

# **Synthesis**

## **Tool Invocation Commands**

---

Version C-2009.06-SP4, December 2009

**SYNOPSYS<sup>®</sup>**

# Copyright Notice and Proprietary Information

Copyright © 2009 Synopsys, Inc. All rights reserved. This software and documentation contain confidential and proprietary information that is the property of Synopsys, Inc. The software and documentation are furnished under a license agreement and may be used or copied only in accordance with the terms of the license agreement. No part of the software and documentation may be reproduced, transmitted, or translated, in any form or by any means, electronic, mechanical, manual, optical, or otherwise, without prior written permission of Synopsys, Inc., or as expressly provided by the license agreement.

## Right to Copy Documentation

The license agreement with Synopsys permits licensee to make copies of the documentation for its internal use only. Each copy shall include all copyrights, trademarks, service marks, and proprietary rights notices, if any. Licensee must assign sequential numbers to all copies. These copies shall contain the following legend on the cover page:

“This document is duplicated with the permission of Synopsys, Inc., for the exclusive use of \_\_\_\_\_ and its employees. This is copy number \_\_\_\_\_.”

## Destination Control Statement

All technical data contained in this publication is subject to the export control laws of the United States of America. Disclosure to nationals of other countries contrary to United States law is prohibited. It is the reader's responsibility to determine the applicable regulations and to comply with them.

## Disclaimer

SYNOPTSYS, INC., AND ITS LICENSORS MAKE NO WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, WITH REGARD TO THIS MATERIAL, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

## Registered Trademarks (®)

Synopsys, AMPS, Astro, Behavior Extracting Synthesis Technology, Cadabra, CATS, Certify, CHIPit, Design Compiler, DesignWare, Formality, HDL Analyst, HSIM, HSPICE, Identify, Leda, MAST, ModelTools, NanoSim, OpenVera, PathMill, Physical Compiler, PrimeTime, SCOPE, Simply Better Results, SiVL, SNUG, SolvNet, Syndicated, Synplicity, Synplify, Synplify Pro, Synthesis Constraints Optimization Environment, TetraMAX, the Synplicity logo, UMRBus, VCS, Vera, and YIELDirector are registered trademarks of Synopsys, Inc.

## Trademarks (™)

AFGen, Apollo, Astro-Rail, Astro-Xtalk, Aurora, AvanWaves, BEST, Columbia, Columbia-CE, Confirma, Cosmos, CosmosLE, CosmosScope, CRITIC, CustomExplorer, CustomSim, DC Expert, DC Professional, DC Ultra, Design Analyzer, Design Vision, DesignerHDL, DesignPower, DFTMAX, Direct Silicon Access, Discovery, Eclipse, Encore, EPIC, Galaxy, Galaxy Custom Designer, HANEX, HAPS, HapsTrak, HDL Compiler, Hercules, Hierarchical Optimization Technology, High-performance ASIC Prototyping System, HSIM<sup>plus</sup>, i-Virtual Stepper, IICE, in-Sync, iN-Tandem, Jupiter, Jupiter-DP, JupiterXT, JupiterXT-ASIC, Liberty, Libra-Passport, Library Compiler, Magellan, Mars, Mars-Rail, Mars-Xtalk, Milkyway, ModelSource, Module Compiler, MultiPoint, Physical Analyst, Planet, Planet-PL, Polaris, Power Compiler, Raphael, Saturn, Scirocco, Scirocco-i, Star-RCXT, Star-SimXT, StarRC, System Compiler, System Designer, Taurus, TotalRecall, TSUPREM-4, VCS Express, VCSi, VHDL Compiler, VirSim, and VMC are trademarks of Synopsys, Inc.

## Service Marks (SM)

MAP-in, SVP Café, and TAP-in are service marks of Synopsys, Inc.

SystemC is a trademark of the Open SystemC Initiative and is used under license.

ARM and AMBA are registered trademarks of ARM Limited.

Saber is a registered trademark of SabreMark Limited Partnership and is used under license.

All other product or company names may be trademarks of their respective owners.

# Table of Contents

---

acs_setup . . . . .	1
aman. . . . .	2
cache_ls . . . . .	3
cache_rm . . . . .	4
create_types . . . . .	5
dc_shell . . . . .	8
design_vision . . . . .	19
lc_shell . . . . .	21
synenc . . . . .	30
synopsys_users . . . . .	31



## **acs\_setup**

This command is obsolete from 2000.05 release.

For more information about setting up directory structure and the project setup files, please refer to ACS user's guide.

# aman

Displays Synopsys extended error messages.

## SYNTAX

**aman** [*error\_message\_code*]  
string *error\_message\_code*

## ARGUMENTS

## DESCRIPTION

Displays the Synopsys extended error message for the given *error\_message\_code*.

## EXAMPLES

```
unix> aman HDLA-1
```

Command Reference	N. Messages	messages
-------------------	-------------	----------

### NAME

HDLA-1 (error) Design '%s' does not contain HDL Advisor information.

### DESCRIPTION

Either of the following cases may apply :

.....

### WHAT NEXT

Fix your syntax errors and use `ha_shell` to read/analyze your HDL source files and regenerate the GTECH design.

```
unix>
```

## SEE ALSO

## cache\_ls

Lists elements in a Synopsys cache.

### SYNTAX

```
cache_ls cache_dir reg_expr  
string cache_dir  
string reg_expr
```

### ARGUMENTS

*cache\_dir*

Specifies a UNIX pathname to the cache directory to be searched. The pathname should end with the directory component "synopsys\_cache".

*reg\_expr*

Specifies a regular expression to be used to match the pathname of each cache element that is to be listed. The regular expression is the type accepted by the UNIX egrep command.

### DESCRIPTION

From the directory *cache\_dir*, this command lists the cache elements whose pathname (as opposed to the filename) matches the expression *reg\_expr*. The command is translated into the following UNIX command:

```
find cache_dir -type f -exec ck_path.sh {} reg_expr ; -print
```

As an aside, an easy way to get all the cache elements is the UNIX command "ls -R".

### EXAMPLES

In this example, all of the cache elements with "add" in their pathname are listed:

This example lists cache elements that use lsi\_10k or generic technology libraries:

### SEE ALSO

cache\_rm(1).

## cache\_rm

Removes elements from a Synopsys cache.

### SYNTAX

```
cache_rm cache_dir reg_expr  
string cache_dir  
string reg_expr
```

### ARGUMENTS

*cache\_dir*

Specifies a UNIX pathname to a cache directory. The pathname should end with the directory component "synopsys\_cache".

*reg\_expr*

Specifies a regular expression to be used to match the pathname of each cache element that is to be removed. The regular expression is the type accepted by the UNIX egrep command.

### DESCRIPTION

From the directory *cache\_dir*, this command removes the cache elements whose pathname (as opposed to the filename) matches the expression *reg\_expr*. The command is translated into the following UNIX command:

```
find cache_dir -type f -exec ck_path.sh {} reg_expr ; -print -exec rm {} ;
```

As an aside, an easy way to remove the entire cache directory is the UNIX command "rm -r".

### EXAMPLES

In this example, all of the cache elements with "add" in their pathname are removed:

This example removes all cache elements that use lsi\_10k or generic technology libraries:

### SEE ALSO

**cache\_ls(1)**.

## create\_types

Extracts user-defined type information from VHDL package files.

### SYNTAX

```
create_types [-nc] [-w lib] [-v]  
[-o logfile] file_list
```

```
string lib  
string logfile  
list file_list
```

### ARGUMENTS

-nc

Indicates that the initial copyright banner message is to be turned off.

-w *lib*

Specifies the name of a library that is to be mapped to the library logical name **WORK**. This option overrides any mapping specified in the user option file (**.synopsys\_vss.setup**).

-v

Indicates that **create\_types** is to display program version information and then exit.

-o *logfile*

Specifies the name of a log file to which messages sent to the standard output are to be redirected. Use this option if you are running **create\_types** in batch mode, or if you do not wish messages to be displayed during execution of **create\_types**.

*file\_list*

Specifies the name(s) of one or more VHDL package files from which type information is to be extracted. Typically these files have the extension **.vhd** or **.vhdl**.

### DESCRIPTION

Extracts type information from VHDL package files that contain user-defined VHDL types. For each package contained in the input VHDL file(s), **create\_types** creates a **package.typ** file. Creating the **package.typ** file isolates the type information and makes it available to other utilities (for example, **dc\_shell** (**analyze** or **read**); **vhdlan**; and DesignSource.) **create\_types** places the **.typ** files in the design library mapped to the logical name **WORK**. To override the mapping in the user option file (**.synopsys\_vss.setup**), use the **-w lib** option.

**NOTE:** Before running **create\_types** on your VHDL package, you must have already run **analyze**, **read**, or **vhdlan** on the package.

The type information contained in a **.typ** file is used by Synopsys synthesis and

simulation tools when analyzing designs that use the user-defined types defined in the corresponding package. You must create **.typ** files to analyze designs or DesignWare components that use VHDL types not defined in **STD.STANDARD**. Notice that type information is used hierarchically. That is, if you analyze a high-level package that references user-defined types from lower-level packages, **.typ** files must exist for the lower-level packages.

The type information in **.typ** files is used also by Synopsys's DesignSource tools to perform type resolution and checking and to permit interactive type selection. You must create a **.typ** file in order for DesignSource to be aware of the user-defined types contained in a package.

## FILES

`$$SYNOPSIS/admin/setup/.synopsys_vss.setup`

The first setup file **create\_types** reads. This file contains the default setup.

`$HOME/.synopsys_vss.setup`

The second setup file **create\_types** reads. Settings in this file override those in **\$\$SYNOPSIS/admin/setup/.synopsys\_vss.setup**.

`./synopsys_vss.setup`

The last setup file **create\_types** reads. Settings in this file override those in **\$HOME/.synopsys\_vss.setup**.

`filename.vhd`

The VHDL package file that defines the user-defined types.

`package.typ`

The analyzed file that contains information about the user-defined types contained in `package`. These files are similar to the **.syn** and **.sim** files produced by VHDL Analyzer.

## EXIT CODES

**create\_types** exits with one of the following codes:

0	On Success (the data may have been analyzed with or without warnings)
2	Errors in the Input Data
3	Fatal Error
4	License Not Found

`create_types`

6

## SEE ALSO

`vhdlan` (1); `analyze` (2), `read` (2).

## dc\_shell

Invokes the Design Compiler command shell.

### SYNTAX

#### dc\_shell

```
[-f script_file]  
[-x command_string]  
[-no_init]  
[-no_home_init]  
[-no_local_init]  
[-checkout feature_list]  
[-64bit]  
[-wait wait_time]  
[-timeout timeout_value]  
[-version]  
[-no_log]  
[-topographical]
```

### Data Types

<i>script_file</i>	string
<i>command_string</i>	string
<i>feature_list</i>	list
<i>timeout_value</i>	integer

### ARGUMENTS

#### -f *script\_file*

Executes *script\_file* (a file of dc\_shell commands) before displaying the initial dc\_shell prompt. If the last statement in *script\_file* is **quit**, no prompt is displayed and the command shell is exited.

#### -x *command\_string*

Executes the dc\_shell statement in *command\_string* before displaying the initial dc\_shell prompt. Multiple statements can be entered. Separate the statements with semicolons and enclose each statement with quotation marks around the entire set of command statements after the **-x** option. If the last statement entered is **quit**, no prompt is displayed and the command shell is exited.

#### -no\_init

Specifies that dc\_shell is not to execute any .synopsys\_dc.setup startup files. This option is only used when you want to include a command log or other script file in order to reproduce a previous Design Analyzer or dc\_shell session. Include the script file either by using the **-f** option or by issuing the **include** command from within dc\_shell.

#### -no\_home\_init

Specifies that dc\_shell is not to execute any home .synopsys\_dc.setup startup files.

- `-no_local_init`  
Specifies that `dc_shell` is not to execute any local `.synopsys_dc.setup` startup files.
- `-checkout feature_list`  
Specifies a list of licensed features to check out in addition to the default features checked out by the program.
- `-wait wait_time`  
Specifies the maximum wait time (in minutes), that `dc_shell` waits to check out the licensed features specified by the **-checkout** option. You can invoke `dc_shell` successfully only when all of the licensed features specified with the **-checkout *feature\_list*** option can be checked out during the specified wait time.
- `-timeout timeout_value`  
Specifies a value from 5 to 20 that indicates the number of minutes the program spends trying to recover a lost contact with the license server before terminating. The default is 10 minutes.
- `-version`  
Displays the version number, build date, site id number, local administrator, and contact information, and then exits.
- `-64bit`  
Invokes the 64-bit executable of the Design Compiler command shell.
- `-no_log`  
Disables command file logging for the session and creates a filenames log file such as:  
<filename>\_<pid>\_<timestamp>.log.
- `-topographical`  
Enables Design Compiler topographical mode.

## DESCRIPTION

The **dc\_shell** command interprets and executes Design Compiler and DFT Compiler commands. Design Compiler and DFT Compiler are Synopsys products that optimize logic. The `dc_shell` environment consists of user commands and variables that control the synthesis and optimization capabilities of Design Compiler and DFT Compiler.

The `dc_shell` command executes commands until it is terminated by a **quit** or **exit** command. During interactive mode, you can also terminate the `dc_shell` session by pressing Control-d.

To cancel or interrupt the command currently executing in `dc_shell`, press Control-c. The time it takes for a command to process an interrupt depends upon the size of the design and the command. If you press Control-c 3 times before a command responds to the interrupt, `dc_shell` exits and the following message is displayed:

Information: Process terminated by interrupt.

There are 3 types of statements in `dc_shell`: assignment, control, and command.

There are 7 types of expressions: string, numeric, constant, variable, list, command, operator, and complex.

Statements and expressions are discussed in detail in the following subsections.

## **Special Characters**

The pipe character ( | ) has no meaning in dc\_shell. Use backslash e ( \e ) to escape double quotes when executing a UNIX command. For example, the following command requires backslash characters before the double quotes to prevent Design Compiler from ending the command prematurely:

```
dc_shell> sh 'grep \'foo\' my_file'
```

## **Assignment Statements**

An assignment statement assigns the value of the expression on the right side of an equal sign to the variable named on the left side of the equal sign.

The syntax of an assignment statement is as follows:

```
variable_name = expression
```

The following are examples of dc\_shell assignment statements:

```
dc_shell> hlo_ignore_priorities = "false"
```

```
dc_shell> text_threshold = 6
```

The following are examples of dc\_shell assignment statements for float numbers:

```
dc_shell> my_float = 100.3  
100.300003
```

```
dc_shell> my_another_float = 123456700.0  
123456704.000000
```

The dc\_shell environment uses 32 bit IEEE format to represent floating point numbers. This format cannot represent all numbers exactly, so the returned number may not always be the number originally specified. Typically, only the first 6 or 7 digits are precisely represented. Beyond that, there can be some variance.

## **Control Statements**

The **if** and **while** control statements allow conditional execution and looping in dc\_shell language. The syntax of the basic **if** statement is as follows:

```
if ( condition ) {  
  statement_list  
}
```

Other forms of the **if** statement allow the use of **else** and **else if**.

The syntax of the **while** statement is as follows:

```
while ( condition ) {  
  statement_list  
}
```

For a discussion of relational and logical operators used in the control statements, see the *Operator Expressions* and *Complex Expressions* sections of this man page.

## **Command Statements**

The `dc_shell` invokes the specified command with its arguments. The following examples show the syntax of a command statement:

```
command_name argument_1 argument_2 ... argument_n
```

Arguments are separated by commas or spaces and can be enclosed in parentheses. The following are examples of `dc_shell` command statements:

```
dc_shell> set_max_delay 0 "OUT_PIN_1"  
  
dc_shell> create_schematic ("--size", "A", "--hierarchy")  
  
dc_shell> compile
```

## **String Expressions**

A string expression is a sequence of characters enclosed in quotation marks (""). The following are examples of string expressions:

```
"my_design_name"  
  
"~/dir_1/dir_1/file_name"  
  
"this is a string"
```

## **Numeric Constant Expressions**

Numeric constant expressions are numeric values. They must begin with a digit and can contain a decimal point; a leading sign can also be included. Exponential notation is recognized. The following are examples of numeric constant expressions:

```
123  
  
-234.5  
  
123.4e56
```

## **Variable Expressions**

A variable expression recalls the value of a previously-defined variable. Variable names can contain letters, digits, and most punctuation characters, but cannot start

with a digit. The following are examples of variable expressions:

```
current_design  
name/name  
-all  
+-*/.:.'#~`%$&^@!_[]|?
```

If a variable used in an expression has not previously been assigned a value in an assignment statement, then its value is a string containing the variable name. The following two command statements are equivalent, assuming there is no variable defined with the **-hierarchy** option:

```
dc_shell> create_schematic -hierarchy  
dc_shell> create_schematic "-hierarchy"
```

This feature allows you to omit the quotes around many strings. For example, the following commands are equivalent, assuming there are no variables called "~user/dir/file", "equation", or "-f").

```
dc_shell> read -f "equation" "~user/dir/file"  
dc_shell> read -f equation ~user/dir/file
```

## List Expressions

A list expression defines a list constant. The list can include pathnames, cell names or pin names, values, etc. The syntax of a list expression is as follows:

```
{ expression_1 expression_2 ... expression_n }
```

Expressions are separated by spaces or commas. The following are examples of list expressions:

```
{}  
{"pin_1" "pin_2" "pin_3"}  
{1,2,3,4,5}
```

## Command Expressions

A command expression invokes a dc\_shell command and returns its value. The syntax of a command expression is the same as that of a command statement, except that parentheses are required in a command expression and are optional in a command statement. Commas separating arguments are optional for both. The following are examples of command expressions:

```
dc_shell> all_inputs( )
```

```
dc_shell> create_schematic ("-size" "a" "-hierarchy")
```

```
dc_shell> set_max_delay(0 "OUT_PIN_1")
```

## Operator Expressions

Operator expressions perform simple arithmetic and string and list concatenation. The syntax of an operator expression is as follows:

```
expression operator expression
```

The *operator* is "+", "-", "\*", or "/", and is separated by at least one preceding and one following space. Operator expressions involving numbers return the computed value. The "+" operator can be used with strings and lists to perform concatenation. The following are examples of operator expressions:

```
234.23 - 432.1
```

```
100 * scale
```

```
file_name_variable + ".suffix"
```

```
{portA, portB} + "portC"
```

The relational operators "==", "!=", ">", ">=", "<", and "<=" are used in the control statements **if** and **while**. The greater than (>) operator should only be used in expressions with parentheses to avoid confusion with the file redirection operator ">".

The logical operators "&&", "||", and "!" (and, or, not) are also used in the **if** and **while** control statements. The "not" operator is different from the other operators in that it is a unary operator with the following syntax:

```
! expression
```

## Complex Expressions

Expressions can be built from other expressions, creating complex expressions. When a complex expression contains more than one operator, dc\_shell satisfies multiplication and division operators before addition and subtraction. Simple expressions enclosed in parentheses take priority and override this rule. The expression "1 + 2 \* 3 + 4" has the value 11, and "(1 + 2) \* (3 + 4)" has the value 21.

The following is an example of an **assignment** statement containing complex expressions:

```
dc_shell> my_variable = set_max_delay(23.2 * scaling_factor, \  
all_outputs( ))
```

In this example, "my\_variable" is assigned the value returned by the **set\_max\_delay** command expression. The **set\_max\_delay** command is invoked with two arguments. The first argument is an operator expression that returns the value of the variable

expression "scaling\_factor" multiplied by the numeric constant expression "23.2". The second argument is a command expression that is equal to the value returned by the **all\_outputs** command. The **all\_outputs** command is called with no arguments.

The following is an example of a complex command statement:

```
dc_shell> read -f edif ~user/dir/ + file_name
```

In this example, the **read** command is called with 3 arguments. If you assume that "-f", "edif" and "~user/dir/" are not defined variables, and that *file\_name* is assigned the value *my\_design*, then the first argument to the **read** command is the string "-f". The second argument is the string "edif". The third argument is the concatenation of the string "~user/dir/" with the string *my\_design*. The third argument to the **read** command is the string "~user/dir/my\_file". The relational and logical operators can be used in combination to form complex conditions. The following are examples of complex conditional expressions:

```
(goal >= 7.34 || ! complete)
```

```
(a >= 7 || run_mode != "test" && !(error_detected == true))
```

```
(cycle < 4 && test == true || design_area > area_goal)
```

Complex logical expressions are evaluated from left to right, with "&&" being evaluated before "||". However, those expressions enclosed in parentheses are evaluated first.

## Command Arguments

Many dc\_shell commands have required or optional arguments that allow you to further define, limit, or expand the scope of their operation.

This man page contains a comprehensive list and description of these arguments. You can also use the **help** command to view the man page online. For example, to view the online man page of the **ungroup** command, enter the following command:

```
dc_shell> help ungroup
```

Many commands also offer a **-help** option that lists the arguments available for that command. For example:

```
dc_shell> ungroup -help
Usage: ungroup
    <cell_list>
    -all
    -prefix
    -flatten
    -simple_names
```

Arguments that do not begin with a hyphen (-) are positional arguments. Positional arguments must be entered in a specific order. Non-positional arguments (those beginning with a hyphen) can be entered in any order and can be intermingled with positional arguments.

The names of non-positional arguments can be abbreviated to the minimum number of characters required to distinguish them from the other arguments.

The following commands are equivalent:

```
dc_shell> ungroup MODULAR -flatten -prefix MOD
```

```
dc_shell> ungroup -flatten -prefix MODULAR MOD
```

```
dc_shell> ungroup -f MODULAR -p MOD
```

Many arguments are optional, but if you omit a required argument, an error message and usage statement is displayed. For example:

```
dc_shell> group
Error: Argument '-design_name' required
Usage: group
    <cell_list>
    -except <cell_list>
    -design_name
    -cell_name
    -logic
    -pla
    -fsm
```

## ***Multiple Statement Lines and Multiple Line Statements***

Normally, only one command is typed on a single line. To put more than one command on a line, must separate each command with a semicolon. For example:

```
dc_shell> read -f equation my_file.eqn; set_max_area 0; compile; \
          create_schematic; plot
```

There is no limit to the number of characters on a dc\_shell command line, but you can break a long command into multiple lines by terminating all but the last line with a backslash (e). This tells dc\_shell to expect the command to continue on the next line.

```
dc_shell> read -f equation\
          {file_1, file_2, file_3,\
          file_4, file_5, file_6}
```

This feature is normally used in files containing dc\_shell commands (script files).

## ***Output Redirection***

The dc\_shell allows you to divert command output messages to a file. To do this, type "> file\_name" after any statement. The following example deletes the old contents of "my\_file" and writes the output of the **report\_hierarchy** command to the file:

```
dc_shell> report_hierarchy > my_file
```

You can append the output of a command to a file with ">>". The following example appends the hierarchy report to the contents of *my\_file*:

```
dc_shell> report_hierarchy >> my_file
```

## Aliases

The **alias** command gives you the ability to define new commands in terms of existing ones. You can reduce the number of keystrokes by defining short aliases for the commands and options you use most often.

The following example defines a new command called **com** that is equivalent to running the **compile** command with the **-no\_map** option.

```
dc_shell> alias com compile -no_map
```

With the **com** alias defined, the following two commands are equivalent:

```
dc_shell> compile -no_map -verify
```

```
dc_shell> com -verify
```

Alias definitions can be placed in your *.synopsys\_dc.setup* file or in a separate file. The advantage of keeping aliases in a separate file is that all defined aliases can be written to a file with a command such as:

```
dc_shell> alias > ~/.synopsys_aliases
```

This works only if you put the command **include ~/.synopsys\_aliases** in your *.synopsys\_dc.setup* file. The aliases are defined every time you start a new *dc\_shell* session.

An alias is expanded only if it is the first token in a command, so aliases cannot be used as arguments to other commands.

## History

A record is kept of all *dc\_shell* commands issued during any given *dc\_shell* session. The **history** command displays a list of these commands.

```
dc_shell> history
 1 read -f equation my_design.eqn
 2 compile -no_map
 3 create_schematic
 ...
```

Your previous commands can be re-executed with the following "!" commands:

```
!!
    Expands to the previous command.
```

*!number*

Expands to the command whose number in the history list matches *number*.

*!-number*

Expands to the command whose number in the history list matches the current command minus *number*.

*!text*

Expands to the most recent command that starts with *text*. A *text* command can contain letters, digits, and underscores, and must begin with a letter or underscore.

*!?text*

Expands to the most recent command that contains *text*. A *text* command can contain letters, digits, and underscores, and must begin with a letter or underscore.

As with aliases, a "!" command must be the first token in a statement, but not necessarily the only one.

```
dc_shell> read -f equation my_design.eqn
```

```
dc_shell> compile
```

```
dc_shell> !! -no_m/* Recompile with the -no_m option */
```

```
dc_shell> history
```

```
1 read -f equation my_design.eqn
```

```
2 compile
```

```
3 compile -no_m
```

```
4 history
```

Given the previous history, the following commands are equivalent:

```
dc_shell> !-4 -s file/* Same as command 1 */
```

```
dc_shell> !1 -s file
```

```
dc_shell> !re -s file
```

```
dc_shell> !?eqn -s file
```

```
dc_shell> !?ead -s file
```

Additional parameters can be included in a **!** command statement. The above examples include the **-single\_file** option of the **read** command.

More than one **!** command can appear in a line as long as each is the first token in a statement.

```
dc_shell> !?q; !c; !4
```

The previous command is the same as the following:

```
dc_shell> read -f equation my_design.eqn
```

```
dc_shell> compile -no_m
```

```
dc_shell> history
```

## SEE ALSO

design\_analyzer(1)

alias(2)

history(2)

if(2)

include(2)

while(2)

## design\_vision

Runs Design Vision visualization for Synopsys synthesis products.

### SYNTAX

```
design_vision [-f script_file] [-x command_string]  
[-no_init] [-checkout feature_list]  
          [-timeout timeout_value] [-version]  
          [-behavioral]  
          [-syntax_check | -context_check]  
          [-tcl_mode]
```

string *script\_file*

string *command\_string*

list *feature\_list*

float *timeout\_value*

### ARGUMENTS

**-f** *script\_file*

Executes a specified script file (a file of dc\_shell commands) before displaying the initial Design Vision window.

**-x** *command\_string*

Executes the dc\_shell command in the specified command string before displaying the initial Design Vision window. You can enter multiple commands if you separate each by a semicolon.

**-no\_init**

Tells dc\_shell not to execute any .synopsys\_dc.setup startup files. This option is used only when you have a command log or other script file that you want to include in order to reproduce a previous Design Analyzer or dc\_shell session.

**-checkout** *feature\_list*

Specifies a list of licensed features to be checked out in addition to default features checked out by the program.

**-timeout** *timeout\_value*

Specifies a value from 5 to 20 that indicates the number of minutes the program will spend trying to recover a lost contact with the license server before terminating. The default is 10 minutes.

**-version**

Displays the version number, build date, site id number, local administrator, and contact information; then exits.

- behavioral  
Invokes `dc_shell` in Behavioral Compiler mode. This argument is required for synthesizing behavioral designs.
- syntax\_check  
Invokes `dc_shell` in `syntax_checking` mode which causes the command interpreter to check for syntax errors instead of executing commands.
- context\_check  
Invokes `dc_shell` in `context_checking` mode which causes the command interpreter to check for context errors instead of executing commands.
- tcl\_mode  
Invokes `dc_shell` in Tcl mode which brings up the Tcl user interface shell with the `design_vision-t` prompt. All commands in this shell should be in Tcl format. The default is to invoke `dc_shell` in `eqn` mode.

## DESCRIPTION

The **`design_vision`** command runs Design Vision visualization for Synopsys synthesis products.

For information about Design Vision menus and features, see Design Vision online help.

## EXAMPLES

Use the following command to start Design Vision visualization:

or

The following command starts Design Vision and executes the commands found in the script file `"test_adder."`

## SEE ALSO

**`dc_shell`** (1); **`context_check`** (2), **`syntax_check`** (2); **`schematic_variables`** (3), **`view_variables`** (3).

## lc\_shell

Runs the Library Compiler command shell.

### SYNTAX

```
lc_shell
    [-f script_file]
    [-x command_string]
    [-no_init]
    [-version]
```

### Data Types

<i>script_file</i>	string
<i>command_string</i>	string

### ARGUMENTS

**-f** *script\_file*

Executes *script\_file* (a file of **lc\_shell** commands) before displaying the initial **lc\_shell** prompt. If the last statement in *script\_file* is **quit**, no prompt is displayed and the command shell is exited.

**-x** *command\_string*

Executes the **lc\_shell** statement in *command\_string* before displaying the initial **lc\_shell** prompt. Multiple statements can be entered, each statement separated by a semicolon. See the *Multiple Statement Lines and Multiple Line Statements* subsection of this manual page. If the last statement entered is **quit**, no prompt is displayed and the command shell is exited.

**-no\_init**

Tells the **lc\_shell** not to execute any **.synopsys\_lc.setup** startup files. This option is only used when you have a command log or other script file that you want to include in order to reproduce a previous Library Compiler graphical interface or **lc\_shell** session. You can include the script file either by using the **-f** option or by issuing the **include** command from within **lc\_shell**.

**-version**

Displays the version number, build date, site identification number, local administrator, and contact information, and then exits.

### DESCRIPTION

Interprets and executes library compiler commands. The **lc\_shell** environment consists of user commands and variables that control the creation and manipulation of libraries

The **lc\_shell** executes commands until it is terminated by a **quit** or **exit** command. During interactive mode, you can also terminate the **lc\_shell** session by typing Control-d.

To cancel (interrupt) the command currently executing in **lc\_shell**, type Control-c. The time it takes for a command to process an interrupt (stop what it is doing and continue with the next command) depends upon the size of the library and the type of command. If you enter Control-c three times before a command responds to the interrupt, **lc\_shell** exits and the following message is displayed:

Information: Process terminated by interrupt.

There are three basic types of statements in **lc\_shell**:

- assignment
- control
- command

Additionally, there are seven types of expressions:

- string
- numeric
- constant
- variable
- list
- command
- operator
- complex

Statements and expressions are discussed in detail in the following subsections.

## ***Special Characters***

The pipe character ( | ) has no meaning in **lc\_shell**. Use the backslash ( \ ) to escape double quotes when executing a UNIX command. For example, the following command requires backslash characters before the double quotes to prevent Design Compiler from ending the command prematurely:

```
lc_shell> sh 'grep \'foo\' my_file'.
```

## ***Assignment Statements***

An assignment statement assigns the value of the expression on the right side of an equal sign to the variable named on the left side of the equal sign.

The syntax of an assignment statement is:

```
variable_name = expression
```

Following are examples of **lc\_shell** assignment statements:

```
lc_shell> command_log = "file.log"  
lc_shell> vhdllib_architecture = "FTGS"
```

## Control Statements

The two control statements **if** and **while** allow conditional execution and looping in the **lc\_shell** language. The syntax of the basic **if** statement is:

```
if ( condition ) {
    statement_list
}
```

Other forms of the **if** statement allow use of **else** and **else if**. See the description of the **if** statement in the *Synopsys Commands* section of this manual for details.

The syntax of the **while** statement is:

```
while ( condition ) {
    statement_list
}
```

See the description of the **while** statement in the *Synopsys Commands* section of this manual for more details. See the *Operator Expressions* and *Complex Expressions* subsections of this manual page for a discussion of relational and logical operators used in the control statements.

## Command Statements

The **lc\_shell** invokes the specified command with its arguments. The syntax of a command statement is:

```
command_name argument_1 argument_2 ... argument_n
```

Arguments are separated by commas or spaces and can be enclosed in parentheses. Following are examples of **lc\_shell** command statements:

```
lc_shell> read_lib my_lib.lib
lc_shell> report_lib my_lib
```

## String Expressions

A string expression is a sequence of characters enclosed within quotation marks (""). Following are examples of string expressions:

```
"my_lib_name"
"~/dir_1/dir_1/file_name"
"this is a string"
```

## Numeric Constant Expressions

Numeric constant expressions are numeric values. They must begin with a digit and can contain a decimal point; a leading sign can be included. Exponential notation is also recognized. Following are examples of numeric constant expressions:

```
-234.5
123.4e56
```

## ***Variable Expressions***

A variable expression recalls the value of a previously-defined variable. Variable names can contain letters, digits, and most punctuation characters, but must not start with a digit. Following are examples of variable expressions:

```
current_lib
name/name
-all
+~*/.:'#~`%$&^@!_[]|?
```

If a variable used in an expression has not previously been assigned a value (in an assignment statement), then its value is a string containing the variable name. This feature allows you to omit the quotes around many strings. For example, the following commands are equivalent (assuming there are no variables called "~user/dir/file", "edif", or "-f").

```
lc_shell> read -f "edif" "~user/dir/file"
lc_shell> read -f edif ~user/dir/file
```

## ***List Expressions***

A list expression defines a list constant. The list can include pathnames, cell or pin names, values, etc. The syntax of a list expression is:

```
{ expression_1 expression_2 ... expression_n }
```

Expressions are separated by spaces or commas. Following are examples of list expressions:

```
{ }
{"pin_1" "pin_2" "pin_3"}
{1,2,3,4,5}
```

## ***Operator Expressions***

Operator expressions perform simple arithmetic, and string and list concatenation. The syntax of an operator expression is:

```
expression <operator> expression
```

where <operator> is: "+", "-", "\*", or "/", and is separated by at least one preceding and following space. Operator expressions involving numbers return the computed value. The "+" operator can be used with strings and lists to perform concatenation. Following are examples of operator expressions:

```
234.23 - 432.1
100 * scale
file_name_variable + ".suffix"
```

```
{portA, portB} + "portC"
```

The **relational operators** "=", "!", ">", ">=", "<", and "<=" are used in the control statements **if** and **while**. The "greater than" operator ">" should only be used in parenthesized expressions to avoid confusion with the file redirection operator ">".

The **logical operators** "&&", "||", and "!" (and, or, not) are also used in the control statements **if** and **while**. The "not" operator is different from the other operators in that it is a unary operator with the syntax:

```
! expression
```

## Complex Expressions

Expressions can be built from other expressions, creating complex expressions. When a complex expression contains more than one operator, **lc\_shell** satisfies multiplication and division operators before addition and subtraction. Simple expressions enclosed in parentheses are given priority and override this rule. Thus, the expression "1 + 2 \* 3 + 4" has the value 11, and "(1 + 2) \* (3 + 4)" has the value 21.

Following is an example of a complex command statement:

```
lc_shell> read -f edif ~user/dir/ + file_name
```

In this example, the **read** command is called with three arguments. If we assume that "-f", "edif" and "~user/dir/" are not defined variables, and that "file\_name" was assigned the value "my\_lib", then the first argument to the **read** command is the string "-f". The second argument is the string "edif". The third argument is the concatenation of the string "~user/dir/" with the string "my\_lib". Thus, the third argument to the **read** command is the string "~user/dir/my\_file". The relational and logical operators can be used in combination to form complex conditions. Following are examples of complex conditional expressions:

```
(goal >= 7.34 || ! complete)
(a >= 7 || run_mode != "test" && !(error_detected == true))
```

Complex logical expressions are evaluated from left to right, with "&&" being evaluated before "||". However, those expressions enclosed in parentheses are evaluated first.

## Command Arguments

Many **lc\_shell** commands have required or optional arguments that allow you to further define, limit or expand the scope of its operation.

This manual contains a comprehensive list and description of these arguments. You can also use the **help** command to view the manual page online. For example, to view the online manual page of the **read\_libn** command, enter:

```
lc_shell> help read_lib
```

Many commands also offer a `-help` option that lists the arguments available for that command, for example:

```
lc_shell> read_lib -help
Usage: read_lib
      -format          (EDIF symbol format; default is Synopsys format)
      -
symbol      (with EDIF, name of Synopsys library file to create)
            <file_name> (technology or symbol library file)
            -no_warnings (disable warning messages)
```

Arguments that do not begin with a hyphen (-) are positional arguments. Positional arguments must be entered in a specific order relative to each other. Non-positional arguments (those beginning with a hyphen) can be entered in any order and can be intermingled with positional arguments.

The names of non-positional arguments can be abbreviated to the minimum number of characters required to distinguish them from the other arguments.

The following commands are equivalent:

```
lc_shell> write_lib -format vhd1 -output lib.vhd my_lib
lc_shell> write_lib my_lib -format vhd1 -output lib.vhd my_lib
lc_shell> write_lib -f vhd1 -o lib.vhd my_lib
```

Many arguments are optional, but if you omit a required argument, an error message and usage statement are displayed. For example:

```
lc_shell> read_lib
Error: Value required for the '<file_name>' argument. (EQN-19)
Usage: read_lib
      -format          (EDIF symbol format; default is Synopsys format)
      -
symbol      (with EDIF, name of Synopsys library file to create)
            <file_name> (technology or symbol library file)
            -no_warnings (disable warning messages)
```

## ***Multiple Statement Lines and Multiple Line Statements***

Normally, only one command is typed on a single line. If you want to put more than one command on a line, you must separate each command with a semicolon, for example:

```
lc_shell> read_lib my_lib.lib; report_lib my_lib; write_lib my_lib;
list -libraries; list -variables all
```

There is no limit to the number of characters on a `lc_shell` command line, but you can break a long command into multiple lines by terminating all but the last line with a backslash (`e`). This tells `lc_shell` to expect the command to continue on the next line:

```
lc_shell> read -f edife
      {file_1, file_2, file_3,e
      file_4, file_5, file_6}
```

This feature is normally used in files containing **lc\_shell** commands (*script files*).

## Output Redirection

The **lc\_shell** lets you divert command output messages to a file. To do this, type "> *file\_name*" after any statement. The following example deletes the old contents of "my\_file" and writes the output of the **report\_lib** command to the file.

```
lc_shell> report_lib my_lib1 > my_file
```

You can append the output of a command to a file with ">>". The following example appends the library report of my\_lib2 to the contents of "my\_file":

```
lc_shell> report_lib my_lib2 >> my_file
```

## Aliases

The **alias** command gives you the ability to define new commands in terms of existing ones. You can reduce the number of keystrokes by defining short aliases for the commands and options you use most often.

The following example defines a new command "lc" that is equivalent to running the **list** command with the **-variables** option.

```
lc_shell> alias com list -variables
```

With the "lv" alias defined, the following two commands are equivalent:

```
lc_shell> list -variable vhdlio  
lc_shell> lv vhdlio
```

Alias definitions can be placed in your **.synopsys\_lc.setup** file or in a separate file. The advantage of keeping aliases in a separate file is that all defined aliases can be written to a file with a command such as:

```
lc_shell> alias > ~/.synopsys_aliases
```

If you put the command **include ~/.synopsys\_aliases** in your **.synopsys\_lc.setup** file, the aliases are defined every time you start a new **lc\_shell** session.

Note that aliases are only expanded if they are the first token in a command. Thus, they can not be used as arguments to other commands. See the description of the **alias** command in the *Synopsys Commands* section of this manual.

## History

A record is kept of all **lc\_shell** commands issued during any given **lc\_shell** session. The **history** command displays a list of these commands.

```
lc_shell> history  
1 read_lib file.lib
```

```
2 report_lib my_lib
3 write_lib my_lib
...
```

Your previous commands can be re-executed with the following "!" commands:

!!

Expands to the previous command.

!*number*

Expands to the command whose number in the history list matches *number*.

!*-number*

Expands to the command whose number in the history list matches the current command minus *number*.

!*text*

Expands to the most recent command that starts with *text*. A *text* command can contain letters, digits, and underscores, and must begin with a letter or underscore.

!*?text*

Expands to the most recent command that contains *text*. A *text* command can contain letters, digits, and underscores, and must begin with a letter or underscore.

As with aliases, a "!" command must be the first token in a statement, but not necessarily the only one.

```
lc_shell> read_lib file.lib
lc_shell> write_lib my_lib
lc_shell> !! -f vhdl/* Rewrite with the -format vhdl option */
lc_shell> history
    1 read_lib file.lib
    2 write_lib my_lib
    3 write_lib my_lib -f vhdl
    4 history
```

Given the previous history, the following commands are equivalent:

```
lc_shell> !-4 -s file/* Same as command 1 */
lc_shell> !1 -s file
lc_shell> !re -s file
lc_shell> !?lib -s file
lc_shell> !?ead -s file
```

Additional parameters can be included in a ! command statement. The above examples include the **-single\_file** option (**-s file**) of the **read** command.

More than one ! command can appear in a line, as long as each is the first token in a statement.

```
lc_shell> !?q; !c; !4
```

The previous command is the same as:

```
lc_shell> read_lib file.lib  
lc_shell> write_lib my_lib -f vhd1  
lc_shell> history
```

## SEE ALSO

```
library_compiler(1)  
alias(2)  
history(2)  
if(2)  
include(2)  
while(2)
```

# synenc

Runs the Synopsys Encryptor for HDL source code.

## SYNTAX

```
synenc [-r synopsys_root] file_list
```

## ARGUMENTS

*-r synopsys\_root*

Specifies that *synopsys\_root* will be used as the UNIX path name where Synopsys tools are installed. If the **-r** option is not specified, then the value of the SYNOPSIS environment variable is used as the path for the root directory. The Synopsys root directory is used to verify that the site has a DesignWare Developer license, which is required to run **synenc**. An error is issued if neither the **-r** option nor the SYNOPSIS environment variable is set.

*file\_list*

Specifies a list of files to encrypt. At least one file must be specified.

## DESCRIPTION

The Synopsys Encryptor converts the HDL source of DesignWare parts to a form readable by Synopsys tools. Vendors protect the proprietary nature of DesignWare parts by encrypting them using **synenc**. Thus, customers who buy DesignWare parts from Synopsys or from a third-party vendor receive encrypted parts.

The **synenc** command writes the encrypted output to files named *file\_name.e* in the current directory.

## EXAMPLES

In the following example, **synenc** is used to encrypt the verilog files *add.v* and *add\_fast.v*, and store the output in the files *add.v.e* and *add\_fast.v.e* in the current directory. The directory */usr/cad/synopsys* is used as the root in verifying authorization.

In the following example, all VHDL files in the directory */usr/parts/adders* are encrypted. The results are stored in the file *file\_name.vhdl.e* in the current directory. The value of the SYNOPSIS environment variable is used as the root in verifying authorization.

## SEE ALSO

*dc\_shell(1)*.

## synopsys\_users

Lists the current users of the Synopsys licensed features.

### SYNTAX

```
synopsys_users [feature_list]  
list feature_list
```

### ARGUMENTS

*feature\_list*

List of licensed features for which to obtain the information. Refer to the Synopsys *System Installation and Configuration Guide* for a list of features supported by the current release. Or, determine from the key file all the features that are licensed at your site.

### DESCRIPTION

Displays information about all of the licenses, related users, and hostnames currently in use. If a feature is specified, all users of that feature are displayed.

**synopsys\_users** is valid only when Network Licensing is enabled.

For more information about **synopsys\_users**, refer to the *System Installation and Configuration Guide*.

### EXAMPLES

In this example, all of the users of the Synopsys features are displayed:

```
krig@node1      Design-Analyzer, Design-Compiler, LSI-Interface  
                DFT-Compiler, VHDL-Compiler  
doris@node2     HDL-Compiler, Library-Compiler  
test@node3      Design-Compiler, Design-Analyzer, TDL-Interface  
  
3 users listed.
```

This example shows users of the "Library-Compiler" or "VHDL-Compiler" feature.

```
krig@node1      Design-Analyzer, Design-Compiler, LSI-Interface  
                DFT-Compiler, VHDL-Compiler  
doris@node2     HDL-Compiler, Library-Compiler  
  
2 users listed.
```

## SEE ALSO

`get_license` (2), `license_users` (2), `list` (2), `remove_license` (2).