

The msb of a bus slice to instrument.

-lsb *integer*

The lsb of a bus slice to instrument.

-field arg

field of a record to instrument

Command Example

```
signals add /top/u1/reset_n
signals add -iice IICE_2 -trigger /top/u1/clken
signals add -sample -field iport_mem {/Struc_P_Signed_LDDT_iport}
signals delete -msb 63 -lsb 32 /top/data_in
signals group {2 3} /top/data_in top_data_out
signals group -show_tab all
signals map /beh/blk_xfer_cntrl/req_o 4.M1.D13o
signals map /beh/blk_xfer_inst/beh/{slave_bus[0]} 4.M1.D13o
```

See Also

- [breakpoints, on page 25](#)
- clock option – [iice, on page 53](#)

source

Runs a TCL script of commands.

Syntax

```
source fileName
```

Arguments and Options

FileName contains a script of TCL commands plus commands for the debugger.

Command Example

```
source /home/joe/syn.tcl  
source E:/counter/load.tcl
```

statemachine

Configures the state machine with the desired behavior.

Syntax

```
statemachine addtrans [-iice iiceID|all] -from state [-to state]
                    [-cond "equation|ti triggerInID"] [-cntval integer] [-cnten] [-trigger]
```

```
statemachine clear [-iice iiceID|all] -all|state [state ...])
```

```
statemachine info [-iice iiceID|all] [-raw] -all|state [state ...])
```

Arguments and Options

addtrans -iice *iiceID*|all

Used when more than one IICE is defined to specify the active IICE (*iiceID*) for state-machine configuration. If the argument *all* is specified, state-machine configuration applies to each IICE.

addtrans -from *state*

Specifies the state from which the transition is exiting. This option is required to add a transition to the state machine.

addtrans [-to *state*]

Specifies the state to which the transition goes. If the *-to* option is not given, the state defaults to the state given by the *-from* option, thus creating a transition back to the *-from* state.

addtrans [-cond "*equation*|*ti triggerInID*"]

Specifies the condition or external trigger under which the transition is to be taken. The default is "true" (that is, the transition is taken regardless of any input data).

The conditions are specified using boolean expressions comprised of variables and operators. The available variables are:

- **c0, ... cn**: where *n* is the number of trigger conditions instrumented. These variables represent the trigger output of the respective trigger condition.

- **cntnull**: true whenever the counter is equal to '0' (only available if a counter has been instrumented using the `-counterwidth` option of the `iice` controller command).
- **iiceID**: this variable is used with cross triggering to define the source IICE units to be included in the equation for the destination IICE trigger.
- **tiTriggerInID**: the ID (0 thru 7) of an external trigger input.

Operators are:

- Negation: `not`, `!`, `~`
- AND operators: `and`, `&&`, `&`
- OR operators: `or`, `||`, `|`
- XOR operators: `xor`, `^`
- NOR operators: `nor`, `~|`
- NAND operators: `nand`, `~&`
- XNOR operators: `xnor`, `~^`
- Equivalence operators: `==`, `=`
- Constants: `0`, `false`, `1`, `true`

Parentheses '(,)' are recommended whenever the operator precedence is in question. Use the `state info` command to verify the conditions specified.

addtrans [-cntval *integer*]

Specifies that in the case when the transition is taken, the counter must be loaded with the given value. This option is only valid if a counter was instrumented using the `iice` controller `-counterwidth` option.

addtrans [-cnten]

If this flag is given, the counter is decremented by '1' during this transition. This flag is only valid if a counter was instrumented using the `iice` controller `-counterwidth` option.

addtrans [-trigger]

If this flag is given, the trigger occurs during this transition.

clear [-iice *iiceID*|all] -all|state [*state* ...]

Deletes state transitions.

-iice *iiceID*|all

Used when more than one IICE is defined to specify the active IICE (*iiceID*) for state-machine transition deletion. If the argument all is specified, transition deletion applies to each IICE.

-all|state [*state* ...]

Deletes the state transitions from the states given in the argument, or from all states if the argument -all is specified.

info [-iice *iiceID*|all] [-raw] -all|state [*state* ...]

Prints the current state-machine settings.

-iice *iiceID*|all

Used when more than one IICE is defined to specify the active IICE (*iiceID*) reporting the state-machine settings. If the argument all is specified, the settings for each IICE are reported.

-all|state [*state* ...]

Reports the settings for the states given in the argument or, if the option -all is specified, for the entire state machine.

-raw

Reports the settings in a machine-processible form.

Command Example

```

statemachine addtrans -from 0 -to 1 -cntval 9
statemachine addtrans -from 0 -cond "(c1 | c2)" -trigger
statemachine addtrans -from 1 -cond "c1 && c2" -cnten
statemachine addtrans -from 2 -cond "c2 && cntnull" -trigger
statemachine addtrans -from 0 -cond "IICE_1 and IICE_2" -trigger
statemachine clear 1

```

```
statemachine info -all
```

See Also

- [iice controller -counterwidth option – iice, on page 53](#)
- [iice controller -triggerconditions option – iice, on page 53](#)
- [iice controller -crosstrigger option – iice, on page 53](#)
- [condition info, on page 32](#)

Note: The order in which the transitions are added is important. In each state, the first transition condition that matches the current data, is taken. There may be other transitions later in the list that also match the current data, but they are ignored.

stop 

Activates/deactivates an HDL source-level breakpoint that has been added by the instrumentor. All activated breakpoints are used to form the trigger condition of the IICE. Only breakpoints that have been instrumented using the `breakpoints add` command can be activated. One or more breakpoints can be activated/deactivated at the same time. A breakpoint name consists of two components:

- The fully hierarchical path of the HDL design unit that denotes the underlying control statement of the breakpoint.
- The HDL source code location given by the file name and the line number of the breakpoint.

The combination of these two components ensures that each breakpoint has a unique name.

Syntax

stop disable [*options*] *breakpointName* [*breakpointName* ...]

stop enable [*options*] *breakpointName* [*breakpointName* ...]

stop info [-raw] *breakpointName*

Arguments and Options

disable [*options*] *breakpointName* [*breakpointName* ...]

Deactivates one or more HDL source-level breakpoints.

-iice *iiceID*|**all**

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing the breakpoint to be disabled. If the argument **all** is specified, disabling the breakpoint applies to each IICE.

-condition all | {*conditionList*}

Specifies a list of trigger conditions in which to disable the breakpoint or breakpoints. If only one trigger condition exists in the current design, this option can be omitted, otherwise it is required. The identifier **all** disables all breakpoints from all trigger conditions.

enable [*options*] *breakpointName* [*breakpointName* ...]

Activates one or more HDL source-level breakpoints.

-iice *iiceID*|**all**

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing the breakpoint to be enabled. If the argument **all** is specified, enabling the breakpoint applies to each IICE.

-condition **all**|{*conditionList*}

Specifies a list of trigger conditions in which to enable the breakpoints. If only one trigger condition exists in the current design, this option can be omitted, otherwise it is required. The identifier **all** enables the breakpoints from all trigger conditions.

info [**-raw**] *breakpointName* [*breakpointName* ...]

Displays information about the settings for the given HDL breakpoint. The **-raw** option provides the information in a machine-readable format.

Command Example

```
stop disable -condition 1 /top/u1/case_128/cpu.vhd:29
```

See also

- [breakpoints, on page 25](#)
- [iice, on page 53](#)

transcript

Controls recording of all typed commands into a transcript file.

Syntax

```
transcript [fileName]
```

```
transcript [off]
```

```
transcript [on]
```

Arguments and Options

transcript *fileName*

Saves all typed commands to the file specified by *fileName*.

transcript off

Commands system to stop recording commands.

transcript on

Commands system to start recording all typed commands and to store them to the default transcript file. The default file is `syn_di.scr` for the instrumentor and `syn_hhd.scr` for the debugger.

Default Value

By default, command recording is off.

Command Example

```
transcript on
```

See Also

- [log](#), on page 70

verdi

Imports or instruments signals from the Verdi essential signal database.

Syntax

```
verdi getsignals ESDBpath  
verdi instrument
```

Arguments and Options

ESDBpath is the location where es.esdb++ is installed.

watch

Activates/deactivates a watchpoint as a trigger condition for the IICE. A watchpoint triggers when the sample value of the watched signal matches the watch value. Only signals that have been instrumented using the `signals add` command can be used for watchpoints.

Syntax

```

watch disable [options] signalName [signalName ...]
watch disable [options] -msb value [-lsb value] signalName

watch enable [options] signalName {value} {valueFrom} {valueTo}
watch enable [options] -msb value [-lsb value]
  signalName {value} {valueFrom} {valueTo}

watch info [-raw] signalName

watch radix [options] signalName [default|binary|octal|integer|unsigned|hex]

watch width signalName

```

Arguments and Options

Deactivates an HDL source-level watchpoint. One or more watchpoints can be deactivated at the same time.

```

disable [options] signalName [signalName ...]
disable [options] -msb value [-lsb value] signalName

```

SigName is the full hierarchical path name of the signal. In the first syntax statement, more than one signal can be deactivated for sampling or triggering by including additional signal names separated by spaces. In the second syntax statement, the `-msb` and `-lsb` arguments specify a bit or bit range of a bus. Note that when specifying partial buses:

- Use the `-msb` argument (without an `-lsb` argument) to specify a single bit
- Observe the index order of the bus. For example, when defining a partial bus range for bus `[63:0]` (or “63 downto 0”), the MSB value specified must be greater than the LSB value. Similarly, for bus `[0:63]` (or “0 upto 63”), the MSB value specified must be less than the LSB value.

-iice *iiceID*|all

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing the watchpoint to be disabled. If the argument all is specified, disabling the watchpoint applies to each IICE.

-condition all|{*conditionList*}

Specifies a list of trigger conditions in which to disable the watchpoint. If only one trigger condition exists in the current design, then this option can be omitted, otherwise it is required. The identifier all can be used to disable the watchpoint from all trigger conditions.

enable [*options*] *signalName* {*value*}|{*valueFrom*} {*valueTo*}

enable [*options*] **-msb** *value* **-lsb** *value* *signalName* {*value*}|{*valueFrom*} {*valueTo*}

When only *value* is specified for *signalName*, gives the watchpoint signal an exact value that the system watches for, and enables that watchpoint for triggering. When *valueFrom*/*valueTo* is specified, gives the watchpoint signal two values that the system watches for, and enables the watchpoint for triggering. These formats allow you to specify a trigger condition on the value transition of a signal. In the second syntax statement, the **-msb** and **-lsb** arguments specify a bit or bit range of a bus. Note that when specifying partial buses:

- Use the **-msb** argument (without an **-lsb** argument) to specify a single bit
- Observe the index order of the bus. For example, when defining a partial bus range for bus [63:0] (or “63 downto 0”), the MSB value specified must be greater than the LSB value. Similarly, for bus [0:63] (or “0 upto 63”), the MSB value specified must be less than the LSB value.

-iice *iiceID*|all

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing the watchpoint to be enabled. If the argument all is specified, enabling the watchpoint applies to each IICE.

-condition all|{*conditionList*}

Specifies a list of trigger conditions in which to enable the one or more watchpoints. If only one trigger condition exists in the current design, this option can be omitted, otherwise it is required. The identifier all enables the watchpoints from all trigger conditions.

info [-raw] *breakpointName* [*breakpointName* ...]

Displays information about the settings for the given HDL watchpoint. The -raw option provides the information in a machine readable format.

radix [*options*] *signalName* [default|binary|octal|integer|unsigned|hex]

Displays or changes the radix of the specified watchpoint signal for the sampled data. Specifying default resets the radix to its initial intended value. Note that the radix value is maintained in the “activation database” and that this information will be lost if you fail to save or reload your activation. Also, the radix set on a signal is local to the debugger and is not propagated to any of the waveform viewers. Note that with partial buses, the radix applies to the entire bus.

-iice *iiceID*|all

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing *signalName*. If the argument all is specified, the radix is reported/changed for each IICE.

width *signalName*

Reports the width of a vectored (bused) signal. Note that with partial buses, the width reported always applies to the entire bus.

Command Example

```
watch enable /top/u2/current_state {red}
watch enable -condition {1 2} /top/u1/count {"0X01"} {"0010"}
watch radix current_state hex
watch enable /top/bx {4'b0010}
watch enable -msb 3 -lsb 0 /top/u2/data_sel {4'h0}
watch enable -condition all /top/done {1'b0} {1'b1}
```

See also

- [signals, on page 79](#)
- controller -triggerconditions option – [iice, on page 53](#)

waveform

Configures the waveform preferences and launches the desired waveform viewer once the debugger has uploaded data from the instrumented design.

Syntax

waveform custom [*userProcedure*]

waveform period [*period_in_ns*]

waveform show [*options*]

waveform viewer [*options*] **aldec|verdi|dve|gtkwave|modelsim|custom**

Arguments and Options

custom [*userProcedure*]

Sets/gets user-defined TCL procedure (*userProcedure*) that is used to launch a custom waveform viewer. This procedure must be defined in the TCL window or sourced through a startup script prior to launching the waveform viewer. The default value is `custom_waveform`. This procedure is called by `waveform show` with the following five arguments:

- *lang* – the language the design is written in -- Verilog or VHDL
- *toplevel* – the name of the top-level module or entity
- *firstcycle* – the cycle number of the first cycle
- *sampledepth* – the total number of samples
- *period* – the period for the waveform display independent of the design speed

period [*period_in_ns*]

Sets/gets the period with which to display the debug data in the waveform viewer. Since the debugger has no information about the timing of the user design, this setting is merely used for customizing the display.

show

Launches the waveform viewer that is currently selected with the current set of sample data.

-iice *iiceID*|all

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing the sample data to be displayed. If the argument *all* is specified, the sample data is displayed for each IICE.

-showequiv

Includes all equivalent signals in the sample data.

viewer [*options*] *aldec|verdi|dve|gtkwave|modelsim|custom*

Selects the user preference for the waveform viewer. The selection *custom* causes the waveform *show* command to call the procedure specified by the waveform *custom* command.

-list

Lists the available waveform viewer choices. An asterisk preceding the waveform viewer name in the list indicates the currently selected viewer.

Command Example

```
waveform viewer -list
```

```
waveform show -showequiv
```

write fsdb

Writes the sample data of each specified signal in FSDB format for analysis and display in Verdi nWave.

Syntax

```
write fsdb [options] fsdbFilename
```

Arguments and Options

-iice *iiceID*

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing the sample data.

-showequiv

Includes the sample data for all equivalent signals.

-range {*start stop*}

Writes a specified range of sample data to the FSDB file.

fsdbFilename

Writes the sample data to the specified fast signal database output file.

Command Example

```
write fsdb D:/tmp/b.fsdb
```

write instrumentation

Writes the instrumented design files to the project directory.

Syntax

write instrumentation *options*

Options

-save_orig_src

Create an `orig_sources` directory in the project directory and copy the user's original sources into this directory.

-encrypt_orig_src

Encrypt the original sources in the `orig_sources` directory. The encryption is based on a password which must previously be set with the `encryption set_passwd` command. Attempting to use this flag without a valid password set results in an error. Note that the `-encrypt_orig_src` flag implies and overrides the `-save_orig_src` flag. When neither flag is set, no `orig_sources` directory is created in the project directory.

-idc_loc *directory*

Save Identify constraints to the specified directory.

-idc_only

Save only the `idc` file.

-cdc_only

Save only the `CDC` file.

Command Example

```
write instrumentation -encrypt_orig_src
write instrumentation -save_orig_src
write instrumentation -idc_only
```

See Also

- [encryption, on page 40](#)

write samples

Writes the sample data of each specified signal.

Syntax

```
write samples [options] signalName [signalName ...]
write samples [options] -msb value [-lsb value] signalName
```

In the above syntax statements, *sigName* is the full hierarchical path name of the signal. In the first syntax statement, sample data can be written for more than one signal by including additional signal names separated by spaces. In the second syntax statement, the **-msb** and **-lsb** arguments specify a bit or bit range of a bus. Note that when specifying partial buses:

- Use the **-msb** argument (without an **-lsb** argument) to specify a single bit
- Observe the index order of the bus. For example, when defining a partial bus range for bus [63:0] (or “63 downto 0”), the MSB value specified must be greater than the LSB value. Similarly, for bus [0:63] (or “0 upto 63”), the MSB value specified must be less than the LSB value.

Arguments and Options

-iice *iiceID*

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing the sample data for the specified signal.

-cycle {*cycleFirst* *cycleLast*}

Specifies the range of sample data displayed. You can view the data at different points of the trigger event. Enter a negative cycle value to view data sampled before the triggered event. Enter a positive cycle value to view data samples after the trigger event. Enter a zero cycle value to view data sampled during the trigger event.

-file *fileName*

Writes the sample data to a specified output file. If no file is given, the data is displayed on the screen.

-force

Overwrite *fileName* if it exists

-raw

Return machine-readable samples. For each signal specified, the command returns a Tcl list formatted as shown:

```
{{signalName cycleFirst cycleLast} {sampleValuesList}}
```

Command Example

```
write samples -file D:/tmp/samples.txt /top/u1/count  
write samples -cycle { -10 10 } /top/u2/current_state  
write samples -msb 31 -lsb 0 /top/u3/data_outA
```

write vcd

Writes the sample data of each specified signal to a Verilog Change Dump (vcd) format.

Syntax

```
write vcd [options] fileName
```

Arguments and Options

-iice *iiceID*

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing the sample data for the specified signal.

-comment *commentText*

Inserts a text comment into a file. Use curly braces ‘{}’ to group a multi-word comment.

-gtkwave

Creates a GTKWave control file for the VCD output file.

-showequiv

Includes the sample data for all equivalent signals.

fileName

Writes the sample data to the specified output file.

Command Example

```
write vcd -gtkwave D:/tmp/b.vcd
```

write vhdlmodel

Creates a VHDL model from sample data. This command is not supported in Verilog-based designs or in mixed-language designs when the top-level is a Verilog module.

Syntax

```
write vhdlmodel [options] fileName
```

Arguments and Options

-iice *iiceID*

Used when more than one IICE is defined to specify the active IICE (*iiceID*) containing the sample data for the VHDL model.

-showequiv

Includes the sample data for all equivalent signals.

fileName

Writes the VHDL model to a specified output file.

Command Example

```
write vhdlmodel D:/tmp/b.vhd
```


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