SIMetrix / SIMPLIS

Script Reference Manual

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SIMetrix/SIMPLIS Script Reference Manaul

SIMetrix Technologies Ltd.,
78 Chapel Street,
Thatcham,
Berkshire
RG18 4QN
United Kingdom

Tel:	+44 1635 866395
Fax:	+44 1635 868322
Email:	support@simetrix.co.uk
Web:	http://www.simetrix.co.uk

SIMPLIS Technologies, Inc.
P.O. Box 40084
Portland, OR 97240-0084
USA

Tel:	+1 503 766 3928
Fax:	+1 503 296 5674
Email:	info@simplistechnologies.com
Web:	http://simplistechnologies.com

Contents

Chapter 1

Introduction

SIMetrix features a simple interpreted script language, loosely based on BASIC, in which most of the user interface is written.

This manual provides the means for users sympathetic to the concept of computer programming to develop their own scripts or to adapt the user interface by modifying the internal scripts.

We have identified three main applications for script development although there may be others we haven't thought of. These are:

1. User interface modification perhaps to suit individual taste or for specialised applications.
2. Automated simulations. For example, you may have a large circuit which for which you need to run a number of tests. The simulations take along time so you would like to run them overnight or over a weekend. A simple script can perform this task.
3. Specialised analysis. The curve analysis functions supplied with SIMetrix are all implemented using scripts. You can write your own to implement specialised functionality. Also the goal functions used for performance and histogram analysis are "user defined functions" and are actually implemented as scripts. More goal functions may be added for special applications.

The scripting language is supported by about 600 functions and 300 commands that provide the interface to the SIMetrix core as well as some general purpose functionality.

As well as the built-in functions, a tool kit is available that allows you to develop your own functions in 'C' or 'C++'.

Chapter 2

The SIMetrix Script Language

A Tutorial

Example 1: Hello World!

Any one who has learnt the 'C' programming language will be familiar with the now celebrated "Hello World" program - possibly the simplest program that can be written. Here we will write and execute a SIMetrix "Hello World" script.

The script is simple:

```
echo "Hello World!"
```

To execute and run this script start by selecting the menu **File | New | Script** this will open the in built script editor. Type:

```
echo "Hello World!"
```

Now save the text to a file called *hello.sxscr*. To execute the script, click on the Run toolbar button or type "hello" at the command line. You should see the message:

```
Hello World!
```

Appear in the message window. A script is executed by typing its filename at the command line. If the file has the extension .sxscr the extension may be omitted. You can also assign a key or menu to execute a script. Type at the command line:

```
DefKey F6 HELLO
```

Now press the F6 key. The message should appear again. For information on defining menus see "User Defined Key and Menu Definitions" on page 556.

Example 2: An Introduction to Loops

This example adds up all the elements in a vector (or array). To create a vector we will run a simulation on one of the example circuits. The whole process will be put into a script except opening the schematic which we will do manually. (But this can be done from a script as well).

To start with, open the example circuit *General/AMP.sxsch*. Make sure it is selected to run a transient analysis.

Now select **File | New Script**. This will open a text editor with the current directory set to the SCRIPT. Type in the following:

```
Netlist design.net
Run design.net

let sum = 0
for idx=0 to length(vout)-1
       let sum = sum + vout[idx]
next idx

echo The sum of all values in vout is {sum}
```

Save the script to the file name *SUM.sxscr*. Now type SUM at the command line. A simulation will run and the message:

```
The sum of all values in vout is -6.1663737561
```

Should appear in the message window. The exact value given may be different if you have modified the circuit or set up different model libraries. This script introduces four new concepts:

1. For loops
2. Braced substitutions (sum in the last line)
3. Vectors (or arrays)
4. Accessing simulation data

Let's go through this script line by line.

The first two lines carry out the simulation and in fact something similar is done each time a simulation is run using the menu or F9 key. `Netlist design.net` generates a netlist of the circuit and saves it in a file called `design.net`. Then Run `design.net` runs the simulation on the netlist `design.net`.

The line

```
let sum = 0
```

creates and initialises the variable `sum` which will ultimately hold the final result. The next three lines is a simple *for statement*. The variable `idx` is incremented by one each time around the loop starting at zero and ending at `length(vout)-1`. `vout` is a variable - actually a vector - which was generated by the simulator and holds the simulated values of the voltage on the VOUT net. This net is marked with a terminal symbol. `length(vout)` returns the number of elements in `vout` (1 is subtracted because idx starts at 0). In the line:

```
let sum = sum + vout[idx]
```

`vout[idx]` is an indexed expression which returns element number idx of the vector vout. sum is of course the accumulative total. The final line:

```
echo The sum of all values in vout is {sum}
```

contains the *braced substitution* `sum`. `sum` is evaluated and the result replaces expression and the braces. See "Braced Substitutions" on page 13 for more information.

Example 3: Cross Probing

The standard plotting menus, plot one curve at a time. Here a script is described which repeatedly plots cross-probed curves until the right mouse key is clicked.

```
let start=1
do while probe()
    if start then
        plot {netname()}
    else
        curve {netname()}
    endif
    let start=0
    probe
loop
```

This script introduces if statements, while statements, functions and the features that allow voltage cross-probing, namely the functions NetName (page 276) and Probe (page 301) and the command Probe (page 509).

The script repeatedly executes the statements between `do while` and `loop` until the `probe()` function returns 0 (=FALSE). The `Probe` function changes the cursor shape to an oscilloscope probe but doesn't return until the user presses the left or right mouse key. If the user presses the left key the function returns 1 (=TRUE) and execution continues to the statements inside the loop. If the user presses the right key, the `Probe` function returns 0 (=FALSE) and the loop is completed and the script terminates. In the next 5 lines:

```
if start then
    plot {netname()}
else
    curve {netname()}
endif
```

the first time around the loop `start` is equal to 1 and the Plot (page 506) command is executed. This creates a new graph. Subsequently, `start` is set to zero and the Curve (page 456) command is executed which adds new curves to the graph already created.

The argument to the Plot (page 506) and Curve (page 456) commands, `netname()` is a braced substitution which we saw in the previous example. The NetName (page 276) function returns a string which is the name of the nearest net to the cursor at the time the function is executed. The function is executed soon after the user presses the left mouse key so the string returned by NetName (page 276) will be the net the user is pointing to. The value returned by NetName (page 276) is a string, but the Plot (page 506) command requires a numeric expression. By putting `netname()` in braces the result of evaluating it is substituted as if it were typed in. So if the user pointed at a the net named VOUT, netname() would return 'VOUT' and that would be placed after `plot` or `curve` i.e. `plot vout` would be executed.

The final command

```
probe
```

calls the Probe (page 509) command. This does the same as the Probe (page 301) function but doesn't return a result. It is needed because both the `Probe` function and the `Probe` command return on both up and down clicks of the mouse. The second occurrence of Probe simply waits for the up click of the mouse button.

There are four other functions which are used for cross-probing. These are GetNearestNet (page 199), NearestInst (page 276), PinName (page 299) and Branch (page 66).

Just one final note. `plot netname()` won't work for vectors whose name contains certain characters such as arithmetic characters e.g. '+' and '-'. These characters get interpreted as their literal meaning and an error usually results. To plot vectors whose names contain these characters, you should use the `Vec()` function and supply the vector name as a string. E.g.

```
plot Vec(netname())
```

Note that there are no curly braces used here. This is because the `Vec()` function returns a numeric vector containing the actual data to be plotted. The NetName (page 276) function returns the *name* of the vector not its actual data.

Example 4: Making a Parts List

This script example displays a list of components in the currently selected schematic with their references and values in the message window.

```
* mk_bom.txt Display parts list in message window
if NOT SelSchem() then
echo There are no schematics open
exit all
endif

let refs = PropValues('ref', 'ref')

for idx=0 to length(refs)-1

let val = PropValues('value', 'ref', refs[idx])
* check for duplicate ref
if length(val)==1 then
    echo {refs[idx]} {val}
else
    echo Duplicate reference {refs[idx]}. Ignoring
endif
next idx
```

The first line:

```
* do_bom.txt Display parts list in message window
```

is a comment. Any line beginning with a '*' will be ignored.

The next line:

```
if NOT SelSchem() then
```

is the start of an *if statement*. `SelSchem()` is a function which returns 1 if there are schematics open and 0 if there are not. `if NOT SelSchem()` then means 'if there are *no* schematics open'. This is an initial check that the user has actually opened a schematic.

If there are no schematic open the lines:

```
echo There are no schematics open
exit all
```

will be executed. The first line calls the `echo` command. This echoes to the message window all subsequent text on the same line. The second line is an *exit statement*. In this case it causes execution to abort and the rest of the script will be ignored.

The next line

```
endif
```

terminates the *if statement*. For every `if` there must be a matching `endif` or `end if`.

Normally, of course, we hope the user has opened a schematic and the remainder of the script will be executed. The next line

```
let refs = PropValues('ref', 'ref')
```

calls the let command. This expects an assignment expression which it evaluates. In this case it assigns refs with the result of the a call to the function PropValues (page 309). In this example it returns the component reference for all instances (i.e. symbols) on the schematic that have one.

The next line

```
for idx=0 to length(refs)-1
```

starts a *for loop*. The block of statements between this line and the matching `next` will be repeated with values of `idx` incrementing by 1 each time around the loop until idx reaches `length(refs)-1`.The length function returns the number of elements in the refs variable so the loop is repeated for all elements in refs.

The next line is

```
let val = PropValues('value', 'ref', refs[idx])
```

This calls the `PropValues` function again. This time it returns the value of the *value* property for any instance with the property *ref* which has the value `refs[idx]`. Assuming the schematic has been annotated (unique references assigned to all components) the result of this call should be a single value which is assigned to `val`.

The next 2 lines

```
if length(val)==1 then
    echo {refs[idx]} {val}
```

The `if` statement checks that val has length one which means that the reference is unique. If it is then the Echo (page 471) command is called which displays on the message window all the text following it. In this instance the `echo` command is followed by two *braced substitutions*. A braced substitution is an expression enclosed in curly braces ‘’ and ‘’. The braces and the enclosed expression are replaced by the result of evaluating the expression as if it had been typed in. Braced substitutions are a very important feature of the SIMetrix scripting language. Here the result is the component’s reference and value are displayed in the message window.

The last part of the for loop is:

```
else
    echo Duplicate reference {refs[idx]}. Ignoring
endif
```

This is executed if the if expression `length(val)==1` is false. This means that there is more than one component with that component reference. A message is output saying that it is being ignored. The final line

```
next idx
```

terminates the for loop.

Variables, Constants and Types

SIMetrix scripts, like all computer programs, process data stored in variables. Variables may hold real, complex or string data and may be scalar - possessing only a single value - or single dimension arrays called vectors.

Variable names

Variables names must be a sequence of characters but the first must be non-numeric. Any character may be used except:

```
\ " & + - * / ^ < > ' @ { } ( ) [ ] ! \% ; : |=
```

and spaces.

Although it is legal the following names should be avoided as they are statement keywords:

all

do

else

elseif

end

endif

endwhile

exit

or

if

loop

next

script

step

then

to

while

Types

Variables may have real, complex or string type. Real and complex are selfexplanatory. Strings are a sequence of ASCII characters of any length.

SIMetrix does not have an integer type. Although all numbers are represented internally as floating point values, the format used permits integers to be represented exactly up to values of about 2^{52}.

Constants

These can be real complex or string. Real numbers are represented in the usual way but may also contain the engineering suffixes:

a	10^{-18}
f	10^{-15}
p	10^{-12}

n	10^{-9}
u	10^{-6}
m	10^{-3}
k	10^{+3}
Meg	10^{+6}
G	10^{+9}
T	10^{+12}

Note that engineering suffixes *are not case sensitive*. A common mistake is to use 'M' when what was meant was 'Meg'. 'M' is the same as 'm'.

Complex numbers are represented in the form:

(*real*, *imaginary*)

Strings are a sequence of text characters enclosed in single quotation marks. Single quotation marks themselves are represented by two in succession.

Example 1: Real

```
2.3
4.6899
45
1e-3
1.2u
```

Example 2: Complex

```
(1,1)     means 1+i
(2.34,10) means 2.34+10i
```

Example 3: String

```
'this is a string'
'This is a "string"'
```

Creating and Assigning Variables

Variables are created and assigned using the `Let` command. For example:

```
Let x=3
```

assigns the value 3 to the variable x. Note that `Let` is not optional as it is in most forms of Basic.

You can also assign complex numbers and strings e.g.

```
Let x=(5,1)
Let s=`This is a string'
```

All of the above are *scalar* that is they contain only one value. Variables may also be single dimension arrays called *vectors*. Vectors are described below.

Special Characters

Some characters have a special meaning and if entered into a string literal will not work correctly. Characters affected are newline, tab, semi-colon, single and double quotation and open and close brace characters.

Open and close brace characters ('{' and '}') and semi-colon (';') may be included in a string literal by enclosing the whole string with *double* quotation marks. (There is more information here "Quotes: Single or Double" on page 10).

Single and double quotation marks can be included by doubling them up. However, this can be inconvenient and an alternative method is to assign a variable with the special character using the Chr (page 69) function. This method is also the only way to enter a tab character into a literal string. For example:

```
Let tab = chr(9)
Let string = 'This is a tab ' \& tab \& ' character'
```

This method can be used to enter new line characters (chr(10)) and also single quotes (chr(39)), double quotes (chr(34)) and semi-colons (chr(59))

Vectors

Vectors can be created using a *bracketed list*, with a function that returns a vector or by the simulator which creates a number of vectors to represent node voltages and device currents. A bracketed list is of the form:

```
[ expression1, expression2, ...]
```

E.g.

```
let v = [1, 3, 9]
```

These are described in more detail in the section on "Bracketed Lists" on page 14. Functions and simulator vectors are described in following sections.

Vectors, like other variables may also contain strings or complex numbers but all the elements must be the same *type*.

Individual elements of vectors may be accessed using square brackets: '[' and ']'. E.g.

```
let v = [1, 3, 9]
let a = v[2]
```

`a` is assigned 9 in the above example. Index values start at 0 so the first element (1) is `v[0]`.

It is also possible to assign values to individual elements e.g.

```
let v[2] = 5
```

In which case the value assigned must have the same type (i.e. real, complex or string) as the other elements in the vector.

Vectors, like other variables may also contain strings or complex numbers but all the elements must be the same type.

Scope of Variables, Global Variables

Variables created using the Let (page 482) command are only available within the script where the `Let` command was executed. The variable is destroyed when the script is completed and it is not accessible to scripts that the script calls. If, however, the `Let` command was called from the command line, the variable is then *global* and is available to all scripts until it is explicitly deleted with the UnLet (page 544) command. If a global variable needs to be created within a script, the variable name must be preceded by `global`: For example:

```
Let global:result = 10
```

`global:result` will be accessible by all scripts and from the command line. Further it will be permanently available until explicitly deleted with `UnLet`. After the variable has been created with the `global:` prefix, it can subsequently be omitted. For example in:

```
Let global:result = 10
Show result
Let result = 11
Show result
```

will display

```
result=10
result=11
```

in the message window. The variable `result` will be available to other scripts whereas if the `global:` prefix had been left off, it would not. Although it is not necessary to include the `global:` prefix except when first creating the variable, it is nevertheless good practice to do so to aid readability of the script.

Empty Values

Many functions return *empty* values (also known as empty vectors) when they are unable to produce a return value. An empty value contains no data. An empty value can be tested with the `Length` function which will return 0. All other functions and operators will yield an error if presented with an empty value.

Empty values should not be confused with empty strings. The latter is explained in the next section.

Empty Strings

An empty string is one that has no characters. An empty string can be entered on a command line with the character sequence:

```
{`'}
```

Empty strings are not the same as empty values. An empty value has no data at all and will result in an error if supplied to any function other than the Length function.

Quotes: Single and Double

Single quotation marks (') and double quotation marks (") both have a special, but different, meaning in SIMetrix and in the past this has been the source of much confusion. Here we explain

what each means and when they should be used. Single quotes are used to signify a text string in an expression. Expressions are used as arguments to the Plot (page 506), Curve (page 456), Let (page 482) and Show (page 539) commands, they are used in braced substitutions and also as the tests for `if`, `for` and `while` statements. These are the only places where you will find or need single quotes. Double quotes are used in commands to bind together words separated by spaces or semi-colons so that they are treated as one. Normally spaces and semi-colons have a special meaning in a command. Spaces are used to separate arguments of the command while semi-colons terminate the command and start a new one. If enclosed within double quotes, these special meanings are disabled and the text within the quotes is treated as a single argument to the command. Double quotes are often used to enclose strings that contain spaces (see example) but this doesn't necessarily have to be the case.

Examples

```
Let PULSE_SPEC = `Pulse 0 5 0 10n 10n 1u 2.5u'
```

In the above line we are assigning the variable `PULSE_SPEC` with a string. This is an expression so the string is in single quotes. `Let` is a command but it is one of the four commands that take an expression as its argument.

```
Prop value "Pulse 0 5 0 10n 10n 1u 2.5u"
```

`Prop` is a command that takes a number of arguments. The second argument is the value of a property that is to be modified. In the above line, the new property value, `Pulse 0 5 0 10n 10n 1u 2.5u` has spaces in it so we must enclose it double quotation marks so that the command treats it as a single string. If there were no quotes, the second argument would be just `Pulse` and the remainder of the line would be ignored. If an argument contains no spaces or semi-colons then no quotes are necessary although they will do no harm if present.

Where you need both single and double quotes

There are situations where both single and double quotes are needed together. In some of the internal scripts you will find the Scan (page 335) function used to split a number of text strings separated by semi-colons. The second argument to Scan is a string and must be enclosed in single quotation marks. But this argument is also a semi-colon which, despite being enclosed in single quotes, will still be recognised by the command line interpreter as an end-of-command character. So this must be enclosed in double quotes. The whole expression can be enclosed in double quotes in this case.

If you need a literal quote

If you need a string that contains a double or single quote character, use two of them together.

Expressions

An expression is a sequence of variable *names*, *constants*, *operators* and *functions* that can be evaluated to yield a result. Expressions are required by four commands: Let (page 482), Curve (page 456), Plot (page 506) and Show (page 539) and they are also used in "*braced substitutions*" on page 13) and *if statements*, *while statements* and *for statements*. This section describes expression syntax and how they are evaluated.

Operators

operators. Available operators are:

Arithmetic

```
+ - * / ^ %
```

'%' performs a remainder function

Relational

```
< > == <= >=
```

Important: a single '=' can be used as equality operator if used in an *if* or *while* statement. In other places it is an assignment operator and '==' must be used for equality.

Logical

```
AND, OR, NOT,
&& || !
```

Note: `AND`, `OR`, `NOT` are equivalent to `&& || !` respectively.

String

```
&
```

'&' concatenates two strings.

Operator Precedence

When calculating an expression like `3+4*5`, the 4 is multiplied by 5 first then added to 3. The multiplication operator - '*' - is said to have higher precedence then the addition operator - '+'. The following lists all the operators in order of precedence:

```
( ) [ ]
Unary - + NOT !
^
* / %
+ -
< > <= >= ==
AND &&
OR ||
&
=
,
```

Notes

1. A single '=' is interpreted as '==' meaning equality when used in if statements and while statements and has the same precedence.
2. Parentheses have the highest precedence and are used in their traditional role to change order of evaluation. So `(3+4)*5` is 35 whereas `3+4*5` is 23.
3. The comma ',' is used as a separator and so has the lowest precedence.

Functions

Functions are central to SIMetrix scripts. All functions return a value and take zero or more arguments. The sqrt (page 362) function for example takes a single argument and returns its square root. So:

```
Let x = sqrt(16)
```

will assign 4 to x.

Functions are of the form:

```
function_name( [ argument, ...] )
```

Examples

Function taking no arguments:

```
NetName()
```

function taking two arguments:

```
FFT( vout, 'Hanning')
```

Functions don't just perform mathematical operations like square root. There are functions for string processing, functions which return information about some element of the program such as a schematic or graph, and there are user interface functions. Complete documentation on all available functions is given in "Function Reference" on page 57.

Braced Substitutions

A braced substitution is an expression enclosed in curly braces '' and ''. When the script interpreter encounters a braced substitution, it evaluates the expression and substitutes the expression and the braces with the result of the evaluation - as if it had been typed in by the user. Braced substitutions are important because, with the exception of Let (page 482), Show (page 539), Plot (page 506) and Curve (page 456), commands cannot accept expressions as arguments. For example, the Echo (page 471) command displays in the message window the text following the `Echo`. If the command `Echo x+2` was executed, the message `x+2` would be displayed not the result of evaluating x+2. If instead the command was `Echo { x+2 }` the result of evaluating `x+2` would be displayed.

If the expression inside the braces evaluates to a vector each element of the vector will be substituted. Note that the line length for commands is limited (although the limit is large - in excess of 2000 characters) so substituting vectors should be avoided unless it is known that the vector does not have many elements.

Braced substitutions may not be used in the control expression for conditional statements, while loops and for loops. For example, the following is not permitted

```
if {netname()} < 4.56 then
```

To achieve the same result the result of the braced expression must be assigned to a variable e.g.:

```
let v = {netname()}
if v < 4.56 then
```

Bracketed Lists

These are of the form

```
[ expression1, expression2, ...]
```

The result of a bracketed list is a vector of length equal to the number of expressions separated by commas. There must be at least one expression in a bracketed list - an empty list is not permitted. For example:

```
Let v = [3, 5, 7]
```

assigns a vector of length `3` to `v`. So `v[0]=3`, `v[1]=5` and `v[2]=7`. The expressions in a bracketed list may be any type, as long they are all the same. The following for example, is illegal:

```
Let v = [3, 'Hello', 'World']
```

The second element is of type string whereas the first is real. The following example is however legal:

```
Let v = ['3', 'Hello', 'World']
```

3 which is real has been replaced by '3' which is a string.

Type Conversion

Most functions and operators expect their arguments to be of a particular type. For example the `+` operator expects each side to be a numeric (real or complex) type and not a string. Conversely, the `&` operator which concatenates strings naturally expects a string on each side. The majority of functions also expect a particular type as arguments, although there are some that can accept any type.

In the event that the type presented is wrong, SIMetrix will attempt to convert the value presented to the correct type. To convert a numeric value to a string is straightforward, the value is simply represented in ASCII form to a reasonable precision. When a string is presented but a numeric value is required, the string is treated as if it were an expression and is evaluated. If the evaluation is successful and resolves to the correct type the result is used as the argument to the operator or function. If the evaluation fails for any reason an error message will be displayed.

Aliases

An *alias* is a special type of string. Alias strings hold an expression which is always evaluated when used. The simulator outputs some of its data in alias form to save memory and simulation time. For example, the currents into subcircuit pins are calculated by adding the currents of all devices within the subcircuit connected to that pin. If its efficient to do so, this current is not calculated during simulation. Instead the expression to perform that calculation is stored as an alias so that it can be calculated if needed. Aliases may also be created using the MakeAlias (page 485) command.

Statements and Commands

Scripts are composed of a sequence of *statements*. Statements usually comprise at least one command and optionally control words such as `if` and `then`. A *command* is a single line of text starting with one of the command names listed in the "Command Reference" on page 428.

There are six types of statement. These are:

command statement

if statement

while statement

for statement

jump statement

script statement

Commands

Commands begin with one of the names of commands listed in the "Command Summary" on page 414. A command performs an action such as running a simulation or plotting a result. E.g.:

```
Plot v1_p
```

is a command that will create a graph of the vector `v1_p`. The syntax varies for each command. Full details are given in the "Command Reference" on page 428.

All commands must start on a new line or after a semi-colon. They must also end with a new line or semi-colon.

A command statement is a sequence of one or more commands.

Command Switches

Many commands have *switches*. These are always preceded by a '/' and their meaning is specific to the command. There are however four global switches which can be applied to any command. These *must* always be placed immediately after the command. Global switches are as follows:

- /e Forces command text to copied to command history. Use this when calling a command from a script that you wish to be placed in the command history.
- /ne Inhibits command text copying to command history. Use this for commands executed from a menu or key definition that you do *not* wish to be included in the command history.
- /quiet Inhibits error messages for that command. This only stops error message being displayed. A script will still be aborted if an error occurs but no message will be output.
- /noerr Stops scripts being aborted if there is an error. The error message will still be displayed.

If Statement

An *if statement* is of the form:

```
if expression then
   statement
endif
```

OR

```
if expression then
   statement
else
```

```
    statement
endif
```

OR

```
if expression then
    statement
[[elseif expression then
    statement ]...]
else
    statement
endif
```

Examples

```
if NOT SelSchem() then
    echo There are no schematics open
    exit all
endif

if length(val)==1 then
    echo {refs[idx]} {val}
else
    echo Duplicate reference {refs[idx]}. Ignoring
endif
if opts[0] && opts[1] then
    let sel = 1
elseif opts[0] then
    let sel = 2
else
    let sel = 3
endif
```

In form1, if the expression resolves to a TRUE value the statement will be executed. (TRUE means not zero, FALSE means zero). In the second form the same happens but if the expression is FALSE the statement after the `else` is executed. In the third form, if the first expression is FALSE, the expression after the `elseif` is tested. If that expression is TRUE the next statement is executed if not control continues to the next `elseif` or `else`.

While Statement

While statements are of the form:

```
do while expression
    statement
loop
```

OR (alternative form)

```
while expression
    statement
endwhile
```

Example

```
do while GetOption(opt)<>'FALSE'
    let n = n+1
    let opt = 'LibFile' & (n+99)
loop
```

Both forms are equivalent.

In while loops the expression is evaluated and if it is TRUE the statement is executed. The expression is then tested again and the process repeated. When the expression is FALSE the loop is terminated and control passes to the statement following the `endwhile`.

Script Statement

A script statement is a call to execute another script. Scripts are executed initially by typing their name at the command line (or if the script has .sxscr extension, the .sxscr can be omitted) or selecting a key or menu which is defined to do the same. Scripts can also be called from within scripts in which case the call is referred to as *script statement*. Note that a script may not call itself.

Exit Statement

There are four types:

```
exit while
exit for
exit script
exit all
```

`exit while` forces the innermost while loop to terminate immediately. Control will pass to the first statement after the terminating `endwhile` or `loop`.

`exit for` does the same for for-loops.

`exit script` will force the current script to terminate. Control will pass to the statement following the call to the current script.

`exit all` will abort all script execution and control will return to the command line.

Accessing Simulation Data

Overview

When a simulation is run, a number of vectors (scalars for dc operating point) are created providing the node voltages and branch currents of the circuit. These are just like variables used in a script and can be accessed in the same way. There are however a number of differences from a normal variable. These are as follows:

- Simulation vectors are placed in their own *group*.
- They are usually attached to a *reference* vector.
- They usually have a *physical type* (e.g. Volts, Amps etc.)
- Some are *aliases*. See "aliases" on page 14.

Each of these is described in the following sections.

Groups

All variables are organised into groups. When SIMetrix first starts, there is only one called the Global group and all global variables are placed in it. (See "Scope of Variables, Global Variables" on page 10). When a script executes a new group is created for it and its own - local - variables are placed there. The group is destroyed when the script exits as are its variables.

Each time a simulation run is started a new group is created and the data generated by the analysis is placed in the group. Groups from earlier runs are not immediately destroyed so that results from earlier runs can be retrieved. By default, three simulation groups are kept at any time with the oldest being purged as new ones are created. A particular group can be prevented from being purged by selecting the menu **Simulator | Manage Data Groups**. Further the number of groups kept can be changed with the GroupPersistence option. See *User's Manual/Sundry Topics/Options/UsingtheSetandUnsetcommands/List of Options* for details about Options.

Groups provide a means of organising data especially simulation data and makes it possible to keep the results of old simulation runs.

All groups have a name. Simulation group names are related to the analysis being performed. E.g. transient analyses are always trann where n is a number chosen to make the name unique.

Variables within a group may be accessed unambiguously by using their fully qualified name. This is of the form:

```
groupname:variable_name
```

E.g. `tran1:vout`.

The Current Group

At any time a single group is designated the *current* group. This is usually the group containing the most recent simulation data but may be changed by the user with the **Simulator | Manage Data Groups** menu or with the SetGroup (page 533). If a variable name is used in an expression that is not local (created in a script) or global, the current group is searched for it. So when the command `Plot vout` is executed if `vout` is not a local or global variable SIMetrix will look for it in the current group.

You can view the variables in the current group with the Display (page 470) command. Run a simulation and after it is completed type `Display` at the command line. A list of available variables from the simulation run will be displayed. Some of them will be *aliases*. These are explained in the "aliases section" on page 14.

The ':' Prefix

If a variable name is prefixed with a colon it tells SIMetrix to only search the current group for that name. Local or global variables of the same name will be ignored.

The colon prefix also has a side effect which makes it possible to access vectors created from numbered nodes. SPICE2 compatible netlists can only use numbers for their node (=net) names. SIMetrix always creates simulation vectors with the same name as the nets. If the net name is a number, so is the variable name. It was stated earlier that variable names must begin with a non-numeric character but in fact this is only partly true. Variable names that start with a digit or indeed consist of only digits can be used but the means of accessing them is restricted. Prefixing with a ':' is one method. The function Vec (page 393) can also be used for this purpose.

Multi-division Vectors

Multi-step runs such as Monte Carlo produce multiple vectors representing the same physical quantity. In SIMetrix version 3.1 and earlier these vectors remained independent but the groups to which they were attached were bundled together into a *collection*. From version 4 the multiple vectors are in effect joined together into a *multi-division vector*. This is similar to a two dimensional vector (or array or matrix) except that the rows of the matrix are not necessarily all the same length.

When plotting a multi-division vector, each individual vector - or division - will be displayed as a single curve. If listing or printing a multi-division vector with the Show (page 539) command, all the divisions will be listed separately.

You can access a single vector (or division) within a multi-division vector using the index operators - '[' and ']'. Suppose `VOUT` was a multi-division vector with 5 divisions. Each individual vector can be accessed using `VOUT[0]`, `VOUT[1]`, `VOUT[2]`, `VOUT[3]` and `VOUT[4]`. Each of these will behave exactly like a normal single division vector. So, you can use the index operator to access single elements e.g. `VOUT[2][23]` retrieves the single value at index 23 in division 2.

To find the number of divisions in a multi-division vector, use the function NumDivisions (page 282).

You can collate values at a given index across all divisions using the syntax: `vectorname[][index]`. E.g. in the above example `VOUT[][23]` will return a vector of length 5 containing the values of index 23 for all 5 divisions.

Multi-division vectors may be combined using arithmetic operators provided either both sides of the operator are compatible multi-division vectors - i.e. have identical x-values - or one of the values is a scalar.

Multi-division Vectors

Not all functions accept multi-division vectors for their arguments. The following table lists the functions that do accept multi-division vectors. The entry for each argument specifies whether that argument accepts multi-division vectors and how the data is dealt with.

"X"	Multi-division vectors are not accepted for this argument.
"Scalar"	The function acts on the multi-division vector to obtain a scalar value.
"Vector"	The function obtains a scalar value for each division within the multi-division vector.
"Multi"	The function processes all the vector's data to return a multi-division vector

Function name	Arg 1	Arg 2	Arg 3	Arg 4
abs (page 57)	Multi			
atan (page 64)	Multi			
atan_deg (page 65)	Multi			
avg (page 65)	Multi			
cos (page 77)	Multi			
cosh (page 78)	Multi			
CyclePeriod (page 82)	Multi	Multi		
cos_deg (page 77)	Multi			
db (page 84)	Multi			
DefineFourierDialog (page 90)	X	Scalar		

Function name	Arg 1	Arg 2	Arg 3	Arg 4
diff (page 101)	Multi			
Execute (page 135)	X	Multi	Multi	Multi
erf (page 132)	Multi			
exp (page 138)	Multi			
fft (page 139)	Multi	X		
FIR (page 141)	Multi	X	X	
Fourier (page 143)	Multi	X	X	X
FourierOptionsDialog (page 144)	X	Scalar		
FourierWindow (page 145)	Multi	X	X	
gamma (page 146)	Multi			
GetVecStepParameter (page 229)	Scalar			
GetVecStepVals (page 229)	Scalar			
GroupDelay (page 232)	Multi			
HasLogSpacing (page 236)	Multi			
Histogram (page 240)	Multi	X		
IIR (page 241)	Multi	X	X	
im (page 243)	Multi			
imag (page 243)	Multi			
integ (page 250)	Multi			
Interp (page 251)	Multi	X	X	X
IsComplex (page 252)	Scalar			
IsNum (page 254)	Scalar			
IsStr (page 256)	Scalar			
length (page 258)	Scalar			
ln (page 259)	Multi			
log (page 260)	Multi			
log10 (page 261)	Multi			
mag (page 261)	Multi			
magnitude (page 261)	Multi			
maxidx (page 266)	Multi			
Maxima (page 266)	Multi	X	X	
Maximum (page 267)	Multi	X	X	
mean (page 267)	Multi			
Mean1 (page 268)	Multi	X	X	
minidx (page 271)	Multi			
Minima (page 271)	Multi	X	X	
Minimum (page 273)	Multi	X	X	
norm (page 281)	Multi			
NumDivisions (page 282)	Scalar			
NumElems (page 282)	Vector			

Function name	Arg 1	Arg 2	Arg 3	Arg 4
ph (page 296)	Multi			
phase (page 297)	Multi			
phase_rad (page 297)	Multi			
PhysType (page 298)	Scalar			
Range (page 320)	Multi	X	X	
re (page 320)	Multi			
real (page 327)	Multi			
Ref (page 327)	Multi			
RefName (page 327)	Scalar			
Rms (page 333)	Multi			
RMS1 (page 333)	Multi	X	X	
rnd (page 334)	Multi			
RootSumOfSquares (page 334)	Multi	X	X	
sign (page 355)	Multi			
sin (page 358)	Multi			
sinh (page 358)	Multi			
sin_deg (page 358)	Multi			
sqrt (page 362)	Multi			
SumNoise (page 367)	Multi	X	X	
tan (page 376)	Multi			
tanh (page 376)	Multi			
tan_deg (page 376)	Multi			
Truncate (page 383)	Multi	X	X	
Units (page 388)	Scalar			
Val (page 392)	Multi			
XFromY (page 409)	Multi	X	X	X
XY (page 412)	Multi	Multi		
YFromX (page 413)	Multi	X	X	

Vector References

Simulation vectors are usually attached to a *reference*. The reference is a vector's x-values. E.g. any vector created from a transient analysis simulation will have a reference of time. AC analysis results have a reference of frequency.

Vectors created by other means may be assigned a reference using the "SetRef command" on page 536. Also the XY (page 412) function may be used to compose a vector containing a reference.

Physical Type

Simulation vectors also usually have a *physical type*. This identifies the values units e.g. Volts or Amps. When evaluating expressions SIMetrix attempts to resolve the physical type of the result.

For example, if a voltage is multiplied by a current SIMetrix will assign the Physical Type Watts to the result.

Any vector can be assigned a physical type using the "SetUnits command" on page 537.

User Interface to Scripts

Dialog Boxes

A number of functions are available which provide means of obtaining user input through dialog boxes. These are:

Function name	Comment
AddRemoveDialog (page 60)	Add or remove items to or from a list
BoolSelect (page 65)	Up to 6 check boxes
ChooseDir (page 68)	Select a directory
EditObjectPropertiesDialog (page 113)	Read/Edit a list of property names and values
EditSelect (page 121)	Up to 6 edit boxes
EnterTextDialog (page 131)	Enter multi line text
GetSimetrixFile (page 209)	Get file name of pre-defined type
GetUserFile (page 227)	Get file name (general purpose)
InputGraph (page 244)	Input text for graph
InputSchem (page 244)	Input text for schematic
NewValueDialog (page 279)	General purpose dialog box
RadioSelect (page 319)	Up to 6 radio buttons
SelectDialog (page 341)	Select item(s) from a list
TableDialog (page 373)	Present items in a table
TableEditor (page 374)	Present lists of items in a table
TreeListDialog (page 381)	Select item from tree structured list
UpDownDialog (page 390)	Re order items
UserParametersDialog (page 391)	Read/Edit a list of parameter names and values
ValueDialog (page 392)	Up to 10 edit boxes for entering values

The above are the general purpose user interface functions. In particular, the function NewValueDialog (page 279) is very universal in nature and has a wide range of applications. There are many more specialised functions. These are listed in "Functions by Application" on page 50.

User Control of Execution

Sometimes it is desirable to have a script free run with actions controlled by a key or menu item. For example you may require the user to select an arbitrary number of nodes on a schematic and then press a key to continue operation of the script to perform - say - some calculations with those nodes. You can use the DefKey (page 460) and DefMenu (page 462) commands to do this. However, for a key or menu to function while a script is executing, you must specify "immediate" mode when defining it. Only a few commands may be used in "immediate" mode definitions. To

control script execution, the Let (page 482) command may be used. The procedure is to have the key or menu assign a global variable a particular value which the script can test. The following example outputs messages if F2 or F3 is pressed, and aborts if F4 is pressed:

```
defkey F2 "scriptresume;let global:test=1" 5
defkey F3 "scriptresume;let global:test=2" 5
defkey F4 "scriptresume;let global:test=0" 5

let global:test = -1
while 1
    scriptpause
    if global:test=0 then
        exit script
    elseif global:test=1 then
        echo F2 pressed
    elseif global:test=2 then
        echo F3 pressed
    endif
    let global:test = -1
endwhile

unlet global:test
```

Errors

Loosely, there are two types of error, syntax errors and execution errors.

Syntax Errors

Syntax errors occur when the script presented deviates from the language rules. An endif missing from an *if statement* for example. SIMetrix will attempt to find all syntax errors - it won't abort on the first one - but it will not execute the script unless the script is free of syntax errors. Sometimes one error can hide others so that fixing syntax errors can be an iterative process. On many occasions SIMetrix can identify the details of the error but on some occasions it is unable to determine anything other than the fact that it isn't right. In this instance a "Bad Statement" error will be displayed. These are usually caused by unterminated *if*, *while* or *for* statements. Although in many cases SIMetrix can correctly identify an unterminated statement, there are some situations where it can't.

Note that a syntax error in an expression will not be detected until execution.

Execution Errors

These occur when the script executes and are mostly the result of a command execution failure or an expression evaluation failure.

Executing Scripts

Scripts are executed by typing their file name at the command line, running them from the script editor, or dragging and dropping the file to the Command shell. Additionally, scripts can be assigned to a key or menu. See "User Defined Key and Menu Definitions" on page 556.

If a full pathname is not given, SIMetrix first searches a number of locations. The rules are a little complicated and are as follows:

1. Search the BiScript directory followed by all its descendants. On Windows the BiScript directory is usually at *⟨simetrix_root⟩/support/biscript*.
2. Search for a built in script of that name. Built in scripts are bound into the executable binary of SIMetrix. See "Built-in Scripts" on page 25.
3. Search the SCRIPT directory. This is defined by the ScriptDir option setting (see "Set" on page 531) which can also be accesses in the File Locations tab of the options dialog box. (see **File | Options | General...**).
4. Search the User Script list of directories. This is defined by the UserScriptDir option variable (see "Set" on page 531). This may be set to a semi-colon delimited list of search paths.
5. Search the current working directory if the script was executed from a menu or the command line. If the script was called from another script, the directory where the calling script was located is searched instead

Scripts can also be executed using the "Execute command" on page 475.

Script Arguments

You can pass data to and from scripts using arguments.

Passing by Value

To pass a value *to* a script, simply place it after the script name. E.g.

```
my_script 10
```

The value `10` will be passed to the script. There are two methods of retrieving this value within the script. The easiest is to use the Arguments (page 444) command. In the script you would place a line like:

```
Arguments num
```

In the above the variable `num` would be assigned the value `10`. If the `Arguments` command is used, it becomes compulsory to pass the argument. If you wish to provide a script with optional arguments you must use the `$arg` variables. When an argument is passed to a script a variable with name `$argn` is assigned with the value where n is the position of the argument on the command line starting at 1. To find out if the argument has been passed, use the ExistVec (page 138) function. E.g.

```
if ExistVec('$arg1') then
    .. action if arg 1 passed
else
    .. action if arg 1 not passed
endif
```

Passing by Reference

When an argument is passed by value, the script in effect obtains a local copy of that data. If it subsequently modifies it, the original data in the calling script remains unchanged even if a variable name was used as the argument. The alternative is to pass *by reference* which provides a means of passing data back to the calling script. To pass by reference you must pass a variable prefixed with the @ character. E.g.

```
Let var = 10
my_script @var
```

To retrieve the value in the called script we use the Arguments (page 444) command as we did for passing by value but also prefix with @. E.g.

```
Arguments @var
Let var = 20
```

The above modifies `var` to 20 and this change will be passed back to the `var` in the calling script. In the above example we have used the same variable name `var` in both the called and calling scripts. This is not necessary, we have just done it for clarity. You can use any name you like in either script.

Optional arguments passed by reference work the same way as arguments passed by value except that instead of using the variable `$argn` you must use `$varn`. You do not need to use when accessing arguments in this way. See the internal script *define_curve* for an example.

Important

There is currently a limitation that means you can't use an argument passed by reference directly in a braced substitution. E.g.

```
{var}
```

where var is an argument passed by reference will not work. Instead you can assign the value to a local variable first.

Passing Large Arrays

In many computer languages it is usually recommended that you pass large data items such as arrays by reference as passing by value involves making a fresh copy which is both time consuming and memory hungry. Passing by reference only passes the location of the data so is much more efficient. In the SIMetrix script language, however, you can efficiently pass large arrays by value as it uses a technique known as *copy on write* that does not make a copy of the data unless it is actually modified.

Built-in Scripts

All the scripts needed for the standard user interface are actually built in to the executable file. The source of all of these can be found on the installation CD.

Debugging Scripts

Displaying Commands Executed

You can watch the script being executed line by line by typing at the command line before starting the script:

```
Set EchoOn
```

This will cause the text of each command executed to be displayed in the message window. When you have finished you cancel this mode with:

```
Unset EchoOn
```

Single Step a Script

Run the script by typing at the command line:

```
ScriptPause ; scriptname
```

where `scriptname` is the name of the script you wish to debug. To be useful it is suggested that you enable echo mode as described above. To single step through the script, press F2.

Note that ScriptPause (page 528) only remains in effect for the first script. Subsequent scripts will execute normally.

Abort Currently Executing Script

Press escape key.

To pause a currently executing script.

Press shift-F2. Note that it is not possible to run other commands while a script is paused but you can single step through it using F2.

Resume a Paused Script

Press ctrl-F2

Startup Script

The startup script is executed automatically each time SIMetrix is launched. By default it is called startup.sxscr but this name can be changed with in the options dialog box. (**File | Options | General...**). The startup file may reside in the script directory (defined by ScriptDir option variable) or in a user script directory (defined by UserScriptDir option variable).

The most common use for the startup script is to define custom menus and keys but any commands can be placed there.

To edit the startup script, select the **File | Options | Edit Startup Script** menu item.

Unsupported Functions and Commands

A very small number of functions and commands are designated as *unsupported*. These are usually functions or commands we developed for internal use and are not used by the user interface. They are unsupported in so much as we will be unable to fix problems that you may encounter with them.

If you do use an unsupported function or command and it is useful to you, please tell technical support - by Email preferably. If a number of users find the function or command useful, we will raise its status to supported.

Chapter 3

Function Summary

The following table lists all functions available.

Function Name	Description
abs	Absolute value
ACSourceDialog	Displays dialog box intended for the user definition of an AC source
AddConfigCollection	Adds a list of entries to a named section in the configuration file
AddGraphCrossHair	Adds a new cursor to the current graph
AddModelFiles	Installs Model Files
AddPropertyDialog	User interface function. Open add property dialog for symbol editor
AddRemoveDialog	User interface function. Allows selection of a list of items.
AddRemoveDialogNew	User interface function. Allows selection of a list of items.
AddSymbolFiles	Adds file or files to list of installed symbol library files
area	Calculates the area under a curve
arg	Phase of argument in degrees. Result always between -180 to 180
arg_rad	Phase of argument in radians. Result always between $-\pi$ to π
Ascii	Returns ASCII code for character
AssociateModel	Special purpose function for managing parts browser.
atan	Arc Tangent (radians)
atan_deg	Arc Tangent (degrees)

Function Name	Description
avg	Returns the average of argument
BoolSelect	User interface function. Returns state of up to 6 check boxes
Branch	Returns branch current formula of schematic net nearest cursor
CanOpenFile	Returns TRUE if specified file exists and can be opened for read
ChangeDir	Change current working directory
Char	Returns character from string
ChooseDir	User interface function. Returns user selected pathname.
ChooseDirectory	User interface function. Returns user selected pathname.
Chr	Returns a string consisting of a single character specified by an ASCII code
CloseEchoFile	Closes the file associated with the Echo command. (See also OpenEchoFile (page 282))
CloseFile	Closes a file opened using OpenFile
CloseSchematic	Close a schematic handle opened using OpenSchematic (page 286)
CloseSchematicTab	Close a schematic using ID
CollateVectors	Returns vector data in an interleaved manner
CommandStatus	Obtain information about the current script execution context
CompareSymbols	Compare two schematic symbols
ComposeDigital	Builds a new vector from a binary weighted combination of digital vectors
ConvertLocalToUnix	Convert file name to UNIX format using '/'
ConvertUnixToLocal	Convert file name to the local format.
CopyTree	Copy a directory tree
CopyURL	Copy a file to or from a location defined by a URL. Supports http, ftp and local files.
cos	Cosine (radians)
cos_deg	Cosine (degrees)
cosh	Hyperbolic cosine (radians)
CreateDiodeDialog	Opens a specialised dialog used by the diode model in-circuit parameter extractor
CreateLockFile	Create or remove a lock file for specified file.

Function Name	Description
CreateNewTitleBlockDialog	Displays the title block creation dialog
CreateShortcut	Create a shortcut to the specified path
CreateTimer	Create a timer to schedule events in the future
cv	Alias to GetCurveVector (page 163)
CyclePeriod	Returns the time between zero crossing pairs with the same slope direction. It can be used for plotting frequency vs time
Date	Return current system date in string form
db	$dB(x) = 20 \times \log10(\text{mag (page 261)}(x))$
DCSourceDialog	Opens 'Edit DC Source' dialog box
DefineADCDialog	UI function to define generic ADC
DefineArbSourceDialog	UI function to define arbitrary source
DefineBusPlotDialog	Opens a dialog box to allow the user to plot a bus
DefineCounterDialog	UI function to define generic counter
DefineCurveDialog	Opens define curve dialog box
DefineDACDialog	UI function to define generic DAC
DefineFourierDialog	UI function, opens define fourier dialog
DefineIdealTxDialog	UI function to define ideal transformer
DefineLaplaceDialog	UI function to define S-domain transfer function
DefineLogicGateDialog	UI function to define generic logic gate
DefinePerfAnalysisDialog	UI function for defining a performance analysis
DefineRegisterDialog	UI function to define Bus register
DefineRipperDialog	UI function to define schematic bus ripper
DefineSaturableTxDialog	Open dialog box to define a saturable transformer
DefineShiftRegDialog	UI function to define generic shift register
DefineSimplisMultiStepDialog	Open dialog box to define SIMPLIS multi-step dialog.
DeleteConfigCollection	Deletes a list of entries in the config file
DeleteTimer	Deletes a timer
DeleteTree	Delete an entire directory tree
DescendDirectories	Returns all directories under the specified directory, recursing through all sub-directories
DescendHierarchy	Analyse schematic hierarchy
DialogDesigner	Simple dialog designer
diff	Return derivative of argument

Function Name	Description
DirectoryIsWriteable	Tests whether or not a directory can be written to
Distribution	Returns random number with a custom distribution
EditArcDialog	UI function to edit symbol editor arc
EditAxisDialog	UI function, opens edit axis dialog
EditBodePlotProbeDialog	UI function for editing Bode plot fixed probes
EditBodePlotProbeDialog2	
EditCrosshairDimensionDialog	UI function, opens dialog for editing cursor dimension
EditCurveMarkerDialog	UI function, opens dialog to edit curve marker
EditDeviceDialog	UI function to select device and edit device parameters
EditDigInitDialog	UI function to edit digital initial condition
EditFreeTextDialog	UI function, opens dialog to edit graph free text object
EditGraphTextBoxDialog	UI function, opens dialog to edit graph text box object
EditJumperDialog	
EditLegendBoxDialog	UI function, opens dialog to edit graph legend box object
EditObjectPropertiesDialog	UI function, opens dialog to edit property values
EditPinDialog	UI function to edit symbol editor pins
EditPotDialog	UI function to edit potentiometer properties
EditProbeDialog	UI function, opens edit fixed probe dialog
EditPropertyDialog	UI function to edit symbol editor properties
EditReactiveDialog	Opens a dialog box designed to edit inductors and capacitors
EditSelect	User interface function. Returns entries in up to 6 edit controls
EditSimplisMosfetDriverDialog	Opens a specialized dialog used to edit the parameters for a SIMPLIS Multi-Level MOSFET Driver.
EditStylesDialog	Opens the Edit Styles dialog
EditSymbolBusDialog	
EditTimer	Edit a timer
EditWaveformDialog	Opens the dialog box editing a time domain waveform

Function Name	Description
EditWaveformStrDialog	Opens the dialog box editing a time domain waveform
ElementProps	Returns selected element's properties
EnterTextDialog	UI function to define multi line text
EpochTime	Returns absolute time in seconds
erf	Calculate erf(x)
erfc	Calculate erfc(x)
EscapeString	Process string and replace escaped characters with literals
EscapeStringEncode	Process string and replace literals with escaped characters.
ev	Special function used to evaluate a sequence of expressions
Execute	Execute script as a function
ExistCommand	Tests if a command exists
ExistDir	Checks if the specified directory exists
ExistFile	Tests whether a file exists
ExistFunction	Returns TRUE if the specified function exists.
ExistSymbol	Returns TRUE if specified schematic symbol exists.
ExistVec	Returns TRUE if specified schematic symbol exists.
exp	Exponential
fft	Fast Fourier Transform
Field	Provides bit-wise access to integers
FilterEditMenu	Filters a menu list to return only menu definitions that are actually displayed
FilterFile	Filters specific lines from a text file.
FindModel	Returns location of simulator model given name and type
FIR	Finite Impulse Response digital filter
Floor	Returns argument truncated to next lowest integer
floorv	Returns arguments truncated to next lowest integers, as a vector
FormatNumber	Returns formatted number in string form
Fourier	Performs a spectral analysis using the continuous Fourier algorithm

Function Name	Description
FourierOptionsDialog	UI function, opens fourier options dialog
FourierWindow	Apply window function for fourier analysis
FullPath	Returns full path name of given relative path
gamma	Calculate gamma(x)
Gauss	Returns random number with Gaussian distribution
GaussLim	Returns random number with Gaussian distribution truncated at the tolerance limits. Alias of function GaussTrunc (page 148)
GaussTrunc	Returns random number with Gaussian distribution truncated at the tolerance limits
GenPrintDialog	UI function, opens print dialog box
GetActualPath	Returns a file system path resolving any links
GetAllCurves	Returns array of curve indexes for all curves in current graph
GetAllSimulatorDevices	Returns details of all simulator built-in devices
GetAllSymbolPropertyNames	Finds names of all the properties on currently open symbol
GetAllYAxes	Returns array of axis id's for all y axes in current graph
GetAnalysisInfo	Return information about most recent analysis
GetAnalysisLines	Returns the analysis lines used in the most recent simulation analysis
GetAnnotationText	Returns the text of the requested annotation
GetAxisCurves	Returns array of curve id's for all curves attached to specified axis
GetAxisLimits	Returns min and max limits and axis type (log or lin) of specified axis
GetAxisType	Returns type (X, Y, Digital etc.) of specified axis
GetAxisUnits	Returns units of specified axis
GetChildModulePorts	Finds information about module ports in the underlying schematic of a hierarchical block
GetCodecNames	Returns encoding types available
GetColours	Return names of all colour objects
GetColourSpec	Return specification for a colour object
GetCompatiblePathName	Returns a path name with no white space.
GetComponentValue	Special function to get a component value or parameter

Function Name	Description
GetConfigLoc	Return location of config information
GetConnectedPins	Returns instance and pin name for all instances connected to net at specified point
GetConvergenceInfo	Return convergence data for most recent simulation
GetCurDir	Returns current working directory.
GetCurrentGraph	Returns id of the currently selected graph.
GetCurrentStepValue	Get current step value in a script-based multi-step analysis
GetCursorCurve	Returns curve id and source group name of curve attached to measurement cursor
GetCurveAxis	Returns axis id of specified curve
GetCurveName	Returns name of specified curve
GetCurves	Returns curve names in selected graph
GetCurveVector	Returns data associated with a graph curve
GetDatumCurve	Returns curve id and source group name of curve attached to reference cursor
GetDeviceDefinition	Retrieve the text of a model definition from library
GetDeviceInfo	Returns information about the specified simulator device
GetDeviceParameterNames	Returns list of device parameter names for specified SPICE device
GetDevicePins	Get electrical connections of a simulator device
GetDeviceStats	Get simulation statistics for each device type
GetDotParamNames	Returns names of .PARAM variables used in latest simulation
GetDotParamValue	Returns value of specified .PARAM value in latest simulation run
GetDriveType	Determines the type of drive or file system of the specified path
GetEmbeddedFileName	Returns the actual file name used for an embedded file specified using '.FILE' and '.ENDF'
GetEnvVar	Return specified system environment variable
GetEthernetAddresses	Returns information about the installed Ethernet adapters
GetF11Lines	Returns the contents of the schematic's text window (also known as the F11 window)

Function Name	Description
GetFile	User interface function. Returns user selected file name
GetFileCD	User interface function. As GetFile but changes directory.
GetFileDir	Get the directory where the specified file is located
GetFileExtensions	Returns file extensions for specified SIMetrix file type
GetFileInfo	Returns information about a specified file
GetFileSave	User interface function. Returns user selected file name for saving
GetFileVersionStamp	Returns file version stamp
GetFileViewerSelectedFiles	Returns file names of selected files in the File Views
GetFirstSelectedElementOfType	Returns handle of first selected schematic element of the requested type
GetFonts	Return names of all font objects
GetFontSpec	Return specification for named font
GetFreeDiskSpace	Returns space available on specified disk volume
GetGraphObjects	Return IDs for specified graph objects
GetGraphObjPropNames	Return property names for specified graph object
GetGraphObjPropValue	Return value for a graph object property
GetGraphObjPropValues	Return value for a graph object property
GetGraphTabs	Return graph ids for graph tabbed sheets
GetGraphTitle	Return current graph title
GetGroupInfo	Returns information about a group
GetGroupStepParameter	Returns the name of the 'stepped parameter' of a multi-step run
GetGroupStepVals	Returns the 'stepped values' in a multistep run
GetHighlightedWidgetId	Returns ID of highlighted widget
GetHostId	Get hostid that can be used for licensing
GetInstanceParamValues	Returns parameter values for a simulator device
GetInstancePinLocs	Returns pin locations of specified instance
GetInstsAtPoint	Returns instances at specified point
GetInternalDeviceName	Finds the simulator's internal device name for a model
GetKeyDefs	Returns details of all key definitions created using DefKey (page 460)

Function Name	Description
GetLaplaceErrorMessage	Convert ParseLaplace (page 289) status code to an error message
GetLastCommand	Retrieve last command issued by a menu or toolbar
GetLastError	Returns result of most recent command
GetLegendProperties	Returns array of legend property
GetLibraryModels	Returns a string array containing information about each model in the specified model library
GetLicenseInfo	Returns information about the current license
GetLicenseStats	Returns information about the license check out process
GetLine	Returns a single line from a file.
GetListSelected	Return list of selected elements from the ListSubsetDialog
GetListUnselected	Return list of unselected elements from the ListSubsetDialog
GetLongPathName	Returns long path name for path specified either as a long or short path
GetMaxCores	Return maximum cores available taking account of hardware capability and license
GetMenuItems	Returns all menu item names in the specified menu
GetModelFiles	Returns a list of currently installed device models.
GetModelLibraryErrors	Returns list of error messages from model library install operations
GetModelName	Returns the model name used by a simulator device
GetModelParameterNames	Returns the names of all real valued parameters of a simulator device model
GetModelParameters	Returns information about a device's model parameters
GetModelParameterValues	Returns the values of all parameters of a simulator model
GetModelType	Returns the simulator internal device name given a user model name
GetModifiedStatus	Returns modified status of the specified schematic
GetNamedSymbolPins	Returns the names for all the pins of a symbol or hierarchical component
GetNamedSymbolPropNames	Returns names of all properties defined for a library symbol

Function Name	Description
GetNamedSymbolPropValue	Returns the value of a property defined for a library symbol
GetNearestNet	Returns information about the schematic net nearest the mouse cursor
GetNextDefaultStyleName	Returns next fully available default style name
GetNodeNames	Returns all node names used in most recent simulation
GetNonDefaultOptions	Returns names of all explicit .OPTION settings in the most recent simulation
GetNumCurves	Returns number of curves in curve group
GetOpenSchematics	Returns the path names of all open schematics
GetOption	Returns the value of an option variable
GetPath	Returns application path
GetPlatformFeatures	Returns information on the availability of some platform dependent features
GetPrinterInfo	Returns information on installed printers
GetPrintValues	Returns the names of all quantities specified in .PRINT controls in the most recent simulation
GetReadOnlyStatus	Retruns internal read-only status of specified schematic
GetRegistryClassesRootKeys	List sub keys under key in registry HKEY_CLASSES_ROOT root
GetSchematicFileVersion	Returns the file version for the schematic
GetSchematicTabs	Returns the IDs of the schematics.
GetSchematicVersion	Returns version information about the current schematic
GetSchemTitle	Returns the title of the current schematic
GetSelectedAnnotationText	Returns the text in the selected annotation
GetSelectedCurves	Returns array of curve id's for selected curves
GetSelectedGraphAnno	Return ID of selected graph annotation object
GetSelectedStyleNames	Returns the names of the styles used by the selected elements
GetSelectedYAxis	Returns id of selected Y-Axis
GetShortPathName	Returns short path name for path specified either as a long or short path
GetSimConfigLoc	Returns the location of the simulator's configuration information
GetSimetrixFile	Returns path name of user selected file

Function Name	Description
GetSimplisExitCode	Returns the application exit code for the most recent SIMPLIS run
GetSimulationErrors	Retrieves the error messages raised by the most recent simulation run
GetSimulationInfo	Returns information about the most recent simulation
GetSimulationSeeds	Returns the seeds used for the most recent run
GetSimulatorEvents	Returns list of events for most recent simulation
GetSimulatorMode	Returns the simulator mode of the current schematic
GetSimulatorOption	Returns the value of a simulator option as used by the most recent analysis
GetSimulatorOptionInfo	Returns type and default value of a simulator option setting
GetSimulatorOptions	Return list of simulator options
GetSimulatorStats	Returns statistical information about the most recent run
GetSimulatorStatus	Returns the current status of the simulator
GetSoaDefinitions	Returns all Safe Operating Area definitions specified in the most recent analysis
GetSoaMaxMinResults	Returns the maximum and minimum values reached for all SOA definitions
GetSoaOverloadResults	Returns the overload factor for each SOA definition
GetSoaResults	Returns the SOA results for the most recent simulation
GetSymbolArcInfo	Returns information on symbol editor arc
GetSymbolFiles	Returns full paths of all installed symbol library files
GetSymbolInfo	Returns information on symbol editor symbol
GetSymbolOrigin	Returns the location of the symbol editor's symbol origin point
GetSymbolPropertyInfo	Returns information about symbol editor symbol properties
GetSymbolPropertyNames	Returns symbol editor symbol property names
GetSymbols	Returns array of available schematic symbols
GetSystemInfo	Returns information about the user's system
GetTempFile	Creates a temporary file name
GetTextEditorText	Returns text in the selected text based editor

Function Name	Description
GetThreadTimes	Returns the execution times for each device thread for the most recent simulation
GetTimerInfo	Returns information about a timer object
GetTitleBlockInfo	Returns information about the selected schematic title block
GetToolButtons	Returns name and description for available tool buttons
GetUncPath	Returns UNC path of specified path
GetUserFile	Returns path name of user specified file. Supersedes GetFile (page 172), GetFileCD (page 172), and GetFileSave (page 175)
GetVecStepParameter	Returns parameter name associated with vector
GetVecStepVals	Returns parameter values associated with vector
GetWidgetInfo	Returns info about open views
GetWindowNames	Returns names of current SIMetrix windows
GetXAxis	Returns the id of the x-axis in the currently selected graph
GraphImageCapture	Opens Graph Image Capture dialog
GraphLimits	Returns x and y limits of selected graph
GroupDelay	Returns group delay of argument
Groups	Returns array of available groups
GuiType	Returns whether a GUI is enabled
Hash	Returns a 'hash' value for the supplied string
HashAdd	Add items to a hash table
HashCreate	Create a hash table
HashDelete	Delete a hash table
HashSearch	Search hash table for an item
HasLogSpacing	Determines whether the supplied vector is logarithmically spaced
HasProperty	Determines whether a particular instance possesses a specified property.
HaveFeature	Detrmines whether a specified license feature is available
HaveInternalClipboardData	Returns the number of items in the specified internal clipboard
HierarchyHighlighting	
HighlightedNets	Returns names for any wholly highlighted net names on the specified schematic

Function Name	Description
Histogram	Returns histogram of argument
Iff	Returns a specified value depending on the outcome of a test
IffV	Returns a specified value depending on the outcome of a test
IIR	Infinite Impulse Response digital filter
im	Returns imaginary part of argument
imag	Returns imaginary part of argument
InitRandom	Initialises the random number generator used for SIMPLIS Monte Carlo distribution functions
InputGraph	User Interface function. Input text for graph operation
InputSchem	User Interface function. Input text for schematic operation
Instances	Returns array of instances possessing specified property
InstNets	Returns array of net names for each pin of selected schematic instance
InstNets2	As InstNets but with more advanced features to identify instance
InstPins	Returns array of pin names for each pin of selected schematic instance
InstPoints	Returns location and orientation of specified instance
InstProps	Returns names of all properties owned by selected instance
integ	Returns integral of argument
Interp	Interpolates argument to specified number of evenly spaced points
IsComplex	Returns TRUE if argument is complex
IsComponent	Determines whether a schematic instance is a hierarchical component
IsDocumented	Returns whether the script command or function is documented
IsFileOfType	Returns TRUE if the filename given is of the type checked against
IsFullPath	Returns TRUE if the supplied path name is a full absolute path
IsImageFile	Tests if a file type is an image format.

Function Name	Description
IsModelFile	Determines if a file contains valid electrical models
IsNum	Returns TRUE if argument is numeric (real or complex)
IsOptionMigrateable	Determines if an option variable may be migrated in a version upgrade.
IsSameFile	Compares two paths and returns true (1) if they point to the same file
IsScript	Determines whether the supplied script name can be located
IsStr	Returns TRUE if argument is a string
IsTextEditor	Returns true if selected editor is a text editor
IsTextEditorModified	Returns true if the highlighted text editor is modified.
JoinStringArray	Concatenates two string arrays to return a single array
length	Returns number of elements in vector.
ListDirectory	Returns file names found in a directory matching a supplied wildcard spec
ListSchemProps	Returns the schematic properties
ListSubsetDialog	
ln	Natural logarithm
LoadFile	Returns the contents of a text file as a vector
Locate	Locates value in a monotonic vector. Returns index.
log	Base 10 logarithm, same as log10 (page 261)()
log10	Base 10 logarithm
mag	Magnitude (same as abs (page 57)())
magnitude	Magnitude (same as the function abs (page 57))
MakeDir	Make a directory and result of operation
MakeLogicalPath	Converts a file system path to a symbolic path
MakeString	Create a string array with specified number of elements
ManageDataGroupsDialog	Open Manage Data Group dialog box
ManageMeasureDialog	Opens dialog box used to manage graph measurements.
max	Returns max of two vectors
maxidx	Returns index to maximum input value

Function Name	Description
Maxima	Returns locations of maxima of specified vector
Maximum	Returns most positive value in vector
mean	Returns statistical mean of all values in vector
Mean1	Returns mean of data in given range
MeasureDialog	Opens dialog for specifying graph measurements
MenuModifier	
MessageBox	Opens a dialog box with a message and user options
Mid	Returns substring of the given string
min	Returns min of two vectors
minidx	Returns index to minimum input value
Minima	Returns locations of minima of specified vector
Minimum	Returns most negative value in vector
MkVec	Returns an expression to access simulation vector data
MLSplineFit	Spline based fit to given data
MLVector	Creates a vector of consecutively increasing values.
ModelLibsChanged	Returns TRUE if any installed model paths have changed
Navigate	Returns path name of hierarchical block given root path and full component reference
NearestInst	Cross probe function. Returns nearest schematic instance to cursor
NetName	Cross probe function. Returns the net name of the nearest wire or instance pin.
NetNames	Returns array of all net names in selected schematic
NetWires	Return all wires on specified net
NewPassiveDialog	UI function to select passive component value and parameters
NewValueDialog	General purpose user input function. Opens a user configurable dialog box
norm	Returns argument scaled so that its largest value is unity.
NumberSelectedAnnotations	Returns number of selected annotations
NumDivisions	Returns number of divisions in a vector
NumElems	Returns number of elements in a vector

Function Name	Description
OpenEchoFile	Redirects the output of the Echo command
OpenFile	Opens a file and returns its handle. This may be used by the Echo command
OpenPDFPrinter	Sets up printing for PDF output
OpenPrinter	Starts a print session
OpenSchem	Opens a schematic and returns value indicating success or otherwise
OpenSchematic	Opens a schematic without displaying it. Returned ID useable by various functions and commands
Parse	Splits up the string supplied as argument 1 into substrings or tokens
ParseAnalysis	Opens the choose analysis dialog
ParseLaplace	Parses a Laplace expression to return array of denominator and numerator coefficients
ParseParameterString	Parses a string of name-value pairs and performs some specified action on them
ParseSimplisInit	Reads and parses the .init file created by a SIMPLIS run
PathEqual	Compares two path names with platform dependent case-sensitivity
PerCycleTiming	Returns a vector of “Per Cycle” Frequency, Period, Duty Cycle, On-Time, or Off-Time values.
PerCycleValue	Returns a vector of "Per Cycle" Minimum, Maximum, Mean, Peak-to-Peak, or RMS values.
ph	Returns phase of argument in degrees
phase	Returns phase of argument in degrees
phase_rad	Returns phase of argument in radians
PhysType	Returns the physical type of the argument
PinName	Cross probe function. Returns pin name nearest to cursor
PrepareSetComponentValue	Configures SetComponentValue (page 347) function
Probe	Displays probe cursor in schematic and waits for mouse click
ProcessingAccelerator	Detects if the current script was called by an accelerator key
ProcessingDragAndDrop	Detects if the current script was called by a drag and drop operation

Function Name	Description
ProcessingGuiAction	Detects if the current script was called by a GUI action
Progress	UI function, opens progress bar
PropFlags	Returns the attribute flags of a schematic property
PropFlags2	Returns the attribute flags of a schematic property
PropFlagsAll	Returns selected property flags for all selected elements with optional filtering
PropFlagsAnnotations	Returns selected property flags for all selected annotations with optional filtering
PropFlagsWires	Returns selected property flags for all selected wires with optional filtering
PropOverrideStyle	Returns override style of selected property
PropValue	Returns value of specified property for selected instance
PropValues	Returns array of property values
PropValues2	As PropValues but with rearranged arguments
PropValuesAll	Returns selected property values for all selected elements with optional filtering
PropValuesAnnotations	Returns selected property values for all selected annotations with optional filtering
PropValuesWires	Returns selected property values for all selected wires with optional filtering
PutEnvVar	Write an environment variable
PWLDialog	Opens a dialog box designed for editing piece wise linear sources
QueryData	Filters a list of data items according to search criteria
RadioSelect	User interface function. Returns user selection of up to 5 radio buttons
RadioSelectWidgetStackDialog	
Range	Returns range of vector (accepts, real, complex and string)
re	Returns real part of argument
ReadClipboard	Returns text contents of the windows clipboard
ReadConfigCollection	Returns the contents of an entire section in the configuration file
ReadConfigSetting	Reads a configuration setting

Function Name	Description
ReadF11Options	Read .OPTIONS line in the F11 window
ReadFile	Reads text file and returns contents as an array of strings
ReadIniKey	Reads a key in an “INI” file
ReadRegSetting	Reads a string setting from the windows registry
ReadSchemProp	Returns value of schematic window property value.
ReadTextEditorProp	Reads a text editor property
real	Returns real part of argument
Ref	Returns reference of argument
RefName	Returns the name of the arguments reference vector
RelativePath	Returns a relative path name given a full path and a reference path
RemapDevice	Map SIMetrix simulator device to model name and level number
RemoveConfigCollection	Removes one or more entries from a configuration file collection
RemoveModelFile	Uninstalls a model path
RemoveSymbolFiles	Removes a symbol file or set of symbol files from the symbol library
ResolveGraphTemplate	Evaluate template string used by graph object
ResolveTemplate	Evaluate template string
RestartTranDialog	UI function, opens restart transient dialog
Rms	Returns accumulative RMS value of argument
RMS1	Returns RMS of argument over specified range
rnd	Returns random number
RootSumOfSquares	Returns root sum of squares of argument over specified range
rt	Evaluate template string
SaveSpecialDialog	Opens the dialog used by the schematic’s Save Special... menu
Scan	Splits a character delimited string into its components.
ScriptName	Return name of currently executing script
Search	Search for a string in a list of strings
SearchModels	Special purpose used by library installation. Returns pathnames of SPICE compatible model files

Function Name	Description
Seconds	Returns the number of seconds elapsed since January 1, 1970
Select2Dialog	Displays a dialog offering two lists
SelectAnalysis	Opens choose analysis dialog box. Returns value according to how box closed
SelectColourDialog	UI function, opens colour selection dialog
SelectColumns	Analyses an array of character delimited strings and returns selected values.
SelectCount	Returns number of selected items on schematic
SelectDevice	Special function forms part of parts browser system. Takes catalog data as arguments and opens dialog box to select a device.
SelectDialog	User interface function. Allows selection of one or more items from list
SelectedProperties	Returns information about selected properties
SelectedStyleInfo	Returns style information for the selected element
SelectedWires	Returns handles to selected wires on schematic
SelectFontDialog	UI function, opens select font dialog
SelectRows	Analyses an array of character delimited strings and returns selected values.
SelectSimplisAnalysis	Opens SIMPLIS choose analysis dialog box
SelectSymbolDialog	Opens a dialog box allowing the user to select a schematic symbol from the symbol library
SelGraph	Returns id of selected graph.
SelSchem	Returns TRUE if at least one schematic is open.
SetComponentValue	Special function to set or get a component value or parameter
SetInstanceParamValue	Set an instance parameter during a script-based multi-step analysis
SetModelParamValue	Set a model parameter during a script-based multi-step analysis
SetPropertyStyles	Sets styles as property styles
SetReadOnlyStatus	Sets read-only/writeable status of specified schematic
Shell	Runs an external program and returns its exit code
ShellExecute	Performs an operation on a windows registered file
sign	Returns sign of argument

Function Name	Description
SimetrixFileInfo	Returns information about a SIMetrix file
SIMPLISRunStatus	Tests if a SIMPLIS simulation is running
SIMPLISSearchIdx	Searches input string array for a test string, returning the indices into input array array where the test string matches.
SimulationHasErrors	Determines success of most recent simulation
sin	Sine (radians)
sin_deg	Sine (degrees)
sinh	Hyperbolic sine (radians)
Sleep	Executes a timed delay
Sort	Performs alphanumeric sort on argument.
SortIdx	Sorts any vector and returns index order
SourceDialog	User Interface function. Opens source dialog box for specifying of voltage and current source. Returns string with user selected values
SplitPath	Splits file system path into its components
SplitString	Splits string into parts according to single token
SprintfNumber	Returns a formatted string
sqrt	Square root
Str	Converts argument to string
StringLength	Returns the number of characters in the supplied string.
StringStartsWith	Checks whether a string starts with another string.
StrStr	Locates a sub string within a string
StyleInfo	Returns style information
StyleLineTypes	Returns list of possible style line types
StyleNames	Returns a list of style names
SubstChar	Substitutes characters in string
SubstString	Replaces a substring in a string, case sensitive
sum	Sums the arguments
SumNoise	Returns root sum of squares of argument over specified range
SupportedReadFormats	Returns names of image formats types supported for display in SIMetrix windows such as schematics.

Function Name	Description
SupportedWriteFormats	Returns names of image formats types that SIMetrix can create for graphical windows such as schematics and graphs.
SymbolInfoDialog	Returns name of schematic symbol
SymbolLibraryManagerDialog	Opens the Symbol Library Manager dialog box
SymbolName	Returns symbol name of specified instance
SymbolNames	Returns symbol names of schematic instances
SymbolPinOrder	Set and/or return pin order of symbol editor symbol
SymbolPinPoints	Returns the location of specified pin
SymbolPropertyAutoOrder	
SystemValue	Returns the value of a system defined variable
SystemValuePath	Returns the value of a system defined variable that accesses a file system path
SystemWidgetExistsInSelectedWindow	States whether particular system view is in the highlighted window
TableDialog	Displays a spreadsheet style table to allow the user to enter tabular data
TableEditor	Displays a table of combo boxes to allow select tabular data
TabValueDialog	
tan	Tangent (radians)
tan_deg	Tangent (degrees)
tanh	Hyperbolic tangent (radians)
TemplateGetPropValue	Function returns the value of a property. For use in template scripts only
TemplateResolve	Resolve TEMPLATE value. For use in template scripts only
TextEditorHasComments	Returns whether the editor supports comments
ThdWeight	Returns a vector of weighting coefficients used to weight the harmonic coefficients before making a THD measurement.
TickCount	Returns a time in seconds suitable for timing measurement
Time	Return system time as string
ToLower	Converts a string to all lower case
TransformerDialog	Special function to select transformer characteristics
TranslateLogicalPath	Converts symbolic path to a physical path

Function Name	Description
TreeListDialog	General purpose UI function. Open dialog box with tree list control
True	Returns 1 if vector exists and is nonzero
Truncate	Returns vector that is a sub range of supplied vector
TwoFileSelectionDialog	General purpose file dialog with two file entries and an option third description entry
UD	Alias of Distribution (page 102)
Unif	Returns random number with uniform distribution
Units	Returns physical units of argument
unitvec	Returns vector of specified length whose elements are all 1
UpDownDialog	General purpose UI function. Opens dialog with up-down list to allow rearranging order
UserParametersDialog	UI function, opens dialog allowing editing of user parameter values
Val	Converts argument to value
ValueDialog	User interface function. Opens dialog with up to 10 boxes for entering numeric values. Return array of user selected values
Vec	Returns data for named vector. (Allows access to vectors with invalid names)
vector	Returns vector of specified length with each element equal to its index
VectorsInGroup	Returns array of variable names belonging to specified group
VersionInfo	Returns version information about running copy of SIMetrix
ViewFormattedText	View HTML formatted text
WC	Returns random number with worst case distribution
WirePoints	Returns location of specified wire
Wires	Return all wires in schematic
WM_CanRevertToSaved	Returns whether chosen editor has a revertable saved state.
WM_GetCentralWidgetGeometry	Returns window geometry information
WM_GetContentWidgetNames	Returns content widget names
WM_GetContentWidgetSessionInfo	Returns widget session information

Function Name	Description
WM_GetContentWidgetsLayout	Returns layout information
WM_GetContentWidgetTypes	Returns the workspace view types in a particular window
WM_GetCurrentWindowName	Returns name of highlighted window
WM_GetNumberModifiedEditors	Returns number of editors that are modified in all windows
WM_GetPrimaryWindowName	Returns the name of the primary window
WM_GetSystemWidgetSessionInfo	Returns widget session information
WM_GetSystemWidgetsLayout	Returns layout information
WM_GetWindowGeometry	Returns window geometry
WM_GetWindowNames	Returns the names of all windows
WM_NumberContentWidgets	Returns the number of content widgets in use
WM_NumberSystemWidgets	Returns the number of system widgets in use
WriteConfigSetting	Writes a configuration setting
WriteF11Lines	Writes lines directly to the F11 window overwriting any existing lines
WriteF11Options	Write SIMetrix simulator options to the F11 window.
WriteIniKey	Writes a key value to an 'INI' file
WriteRawData	Writes data to the specified file in a SPICE3 raw file compatible format
WriteRegSetting	Writes a string value to the windows registry
WriteSchemProp	Write schematic window property value
XCursor	Returns x location of graph cursor
XDatum	Returns x location of graph reference cursor
XFromY	Returns array of values specifying horizontal locations where specified vector crosses given y value
XMLCountElements	Returns the number of elements of a particular type
XMLGetAttribute	Returns the attribute value for given name at the current focus element
XMLGetElements	Lists elements at the current focus level
XMLGetText	Returns the text for the current focus element
XMLToString	Returns the XML document as a string
XY	Creates an XY Vector from two separate vectors
YCursor	Returns y location of graph cursor
YDatum	Returns x location of graph reference cursor

Function Name	Description
YFromX	Returns array of values specifying the vertical value of the specified vector at the given x value

3.1 Functions by Application

3.1.1 Configuration/Licensing

GetColours
GetColourSpec
GetConfigLoc
GetFileExtensions
GetFonts
GetFontSpec
GetLicenseInfo
GetLicenseStats
GetOption
GetSimConfigLoc
HaveFeature
IsOptionMigrateable
VersionInfo
WriteConfigSetting

3.1.2 Data fitting

GraphImageCapture
MLSplineFit
MLVector

3.1.3 File/Directory

CanOpenFile
ChangeDir
ChooseDir
ChooseDirectory
CloseEchoFile
CloseFile
ConvertLocalToUnix
ConvertUnixToLocal
CopyTree
CopyURL
CreateLockFile
CreateShortcut
DeleteTree
DescendDirectories
DirectoryIsWriteable
ExistDir
ExistFile
FullPath
GetActualPath
GetCodecNames
GetCurDir
GetDriveType
GetFileDir
GetFileInfo
GetFileVersionStamp
GetFreeDiskSpace
GetLine
GetLongPathName
GetPath
GetShortPathName
GetTempFile
GetUncPath
IsFullPath
IsSameFile
ListDirectory
LoadFile
MakeDir
MakeLogicalPath
OpenEchoFile
OpenFile
ReadFile
RelativePath
SimetrixFileInfo
SplitPath
TranslateLogicalPath

3.1.4 Graph

AddGraphCrossHair
GetAllCurves
GetAllYAxes
GetAxisCurves
GetAxisLimits
GetAxisType

GetAxisUnits
GetCurrentGraph
GetCursorCurve
GetCurveAxis
GetCurveName
GetCurves
GetCurveVector
GetDatumCurve
GetGraphObjects
GetGraphObjPropNames
GetGraphObjPropValue
GetGraphObjPropValues
GetGraphTabs
GetGraphTitle
GetLegendProperties
GetNumCurves
GetSelectedCurves
GetSelectedGraphAnno
GetSelectedYAxis
GetXAxis
GraphLimits
ResolveGraphTemplate
SelGraph
XCursor
XDatum
YCursor
YDatum

3.1.5 Mathematical

abs
area
arg
arg_rad
atan
atan_deg
avg
cos
cos_deg
db
diff
erf
erfc
exp
fft
Field
FIR
Floor
floorv
Fourier
FourierWindow
gamma
GroupDelay
HasLogSpacing
Histogram
Iff
IffV
IIR
im
imag
integ
ln
log
log10
mag
magnitude
max
maxidx
Maxima
Maximum
mean
Mean1
min
minidx
Minima
Minimum
norm
ph
phase
phase_rad
re
real
Rms
RMS1
rnd
RootSumOfSquares
sign
sin
sin_deg
sqrt
SumNoise
tan
tan_deg
unitvec

3.1.6 Miscellaneous

GetLaplaceErrorMessage
HaveInternalClipboardData
IsImageFile
ParseLaplace
SupportedReadFormats
SupportedWriteFormats

3.1.7 Model Library

AddModelFiles
AssociateModel
FindModel
GetLibraryModels
GetModelLibraryErrors
IsModelFile
ModelLibsChanged
RemoveModelFile
SearchModels

3.1.8 Monte Carlo Distribution

Distribution
Gauss
GaussTrunc
InitRandom
UD
Unif
WC

3.1.9 SIMPLIS

SIMPLISRunStatus

3.1.10 Schematic

Branch
CloseSchematic
CloseSchematicTab
DescendHierarchy
GetAnnotationText
GetChildModulePorts
GetComponentValue
GetConnectedPins
GetF11Lines
GetFirstSelectedElementOfType
GetInstancePinLocs
GetInstsAtPoint
GetListSelected
GetListUnselected
GetModifiedStatus
GetNearestNet
GetOpenSchematics
GetReadOnlyStatus
GetSchematicFileVersion
GetSchematicTabs
GetSchematicVersion
GetSchemTitle
GetSelectedAnnotationText
GetTitleBlockInfo
HasProperty
HighlightedNets
Instances
InstNets
InstNets2
InstPins
InstPoints
InstProps
IsComponent
ListSchemProps
Navigate
NearestInst
NetName
NetNames
NetWires
NumberSelectedAnnotations
OpenSchem
OpenSchematic
PinName
PrepareSetComponentValue
Probe
PropFlags
PropFlags2
PropFlagsAll
PropFlagsAnnotations
PropFlagsWires
PropValue
PropValues
PropValues2
PropValuesAll
PropValuesAnnotations
PropValuesWires
ReadF11Options
ReadSchemProp
SelectCount
SelectedProperties
SelectedWires
SelSchem
SetComponentValue
SetReadOnlyStatus
TemplateGetPropValue
TemplateResolve

WirePoints
Wires
WriteF11Lines
WriteF11Options
WriteSchemProp

3.1.11 Schematic Styles

GetNextDefaultStyleName
GetSelectedStyleNames
PropOverrideStyle
SelectedStyleInfo
SetPropertyStyles
StyleInfo
StyleLineTypes
StyleNames

3.1.12 Schematic Symbols and Library

AddSymbolFiles
CompareSymbols
ExistSymbol
GetAllSymbolPropertyNames
GetNamedSymbolPins
GetNamedSymbolPropNames
GetNamedSymbolPropValue
GetSymbolArcInfo
GetSymbolFiles
GetSymbolInfo
GetSymbolOrigin
GetSymbolPropertyInfo
GetSymbolPropertyNames
GetSymbols
RemoveSymbolFiles
SymbolInfoDialog
SymbolName
SymbolNames
SymbolPinOrder
SymbolPinPoints

3.1.13 Script

CommandStatus
Execute
ExistCommand
GetLastError
IsDocumented
IsScript
ReadConfigSetting
ScriptName

3.1.14 Simulator

GetAllSimulatorDevices
GetAnalysisInfo
GetAnalysisLines
GetConvergenceInfo
GetCurrentStepValue
GetDeviceDefinition
GetDeviceInfo
GetDeviceParameterNames
GetDevicePins
GetDeviceStats
GetDotParamNames
GetDotParamValue
GetEmbeddedFileName
GetInstanceParamValues
GetInternalDeviceName
GetModelName
GetModelParameterNames
GetModelParameters
GetModelParameterValues
GetModelType
GetNodeNames
GetNonDefaultOptions
GetPrintValues
GetSimplisExitCode
GetSimulationErrors
GetSimulationInfo
GetSimulationSeeds
GetSimulatorEvents
GetSimulatorMode
GetSimulatorOption
GetSimulatorOptionInfo
GetSimulatorOptions
GetSimulatorStats
GetSimulatorStatus
GetSoaDefinitions
GetSoaOverloadResults
GetSoaResults
GetThreadTimes
ParseAnalysis
RemapDevice
SelectAnalysis
SelectSimplisAnalysis

SetInstanceParamValue SetModelParamValue SimulationHasErrors

3.1.15 String

Ascii
Char
Chr
EscapeString
EscapeStringEncode
FilterFile
FormatNumber
HashAdd
HashCreate
HashDelete
HashSearch
MakeString
Mid
Parse
ParseParameterString
ParseSimplisInit
PathEqual
QueryData
ResolveTemplate
rt
Scan
Search
SelectColumns
SelectRows
Sort
SortIdx
SplitString
SprintfNumber
StringLength
StrStr
SubstChar
SubstString
ToLower

3.1.16 System

CreateTimer
Date
DeleteTimer
EditTimer
EpochTime
GetEnvVar
GetHostId
GetMaxCores
GetPlatformFeatures
GetPrinterInfo
GetRegistryClassesRootKeys
GetSystemInfo
GetTimerInfo
OpenPrinter
PutEnvVar
ReadClipboard
ReadIniKey
ReadRegSetting
Seconds
Shell
ShellExecute
Sleep
TickCount
Time
WriteIniKey
WriteRegSetting

3.1.17 Text Editor

GetTextEditorText IsTextEditorModified TextEditorHasComments

3.1.18 User Interface

ACSourceDialog
AddPropertyDialog
AddRemoveDialog
AddRemoveDialogNew
BoolSelect
DCSourceDialog
DefineADCDialog
DefineArbSourceDialog
DefineBusPlotDialog
DefineCounterDialog
DefineCurveDialog
DefineDACDialog
DefineFourierDialog
DefineLaplaceDialog
DefineLogicGateDialog
DefinePerfAnalysisDialog
DefineRegisterDialog
DefineRipperDialog
DefineSaturableTxDialog
DefineShiftRegDialog
DefineSimplisMultiStepDialog

EditArcDialog
EditAxisDialog
EditCrosshairDimensionDialog
EditCurveMarkerDialog
EditDeviceDialog
EditDigInitDialog
EditFreeTextDialog
EditGraphTextBoxDialog
EditLegendBoxDialog
EditObjectPropertiesDialog
EditPinDialog
EditPotDialog
EditProbeDialog
EditPropertyDialog
EditReactiveDialog
EditSelect
EditStylesDialog
EditWaveformDialog
EditWaveformStrDialog
EnterTextDialog
FilterEditMenu
FourierOptionsDialog
GenPrintDialog
GetFile
GetFileCD
GetFileSave
GetFileViewerSelectedFiles
GetHighlightedWidgetId
GetLastCommand
GetMenuItems
GetSimetrixFile
GetToolButtons
GetUserFile
GetWidgetInfo
GetWindowNames
GuiType
InputGraph
InputSchem
IsTextEditor
ManageDataGroupsDialog
ManageMeasureDialog
MessageBox
NewPassiveDialog
NewValueDialog
ProcessingAccelerator
ProcessingDragAndDrop
ProcessingGuiAction
Progress
PWLDialog
RadioSelect
ReadTextEditorProp
RestartTranDialog
SelectColourDialog
SelectDevice
SelectDialog
SelectFontDialog
SelectSymbolDialog
SourceDialog
SymbolLibraryManagerDialog
SystemWidgetExistsInSelectedWindow
TableDialog
TableEditor
TransformerDialog
TreeListDialog
TwoFileSelectionDialog
UpDownDialog
UserParametersDialog
ValueDialog
ViewFormattedText
WM_CanRevertToSaved
WM_GetCentralWidgetGeometry
WM_GetContentWidgetNames
WM_GetContentWidgetSessionInfo
WM_GetContentWidgetsLayout
WM_GetContentWidgetTypes
WM_GetCurrentWindowName
WM_GetPrimaryWindowName
WM_GetSystemWidgetSessionInfo
WM_GetSystemWidgetsLayout
WM_GetWindowGeometry
WM_GetWindowNames
WM_NumberContentWidgets
WM_NumberSystemWidgets

3.1.19 Vectors/Groups

CollateVectors
ComposeDigital
CyclePeriod
ev
ExistFunction
ExistVec
GetGroupInfo
GetGroupStepParameter
GetGroupStepVals
GetVecStepParameter
GetVecStepVals
Groups
IsComplex
IsNum
IsStr
length
Locate
MkVec
NumDivisions
NumElems
PhysType

Chapter 4

Function Reference

abs

Returns absolute value or magnitude of argument. This function is identical to the function mag (page 261).

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real array

Absolute value of input

ACSourceDialog

Displays dialog box intended for the user definition of an AC source. Argument is a real array with two elements which specify the initial values for the two controls as follows:

0 Magnitude

1 Phase

The function returns a real array of length 2 with the same format as the argument described above.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Initial value

Returns

Return type: Real array

AddConfigCollection

Adds a list of entries to a named section in the configuration file.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Section name
2	string array	Yes		List of entries

Argument 1

Section name in configuration file where entries are to be added. The configuration file is where SIMetrix stores its settings. See the User's Manual chapter 13 for more information.

Argument 2

List of entries to be added. Note that duplicates are not permitted and any entered will be ignored.

Returns

Return type: real

The number of new entries successfully added is returned. This will may be less than the number of entries supplied to argument 2 if any are already entered or if their are duplicates in the list supplied.

AddGraphCrossHair

Adds a new cursor to the current graph. Note that cursors must be switched on for this to work. This can be done with the command CursorMode (page 456).

For more information on graph annotation objects, please refer to "Graph Objects" on page 569.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		curve id

Argument 1

Id of curve on which crosshair is intially placed. If the Id supplied is not valid, the cursor will be placed on an undetermined existing curve.

Returns

Return type: string array

String array with three elements defined as follows:

Index	Description
0	Id of new cursor
1	Id of cursor's horizontal dimension
2	Id of cursor's vertical dimension

AddModelFiles

Installs a list of new models to the model library. Models may be either single files or wildcard specifications. Duplicates will be ignored

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Model path names

Argument 1

String array containing library specifications to be added. A library specification can either be a single file or a wildcard definition, e.g. path*.lb

Returns

Return type: real

Number of models actually installed. This may be less than the number supplied if any are already installed

AddPropertyDialog

Opens the dialog box used to create a new property in the symbol editor. (E.g as opened by **Property/Pin | Add Property...**) The first and third arguments initialise the Name and Value boxes respectively. Argument 2 initialises the text location and property attributes. For details on the meaning of attribute flags see "Attribute Flags in the Prop command" on page 510.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	⟨⟨empty⟩⟩	initial property name
2	string	No	0	initial property attribute flags
3	string	No	⟨⟨empty⟩⟩	initial property value
4	string	No	⟨⟨empty⟩⟩	options
5	string	No	⟨⟨empty⟩⟩	font override style
6	string	No	⟨⟨empty⟩⟩	available font override styles

Returns

Return type: string array length 3

String array of length 4 providing the users settings. The function returns an empty vector if Cancel is selected.

Index	Description
0	Property name
1	Flags value
2	Property value
3	Font override style

AddRemoveDialog

Opens a dialog box to allow user to select from a number of items

This dialog box is used by the menu **File |Model Library | Add/Remove Models...** (horizontal style) and also by the schematic menu **View | Configure Toolbar...** (vertical style).

The function will display in the lower list box, all items found in both arguments 1 and arguments 2 with no duplicates. In the top list box, only the items found in argument 1 will be displayed. The user may freely move these items between the boxes. The function returns the contents of the top list box as an array of strings.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		
2	string array	Yes		All items available
3	string array	No	⟨⟨empty⟩⟩	Options
4	string	No	'horizontal'	Box style

Argument 1

Initial contents of selected list box

Argument 3

A string array of size up to four which may be used to specify a number of options. The first three are used for text messages and the fourth specifies a help topic to be called when the user presses the Help button. The help button will not be shown if the fourth element is empty or omitted.

Argument 4

Determines the style of the box. The default is 'horizontal' and with this style the two list boxes are on top of each other. If arg4 is set to 'vertical', the two list boxes will be arranged side by side.

Returns

Return type: string array

The function returns the contents of the selected list or an empty vector if "Cancel" is selected. The function will also return an empty vector if there are no selected items and thus it is not possible to use this function to select no items at all. Instead use AddRemoveDialogNew (page 61) if it is necessary to be able to select no items.

AddRemoveDialogNew

Opens a dialog box to allow user to select from a number of items. This function is identical to AddRemoveDialog (page 60) except that the return value has an additional element to specify the number of selected items. This makes it possible for the selected items list to be empty.

Arguments

No arguments

Returns

Return type: string array

The first element of the result returns the number of items in the selected list which can be zero. This is followed by the items themselves. The return value will an empty vector if "Cancel" is selected.

AddSymbolFiles

Adds file or files to list of installed symbol library files.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Files to add

Argument 1

A string array containing the path names of the symbol libraries to be installed. The names may use symbolic constants.

Returns

Return type: Real

Number of files actually added to the library. This may not be the same length as the argument as the function will not install files that are already installed.

area

Calculates the area under the curve of the argument.

This function returns a single value that can be used for measurements. The integ (page 250) function may be used to obtain a vector of the area. area(arg) is equivalent to the value of (integ(arg))[length(arg)-1]

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Vector
2	real	No	0.0	Start x value
3	real	No	Final x value in data	End x value

Argument 1

Vector to process. Must have a reference - e.g. x-values

Argument 2

Value on x-axis where the start of the curve area is located

Argument 3

Value on x-axis where the end of the curve area is located

Returns

Return type: real

Area under curve

Example

arg

Returns the phase of the argument in degrees. Unlike the functions phase (page 297) and phase_rad (page 297), this function wraps from 180 to -180 degrees. See arg_rad (page 63) function below for a version that returns phase in radians.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the arc tangent of the argument. Result is in degrees.

arg_rad

Returns the phase of the argument in radians. Unlike the functions phase (page 297) and phase_rad (page 297), this function wraps from $-\pi$ to π radians. See arg (page 63) function above for a version that returns phase in degrees.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the arc tangent of the argument. Result is in radians.

Ascii

Returns the ASCII code for the first letter of the argument

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		

Returns

Return type: real

AssociateModel

Special purpose function forms part of parts browser system. Function opens 'Associate Models' dialog box which allows user to associate electrical models with schematic symbols as well as be able to specify part categories and pin mapping. The function modifies the user catalog file (second argument. The return value is FALSE if the user cancels the box otherwise it returns TRUE. For full details on using this dialog box, refer to the "Device Library" chapter in the User's Manual.

The dialog box may be opened in one of two modes namely multiple and single. In multiple mode, a list of models and categories is displayed allowing the association of many devices together. In single mode, a single device name is provided as an argument and only that device may be associated.

To open in single mode, provide a two element string array to argument 4 with the first element set to the model to be associated and the second element set to 'single'. Otherwise the box will be opened in multiple mode in which the first element of argument 4 (if present) defines the initial selected device.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Catalog file (usually OUT.CAT)
2	string	Yes		User catalog file (usually USER.CAT)
3	string	No	⟨⟨empty⟩⟩	Command to execute to create symbol
4	string	No	⟨⟨empty⟩⟩	Options

Returns

Return type: Real

atan

Returns the arc tangent of its argument. Result is in radians.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the arc tangent of its argument. Result is in radians.

atan_deg

Returns the arc tangent of the argument. Result is in degrees.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the arc tangent of the argument. Result is in degrees.

avg

Calculates the average of the argument with respect to its reference as defined by:

$$y = \int_0^t \frac{x}{t} dt$$

where x is the argument and t is the reference of x. See "Vector References" on page 21 for details.

The function uses simple trapezoidal integration.

An error will occur if the argument supplied has no reference.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		vector

Returns

Return type: real array

BoolSelect

Opens a dialog box with any number of check boxes. The return value is a real vector containing the user's check box settings. 1 means checked, 0 means not checked. The number of check boxes displayed is the smaller of the length of arguments 1 and 2. If neither argument is supplied, 6 check boxes will be displayed without labels.

If the user cancels the operation, an empty value is returned. This can be checked with the function length (page 258).

Arguments

Number	Type	Compulsory	Default	Description
1	real	No		Initial check box settings
2	string	No		Labels
3	string	No		Dialog Box Caption

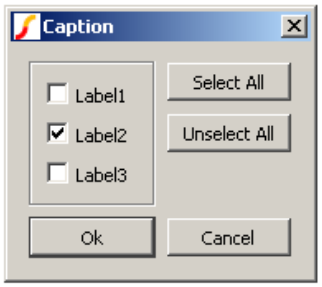
Returns

Return type: real array

Example

The following dialog box is displayed after a call to:

```
BoolSelect([0,1,0], ['Label1', 'Label2', 'Label3'], 'Caption')
```



See Also

"EditSelect" on page 121

"RadioSelect" on page 319

"ValueDialog" on page 392

Branch

Returns the *branch current formula* for the wire nearest the cursor on the selected schematic. This function will only return a result after the circuit has been netlisted.

The branch current formula is an expression that when evaluated yields the current flowing in the wire. The polarity of the result assumes current flows from right to left and top to bottom. An empty string will be returned if there is more than one path for current to flow or if the wire is dangling.

Arguments

No arguments

Returns

Return type: string

See Also

"NearestInst" on page 276

"NetName" on page 276

"PinName" on page 299

CanOpenFile

Returns TRUE (1) if file specified by argument 1 can be opened otherwise returns FALSE (0). Argument 2 may be set to 'read' (the default) or 'write' specifying what operation is required to be performed on the file.

This function takes account of lock files used to prevent other instances of SIMetrix from opening a file. For example, when a schematic is opened in non read only mode, a lock file is created which will prevent another instance of SIMetrix from opening that file but will not prevent another application from opening the file. CanOpenFile will return false for such files when 'write' mode is specified.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		file name
2	string	No	read	options

Returns

Return type: real

ChangeDir

Change current working directory to that specified by argument.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		New directory

Returns

Return type: real

Return value is a code indicating the success of the function:

Code	Meaning
0	Success
1	Cannot create directory
2	Invalid disk (windows)

Char

Returns a string consisting of the single character in arg1 located at index given in arg2. The first character has index 0. An empty string is returned if the index is out of range.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Input string
2	real	Yes		Character position

Returns

Return type: string

Example

```
Show Char('Hello World!', 4)
```

displays result:

```
Char('Hello World!', 4) = 'o'
```

ChooseDir

Opens a dialog box showing a directory tree. Returns path selected by user or an empty string if cancelled. Initial directory shown specified in argument1.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	Current directory	Starting directory
2	string	No	'Choose Directory'	Dialog box caption
3	string	No	'Double-click directory to select'	Message

Returns

Return type: string

ChooseDirectory

Opens a dialog box showing a directory tree. Returns path selected by user or an empty string if cancelled. Initial directory shown specified in argument1. This function is similar to ChooseDir (page 68) but uses the standard system dialog which includes access to network shares.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Starting Directory

Returns

Return type: string array

Chr

Returns a string consisting of a single character specified by an ASCII code. This function may be used to represent special characters such as TAB (Chr(9)) and newline (Chr(10)).

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		ASCII code

Returns

Return type: string

CloseEchoFile

Closes the file associated with the Echo command. For more information, see "OpenEchoFile" on page 282.

Arguments

No arguments

Returns

Return type:

CloseFile

Closes a file opened using OpenFile (page 283).

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		File handle

Argument 1

File handle to close. This is the value returned by the OpenFile (page 283) function.

Returns

Return type: real

CloseSchematic

Closes a schematic handle opened using OpenSchematic (page 286). Schematic handles are used to obtain information about schematics that are not currently being displayed. For more information see "OpenSchematic" on page 286.

Function returns 1 if successful otherwise returns 0.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Schematic handle

Returns

Return type: real

CloseSchematicTab

Closes a schematic using its ID. A schematic's ID may be obtained from OpenSchematic (page 286) or GetSchematicTabs (page 205).

Function returns 1 if successful otherwise returns 0.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Schematic ID

Returns

Return type: real

CollateVectors

Returns the data for the specified vectors in an interleaved manner suitable for writing out in common simulation data formats such as SPICE3 raw format.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Vector names
2	string	Yes		Group name
3	real array	No		Start index, length, division index

Argument 1

List of vector names. Note that they must be valid vector names in the group specified by argument 2. Expressions of vectors are not permitted.

Argument 2

Group name holding vectors specified in argument 1.

Argument 3

Three element array. Element 1 is the start index for the return values, element 2 is the number of values to be returned for each vector and element 3 is the division index. The default values for the three elements are 0, the length of the first vector and 0 respectively.

Returns

Return type: real or complex array

If the vectors supplied in arg 1 are real the return value will be a real array. If they are complex the return value will be a complex array. The length of the result will be 3+(number of vectors)*(vector length)

The first three elements of the array are:

0: number of vectors

1: start index

2: length of each vector

The remaining elements hold the vector data. This is in the following order:

```
vec1[0]
vec2[0]
```

```
vec3[0]
....
vecn[0]
vec1[1]
vec2[1]
vec3[1]
...
vecn[1]
vec1[2]
vec2[2]
vec3[2]
....
vecn[2]
etc.
```

Where vec1 is the first vector specified in arg 1, vec2 the second and so on.

This function is used by the write_raw_file script to create SPICE3 raw file data. The source for this script is provided on the install CD.

CommandStatus

Obtain information about the current script execution context

Arguments

No arguments

Returns

Return type: real array

Four element array. Elements described in the following table:

Index	Description
0	Drag and drop: 1 if current script was called as a result of a drag and drop operation, otherwise 0
1	GUI Action: 1 if the current script was called by a GUI action such as a menu operation. 0, if called by a remote command. Refer to ProcessingGuiAction (page 302) for a more detailed explanation
2	Processing accelerator: 1 if the current script was called by an accelerator key, otherwise 0
3	Running startup command: 1 if current script was called by a startup command provide on the SIMetrix.exe command line

See Also

ProcessingAccelerator (page 301)
ProcessingDragAndDrop (page 301)
ProcessingGuiAction (page 302)

CompareSymbols

Returns 1 if the definitions of the schematic symbols specified are identical. Otherwise returns 0. Two symbol definitions are identical if:

1. Their graphics are identical. I.e. all segments, arcs and pin locations are the same
2. All pin names are the same
3. All protected properties are identical

Unprotected properties are not compared.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		symbol name 1
2	string	Yes		symbol name 2

Returns

Return type: real

ComposeDigital

ComposeDigital builds a new vector from a binary weighted combination of digital vectors. It is intended to be used to plot or analyse digital bus signals. The simulator outputs bus signals as individual vectors. To plot a bus signal as a single value - either in numeric or analog form - these individual vectors must be combined as one to create a single value.

Note that ComposeDigital can only process purely digital signals. These are expected to have one of three values namely 0, 1 and 0.5 to represent an invalid or unknown state.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Bus name
2	real array	No	See notes	Index range
3	string array	No		Options
4	string	No		Wire template
5	real	No	[0.8,0.9]	Analog thresholds

Argument 1

Signal root name. The function expects a range of vectors to be available in a form defined by the *wire template* argument. By default this is in the form *busname#n* where *busname* is specified in argument 1 while the range of values for *n* is specified in argument 2.

Argument 2

Index range. The function processes vectors from *busname#idx_start* to *busname#idx_end*. *idx_start* and *idx_end* are specified by this argument as a two dimensional array. For example if arg 1 is 'BUS' and arg 2 is [0,3], the function will process vectors:

```
BUS1\#0
BUS1\#1
BUS1\#2
BUS1\#3
```

as long all 4 vectors exist. If one or more vectors do not exist the first contiguous set of vectors will be used within the indexes specified. So if BUS1#0 didn't exist, the function would use BUS1#1 to BUS1#3. If BUS1#2 didn't exist, it would use just BUS1#0 and BUS1#1.

Note that the index may not be larger than 31.

Argument 3

1 or 2 element string array. Values may be any combination of 'holdInvalid' and 'scale'.

'holdInvalid' determines how invalid states in the input are handled. If the 'holdInvalid' option is specified, they are treated as if they are not present and the previous valid value is used instead. If omitted, invalid states force an output that alternates between -1 or -2. This is to allow consecutive invalid states to be distinguished. For example, suppose there are 4 bits with one bit invalid. If one of the valid bits changes, the end result will still be invalid, but it sometimes desirable to know that the overall state has changed. So, in this case the first invalid state will show as a -1 and the second invalid state will be -2. In any following invalid state, the result will be -1 and so on.

'scale' forces the output to be scaled by the value $2^{(-\text{idxend}-\text{idxstart}+1)}$.

Argument 4

Optional wire template used to describe how bus vectors are named. The default value is %BUSNAME%#%WIRENUM% which means that bus vectors are of the form *busname#n* where *busname* is the name of the bus (argument 1) and *n* is the index value. For more details about wire templates, see "Netlist" on page 489.

Argument 5

Threshold used to define logic levels for analog signals. Two element array. The first element is the lower threshold and the second element is the upper threshold. If either or both is omitted these values default to 0.8 and 0.9 respectively.

The lower threshold is the value below which an analog signal is considered to be a logic zero. The upper threshold is the value above which an analog signal is considered to be a logic one.

Returns

Return type: real vector

The return value is a real vector that is the binary weighted sum of the vectors defined by arg 1 and arg 2 but treating invalid values (=0.5) as described above. So, in the example above, the result will be:

BUS1#0 + BUS1#1 + 2 + BUS1#2 + 4 + BUS1#3 + 8.

ConvertLocalToUnix

Convert file name to UNIX format using '/' as the directory separator.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File path

Returns

Return type: string

This function returns argument 1 but with any back slash characters replaced by forward slash.

See Also

ConvertUnixToLocal (page 75)

ConvertUnixToLocal

Convert filename to local format using backslash for the directory separator.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File path

Returns

Return type: string

Any forward slash found in the input string is replaced by a back slash.

CopyTree

Copy a directory tree. Requires target to be empty

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Source directory
2	string	Yes		Target directory

Returns

Return type: string

Single string value providing status of operation as follows

Value	Description
success	Operation successful
failed	Operation failed
incomplete	Operation partially completed: some files were not copied
notempty	Target already exists and was not empty
sourcenotexist	Source does not exist
unknown	Unknown error

CopyURL

Copies a file specified by a URL from one location to another. The URL may specify HTTP addresses (prefix 'http: addresses (prefix 'file:/').

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		From URL file
2	string	Yes		To URL file
3	string	No	progress	options

Argument 1

URL of source file.

Argument 2

URL of destination file

Argument 3

Options: can be 'progress' or 'noprogress'. If set to 'progress' (the default) a box will display with a bar showing the progress of the file transfer. Otherwise no such box will display.

Returns

Return type: string array

String array of length 2. First element will be one of the values shown in the following table:

Id	Description
IncorrectLogin	A username and password are required for this URL
HostNotFound	The specified host in the URL could not be found. This error can also occur if there is no Internet connection.
Unexpected2	This is an internal error that should not occur
MkdirError	Could not create target directory
RemoveError	This is an internal error that should not occur
RenameError	This is an internal error that should not occur
GetError	An error occurred while fetching a file
PutError	An error occurred while storing a file
FileNotExist	File doesn't exist
PermissionDenied	You do not have sufficient privilege to perform the operation
Unknown Error	This is an internal error that should not occur

The second element of the returned string gives a descriptive message providing more information about the cause of failure.

cos

Returns the cosine of its argument. Result is in radians.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the consine of its argument. Result is in radians.

cos_deg

Returns the cosine of the argument. Result is in degrees.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the cosine of the argument. Result is in degrees.

cosh

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Return the hyperbolic cosine of the argument specified in radians.

CreateDiodeDialog

Opens a specialised dialog used by the diode model in circuit parameter extractor. See internal script *make_srdiode_model* for an application example of this function.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No		Initial values

Argument 1

String array providing initial values for the various controls. The order is 'IF', 'IRM', 'dIf/dt', 'Tr', 'Vd1', 'Id1', 'Vd2', 'Id2', 'Cj0', 'Save option', 'Device name'. The 'Save option' will be '0' if 'Save to schematic symbol' is specified and '1' if 'Save to model library' is specified.

Returns

Return type: string array

String array corresponding exactly to argument 1 and holding the user's selected values. Return value will be empty if the user cancels the box.

CreateLockFile

Creates or removes a lock file for the filename specified. This can be used to synchronise operations between multiple instances of SIMetrix.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		filename
2	string	Yes		operation

Argument 1

Filename to lock. The lock file created will have the same name with the suffix .lck. The lock file itself will be locked for write and other applications will not be able to delete or write to the file.

Argument 2

One or two element string array. First element is the operation to be performed. This is either 'lock' or 'unlock'. If 'lock' is specified, an attempt will be made to create a lock file. The operation will fail if the file has already been locked - perhaps by another instance of SIMetrix. If 'unlock' is specified the file will be removed provided that this instance of SIMetrix created the file in the first place.

A second element may be specified and set to 'autodelete'. In this case the file will automatically be unlocked when control is returned to the command line.

Returns

Return type: string

May be one of the following values:

success	Operation successful
failed	Lock failed because the file has already been locked
notexist	Attempt made to unlock a file that was not locked by this instance or has not been locked at all
locked	File has already been locked by this instance

CreateNewTitleBlockDialog

Displays the title block creation dialog.

Arguments

Number	Type	Compulsory	Default	Description
1	string vector	No		Initial display values

Argument 1

Initial display values for the dialog. Each value is in a separate vector element and will start with one of the following prefixes (including the colon ':'):

Prefix	Description
CompanyName:	Company name to appear
Title:	Title of the schematic
Author:	Author of the schematic
Notes:	Notes about the schematic
LayoutStyle:	Either 'Horizontal' or 'Vertical'. Vertical mode will not display an image.
Logo:	Full path to an image to use.
Version:	Schematic version number. Use "⟨⟨auto⟩⟩" for an automatically assigned version number.
Date:	Schematic version date. Use "⟨⟨auto⟩⟩" for an automatically assigned version number.

Not all of these values have to be defined. If no values are defined, then the company, author and logo image will attempt to be chosen from option settings.

Returns

Return type: string array

Title block definition. Values are specified one per vector element and have one of the following prefixes (including the colon ':'):

Prefix	Description
CompanyName:	Company name to appear
Title:	Title of the schematic
Author:	Author of the schematic
Notes:	Notes about the schematic
LayoutStyle:	Either 'Horizontal' or 'Vertical'. Vertical mode will not display an image.
Logo:	Full path to an image to use.
Version:	Schematic version number. Use "«auto»" for an automatically assigned version number.
Date:	Schematic version date. Use "«auto»" for an automatically assigned version number.

CreateShortcut

Create a 'shortcut' to a file or directory.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path of object
2	string	Yes		Path of link file
3	string	Yes		Description

Argument 1

Path of file or directory which shortcut will point to

Argument 2

Path of shortcut itself.

Argument 3

Description of shortcut

Returns

Return type: string

'Success' or 'Fail'

CreateTimer

Creates a timer to run a script at regular intervals or at some specified time in the future.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Command
2	real	Yes		Interval
3	string array	No	2	options

Argument 1

Command to run. This can be a primitive command or the name of a script and may include arguments to the command or script.

Argument 2

Interval in milliseconds. The first event will occur after the interval time has elapsed.

Argument 3

Options. String array containing any combination of 'oneshot' and 'echo'. 'oneshot' defines a timer that will trigger only once. 'echo' enables message output in the command shell.

Returns

Return type: real

The function returns an integer id. This can be used as an argument to functions DeleteTimer (page 99), EditTimer (page 126) and GetTimerInfo (page 225).

cv

Returns the data for a curve.

For a single curve (i.e. not a group of curves as created from a Monte Carlo plot) only the first argument is required and this specifies the curve's id.

If the curve id refers to a group of curves created by a multi-step run, then the second argument may be used to identify a single curve within the group. The data for the complete curve set is arranged as a "Multi Division Vector" on page 19. The second argument specifies the division index. If absent the entire vector is returned

Note that the arguments to this function for version 4 and later have changed from earlier versions.

This function is identical to GetCurveVector (page 163) and is convenient in situations where a short expression is desirable.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		curve id
2	real	No	Return all divisions	Division index
3	string	No		Obsolete - no longer used

Returns

Return type: real array

CyclePeriod

Returns the time between zero crossing pairs with the same slope direction. It can be used for plotting frequency vs time by using 1/CyclePeriod.

Arguments

Number	Type	Compulsory	Default	Description
1	real vector	Yes		Input vector
2	real	Yes		Baseline
3	real	No	2	Interpolation order
4	real	No	0	X start position (0, 1 or 2)

Argument 1

Input vector to be processed.

Argument 2

Baseline for zero-crossing detection.

Argument 3

Interpolation order, may be 1 or 2. The actual zero crossing point from which the measurements are based are calculated by interpolation from points either side of the zero-crossing. This sets the order of the interpolation algorithm.

Argument 4

Can be 0, 1 or 2. This shifts the x-axis of the result. So for example if the input vector is a 1kHz sine wave, the first element of the result will be the duration of the first cycle - i.e 1mS. What this argument does is set what the x value will be. If set to 0, it will be 1mS - i.e the location of the end of the first cycle. If set to 1, it will be 0.5mS - i.e the location of the end of the first half-cycle and if set to 2, it will be 0, i.e the start of the input.

Returns

Return type: real

Date

Returns the current date in the format specified.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	'locale'	format

Argument 1

May be 'iso' or 'locale'. When set to 'locale' the date is returned in a format specified by system settings. When set to 'iso' the date is returned in a format complying with ISO8601 which is YYYY-MM-DD where YYYY is the year, MM is the month of the year (between 01 and 12), and DD is the day of the month between 01 and 31.

Returns

Return type: string

db

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns $20 \times \log10(\text{mag}(x))$

DCSourceDialog

Opens "Edit DC Source" dialog box. This accepts user input for the value of a DC source.

Return value is the user's entry

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Initial value

Returns

Return type: real

DefineADCDialog

Opens a dialog box to define an analog to digital converter. Argument is a real array which specifies the initial values for each control as follows:

Element index	Description

Element index	Description
0	Number of bits
1	Convert time (default 1u)
2	Maximum conversion rate (default 2Meg)
3	Offset voltage (default 0)
4	Range (default 5)

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		initial values

Returns

Return type: real array

The function returns a real array of length 5 with the same format as the argument described above. If the user selects “Cancel” the function returns an empty vector.

DefineArbSourceDialog

Opens a dialog box to define an arbitrary source:

Argument is a string array which specifies the initial values for each control as follows:

Element index	Description
0	Expression
1	Number of input voltages. (Default 1. Must be entered as a string)
2	Number of input currents. (Default 0. Must be entered as a string)
3	Output config: 0: Single ended voltage (default) 1: Single ended current 2: Differential voltage 3: Differential current (value must be entered as a string)

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial values

Returns

Return type: string array

The function returns a string array of length 4 with the same format as the argument described above.

DefineBusPlotDialog

Opens a dialog box to allow the user to plot a bus.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Initial values
2	string	No		options

Argument 1

String array of length up to 9. Elements defined in the following table:

Index	Description	Default
0	Bus name	‘’
1	Bus start index	0
2	Bus end index	0
3	Display type: ‘0’ Decimal ‘1’ Hexadecimal ‘2’ Analog waveform ‘3’ Binary	‘0’
4	Hold invalid: ‘TRUE’ Hold invalid ON ‘FALSE’ Hold invalid off	‘FALSE’
5	Scale factor	‘1.0’
6	Offset ‘0.0’	
7	Units	
8	Items used to load ‘Units’ combo box separated by ‘|’	
9	Analog threshold lower	

Index	Description	Default
10	Analog threshold upper	
11	Axis type: '0' Auto select '1' Use separate Y-axis '2' Use separate grid '3' Digital	
12	Axis name	
13	Use separate graph? 0 yes 1 no	
14	Graph name	

Argument 2

Options. Currently just one. If set to 'noProbeOptions', the Probe Options sheet will be hidden.

Returns

Return type: string array

String array with the same length as the input. Each field holds the value selected by the user. Note that field index 8 does not currently output a meaningful value and should be ignored.

DefineCounterDialog

Opens a dialog box to define a digital counter.

Argument is a real array which specifies the initial values for each control as follows:

0 Number of bits
1 Maximum count (default = $2^{\text{number of bits}} - 1$)
2 1 = Has reset, 0 = does not have reset (default 0)
3 Clock to out delay (default 10n)

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		initial values

Returns

Return type: real array

The function returns a real array of length 4 with the same format as the argument described above. If the user selects "Cancel" the function returns an empty vector.

DefineCurveDialog

Opens the dialog box used to define a curve for plotting. See menu **Probe | Add Curve...** or **Plot | Add Curve...** in the graph window.

The argument is a string array of length 25 which defines how the various controls are initialised. This array has the same format for EditAxisDialog (page 105) and EditProbeDialog (page 117). Not all the elements are relevant to this function. The following table describes the elements that are used:

Index	Purpose	Notes	Default
0	Axis Type	Setting of Axis Type group in Axis/Graph Options sheet. Possible values: 'auto' Auto Select 'selected' Use Selected 'axis' Use New Y-Axis 'grid' Use New Grid 'digital' Digital	No default. Value must be specified.
1	Graph Type	Setting of Graph Options group in Axis/-Graph Options sheet. Possible values: 'add' Add To Selected 'newsheet' New Graph Sheet 'newwindow' New Graph Window	No default. Value must be specified.
2	Axis name	Not used with this function	
3	Persistence	Not used with this function	
4	Graph name	Not used with this function	
5	Curve label	Curve label control in Define Curve sheet	⟨⟨empty⟩⟩
6	Analysis	Not used with this function	
7	Plot on completion	Not used with this function	
8	reserved for future use	Not used with this function	
9	reserved for future use	Not used with this function	
10	X axis graduation	Setting of Log|Lin|Auto for X Axis in Axis Scales sheet. Possible values: 'in' Lin 'log' Log 'auto' Auto	'auto'
11	X axis scale options	Setting of scale options for X Axis in Axis Scales sheet. Possible values: 'nochange' No Change 'auto' Auto scale 'defined' Defined	'auto'

Index	Purpose	Notes	Default
12	Y axis graduation	Setting of Log|Lin|Auto for Y Axis in Axis Scales sheet. Possible values as for X axis.	'auto'
13	Y axis scale options	Setting of scale options for X Axis in Axis Scales sheet. Possible values as for X axis.	'auto'
14	X axis min limit	Min value for X Axis in Axis Scales sheet. Must be specified as a string.	0
15	X axis max limit	Max value for X Axis in Axis Scales sheet. Must be specified as a string.	1
16	Y axis min limit	Min value for Y Axis in Axis Scales sheet. Must be specified as a string.	0
17	Y axis max limit	Max value for Y Axis in Axis Scales sheet. Must be specified as a string.	1
18	X axis label	Axis Label setting for X-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
19	X axis units	Axis Units setting for X-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
20	Y axis label	Axis Label setting for Y-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
21	Y axis units	Axis Units setting for Y-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
22	Y-expression	Contents of Y expression edit box	⟨⟨empty⟩⟩
23	X-expression	Contents of X expression edit box, if enabled	⟨⟨empty⟩⟩
24	Vector filter	Subcircuit filter selection in Available Vectors group. Possible values: 'all' — All 'top' — Top level sub circuit name — Select a subcircuit name.	

The available vectors list box is initialised with the names of vectors in the current group.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial values

Returns

Return type: string array

The function returns a string array with the same format as the argument. If the user selects Cancel the function returns an empty vector.

DefineDACDialog

Opens a dialog box to define an analog to digital converter.

Argument is a real array which specifies the initial values for each control as follows:

0	Number of bits
1	Output slew time (10n)
2	Offset voltage (default 0)
3	Range (default 5)

The function returns a real array of length 4 with the same format as the argument described above. If the user selects "Cancel" the function returns an empty vector.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Initial values

Returns

Return type: real array

The function returns a real array of length 4 with the same format as the argument described above. If the user selects "Cancel" the function returns an empty vector.

DefineFourierDialog

Opens the Define Fourier dialog box used to specify a fourier transform. This is similar to the "Define Curve dialog" on page 88 but has an extra tabbed sheet to define the fourier analysis options. Select menu **Probe | Fourier | Arbitrary...** to see how this dialog box looks.

The function takes an argument that is a string array with up to 37 elements which initialises the controls in the dialog box. The first 25 have the same function as for the DefineCurveDialog (page 88)() function. The remaining are described in the following table:

Index	Description	Default
0-24	See "DefineCurveDialog" on page 88	
25	Fundamental Frequency	100
26	Frequency display - Start Frequency	⟨⟨empty⟩⟩
27	Frequency display - Stop Frequency	10K
28	Number of points for FFT interpolation	256 if arg 2 not specified. See below
29	Interpolation order for FFT	2
30	Fourier method. Possible values: 'continuous' Use continuous fourier 'interpolated' Use interpolated FFT	'continuous'

Index	Description	Default
31	Window function. Possible values: 'rectangular' 'hanning' 'hamming' 'blackman'	'hanning'
32	Start of data span	0
33	End of data span	0.01
34	Use specified span: TRUE/FALSE	FALSE
35	Know fundamental frequency: TRUE/FALSE	FALSE
36	Resolution	100
37	Plot options - 'mag', 'db' or 'phase'	

A second argument may be specified to provide time domain information. Usually this would be the 'time' vector created by the simulation. The vector is analysed to find the start time, stop time and number of interpolation points. The number of interpolation points is calculated from the number of points in the time vector and is the next highest integral power of 2.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial values
2	real array	No		sample vector

Returns

Return type: string array

The function returns a string array with the same format as the argument. If the user selects Cancel, the function returns an empty vector.

DefineIdealTxDialog

Opens a dialog box to define an ideal transformer.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		initial inductance, coupling factors, number of windings
2	real array	Yes		initial primary turns ratios
3	real array	Yes		initial secondary turns ratios
4	string	No		options

Argument 1

Real array of size 6. Function of each element is described below:

0	Primary 1 inductance
1	Coupling factor primary to primary
2	Coupling factor secondary to secondary
3	Coupling factor primary to secondary
4	Number of primaries
5	Number of secondaries

Argument 2

Real array of primary turns ratios relative to primary 1. (The first value is the ratio of primary 1 to itself. This is of course always 1 but the value is in fact ignored).

Argument 3

Real array of secondary turns ratios relative to primary 1.

Argument 4

If set to 'nonind', the box design will that used for non-inductive transformers. These do not show inductance related parameters.

Returns

Return type: real array

The function returns, the settings selected by the user in a single real array with the same format as the three arguments concatenated together. If the user selects Cancel the function returns an empty vector.

DefineLaplaceDialog

Opens a dialog box to define a Laplace transfer function.

The argument is a string array of length 5 that defines the initial settings. The meaning of each element is as follows:

Index	Description
0	Laplace expression. (contents of "Define output using s variable" box)
1	Device type: 0 Transfer function 1 Impedance - V/I 2 Admittance - I/V
2	Input type: 0 Single ended voltage 1 Single ended current 2 Differential voltage 3 Differential current
3	Output type: 0 Single ended voltage 1 Single ended current 2 Differential voltage 3 Differential current
4	Frequency scale factor

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial settings

Returns

Return type: string array

The function returns a string array of length 5 with the same format as the argument described above. If the user selects "Cancel" the function returns an empty vector.

DefineLogicGateDialog

Opens a dialog box to define a logic gate.

The argument is a real array of length 3 and defines the initial settings for the box controls as follows:

Index	Description
0	Number of inputs
1	Propagation delay
2	Gate type: 0 AND 1 NAND 2 OR 3 NOR

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		initial settings

Returns

Return type: real array

The function returns a real array of length 3 with the same format as the argument described above. If the user selects Cancel the function returns an empty vector.

DefinePerfAnalysisDialog

Essentially the same as DefineCurveDialog (page 88) but with a different design for the expression entry. Used by the **Probe | Performance Analysis...** and **Probe | Plot Histogram...** menus.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial values

Returns

Return type: string array

DefineRegisterDialog

Opens a dialog box to define a bus register.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		initial settings

Argument 1

The argument is a real array of length 4 and defines the initial settings for the box controls as follows:

0	Number of bits
1	1 if "Has output enable" box checked. Otherwise 0.
2	Setup time
3	Clock delay

Returns

Return type: real array

The function returns a real array of length 4 with the same format as the argument described above. If the user selects Cancel the function returns an empty vector.

DefineRipperDialog

Opens a dialog box to define a schematic bus ripper.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial settings
2	string array	Yes		list of style box items

Argument 1

This argument is a string array of length 4 and defines the initial settings for the box controls as follows:

Index	Description
0	Bus name
1	Start index (entered as a string)
2	End index (entered as a string)
3	Style index. This is an index into the values in the style box which are defined in argument 2

Argument 2

String array containing list of items entered in style box

Returns

Return type: string array

The function returns a string array of length 4 with the same format as argument 1 described above. If the user selects Cancel the function returns an empty vector.

DefineSaturableTxDialog

Opens a dialog box to define a saturable transformer.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Core material info
2	string array	Yes		Part number info
3	real array	Yes		Winding ratios
4	real array	Yes		Initial values

Argument 1

Array of core material specifications. Each element is a string has the format:

```
name;model_name;saturation_flux_density
```

Argument 2

Array of core part specifications. Each element is a string which has the format:

```
name;Ae;Le;Ue;material_name
```

Argument 3

Array of turns ratios.

Argument 4

Real array with up to 9 elements that defines the initial values for the controls in the dialog box, as defined in the following table:

Index	Description
0	Primary number of turns
1	Selected material index (into arg 1)
2	Selected part index (into arg 2). -1 for manual entry.
3	Number of primaries
4	Number of secondaries

Index	Description
5	Effective area
6	Effective length
7	Ue
8	Coupling factor

Returns

Return type: real array

The return value is a real array containing the user's selection. The definition of the values is identical to that for argument 4 as described above.

DefineShiftRegDialog

Open a dialog box to define a shift register.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		initial settings

Argument 1

The argument is a real array of length 2 and defines the initial settings of the box controls as follows:

Index	Description
0	Number of inputs
1	Clock to out delay

Returns

Return type: real array

The function returns a real array of length 3 with the same format as the argument described above. If the user selects Cancel the function returns an empty vector.

DefineSimplisMultiStepDialog

Opens a dialog box used to define SIMPLIS multi step analyses.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Configuration
2	string array	Yes		Sweep values

Argument 1

4 element string array used to initialise the dialog box as defined by the following table:

Index	Description
0	Sweep mode: 'Parameter' or 'MonteCarlo'
1	Parameter name
2	Step type: 'Decade', 'Linear' or 'List'
3	Group curves (true/false)

Argument 2

Sweep values. If step type is decade or linear, values define start, stop and number of steps. Otherwise defines list of values.

Returns

Return type: string array

DeleteConfigCollection

Deletes an entire section in the configuration file.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		section name

Argument 1

Name of section to be deleted.

Returns

Return type: real

Returns the number of entries successfully deleted.

DeleteTimer

Deletes a timer

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Timer ID

Argument 1

Timer ID as returned by CreateTimer (page 81)

Returns

Return type: real

Returns 1.0 if the function is successful, otherwise returns 0.0. The function will fail if the timer specified does not exist.

DeleteTree

Delete an entire directory tree

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		directory to delete

Returns

Return type:

Single string value providing status of operation as follows

Value	Description
success	Operation successful
failed	Operation failed
incomplete	Operation partially completed: some files were not deleted
sourcenotexist	Source does not exist
unknown	Unknown error

Example

DescendDirectories

Returns all directories under the specified directory. DescendDirectories recurses through all sub-directories including those pointed to by symbolic links. DescendDirectories only returns directory names. It does not return files. Use the ListDirectory (page 258) function to return the files in a directory.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Directory

Returns

Return type: string array

DescendHierarchy

Descends through the hierarchy from the current schematic and collects each distinct schematic in use. The result is a list of schematic path names. Each path name is accompanied by a list of hierarchy references where that schematic is used.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	'Ref'	Property used to report 'where used' references
2	real	No	-1	Schematic ID
3	string			options

Argument 1

Name of property to be used to report 'where used' references. Each entry in the return value contains a list of schematic instance references that identify where the schematic component is used. The references are in the form of a series of property values separated by a period ('.'). The property used defaults to 'Ref' but this argument may be used to identify another property - e.g. 'Handle'.

Argument 2

Schematic ID as returned by the OpenSchematic (page 286) function. This allows this function to be used with a schematic that is not open or not currently selected. If equal to -1, the currently selected schematic will be used.

Argument 3

If set to 'pathtypes' will return information on the type of path. Possible values are 'absolute', 'relative' and 'symbolic'

Returns

Return type: string array

Returns a string array with one element for each schematic file used in the hierarchy. Each element is a semi-colon delimited list of values. The first value is the full path to the schematic in UNC form if applicable. UNC paths begin with '\\' followed by a server name and path. Paths referenced by a local drive letter are not returned in UNC form even if sharing is enabled for that drive.

The remaining values are a list of hierarchical references identifying where that schematic is used within the hierarchy. The references use the value of the property defined in argument 1.

DialogDesigner

Simple dialog designer that generates an XML dialog definition. The dialog shows the dialog as a tree, where the user can drag and drop items in the tree, add groups and add tabs. A preview of the dialog is shown alongside.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	⟨⟨empty string⟩⟩	Initial XML definition

Argument 1

This optional argument can contain a basic XML definition of the dialog. Note that XML nesting is not processed and all elements are added to the root of the tree.

Returns

Return type: string

An XML file describing the dialog.

diff

Returns the derivative of the argument with respect to its reference. If the argument has no reference the function returns the derivative with respect to the argument's index - in effect a vector containing the difference between successive values in the argument. For details on references see "Vector References" on page 21.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		vector

Returns

Return type: real array

DirectoryIsWriteable

Tests whether or not a directory can be written to by creating a temporary writeable file in that directory. If the file is successfully created the directory is deemed to be writeable

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Directory to test

Returns

Return type: real

1 if directory is writeable otherwise 0

Distribution

Returns a random number with a distribution defined by a lookup table. This function is intended to be used for SIMPLIS Monte Carlo analyses and would typically be used in device value expressions.

This function is only available in the Simulator process and cannot be called from scripts running in the context of the front end. The function is only active when used by the netlist pre-processor with Monte Carlo analysis enabled. When used in other contexts, the function returns 1.0.

A similar function is available for SIMetrix Monte Carlo analyses, but the syntax is slightly different. Refer to the Simulator Reference Manual for further details.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Tolerance
2	real array	Yes		Distribution definition

Argument 1

Tolerance - in effect scales the extent of the distribution defined in argument 2.

Argument 2

Lookup table organised in pairs of values.

The first value in the pair is the deviation. This should be in the range +1 to -1 and maps to the output range. So +1 corresponds to an output value of +tolerance and -1 corresponds to -tolerance. Each deviation value must be greater than or equal to the previous value. Values outside the range +/- 1 are allowed but will result in the function being able to return values outside the tolerance range.

The second value in the pair is the relative probability and must 0 or greater.

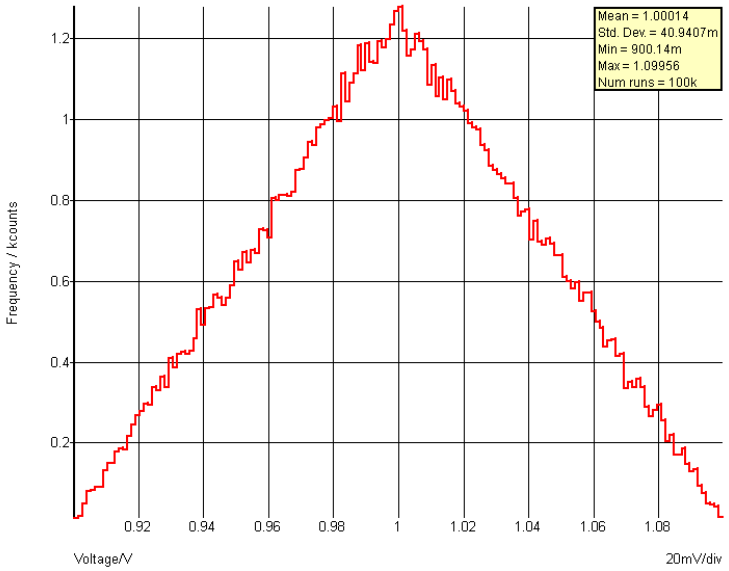
There is no limit to the number of entries in the table

Returns

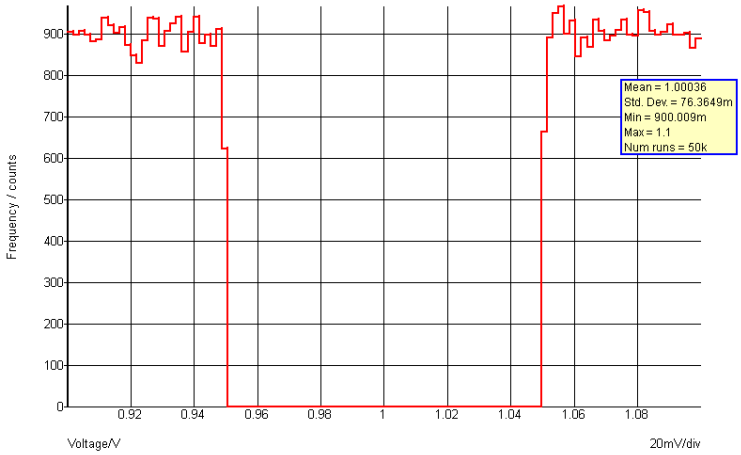
Return type: real

Example

distribution(1.0, [-1,0, 0,1, 1,0]) - see graph below:



distribution(1.0, [-1,1, -0.5,1, -0.5,0, 0.5,0, 0.5,1, 1,1])



Notes

If multiple instances of a particular distribution are needed, a variable of the lookup table may be defined. For example:

```
.VAR binomial = {[-1,1, -0.5,1, -0.5,0, 0.5,0, 0.5,1, 1,1]}
```

The above can be placed in the F11 window of a SIMPLIS schematic. Then to access a binomial distribution for a component value, use something like:

```
{ 1k * distribution(0.1, binomial) }
```

The above defines a value of 1k with a 10% tolerance using the binomial distribution defined by the lookup table 'binomial'.

The function UD (page 387) is an alias to this function and may be more convenient.

See Also

Gauss (page 146)

GaussTrunc (page 148)

Unif (page 388)

UD (page 387)

WC (page 396)

EditArcDialog

Opens a dialog box used to define an arc circle or ellipse for the symbol editor.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	90	initial start to finish angle
2	real	No	1	initial ellipse height/width

Argument 1

Initial value for start to finish angle.

Argument 2

Initial value for ellipse height/width.

Returns

Return type: real array

If the user selects Cancel the function returns an empty vector, otherwise the following real array of length 2 is produced:

Index	Description
0	Start to finish angle
1	Ellipse height/width

EditAxisDialog

Opens a dialog box used to edit graph axes

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial settings

Argument 1

The argument is a string array of length 25 which defines how the various controls are initialised. This array has the same format as DefineCurveDialog (page 88) and EditProbeDialog (page 117) but not all the elements are used here. The following table describes the elements that are used.

Index	Purpose	Notes	Default
0-10		Not used with this function	

Index	Purpose	Notes	Default
11	X axis scale options	Setting of scale options for X Axis in Axis Scales sheet. Possible values: 'nochange' No Change 'auto' Auto scale 'defined' Defined	'auto'
12	Y axis graduation	Not used with this function	
13	Y axis scale options	Setting of scale options for X Axis in Axis Scales sheet. Possible values as for X axis.	'auto'
14	X axis min limit	Min value for X Axis in Axis Scales sheet. Must be specified as a string.	0
15	X axis max limit	Max value for X Axis in Axis Scales sheet. Must be specified as a string.	1
16	Y axis min limit	Min value for Y Axis in Axis Scales sheet. Must be specified as a string.	0
17	Y axis max limit	Max value for Y Axis in Axis Scales sheet. Must be specified as a string.	1
18	X axis label	Axis Label setting for X-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
19	X axis units	Axis Units setting for X-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
20	Y axis label	Axis Label setting for Y-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
21	Y axis units	Axis Units setting for Y-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
22	Y-expression	Not used with this function	
23	X-expression	Not used with this function	
24	Vector filter	Not used with this function	

Returns

Return type: string array

The function returns a string array with the same format as the argument. If the user selects Cancel the function returns an empty vector.

EditBodePlotProbeDialog

UI function for editing Bode plot fixed probes.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No		Initialisation

Argument 1

Array values used to initialise dialog as shown in the table below.

Index	Description
0	Gain label
1	Phase label
2	Persistence
3	'Multiplied by -1' . '0' for normal, '1' for invert
4	'Use dB auto limits'. '1' on, '0' off
5	Minimum limit - dB
6	Maximum limit - dB
7	'Use phase auto limits'. '1' on, '0' off
8	Minimum limit - phase
9	Maximum limit - phase

Returns

Return type: string array

Returns the values entered in the dialog controls as defined in the table above

EditBodePlotProbeDialog2

Arguments

No arguments

Returns

Return type:

EditCrosshairDimensionDialog

Opens a dialog intended for editing the characteristics of cursor crosshair dimensions.

The Properties sheet behaves in the same way as the EditObjectPropertiesDialog (page 113) function and is initialised by the function's arguments. The Edit sheet allows the edit and display of certain properties as defined in the following table:

Property Name	Affects Control:
Label1	Label 1
Label2	Label 2
Label3	Label 3

Property Name	Affects Control:	
Style	Contents of Style box. One of six values:	
	Auto	Automatic, Show Difference
	Internal	Internal, Show Difference
	External	External, Show Difference
	P2P1	Show Absolute
	P2P1	AutoAutomatic, Show Difference, Show Absolute
	None	No controls selected
Font	Font. String defining font specification	

If any of the controls in the Edit sheet are changed, the corresponding property values in the Properties sheet will reflect those changes and vice-versa.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Property names
2	string array	Yes		Property values
3	string array	No		Property types

Returns

Return type: string array

EditCurveMarkerDialog

Opens a dialog intended for editing the characteristics of curve markers.

The Properties sheet behaves in the same way as the EditObjectPropertiesDialog (page 113) function and is initialised by the functions arguments. The Edit sheet allows the edit and display of certain properties as defined in the following table:

Property Name	Affects Control
Label	Label

Property Name	Affects Control
LabelJustification	Text Alignment box. One of these values: -1 Automatic 0 Left-Bottom 1 Centre-Bottom 2 Right-Bottom 3 Left-Middle 4 Centre-Middle 5 Right-Middle 6 Left-Top 7 Centre-Top 8 Right-Top
Font	Font. String defining font specification

If any of the controls in the Edit sheet are changed, the corresponding property values in the Properties sheet will reflect those changes and vice-versa.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Property names
2	string array	Yes		
3	string array	No		Property types

Argument 2

Property values

Returns

Return type: string array

EditDeviceDialog

Opens a dialog box used to select a device and optionally specify its parameters.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		options/initial settings
2	string array	Yes		devices
3	string array	No	⟨⟨empty⟩⟩	parameter names
4	string array	No	⟨⟨empty⟩⟩	parameter values

Argument 1

Defines options and initial settings as follows:

Index	Description
0	Text entered in edit control above list box. If the text item is also present in the device list (argument 2), then that item will be selected.
1	Ignored unless element 1 is empty. Integer (entered in string form) which defines selected device.
2	Dialog box caption. Default if omitted: "Select Device"
3	Message at the top of the dialog box. . Default if omitted: "Select Device"

Argument 2

String array defining the list of devices.

Argument 3

String array defining list of parameter names. See argument 4.

Argument 4

String array defining list of parameter values. If arguments 3 and 4 are supplied the "Parameters..." button will be visible. This button opens another dialog box that provides the facility to edit these parameters' values.

Returns

Return type: string array

If the user selects Cancel the function returns an empty vector, otherwise returns a string array.

Index	Description
0	Entry in the text edit box.
1	Index into device list (argument 2) of device in text edit box. If this device is not in the list, -1 will be returned.
2	Number of parameter values.
3	(Onwards) The values of the parameters in the order they were passed.

EditDigInitDialog

Opens a dialog box used to define a digital initial condition

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		initial setting

Argument 1

The argument is a real array of length 2 which defines the initial settings of the dialog box as follows:

1	Initial state:	1	ONE
		0	ZERO
2	Initial Strength:	1	Strong
		0	Resistive

Returns

Return type: real array

The function returns a real array of length 2 with the same format as argument 1 described above. If the user selects Cancel the function returns an empty vector.

EditFreeTextDialog

This function is almost identical to the EditCurveMarkerDialog (page 108) functions except for some changes to the aesthetics of the dialog box.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Property names
2	string array	Yes		Property values
3	string array	No		Property types

Returns

Return type: string array

EditGraphTextBoxDialog

Opens a dialog intended for editing the characteristics of text box objects for graphs.

The Properties sheet behaves in the same way as the EditObjectPropertiesDialog (page 113) and is initialised by the function's arguments. The Edit sheet shown above allows the edit and display of certain properties as defined in the following table:

Property Name	Affects Control
Label	Label
Colour	Background Colour. An integer defining the RGB value
Font	Font. String defining font specification

If any of the controls in the Edit sheet are changed, the corresponding property values in the Properties sheet will reflect those changes and vice-versa.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Property names
2	string array	Yes		Property values
3	string array	No		Property types

Returns

Return type: string array

EditJumperDialog

Arguments

No arguments

Returns

Return type:

EditLegendBoxDialog

Opens a dialog intended for editing the characteristics of a graph legend.

The Properties sheet behaves in the same way as the EditObjectPropertiesDialog (page 113) and is initialised by the function's arguments. The Edit sheet shown above allows the edit and display of certain properties as defined in the following table:

Property Name	Affects Control
Label	Label

Property Name	Affects Control
Colour	Background Colour. An integer defining the RGB value
Font	Font. String defining font specification

If any of the controls in the Edit sheet are changed, the corresponding property values in the Properties sheet will reflect those changes and vice-versa.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Property names
2	string array	Yes		Property values
3	string array	No		Property types

Returns

Return type: string array

EditObjectPropertiesDialog

Displays a dialog box allowing the editing of property values. This is used for a number of functions. See the schematic right-click popup menu Edit Properties... for an example.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Property names
2	string array	Yes		Property values
3	string array	No		Property types
4	string array	No		Options
5	string	No	⟨⟨empty⟩⟩	Override Style
6	string	No	⟨⟨empty⟩⟩	Available override styles

Argument 1

Function will list in a dialog box the property names and values given in the first two arguments. The function returns the values of the properties. Unless declared read-only (see below) the value of each property may be edited by the user by double clicking on its entry in the list.

Argument 2

Function will list in a dialog box the property names and values given in the first two arguments. The function returns the values of the properties. Unless declared read-only (see below) the value of each property may be edited by the user by double clicking on its entry in the list.

Argument 3

The third argument of the function declares the type for each property. Possible values are:

'String'	Property value is a simple text string
'Font'	Property value is a font definition. When the user double clicks the item to edit, a font dialog box will be opened. Font definitions consist of a series of numeric a text values separated by semi-colons. E.g. '-11;0;0;0;0;0;Arial'
'Colour'	Property value is a colour definition. When the user double clicks the item to edit, a "choose colour" dialog box will be opened. Colours are defined by a single integer that specifies the colour's RGB value.
item1|item2|item3|...	Up to six items separated by the '|' symbol. When the user double clicks a property so defined, a dialog showing a number of radio buttons is displayed labelled item1, item2 etc. The value of the property will be the item selected.
'*'	Declares the property read-only. If the user attempts to edit its value a warning message box will be displayed.

Argument 4

Array of up to 4 values as described in the following table:

Index	Description	Default
0	Box caption	'Edit Properties'
1	Properties tabbed sheet tab title	'Properties'
2	Name column title	'Name'
3	Value column title	'Value'

Note that fields 2 and 3 should be provided as a pair. If 2 is supplied but not 3, 2 will be ignored and the default value will be used.

Argument 5

If set, this specifies the style the property should use when being displayed on the schematic.

Argument 6

A set of styles that can be chosen between if setting an override style for a property. These styles are chosen from those styles in the Style Library that have the override style flag checked.

Returns

Return type: string array

String array containing values for all properties. An empty result is returned if the user cancels the dialog box.

EditPinDialog

Opens a dialog box used to edit a pin in the symbol editor.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		initial pin name
2	string	No	'256'	initial flags value
3	string	No		not used
4	string	No		not used
5	string	No	⟨⟨empty⟩⟩	font override style
6	string	No	⟨⟨empty⟩⟩	available font override styles

Argument 1

Specifies the initial value for the Pin name entry

Argument 2

Specifies the initial value for the remaining controls using the property attributes flag. See "Attribute Flags in the Prop command" on page 510 for details.

Returns

Return type: string

If the user selects Cancel the function returns an empty vector, otherwise The function returns a string array of length 2.

Index	Description
0	Flags value defining justification and property attributes
1	Pin name

EditPotDialog

Opens a dialog to define a potentiometer

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		initial settings

Argument 1

The argument is a real array of length 3 and defines the initial settings as follows:

0 Resistance

1 Wiper position (0 to 1)

2 Run simulation after position changed check box state:

  1 checked

  0 not checked

Returns

Return type: real array

The function returns a string array with the same format as the argument. If the user selects Cancel the function returns an empty vector.

EditProbeDialog

Opens a dialog to define a schematic fixed probe

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial settings

Argument 1

The argument is a string array of length 25 which defines how the various controls are initialised. This array has the same format for EditAxisDialog (page 105) and DefineCurveDialog (page 88). Not all the elements are relevant to this function. The following table describes the elements that are used:

Index	Purpose	Notes	Default
0	Axis Type	Setting of Axis Type group in Axis/Graph Options sheet. Possible values: 'auto' Auto Select 'selected' Use Selected 'axis' Use New Y-Axis 'grid' Use New Grid 'digital' Digital	No default. Value must be specified.
1	Graph Type	Not used with this function	
2	Axis name	Entry in Axis Name in Probe Options sheet	⟨⟨empty⟩⟩
3	Persistence	Entry in Persistence box in Probe Options sheet	⟨⟨empty⟩⟩
4	Graph name	Entry in Graph Name in Probe Options sheet	⟨⟨empty⟩⟩

Index	Purpose	Notes	Default
5	Curve label	Curve label control in Probe Options sheet	⟨⟨empty⟩⟩
6	Analysis	Setting for Analyses check boxes in "Probe Options" sheet. Single string comprising a combination of "ac", "dc" and "tran" separated by the pipe symbol ('|'). An empty string will cause all boxes to be checked and "none" will clear all boxes.	⟨⟨empty⟩⟩
7	Plot on completion	State of Plot on completion only check box. 'true' Checked 'false' Not checked	'false'
8	reserved for future use	Not used with this function	
9	reserved for future use	Not used with this function	
10	X axis graduation	Setting of Log|Lin|Auto for X Axis in Axis Scales sheet. Possible values: 'lin' Lin 'log' Log 'auto' Auto	'auto'
11	X axis scale options	Setting of scale options for X Axis in Axis Scales sheet. Possible values: 'nochange' No Change 'defined' Defined	'auto'
12	Y axis graduation	Setting of Log|Lin|Auto for Y Axis in Axis Scales sheet. Possible values as for X axis.	'auto'
13	Y axis scale options	Setting of scale options for X Axis in Axis Scales sheet. Possible values as for X axis.	'auto'
14	X axis min limit	Min value for X Axis in Axis Scales sheet. Must be specified as a string.	0
15	X axis max limit	Max value for X Axis in Axis Scales sheet. Must be specified as a string.	1
16	Y axis min limit	Min value for Y Axis in Axis Scales sheet. Must be specified as a string.	0
17	Y axis max limit	Max value for Y Axis in Axis Scales sheet. Must be specified as a string.	1
18	X axis label	Axis Label setting for X-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
19	X axis units	Axis Units setting for X-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
20	Y axis label	Axis Label setting for Y-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
21	Y axis units	Axis Units setting for Y-Axis group in Axis Labels sheet	⟨⟨empty⟩⟩
22	Y-expression	Not used with this function	
23	X-expression	Not used with this function	

Index	Purpose	Notes	Default
24	Vector filter	Not used with this function	
25	Curve colour	Colour of curve as an RGB value. May be passed directly to the .GRAPH colour parameter	⟨⟨empty⟩⟩
26	All analyses disabled	Disables all analyses for this probe.	0
27	Physical Probe Type		
28	Measurement type		
29	Output type		
30	Edge type		
31	Probe type		
32	AC power mode		

Returns

Return type: string array

The function returns a string array with the same format as the argument. If the user selects Cancel the function returns an empty vector.

EditPropertyDialog

Opens a dialog box intended to edit a property in both the symbol and schematic editors. Select the symbol editor's **Property/Pin | Edit Property...** menu then double click on one of the items. This will open this dialog box.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes	⟨⟨empty⟩⟩	property name
2	string	No	0	initial property flags
3	string	No	⟨⟨empty⟩⟩	initial property value
4	string	No		option
5	string	No	⟨⟨empty⟩⟩	font override style
6	string	No	⟨⟨empty⟩⟩	available font override styles

Argument 1

Specifies the property name and this is displayed at the top left of the box. This cannot be edited by the user.

Argument 2

Initialises the text location and property attributes using the property flag value. For details on the meaning of flags values see "Attribute Flags in the Prop command" on page 510.

Argument 3

Argument initialises the Value box

Returns

Return type: string array

String array of length 2 providing the users settings, or empty vector if Cancel is pressed.

Index	Description
0	Flags value
1	Property value

EditReactiveDialog

Opens a dialog box designed to edit inductors and capacitors.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Initial values
2	string	Yes		Options
3	string	No		Parameter names
4	string	No		Parameter values

Argument 1

First element is the initial value of device. Second element is the initial condition.

Argument 2

Three element string array. Each field has the meaning defined in the following table:

Index	Description
0	Caption for value group box
1	Initial range. Possible values: 'E6', 'E12', 'E24'
2	Type of device. Possible values: 'capacitor', 'inductor'. This controls the Initial condition group box design
3	Initial condition enabled for operating point check box. ('true' or 'false')
4	Initial condition enabled fro transient check box. ('true' or 'false')

Index	Description
5	Initial condition enabled for AC check box. (‘true’ or ‘false’)
6	Initial condition enabled for DC check box. (‘true’ or ‘false’)

Argument 3

String array defining list of parameter names. See argument 4.

Argument 4

String array defining list of parameter values. If arguments 3 and 4 are supplied the Parameters... button will be visible. This button opens another dialog box that provides the facility to edit these parameters’ values.

Returns

Return type: string array

The function returns a string array in the following form:

Index	Description
0	Value in Result box
1	Value in Initial Voltage or Initial Current box. Empty if Open circuit or Short circuit is selected
2	Number of parameter values.
3	onwards The values of the parameters in the order they were passed.
number of parameters +3	Initial condition enabled for operating point check box (‘true’ or ‘false’)
number of parameters +4	Initial condition enabled fro transient check box (‘true’ or ‘false’)
number of parameters +5	Initial condition enabled for AC check box. (‘true’ or ‘false’)
number of parameters +6	Initial condition enabled for DC check box. (‘true’ or ‘false’)

EditSelect

Opens a dialog box containing any number of edit controls allowing the user to enter text values. The number of edit controls is the smaller of the lengths of arguments 1 and 2. If no arguments are given, 6 controls will be displayed with blank labels. Function returns string vectors containing user entries for each control. If cancel is selected, a single empty string is returned.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	⟨⟨empty⟩⟩	initial edit control entries
2	string	No	⟨⟨empty⟩⟩	labels
3	string	No	⟨⟨empty⟩⟩	dialog box caption

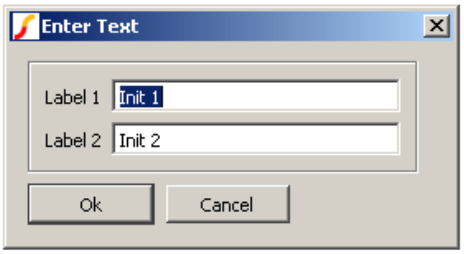
Returns

Return type: string array

Example

The following dialog box will be displayed on a call to:

```
EditSelect(['Init 1','Init 2'],['Label 1','Label 2'],'Enter Text')
```



See Also

"BoolSelect" on page 65

"RadioSelect" on page 319

"ValueDialog" on page 392

EditSimplisMosfetDriverDialog

Opens a specialized dialog used to edit the parameters for a SIMPLIS multi-Level MOSFET Driver. See internal script *simplis_edit_mosfet_driver* for an application example of this function.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No		Initial values
2	string array	No		Caption, combo options, Help context id

Argument 1

String array providing initial values for the various controls. The order is:

Index	Purpose	Notes	Default
0	LEVEL	The model level	1
1	INVERTING	Inverting flag	0
2	USE_DELAY	Delay flag	1
3	THRESHOLD	The input threshold	2.5
4	HYSTWD	The input hysteresis	1.0
5	RISE_DELAY	The rising edge delay	15n
6	FALL_DELAY	The falling edge delay	10n
7	HS_RDSON	The upper switch RDS(on) for Level 0 and 1 models	1
8	HS_RSAT	The upper switch saturation resistance for Level 0 and 1 models	10Meg
9	HS_ISAT	The upper switch saturation current for Level 0 and 1 models	2
10	LS_RDSON	The lower switch RDS(on) for Level 0 and 1 models	1
11	LS_RSAT	The lower switch saturation resistance for Level 0 and 1 models	10Meg
12	LS_ISAT	The lower switch saturation current for Level 0 and 1 models	3
13	IC	The initial condition of the upper switch.	⟨⟨empty⟩⟩
14	HS_ROFF	The upper switch off resistance for Level 0 and 1 models	10Meg
15	LS_ROFF	The lower switch off resistance for Level 0 and 1 models	10Meg
16	HS_VON	The upper switch on-state voltage	0
17	LS_VON	The lower switch on-state voltage	0
18	HS_RDSON_L2	The upper switch RDS(on) for Level 2 models	10
19	HS_R2_L2	The upper switch resistance for the second PWL segment	500m
20	HS_RSAT_L2	The upper switch saturation current for Level 2 models	10Meg
21	HS_V1_L2	The voltage where the upper switch transitions from the 1st to 2nd PWL segments	500m
22	HS_ISAT_L2	The upper switch saturation current for Level 2 models	1
23	LS_RDSON_L2	The lower switch RDS(on) for Level 2 models	10
24	LS_R2_L2	The lower switch resistance for the second PWL segment	500m

Index	Purpose	Notes	Default
25	LS_RSAT_L2	The lower switch saturation current for Level 2 models	10Meg
26	LS_V1_L2	The voltage where the lower switch transitions from the 1st to 2nd PWL segments	100m
27	LS_ISAT_L2	The lower switch saturation current for Level 2 models	3

Argument 2

Index	Purpose	Notes	Default
0	Caption	The dialog box caption	"Edit Multi-Level MOSFET Driver"
1	Combo options	Combo items for the initial conditions box.	⟨⟨empty⟩⟩
2	Help context id	The help context id, used for the built-in Multi-Level MOSFET Driver.	⟨⟨empty⟩⟩

Returns

Return type: string array

String array corresponding exactly to argument 1 and holding the user's selected values. Return value will be empty if the user cancels the box.

EditStylesDialog

Opens the Edit Styles dialog. This is a system function and is unsupported.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Style names
2	string array	Yes		Style info
3	string array	Yes		Line types available
4	string array	No	empty string	Hidden default styles for viewer
5	string array	No	empty string	Flags for hiding buttons
6	string array	No	empty string	Global style info
7	string	No	empty string	Editor settings

Argument 2

Style information for each style name specified in argument 1. Each element in the array is matched to the corresponding element in argument 1 and must be in the form:

```
Name|LineType|LineThickness|LineColour
```

Argument 3

Each array element is a different line type available to all styles. Options are: Solid, Dash, Dot, DashDot, DashDotDot.

Argument 4

Default styles to use in the preview window that are not shown or editable in the dialog. Only required to ensure the correct default wire, symbol and annotation styles are applied.

Each element in the array is a full style definition, in the form:

```
StyleName|lineColour:[lineColour] lineType:[lineType]
  lineThickness:[lineThickness] fontFamily:[fontFamily]
  fontItalics:[fontItalics] fontBold:[fontBold] fontColour:[fontColour]
  fontSize:[fontSize] propertyStyle:[propertyStyle]
  fontOverline:[fontOverline] fontUnderline:[fontUnderline]
```

StyleName values can be either: DefaultWire, DefaultInstance, DefaultAnnotation.

Argument 5

Optional flags for hiding buttons in the dialog. The flags are:

Flag	Behaviour
noadd	Hides the *New...* button.
noduplicate	Hides the *Duplicate* button.
noedit	Hides the *Edit Name...* button.

Argument 6

Global style information, used for reverting local styles back to their global settings. Each row is a separate style, defined in the same form as argument 4. Any style name is allowed.

Argument 7

If set to "*FontOnly*", only font settings will be displayed within the editor.

Returns

Return type: string array

String vector of updated styles if successful, or an empty string if cancel is selected.

Each element in the array is a different style. Styles are in the form:

```
StyleName|lineColour:[lineColour] lineType:[lineType]
  lineThickness:[lineThickness] fontFamily:[fontFamily]
  fontItalics:[fontItalics] fontBold:[fontBold] fontColour:[fontColour]
  fontSize:[fontSize] propertyStyle:[propertyStyle]
  fontOverline:[fontOverline] fontUnderline:[fontUnderline]
```

EditSymbolBusDialog

Arguments

No arguments

Returns

Return type:

EditTimer

Edit a timer. The function can stop a timer or change its interval. To delete a timer, use the DeleteTimer (page 99) function.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Timer ID
2	string	Yes		action
3	real	No		Value

Argument 1

Timer ID as returned by the CreateTimer (page 81) function

Argument 2

Action. This can be either:

1. 'interval' in which case this function will change the interval of the timer identified in argument 1 to the value specified in argument 3
2. 'kill' in which case the timer will be stopped. The timer will not be deleted and can be restarted by calling this function with the 'interval' action

Argument 3

Required if 'interval' is specified in argument 2

Returns

Return type: real

Returns 1.0 if the function is successful. Otherwise returns 0.0. The function will fail if the specified timer does not exist, if the action is not recognised or if the action is 'interval' and argument 3 is not specified.

EditWaveformDialog

Opens a dialog designed for editing a time domain waveform. This function has been superceeded by EditWaveformStrDialog (page 128) but is retained to support old designs.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Time/frequency initial values
2	real	No		Vertical initial values
3	string array			options

Argument 1

Initial values for the controls in the Time/Frequency group box. Up to 10 elements defined as follows:

Index	Description
0	Integer from 0 to 8, specifies wave shape as follows: 0 Square 1 Triangle 2 Sawtooth 3 Sine 4 Cosine 5 Pulse 6 One pulse 7 One pulse (exp) 8 Step
1	Delay
2	Rise time
3	Fall time
4	Width
5	Period
6	Damping
7	0: Use Delay, 1: Use Phase

Index	Description
8	Frequency
9	Duty cycle

Argument 2

Initial values for the controls in the Vertical group box. Up to 5 elements defined as follows:

Index	Description
0	Initial
1	Pulse
2	Off until delay
3	Offset
4	Amplitude

Argument 3

String array up to length 2 which may specify either of these options

Simulator mode - either 'SIMetrix' or 'SIMPLIS'

Initial pulse mode - set to 'initialpulse'

Returns

Return type: string array

String array with 15 elements. Elements 0 - 9 as for argument 1, elements 10-14 as for argument 2.

EditWaveformStrDialog

Opens a dialog box designed for editing a time domain waveform. To see an example of this dialog box, place a Waveform Generator on a schematic, select it then press F7.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Time/frequency initial values
2	string array	No		Vertical initial values
3	string array	No		Options

Argument 1

Initial values for the controls in the Time/Frequency group box. Values must be entered as strings and may be in the form of expressions enclosed with curly braces as well as literal constants. Up to 10 elements defined as follows:

Index	Description
0	Integer from 0 to 8, specifies wave shape as follows: 0 Square 1 Triangle 2 Sawtooth 3 Sine 4 Cosine 5 Pulse 6 One pulse 7 One pulse (exp) 8 Step
1	Delay
2	Rise time
3	Fall time
4	Width
5	Period
6	Damping
7	0: Use Delay, 1: Use Phase
8	Frequency
9	Duty cycle

Argument 2

Initial values for the controls in the Vertical group box. Values must be entered as strings and may be in the form of expressions enclosed with curly braces as well as literal constants. Up to 5 elements defined as follows:

Index	Description
0	Initial
1	Pulse
2	Off until delay
3	Offset
4	Amplitude

Argument 3

String array which may contain any combination of:

Name	Description
simplis	Select SIMPLIS mode. This shows the "Source idle during POP and AC analyses" check box
initialpulse	If true, means read the values for initial and pulse and use these to derive values for offset and amplitude. If false, read the values for offset and amplitude and use these to derive values for initial and pulse. This is set unconditionally if arg1 is missing or has size ⟨5. Otherwise it is set by a flag in arg2 if present otherwise it is false.

Returns

Return type: string array

String array with 16 elements. Elements 0 - 9 as for argument 1, elements 10-14 as for argument 2. Element returns the state of the "Source idle during POP and AC analyses" check box.

ElementProps

Returns an array of strings holding the names of all properties of an instance. The functions PropValue (page 309) or PropValues2 (page 310) can be used to find values of these properties.

This is a generalisation of InstProps (page 249), in that it will return the properties for any selected schematic element.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Property name
2	string	No		Property value
3	real	No	-1	Schematic ID

Argument 1

Property name to identify element. Along with parameter 2, if these arguments are not provided, the selected element, if any, will be used instead. If there are no selected elements or no elements that match the arguments, the function will return an empty vector. If the arguments identify more than one element, the function will return information for one of them but there are no rules to define which one.

Using the 'HANDLE' property and its value will guarantee uniqueness.

Argument 2

Property value to identify element. Along with parameter 1, if these arguments are not provided, the selected element, if any, will be used instead. If there are no selected elements or no elements that match the arguments, the function will return an empty vector. If the arguments identify more than one element, the function will return information for one of them but there are no rules to define which one.

Using the 'HANDLE' property and its value will guarantee uniqueness.

Argument 3

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If equal to -1, the currently selected schematic will be used.

Returns

Return type: string array

Array of strings with property values. Returns empty value if no match to property name and value is found. Also returns empty value if the schematic ID is invalid.

EnterTextDialog

Opens a dialog box allowing the user to enter lines of text.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial text and box caption

Argument 1

The argument specifies the initial text and the dialog box's caption as follows:

0 Initial text
1 Dialog box caption

Returns

Return type: string

The function returns the text entered by the user.

EpochTime

Returns the number of seconds elapsed since midnight, January 1, 1970.

Arguments

No arguments

Returns

Return type: real

Example

Notes

The return value has a numerical resolution of 1 ms but the useable resolution is system dependent and usually much coarser.

erf

Calculate erf(x)

Arguments

Number	Type	Compulsory	Default	Description
1	real array	yes		x

Returns

Return type: real array

erf(x)

Example

erfc

Calculate erfc(x)

Arguments

Number	Type	Compulsory	Default	Description
1	real array	yes		x

Returns

Return type: real array

erfc(x)

Example

EscapeString

Process string to replace escaped characters with literals.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		input string
2	string	Yes		options

Argument 1

Input string

Argument 2

Set to 'replacespaces' to enable \s which is substituted with a single space

Returns

Return type: string

Returns the input string but with the following character sequences substituted with their literal values as follows:

\t	Replaced with a tab character. (ASCII code 9)
\n	Replaced with a new line character. (ASCII code 10)
\r	Replaced with a carriage return character. (ASCII code 13)
\f	Replaced with a form feed character. (ASCII code 12)
\s	Replaced with a single space. Enabled is arg2 set to 'replacespaces'. Can be used to create strings that contain no spaces.
\\	Replaced by a single '\'
'\' followed by any other character	Replaced by the character following the '\'. The '\' itself is omitted.

EscapeStringEncode

Process string and replace literals with escaped characters. Performs the reverse operation to EscapeString (page 133)

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		input string

Argument 1

Input string

Returns

Return type: string

Returns the input string but with the following literal values substituted with character sequences as follows:

Literal value	Replaced with:
Tab character (ASCII code 9)	\t
New line character (ASCII code 10)	\n
Carriage return character (ASCII code 13)	\r
Form feed character (ASCII code 12)	\f
'\'	\\

ev

Special function used to evaluate a sequence of expressions without requiring multiple Let statements. Useful for schematic TEMPLATEs and similar.

This function may be supplied with up to 8 arguments. All arguments except the last is ignored by the function.

Arguments

Number	Type	Compulsory	Default	Description
1	any type	Yes		vector
2	any type	No		vector
3	... Up to 8 arguments in total	No		

Returns

Return type: real/complex array

The function returns the value of the last argument supplied

Notes

The purpose of this function is to allow the evaluation of intermediate variables withing a single expression. This is useful when the expression is in a schematic or graph template, for example, where there is only the facility available to enter a single expression.

For example:

```
ev(x=3,x*x)
```

returns 9. The first argument is evaluated and assigns 3 to x. The second argument is then evaluated using the value of x assigned in argument 1. In a script, it would be more conventional to use the 'Let' command to assign x. But if the expression was used in a template property, there is no facility to execute commands, so this would not be possible.

Execute

Function calls the script defined in arg 1 and passes it the arguments supplied in arg 2- 8. The function's returned value is the script's first argument passed by reference. The Execute function is used internally to implement user functions that are registered with the RegisterUserFunction command. See "User Defined Script Based Functions" on page 581.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Script name
2	any	No		Script argument 1
3	any	No		... Upto 8 args in total

Argument 3

Script args 2-7

Returns

Return type: Depends on called script

ExistCommand

Test if a script command is a valid command.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Command name

Returns

Return type: real

Returns 1.0 if the command is available otherwise 0.0

Notes

There are two situations where a documented command may not be available:

- The command is not implemented in the currently executing version of the application.
- The command is not enabled with the current license. A few commands are 'licensed' and are not available with all products.

See Also

ExistFunction (page 137)

ExistDir

Checks if the specified directory exists

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Directory name

Returns

Return type: real

Function returns a real scalar with one of three values:

Index	Description
0	Directory does not exist
1	Directory exists with write privilege
2	Directory exists but with no write privilege

ExistFile

Tests whether the given file exists. Does not test whether the file can be opened. Use CanOpenFile (page 67) to test if a file exists and can also be opened.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File path

Returns

Return type: real

1.0 if file exists otherwise 0.0

ExistFunction

Returns TRUE or FALSE depending on whether specified function exists.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Function name
2	string	No	'global'	Function type

Argument 1

Function name.

Argument 2

Either 'global' or 'script'. If 'global', arg 1 is assumed to be the name of a built in function. If 'script' arg 1 is assumed to be a function defined as a script and installed using the command RegisterUserFunction (page 515).

User defined compiled functions linked in as a DLL are treated as 'global'.

Returns

Return type: real

Notes

There are two situations where a documented function may not be available:

- The function is not implemented in the currently executing version of the application.
- The function is not enabled with the current license. A few functions are 'licensed' and are not available with all products.

ExistSymbol

Returns TRUE if symbol name given in argument 1 exists. Argument 2 specifies the scope of the search. If set to 'global', only the global library will be searched, if set to 'local', only the current schematic's local symbols will be searched. If set to 'all', both will be searched.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Symbol name
2	string	No	'global'	Scope

Returns

Return type: real

ExistVec

Returns TRUE (1) if the specified vector exists otherwise returns FALSE (0). If the second argument is 'GlobalLocal', only the global and local groups are searched for the vector otherwise the current group is also searched. See "Groups" on page 18 for further details.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		vector name
2	string	No	'global'	options

Returns

Return type: real

exp

Returns e raised to the power of argument. If the argument is greater than 709.016, an overflow error occurs.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

The exponential of the argument.

fft

Performs a Fast Fourier Transform on supplied vector. The number of points used is the next binary power higher than the length of argument 1.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		vector
2	string	No	'Hanning'	window function

Argument 2

Values are either 'Hanning' (default) or 'None'.

Returns

Return type: complex array

Notes

User's should note that using this function applied to raw transient analysis data will not produce meaningful results as the values are unevenly spaced. If you apply this function to simulation data, you must either specify that the simulator outputs at fixed intervals (select the Output at .PRINT step option in the **Simulator | Choose Analysis...** dialog box) or you must interpolate the results using the Interp (page 251) function. The FFT plotting menu items run a script which interpolate the data if it detects that the results are unevenly spaced. Use of these menus does not require special consideration by the user.

Field

Function provides bit access to integers. Returns the decimal value of a binary number composed from the binary representation of argument 1 between the bit numbers defined in arguments 2 and 3. E.g.:

```
Field(100, 1, 3) = 2

100 (decimal) = 1100100 (binary)
bits 1 to 3 (from right i.e. least significant) = 010 (binary) = 2
```

Field is useful for cracking the individual bits used for symbol attribute flags. See "Attribute Flags in the Prop command" on page 510.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		value
2	real	Yes		first bit
3	real	Yes		second bit

Returns

Return type: real

FilterEditMenu

Filters a menu list to return only menu definitions that are actually displayed.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Menu definition list

Argument 1

The menu definition list, as given by global:menusnapshot.

Returns

Return type: string array

Same as the input, but with entries removed for menus that are not displayed but rather form menus that are built up.

FilterFile

*** UNSUPPORTED *** – See page 26 for more information

Processes a file specified by arg 1 and returns a string array containing any lines in the file that start with any of the keywords specified by arg 2. If arg 3 = 'strip', the lines will be returned with the keyword removed.

If arg3='spice', the input file will be filtered to remove inline comments and join lines connected using the '+' continuation character. Note that with arg3='spice' normal '*' comments pass through unmodified as long as they are not embedded between '+' continuation lines.

This function was developed for internal testing and was used to extract control lines from netlists. It may have other uses.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		file name
2	string array	Yes		keywords
3	string	No		option

Returns

Return type: string array

FindModel

Returns the file path and line number of a simulator model given its name and type

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Model name
2	string	Yes		Model letter
3	string	No	'SIMetrix'	Simulator type

Argument 1

Model name, this is either the name in a .MODEL statement or the name in a .SUBCKT statement.

Argument 2

Model letter, e.g 'Q' for BJTs, 'D' for diodes and 'X' for subcircuits.

Argument 3

Simulator type, i.e 'SIMetrix' or 'SIMPLIS'

Returns

Return type: String array

String array of length 2 holding the file name and line number of the definition of the specified model.

FIR

Performs "Finite Impulse Response" digital filtering on supplied vector. This function performs the operation:

$$y_n = x_n \cdot c_0 + x_{n-1} \cdot c_1 + x_{n-2} \cdot c_2 + \ldots$$

Where:

x is the input vector (argument 1)

c is the coefficient vector (argument 2)

y is the result (returned value)

The third argument provide the 'history' of x i.e. x_{-1}, x_{-2} etc. as required. Below is the simple case of a four sample rolling average. In principle an almost unlimited range of FIR filtering operations may be performed using this function. A text on Digital Signal Processing will provide further details.

User's should note that using this function applied to raw transient analysis data will not produce meaningful results as the values are unevenly spaced. If you apply this function to simulation data, you must either specify that the simulator outputs at fixed intervals (select the Output at .PRINT

step option in the **Simulator | Choose Analysis...** dialog box) or you must interpolate the results using the Interp (page 251) function.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		vector to be filtered
2	real array	Yes		filter coefficients
3	real array	No	All zero	initial conditions

Returns

Return type: real array

Example

Suppose a vector VOUT exist in the current group (simulation results). The following will plot VOUT with a 4 sample rolling average applied

```
Plot FIR(vout, [0.25, 0.25, 0.25, 0.25])
```

Alternatively, the following does the same

```
Plot FIR(vout, 0.25*unitvec(4))
```

See Also

IIR (page 241)

Floor

Returns the argument truncated to the next lowest integer. Examples:

```
Floor(3.45) = 3
Floor(7.89) = 7
Floor(-3.45) = -4
```

This function accepts only scalar input values. See floorv (page 143) for a version that accepts vector input.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		scalar

Returns

Return type: real

floorv

Returns the argument truncated to the next lowest integer. Same as Floor (page 142), except that it also accepts vector inputs, for example:

```
Floorv([3.45, 7.89, -3.45]) = [3, 7, -4]
```

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		vector

Returns

Return type: real vector

Returns a vector of the arguments truncated to next lowest integers

FormatNumber

Formats a real value and returns a string representation of it.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		number
2	real	Yes		significant digits
3	string	No	'eng'	format

Argument 3

Format options are:

'eng'	(default if omitted). Formats the number using engineering units
'noeng'	Normal format. Will use 'E' if necessary
'%'	Formats as a percentage

Returns

Return type: real

Fourier

Calculates the fourier spectrum of the data in argument 1. The function uses the 'Continuous Fourier' technique which numerically integrates the Fourier integral. Because this technique does

not require the input data to be sampled at evenly spaced points, it doesn't suffer from frequency aliasing. This is the main drawback of the more commonly used FFT (Fast Fourier Transform) algorithm. However, the Continuous Fourier algorithm is much slower then the FFT, sometimes dramatically so.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		data
2	real	Yes		Fundamental frequency
3	real	Yes		Number of frequency terms
4	real array	No		options

Argument 1

The input data. This is expected to possess a reference i.e. x-values

Argument 2

Specifies the fundamental frequency. All terms calculated will be an integral multiple of this.

Argument 3

Specifies the number of frequency terms to be calculated.

Argument 4

This is optional and can be a 1 or 2 element array. The first element is the first frequency to be calculated expressed as a multiple of the fundamental. The default value is 0 i.e. the DC term is calculated first. The second element is the integration order used and may be 1 or 2.

Returns

Return type: complex array

The result of the calculation and will be a complex array with length equal to argument 3.

FourierOptionsDialog

Same as DefineFourierDialog (page 90) except that only the Fourier sheet is displayed. The remaining tabbed sheets are hidden.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial values
2	real array	No		sample vector

Returns

Return type: string array

FourierWindow

Returns the input vector multiplied by one of a selection of 4 window functions. This is intended to be used with a Fourier transform algorithm.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		input vector
2	string	No	'hanning'	window type

Argument 1

Input vector

Argument 2

Window type. One of:

'hanning'
'hamming'
'blackman'
'rectangular'

Returns

Return type:

FullPath

Returns the full path name of the specified relative path and reference directory.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		relative path name
2	string	No	Current working directory	reference directory

Returns

Return type: real

Example

```
FullPath('amplifier.sch', 'c:\simulation\circuits') =
c:\simulation\circuits\amplifier.sch

FullPath('..\amplifier.sch', 'c:\simulation\circuits') =
c:\simulation\amplifier.sch
```

See Also

"RelativePath" on page 328

"SplitPath" on page 361

gamma

Calculate gamma(x)

Arguments

Number	Type	Compulsory	Default	Description
1	real array	yes		x

Returns

Return type: real array

gamma(x)

Example

Gauss

Returns a random number with a Gaussian distribution. This function is intended to be used for SIMPLIS Monte Carlo analyses and would typically be used in device value expressions.

This function is only available in the Simulator process and cannot be called from scripts running in the context of the front end. The function is only active when used by the netlist pre-processor with Monte Carlo analysis enabled. When used in other contexts, the function returns 1.0.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Tolerance - 3-sigma spread

Returns

Return type: real

Random number with a Gaussian distribution of mean 1.0 and standard deviation of tolerance/3 where tolerance is the value supplied to argument 1.

Returns 1.0 when used in non Monte Carlo contexts.

Example

1k*Gauss(0.1) will return 1000 +/- 10% with a 3-sigma spread. Returns 1.0 in a non Monte Carlo run.

Notes

The function can return values outside the tolerance range. For example Gauss(0.1) can return values greater than 1.1 and less than 0.9 which would violate the tolerance specification for many components. Use the GaussTrunc (page 148) function to get a distribution that does not extend beyond the tolerance range.

See Also

Unif (page 388)

GaussTrunc (page 148)

Distribution (page 102) - also alias UD (page 387)

WC (page 396)

GaussLim

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Tolerance
2	real	No	3	sigma multiplier

Returns

Return type: real

GaussTrunc

Returns a random number with a Gaussian distribution but truncated so that it won't return values outside the specified tolerance range. This function is intended to be used for SIMPLIS Monte Carlo analyses and would typically be used in device value expressions.

This function is only available in the Simulator process and cannot be called from scripts running in the context of the front end. The function is only active when used by the netlist pre-processor with Monte Carlo analysis enabled. When used in other contexts, the function returns 1.0.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Tolerance
2	real	No	3	sigma multiplier

Returns

Return type: real

Random number with a Gaussian distribution of mean 1.0 and standard deviation of (tolerance/sigma_multiplier) where tolerance is the value supplied to argument 1 and sigma_multiplier is the argument provided to argument 2. Values outside the range 1.0 +/-tolerance are rejected so the function will never return values outside this range

Example

1k*GaussTrunc(0.1) will return 1000 +/- 10% with a 3-sigma spread. Will not return values outside the range 0.9-1.1. Returns 1.0 in a non Monte Carlo run.

See Also

Gauss (page 146)

Unif (page 388)

Distribution (page 102) - also alias UD (page 387)

WC (page 396)

GenPrintDialog

Opens a dialog box used to define print settings

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		initial settings
2	string	No		Enabled modes

Argument 1

The argument is a string array of length 13 and defines the initial settings of the dialog box as follows:

Index	Description
0	'area' "Fit Area" 'grid' "Fixed Grid"
1	Schematic scale (entered as a string)
2	Schematic caption
3	Graph magnification (entered as a string)
4	Graph caption
5	Orientation 'landscape' or 'portrait'
6	Layout: '0' Schematic only '1' Graph only '2' Schematic/Graph '3' Graph/Schematic
7	Left margin. The value is entered and returned in units of 0.1mm but will be displayed according to system regional settings. Must be entered as a string.
8	Top margin. Comments as for left margin.
9	Right margin. Comments as for left margin.
10	Bottom margin. Comments as for left margin.
11	Major grid checked: 'on' Checked 'off' Not checked
12	Minor grid checked: 'on' Checked 'off' Not checked

Argument 2

Specifies whether schematic mode, graph mode or both are enabled. If omitted the mode is determined by the schematic and graph windows that are open.

To enable schematic mode only, set this argument to 'Schem', to set to graph mode set to 'Graph' and to set to both, set to 'Schem|Graph'.

Returns

Return type: string array

The function returns a string array with the same format as argument 1 and assigned with the user's settings. If the user selects Cancel the function returns an empty vector.

GetActualPath

Returns actual file or directory path as a full path even if the path passed is a symbolic or hard link. If the path is a network share it will return a
server style UNC path. It will also convert "8.3" short paths to "long" paths. Path returned will always use native path separators (i.e. backslashes) but will accept forward slashes on input. This will return an empty string if the object pointed to does not exist or cannot be opened

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path

Returns

Return type: string

Resolved path

GetAllCurves

Returns an array listing id's for all curves on currently selected graph. All curves are referred to by a unique value that is the 'id'. Some functions and command require a curve id as an argument.

Arguments

No arguments

Returns

Return type: string array

GetAllSimulatorDevices

Returns a list of semi-colon delimited strings containing information on all built-in simulator devices.

Arguments

No arguments

Returns

Return type: string array

Array of semi-colon delimited strings. The strings in the field are defined in the following table:

Field	Description
0	Device name
1	Model name - as used in the .MODEL statement. E.g npn, nmos etc.
2	Level parameter value
3	Minimum number of terminals
4	Maximum number of terminals
5	Device letter. E.g. 'Q' for BJTs, 'D' for diodes

Example

GetAllSymbolPropertyNames

Returns a string array containing the names of all the properties on the symbol currently open in the symbol editor.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Options

Argument 1

Options. Currently, there is only one which is 'nopins'. If *not* present, the function will return all properties including the internally generated properties used to display pin names. These are of the form Pin*pinname*. If 'nopins' is specified, these properties will not be returned by the function.

Returns

Return type: string array

GetAllYAxes

Returns an array listing all y axis id's for currently selected graph. All graph axes have a unique 'id' which may be used with some other commands and functions.

Arguments

No arguments

Returns

Return type: string array

GetAnalysisInfo

Returns the parameters of the most recent analysis performed by the simulator. The parameters are returned in the form of a string array. If argument 1 is set to 'name' the function will return the names of each parameter.

The following sample shows how to obtain a the stop time of a transient analysis:

```
let stopIdx = Search(GetAnalysisInfo('name'), 'tstop')
Let stopTime = Val(info[stopIdx])
```

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Options

Argument 1

The following table shows the parameter names currently available for each analysis type:

Analysis Type	Parameter Names
Transient	ANALYSISNAME, GROUPNAME, TSTART, TSTOP, TSTEP, TMAX, UIC, DELTA, RTNSTART, RTNSTOP, RTNSTEP, RTNENABLED, FAST
AC	ANALYSISNAME, GROUPNAME, PARAM, MODEL, TEMP, FREQ, MONTE, REPEAT, DEVICE, MODE, START, STOP, STEP, NUMSTEPS, GRAD, SINGLE, F
DC	ANALYSISNAME, GROUPNAME, PARAM, MODEL, TEMP, FREQ, MONTE, REPEAT, DEVICE, MODE, START, STOP, STEP, NUMSTEPS, GRAD, SINGLE
Noise	ANALYSISNAME, GROUPNAME, PARAM, MODEL, TEMP, FREQ, MONTE, REPEAT, DEVICE, MODE, START, STOP, STEP, NUMSTEPS, GRAD, SINGLE, V, VN, INSRC, PTSPERSUM, F
Transfer	Function ANALYSISNAME, GROUPNAME, PARAM, MODEL, TEMP, FREQ, MONTE, REPEAT, DEVICE, MODE, START, STOP, STEP, NUMSTEPS, GRAD, SINGLE, V, VN, I, INSRC, F, IMODE
Sensitivity	ANALYSISNAME, GROUPNAME, POSNAME, NEGNAME, I, GRAD, START, STOP, NUMSTEPS
Pole-zero	ANALYSISNAME, GROUPNAME, NODEINAME, NODEGNAME, NODEJNAME, NODEKNAME, VOLCUR, POLZER
Operating point	ANALYSISNAME, GROUPNAME

Returns

Return type: string array

GetAnalysisLines

Returns the analysis lines used in the most recent simulation analysis. The analysis lines are the lines in the netlist that specify an analysis such as '.tran', '.ac' etc. The function will return an empty vector if no simulation has been run or if the latest run has been reset or was aborted.

Arguments

No arguments

Returns

Return type: string array

GetAnnotationText

Returns the text of the requested annotation. This work for text annotations and shape annotations with text applied to them.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	'Ref'	Handle of the annotation

Returns

Return type: string array

The text of the requested annotation.

GetAxisCurves

Returns an array listing all curve id's for specified y-axis. All curves are referred to by a unique value that is the 'id'. Some functions and command require a curve id as an argument.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Y axis id

Returns

Return type: string array

GetAxisLimits

Returns min and max limits and axis type (log or lin) of specified axis

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Axis ID

Returns

Return type: real array

Returns array of length 3 providing limits info for specified axis.

Index	Description
0	Minimum limit
1	Maximum limit
2	Axis scale type - 0 = linear, 1 = logarithmic
3	Fixed or auto. 0 = fixed, 1 = auto

GetAxisType

Returns string specifying type of axis.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Axis ID

Returns

Return type: string

Returns the type of axis. Possible values are:

'X'	X-axis
'Digital'	A Digital Y-axis. (Created with `Curve /dig` or menu **Probe | Voltage - Digital...**)
'Main'	Main Y-axis (axes at bottom of graph)
'Grid'	Grid Y-axis (axes stacked on top of main)
'NotExist'	Axis does not exist

GetAxisUnits

Returns physical units of axis. See the function "Units" on page 388 for list of possible values.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Axis ID

Returns

Return type: string

GetChildModulePorts

Finds information about module ports in the underlying schematic of a hierarchical block. This function was developed as part of the system to allow buses to pass through hierarchies as it can find whether the underlying module port for a hierarchical block is defined for bus connections.

Property name and value must uniquely define an instance.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name
2	string	Yes		Property value
3	real	No	-1 (use currently selected schematic)	Schematic ID

Argument 1

Usually arg 1 the property name is 'handle'. If arg 1 is an empty string, a single selected instance will be used.

Argument 2

The property value

Argument 3

Schematic ID as returned by the OpenSchematic (page 286) function. This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

String array of size = 2 times the number of module ports in the underlying schematic. Values arranged in pairs. The first in each pair in the name of the module port and the second value is the bus size. The latter will always be 1 for a non bus module port.

GetCodecNames

Returns all encoding types available to be used with LoadFile (page 259), SetDefaultEncoding (page 532) and all text editor open commands using the /encoding switch.

Arguments

No arguments

Returns

Return type: string array

GetColours

Returns the names of built-in colour objects.

Arguments

No arguments

Returns

Return type: string array

GetColourSpec

Returns the current colour specification for a colour object whose name is passed to argument 1. Named colour objects are simply option variables used to store colour information. See Set (page 531) for information about option variables.

Returns the value in the form #rrggbb.

If the object name passed is not recognised the function will return the representation for the colour black.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Colour name

Returns

Return type: string

GetCompatiblePathName

Returns a "short" path name if the supplied path has white space or non-ascii characters. This function may not function as desired on all systems as not all file systems support short path names.

The function only replaces the parts of the path that have spaces or non-ASCII characters.

A short path is one that complies with the DOS 8.3 naming convention.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path

Argument 1

Input path. Maybe full or partial and the function will return its argument in the same form (that it, it won't convert to a full path). If the input path does not exist, this function will simply return its argument unmodified.

Returns

Return type: string

See Also

"GetLongPathName" on page 192

GetComponentValue

Same as SetComponentValue (page 347) except that it can only read values. Refer to SetComponentValue (page 347) for full details.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Address
2	real	No	-1	Schematic ID

Argument 2

Schematic ID as returned by the OpenSchematic (page 286) function. This allows this function to be used with a schematic that is not open or not currently selected. If equal to -1, the currently selected schematic will be used.

Returns

Return type: string array

Refer to SetComponentValue (page 347) for details

GetConfigLoc

Returns the location of the application's configuration settings. In versions prior to version 5, this would be in one of the following forms:

```
REG;registry_root_pathname
```

OR

```
PATH;inifile_pathname
```

If the first form is returned, the settings are stored in the registry. The path of the registry key is HKEY_CURRENT_USER *registry_root_pathname*.

If the second form is returned the settings are stored in a file with full path equal to *inifile_pathname*.

From version 5, the registry is no longer used for storing settings, so only the second of the two forms will ever be returned.

The return value from GetConfigLoc can be used directly as the value of the `/config_location` switch at the simulator (SIM.EXE) command line. See the "Running the Simulator" chapter in the Simulator Reference Manual for more details.

Arguments

No arguments

Returns

Return type: string array

GetConnectedPins

Function returns instance and pin name for all pins connected to net at specified point. Results are sorted according to the number of pins on owner instance.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		schematic location
2	string	No	'ref'	identifying property
3	string	No	'pinname'	pin number of pin name

Argument 1

Specifies a point on the schematic that identifies a net. This could be returned by the WirePoints (page 397) function for example.

Argument 2

Property whose value will be used to identify instance in returned values.

Argument 3

Specify whether pins to be identified by their name or number. If set to 'pinnumber', the number will be used otherwise the name will be used.

Returns

Return type: string array

An array of strings of length equal to 2 times the number of pins on the net. The even indexes hold the property value identifying the instance and the odd indexes hold either the pin's name or number according to the value of argument 3.

Note that this function does not return pins on implicit connections. An implicit connection is one that is made by virtue of having the same netname as defined by a terminal symbol or similar but has no physical connection using wires.

Example

The following sequence will display the output of this function for a single selected wire on the schematic:

```
** Get selected wires
Let wires = SelectedWires()

** Get locations for first wire in selected list
Let points = WirePoints(wires[0])

** Show connected pins
Show GetConnectedPins([point[0], points[1]])
```

GetConvergenceInfo

Return convergence data for most recent simulation

Arguments

No arguments

Returns

Return type: string array

Returns a string array providing convergence information about the most recent run. Each element of the array is a list of values separated by semi-colons. The output may be pasted into a spreadsheet program that has been set up to interpret a semicolon as a column separator. The first element of the array lists the names for each column and therefore provides a heading. The following headings are currently in use:

type	Node or Device
name	Name of node or device that failed to converge count Number of times node/device failed to converge during run
time (first step)	Time of most recent occurrence of a 'first step' failure.
required tol	Required tolerance for most recent 'first step' failure
actual tol	Tolerance actually achieved for most recent 'first step' failure
absolute val	Absolute value for most recent 'first step' failure
time (cut back step)	Time of most recent occurrence of a 'cut back step' failure.
required tol	Required tolerance for most recent 'cut back step' failure
actual tol	Tolerance actually achieved for most recent 'cut back step' failure
absolute val	Absolute value for most recent 'cut back step' failure
final?	Node or device failed on the final step that caused the simulation to abort
top analysis	Main analysis mode (Tran, DC etc.)
current analysis	Current analysis. Either the same as 'top analysis' or Op
op mode	Method being used for operating point. (PTA, JI2, GMIN or SOURCE)

A *first step* failure is a failure that occurred at the first attempt at a time step after a previously successful step. If a time point fails, the time step is cut back and further iterations are made. Failures on steps that have been cut back are referred to in the above table as *cut back steps*. Quite often the nodes or devices that fail on a *cut back step* are quite different from the nodes or devices that fail on a first step. The root cause of a convergence failure will usually be at the nodes or devices that fail on a *first step*.

It is quite difficult to interpret the information provided by this function. The 'where' script performs a simple analysis and sometimes displays the nodes or devices most likely to be the cause.

GetCurDir

Returns current working directory.

Arguments

No arguments

Returns

Return type: string

Returns current working directory.

GetCurrentGraph

Returns id of the currently selected graph.

Arguments

No arguments

Returns

Return type: string

Returns id of the currently selected graph. Returns '-1' if no graphs are open. The id can be used in a number of functions that return information about graphs or graph objects generally.

See Also

GetGraphObjPropValues (page 180)

GetGraphObjPropValue (page 179)

GetGraphObjects (page 178)

GetGraphObjPropNames (page 178)

GetSelectedGraphAnno (page 207)

GetCurrentStepValue

Returns the current step value in a script-based multi-step analysis. Script-based multi-step analyses use a script call to define each step. For this analysis type, a counter is maintained which increments on each step. This function returns the value of that counter. Note that the counter is initialised to 1.

Arguments

No arguments

Returns

Return type:

Example

The following script code sets the BF parameter to values of 100, 200 and 400 for the first, second and third steps respectively.

```
Let values = [100, 200, 400]
Let step = GetCurrentStepValue()
Let value = values[step-1]

Let SetModelParamValue('BC546B', 'BF', value)
```

See Also

SetModelParamValue (page 350)

SetInstanceParamValue (page 349)

GetModelParameterValues (page 196)

GetDotParamValue (page 169)

GetCursorCurve

Returns curve id and source group name of curve attached to measurement cursor

Arguments

No arguments

Returns

Return type: string array

Returns a string array of length 3 providing information on the curve attached to the measurement cursor. Returns an empty vector if cursors not enabled.

Index	Description
0	Curve id
1	Source group name. This is the group that was current when the curve was created.
2	Division index if curve is grouped. (E.g. for Monte Carlo)

GetCurveAxis

Returns axis id of specified curve

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Curve ID

Returns

Return type: string

Returns the id of the y-axis to which the specified curve is attached.

GetCurveName

Returns name of specified curve.

Arguments

Number	Type	Compulsory	Default	Description
1	Integer	Yes		ID of the curve

Returns

Return type: string

Returns name of specified curve.

GetCurves

Returns curve names in selected graph.

Arguments

No arguments

Returns

Return type: string array

Returns an array of curve names (as displayed on the graph legend) for the current graph.

GetCurveVector

Returns the data for a curve.

For a single curve (i.e. not a group of curves as created from a Monte Carlo plot) only the first argument is required and this specifies the curve's id.

If the curve id refers to a group of curves created by a multi-step run, then the second argument may be used to identify a single curve within the group. The data for the complete curve set is arranged as a "Multi Division Vector" on page 19. The second argument specifies the division index. If absent the entire vector is returned

Note that the arguments to this function for version 4 and later have changed from earlier versions.

The function cv (page 82) is identical to this function and is convenient in situations where a short expression is desirable.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		curve id
2	real	No	Return all divisions	Division index
3	string	No		Obsolete - no longer used

Returns

Return type: real array

GetDatumCurve

Returns curve id and source group name of curve attached to reference cursor.

Arguments

No arguments

Returns

Return type: string array

Returns a string array of length 3 providing information on the curve attached to the reference cursor.

Index	Description
0	Curve id
1	Source group name. This is the group that was current when the curve was created.
2	Division index if curve is grouped. (E.g. for Monte Carlo)

GetDeviceDefinition

Searches for the specified device model in the global library and returns the text of the model definition. If the device is defined using a .MODEL control, the result will have a single element containing the whole definition. If the device is defined using a subcircuit then the result will be a string array with a single element for each line in the subcircuit definition.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Device name
2	string	Yes		Device type
3	string	No	'SIMetrix'	Simulator type
4	string	No		Options

Argument 1

The model/subcircuit name. E.g. 'Q2N2222' or 'TL072'

Argument 2

The type of the device. This may be either the device letter e.g. 'Q' for a BJT, or the model type name e.g. 'npn'. A list of device letters is given in the Simulator Reference manual in the "Running the Simulator" chapter.

If the device is a subcircuit, use the letter 'X'.

Argument 3

This must be either 'SIMetrix' or 'SIMPLIS'. If set to SIMPLIS, only subcircuits declared for use with SIMPLIS will be returned. This is done using the .SIMULATOR control in the library file. Note that only SIMPLIS subcircuits are supported. Currently SIMPLIS devices defined using .MODEL are not supported by the SIMetrix model library manager.

Argument 4

Options. Currently there is only one: set this argument to 'header' to instruct the function to output preceding comment text. If this is set, up to 20 comment lines (starting with '*') before the start of the model will also be output.

Returns

Return type: string array

GetDeviceInfo

Returns information about the specified simulator device.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Model name
2	string	No	none	Options

Argument 1

Internal device name as returned by the GetModelType or GetInternalDeviceName function. This is not the same as the type name used in the .MODEL control but a name that is used internally by the simulator. For example, the internal device name for a LEVEL 1 MOSFET is 'MOS1'.

Optionally the device letter may be specified if arg2 = 'letter'. However, the function will not return such precise information if this option is used. For example, the LEVEL value will not be known and so -1 will be returned. Also the minimum and maximum number of terminals will reflect all devices that use that device letter and not just one specific device. E.g. the 'BJT' device

defines the standard SPICE Gummel-Poon transistor which can have 3 or 4 terminals. But the 'q' letter can also specify VBIC_Thermal devices which can have 5 terminals.

Argument 2

Options, currently only one. If this is set to 'letter', a single letter should be specified for argument 1. This is the device letter as used in the netlist, e.g. 'Q' for a BJT, 'R' for a resistor. See notes above concerning specifying using the device letter.

Returns

Return type: string array

Result is a 7 element array about the specified simulator device.

Index	Description
0	Model type name for negative polarity device. E.g. 'npn', 'nmos' etc.
1	Model type name for positive polarity device E.g. 'pnp', 'pmos' etc. Empty if device has only a single polarity
2	Device letter. E.g. 'Q' for a BJT
3	Maximum number of terminals.
4	Minimum number of terminals. This is usually the same as the maximum number of terminals, except for BJTs whose substrate terminal is optional.
5	Value required for LEVEL parameter. 0 means that this is the default device when no LEVEL parameter is specified. -1 will be returned if the 'letter' option is specified.
6	Semi-colon delimited list of valid .MODEL control model name values. E.g. 'npn', 'pnp' and 'lpnp' are returned for the 'BJT' device.

GetDeviceParameterNames

Returns string array containing all device parameter names for the specified simulator model type.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Device type
2	real	No	-1	Level
3	string array	No		Options

Argument 1

Device type specified using its SPICE letter e.g. 'Q' for a BJT, 'M' for a MOSFET etc.

Argument 2

Model level if relevant. If omitted or set to -1, the default level for that type of device will be used.

Argument 3

String array of length up to 2. May contain one or both of 'useInternalName' and 'readback'. If 'useInternalName', then argument 1 must specify the device's internal name. This is returned by GetInternalDeviceName (page 186). Argument 2 is ignored in this case.

If 'readback' is specified, the function returns names of 'read back' parameters. Read back parameters aren't writeable but return information about a device's operating characteristics. For example, most MOS devices have 'vdsat' read back parameter that returns the saturation voltage. This function only returns the names of read back parameters. To find their values, use GetInstanceParamValues (page 184).

Returns

Return type: string array

String array of length determined by the number of parameters the device has. Each element contains the name of a single parameter. To find the values for the parameters use GetInstanceParamValues (page 184).

Example

The following:

```
Show GetDeviceParameterNames('M')
```

returns:

```
0   'L'
1   'W'
2   'M'
3   'AD'
4   'AS'
5   'PD'
6   'PS'
7   'NRD'
8   'NRS'
9   'IC-VDS'
10  'IC-VGS'
11  'IC-VBS'
12  'TEMP'
```

GetDevicePins

Returns information about the electrical connections on a specified simulator device

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		device identifier
2	string array	No		options

Argument 1

Device identifier. If 'instname' is specified in argument 2, this will be the instance reference of the device. Otherwise the device name must be specified.

Argument 2

Can be a combination of 'instname' and 'getterms'. 'instname' means use the instance name to define the device. 'getterms' is functional for Verilog-HDL devices and will instruct the function to return information on vectored terminals.

Returns

Return type: string array

Array of semi-colon delimited strings providing the following information about the electrical connections to the specified simulator device.

Field index	Description
1	Pin name
2	Direction - in, out or inout. Currently only Verilog-HDL devices will return anything other than in or out for this field
3	Discipline - Verilog-A devices will return the defined discipline for the connection. This field will be empty for other devices
4	Connection size for vector connections - Currently only Verilog-HDL devices will return anything other than 1 for this field

GetDeviceStats

Get simulation statistics for each device type

Arguments

No arguments

Returns

Return type: string array

Array of strings with each element containing a list of name=value pairs providing information on each device type used in the simulator. Information provided is as follows:

Name	Value
(unlabelled)	Device type

Name	Value
Tload	Time in seconds used to evaluate the device's equations. This entry will be zero unless '.OPTIONS devacct' is specified in the simulation netlist
Count	Number of instances of this device type
ByteCount	Number of bytes used to store the data for instances of this device

GetDotParamNames

Returns names of variables defined using .PARAM in the most recent simulation run.

Arguments

No arguments

Returns

Return type: string array

String array with names of variables. If no simulation has been run, an empty result will be returned. Note that real values in the front end's global group are passed to the simulator and entered as .PARAM values. So this function will always return those values. In addition the values 'PLANCK', 'BOLTZ' and 'ECHARGE' are always defined.

GetDotParamValue

Returns the value of a variable defined using .PARAM in the most recent simulation run.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Variable name

Returns

Return type: real

Real value of variable. If variable does not exist or if no simulation has been run, an empty result will be returned.

GetDriveType

Determines the type of drive or file system of the specified path.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path

Returns

Return type: string

Determines the type of drive or file system of the specified path. Returns one of the following values:

Return value	Description
'local'	Drive or file system present on the local machine
'remote'	Network drive or file system
'cdrom'	CD Rom or DVD drive
'other'	Other file system or drive
'notexist'	The path doesn't exist or media not present
'unknown'	Drive type or file system could not be determined

GetEmbeddedFileName

Returns the actual file name used for an embedded file specified using '.FILE' and '.ENDF'.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File path

Argument 1

Name of embedded file. That is the name used after .FILE

Returns

Return type: string

'.FILE' and '.ENDF' allow file to be embedded in netlist and this is implemented by writing the contents to a real file. This function returns the full path name of the real file.

Notes

This function can be used to access an embedded file in a script called using the .POST_PROCESS statement. This is useful, for example, to embed data in a netlist to be accessed in that script.

This function may also be called after a simulation has been run to access data contained in any .FILE/.ENDF block.

GetEnvVar

Returns the value of a system environment variable.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		System environment variable name

Returns

Return type: string

GetEthernetAddresses

Returns information about the installed Ethernet adapters.

Arguments

No arguments

Returns

Return type: string array

Returns a string array providing information about the Ethernet adapters installed in the system. Depending on the operating system, this will either be a simple list of Ethernet addresses or a list of semi-colon delimited strings providing the Ethernet address followed by a description of the adapter.

GetF11Lines

Returns the contents of the schematic's text window also known as the F11 window. Each element of the returned array contains a single line of the F11 text.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Options
2	real	No	-1	Schematic ID

Argument 1

If set to 'spice' the lines will be filtered to remove inline comments and join lines connected using the '+' continuation character. Note that with arg1='spice' normal '*' comments pass through unmodified as long as they are not embedded between '+' continuation lines. Also, leading spaces will also be stripped in this mode.

Argument 2

Schematic ID as returned by OpenSchematic (page 286). This makes it possible to apply this function to any schematic and not just the one that is currently displayed. See "OpenSchematic" on page 286 for more details.

Returns

Return type: string array

GetFile

Opens the Open File dialog box. Return value is full pathname of file selected by user. If user cancels operation, function returns an empty string. Argument to function supplies description of files and default extension. These two items are separated by '\'. E.g. `getfile('Schematic Files\sch')`.

This function has now been superseded by the functions GetSimetrixFile (page 209) and GetUserFile (page 227) which are more flexible.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File specification
2	real	No		0: file must exist, 1:need not exist

Returns

Return type: string

GetFileCD

This function is now obsolete. Use the functions GetSimetrixFile (page 209) or GetUserFile (page 227) instead.

Arguments

No arguments

Returns

Return type:

GetFileDir

Get the directory where the specified file is located.

The function first converts the supplied path to a full path then strips off the final component of the path. If the path actually points to a directory, the value returned will be the parent directory. The function does not check that the path supplied actually exists.

Arguments

Number	Type	Compulsory	Default	Description
1	string	yes		Path to file. May be a relative path

Returns

Return type:

Full directory path where file is located

GetFileExtensions

Returns a string array containing all valid extensions (without prefixed '.') for the given file type.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File type

Returns

Return type: string array

Returns a string array containing all valid extensions (without prefixed '.') for the given file type. The extension returned in the first element is the default. File extensions can be changed in the general options dialog box (**File | Options | General...**) and are stored in a number of option variables. These are listed in the following table.

Argument	Used for	Option name	Default
'Schematic'	Schematic files	SchematicExtension	sxsch
'Data'	Data files	DataExtension	sxdat, dat
'Text'	Text files	TextExtension	txt, log
'Symbol'	Binary symbol files	SymbolExtension	sxslb, slb

Argument	Used for	Option name	Default
'LogicDef'	Logic definition files used with arbitrary logic block	LogicDefExtension	ldf
'Script'	Script files	ScriptExtension	sxscr
'Model'	Model files	ModelExtension	lb, lib, mod, cir, spi, fam, mdl, sp, sp2, model, pkg, prm, sub, sio, ckt
'Catalog'	Catalog files	CatalogExtension	cat
'Graph'	Graph binary files	GraphExtension	sxgph
'Component'	Schematic hierarchical component	ComponentExtension	sxcmp
'Snapshot'	Snapshot files	SnapshotExtension	sxsnp
'Netlist'	Netlist files	NetlistExtension	net, cir, deck
'Verilog-A'	Verilog-A files	VerilogAExtension	va, vams
'Verilog-HDL'	Verilog-HDL files	VerilogHDLExtension	v
'Schematic ASCII'	SChematic ASCII files	AsciiFileEditorExtension	sxsch, sxslb, sxcmp

You can combine multiple file types delimited by '&'. For example "Netlist & Model" will return the extensions for both netlist and model file types.

GetFileInfo

Returns information about a specified file.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File path

Returns

Return type: string array

Returns an array of length 5.

Index	Description
0	Drive type, one of: 'local', 'cdrom', 'remote', 'other', 'notexist', 'unknown'. See notes for function GetDriveType (page 169).
1	File size in bytes
2	Full path name
3	Last modified time. Value is the number of seconds elapsed since January 1, 1970.
4	'True' if path is a directory, otherwise 'false'

GetFileSave

This function is now obsolete. Use GetSimetrixFile (page 209) or GetUserFile (page 227) instead.

Arguments

No arguments

Returns

Return type:

GetFileVersionStamp

Returns file version stamp

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File path
2	string	No		Options

Argument 1

File path

Argument 2

If set to 'usestringinfo' the FileVersion string will be read instead of the integer values. Set this if you need the behaviour of this function to be the same as SIMetrix version 7.2 or earlier.

Returns

Return type: string

Version stamp typically in form major.minor.service.build

GetFileViewerSelectedFiles

Returns the full path names of files selected in all of the File Views.

Arguments

No arguments

Returns

Return type: string array

List of path names, each array item is a separate path name.

GetFirstSelectedElementOfType

Returns handle of first selected schematic element of the requested type or types.

If mulitple types are given, a search will be conducted on each type in turn, until a selected element of one of the requesting types is found. Only one handle is returned and this is the first element that the search comes across that is selected and is of the type requested.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Element type or types

Argument 1

Either a single element type, or an array of different types. If several types are provided, it will search for a selected element of the different types in order, meaning that if there is a match for the first array index, any subsequent indexes will not be searched.

Available elements types are:

ArrowAnnotation

ImageAnnotation

Instance

LineAnnotation

ShapeAnnotation

TextAnnotation

TitleBlock

Wire

Returns

Return type: string

Handle of the first selected element of the type requested, or an empty string if no matching elements were found.

GetFonts

Returns the names of all objects in the program whose font may be edited. The function is usually used in conjunction the function GetFontSpec (page 177), the function SelectFontDialog (page 344) and the command EditFont (page 473).

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		options

Argument 1

If set to 'supportcolour' will return only fonts that have an editable colour.

Returns

Return type: string array

GetFontSpec

Returns the current font specification for the object whose name is passed to argument 1. Valid object names can be obtained from the GetFonts function (page 163). The return value may be used to initialise the SelectFontDialog (page 286) which allows the user to define a new font.

The return value represents the font of the object as a string consisting of a number of values separated by semi-colons. The values define the font in terms of its type face, size, style and other characteristics. However, these values should not be used directly as the format of the string may change in future versions of the product. The return value should be used only as an argument to functions or commands that accept a font definition. E.g. The SelectFontDialog (page 344) function and EditFont (page 473) command.

If the object name passed is not recognised the function will return the definition for the default font.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Object name

Returns

Return type: string

string

GetFreeDiskSpace

Returns free space on disk volume holding specified file or directory.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Directory

Argument 1

A file or directory that resides on the disk volume whose free space is required. On windows this may be simply the drive letter followed by a colon. E.g. 'C:'

Returns

Return type: real

Free space available in bytes

GetGraphObjects

Returns a list of IDs for the graph objects defined by the optional arguments as follows:

If no arguments are specified, the IDs for all graph objects are returned.

If the first argument is specified, all objects of the defined type will be returned.

If both arguments are specified, all objects of the defined type and located on the specified graph will be returned.

If the type name is invalid, or if the graph id specified in arg 2 is invalid or if there are no graphs open, the function will return an empty vector.

See "Graph Objects" on page 569 for information on graph objects.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Object type name
2	string	No		Graph ID

Returns

Return type: string array

See Also

GetGraphObjPropValues (page 180)

GetGraphObjPropValue (page 179)

GetCurrentGraph (page 161)

GetGraphObjPropNames (page 178)

GetSelectedGraphAnno (page 207)

GetGraphObjPropNames

Returns the valid property names for the graph object defined by argument 1. See "Graph Objects" on page 569 for more information.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Graph object ID

Returns

Return type: string array

See Also

GetGraphObjPropValues (page 180)

GetGraphObjPropValue (page 179)

GetGraphObjects (page 178)

GetCurrentGraph (page 161)

GetSelectedGraphAnno (page 207)

GetGraphObjPropValue

Returns property values for the specified object. If argument 2 is present the value of one particular property will be returned. Otherwise the function will return an array containing all property values. The order of the values corresponds to the return value of GetGraphObjPropNames (page 178).

See "Graph Objects" on page 569 for more information.

(Note the function GetGraphObjPropValues is the same but will only accept one argument)

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Graph object ID
2	string	No	Return all values	Property name

Returns

Return type: string array

Index	Description
0	

See Also

GetGraphObjPropValues (page 180)

GetGraphObjects (page 178)

GetCurrentGraph (page 161)

GetGraphObjPropNames (page 178)

GetSelectedGraphAnno (page 207)

GetGraphObjPropValues

Returns property values for the specified object. The function will return an array containing all property values. The order of the values corresponds to the return value of GetGraphObjPropNames (page 178).

See "Graph Objects" on page 569 for more information.

See GetGraphObjPropValue (page 179) to obtain one property at a time.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Graph object ID

Returns

Return type: string array

Index	Description
0	

See Also

GetGraphObjPropValue (page 179)

GetGraphObjects (page 178)

GetCurrentGraph (page 161)

GetGraphObjPropNames (page 178)

GetSelectedGraphAnno (page 207)

GetGraphTabs

Returns the graph IDs of all graphs currently open

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	All graph windows	No longer used

Argument 1

Originally this was the index of a graph window as returned in the user index field by the function GetWindowNames (page 230) with the 'full' option specified. However, since version 8, the GUI design of SIMetrix has changed and there is no longer a concept of different types of window. All windows can contain many different types of tabbed object. So this value is now ignored and the function returns the paths for all open graphs.

Returns

Return type: string array

Returns an array of strings of length equal to the number of graphs currently open. Each element in the array is the ID of the graph object displayed in the tabbed sheet. The ID may be used in functions such as GetGraphObjPropValue (page 179) to obtain information about the graph including curves, axes, titles etc.

GetGraphTitle

Returns title of currently selected graph.

Arguments

No arguments

Returns

Return type: string

GetGroupInfo

Returns information about a group.

For more information on groups, see "Groups" on page 18.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Group name

Argument 1

Group name for which information is required. Enter '' to obtain information on the current group.

Returns

Return type: string array

String array of length 3 as described in the following table:

Index	Description
0	Source file. This is the path name for the file that contains the data for the group. If the groups data is stored in RAM, this element will hold an empty string
1	Group title. For groups created by a simulation (which is to say virtually all groups) this is obtained from the netlist title
2	Empty - reserved for future use

GetGroupStepParameter

Returns the names of the 'stepped parameters' of a multi-step run. These values are stored within the group created for the simulation run's output data. The stepped parameters are labels that identify the parameters, devices, model parameters or other quantities that are varied during a multi-step run.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	Current group	Group name

Returns

Return type: string array

GetGroupStepVals

Returns the 'stepped values' in a multi-step run. These values are stored within the group created for the simulation run's output data. The stepped values are the values assigned to the 'stepped parameters' (see the function GetGroupStepParameter (page 182)) during a multi-step run.

If there is more than one stepped parameter, the second argument may be used to identify for which parameter the values are returned.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	Current group	Group name
2	real	No	0	index

Argument 2

Identifies parameter when there is more than one

Returns

Return type: real array

GetHighlightedWidgetId

Returns ID of highlighted widget.

Arguments

No arguments

Returns

Return type: string

ID of highlighted widget

GetHostId

Get MAC address or dongle serial numbers used for licensing

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	-1	Host id type

Argument 1

Can be the following value

Value	Description
'-1'	Default host id - this is the MAC address on Windows systems
'2'	MAC address
'15'	Serial number of FLEXid-9 type dongle
'51'	Serial number of FLEXid-10 type dongle

Returns

Return type: string

String as used in a license file

GetInstanceParamValues

Returns simulation instance parameter values for the device specified. This function returns the values used in the most recent simulation. If simulation has been run, or it was aborted or reset (using Reset command), then this function will return an empty vector.

If argument 3 is set to 'readback', this function will return the values for readback parameters.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Instance name
2	string	No	Get all parameters	Parameter name
3	string	No		Options

Argument 1

Instance name, e.g. Q23, R3 etc. This is the name used in the netlist stripped of its dollar prefix if applicable.

Argument 2

Name of parameter whose value is required. If this argument is missing or empty, then all parameters will be returned. The number and order of the parameters in this case will match the return value of parameter names from the function GetDeviceParameterNames (page 166).

Argument 3

If set to 'readback' and argument 2 is empty, this function will return the values of all read back values for the devices. 'read back' values are values calculated during a run and give useful information about a device's operating conditions. Note that the value returned will reflect the state of the device at the last simulation point. For example, if a transient run has just been performed, the values at the final time point will be given. If a small-signal analysis has been performed, the results will usually reflect the DC operating point conditions.

Returns

Return type: string or string array

If argument 2 is provided and valid, will return a single string expressing the value of the parameter. If arg 2 is missing or empty, a string array will be returned with all parameter values.

GetInstancePinLocs

Return an array of pin locations for the symbol identified by arguments 1 and 2.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Property name
2	string	No		Property value
3	string	No	'relative'	Options
4	real	No	-1	Schematic ID

Argument 1

Property name to identify instance. Along with parameter 2, if these arguments are not supplied, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Argument 2

Property value to identify instance. Along with parameter 1, if these arguments are not supplied, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Argument 3

If set to 'absolute', the values returned will be relative to a fixed origin on the schematic. Otherwise they will be relative to the origin of the instance. The origin of an instance can be determined using the function InstPoints (page 248).

Argument 4

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: real array

GetInstsAtPoint

Functions finds the instances with pins at a specified point and returns a string array to identify them. The return value is a string array of length 2 times the number of pins at the specified point. The first value in each pair is the value of the property identified in argument 2. The second value is the pin number (also referred to as the *netlist order*).

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Instance pin location
2	string	Yes		Property name

Argument 1

specifies the pin location and is the value returned from the GetInstancePinLocs (page 184) with the 'absolute' option specified.

Returns

Return type: real array

GetInternalDeviceName

Finds the simulator's internal device name for a model defined using its model type name and optionally, level and version.

The internal device name is a unique name used to define a primitive simulator device. For example, npn and pnp transistors have the internal device name of 'BJT'. Level 1 MOSFETs have the internal device name of 'MOS1' while nmos level 8 devices are called 'BSIM3'. Some functions - e.g. GetDeviceInfo (page 165) - require the internal device name as an argument.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Model details

Returns

Return type: string array

1 - 3 element string array which describes device.

Index	Description
0	Model type name as used in the .MODEL control. E.g. 'nmos', 'npn' etc.
1	Optional. Value of LEVEL parameter. If omitted, default level is assumed.
2	Optional. Value of VERSION parameter.

GetKeyDefs

Returns details of all key definitions. Note that only keys defined using DefKey (page 460) are listed. Keys assigned as accelerators to menu definitions are not included.

Arguments

No arguments

Returns

Return type: string array

Returns an array of strings with each element in the array detailing a single key definition. Each definition is a semi-colon delimited string with three fields:

Index	Description
0	Name of key as entered in DefKey (page 460)
1	Command executed by key press
2	Flag value. This is usually 4, but will be 5 for 'immediate' keys.

GetLaplaceErrorMessage

The function ParseLaplace (page 289) returns a status code in the first field of its return value. This function converts it to an error message.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		code

Returns

Return type: string

Error message

GetLastCommand

Retrieve last command issued by a menu or toolbar with a specified command group definition. This is used for operations such as "repeat last place".

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Command group

Argument 1

Name of a command group. These are arbitrary strings that may be supplied to a DefMenu (page 462) or DefButton (page 458) command using the `/comgroup` switch.

Returns

Return type: string

If a menu or button defined with a `/comgroup` specification is executed, the command executed is stored. This function retrieves the most recent with the specified comgroup value.

Notes

Menus and buttons used for placing components on a schematic are defined using the comgroup value 'place'. So `GetLastCommand('place')` always returns the command used for the most recent place operation.

GetLastError

Returns a string with one of three values signifying the status of the most recent command executed.

The command switches /noerr and /quiet (see "Command Switches" on page 15) can be used to effectively disable non-fatal errors. This function allows customised action in the event of an error occurring. For example, if a simulation fails to converge, the run command yields an error. This function can be used to take appropriate action in these circumstances.

When a fatal error occurs, the command will abort unconditionally and this function returns 'Fatal'.

Arguments

No arguments

Returns

Return type: string

Returns a string with one of three values signifying the status of the most recent command executed. The three values are:

'OK'	Command executed without error
'Error'	One or more errors occurred in the most recent command
'Fatal'	The most recent command was not recognised or the evaluation of a braced substitution failed.

GetLegendProperties

Returns either all legend property names or all legend property values for specified curves. Legend properties are the text associated with curve names in the graphs legend panel. The legend panel is the area between the graph and the toolbar where the curve legends are located.

If argument 2 = 'values' the function returns legend property values. Otherwise it returns legend property names.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Curve ID
2	string	No	'names'	Options

Returns

Return type: string array

GetLibraryModels

Returns a string array containing information about each model in the specified model library.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Library spec
2	string	No		Options

Argument 1

Library specification for installed library. This could be a single file or a folder containing a wildcard specification. All installed libraries are returned by GetModelFiles (page 193).

Argument 2

If set to 'usermodelsonly' only models installed by the user will be returned.

Returns

Return type: string array

String array with each element describing a single library model. Information is supplied as a semi-colon delimited string with the following fields:

Index	Description
0	Model name
1	File where model found. (Filename only, not full path)
2	Line number
3	SPICE letter. E.g. 'x' for subcircuits
4	Is alias: 'false' not an alias, 'true' is an alias
5	User install time. 0 if system installed. Time is number of seconds since January 1, 1970

GetLicenseInfo

Returns information about the current license.

Arguments

No arguments

Returns

Return type: string array

String array as defined in the following table:

Index	Description
0	License type. One of 'Network', 'NamedUser', 'Nodelocked', 'Portable' or 'Unknown'
1	License serial number
2	Licensee
3	License location. Server name if network.
4	Additional information specific to license type. For portable licenses this is the type and serial number of the hardware key (dongle).
5	Expiry date. Returns 'permanent' if non-expiring.
6	License version - this number is related to the maintenance expiry date.
7	Enabled features
8	Encryption code
9	License server version

GetLicenseStats

Returns information about the license checkout process. This function is typically used to provide diagnostic information when a license checkout fails.

Arguments

No arguments

Returns

Return type: string array

Returns an array of strings. Each entry provides details of each license location. The first entry is always the license path for license files. This is always the License directory under the SIMetrix root. Subsequent entries refer to network license servers and there could be more than one of these.

Each entry is a semi-colon delimited list of values in the form: *location;type;checkout successful;checkout time;error code*. *type* may be 'path' or 'server'. *error code* will be 0 if successful otherwise it will be a negative number according to the cause of failure. A list of error codes is provided in the FLEXlm end user documentation provided on the install CD. *checkout time* is the time taken to check out the license.

GetLine

Returns a single line from a file.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		File handle

Argument 1

Handle as returned by the function OpenFile (page 283).

Returns

Return type: string

The first call to this function after opening the file, will return the first line in the file. Subsequent calls will return the remaining lines in sequence. The function will return an empty vector when there are no more lines in the file. The function will also return an empty vector if the file handle is not valid.

GetListSelected

Return list of selected elements from the ListSubsetDialog.

Argument list will be in the form: [selected] ⟨elements⟩[notselected] ⟨elements⟩.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		List elements

Returns

Return type: string array

Selected elements.

GetListUnselected

Return list of unselected elements from the ListSubsetDialog.

Argument list will be in the form: [selected] ⟨elements⟩[notselected] ⟨elements⟩.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		List elements

Returns

Return type: string array

Unselected elements.

GetLongPathName

Returns long path name for path specified either as a long or short path. Short path names are a feature of some file systems which represent the path in a form that would be accepted on legacy files systems especially DOS.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path

Argument 1

Input path. Maybe full or partial and the function will return its argument in the same form. (That it, it won't convert to a full path). If the input path does not exist, this function will simply return its argument unmodified.

Returns

Return type: string array

See Also

"GetShortPathName" on page 208

GetMaxCores

Return maximum cores available taking account of hardware capability and license

Arguments

No arguments

Returns

Return type: real

Maximum cores available

GetMenuItems

Returns all menu item names in the specified menu.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Menu path
2	string	No		Options

Argument 1

Specifies the path for the menu as it would be provided to the command DefMenu (page 462) but without the menu item name. For example, the command to define the command shell's New Schematic menu is similar to:

```
DefMenu "Shell|&File|&New Schematic" "NewSchem /ne"
```

`Shell|&File` is the menu path and this what the GetMenuItems function expects.

Argument 2

Can be set to 'recurse'. This instructs the function to recurse into sub-menus and list all menu definitions. The definitions are given as semi-colon delimited strings providing the menu accelerator (if present), a unique ID and the full path of the menu.

Returns

Return type: string array

Returns a string array listing all the menu item names.

Example

```
GetMenuItems('Shell|&File')
```

returns all the menu items in the command shell's File menu.

GetModelFiles

Returns a list of currently installed device models.

Arguments

No arguments

Returns

Return type: string array

GetModelLibraryErrors

Returns list of error messages from model library install operations. List is cleared when this function is called.

Arguments

No arguments

Returns

Return type: string array

String array holding error messages

GetModelName

Returns the model name used by an instance. The model name is the name for the parameter set (e.g. 'QN2222') as opposed to 'model type name' (e.g. 'npn') and 'internal device name' (e.g. 'BJT').

Note that all simulator devices use a model even if it is not possible for the device to use a .MODEL statement. Inductors, for example. are not permitted a .MODEL control but they nevertheless all refer to an internal model which is always called '$Inductor'.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Instance name

Returns

Return type: string

GetModelParameterNames

Returns the names or default values of all real valued parameters for a device model.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Internal device name
2	string	No		default flag (unsupported)

Argument 1

Internal device name. This is returned by the functions GetInternalDeviceName (page 186) and GetModelType (page 196).

Argument 2

If a second argument is supplied set to 'default', the function will instead return the default values used for the device's parameter names. This doesn't work correctly for all simulator devices and so is currently unsupported.

Returns

Return type: string array

GetModelParameters

Returns the names and types of all parameters for a device model.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Internal device name
2	string	No	Use internal device name	options

Argument 1

Internal device name. This is returned by the functions GetInternalDeviceName (page 186) and GetModelType (page 196). If argument 2 is set to 'modelname' argument must be the model name of a model used in the most recent simulation

Argument 2

If set to 'modelname' argument 1 must be the name of a model used in the most recent simulation.

Returns

Return type: string array

String array of semi-colon delimited strings. Each token in the string is defined as follows:

Index	Description
0	parameter name
1	Parameter type
2	Parameter description - this is blank for most devices

GetModelParameterValues

Returns the values of all parameters of the specified model. (Defined by 'model name' e.g. 'Q2N2222'). This function reads the values from the simulator and requires that a simulation has been run or checked. The returned array with arg2 omitted is of the same size as the array returned by GetModelParameterNames (page 194) for the same device and the values and parameter names map directly.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Model name
2	string	No	All values returned if omitted	Parameter name

Argument 1

Model name. (Model name is the user name for a model parameter set as defined in the .MODEL control e.g. 'Q2N2222').

Argument 2

Parameter name. If specified return value will be a single value for the specified parameter. If omitted, the values for all parameters will be returned.

Returns

Return type: string array

GetModelType

Returns internal device name given user model name. The internal device name is a name used internally by the simulator and is required by some functions. See "GetInternalDeviceName" on page 186 for full details. The user model name is the name of a model parameter set defined using .MODEL. E.g. 'Q2N2222'.

Important: this function only works for models used by the current simulation. That is, you must run or check a simulation on a netlist that uses the specified model before calling this function.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Model name

Returns

Return type: string

GetModifiedStatus

Returns whether the specified schematic has been modified.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	-1	Schematic ID

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: real

GetNamedSymbolPins

Returns the names for all pins of the specified symbol or hierarchical component.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Symbol name or component path
2	string	No	'symbol'	Options

Argument 1

Internal symbol name. This is the name used internally to reference the symbol and should not be confused with the 'user name' which is usually displayed by the user interface.

The symbol must be present in a currently installed library. If argument 2 is set to 'comp' then this argument instead specifies the file system path name of a component (.SXCMP) file.

Returns

Return type: string array

Returns a string array of length equal to the number of pins on the specified symbol. If the symbol or component cannot be found the function returns an empty vector.

GetNamedSymbolPropNames

Returns names of all properties defined for a library symbol.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Internal symbol name
2	string	No	'symbol'	Options

Argument 1

Internal symbol name. This is the name used internally to reference the symbol and should not be confused with the 'user name' which is usually displayed by the user interface.

The symbol must be present in a currently installed library. If argument 2 is set to 'comp' then this argument instead specifies the file system path name of a component (.SXCMP) file.

Returns

Return type: string array

Returns a string array holding the names of all the symbol's properties. If the symbol or component cannot be found the function returns an empty vector.

GetNamedSymbolPropValue

Returns the value of a property defined for a library symbol.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Internal symbol name
2	string	Yes		Property name
3	string	No	'symbol'	Options

Argument 1

Internal symbol name. This is the name used internally to reference the symbol and should not be confused with the 'user name' which is usually displayed by the user interface.

The symbol must be present in a currently installed library. If argument 3 is set to 'comp' then this argument instead specifies the file system path name of a component (.SXCMP) file

Returns

Return type: string

Returns a string holding the value of the selected property. If the symbol/component or property do not exist the function will return an empty vector.

GetNearestNet

Returns information about the schematic net nearest the mouse cursor

Arguments

No arguments

Returns

Return type: string array

Returns a string array of length 3 providing information on the net nearest the mouse cursor. The elements of the array are defined in the following table:

Index	Description
0	Local net name e.g. V1_P.
1	Net name prefixed with hierarchical path e.g. U1.V1_P
2	'1' if the net is a bus connections, otherwise '0'

GetNextDefaultStyleName

Returns next fully available default style name. This is used when creating new styles with a default name, where an index increments for additional styles created.

Names are in the form: MyStyleNormal[index] and MyStyleSelected[index], eg MyStyleNormal10. Returns a name that will be valid for both the normal style and the selected style.

Arguments

No arguments

Returns

Return type: string

Next available style name that is not being used elsewhere, which can be used to create Normal and Selected variants of it.

GetNodeNames

Returns all node names used in most recent simulation

Arguments

No arguments

Returns

Return type: string array

All node names used in simulation. Will return an empty vector if no simulation has been run

GetNonDefaultOptions

Returns names of all .OPTION settings in the most recent simulation that were not at their default value.

Arguments

No arguments

Returns

Return type: string array

GetNumCurves

Returns the number of curves in curve group. This is applicable to curves plotted for a Monte Carlo analysis.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Curve ID

Returns

Return type: real

GetOpenSchematics

Returns the path names of all schematics currently open.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	All schematics	No longer used

Argument 1

Originally this was the index of a schematic window as returned in the user index field by the function GetWindowNames (page 230) with the 'full' option specified. However, since version 8, the GUI design of SIMetrix has changed and there is no longer a concept of different types of window. All windows can contain many different types of tabbed object. So this value is now ignored and the function returns the paths for all open schematics.

Returns

Return type: string array

A string array containing the full path names all schematics currently open.

See Also

GetSchematicTabs (page 205) SaveAs (page 523) SelectSchematic (page 530)

GetOption

Returns the value of the *option variable* of name given as argument. *Option variables* are created using the command Set (page 531) - see *User's Manual/Sundry Topics/Using the Set and Unset commands/List of Options* for details on *option variables*. The GetOption function returns FALSE if the option does not exist and TRUE if it exists but has no value.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Option name

Returns

Return type: string

Index	Description
0	

GetPath

Returns full path name of one of the following:

Argument value	Function
ScriptDir	Script directory
StartUpDir	Start up directory
StartUpFile	Start up script
BiScriptDir	Built-in script directory
ExeDir	Directory containing executable file.
TempDataDir	Temporary simulation data directory
DocsDir	File system directory for the "My Documents" folder
ShareDir	The directory where the directories for symbol and model sub-directories are expected to reside. Typically *Program Files/SIMetrix80/support/*.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Item name

Returns

Return type: string

GetPlatformFeatures

Returns information on availability of certain features that are platform dependent.

Arguments

No arguments

Returns

Return type: string array

Currently a string of length 4 defined as follows:

Index	Description
0	Is the function ShellExecute (page 354) implemented? 'true' or 'false'
1	Obsolete
2	Is 'VersionStamp' function implemented. 'true' or 'false'
3	Is context sensitive help implemented. 'true' or 'false'

GetPrinterInfo

Returns information on installed printers.

Arguments

No arguments

Returns

Return type: string array

Returns array of strings providing system printer names and current application default printer. Format is as follows:

Index	Description
0	Number of printers available in system
1	Index of printer that is currently set as default. (This is the default for the application *not* the system default printer - see below)
2	List of printer names (and subsequent indexes)

Example

The following is an example of executing the command `Show GetPrinterInfo`

```
Index   GetPrinterInfo()
    0   '5'
    1   '2'
    2   'Dell Laser Printer 1100'
    3   'Fax'
    4   'HP Color LaserJet CP4020 Series PCL6'
    5   'Microsoft XPS Document Writer'
    6   'Send To OneNote 2010'
```

The default index is 2 so this means that 'HP Color LaserJet CP4020 Series PCL6' is currently set as the default printer. This is the current default for the *application* and is what will be set when you open a Print dialog box. When SIMetrix starts, it will be initialised to the *system* default printer but changes whenever you select a different printer in any of the printer dialogs.

GetPrintValues

Returns the names of all quantities specified in .PRINT controls in the most recent simulation run.

Arguments

No arguments

Returns

Return type: string array

GetReadOnlyStatus

Returns the read only status of the specified schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	-1	Schematic ID

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: real

Returns 1.0 if the schematic is read-only. Otherwise returns 0.0

GetRegistryClassesRootKeys

List sub keys under key in registry HKEY_CLASSES_ROOT root

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		

Argument 1

Parent key path

Returns

Return type: string array

Sub keys under specified key

Example

GetSchematicFileVersion

Returns the file version for the requested schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Schematic file path

Returns

Return type: string array

Version information about the file type.

Index	Description
0	Binary or ASCII file
1	Format version
2	Format revision

GetSchematicTabs

Returns IDs for all open schematics. The ID is an integer value that uniquely identifies a schematic and may be used by a number of commands and functions to perform operations on a schematic. For more information, refer to the OpenSchematic (page 286) function.

Arguments

No arguments

Returns

Return type: real array

See Also

GetOpenSchematics (page 201) returns the corresponding paths of open schematics OpenSchematic (page 286) for more information on schematic IDs

GetSchematicVersion

Returns version information for the currently selected schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	-1	Schematic ID

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

Returns an array of length 3 with each element defined in the following table:

Index	Description
0	Format version. This will be an integer defining the format of the schematic binary file. Possible values and the SIMetrix versions for which those formats were used are: 102 Version 1.0 to 2.02 250 Version 2.5 to 4.0 420 Version 4.1 421 Version 4.2 422 Version 4.5 423 Version 5.0 - 5.2 424 Version 5.3 425 Version 5.4 426 Version 5.5 0 ASCII schematic
1	User version. Each time the schematic is saved this value is incremented
2	Exact version of SIMetrix that was used to save the file. Only valid if saved with version 5.4 or later. Otherwise this field will be empty. Version includes the maintenance suffix letter. E.g. 5.4e

GetSchemTitle

Returns the title of the current schematic.

Arguments

No arguments

Returns

Return type: string

GetSelectedAnnotationText

Returns the text in the selected annotation. Only works for a single selected annotation. If multiple annotations are selected, only the text from one of the annotations will be returned.

Arguments

No arguments

Returns

Return type: string

Annotation text

GetSelectedCurves

Returns array of curve id's for selected curves.

Arguments

No arguments

Returns

Return type: string array

GetSelectedGraphAnno

Returns the ID for the currently selected graph annotation object. If no object is selected, the function returns '-1'. If no graphs are open, the function returns an empty vector.

See "Graph Objects" on page 569 for information on graph annotation objects.

Arguments

No arguments

Returns

Return type: string

See Also

GetGraphObjPropValues (page 180)

GetGraphObjPropValue (page 179)

GetGraphObjects (page 178)

GetCurrentGraph (page 161)

GetGraphObjPropNames (page 178)

GetSelectedStyleNames

Returns the names of the styles used by the selected elements. Each style name is returned at most once in the list.

Arguments

No arguments

Returns

Return type: string array

A list of style names that are used by the selected elements. For line and shape based elements that can be partially selected, the information is only returned if the element is fully selected.

GetSelectedYAxis

Returns id of selected y-axis.

Arguments

No arguments

Returns

Return type: string

GetShortPathName

Returns short path name for path specified either as a long or short path. Short path names are a feature of some file systems which represent the path in a form that would be accepted on legacy files systems especially DOS.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path

Argument 1

Input path. Maybe full or partial and the function will return its argument in the same form (that it, it won't convert to a full path). If the input path does not exist, this function will simply return its argument unmodified.

Returns

Return type: string

See Also

"GetLongPathName" on page 192

GetSimConfigLoc

Returns the location of the simulator's configuration information. This function returns its result in an identical form to the function GetConfigLoc (page 158).

Arguments

No arguments

Returns

Return type: string

Index	Description
0	

GetSimetrixFile

Function opens a dialog box to allow the user to select a file. Returns the full path name to the selected file or an empty string if cancelled.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File type
2	string array	No	⟨⟨empty⟩⟩	Options
3	string	No	⟨⟨empty⟩⟩	Initial file

Argument 1

String to define one of the standard SIMetrix file types. This determines the files that will be displayed. Possible values are:

'Schematic'	Schematic files
'Data'	Data files
'Text'	Text files
'LogicDef'	Logic definition files as used by the arbitrary logic block
'Script'	Script files
'Model'	Model files
'Catalog'	Catalog files
'Graph'	Graph files
'Component'	Schematic component files
'Symbol'	Symbol library files
'Snapshot'	Snapshot files
'Netlist'	Netlist files

'VerilogA'	Verilog-A files
'VerilogHDL'	Verilog-HDL files
'AsciiFileEditor'	Schematic ASCII files

The type selected determines the files to be displayed controlled by their extension. The extension associated with each file type can be set with the options dialog box opened by menu **File | Options | General...**

You can combine multiple file types delimited by '&'. For example "Netlist & Model" will select both netlist and model file types.

Argument 2

String array that specifies a number of options. Any or all of the following may be included:

'ChangeDir'	If present, the current working directory will change to that containing the file selected by the user
'Open'	If present a "File Open" box will be displayed other wise a "Save As" box will be displayed.
'NotExist'	If used with 'Open', the file is not required to already exist to be accepted
'All'	If present an "All files" entry will be added to the "Files of type" list

Argument 3

Initial file selection.

Returns

Return type: string

GetSimplisExitCode

Returns the application exit code for the most recent SIMPLIS run. This may be used to determine whether SIMPLIS completed its run successfully.

Arguments

No arguments

Returns

Return type: real

Returns a single value according to the most recent SIMLIS run.

GetSimulationErrors

Returns all errors raised by the most recent simulation.

Arguments

No arguments

Returns

Return type: string array

Returns a string array with all errors raised by the most recent simulation. If the simulation ran correctly with no errors, an "empty value" on page 10 will be returned. Note that this function only returns error messages; it does not return warnings.

GetSimulationInfo

Returns information about the most recent simulation.

Arguments

No arguments

Returns

Return type: string array

Returns a string array of length 11 providing the following information about the most recent simulation:

Index	Description
0	Netlist path
1	List file path
2	Using data file 'True' or 'False'
3	Name of user specified data file
4	Collection name (obsolete)
5	.OPTIONS line specified at RUN command
6	Analysis line specified at RUN command
7	Reserved for future use
8	Reserved for future use
9	Reserved for future use
10	Reserved for future use

GetSimulationSeeds

Returns the seeds used for the most recent run. If this run was a Monte Carlo analysis, the return value will be an array of length equal to the number of Monte Carlo steps. Each element will hold the seed used for the corresponding step.

Arguments

No arguments

Returns

Return type: real array

GetSimulatorEvents

*** UNSUPPORTED *** – See page 26 for more information

Returns list of events for most recent simulation.

This function was developed to aid simulator development and also to assist identifying causes of convergence failure. It has also been used to detect the success or otherwise of a simulation run called by a script by examining the last event in the return value.

The following is accurate for version 4.0b. Later versions may be different but any changes are likely to be made by adding additional events or/and adding additional fields to the event line.

Arguments

No arguments

Returns

Return type: string array

Returns a string array, each element of which describes an event that occurred during the most recent simulation. Each element is a string consisting of a number of values separated by semicolons. The first value is the name of the event. This can be one of the following:

Singular matrix	Singular matrix - may lead to abort but not necessarily.
Floating point error	Floating point error occurred such as divide by zero or log of a negative number. May lead to abort but depends on where it occurred.
Operating point complete	
Operating point failed	
GMIN step started	
Source step started	
Pseudo transient started	
Job started	Always the first event
Job complete	Final event
Job failed	Final event
Job paused	Final event
Job resumed	
Job aborted	Final event
Node limit exceeded	Means that a node voltage exceeded the value of the NODELIMIT option. (Default 1e50). The iteration is rejected when this happens but does not directly lead to an abort.

Iteration succeeded (full)	
Iteration failed (full)	
Load failed	Iteration failed because device equations could not be evaluated. Usually caused by excessive junction voltage.
LTE reject (full)	Time step rejected because local truncation error too high.
LTE accept (full)	Local truncation error below tolerance. Time step accepted.

The items marked "(full)" will only be listed if the .OPTIONS setting FULLEVENTREPORT is specified when the simulator is run.

The remaining values are listed below:

Index	Description
0	See above table
1	Top level analysis mode. One of: 'none', 'Op', 'Tran', 'AC', 'Sweep', 'Noise', 'TF', 'Sensitivity', 'Pole-zero'
2	Operating point mode. One of: 'none', 'JI2', 'GMIN', 'Source', 'PTA'
3	Transient analysis time
4	Time step
5	Real time measured from start of run (not output for all events)
6	Iteration number
7	Event specific message

GetSimulatorMode

Returns the simulator mode, that is SIMetrix or SIMPLIS, of the current schematic

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	-1	Schematic ID

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string

Return value may be 'SIMetrix' or 'SIMPLIS'.

GetSimulatorOption

Returns the value of a simulator option as used by the most recent analysis. The argument may be any one of the option names defined for the .OPTIONS control. E.g.

```
GetSimulatorOption(`RELTOL')
```

will return the value of RELTOL for the most recent run. If the option value was not explicitly specified in a .OPTIONS control, its default value will be returned. If no simulation has been run, this function will return an empty string.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Option name

Returns

Return type: string

GetSimulatorOptionInfo

Returns type and default value of a simulator option setting

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		option name

Returns

Return type: string array

Array of strings providing the following information

Index	Description
0	Option name
1	Type - can be 'REAL', 'INTEGER', 'BOOL', 'STRING' or 'UNKNOWN'
2	Default value

Notes

This function differs from GetSimulatorOption (page 214) in that it returns information about an option setting independent of any simulation. GetSimulatorOption (page 214) returns the value an option was set to in the most recent simulation.

See Also

GetSimulatorOptions (page 215) GetSimulatorOption (page 214)

GetSimulatorOptions

Return list of simulator options

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Output option

Argument 1

Can optionally be set to 'default' or 'type'. If set to 'default', function returns the default value instead of the name. If set to type, returns the type of the option - one of 'real', 'integer', 'boolean' or 'string'

Returns

Return type:

Array of strings holding names of all available options that can be set using the .OPTIONS statement. Optionally can return default value or type according to argument 2.

See Also

GetSimulatorOptionInfo (page 214)

GetSimulatorStats

Returns statistical information about the most recent run

Arguments

No arguments

Returns

Return type: real array

Returns a 30 element real array providing statistical information about the most recent run. The meaning of each field is described below:

Index	Description
0	Number of event driven outputs
1	Number of event driven ports
2	Number of event driven instances
3	Number of event driven nodes
4	Number of equations (= matrix dimension = total number of nodes including internal nodes)
5	Total number of iterations
6	Number of transient iterations
7	Number of JI2 iterations. (First attempt at DC bias point)
8	Number of GMIN iterations
9	Number of source stepping iterations
10	Number of pseudo transient analysis iterations
11	Number of time points
12	Number of accepted time points
13	Total analysis time
14	Transient analysis time
15	Matrix load time (The time needed to calculate the device equations)
16	Matrix reorder time
17	Matrix decomposition time
18	Matrix solve time
19	Size of state vector
20	Parameter evaluation time
21	Matrix decomposition time (transient only)
22	Matrix solve time (transient only)
23	Circuit temperature
24	Circuit nominal temperature
25	Number of matrix fill-ins
26	Simulator initialisation time
27	Number of junction GMIN iterations
28	Time to process digital events
29	"Accept" time. This is the time used for processing transient time points after the simulator has accepted it. This includes the time taken to write out the data.

GetSimulatorStatus

Returns the current status of the simulator.

Arguments

No arguments

Returns

Return type: string

May be one of the following values:

Value	Definition
Paused	Simulator paused
InProgress	Simulation in progress. (The only situation where this value can be returned is when calling this function remotely using the SxCommand utility with the - immediate switch. It isn't otherwise possible to call a function while a simulation is running.)
ConvergenceFail	Last simulation failed because of no convergence
SimErrors	Last simulation failed because of a run time error
NetlistErrors	Last simulation failed because of a netlist error
Warnings	Last simulation completed with warnings
Complete	Last simulation successful
None	No simulation has been run

GetSoaDefinitions

Returns all Safe Operating Area definitions specified in the most recent analysis.

Arguments

No arguments

Returns

Return type: string array

Returns an array of strings with each string in the form:

```
label;minvalue;maxvalue;xwindow;derating;type
```

Where:

`label`	The label specification on the .SETSOA line
`minvalue`	Minimum value
`maxvalue`	Maximum value
`xwindow`	Window width - the time the limits must be exceeded for the violation to be recorded
`derating`	Derating factor
`type`	'Peak' or 'Mean'

GetSoaMaxMinResults

Returns the maximum and minimum values reached for all SOA definitions.

Arguments

No arguments

Returns

Return type: string array

Returns an array of strings defining max and min values reached. Each element in the array corresponds to the elements returned by the GetSoaDefinitions function. Each string is of the form:

```
min_val;min_reached_at;max_val;max_reached_at;max_mean
```

Where:

`min_val`	Minimum value reached
`min_reached_at`	Time at which the minimum value was reached
`max_val`	Maximum value reached
`max_reached_at`	Time at which the maximum value was reached
`max_mean`	Maximum mean value

Notes

This function returns the maximum and minimum values returned for all SOA definitions regardless of whether or not the limits were violated.

GetSoaOverloadResults

Returns the overload factor for each SOA definition.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Options

Argument 1

String array consisting of one or both of the values: 'ignorewindow' or 'derated'. If 'ignorewindow' is specified, then the function will not return data for SOA specifications that include a window. If 'derated' is included, the values returned allow for any derating factor. For example, if the limit is 40V with 80% derating and the maximum value reached was 38V, the overload factor with 'derated' specificed will be $\frac{38}{40\times0.8} = 1.1875$. Without 'derated' specified, the overload factor would be $\frac{38}{40} = 0.95$.

Returns

Return type: real array

Returns an array of reals defining the overload factor for each SOA definition. Each element in the array corresponds to the elements returned by the function GetSoaDefinitions (page 217).

GetSoaResults

Returns the SOA results for the most recent simulation.

Arguments

No arguments

Returns

Return type: string

Returns an array of strings, each one describing a single SOA failure. Each string is a semi-colon delimited list with fields defined below.

Index	Description
0	SOA Label
1	Start of failure
2	End of failure
3	'under' or 'over'. Defines whether the test fell below a minimum limit or exceeded a maximum limit.
4	Value of limit that was violated

GetSymbolArcInfo

Returns information on symbol editor arc.

Arguments

No arguments

Returns

Return type: real array

Returns an array of length 4 providing information on selected arcs/circles/ellipses in the symbol editor. Format is as follows:

Index	Description
0	Swept angle in degrees
1	Height/Width
2	Number of selected arcs/circles/ellipses
3	0 if all selected arcs/circles/ellipses are identical to each other. Otherwise 1.

GetSymbolFiles

Returns full paths of all installed symbol library files.

Arguments

No arguments

Returns

Return type: string array

GetSymbolInfo

Returns information on symbol in the symbol editor.

Arguments

No arguments

Returns

Return type: string array

Returns a string array of length 3 providing information on the symbol in the currently selected symbol editor sheet. If no symbol editor sheet is open the function returns an empty vector.

Format of the return value is:

Index	Description
0	Symbol name
1	Symbol description
2	Symbol catalog
3	Path to symbol library or component file where the symbol definition is located. If the symbol is not found in any symbol library, this element will be empty.
4	Type of symbol. One of two values: 'Symbol': Regular symbol stored in a library 'Component': Hierarchical component
5	Flags. Currently values can only be 0 or 1. Future versions may use additional bits. For forward compatibility, test this value using the function Field (page 139) to test bit 0. The value reports the state of the 'All references to symbol automatically updated' check box when the symbol was saved. If checked, this value will be 1 otherwise 0.

GetSymbolOrigin

Returns the location of the origin point of the symbol currently open in the symbol editor. The origin is the location of the point 0,0 on the symbol. It is in turn located at a position relative to the *reference point*. The reference point is an absolute location defined by the symbol's geometry. If the symbol has pins, it is the top left of a rectangle that encloses all the pins. Otherwise it is the top left of a rectangle that encloses all the segments.

Arguments

No arguments

Returns

Return type: real array

Two element real array. Index 0 is the x-coordinate while index 1 is the y-coordinate. The units are 100 per grid square.

See Also

"SetOrigin" on page 534

GetSymbolPropertyInfo

Returns information about symbol editor symbol properties.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Property name

Returns

Return type: string array

Returns a string array of length 5 providing information on either a single property as defined in the argument or the currently selected properties.

If more than one property or pin is selected, the information provided in elements 0-2 will be either the property or the pin, however there are no rules to determine which. The displayed names used for pins are represented as properties and this function can be used to gain information about them. The equivalent property name for a pin is the pin name prefixed with Pin.

Format of result is as follows:

Index	Description
0	Property name
1	Property flags value (see "Prop Attribute flags" on page 510 for details.)
2	Property value
3	Number of properties selected
4	Number of pins selected

GetSymbolPropertyNames

Returns string array containing names of all selected properties in the currently open symbol editor sheet. If there are no selected properties or the symbol editor is not open, the function will return an empty vector. Note the displayed names used for pins are represented as properties and this function can be used to list them. The equivalent property name for a pin is the pin name prefixed with "Pin".

Arguments

No arguments

Returns

Return type: string array

GetSymbols

Returns a string array containing information about installed symbols.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	'name'	Options
2	string	No	'all'	Catalog name

Argument 1

Defines what the function returns as defined in the following table:

Options value	Description
'description'	Returns the user name of each symbol.
'catalogs'	Returns the catalog names for each of the symbols. The catalog defines how the symbol user name is displayed in the symbol dialog display as opened by the function SelectSymbolDialog (page 346). It consists of one or more strings separated by semi-colons. Each string defines a node in the tree list display.
'tree'	'catalogs' and 'description' merged together but separated by a semi-colon.
''	Internal symbol name.

For example, the standard three terminal NPN symbol has an internal name of 'npn', a catalog of 'Semiconductors;BJTs' and a description of 'NPN 3 Terminal'. The value returned by the 'tree' option would be 'Semiconductors;BJTs;NPN 3 Terminal'.

Argument 2

Specifies a filter that selects symbols according to catalog. May be prefixed with '-' in which case all symbol not belonging to the specified catalog will be returned.

Returns

Return type: string array

Returns string array providing the symbol info as defined by arg 1 and 2. If there are no symbol libraries installed or there are no symbols with the specified catalog, an empty vector will be returned.

GetSystemInfo

Returns information about the user's system.

Arguments

No arguments

Returns

Return type: string array

String array of length 7 as defined by the following table:

Index	Description
0	Computer name
1	User log in name
2	Returns 'Admin' if logged in with administrator privilege otherwise returns 'User'.
3	Available system RAM in bytes
4	Operating system class, returns 'WINNT'.
5	Operating System descriptive name.
6	Unused
7	Processor architecture
8	Operating system version (major and minor)
9	Operating service pack number
10	Number processor cores
11	Number physical processors
12	Number logical cores

GetTempFile

Creates a temporary file name

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	Default temporary directory	Directory for file

Returns

Return type: string

Returns the full path to a unique file to be used for temporary storage

Notes

The filename generated is guaranteed to be unique at the time the function executes but this function does not open the file. It is theoretically possible (but unlikely) for the filename to be used by another process between the time the function is called and at a later time when it is opened for writing.

GetTextEditorText

Returns the text of the selected text based editor. This will work for any text based editor, including the script editor and verilog editors.

Arguments

No arguments

Returns

Return type: string

Text in the currently selected text editor.

GetThreadTimes

Returns the execution times for each device thread for the most recent simulation. Requires '.OPTIONS devacct' to be set for the simulation.

Arguments

No arguments

Returns

Return type: real array

Array of values of length equal to the number of threads used for the most recent simulation. Each value represents the execution time in seconds used for each device thread.

Example

GetTimerInfo

Returns information about a timer object created using CreateTimer (page 81).

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Timer id

Argument 1

Timer id returned by CreateTimer (page 81)

Returns

Return type:

Notes

If a timer is defined using the 'oneshot' option, the return value for the timer interval will change after the timer has triggered. Before the timer triggers the specified interval will be returned. After the timer has triggered, it will return 0.

GetTitleBlockInfo

Returns information about the selected schematic title block.

Arguments

No arguments

Returns

Return type: string array

Information about the selected title block.

Index	Description
0	Company name
1	Title
2	Author
3	Notes
4	Layout (either horizontal or vertical)
5	Logo
6	Version
7	Date

GetToolButtons

Returns name and description for available tool buttons.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	All	Button class

Argument 1

Class name of buttons. With no user defined buttons, this can be empty or 'component'. If 'component' only buttons intended for placing schematic symbols will be returned. Otherwise all buttons available will be returned.

If user defined buttons have been created using the "CreateToolButton" on page 455 command, this argument may be set to any value used for the /class switch in which case only buttons defined with that /class switch value will be returned.

Returns

Return type:

String array of button specifications. Each entry contains two values separated by a semi-colon. The first value is the name of the button as can be used to add buttons to a toolbar using the command "DefineToolBar" on page 459. The second value is a description of the button.

See Also

"CreateToolBar" on page 454

"DefButton" on page 458

GetUncPath

Returns the given path in UNC form. This function's main purpose is to convert windows drive letters to a consistent format.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path

Argument 1

Path of file in any form. Typically this would include a drive letter on windows.

Returns

Return type: string

Path in UNC form. Note that if a drive letter on a local machine is used in the path, this function will return the original path unmodified even if a netwrok share is defined for that drive.

GetUserFile

Function opens a dialog box to allow the user to select a file.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File filter
2	string	No		Default extension
3	string	No	⟨⟨empty⟩⟩	Options
4	string	No	⟨⟨empty⟩⟩	Initial file

Argument 1

Defines file filters. The 'save as type' list box may contain any number of entries that defines the type of file to be displayed. This argument defines the entries in this list box.

Each entry consists of a description followed by a pipe symbol ('|') then a list of file extensions separated by semi-colons (';'). Entries are also separated by the pipe ('|') symbol. For example, to list just schematic files enter:

```
"`Schematic files|*.sxsch;*.sch'"
```

Note that the text is enclosed in both single and double quotes. Strings in expressions are denoted by single quotes as usual but the semi-colon is normally used to separate commands on a single line. This is inhibited by enclosing the whole string in double quotes.

If you wanted to provide entries for selecting - say - both schematics and netlists, you could use the following:

```
"`Schematic files|*.sxsch;*.sch|Netlist files|*.net;*.cir'"
```

Argument 2

The default extension specified without the dot. This is the extension that will automatically be added to the file name if it does not already have one of the extensions specified in the filter.

Argument 3

String array that specifies a number of options. Any or all of the following may be included:

'ChangeDir'	If present, the current working directory will change to that containing the file selected by the user
'Open'	If present a File Open box will be displayed otherwise a Save As box will be displayed.
'NotExist'	If used with 'Open', the file is not required to already exist to be accepted
'ShowReadOnly'	If present and 'Open' is also specified, an Open as readonly check box will be displayed. The user selection of this check box will be returned in either the second or third field of the return value.
'FilterIndex'	If specified, the type of file selected by the user will be returned as an index into the list of file filters specified in argument 1. So, 0 for the first, 1 for the second etc.

Argument 4

Initial file selection.

Returns

Return type: string

String array of length between 1 and 3 as described in the following table:

Option 'ShowReadOnly'	Option 'FilterIndex'	Return value
No	No	Path name only
Yes	No	Two element array: index=0 path name index=1 Read only checked - 'TRUE' or 'FALSE'
No	Yes	Two element array: index=0 path name index=1 Filter index selected
Yes	Yes	Three element array: index=0 path name index=1 Filter index selected index=2 Read only checked - 'TRUE' or 'FALSE'

GetVecStepParameter

This function retrieves the name of the parameters that were stepped to obtain the vector data supplied. It will only return a meaningful result for data vectors generated by a multi-step analysis. For example, if an analysis was performed which stepped the value of the resistor R7, this function would return 'R7' when applied to any of the data vectors created by the simulator. If the analysis was a Monte Carlo run, the function will return 'Run'.

If this function is applied to single division data as returned by a normal single step run, the return value will be an empty vector.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: string

GetVecStepVals

This function retrieves the values assigned to the parameter that was stepped to obtain the vector data supplied. It will only return a meaningful result for data vectors generated by a multi-step analysis. For example, if an analysis was performed which stepped the value of the resistor R7 from 100Ω to 500Ω in 100Ω steps, this function would return [100, 200, 300, 400, 500]. If the analysis was a Monte Carlo run, the function will return the run numbers starting from 1.

If there is more than one stepped parameter, the second argument may be used to identify for which parameter the values are returned.

If this function is applied to single division data as returned by a normal single step run, the return value will be an empty vector.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		Vector
2	real	No	0	index

Argument 2

Identifies parameter when there is more than one

Returns

Return type: real array

GetWidgetInfo

Returns information about open views. This is primarily an internally used function and the output may change in future releases.

Arguments

No arguments

Returns

Return type: string

Information about all the open views. In the form:

```
window_id ; tab_id ; widget_id ; widget_type ; widget_name ;
highlighted (y/n) ; window_has_focus (y/n) ;
```

GetWindowNames

Returns names of current windows. Result can be supplied as an argument to the command Focus (page 476) using `/named` switch or `/userid` switch.

This function is superceded by WM_GetWindowNames (page 403).

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Options

Argument 1

If set to 'full', this function will return more detailed window information. See the return description for details.

Returns

Return type: string array

If no argument 1 is given, returns an array of window names.

If argument 1 has been set to 'full', each element of the output array contains a semi-colon delimited string with the following three fields:

Index	Description
0	Window type. One of, 'Shell', 'Schematic', 'Graph' or 'Symbol'
1	User index. Integer that can supply to the command Focus (page 476) using `/userid` switch, along with the functions GetGraphTabs (page 180) and GetOpenSchematics (page 201). Note that the command shell always has a user index of -1
2	Window title

GetXAxis

Returns the id of the x-axis in the currently selected graph.

Arguments

No arguments

Returns

Return type: string

GraphImageCapture

Opens the Graph Image Capture dialog for extracting data from a graph image. Is used in the **Digitise Data Sheet Curve** feature. The command handles initial image selection and opening.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	Current working directory	Starting directory for location of graphic files

Returns

Return type: real array

Returns the data points extracted. First element is the number of data points extracted, n. The next n elements are the x-values, the following n elements are the y-values of those data points.

Product

SIMetrix and SIMetrix/SIMPLIS Pro and Elite

GraphLimits

Returns x and y limits of selected graph and axis type (log/linear). Function will fail if there are no selected graphs.

Arguments

No arguments

Returns

Return type: real array

The x and y axis limits of the currently selected graph and axis type. Meaning of each index of the 6 element array are as follows:

Index	Description
0	x-axis lower limit
1	x-axis upper limit
2	y-axis lower limit
3	y-axis upper limit
4	1 if x-axis is logarithmic, 0 if linear
5	1 if y-axis is logarithmic, 0 if linear

GroupDelay

Returns the group delay of the argument. Group delay is defined as:

$$\frac{d}{dx}\left(\text{phase}\left(y\right)\right)\cdot\frac{1}{2\pi}$$

where y is the supplied vector and x is its reference. The GroupDelay function expects the result of an AC analysis where y is a voltage or current and its reference is frequency.

This function will yield an error if its argument is complex and has no reference.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		Vector

Returns

Return type: real array

Groups

Returns names of available groups. The first element (with index 0) is the current group. If the argument 'Title' is provided, the full title of the group is returned. More information about groups can be found in "Groups" on page 18.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	'name'	Title|Name

Returns

Return type: string array

GuiType

Returns whether a GUI is enabled

Arguments

No arguments

Returns

Return type: string

Can return one of two values: 'none' is returned when no GUI is enabled. This is the case when the script is run from the SIM2 utility which does not have a GUI. Normally this function returns 'single' meaning that a single-window GUI style is available. (This is as opposed to earlier SIMetrix versions which used a multiple window GUI type.)

Hash

Returns a 'hash' value for the supplied string. A hash value is an integer value similar to a check sum.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Input string

Returns

Return type: string

HashAdd

HashAdd

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Hash table id as return by HashCreate (page 234)
2	string	Yes		List of keys
3	string	Yes		List of values corresponding to the keys in argument 2

Returns

Return type: real

1.0 if hash table exists otherwise 0.0

See Also

HashCreate (page 234)

HashDelete (page 235)

HashSearch (page 236)

HashCreate

Create a hash table.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No	empty	Options

Argument 1

Array of strings - may be any combination of:

'temporary'	Hash table is temporary and will be automatically deleted when control returns to the command line
'multiple'	Allows multiple entries with the same name to be added to the table

Returns

Return type: real

Id of hash table. May be used in any of the hash table function. See list below in 'See Also' section.

Notes

Hash tables provide a fast method of searching for objects in a large list. Be aware that the number of items in the table needs to be in excess of about 10000 before the hash table offers an worthwhile improvement in performance over a linear search done using the Search (page 336) function. This is because of the function overhead in the script system.

See Also

HashDelete (page 235)

HashSearch (page 236)

HashAdd (page 234)

HashDelete

Delete a hash table

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Hash table id as return by HashCreate (page 234)

Returns

Return type: real

If hash table exists return 1.0 otherwise returns 0.0

See Also

HashCreate (page 234)

HashSearch (page 236)

HashAdd (page 234)

HashSearch

Search hash table for an item

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Hash table id as return by HashCreate (page 234)
2	string array	Yes		Keys to search
3	string	No	Empty string	Empty tag

Argument 2

This can be an array provided that the table was not defined as 'multiple' on creation.

Returns

Return type: string array

For non-multiple tables, return value has the same length as argument 2. Each element maps to the corresponding element in argument 2.

For multiple tables, the return value is a lit of all items that were found matching the search value.

See Also

HashCreate (page 234)

HashDelete (page 235)

HashAdd (page 234)

HasLogSpacing

Performs a simple test to determine whether the supplied vector is logarithmically spaced. The return value is 1.0 if the vector is logarithmically spaced and 0.0 otherwise. Note the function expects to be supplied with x-values.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Vector

Returns

Return type: real

HasProperty

Determines whether a particular instance possesses a specified property.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name
2	string	No		Property name to identify
3	string	No		Property value to identify
4	real	No	-1	Schematic ID

Argument 1

Property name.

Argument 2

Property name to use to identify the instance to check. If present, this argument along with argument 3, identify the instance to be tested for property ownership. If only this argument is present and not argument 3, any instance possessing the property it specifies will be tested. If neither this or argument 3 are present, the currently selected instance will be tested.

If more than instance is identified one of them will be tested but there are no rules to determine which instance will be used.

An example of this property would be 'handle'.

Argument 3

Property value to use to identify the instance to check check. If present, this argument along with argument 2, identify the instance to be tested for property ownership. If neither this or argument 3 are present, the currently selected instance will be tested.

If more than instance is identified one of them will be tested but there are no rules to determine which instance will be used.

An example of this property would be a handle name, such as 'I2'.

Argument 4

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: real

Outcome of test: TRUE (1) or FALSE (0). If no instance matches argument 2 and 3, an empty value will be returned.

HaveFeature

Detrmines whether a specified license feature is available.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Feature name

Argument 1

Name of license feature. Currently may be one of, 'basic', 'advanced', 'micron', 'rtn', 'simplis_if', 'AD', 'schematic' or 'scripts'.

Returns

Return type: real

Returns 1.0 if the license feature is available otherwise it returns 0.0.

HaveInternalClipboardData

Returns the number of items in the specified internal clipboard. The internal clipboard is currently only used for graph curve data.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Data type

Argument 1

The name of the internal clipboard to be queried. Currently there is only one internal clipboard so this argument must always be 'GraphCurve'.

Returns

Return type: real scalar

Notes

Use the command CurveEditCopy (page 458) to copy graph curve data to the internal clipboard. Use the `Curve /icb curve_index` to plot a curve that resides in the internal clipboard.

HierarchyHighlighting

This function is used by the hierarchical highlighting system and its operation and argument list may be subject to change. Consequently, this function is not yet fully supported.

Arguments

No arguments

Returns

Return type:

HighlightedNets

Returns names for any wholly highlighted net names on the specified schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	-1	Schematic ID

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

Returns the highlighted netnames as an array of strings.

Histogram

Creates a histogram of argument 1 with the number of bins specified by argument 2. The bins are divided evenly between the maximum and minimum values in the argument.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Vector
2	real	Yes		Number of bins
3	string	No		Options

Argument 1

Vector to be processed.

Argument 2

Number of bins.

Argument 3

Set to 'step' to force output in a stepped style similar to a bar-graph.

Returns

Return type: real array

Notes

Histograms are useful for finding information about waveforms that are difficult to determine by other means. They are particularly useful for finding "flat" areas such as the flat tops of pulses as these appear as well defined peaks. The Histogram() function is used in the rise and fall time scripts for this purpose.

Users should note that using this function applied to raw transient analysis data will produce misleading results as the values are unevenly spaced. If you apply this function to simulation data, you must either specify that the simulator outputs at fixed intervals (select the Output at .PRINT step option in the **Simulator | Choose Analysis...** dialog box) or you must interpolate the results using the function Interp (page 251).

Iff

If the first argument evaluates to TRUE (i.e. non-zero) the function will return the value of argument 2. Otherwise it will return the value of argument 3. Note that the type of arguments 2 and 3 must both be the same. No implicit type conversion will be performed on these arguments.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Test value
2	real array	Yes		Result if test true
3	real array	Yes		Result if test false

Returns

Return type: real array

IffV

If the first argument evaluates to TRUE (i.e. non-zero) the function will return the value of argument 2. Otherwise it will return the value of argument 3. Note that the type of arguments 2 and 3 must both be the same. No implicit type conversion will be performed on these arguments.

This function performs the same operation as Iff (page 240) but also works with vectors whereas Iff only works with scalar values.

All three arguments may be vectors but the lengths must satisfy the following conditions:

Argument 2 (true value) must be the same length as argument 3 (false value) Argument 1 (test) must either be the same length as arguments 2 and 3 or must have a length of 1

If the test has a length greater than 1 then each element of the test is tested to select the corresponding element in the true and false vectors. If the length of the test is 1 then this value is used to select the entire vector - either the true value or false value.

The return value includes the reference value copied from argument 2. To be useful this assumes that the references of arguments 2 and 3 are the same. This would usually be the case in most applications but the function does not test this.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Test
2	real, complex, string	Yes		true value
3	real, complex, string	Yes		false value

Returns

Return type: Matches arguments 2 and 3 (must be the same)

IIR

Performs Infinite Impulse Response digital filtering on supplied vector. This function performs the operation:

$$y_n = x_n c_0 + y_{n-1} c_1 + y_{n-2} c_2 \ldots$$

where:

x is the input vector (argument 1)

c is the coefficient vector (argument 2)

y is the result (returned value)

The third argument provides the "history" of y i.e. y_{-1}, y_{-2} etc. as required.

The operation of this function (and also the function FIR (page 141)) is simple but its application can be the subject of several volumes! In principle an almost unlimited range of IIR filtering operations may be performed using this function. Any text on Digital Signal Processing will provide further details.

User's should note that using this function applied to raw transient analysis data will not produce meaningful results as the values are unevenly spaced. If you apply this function to simulation data, you must either specify that the simulator outputs at fixed intervals (select the Output at .PRINT step option in the **Simulator | Choose Analysis...** dialog box) or you must interpolate the results using the function Interp (page 251).

Arguments

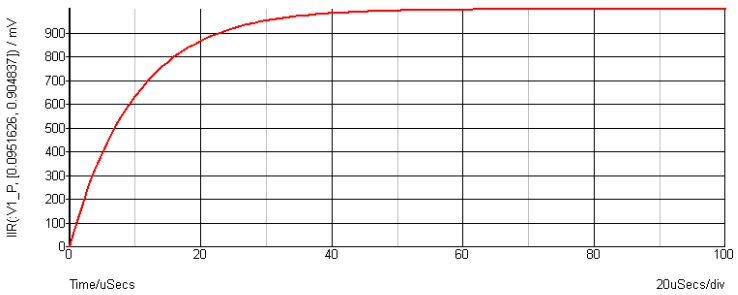
Number	Type	Compulsory	Default	Description
1	real array	Yes		Vector to be filtered
2	real array	Yes		Coefficients
3	real array	No	zero	Initial conditions

Returns

Return type: real array

Example

The following graph shows the result of applying a simple first order IIR filter to a step:



The coefficients used give a time constant of 10 * the sample interval. In the above the sample interval was 1μSec so giving a 10μSec time constant. As can be seen a first order IIR filter has exactly the same response as an single pole RC network. A general first order function is:

$$y_n = x_n c_0 + y_{n-1} c_1$$

where $c_0 = 1 - \exp\left(\frac{-T}{\tau}\right)$

and $c_1 = \exp\left(\frac{-T}{\tau}\right)$

and τ = time constant

and T = sample interval

The above example is simple but it is possible to construct much more complex filters using this function. While it is also possible to place analog representations on the circuit being simulated, use of the IIR function permits viewing of filtered waveforms after a simulation run has completed. This is especially useful if the run took a long time to complete.

im

Returns imaginary part of argument, same as the function imag (page 243).

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real array

Returns imaginary part of argument.

imag

Returns imaginary part of argument, same as the function im (page 243).

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real array

Returns imaginary part of argument.

InitRandom

Initialises the random number generator used for SIMPLIS Monte Carlo distribution functions.

A seed value can be specified allowing the generator to be reset to a known state. This will allow a Monte Carlo run to be repeated to give identical results.

This function resets the random number generator used for functions Unif (page 388), Gauss (page 146), GaussTrunc (page 148), GaussLim (page 147), Distribution (page 102), UD (page 387) and WC (page 396). These functions can only be used for evaluating expressions in a netlist processed by the pre-processor. This applies to value expressions used for components in SIMPLIS simulations.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	seed randomly generated	seed value

Returns

Return type: real

seed used to initialise generator

Example

InputGraph

Opens a simple dialog box prompting the user for input. Dialog box position is chosen to keep selected graph visible if possible. Argument provides initial text, return value is text entered by user.

The function returns an empty vector if the user cancels the dialog box.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Initial text
2	string	No	⟨⟨empty⟩⟩	Message

Returns

Return type: string

InputSchem

Opens a simple dialog box prompting the user for input. Dialog box position is chosen to keep selected schematic visible if possible. Argument provides initial text, return value is text entered by user.

The function returns an empty vector if the user cancels the dialog box.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Initial text
2	string	No	⟨⟨empty⟩⟩	Message

Returns

Return type: string

Instances

Returns array of property values of property name specified as argument. A value will be returned for every instance on the schematic that possesses that property. (An instance is a schematic item represented by a symbol - components, ground symbols etc.) For example, Instances('ref') would return every component reference in the schematic.

Note that every instance has a unique 'Handle' property which is automatically assigned. This makes it possible to access every instance on the schematic.

The second argument is a schematic handle as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

The function will return an empty vector if no schematic is open or argument 2 is invalid. An empty *string* will be returned if no instance possess the specified property. The latter behaviour is not always convenient but is retained for backward compatibility. The function PropValues2 (page 310), with appropriate arguments, will return an empty *vector* when there is no match, and thus easier to use in many cases.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name
2	real	No	-1	Schematic ID

Argument 2

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

InstNets

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Options

Argument 1

Returns an array of strings holding netnames for each pin of the selected schematic instance. Circuit must have been netlisted for the result of the function to be meaningful. This function is used by the power script to find the power dissipated in a device.

If argument 1 is set to 'flat' the resulting netnames will be stripped of hierarchical references.

The function will return with an error if no instances are selected or more than one instance is selected.

Returns

Return type: string array

InstNets2

Returns an array of strings holding the netnames of a schematic instance defined by arguments 1 to 3.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Schematic ID
2	string	Yes		Property name
3	string	Yes		Property value
4	string	No		Options

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If -1 the currently selected schematic will be used.

Argument 2

Property name to identify instance. Along with parameter 3, if these arguments are not provided, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Argument 3

Property value to identify instance. Along with parameter 2, if these arguments are not provided, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Argument 4

If set to 'full', the full hierarchical path of the net names will be supplied. Otherwise the local names will be returned.

Returns

Return type: string array

InstPins

Returns an array of strings holding pin names for each pin of either the selected instance or an instance identified by one or both arguments.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Property name
2	string	No		Property value
3	real	No	-1	Schematic ID

Argument 1

Property name to identify instance. Along with argument 2, if these arguments are not provided, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Using the 'HANDLE' property and its value will guarantee uniqueness.

Argument 2

Property value to identify instance. Along with argument 1, if these arguments are not provided, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Using the 'HANDLE' property and its value will guarantee uniqueness.

Argument 3

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

InstPoints

Returns an array of length 3 providing XY co-ordinates and orientation of an instance.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Property name
2	string	No		Property value
3	real	No	-1	Schematic ID

Argument 1

Property name to identify instance. Along with parameter 2, if these arguments are not provided, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Using the 'HANDLE' property and its value will guarantee uniqueness.

Argument 2

Property value to identify instance. Along with parameter 1, if these arguments are not provided, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Using the 'HANDLE' property and its value will guarantee uniqueness.

Argument 3

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: real array

Returns real array of size 3 as defined by the table. If no instance is identified by arguments 1 and 2 an empty value will be returned.

Index	Description
0	X co-ordinate
1	Y co-ordinate
2	Orientation: 0 to 7

Notes

The co-ordinates are those of the point defined to be at 0,0 in the symbol definition. The scaling used is 120 points to one grid square. (Grid refers to snap grid. This is the same as the visible grid for magnifications of 0.83 and higher.). Co-ordinates are relative. For a new schematic the zero point is at the top left corner of the window but this can change. The orientation values are as follows:

Orientation value	Description
0	Normal (as symbol def)
1	90 deg. clockwise
2	180 deg.
3	270 deg clockwise
4	Mirrored through y-axis
5	Mirrored through y-axis + 90 deg clock.
6	Mirrored through y-axis + 180 deg.
7	Mirrored through y-axis + 270 deg clock.

Note: Mirror through x-axis is equivalent to mirror through y with 180 rotation.

The values returned by this function can be used with the command Inst (page 481) using the `/loc` switch.

InstProps

Returns an array of strings holding the names of all properties of an instance. The functions PropValue (page 309) or PropValues2 (page 310) can be used to find values of these properties.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	-1	Schematic ID
2	string	No		Property name
3	string	No		Property value

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Argument 2

Property name to identify instance. Along with parameter 2, if these arguments are not provided, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Using the 'HANDLE' property and its value will guarantee uniqueness.

Argument 3

Property value to identify instance. Along with parameter 1, if these arguments are not provided, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Using the 'HANDLE' property and its value will guarantee uniqueness.

Returns

Return type: string array

Array of strings with property values. Returns empty value if no match to property name and value is found. Also returns empty value if the schematic ID is invalid.

integ

Integrates the argument with respect to its reference. See "Vector References" on page 21 for details.

The function uses simple trapezoidal integration.

An error will occur if the argument supplied has no reference.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		vector

Returns

Return type: real array

Interp

Interpolates the data in argument 1 either to a fixed number of points or at a specified interval.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Vector to be interpolated
2	real	Yes		Number of points
3	real	No	2	Interpolation order
4	real	No		Mode

Argument 1

Vector to be interpolated. The data should have a reference (x-values, see "Vector References" on page 21) but this is not compulsory when interpolating using a fixed number of points as opposed to a fixed interval.

Argument 2

Either the number of points or the x interval depending on the mode. (See argument 4 below)

Argument 3

Interpolation order. This can be any integer 1 or greater but in practice there are seldom reasons to use values greater than 4. If interpolating a signal containing fast pulses, interpolation order should be set to 1.

Argument 4

Two element boolean array, that is its values should be either TRUE (1) or FALSE (0). The second element specifies the mode. If 0 (FALSE) then the function uses the fixed number of points mode and argument 2 provides the number of points. If 1 (TRUE) the mode is fixed interval mode and argument 2 specifies the interval. The first element is only used with fixed number of points mode. If TRUE the final point of the interpolated result will coincide with the final point of the input vector and the interval between points is T/(N-1) where T is the interval of the whole input vector and N is the number of points. If FALSE the interval is T/N and the final point is at a location T/N before the final input point. The latter behaviour is compatible with earlier versions and is also what should be used if the function is interpolating data to be used by the FFT function.

Returns

Return type: real array

Returns the interpolated data.

Notes

The Interp function overcomes some of the problems caused by the fact that raw transient analysis results are unevenly spaced. It is used by the FFT plotting scripts to provide evenly spaced sample points for the function fft (page 139).

IsComplex

Returns 1 (=TRUE) if the supplied argument is complex and 0 (=FALSE) if the argument is any other type.

Arguments

Number	Type	Compulsory	Default	Description
1	any	Yes		Vector

Returns

Return type: real

IsComponent

Determines whether a schematic instance is a hierarchical component. Schematic instance is defined using a property name and value.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name
2	string	Yes		Property value

Returns

Return type: real

IsDocumented

Returns whether the script command or function is documented. Also states whether the input value is a command or function.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Command or function name

Returns

Return type: integer

0 if the command or function does not exist or is not documented. 1 if it is a documented command, 2 if it is a documented function.

IsFileOfType

Returns TRUE if the filename given has a file extension contained within the set of extensions given.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Filename
2	string array	No	'global'	Extensions

Argument 1

The filename with extension to check.

Argument 2

A list of extensions to check against.

Returns

Return type: real

If the given filename has an extension contained within the extensions array, returns TRUE, otherwise returns FALSE.

IsFullPath

Returns TRUE if the supplied path name is a full absolute path.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path

Argument 1

File system path name

Returns

Return type: real

TRUE if arg is a full absolute path. FALSE if it is a relative path.

IsImageFile

SIMetrix schematics and symbols can display graphical bitmap images. This function tests whether a given image format is supported.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Image file format name

Argument 1

Image file format name including leading '.'. Examples include '.png', '.jpg' and '.bmp'.

Returns

Return type: string array

IsModelFile

Returns 1 if the specified file contains .MODEL, .SUBCKT or .ALIAS definitions. Otherwise returns 0. The function will unconditionally return 0 if the file has any of the following extensions:

.EXE, .COM, .BAT, .PIF, .CMD, .SCH, .SXSCH, .SXDAT, .SXGPH

This will be overridden if the second argument is set to 'AllExt'.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path of file
2	string	No		Options

Returns

Return type: real

IsNum

Returns 1 (=TRUE) if the supplied argument is numeric (real or complex) and 0 (=FALSE) if the argument is a string

Arguments

Number	Type	Compulsory	Default	Description
1	any	Yes		Vector

Returns

Return type: real

IsOptionMigrateable

Determines if an option variable may be migrated in a version upgrade.

This function is used in the script that is run when SIMetrix is started for the first time. Certain option variables (defined using the command Set (page 531)) are marked internally as 'migrateable' meaning that their values are transferred to a new version installation if the user requests that configuration settings are to be migrated.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Option name

Returns

Return type: real

Return 1.0 if the option name is migrateable otherwise returns 0.0.

IsSameFile

Compares two paths and returns true (1) if they point to the same file. The function takes account of the fact that the two arguments might try to access the same file by different methods. For example, on Windows, one file might use a drive letter while the other might use a server path. The function will always return true if the path names are identical even if the target does not exist.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path of file 1
2	string	Yes		Path of file 2

Returns

Return type: real

Returns 1 if the paths are the same, 0 otherwise.

IsScript

Function to determine whether the supplied script name can be located. Calling this script will fail if this function returns FALSE. Note that the function doesn't check the script itself. It only determines whether or not it exists.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Script name

Returns

Return type: real

Returns TRUE if the supplied script name can be located in the standard script path.

IsStr

Returns 1 (=TRUE) if the supplied argument is a string and 0 (=FALSE) if the argument is numeric (real or complex).

Arguments

Number	Type	Compulsory	Default	Description
1	any	Yes		Vector

Returns

Return type: real

IsTextEditor

Returns true if selected editor is a text editor. By default the selected editor will be the currently highlighted editor. Alternately argument 1 can be passed a type of editor to test for.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	⟨⟨empty⟩⟩	Text editor type

Argument 1

This can be used to search for a particular text editor type. Possible values are:

LogicDefinitionEditor

NetlistEditor

ScriptEditor

TextEditor

VerilogAEditor

VerilogHDLEditor

Returns

Return type: boolean

True or false depending on whether the selected editor is a text editor.

IsTextEditorModified

Returns true if the highlighted text editor is modified.

Arguments

No arguments

Returns

Return type: boolean

True if the highlighted editor is a text editor that has been modified, false otherwise.

JoinStringArray

Concatenates two string arrays to return a single array.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		First array
2	string array	Yes		Second array

Returns

Return type: string array

Array of strings of length equal to the sum of the lengths of arguments 1 and 2. Contains arguments 1 and 2 concatenated together.

length

Returns the number of elements in the argument. The result will be 1 for a scalar and 0 for an empty value.

The Length function is the only function which will not return an error if supplied with an 'empty' value. Empty variables are returned by some functions when they cannot produce a return value. All other functions and operators will yield an error if presented with an empty value and abort any script that called it.

Arguments

Number	Type	Compulsory	Default	Description
1	any	Yes		Vector

Returns

Return type: real

ListDirectory

Lists all files that comply with the spec provided in argument 1.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path specification
2	string	No	'none'	Option

Argument 1

Specification for output. This would usually contain a DOS style wild card value. E.g. 'C:\Program Files\SIMetrix 42*.*'. No output will result if just a directory name is given.

Argument 2

If omitted, the result will be file names only. If set to 'fullpath', the full path of the files will be returned.

Returns

Return type: string array

ListSchemProps

Returns the schematic properties.

Arguments

No arguments

Returns

Return type: string array

The schematic property names and whether they are writeable or readonly.

ListSubsetDialog

Arguments

No arguments

Returns

Return type:

ln

Returns the natural logarithm of the argument. If the argument is real and 0 or negative an error will result. If the argument is complex it will return a complex result even if the imaginary part is 0 and the real part negative. An error will always occur if both real and imaginary parts are zero.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the natural logarithm of the argument.

LoadFile

Returns an array of strings holding lines of text from the file specified by argument 1.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File name
2	string	Yes	'auto'	Encoding

Argument 2

Character encoding assumed for input file. May be any value returned by the function GetCodecNames (page 156). Examples include:

'utf-8' UTF8 encoding. This is the encoding used internally and for output

'utf-16' UTF16 also known as UCS-2

'Shift-JIS' Commonly used on Japanese systems

In addition the following special values may be used:

'locale' uses the default encoding for the system's locale

'auto' uses 'utf-8' if successful. Otherwise uses 'locale'

Returns

Return type: string array

Locate

Function performs a binary search on the input vector (argument 1) for the value specified in argument 2. The input vector *must be monotonic* i.e. either always increasing or always reducing. This is always the case for the reference vector (see "Vector References" on page 21) of a simulation result. If the input vector is increasing (positive slope) the return value is the index of the value immediately below the search value. If the input vector is decreasing (negative slope) the return value is the index of the value immediately above the search value.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Vector
2	real	Yes		Search value

Returns

Return type: real

log

Returns log to base 10 of argument. If the argument is real and 0 or negative an error will result. If the argument is complex it will return a complex result even if the imaginary part is 0 and the real part negative. An error will always occur if both real and imaginary parts are zero.

This is identical to "log10" on page 261. We recommend always using log10. log() variably means ln or log10 depending on the program, language etc. and it is rarely clear exactly which is meant.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns log to base 10 of argument.

log10

Returns log to base 10 of argument. If the argument is real and 0 or negative an error will result. If the argument is complex it will return a complex result even if the imaginary part is 0 and the real part negative. An error will always occur if both real and imaginary parts are zero.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns log to base 10 of argument.

mag

Returns the magnitude of the argument. This function is identical to the abs (page 57)() function.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real array

Magnitude of the input argument

magnitude

Returns the magnitude of the argument. This function is identical to the mag (page 261)() function.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real array

Magnitude of the input argument

MakeDir

Creates the directory specified by arg 1. Returns 0 if successful otherwise returns 1.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Directory name

Returns

Return type: real

MakeLogicalPath

Converts a file system path to a symbolic path using the automatic path matching mechanism. This process is described in *User's Manual/Sundry Topics/Symbolic Path Names*.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path
2	string	Yes		Options

Argument 2

May be set to either one of:

Name	Description
'systemonly'	Will only match system symbols to the path. These are: %STARTPATH% %DOCSPATH% %EXEPATH% %APPDATAPATH% %TEMPPATH% %SXAPPDATAPATH% %SHAREPATH% %LIBPATH% %SXDOCSPATH% %COMMON_APPDATAPATH%
'projectonly'	Will only match symbols listed in the [Locations] section of the configuration file

Refer to *User's Manual/Sundry Topics/Symbolic Path Names/Definition* for details of system path

Returns

Return type: string

MakeString

Creates an array of strings. Length of array is given as argument to function. The strings may be initialised by supplying argument 2.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Number of elements in result
2	string array	No		Initial values

Argument 1

Number of elements to create in string array.

Argument 2

Initialises values of string. Can be used to extend an existing string. e.g:

```
Let str = ['john', 'fred', 'bill']
Let str = MakeString(6, str)
```

In the above the string `str` will be extended from length 3 to length 6 by the call to `MakeString`.

Returns

Return type: string array

Returns new string

ManageDataGroupsDialog

Specialised function that opens the Manage Data Group dialog box. The box displays data group information in tabular form with each row representing a single group. The box allows editing of the information and also for groups to be deleted.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		List of data groups and associated information

Argument 1

String array with each element comprising a semi-colon delimited list of items that describe a single group. The items are as follows:

Field	Description
0	Group name
1	Group title
2	Analysis mode
3	Flags: a combination of 'current', 'global', 'keep'

Returns

Return type: string array

String array of the same length as argument 1. Each array element comprising a semi-colon delimited list of items as follows:

Field	Description
0	Group name
1	Group title
2	Flags: a combination of 'current', 'global', 'keep' and 'delete'

Items marked 'delete' were deleted by the user.

The function will return an empty vector if the Cancel button is clicked.

ManageMeasureDialog

Opens dialog box used to manage graph measurements.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Measurements

Argument 1

String array defining measurements to be entered into the dialog box. Each string is a semi-colon delimited line with each element defined in the following table:

Token index	Description
0	Label listed in list box
1	Expression
2	Format template
3	Label as displayed on graph
4	Full description
5	Needs cursors on: 0 or 1
6	Is custom measurement: 0 or 1

Returns

Return type: string array

max

Returns an array equal to the length of each argument. Each element in the array holds the larger of the corresponding elements of argument 1 and arguments 2.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		vector 1
2	real	Yes		vector 2

Returns

Return type: real array

maxidx

Returns index of the input array element with largest magnitude.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns index to maximum input value

Maxima

Returns array of values holding every maximum point in the supplied vector whose value complies with limits specified in argument 2.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Vector
2	real array	No	$[-\infty, +\infty]$	[min limit, max limit]
3	string	No	$\langle\langle$empty$\rangle\rangle$	Options
4	real	No	0.0	Tolerance

Argument 1

Input vector

Argument 2

Real array of max length 2. Specifies limits within which the input values must lie to be included in the result. Values are:

0 Minimum limit i.e. maxima must be above this to be accepted

1 Maximum limit i.e. maxima must be below this to be accepted.

Argument 3

String array of max length 2. Specifies two possible options:

'xsort' If specified the output is sorted in order of their x-values (reference). Otherwise the values are sorted in descending order of y magnitude.

'nointerp'	If not specified the values returned are obtained by fitting a parabola to the maximum and each point either side then calculating the x, y location of the point with zero slope. Otherwise no interpolation is carried out and the literal maximum values are returned.
'noendpts'	If specified, the first and last points in the data will not be returned as maximum points.

Argument 4

Minimum spacing between x values. Any pair of points that are closer than this value will be treated as a single point

Returns

Return type: real array

The function returns the XY values for each maximum point. The X-values are returned as the vector's reference (see "Vector References" on page 21).

Maximum

Returns the largest value found in the vector specified in argument 1 in the range of x values specified by arguments 2 and 3.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		Vector
2	real	No	start of vector	Min range
3	real	No	end of vector	Max range

Returns

Return type: Real

mean

Returns the average of all values in supplied argument. If the argument is complex the result will also be complex.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the average of the supplied arguments

Mean1

Returns the integral of the supplied vector between the ranges specified by arguments 2 and 3 divided by the span (= arg 3 -arg 2). If the values supplied for argument 2 and/or 3 do not lie on sample points, second order interpolation will be used to estimate y values at those points.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Input vector
2	real	No	Start of input vector	start x value
3	real	No	End of input vector	end x value

Returns

Return type: real

MeasureDialog

Opens dialog for specifying graph measurements.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No		Dialog data
2	string array	No		Initial settings
3	string array	No		Condition

Argument 1

Dialog data. Format the same as for argument 1 in the function ManageMeasureDialog (page 265) except the final token is not required.

Argument 2

String array containing initial values. List in same format as return value

Argument 3

If set 'haveCursors' indicates to dialog box that graph cursors are enabled.

Returns

Return type: string array

String array of length 10 providing user selections. Fields defined as follows:

Index	Description
0	Measurement selection from list box
1	'1' if Cursor span box is checked
2	'1' if AC coupled box is checked
3	'1' if Integral cycles box is checked
4	Graph label custom definition
5	Expression custom definition
6	'1' if Save to pre-defined box is checked
7	Format template custom definition
8	Label for custom definition
9	Long description for custom definition

MenuModifier

Arguments

No arguments

Returns

Return type:

MessageBox

Opens a message dialog box with a choice of styles.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Message
2	string array	No		Options

Argument 1

1 or 2 element string array. First element is the text of the message to be displayed in the box. The second element is the box title. If the second element is not supplied the box title will be the name of the application - e.g. 'SIMetrix Micron AD'

Argument 2

1 or 2 element string array. First element is box style. This may be one of the following:

'AbortRetryIgnore'	Three buttons supplied for user response - Abort, Retry and Ignore
'Ok'	Ok button only
'OkCancel'	Ok and Cancel button
'YesNo'	Yes and No buttons
'YesNoCancel'	Yes, No and Cancel buttons.

Default = 'OkCancel'

Second element is icon style. A small icon is displayed in the box to indicate the nature of the message. Possible values: 'Warn', 'Info', 'Question', 'Stop'.

Default = 'Info'

Returns

Return type: string

A single string indicating the user's response. One of:

'Abort'

'Cancel'

'Ignore'

'No'

'Ok'

'Retry'

'Yes'

Mid

Returns a string constructed from a sub string of argument 1. First character is at index specified by argument 2 while argument 3 is the length of the result. The first character is at index 0.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		String
2	real	Yes		Start index
3	real	No	to end of string	Length of result

Returns

Return type: string

Example

```
Mid('Hello World!', 6, 5)
```

will return 'World'.

See Also

"Char" on page 68

min

Returns an array equal to the length of each argument. Each element in the array holds the smaller of the corresponding elements of argument 1 and arguments 2.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Vector 1
2	real	Yes		Vector 2

Returns

Return type: real array

minidx

Returns index of the input array element with smallest magnitude.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns index to minimum input value

Minima

Returns array of values holding every minimum point in the supplied vector whose value complies with limits specified in argument 2.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Vector
2	real array	No	$[-\infty, +\infty]$	[min limit, max limit]
3	string	No	⟨⟨empty⟩⟩	Options
4	real	No	0.0	Tolerance

Argument 1

Input vector

Argument 2

Real array of max length 2. Specifies limits within which the input values must lie to be included in the result. Values are:

0	Maximum limit i.e. minima must be above this to be accepted
1	Minimum limit i.e. minima must be below this to be accepted.

Argument 3

String array of max length 2. Specifies two possible options:

'xsort'	If specified the output is sorted in order of their x-values (reference). Otherwise the values are sorted in descending order of y magnitude.
'nointerp'	If not specified the values returned are obtained by fitting a parabola to the minimum and each point either side then calculating the x, y location of the point with zero slope. Otherwise no interpolation is carried out and the literal minimum values are returned.
'noendpts'	If specified, the first and last points in the data will not be returned as minimum points.

Argument 4

Minimum spacing between x values. Any pair of points that are closer than this value will be treated as a single point

Returns

Return type: real array

The function returns the XY values for each minimum point. The X-values are returned as the vector's reference (see "Vector References" on page 21).

Minimum

Returns the smallest value found in the vector specified in argument 1 in the range of x values specified by arguments 2 and 3.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		Vector
2	real	No	start of vector	Min range
3	real	No	end of vector	Max range

Returns

Return type: Real

MkVec

Most simulation vectors are accessed using the name of the node that generated the data. For example if a node is called 'VOUT' the vector to access the data on that node is also called 'VOUT'.

However, some nodes are named in a manner that cannot directly be accessed as the name contains characters that can be confused with arithmetic and other operators. For example, it is legal to call a node +15V but this would be confused with the constant value +15.

To resolve this, a vector may be accessed using the Vec (page 393) function. E.g. Vec('+15V'). The MkVec() function will return a string that can be used to access the vector data. If the vector name does not contain any conflicting characters, it will return the name unmodified. If it does contain conflisting characters, it will return a string using the Vec function.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Node name

Returns

Return type: string

Expression to access node data

MLSplineFit

Performs a spline based line fit to a set of data.

Given a set of training parameters and observations (x and y values) along with a parameter controlling the smoothness of the required output, the function returns a set of values that make up a curve that fits to the parameters and observations.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Training parameters (x values)
2	real array	Yes		Training observations (y values)
3	real array	Yes		Smoothness parameter
4	real array	Yes		Result parameters (x values)

Argument 1

The parameters for the training data. This would normally be the values on the x-axis of a graph. The values must be ordered from lowest to highest value.

Argument 2

The observations for the training data. This would normally be the values on the y-axis of a graph.

Argument 3

Parameter that controls how smooth the fit to the data will be. Value must be 0-positive, where the smoothness of the fit increases as the parameter increases.

At the extremes, a value of 0 produces a result made up of straight lines between each training point in order, whilst a value tending towards infinity produces a single straight line through the whole of the data.

Argument 4

The parameters to fit the resulting curve to.

Returns

Return type: real array

Vector the same length as parameter 4 *(Result parameters (x values))*, with fitted values for each parameter in order.

Product

SIMetrix and SIMetrix/SIMPLIS Pro and Elite

MLVector

Creates a vector of consecutively increasing values from a minimum to maximum value using a given incremenet.

Eg. MLVector(0,1,10) would give: [0 1 2 3 4 5 6 7 8 9 10].

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Minimum value
2	real	Yes		Incremenet value
3	real	Yes		Maximum value

Returns

Return type: real array

A vector of values within the specified range with given increments.

Product

SIMetrix and SIMetrix/SIMPLIS Pro and Elite

ModelLibsChanged

Returns 1 if the installed model libraries have been changed since the last call to this function. The function always returns 1 the first time it is called after program start.

Arguments

No arguments

Returns

Return type: real

Navigate

Returns path name of hierarchical block given root path and full component reference.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Full component reference
2	string	Yes		Path of hierarchical root

Argument 1

Component reference of block. This must be the full reference specifying the full path to the root. For example the reference U3.U4 refers to a block of reference U4 found in the underlying schematic of a block of reference U3 in the root schematic.

Argument 2

File system pathname of root schematic.

Returns

Return type: string

Returns path name of schematic hierarchical block.

NearestInst

Returns value of property given as argument 1 for nearest instance to cursor. If the nearest instance to the cursor does not possess the specified property, an empty string will be returned.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name

Returns

Return type: string

See Also

"Branch" on page 66

"NetName" on page 276

"PinName" on page 299

NetName

Returns the net name of the nearest wire or instance pin.

This function is used for voltage cross-probing. The node vectors produced by the simulator always have the same name as the net so the string returned by this function is the name of the variable holding the voltage at that node.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	⟨⟨empty⟩⟩	Option

Argument 1

The argument determines the behaviour of the function for child schematics in a hierarchy. If the argument is omitted or empty, the full net name is returned including the parents name(s). (E.g. U2.U6.R3_P). If the argument is the string 'flat' the value returned is just the local netname (E.g. R3_P).

Returns

Return type: string

Returns the net name of the nearest wire or instance pin.

NetNames

Returns array of all net names in selected schematic

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	-1	Schematic ID

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

Returns an array of strings holding all the net names in the currently selected schematic. Returns an empty value if the schematic is empty or can't be found.

NetWires

Returns wire handles of names net.

Note that this function requires that the schematic has been netlisted. This can be forced using the function Netlist (page 489) in the form:

```
Netlist /nooutput /nodescend
```

if required. Note also that, for a child schematic in a hierarchy, a local netname is expected, that is without the path prefix (e.g. 'voutn' not 'u1.voutn')

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Net name
2	real	No	-1	Schematic ID

Argument 1

Name of net whose wire handles are required.

Argument 2

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

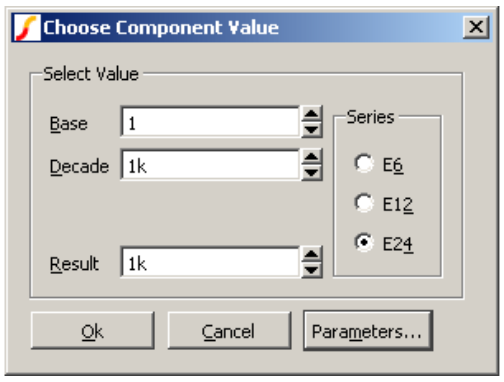
Return type: string array

Returns an array of strings holding the handles for all wires on the specified net. Returns an empty string if there are no wires on the net or if the net does not exist.

NewPassiveDialog

Opens a dialog box intended to select values for passive components such as resistors and capacitors. The dialog below is displayed after executing the following:

```
Let paramNames = [`temp',`tc1',`tc2']
Let paramValues = [`',`',`']
Show NewPassiveDialog(`1k',[`Select Value',`e24'], paramNames, paramValues)
```



Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Initial value
2	string array	No	[‘Select value’, ‘E12’]	[message series]
3	string array	No	⟨⟨empty⟩⟩	Parameter names
4	string array	No	⟨⟨empty⟩⟩	Parameter values

Argument 1

Initial value displayed in “Result” box. “Base” and “Decade” will be adjusted accordingly.

Argument 2

Two element string array:

0 Message displayed at the top of the box.

1 Initial setting of preferred value series. Possible values: ‘E6, ‘E12’, ‘E24’

Argument 3

String array defining list of parameter names. See argument 4.

Argument 4

String array defining list of parameter values. If arguments 3 and 4 are supplied the “Parameters...” button will be visible. This button opens another dialog box that provides the facility to edit these parameters’ values.

Returns

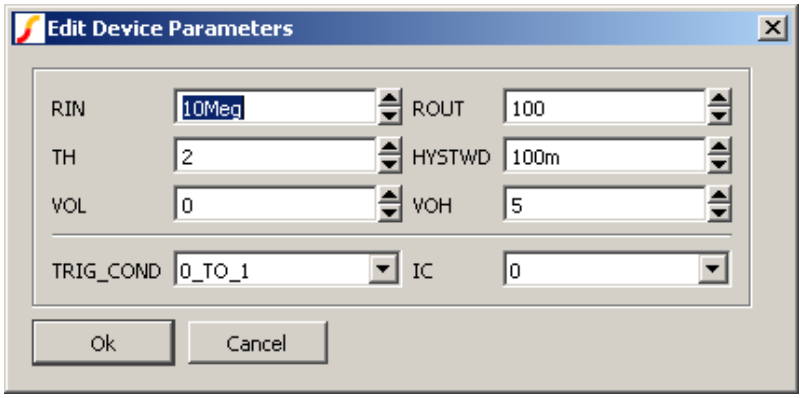
Return type: string array

The function returns a string array in the following form:

Index	Description
0	Value in “Result” box
1	Number of parameter values
2	The values of the parameters in the order they were passed (onwards values)

NewValueDialog

General purpose user input function. A call to NewValueDialog opens a dialog box with an arbitrary number of controls of 5 different types. Any mix of the different types may be used. The following is an example with 8 controls of two different types:



Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Control definitions
2	string	Yes		Initial values
3	string	Yes		Options

Argument 1

This is a string array of length equal to the total number of controls required. Each element of the array defines the control's label, type and valid range of values. The array elements are of the form:

```
label [:type [:range]]
```

Where:

`label` is a text string defining the control's label, which may not contain the characters ':' or '|'.

`type` is one of the following:

REAL	Default if *type* omitted. Displays an edit control with an up-down spinner. Spinner increments in 1:2:5 steps.
INT or INTEGER	Displays an edit control with an up-down spinner. Spinner increments linearly with step size of 1.
STRING	Displays an edit control
BOOL	Displays a check box
LIST	Displays a drop down list with entries defined by *range*.

`range` Valid range of values for control delimited by '|'. Ignored for STRING and BOOL types and compulsory for LIST type. For REAL and INTEGER types, one or two values may be supplied representing the minimum and maximum valid values. The user will not be able to enter values outside this defined range. For LIST types the range defines the entries in the list.

Argument 2

This is a string array which must have the same number of elements as argument 1. Each element defines the initial value for the control. For BOOL types use the values “true” and “false”.

Argument 3

Function options. Currently there is only one and that is the dialog box caption.

Returns

Return type: string array

Example

The following call would display the dialog as shown above.

```
Show NewValueDialog([`RIN::0', `ROUT::0', `TH', `HYSTWD::0', `VOL',
+ `VOH', `TRIG_COND:LIST:0_TO_1|1_TO_0', `IC:LIST:0|1'],
+ [`10Meg', `100', `2', `0.1', `0', `5', `0_TO_1', `0'], [`Edit
+ Device Parameters'])
```

norm

Returns the input vector scaled such that the magnitude of its largest value is unity. If the argument is complex then so will be the return value.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the norm of the input.

NumberSelectedAnnotations

Returns the number of selected annotations.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	empty string	Filter

Argument 1

Optional filter string. If set to "*textenabled*" only annotations that text can be added to are counted.

Returns

Return type: real

The number of selected annotations.

NumDivisions

Returns the number of divisions in a vector. Vectors created by multi-step runs such as Monte Carlo are sub-divided into divisions with one division per step. For a full explanation of this concept, see "Multi-division Vectors" on page 19.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		Vector

Returns

Return type: real

NumElems

Returns the number of elements in a vector. It is similar to the Length function but differs in the way it handles multi-division vectors. NumElems will return an array element for each division in the vector whereas Length will return the number of elements of the first division only.

Arguments

Number	Type	Compulsory	Default	Description
1	any	Yes		Vector

Returns

Return type: real array

OpenEchoFile

Redirects the output of the command Echo (page 471) to a file. Redirection is disabled when the function CloseEchoFile (page 69) is called or when control returns to the command line.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File name
2	string	Yes		Access mode

Argument 1

File name.

Argument 2

A single letter to determine how the file is opened. Can be either 'w' or 'a'. If 'w', a new file will be created. If a file of that name already exists, it will be overwritten. If 'a' and the file already exists, it will be appended.

Returns

Return type: real

OpenFile

Opens a file and returns its handle. This may be used by the command Echo (page 471). Use the function CloseFile (page 70) to close the file.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File path
2	string	Yes		File open mode

Argument 1

Path of file to open.

Argument 2

Open mode. May be 'w' or 'wa'. 'w' opens file for writing and clears the file if it already exists. 'wa' opens the file for append, that is it will append any output to the file if that file already exists.

Returns

Return type: real

OpenPDFPrinter

Sets up printing for PDF output.

Arguments

Number	Type	Compulsory	Default	Description
1	String	Yes		Filename

Returns

Return type: String

Success or Failed message.

OpenPrinter

Starts a print session. This may be used for customised or non-interactive printing. See "Non-interactive and Customised Printing" on page 582

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No		Configuration

Argument 1

String array with up to 6 elements as described in the following table

Index	Description
0	Print orientation: 'landscape' or 'portrait'
1	Number of copies
2	Printer id. This is an index and can be found from the function GetPrinterInfo (page 203). If omitted, the application default printer will be used.
3	Title of print job. This is used to identify a print job and will be displayed in the list of current print jobs that can be viewed for each installed printer from control panel. title is not printed on the final document.
4	Specify printer by name. If omitted, printer will be defined by its index (see above) or the application default printer will be used

Returns

Return type: string

Status of operation: either 'Success' or 'Failed'

OpenSchem

Opens a schematic similar to the command OpenSchem (page 502) but returns a code indicating success or otherwise.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File path
2	string array	No		Options

Argument 1

Schematic file path.

Argument 2

Options. String array may contain any of the following:

Option	Description
'cd'	Change current working directory to the location of the specified schematic file
'readonly'	Open in read only mode
'selectiveReadOnly'	Open in read only mode if the schematic file cannot be opened for writing

Returns

Return type: string

The return value may be one of the following:

Code	Description
NOERR	Schematic opened successfully
SC_READONLY	Schematic file is read only. If 'readonly' or 'selectiveReadOnly' was specified as an option, then the schematic would have been successfully opened but it will not be possible to save it to the same file.

Code	Description
SC_LOCKED	Schematic file is in use by another SIMetrix user. If 'readonly' or 'selectiveReadOnly' was specified as an option, then the schematic would have been successfully opened but it will not be possible to save it to the same file.
FILE_NONAME	No file name was given. (Arg1 an empty string)
FILE_CANTOPENFORREAD	Can't open specified file because it doesn't exist or the path is bad

OpenSchematic

Opens a schematic given its file system path. The return value may be used with a number of other functions and commands. This function does not display the schematic.

The function GetSchematicTabs (page 205) returns the IDs for all currently displayed schematics.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File path

Argument 1

File system path to schematic file. The schematic does not need to be currently displayed

Returns

Return type: real

Returns an integer ID that can be used for a wide range of functions that return information about a schematic. It may also be used by some commands. If the schematic cannot be opened for any reason, the function returns -1.

Notes

The OpenSchematic function along with the functions listed below that support schematic IDs, allow information to be retrieved from schematics that are not currently on display. If the specified schematic is displayed then the values returned by the supported functions will reflect the state of the displayed schematic and not the saved schematic.

The return value from OpenSchematic can be used with the following functions:

CloseSchematicTab (page 70)

DescendHierarchy (page 100)

ElementProps (page 130)

GetChildModulePorts (page 155)

GetComponentValue (page 157)

GetF11Lines (page 171)

GetInstancePinLocs (page 184)

GetModifiedStatus (page 197)

GetReadOnlyStatus (page 204)

GetSchematicTabs (page 205)

GetSchematicVersion (page 205)

GetSimulatorMode (page 213)

HasProperty (page 237)

HighlightedNets (page 239)

Instances (page 245)

InstNets2 (page 246)

InstPins (page 247)

InstPoints (page 248)

InstProps (page 249)

NetNames (page 277)

NetWires (page 277)

PropFlags (page 303)

PropFlags2 (page 304)

PropFlagsAll (page 305)

PropFlagsAnnotations (page 306)

PropFlagsWires (page 307)

PropValues (page 309)

PropValues2 (page 310)

SetComponentValue (page 347)

SetReadOnlyStatus (page 352)

SymbolName (page 369)

SymbolNames (page 370)

WirePoints (page 397)

Wires (page 398)

The schematic ID may also be used by these commands:

SaveAs (page 523)

SelectSchematic (page 530)

The handle returned by OpenSchematic may be closed using the function CloseSchematic (page 70). After a call to CloseSchematic, the handle will no longer be valid and any function it is supplied to will fail. However, it is not usually necessary to call CloseSchematic as handles are automatically closed when control returns to the command line.

Parse

Splits up the string supplied as argument 1 into substrings or tokens. The characters specified in argument 2 are treated as separators of the substrings. For example, the following call to Parse():

```
Parse(`c:\simetrix\work\amp.sch', `\')
```

returns:

```
`c:'
`simetrix'
`work'
`amp.sch'
```

If the second argument is omitted, spaces and tab characters will be treated as delimiters. If a space is include in the string of delimiters, tab characters will be automatically added.

If the third arguments is present and equal to 'quoted' the function will treat strings enclosed in double quotes as single indivisible tokens.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Input string
2	string	No	Space, tab, comma	Delimiters
3	string	No	⟨⟨empty⟩⟩	Options

Returns

Return type: string array

ParseAnalysis

Opens the choose analysis dialog initialised according to the analysis controls passed as the argument. Returns a new analysis spec that may be passed to a netlist.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Analysis spec

Argument 1

Analysis spec as it would appear in a netlist or the F11 window. E.g. lines beginning with .TRAN, .AC, .DC etc.

Returns

Return type: string array

String array of length 2. Element 0 contains the new analysis spec. Note individual simulator controls are separated by new line characters.

Element 1 identifies how the user closed the dialog box as defined below:

Run button	'2'
Cancel button	'1'
OK button	'0'

ParseLaplace

Parses a Laplace expression to return array of denominator and numerator coefficients

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Laplace expression

Argument 1

Expression in s-variable defining a Laplace transfer function. Refer to the User's Manual -⟩Parts -⟩Generic Parts -⟩Laplace Transfer Function for a detailed explanation .

Returns

Return type: real array

real array as follows:

Index	Description
0	Status code - 0 means success. Use GetLaplaceErrorMessage (page 187) to convert this to an error messgae
1	denominator order
2	numerator order
3 to (3+den order)	denominator coefficients - lowest order first
3+den order+1 to 3+den order+1+num order	numerator coefficients - lowest order first

ParseParameterString

Parses a string of name-value pairs and performs some specified action on them. The function can read specified values and return just the values. It can write to specific values and return a modified string. It can also delete specific values.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		String to parse
2	string	Yes		Parameter names to process
3	string	Yes		action
4	string	No		Write value
5	string	No		Options

Argument 1

String to parse. This is a list of name-value pairs but may also contain any number of unlabelled values at the start of the string. The number of unlabelled values must be specified in argument 3 (see below). Examples:

Without any unlabelled value:

```
W=1u L=2u AD=3e-12 AS=3e-12
```

With 1 unlabelled value:

```
2.0 DTEMP=25.0
```

The above shows an equals sign separating names and values, but these may be omitted.

Argument 2

String array listing the names to be processed. If reading (see below) only the values of the names supplied here will be returned. If writing, the names listed in this argument will be edited with new values supplied in argument 4. If deleting, these names will be removed.

Unlabelled parameters may be referenced using the special name '$unlabelled$' followed by the position. I.e. the first unlabelled parameter is position 1, the second 2 and so on. So '$unlabelled$1' refers to the first unlabelled parameter.

Argument 3

1 or 2 element string array. The first element is the action to be performed. The second element is the number of unlabelled parameters that are expected in the input string. This is zero if omitted.

Argument 4

Values to write. These have a 1:1 correspondence with the parameter names in argument 2.

Argument 5

If set to 'allowquoted', the function will treat any items enclosed in single or double quotation marks as a single token even if there are spaces within.

Returns

Return type: string array or scalar

If reading, the return value is an array of strings holding the values of the specified parameters. Otherwise it the input string appropriately modified according to the defined action.

Example

This will return the string array ['1u', '2u']:

```
Let str = `W=1u L=2u AD=3e-12 AS=3e-12'
ParseParameterString(str, [`W', `L'], 'read')
```

This returns '2.0'

```
Let str = `2.0 DTEMP=25.0'
ParseParameterString(str, `$unlabelled$1', [`read',`1'])
```

This will return the modified string: `'W=90n L=120n AD=3e-12 AS=3e-12'`

```
Let str = `W=1u L=2u AD=3e-12 AS=3e-12'
ParseParameterString(str, [`W',`L'], `write', [`90n', `120n'])
```

This will return the modified string: `'AD=3e-12 AS=3e-12'`

```
Let str = `W=1u L=2u AD=3e-12 AS=3e-12'
ParseParameterString(str, [`W',`L'], `delete')
```

ParseSimplisInit

Reads and parses the .init file created by a SIMPLIS run. This is used by the feature that back-annotates SIMPLIS schematics with initial condition values.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Simplis init file

Returns

Return type: string array

PathEqual

Compares two string arrays and returns a real array of the same length with each element holding the result of a string comparison between corresponding input elements. The string comparison assumes that the input arguments are file system path names and will choose case sensitivity according to the underlying operating system. The comparison will be case insensitive.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Path 1
2	string array	Yes		Path 2

Argument 1

First pathname or pathnames to be compared.

Argument 2

Second pathname or pathnames to be compared.

Returns

Return type: real array

Real array of the same length as the arguments. If the lengths of the arguments are different, an empty vector will be returned. Each element in the array will be either -1, 0, or +1. 0 means the two strings are identical (subject to case sensitivity as described above).

PerCycleTiming

Processes the input vector measuring the Frequency, Period, Duty Cycle, On-Time, or Off-Time on a per-period basis. The returned vector contains the measured value of the input vector, such as the Duty Cycle, plotted against the original x-axis value, for example, time. The return vector is either "stepped" or smooth. A stepped return vector will have vertical discontinuities at the beginning and end of each period found in the input vector, with the value being constant during the input vector period. A smooth return vector will have a single data point per input vector period, located at the mid-point of the input vector period.

Argument 3 is optional and specifies the output curve type, if this argument is not passed, the default value will be "stepped". The stepped return vector will change value only at the edges detected in the input vector. The value will be constant during the entire period. A smooth input vector will have a single data point at the mid-point of the input vector period. The points will be connected resulting in a smooth curve from one period to the next.

Argument 4 specifies edge direction. If set to 0 either direction will be accepted. If set to 1 only positive edges will be detected and if set to -1 only negative edges will be detected. This argument is only used for the period and frequency measurements. All other measurements will be processed with the Direction argument set to 1, indicating positive edges.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Input vector
2	string	Yes		Measurement to make
3	string	No	stepped	Type of return curve
4	real	No	1	Direction

Argument 1

The vector to return the Frequency, Period, Duty Cycle, On-Time, or Off-Time values for. The timing edges are found from this vector using a threshold of $\frac{maximum+minimum}{2}$. For this reason, it is important that the vector have a uniform amplitude and is noise-free around the trigger threshold.

Argument 2

A pre-defined measurement function to make, one of:

- frequency
- period
- duty-cycle
- on-time
- off-time

Argument 3

Determines the type of return curve, one of:

- stepped
- smooth

Argument 4

Determines the edges used to process the input vector, one of:

- -1: Falling edges
- 1 : Rising edges
- 0 : Both Rising and Falling Edges

Returns

Return type: real array

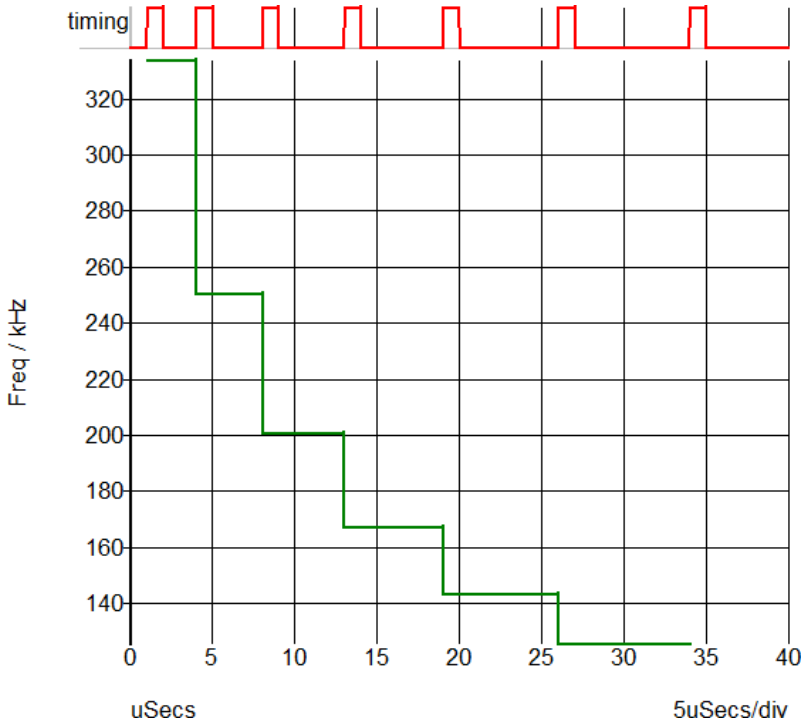
A real vector of the measured values from the input vector, with reference values according to the third argument. The return vector is formatted to be plotted directly on the waveform viewer.

Example

A call to:

```
PerCycleTiming( :Gate , 'frequency' )
```

will generate a vector which, when plotted on the waveform viewer appears like:



PerCycleValue

Processes the input vector measuring Minimum, Maximum, Mean, Peak-to-Peak, or the RMS value of the input vector during time intervals generated by the timing vector. The returned vector contains the measured value of the input vector, such as the Mean value, plotted against the timing vector x-axis value, for example, time. The return vector is either "stepped" or smooth. A stepped return vector will have vertical discontinuities at the beginning and end of timing vector period. A smooth return vector will have a single data point per input vector period, located at the mid-point of the input vector period.

Argument 4 specifies the output curve type with the default being "stepped". The stepped return vector will change value only at the edges detected in the input vector. The value will be constant during the entire period. A smooth input vector will have a single data point at the mid-point of the input vector period. The points will be connected resulting in a smooth curve from one period to the next.

Argument 5 specifies edge direction. If set to 0 either direction will be accepted. If set to 1 only positive edges will be detected and if set to -1 only negative edges will be detected. This argument is only used for the period and frequency measurements. All other measurements will be processed with the Direction argument set to 1, indicating positive edges.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Input vector
2	real array	Yes		Input vector
3	string	Yes		Measurement to make
4	string	No	stepped	Type of return curve
5	real	No	1	Direction

Argument 1

The vector to measure the Minimum, Maximum, Mean, Peak-to-Peak, or the RMS values for. The function finds the timing periods based on the timing vector passed as the second argument.

Argument 2

The vector to determine the period information for the vector input in the first argument. It is expected that the vector input to the first argument will contain noise which precludes using the first argument for any timing measurements. to fail. For this reason, the function finds the edges from this vector using a threshold of $\frac{maximum+minimum}{2}$. For this reason, it is important that the vector have a uniform amplitude and is noise-free around the trigger threshold.

It is possible that the input vector is free of noise, in which case the same vector could be input to both the first and second function arguments. An example of this would be the output of a gate which has well-defined transitions and uniform maximum and minimum amplitudes.

Argument 3

A pre-defined measurement function to make, one of:

- minimum
- maximum
- mean
- peak-to-peak
- rms

Argument 4

Determines the type of return curve, one of:

- stepped
- smooth

Argument 5

Determines the edges used to process the timing vector, one of:

- -1: Falling edges
- 1 : Rising edges

- 0 : Both Rising and Falling Edges

Returns

Return type: real array

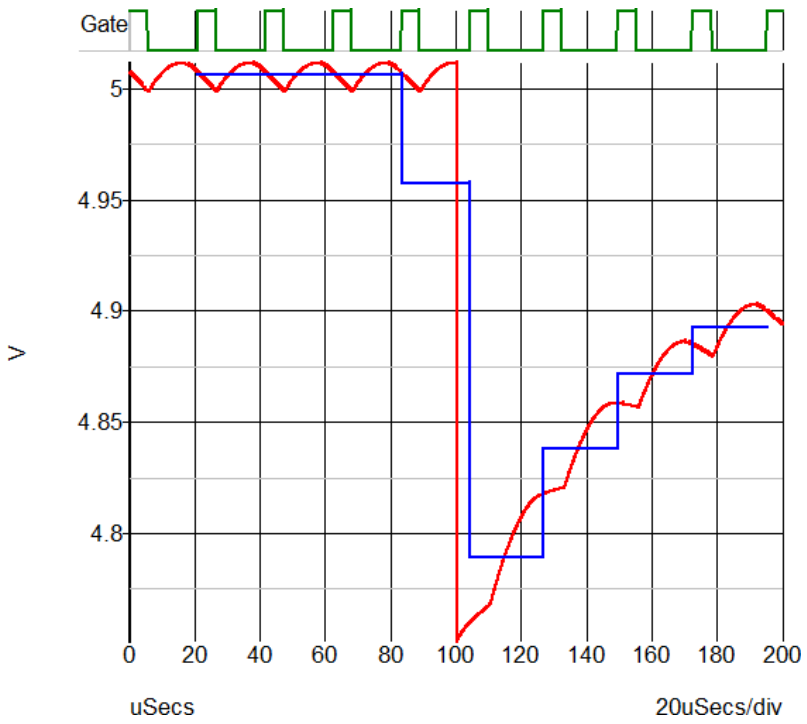
A real vector of the measured values from the input vector, with reference values taken from the timing vector according to the fourth argument. The return vector is formatted to be plotted directly on the waveform viewer.

Example

A call to:

```
PerCycleValue( :Vout , :Clk , 'mean' )
```

will generate a vector which, when plotted on the waveform viewer appears like:



ph

Returns the phase of the argument in degrees.

Each of the functions ph, phase (page 297) and phase_rad (page 297) produce a continuous output i.e. it does not wrap from 180 degrees to -180 degrees. The arg (page 63) function may be used to obtain a phase value that is always between +/- 180 degrees.

This function always returns a result in degrees. This has changed from versions 3.1 and earlier which returned in degrees or radians depending on the setting of the 'Degrees' option. For phase in radians, use phase_rad (page 297)().

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real array

phase

Returns the phase of the argument in degrees. Identical to ph (page 296).

Each of the functions ph (page 296), phase and phase_rad (page 297) produce a continuous output i.e. it does not wrap from 180 degrees to -180 degrees.

This function always returns a result in degrees. This has changed from versions 3.1 and earlier which returned in degrees or radians depending on the setting of the 'Degrees' option. For phase in radians, use phase_rad (page 297).

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type:

phase_rad

Returns the phase of the argument in radians. Identical to ph (page 296), except the result is in radians.

Produces a continuous output i.e. it does not wrap from 180 degrees to -180 degrees.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real array

PhysType

Returns the physical type of the argument.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		Vector

Argument 1

Possible values are.

‘’ (meaning dimensionless quantity)

‘unknown’

‘Voltage’

‘Current’

‘Time’

‘Frequency’

‘Resistance’

‘Conductance’

‘Capacitance’

‘Inductance’

‘Energy’

‘Power’

‘Charge’

‘Flux’

‘Volt^2’

‘Volt^2/Hz’

‘Volt/rtHz’

‘Amp^2’

‘Amp^2/Hz’

‘Amp/rtHz’

‘Volts/sec’

Returns

Return type: string

See Also

“Units” on page 388

PinName

Returns information about the schematic instance pin nearest the mouse cursor. The format of the result depends on the values of the arguments.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	⟨⟨empty⟩⟩	Options
2	string	No	⟨⟨empty⟩⟩	Property name

Argument 1

May be one of five possible values:

⟨⟨empty⟩⟩	Return value is full hierarchical name of pin. (e.g. U1.U6.Q1#c)
'flat'	Return value is local name without hierarchical prefix (e.g. Q1#c)
'property'	Return value is string array with a pair of elements for each pin at the location. First value in each pair is the value of the property specified in argument 2 and the second is the pin number.
'distance'	Return value has two elements. The second element is the distance of the cursor to the pin in "sheet units". There are 120 "sheet units" per grid at X 1 magnification.
['flat', 'distance']	As 'distance' but returns local net name without hierarchical prefix.

Argument 2

Property name whose value is returned if argument 1 is 'property'. See above.

Returns

Return type: string array

PrepareSetComponentValue

Configures SetComponentValue (page 347) function to define how parameters are stored on schematic instances. The definition is in the form of two tables, 'parameter definitions' and 'implicit defaults'. The 'parameter definitions' defines how parameters are stored. The 'implicit defaults' defines parts that have an implicit value. For example, a resistor value can be set by simply defining the reference of the device without a parameter name. This is known as an implicit value.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Table data
2	string	Yes		Table type

Argument 1

This is either the 'parameter definitions' or the 'implicit defaults' depending on the setting of argument 2. Usually PrepareSetComponentValue is called twice, once for the 'parameter definitions' and again for the 'implicit defaults'.

The 'parameter definitions' table is a List of semi-colon delimited definitions to describe how to handle parameters stored in K=V pairs - as opposed to individual properties. The system looks at the VALUESCRIPT property and its arguments. It scans down the table until it finds an entry that matches the script called by VALUESCRIPT. VALUESCRIPT is the property used by nearly all parts that defines the script that is used to edit the part.

The following table describes the 'parameter definitions' table:

Field number	Description
1	'writeprop' OR 'defaultnames'. If 'writeprop' definition defines the name of the property that will hold the modified K=V values. If 'defaultnames', definition defines how you obtain the names of the parameters and their default values.
2	VALUESCRIPT script name
3	VALUESCRIPT argument to examine. 0 means the VALUESCRIPT arguments are ignored
4	'Direct' OR 'Model'. Only relevant of Field 1 is 'defaultnames'. 'Direct' means the default names data is read from the property specified as the argument in Field 3 or its default in Field 6 (see below). 'Model' means it is read from the params: or vars: list in the device's model file.
5	Boolean can be true/false, off/on or yes/no. Specifies whether the F11 window can be searched for the model. Only relevant if Field 4 is set to 'Model'
6	Default value for argument. If the argument to VALUESCRIPT is not present (or if Field 3 is zero) use this value instead
7	Boolean. Means that a property of the same name will also be written as well as the K=V parameter

The following table describes the 'implicit defaults' table:

Field number	Description
1	Property,Value pair. The value can use wildcards * and ?
2	The property or parameter that is read or set by an implicit action on this device. What happens is that the address is appended with this value when a match is found. So if the user entered U1.R1 where R1 is a resistor, the action will be the same as entering U1.R1.⟨contents-of-field2⟩. (And that is how this is implemented internally)
3	Boolean: If true read or write the first unlabelled value only and leave the rest alone

Argument 2

Specifies what the contents of argument 1 defines. Either 'parameter_definitions' or 'implicit_defaults'

Returns

Return type: real

Number of table entries entered

Probe

Changes schematic cursor to a shape depicting an oscilloscope probe. Returns when the user presses a mouse key. If the left key is pressed return value is 1 otherwise it is 0. Probe returns on both up and down strokes of mouse key. See "Cross probing" on page 3 for an example of using the Probe function.

Arguments

No arguments

Returns

Return type: real

1 if left button clicked, 0 if cancelled (right button or escape)

ProcessingAccelerator

Detects if the current script was called by an accelerator key

Arguments

No arguments

Returns

Return type: real

1 if the current script was called by an accelerator key, otherwise 0

See Also

ProcessingDragAndDrop (page 301)

ProcessingGuiAction (page 302)

CommandStatus (page 72)

ProcessingDragAndDrop

Detects if the current script was called by a drag and drop operation

Arguments

No arguments

Returns

Return type: real

1 if current script was called as a result of a drag and drop operation, otherwise 0

See Also

ProcessingAccelerator (page 301)

ProcessingGuiAction (page 302)

CommandStatus (page 72)

ProcessingGuiAction

Detects if the current script was called by a GUI action. Most scripts are called from a GUI action such as a menu or key press. Typing in the name of the scripts at the command line is also classed as a GUI action. This function will return 1 for such calls.

Scripts can also be called remotely using the /s switch on the SIMetrix.exe command line and also using the SxCommand utility. Such calls are classed as non-GUI. This function will return 0 for such calls.

Arguments

No arguments

Returns

Return type: real

1 if the current script was called by a GUI action, otherwise 0

See Also

ProcessingAccelerator (page 301)

ProcessingDragAndDrop (page 301)

CommandStatus (page 72)

Progress

Opens a dialog box showing a progress bar.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Position of progress bar in %
2	string array	No	⟨⟨empty⟩⟩	options/control

Argument 1

Value from 0 to 100 specifying the position of the bar.

Argument 2

String array of max length 2 used to specify options and control as follows:

'open'	Box is displayed (cannot be used with 'close')
'close'	Box is hidden (cannot be used with 'open')
'showabort'	If specified an abort button will be displayed

Returns

Return type: real

The function returns a two element array. The first element returns the value of argument 1, while the second returns 1 if the abort button has been pressed. If the abort button has not been pressed, the second element returns 0.

PropFlags

Returns the attribute flags for instances identified by arguments 2 and 3. See "Attribute Flags" in the command Prop (page 510) for details. This function has been superseded by PropFlags2 (page 304) and it is not recommended for new scripts. PropFlags2 has rearranged arguments allowing the schematic handle to be specified without requiring the property value to provided. It also has more convenient behaviour in the situation when there is no instance match.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name (for flags)
2	string	No	Selected components	Property name (for id)
3	string	No	Instances with property name in arg 2	Property value (for id)
4	real	No	-1	Schematic ID

Argument 1

Property whose flags are to be returned.

Argument 2

Along with argument 3, if present these arguments identify the instances to be examined. If only argument 2 is specified then all instances on the current schematic that possess that property will be used. If argument 3 is also present then the instance name and value must match argument 2 and 3 respectively. If neither are present the selected instances will be used.

Argument 3

See argument 2.

Argument 4

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

The function returns a string array of length equal to the number of instances identified by arguments 2 and 3. Each element will hold a flag value for the property specified in argument 1.

The function will return an empty vector if the specified schematic could not be found. If no instance matches arguments 2 and 3, an empty *string* will be returned.

PropFlags2

Returns the attribute flags for instances identified by arguments 3 and 4. See "Attribute flags" in the command Prop (page 510) for details.

This function replaces PropFlags. Its behaviour is similar but the arguments have been rearranged and its behaviour in the event of no instance match is different.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name (for flags)
2	real	No	-1	Schematic ID
3	string	No	Selected components	Property name (for id)
4	string	No	Instances with property name in arg 2	Property value (for id)

Argument 1

Property whose flags are to be returned.

Argument 2

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Argument 3

ALong with agument 4, if present these arguments identify the instances to be examined. If only argument 3 is specified then all instances on the current schematic that possess that property will be used. If argument 4 is also present then the instance name and value must match argument 3 and 4 respectively. If neither are present the selected instances will be used.

Argument 4

See argument 3.

Returns

Return type: string array

The function returns a string array of length equal to the number of instances identified by arguments 3 and 4. Each element will hold a flag value for the property specified in argument 1.

Note that this function compliments the functions PropValues2 (page 310) and SymbolNames (page 370) and will return the same number of values and in the same order, provided the same instance identifying arguments are given.

The function will return an empty *vector* if no instances match arguments 3 and 4. This differs from PropFlags which returns an empty *string* in this situation. The behaviour of PropValues2 is much more convenient and it is recommended that this is used in all new scripts.

PropFlags2 will also return an empty vector if the specified schematic could not be found.

PropFlagsAll

Returns the flags for the requested property. This will search all selected elements within a schematic. There are optional filters for choosing elements with a particular property, or property and value combination, along with options to select a specific schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name to retrieve flags for
2	string	No		Filter property name
3	string	No		Filter property value
4	real	No	-1	Schematic ID

Argument 1

The name of the property to return the flags for.

Argument 2

If set, will only select elements that have this property in them.

Argument 3

If set, will only select elements that have the property stated by argument 2, with the value stated by this argument.

Argument 4

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

Returns the property flags for all applicable properties. Each row of the resulting array will be a different element's property flag.

Example

The following would return all of the flags for the `ref` property with the selected schematic, for elements that have the property `MODEL` set to `X`:

```
PropFlagsAll(`ref',`model',`X')
```

See Also

"PropFlagsAnnotations" on page 306

"PropFlagsWires" on page 307

PropFlagsAnnotations

Returns the flags for the requested property. This will search selected annotations only within a schematic. There are optional filters for choosing elements with a particular property, or property and value combination, along with options to select a specific schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name to retrieve flags for
2	string	No		Filter property name
3	string	No		Filter property value
4	real	No	-1	Schematic ID

Argument 1

The name of the property that we are returning the flags for.

Argument 2

If set, will only select elements that have this property in them.

Argument 3

If set, will only select elements that have the property stated by argument 2, with the value stated by this argument.

Argument 4

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

Returns the property flags for all applicable properties. Each row of the resulting array will be a different element's property flag.

See Also

"PropFlagsAll" on page 305

"PropFlagsWires" on page 307

PropFlagsWires

Returns the flags for the requested property. This will search selected wires only within a schematic. There are optional filters for choosing elements with a particular property, or property and value combination, along with options to select a specific schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name to retrieve flags for
2	string	No		Filter property name
3	string	No		Filter property value
4	real	No	-1	Schematic ID

Argument 1

The name of the property that we are returning the flags for.

Argument 2

If set, will only select elements that have this property in them.

Argument 3

If set, will only select elements that have the property stated by argument 2, with the value stated by this argument.

Argument 4

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

Returns the property flags for all applicable properties. Each row of the resulting array will be a different element's property flag.

See Also

"PropFlagsAll" on page 305

"PropFlagsAnnotations" on page 306

PropOverrideStyle

Returns the override style of the selected property, if one exists. Override styles are used in the schematic and symbol editors to assign a different font style to a property. Uses the currently selected schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name

Returns

Return type: string

The override style name, if any, used by the property with the name specified.

PropValue

Returns the value of the property supplied as an argument for the selected component. If no components are selected or more than one component is selected, an empty string will be returned.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name

Argument 1

Property name

Returns

Return type: string

PropValues

Returns a property value for instances identified by arguments 2 and 3.

This function has been superseded by PropValues2 (page 310) and it is not recommended for new scripts. PropValues2 has rearranged arguments allowing the schematic handle to be specified without requiring the property value to provided. It also has more convenient behaviour in the situation when there is no instance match.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name whose value is required
2	string	No	Use selected components if omitted	Property name to identify instance
3	string	No	All instances with property name in arg2	Property value to identify instance
4	real	No	-1	Schematic ID

Argument 1

Property name whose value is required

Argument 2

Along with argument 3, if present these arguments identify the instances to be examined. If only argument 2 is specified then all instances on the specified schematic that possess that property will be used. If argument 3 is also present then the instance name and value must match argument 2 and 3 respectively. If neither are present the selected instances will be used.

Argument 3

See argument 2.

Argument 4

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

The function returns a string array of length equal to the number of instances identified by arguments 2 and 3. Each element will hold a value for the property specified in argument 1.

The function will return an empty vector if the specified schematic could not be found. If no instance matches arguments 2 and 3, an empty *string* will be returned.

PropValues2

Returns a property value for instances identified by arguments 3 and 4.

This function replaces PropValues (page 309). Its behaviour is similar but the arguments have been rearranged and its behaviour in the event of no instance match is different and more convenient.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name whose value is required
2	real array	No	-1	Schematic handle and sort option
3	string	No	Use selected components if omitted	Property name to identify instance
4	string	No	All instances with property name in arg2	Property value to identify instance

Argument 1

Property whose value is to be returned.

Argument 2

First element is a schematic handle as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If equal to -1, the currently selected schematic will be used.

A second element may be supplied and if non-zero, the results will be sorted by location. Otherwise they will not be sorted.

Argument 3

Along with argument 4, if present these arguments identify the instances to be examined. If only argument 2 is specified then all instances on the specified schematic that possess that property will be used. If argument 3 is also present then the instance name and value must match argument 2 and 3 respectively. If neither are present the selected instances will be used.

Argument 4

See argument 3.

Returns

Return type: string array

The function returns a string array of length equal to the number of instances identified by arguments 2 and 3. Each element will hold a value for the property specified in argument 1.

Note that this function is analogous to the functions PropFlags2 (page 304) and SymbolNames (page 370) and for identical values of arguments 3 and 4 will return an array of the same length and in the same order.

The function will return an empty *vector* if no instances match arguments 3 and 4. This differs from PropValues which returns an empty *string* in this situation. The behaviour of PropValues2 is much more convenient and it is recommended that this is used in all new scripts.

PropValues2 will also return an empty vector if the specified schematic could not be found.

PropValuesAll

Returns the values for the requested property. This will search all selected elements within a schematic. There are optional filters for choosing elements with a particular property, or property and value combination, along with options to select a specific schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name to retrieve values for
2	string	No		Filter property name
3	string	No		Filter property value
4	real	No		Schematic handle

Argument 1

The name of the property to return the values for.

Argument 2

If set, will only choose elements that have this property in them.

Argument 3

If set, will only choose elements that have the property stated by argument 2, with the value stated by this argument.

Argument 4

Handle to a particular schematic. If not set, uses the currently highlighted schematic.

Returns

Return type: string array

Returns the property values for all applicable properties. Each row of the resulting array will be a different element's property flag.

Example

The following would return all of the value for the `ref` property with the selected schematic, for elements that have the property `MODEL` set to `X`:

```
PropValuesAll(`ref',`model',`X')
```

See Also

"PropValuesAnnotations" on page 313

"PropValuesWires" on page 314

PropValuesAnnotations

Returns the values for the requested property. This will search selected annotations only within a schematic. There are optional filters for choosing elements with a particular property, or property and value combination, along with options to select a specific schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name to retrieve values for
2	string	No		Filter property name
3	string	No		Filter property value
4	real	No		Schematic handle

Argument 1

The name of the property to return the values for.

Argument 2

If set, will only choose elements that have this property in them.

Argument 3

If set, will only choose elements that have the property stated by argument 2, with the value stated by this argument.

Argument 4

Handle to a particular schematic. If not set, uses the currently highlighted schematic.

Returns

Return type: string array

Returns the property values for all applicable properties. Each row of the resulting array will be a different element's property flag.

See Also

"PropValuesAll" on page 312

"PropValuesWires" on page 314

PropValuesWires

Returns the values for the requested property. This will search selected wires only within a schematic. There are optional filters for choosing elements with a particular property, or property and value combination, along with options to select a specific schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name to retrieve values for
2	string	No		Filter property name
3	string	No		Filter property value
4	real	No		Schematic handle

Argument 1

The name of the property to return the values for.

Argument 2

If set, will only choose elements that have this property in them.

Argument 3

If set, will only choose elements that have the property stated by argument 2, with the value stated by this argument.

Argument 4

Handle to a particular schematic. If not set, uses the currently highlighted schematic.

Returns

Return type: string array

Returns the property values for all applicable properties. Each row of the resulting array will be a different element's property flag.

See Also

"PropValuesAll" on page 312

"PropValuesAnnotations" on page 313

PutEnvVar

Write a system environment variable. Note that this only modifies environment variables in the current process and any child processes initiated using the commands Shell (page 538) or ShellOld (page 538).

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Definition

Argument 1

Definition. Must be of form `name=value`.

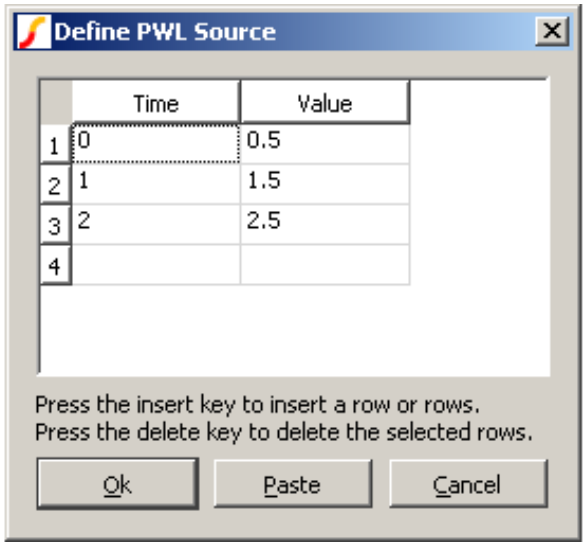
Returns

Return type: real

The function returns 1 on success or 0 on failure. Failure can occur if the argument is of the wrong format.

PWLDialog

Opens the dialog box shown below allowing the entry of X-Y pairs intended for the definition of piece-wise linear devices.



Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		X-Y Pairs
2	string	No		Options
3	real array	No		Initial conidtion / value states

Argument 1

X-Y Pairs to initialise box. The above example would be displayed after a call to:

```
Show pwldialog([`0',`0.5',`1',`1.5',`2',`2.5'])
```

Argument 2

Up to seven element string array to define box labels:

Index	Description
0	Box caption. Default: 'Define PWL Source'
1	Label for X-Values column. Default: 'Time'
2	Label for Y-Values column. Default: 'Value'

Index	Description	
3	Initial condition mode. May be:	
	'none'	Default setting. No initial condition displayed
	'segment'	Initial segment. Initial condition value is an integer with a minimum value of 1 and a maximum value equal to the number of rows. (Used for some SIMPLIS PWL devices). **Use initial condition** check box will not be shown.
	'continuous'	Initial condition is a non-integral number. **Use initial condition** check box will be shown.
4	Help context id. Default: '-1' (no help button shown)	
5	Minimum number of segments. Default = '1'	
6	Maximum number of segments. Default = '255'	
7	Symmetric definition flag. '1' enables symmetric definition mode. Default '0'.	

Argument 3

Real array with two elements. First element is the initial state of the 'Use initial condition' check box. Second element is the initial value of the initial condition edit box.

This argument is ignored if initial condition mode is set to 'none'.

Returns

Return type: string array

The function returns the X-Y Pairs entered by the user in the same format as for argument 1. If initial conditions were enabled on input, there will be two additional elements at the end. The first will be either 'true' or 'false' to indicate whether 'Use initial condition' was checked and the second is the value of the initial condition.

QueryData

Filters a list of data items according to search criteria.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Data
2	string array	Yes		Filter

Argument 1

The data to be filtered. This should consist of an array of strings comprising semicolon delimited fields. The filter supplied in argument 2 matches each field to certain criteria and returns the data in the output if those criteria are satisfied.

Argument 2

Filter to determine if data in arg 1 is passed to the output. The filter consists of one or more semi-colon delimited lists which can be combined in Boolean combinations. Each of the lists is compared with the input data for a match and if the resulting Boolean expression is true, the data item is accepted and passed to the return value. Wild cards '*' and '?' may be used in any field. The system is best explained with examples.

Suppose a data item in arg 1 is as follows,

```
IRFI520N;nmos_sub;X;NMOS;;;;SIMetrix
```

and the filter supplied in arg 2 is:

```
*;*;X;*;*;*;*;SIMetrix
```

This will match successfully. The third and last fields are the same in both the data and the filter and the remaining filter fields are the '*' wild card which means that anything will be accepted in the corresponding data field. With the following filter, however, the data will not be accepted:

```
*;*;X;*;*;*;*;SIMPLIS
```

Here the last field doesn't match.

In the above simple examples, only one filter list has been supplied. However, it is possible to use more sophisticated filters consisting of multiple lists combined using Boolean operators. Boolean operators are specified with the key words:

\OR

\AND

\XOR

\NOT

These can be used to make a Boolean expression using "reverse polish" notation. Here is an example:

```
[`*;nmos;*;*;*;*;*;SIMetrix',
`*;nmos_sub;*;*;*;*;*;SIMetrix', `\OR']
```

This will accept any data where the last field is 'SIMetrix' and the second field is either 'nmos' or 'nmos_sub'. Note that the keyword '\OR' is applied after the filter lists. As well as the '*' wild card, the '?' may also be used. '?' matches only a single character whereas '*' matches any number of characters. For example:

```
?mos
```

Would match 'pmos' as well as 'nmos'. It would also match any other four letter word that ended with the three letters 'mos'.

Returns

Return type: string array

String array of length up to but not exceeding the length of argument 1. Contains all arg 1 items that match the filter as explained above.

RadioSelect

Opens a dialog box with any number of radio buttons. The number of buttons visible depends on the length of argument 2. Six will be displayed if it is omitted.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	1	Number of buttons initially selected
2	string	No	empty	Button labels
3	string	No	Dialog box caption	Other labels
4	string	No		Help context ID

Argument 1

The number of buttons initially selected.

Argument 2

Specifies the labels for each button.

Argument 3

String array up to length 3. First element is dialog box caption and the second element is text label displayed above radio buttons. If a third element is present, a check box will also be displayed underneath the radio buttons. The third element defines the label for this check box

Argument 4

Specifies a help context id and if present a Help button will be displayed. This is used by some internal scripts.

Returns

Return type: real

The return value identifies the selected button with the top most being 1. If the user cancels the function returns 0. If the check box is displayed, the return value will have length 2 with the second element holding the state of the check box.

See Also

"BoolSelect" on page 65

"EditSelect" on page 121

"ValueDialog" on page 392

"NewValueDialog" on page 279

RadioSelectWidgetStackDialog

Arguments

No arguments

Returns

Return type:

Range

Returns a vector which is a range of the input vector in argument 1. The range extends from the indexes specified by arguments 2 and 3. If argument 3 is not supplied the range extends to the end of the input vector. If neither arguments 2 or 3 are supplied, the input vector is returned unmodified.

See also the function Truncate (page 383).

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex or string array	Yes		Vector
2	real	No		Start index
3	real	No	Vector length -1	End index

Returns

Return type: matches argument 1

re

Returns the real part of the complex argument.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real array

Returns the real part of the complex argument.

ReadClipboard

Returns text contents of the windows clipboard. Data is returned as one line per array element.

Arguments

No arguments

Returns

Return type: string array

ReadConfigCollection

Returns the contents of an entire section in the configuration file. Note that only the values are returned, not the names of the keys. To get the names of the keys, use the function ReadConfigSetting (page 321) with an empty second argument.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Section

Argument 1

Name of section to return.

Returns

Return type: string array

An array of strings holding the values for every entry in the specified section. Note that the key names are not returned. This function is intended to be used for managing lists of values identified by their section name. Use the function AddConfigCollection (page 58) to write values to the list.

ReadConfigSetting

Reads a configuration setting. Configuration settings are stored in the configuration file. See *User's Manual/Sundry Topics/Configuration Settings* for more information. Settings are defined by a key-value pair and are arranged into sections. The function takes the name of the key and section and returns the value. Note that option settings (as defined by the Set command) are placed in the 'Options' section. Although these values can be read by this function this is not recommended and instead you should always use the function GetOption (page 201).

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Section
2	string	No		Key

Argument 1

Section name. See description above for explanation.

Argument 2

Key name. See description above for explanation.

If this argument is omitted, the function will return a list of all keynames found in the specified section.

Returns

Return type: string or string array

Value read from configuration file.

See Also

"WriteConfigSetting" on page 404

ReadF11Options

Read .OPTIONS line in the F11 window

Arguments

No arguments

Returns

Return type: string array

Array of semi-colon delimited strings providing details of any SIMetrix .OPTIONS statements located in the current schematic's F11 window. Each token in the string is defined in the following table:

Field	Description
0	Option name
1	Value
2	Type - on eof 'BOOL', 'REAL', 'INT', 'STRING' or 'UNKNOWN'

The function will not return option settings that are not recognised by the simulator. It will also not return option settings that are set to their default value.

See Also

WriteF11Options (page 405)

WriteF11Lines (page 404)

GetF11Lines (page 171)

AppendTextWindow (page 444)

ReadFile

Returns an array of strings holding lines of text from the file specified by argument 1.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File name
2	string	Yes	'utf8'	Encoding option

Argument 2

Can be 'mbcs' or 'utf8'. If 'utf8' the file is assumed to be encoded using UTF8. If 'mbcs' encoding uses the system default

Returns

Return type: string array

See Also

LoadFile (page 259) Perfoms a similar operation but with more encoding options including the ability to auto-detect UTF8

ReadIniKey

Reads an INI file. An INI file usually has the extension .INI and is used for storing configuration information. INI files are used by many applications and follow a standard format as follows:

```
[section_name1]
key1=value1
key2=value2
...
[section_name2]
key1=value1
key2=value2
...
```

```
etc.
```

There may be any number of sections and any number of keys within each section.

The ReadIniKey function can return the value of a single key and it can also return the names of the all the keys in a section as well as the names of all the sections.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Inifile name
2	string	Yes		Section name
3	string	Yes		Key name

Argument 1

File name. You should always supply a full path for this argument. If you supply just a file name, the system will assume that the file is in the WINDOWS directory. This behaviour may be changed in future versions. For maximum compatibility, always use a full path.

Argument 2

Section name. If this argument is an empty string, the function will return the names of the sections in the file.

Argument 3

Key name. If this argument is an empty string and argument 2 is *not* an empty string, the function will return the names of all the keys in the named section.

Returns

Return type: string array

string array

ReadRegSetting

Reads a string setting from the windows registry. Currently this function can only read settings in the HKEY_CURRENT_USER and HKEY_LOCAL_MACHINE top level trees.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Key name
2	string	Yes		Value name
3	string	No	'HKCU'	Top level tree

Argument 1

Name of key. This must be a full path from the top level. E.g. 'Software\SIMetrix\'

Argument 2

Name of value to be read.

Argument 3

Top level tree. This may be either 'HKEY_CURRENT_USER' or 'HKEY_LOCAL_MACHINE' or their respective abbreviations 'HKCU' and 'HKLM'.

Returns

Return type: string

Returns value read from the registry. If the value doesn't exist, the function returns an empty vector.

ReadSchemProp

Returns value of schematic window property value.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name
2	string	No	Currently displayed	Schematic path

Argument 1

Property name. There are a number of built-in properties that are always available. Others can be created with the function WriteSchemProp (page 408). The built-in properties are:

'Path'	Read-only. File system path name of schematic
'RootPath'	Read/Write. Path of root in hierarchy. Value displayed in status bar of schematic
'Reference'	Read/Write. Full component reference of block representing schematic.
'Readonly'	Read-only. Readonly status of schematic. Return value may be 'TRUE' or 'FALSE'
'UserStatus'	Read/Write. Contents of user status box at the bottom of the schematic. This is currently the 6th box from the left.
'UserVersion'	Read-only. Current version number of schematic. This is updated each time the schematic is saved
'ID'	Read-only. Returns ID of schematic (same value returned by OpenSchematic (page 286))

'Magnification'	Read-only. Current view magnification
'Modified'	Modified status 'TRUE' or 'FALSE'

Argument 2

Path of schematic to process. This must be a schematic that is currently displayed; the function can not operate on a closed schematic.If not specified, the currently selected schematic will be processed.

Returns

Return type: string

Returns the value of the property

ReadTextEditorProp

Reads a text editor property. This will work for all text based editors.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name
2	string	No		Editor type

Argument 1

Name of the property to read the value for.

Argument 2

Optional flag to specify the type of editor. Possible values are:

LogicDefinitionEditor

NetlistEditor

ScriptEditor

TextEditor

VerilogAEditor

VerilogHDLEditor

Returns

Return type: string

The property value for the requested property.

real

Returns the real part of the complex argument.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real array

Returns the real part of the complex argument.

Ref

Returns the reference of the argument. See "Vector References" on page 21.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		Vector

Returns

Return type: real/complex array

RefName

Returns the name of the reference of the supplied vector. See "Vector References" on page 21. Note that the function Ref (page 327) returns the actual data for the reference.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		Vector

Returns

Return type: string

RelativePath

Returns a path relative to the reference directory (argument 2 or current working directory) of the full path name supplied in argument 1.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Full path name
2	string	No	Current directory	Reference directory

Returns

Return type: string

See Also

"FullPath" on page 145

"SplitPath" on page 361

RemapDevice

Map SIMetrix simulator device to model name and level number.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Mapping spec

Argument 1

Comma delimited list of name=value pairs providing spec to map a device type to its model and level number. Name=value pairs are defined as follows:

Returns

Return type:

Notes

All device models (that is the binary code that implements the device equations) have an internal name that is used to uniquely identify it, but this name is not used externally. Instead .MODEL statements use their own name (e.g. nmos, pnp) coupled with an optional LEVEL parameter to define the actual device referred to. For example, the MOS level 3 device is referred internally as "MOS3" but the .MODEL statements use the names NMOS or PMOS and set the LEVEL

parameter to 3. The mapping between NMOS and LEVEL 3 to "MOS3" is defined in an internal table which can be modified by this function.

A call to this function can add new entries to the table so providing additional methods of accessing a device. It can also modify existing entries to point to a new device.

To modify an existing mapping, you only need to provide ModelName, Device and Level values. The modelname and level must point to an existing combination that is already in use, e.g. ModelName=D and Level=1, and device would then be set to the new device that this combination is to point to, e.g. Diode3. So this is what the spec would be:

```
RemapDevice('ModelName=D,Level=1,Device=Diode3')
```

The above would make level 1 diodes use the same model as level=3. Here is another example:

```
RemapDevice('ModelName=R,Level=0,Device=HspiceRes')
```

Level=0 is the level value when the LEVEL parameter is not specified. In the case of resistors, no .MODEL statement is required at all, so the above line will change the default model used for all resistors to the Hspice model instead of the native SIMetrix model.

It is also possible to add a new mapping in which case the level and modelname parameters must be currently unused. Also when creating a new mapping the 'Letter' parameter must be specified. 'Letter' is the first letter of the component reference traditionally used to identify the type of device in SPICE netlists. For example 'Q' refers to BJTs and 'D' refers to diodes.

For example, the following entries define LEVEL=69 as a valid level for accessing the PSP 1.03 model:

```
RemapDevice('ModelName=nmos,Level=69,Device=psp103_n,report=on')
```

Note that two entries are required in order to support both n-channel and p-channel devices. The above doesn't change the existing level it adds an additional level. Both the original level number and 69 will be accepted and be equivalent.

When defining a new mapping the letter must be specified and usually this should be the letter conventionally used for the class of device. If defining a new mapping for a MOSFET, the letter 'M' should be used, for a diode the letter 'D' should be used and so on. However, the letters, 'N', 'P', 'W', 'U' and 'Y' maybe used as well for any type of device.

RemoveConfigCollection

Removes one or more entries from a configuration file collection.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Section name
2	string array	Yes		Items to remove

Argument 1

Section where entries to be removed are located

Argument 2

List of strings to remove from the collection.

Returns

Return type: real

RemoveModelFile

Uninstalls the model library paths specified in the argument.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Model path names

Returns

Return type: string

RemoveSymbolFiles

Removes a symbol file or set of symbol files from the symbol library

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		String array of symbol file paths

Returns

Return type: real

Number of library paths removed.

ResolveGraphTemplate

Evaluate template string used by graph object.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Graph object ID
2	string	Yes		Template
3	string	No		Options

Argument 1

ID of graph object whose properties are to be used in the template. See "Graph Object Identifiers - the 'ID"' on page 570.

Argument 2

Template string. This can consist of literal text, properties enclosed with '%' and expressions enclosed with '{' and '}'. The property values are those belong to the object supplied in argument 1. Properties available for the various types of graph object are described in "Objects and Their Properties" on page 571. Some properties return the id of another graph object. These can be used to create nested property definitions. For example `%curve:label%` when applied to a curve marker object returns the label of the attached curve.

The template string may also contain the special keywords `<if>`, `<ifd>`, `<t>` and `<repeat>`. These behave the same and have identical syntax as the keywords of the same name used for schematic TEMPLATE properties described in the *User's Manual*.

Argument 3

Options. Currently there is only 1 and that is the action to take when an expression fails to evaluate. Possible values are:

'msg'	Requires a second arg 3 to have two elements. Returns error message specified in second element of string.
'empty'	Returns an empty value on error
'literal'	(default) Returns the literal text of the expression

Returns

Return type: string

Returns the result of evaluating the template.

Notes

This function along with ResolveTemplate (page 332) are implemented using the same internal program code that implements the schematic TEMPLATE property in a netlist generation and behaves in the same way.

ResolveTemplate

Evaluate template string.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Template string
2	string	Yes		Property names
3	string	Yes		Property values
4	string	No	Input template unmodified	Return value for evaluation error

Argument 1

Template string. This can consist of literal text, expressions enclosed in ‘’ and ‘’ and special property names enclosed in ‘%’. The property names and their respective values may be defined in arguments 2 and 3. Properties names are substituted with their values by this function.

The template string may also contain the special keywords `<if>`, `<ifd>`, `<t>` and `<repeat>`. These behave the same and have identical syntax as the keywords of the same name used for schematic TEMPLATE properties described in the *User's Manual*.

Argument 2

Property names.

Argument 3

Property values corresponding to property names given in argument 2.

Argument 4

If the template contains an expression encloded in braces and the evaluation of the expression fails, the value defined in this argument is returned by the function

Returns

Return type: string

Returns the result of evaluating the template.

RestartTranDialog

Opens a dialog box allowing the user to specify a new stop time for a transient analysis. The value is initialised with the argument. The return value is the stop time entered by the user. The user will not be able to enter a value less than that supplied in the argument.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Initial stop time

Returns

Return type: real

Rms

Returns accumulative RMS value of argument

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Vector

Returns

Return type: real array

Returns a vector of the accumulative rms value of the input. Unlike RMS1 (page 333) this function returns a vector which can be plotted.

RMS1

Returns the root mean square value of the supplied vector between the ranges specified by arguments 2 and 3. If the values supplied for argument 2 and/or 3 do not lie on sample points, second order interpolation will be used to estimate y values at those points.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Vector
2	real	No	Start of input vector	Start x value
3	real	No	End of input vector	End x value

Returns

Return type: real

rnd

Returns a vector with each element a random value between 0 and the absolute value of the argument's corresponding element.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		vector

Returns

Return type: real array

Returns a random number.

RootSumOfSquares

Similar to the function RMS1 (page 333) but returns the root of the sum without performing an average.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Vector
2	real	No	Start of input vector	Start x value
3	real	No	End of input vector	End x value

Returns

Return type: real array

rt

Evaluate template string. This function is an alias to ResolveTemplate (page 332)

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Template string
2	string	Yes		Property names
3	string	Yes		Property values

Returns

Return type: string

Returns the result of evaluating the template.

SaveSpecialDialog

Opens the dialog used by the schematic's Save Special... menu.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No		Initial values

Returns

Return type: string array

A length three array of strings. The elements are defined as:

Index	Description
0	Filename
1	ASCII format? '1' or '0'
2	Save complete component? '1' or '1'

Scan

Splits a character delimited string into its components (known as tokens). Returns result as string array.

Character used as delimiter may be passed as argument 2. If argument 2 omitted delimiter defaults to a semi-colon.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		String to scan
2	string	No		Delimiter
3	real	No		Min number of return values

Argument 1

String to scan.

Argument 2

Delimiter. Semi-colon if omitted. Only a single character is permitted. To scan with multiple delimiters, see the function Parse (page 288).

Argument 3

If present, forces the result to be a minimum size. For example, if the input string had two tokens but this argument was set to three, the result would be a string array of length 3 with the third element an empty string. In many applications, this can save testing the length of the return value to determine if an optional token was provided.

Returns

Return type: string array

Returns tokens as an array of strings. Empty fields are treated as a separate token. E.g. in `'BUF04;buf;;Buffers;;'` the double semi-colon after 'buf' would return an empty entry in the returned array. So:

```
Scan(`BUF04;buf;;Buffers;;')
```

would return:

```
[ `BUF04', `buf', `', `Buffers', `']
```

ScriptName

Returns the full path of the currently executing script.

Arguments

No arguments

Returns

Return type: string

Returns full path of currently executing script. If the script running directly from the script editor then this function will return the path of the file in the editor if there is one. If the script editor file has never been saved then the return value will be '<LocalScript>'

Search

Searches a list of strings for one or more items supplied in argument 1 for the item(s) supplied in argument 2. Function returns a real array of length equal to the length of argument 2. The return value is an array of reals.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		List to search
2	string	Yes		Items to search in list
3	string	No		Options

Argument 1

List to search.

Argument 2

Items to search in list.

Argument 3

Legacy option. Set to 'path' if the items being searched are file system paths. This is to enable case-sensitive searching on systems that use case-sensitive file names.

Returns

Return type: real array

Array of indexes into argument 1 for the items found in argument 2. If a string in argument 2 is not found, the return value for that element will be -1.

SearchModels

This is a special purpose function designed for use with the model installation system. It returns an array of strings holding pathnames with wildcards of directories containing files with SPICE compatible models. The argument specifies a directory tree to search. The function will recurse through all sub directories of the supplied path.

Note that if the root directory of a large disk is specified, this function can take a considerable time to return. It can however be aborted by pressing the escape key.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path to search

Returns

Return type: string array

List of library specs containing model files

Seconds

Returns the number of seconds elapsed since January 1, 1970. Returned value is an integer.

Arguments

No arguments

Returns

Return type: real

Select2Dialog

Opens a dialog box with two list boxes allowing the user to select two values.

Arguments

Number	Type	Compulsory	Default	Description
1	String array	No		Initial values
2	String array	No		List entries

Argument 1

Five element string array. Values as follows:

Index	Description
0	List box 1 initial selection
1	List box 2 initial selection
2	Message at top of box
3	Message under left hand list box
4	Message under right hand list box

Argument 2

Two element array. The first element carries the items to be placed in the left hand list box. The second element carries the items to be placed in the right hand list box. Items are separated by a pipe ('|') symbol.

Returns

Return type: string array

Two element array. First element carries the selected value from the left hand list box while the second value holds the selected value from the right hand list box.

SelectAnalysis

This is a special purpose function. It opens the 'Choose Analysis' dialog box. The return value from this function is simply determined by how the user closes the box. The main operation of the dialog box happens independently of the function call mechanism. Return values are:

No schematic	3
Run button	2
Cancel button	1
OK button	0

The dialog box will not open if there is no current schematic.

The function reads the schematic's text window and translates any analysis controls present including any preceded by a single comment character. It uses the information gained to initialise the dialog box's controls. After the user has made a selection and closed the box, the controls in the schematic text window are updated. This mechanism means that analysis modes are stored with a schematic. Also, the user is free to select analysis modes by manually editing the controls in the text window. Any such changes will be reflected in subsequent calls to SelectAnalysis.

Arguments

No arguments

Returns

Return type: real

SelectColourDialog

Opens a dialog box allowing the user to define a colour. The box is initialised with the colour specification supplied as an argument. The function returns the new colour specification.

If the user cancels the box, the function returns an empty vector.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	Specification for BLACK	Initial colour specification

Argument 1

Initial colour specification. May be the name of a colour object, an integer value as returned by GetColourSpec (page 156) or a colour in the form #rrggbb

Returns

Return type: string

Colour in form #rrggbb

SelectColumns

Accepts an array of character delimited strings and returns an array containing only the specified field. This function was developed for the parts browser mechanism but is general purpose in nature.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Input data
2	real	Yes		Field number
3	string	No	';'	Delimiter

Returns

Return type: string array

Example

Data input (arg 1):

```
BUF600X1;Buf;;Buffers;;2,1,4,3
BUF600X2;Buf;;Buffers;;2,1,4,3
BUF601X1;Buf;;Buffers;;2,1,4,3
BUF601X2;Buf;;Buffers;;2,1,4,3
```

Field number (arg2)

```
0
```

Returns:

```
BUF600X1
BUF600X2
BUF601X1
BUF601X2
```

SelectCount

Returns number of items selected. If argument is 'Wires', only selected wires will be counted, if argument is 'Instances', selected instances will be counted. Otherwise all items are counted.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	'all'	Type of item to count. 'Wires', 'Instances', 'All'

Returns

Return type: real

SelectDevice

Opens parts browser dialog.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Parts data
2	string	No	No device selected	Selected device
3	string array	No		User installed models

Argument 1

Argument is array of strings containing parts database. This is usually read from the file 'OUT.CAT' in the script directory. The format for this file is described in *User's Manual/Device Library and Parts Management/Advanced Topics/Catalog Files* Chapter of the *User's Manual*. Each line contains up to 8 semi-colon delimited fields. Only the first field (part number) and the fourth field (category) are displayed to the user but the values of any other field will be returned in the result.

Argument 2

If supplied and is the part number of a device included in arg 1, that device will be selected.

Argument 3

contains a list of model names that will appear in the '* User Models *' category. These will also appear in the '* Recently Installed Models *' category if the model was installed within the last 30 days or other duration defined by the NewModelLifetime option setting.

Returns

Return type: string array

Return value is a string array of length 8 containing the value of each field of the selected device or an empty vector if cancelled.

SelectDialog

Opens a dialog box containing a list box. The list box is filled with string items supplied in argument 2. The return value is the index or indexes of the items in the list box selected by the user.

This function is used by a number of the standard menus.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Options
2	string array	Yes		List box entries

Argument 1

There are a number of options available and these are specified in argument 1. This is an array of strings of length up to 7. The meaning of each element is as follows:

Index	Possible values	Description
0		Dialog box caption
1		Message above list box
2	'Multiple', 'Single'	If 'single', only one item may be selected. Otherwise any number of items can be selected.
3	'Sorted', ''	If 'sorted', items in list are arranged in alphabetical order. Otherwise they are in same order as supplied.
4		Index of item to select at start. Only effective if 'single' selected for index 2. This is an integer but must be entered as a string e.g. '2'.
5		Initial string in edit box
6		Default return value if none selected

Returns

Return type: real array

The return value is the index or indexes of the items in the list box selected by the user, or empty if the user cancels.

Example

```
SelectDialog(['Caption','Message','single','','1'],
['Fred','John','Bill'])
```

Will place strings 'Fred', 'John' and 'Bill' in the list box with 'John' selected initially. The strings will be in the order given (not sorted).

SelectedProperties

Returns information about selected properties.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	'Handle'	Property name

Argument 1

Property whose value will be used to identify the instance that possesses the selected property.

Returns

Return type: string array

Returns an array of length equal to 3 times the number of properties selected. Currently, however, it is only possible to select one property at a time so the return value will be either of length zero or length 3. The elements in each group of three are as defined in the table.

Index	Description
0	Value of instance property identified in argument 1. This is used to identify the instance that possesses the selected property.
1	Name of selected property
2	Value of selected property

Notes

Properties can only be selected if the 'selectable' attribute is enabled.

SelectedStyleInfo

Returns chosen style information for the selected element. If a style name given in the argument does not exist for the selected element, then the current default style information will be returned instead.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Style names

Argument 1

The style names to return the style information for.

Returns

Return type: string array

The style information as used by that element. Each element of the array corresponds to the result for the matching input array element.

SelectedWires

Returns an array of strings holding the handles of selected wires.

Arguments

No arguments

Returns

Return type: string array

SelectFontDialog

Opens a dialog box allowing the user to define a font. The box is initialised with the font specification supplied as an argument. The function returns the new font specification.

A second argument may be specified to identify the name of the object whose font is being edited. This is so that its font may be updated if the user presses the *Apply* button in the dialog box.

If the user cancels the box, the function returns an empty vector.

Font specifcations are strings that provide information about the type face, size, style and other font characteristics. Font specifications should only be used with functions and commands that are designed to accept them. The format of the font spec may change in future versions.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	Default font	Initial font specification
2	string	No		Name of object being edited

Returns

Return type: string

SelectRows

Accepts an array of character delimited strings and returns an array containing a selection containing the test string at specified field. This function was developed for the parts browser mechanism but is general purpose in nature.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Input data
2	string	Yes		Test string
3	string	No	0	Field number
4	string	No	‘;’	Delimiter

Returns

Return type: string array

Example

Data input (arg 1):

```
HA-5002/HA;buf;;Buffers;;
HA-5033/HA;buf;;Buffers;;
HA5002;buf;;Buffers;;
HA5033;buf;;Buffers;;
LM6121/NS;buf;;Buffers;;1,2,4,3
MAX4178;buf_5;;Buffers;;
MAX4278;buf_5;;Buffers;;
MAX496;buf_5;;Buffers;;
```

Test string (arg 2)

```
`buf'
```

Field number (arg 3)

```
1
```

Returns:

```
HA-5002/HA;buf;;Buffers;;
HA-5033/HA;buf;;Buffers;;
HA5002;buf;;Buffers;;
HA5033;buf;;Buffers;;
LM6121/NS;buf;;Buffers;;1,2,4,3
```

SelectSimplisAnalysis

Opens SIMPLIS choose analysis dialog box. This function reads and writes the schematic's F11 window directly.

Arguments

No arguments

Returns

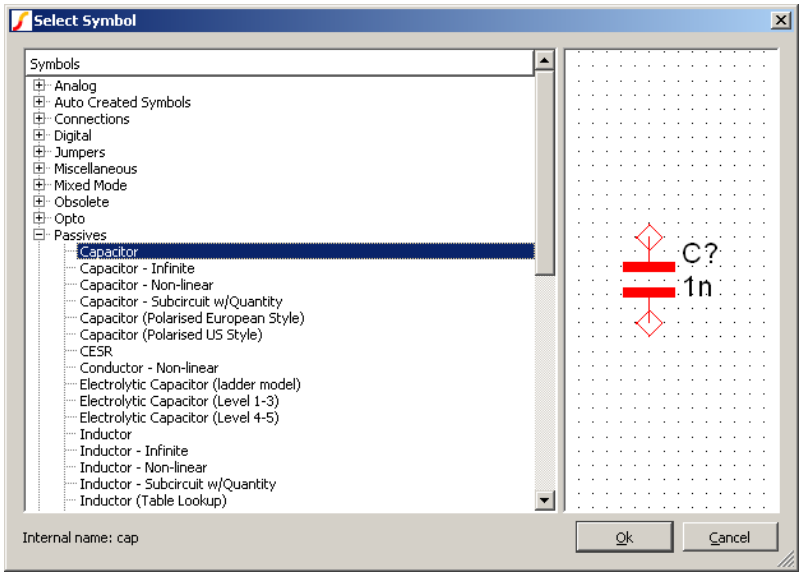
Return type: real array

The return value indicates how the user closed the box as follows, as shown in the table.

Index	Description
0	Ok pressed
1	Cancel pressed
2	Run pressed
3	No schematic open. (Dialog doesn't open in this case)

SelectSymbolDialog

Opens the following dialog box allowing the user to select a schematic symbol from the symbol library.



Arguments

Number	Type	Compulsory	Default	Description
1	string array	No	Use all installed symbols	Internal symbol names
2	string array	No	As defined by symbol	Display name and tree paths
3	string	No		Option

Argument 1

An array of internal symbol names. For the left hand graphic display to function correctly, each symbol specified must be currently installed.

Argument 2

An array of strings that describes how the symbol will be identified in the right hand pane. Expected to be a semi-colon delimited string with each token representing the node name in the tree list structure.

In practice, however, it is more usual to leave this argument empty, so that the path information can be obtained from the symbol definition itself.

Argument 3

Set to 'outIndex' to change return value to an index into argument 1 instead of the actual symbol name.

Returns

Return type: string

The function returns the internal name of the selected symbol. If the user cancels, the function returns an empty value.

Notes

This function is used for the **Place | From Symbol Library...** menu. In that application, no arguments are supplied and the whole symbol library is displayed.

SelGraph

Returns id of selected graph. Returns 0 if no graph is open.

Arguments

No arguments

Returns

Return type: real

Returns id of selected graph. Returns 0 if no graph is open.

SelSchem

Returns 1 if at least one schematic is open otherwise 0.

Arguments

No arguments

Returns

Return type: real

SetComponentValue

SetComponentValue is a specialised function that is used by some internal scripts. It provides a way of setting or getting a value or parameter on a schematic using a single string to identify it. This is in contrast to the usual methods to retrieve values or set values that require a sequence of commands or functions.

For example, to set a resistor R2 to 2200 ohms using conventional methods requires this sequence:

```
Unselect
Select /Prop REF R2
Prop VALUE 2200
```

With SetComponentValue, this can be done simply with:

```
Let SetComponentValue('R2', 2200)
```

However, SetComponentValue can also descend into hierarchies and set values at lower levels. For example:

```
Let SetComponentValue('U1.R2', 2200)
```

Will set the resistor R2 in hierarchical block U1.

SetComponentValue can also set named parameters. For example, if X1 is a parameterised opamp:

```
Let SetComponentValue('X1.GBW', 16.5E6)
```

will set the GBW parameter to 16.5E6.

Because the methods use to store component values and parameters is dependent on the part being edited or viewed, this function requires pre-configuring. This is done using PrepareSetComponentValue (page 299). A built-in script is available that will configure SetComponentValue for the most commonly used cases. The script is called prepare_set_component_default. See PrepareSetComponentValue (page 299) for further details.

Be aware that SetComponentValue will not work for all types of device - only those whose method of storing values it has been configured to accept.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Address
2	string	No	If omitted, value will not be changed but the current value will be returned	Value
3	real	No	-1	Schematic ID

Argument 3

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

String array of lenght 6 with elements defined by the following table

Index	Description
0	Current value (before being edited)

Index	Description
1	Status code. May be one of 'Noerr', 'BadAddress', 'AmbiguousAddress', 'IncompleteAddress', 'MissingChild', 'WriteProtected' or 'NewProp'. See table below for details
2	Full path of hierarchical schematic that contained the part that was processed
3	Handle property of instance that was processed
4	Parameter or property name that was processed
5	Debug error message. This has more detailed information than the error code

Status code	Description
'Noerr'	No error, function completed successfully
'BadAddress'	The address given was not recognised
'AmbiguousAddress'	The address given could refer to more than one item
'IncompleteAddress'	The address was incomplete. For example, it might refer to a valid part without specifying which parameter is to be written or read
'MissingChild'	Address refers to a hierarchical block which is missing, that is the schematic file could not be found
'WriteProtected'	The operation required an instance property to be edited but that property was protected and could not be edited
'NewProp'	A new property was added to the part to complete the required edit. This is not necessarily an error. Some parameters will assume default values if not present. If set to an explicit value a property may be added to the schematic instance

Notes

If the address requires a hierarchical schematic to be written, that schematic will be automatically opened.

SetInstanceParamValue

Script-based multi-step analyses use a script call to define each step. This function can be used in such a script to a set an instance parameter.

Arguments

Number	Type	Compulsory	Default	Description
1	string	yes		Instance name
2	string	Yes		Parameter name
3	string	Yes		New parameter value
4	real	No	0	Vector index for vector parameters

Returns

Return type:

String indicating status of function call:

Return string	Description
'success'	Function successful
'badparam'	Unknown parameter name
'noinstance'	Unknown instance name
'nocircuit'	No circuit loaded

Example

The following script code sets the area parameter of 'Q6' to values of 100, 200 and 400 for the first, second and third steps respectively.

```
Let values = [1, 2, 4]
Let step = GetCurrentStepValue()
Let value = values[step-1]

Let SetInstanceParamValue('q6', 'area', value)
```

See Also

GetCurrentStepValue (page 161)

SetModelParamValue (page 350)

GetModelParameterValues (page 196)

GetDotParamValue (page 169)

SetModelParamValue

Script-based multi-step analyses use a script call to define each step. This function can be used in such a script to a set a model parameter.

Arguments

Number	Type	Compulsory	Default	Description
1	string	yes		Model name
2	string	Yes		Parameter name
3	string	Yes		New parameter value
4	real	No	0	Vector index for vector parameters

Returns

Return type:

String indicating status of function call:

Return string	Description
'success'	Function successful
'badparam'	Unknown parameter name
'nomodel'	Unknown model name
'nocircuit'	No circuit loaded

Example

The following script code sets the BF parameter to values of 100, 200 and 400 for the first, second and third steps respectively.

```
Let values = [100, 200, 400]
Let step = GetCurrentStepValue()
Let value = values[step-1]

Let SetModelParamValue('BC546B', 'BF', value)
```

See Also

GetCurrentStepValue (page 161)

SetInstanceParamValue (page 349)

GetModelParameterValues (page 196)

GetDotParamValue (page 169)

SetPropertyStyles

Sets whether styles are listed as property styles or not. Property styles are styles that can be applied to individual properties. This is generally meant as an internally used function only.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Styles to set as property styles
2	string array	Yes		Styles to set as not property styles

Argument 1

An array of style names that should from now on be considered as property styles.

Argument 2

An array of style names that should from now on not be considered as property styles.

Returns

Return type:

Returns nothing

SetReadOnlyStatus

Sets the read-only status of the specified schematic.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Read-only status
2	real	No	-1	Schematic ID

Argument 1

Read only status. If 1.0, will set schematic to read-only; if 0.0 will set to writeable.

Argument 2

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string

Single string defining the success of the operation is defined below.

Shell

Runs an external program and returns its exit code.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path to executable file
2	string	No		Options
3	string	No	stdout and stderr output directed to message window	File to receive redirected output

Argument 1

File system path to executable file. This would usually be a binary executable but may be any file that is defined as executable by the operating system.

1. The directory where the SIMetrix binary is located
2. The current directory
3. *windows*\SYSTEM32. *windows* is the location of the Windows directory.
4. *windows*\SYSTEM
5. The windows directory
6. The directories listed in the PATH environment variable

Argument 2

String array containing one or more of the options defined in the following table:

'wait'	If specified, the function will not return until the called process has exited.
'command'	Calls OS command line interpreter to execute the command supplied. This can be used to execute system commands such as 'copy' and 'move'.
'stdout'	Stdout from the process is displayed in the command shell message window. Requires either 'wait' or file redirection see argument 3
'stderr'	Stderr from the process is displayed in the command shell message window. Requires either 'wait' or file redirection see argument 3
'console'	Opens a console window to execute the process. Disables stdout and stderr

Argument 3

If stdout or/and stderr are specified, the output can be optionally directed to a file. Use this argument to specify the file to receive the output

Returns

Return type: real array

Returns a real array of length 3 as defined below:

Index	Description
0	Process exit code. If the process is still running when this function returns, this value will be 0.
1	Error code as follows: 0 Process launched successfully 1 Command processor not found. (*command* options specified) 2 Cannot find file 3 File is not executable 4 Access denied 5 Process launch failed 6 Unknown failure
2	PID of process. This will be -1 if the process is no longer running

ShellExecute

Performs an operation on a windows registered file. The operation to be performed is determined by how the file is associated by the system. For example, if the file has the extension PDF, the Adobe Acrobat or Adobe Acrobat Reader would be started to open the file. (Assuming Acrobat is installed and correctly associated)

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File
2	string	No	none	Parameters
3	string	No	current directory	Default directory
4	string	No	'open'	Verb

Argument 1

Name of file to process. This can also be the path to a directory, in which case an 'explorer' window will be opened.

Argument 2

Parameters to be passed if the file is an executable process. This should be empty if arg 1 is a document file.

Argument 3

Default directory for application that processes the file.

Argument 4

'Verb' that defines the operation to be performed. This would usually be 'open' but could be 'print' or any other operation that is defined for that type of file.

Returns

Return type: string

Returns one of the following:

Value	Description
'OK'	Function completed successfully
'NotFound'	File not found
'BadFormat'	File format was incorrect
'AccessDenied'	File could not be accessed due to insufficient privilege
'NoAssoc'	File has no association for specified verb
'Share'	File could not be accessed because of a sharing violation
'Other'	Function failed for other reason
'NotImplemented'	Function not implemented on this platform.

sign

Returns 1 if argument is greater than 0 otherwise returns 0.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		vector

Returns

Return type: real array

Returns 1 if argument is greater than 0 otherwise returns 0.

SimetrixFileInfo

Returns information about a SIMetrix file. Currently this function will only return information about version 4.1 or later schematic files.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		

Argument 1

File name

Returns

Return type: string array

Return value will be an array of length 3. The first element will currently be one of the values, 'Schematic', 'Unknown' or 'CantOpen'. The second element reports the file format version. The third element will be one of:

Value	Description
'Schematic'	File is SIMetrix component or schematic file and contains just a schematic. (4.1 or later)
'Symbol'	File is a SIMetrix component file and contains only the symbol part of the component
'Symbol|Schematic'	File is a SIMetrix component file and contains both the symbol part and the schematic part of the component

SIMPLISRunStatus

Tests if a SIMPLIS simulation is running

Arguments

No arguments

Returns

Return type: string

Returns 'InProgress' if a SIMPLIS simulation is running otherwise returns 'None'.

SIMPLISSearchIdx

Searches the input string array at argument 1 for the test string passed as argument 2. Returns a real array of indices into input array where the test string matches. If no matches are found, the function returns -1. The syntax for this function is similar to the Search (page 336) function, except the test string must be a single string, not an array, and the function returns all indices where the test string matches. The Search (page 336) function returns only the first index where the test string matches.

The case sensitivity of the search is defined by the 3rd argument. By default the search is case insensitive. If the 3rd argument is "casesensitive", the search will only return matches using the exact case. If the third argument is omitted or any string but "casesensitive", the matches are returned for case insensitive matches against the test string. The 3rd argument itself is not case sensitive.

This function is useful for searching netlists or other tabular data for indexes where certain strings, such as control statements, are located. Typically the netlist is parsed into columns using the SelectColumns (page 340) function. This selects the column where the test data is located. After the finding the indices where the data of interest is located, the original file can be be edited by looping through the indices found by this function.

Arguments

Number	Type	Compulsory	Default	Description
1	String Array	Yes		List to Search
2	String	Yes		Test string
3	String	No	Empty string	Option

Argument 1

List to Search

Argument 2

The string to search the first argument for.

Argument 3

If “casesensitive” is passed, the search will be case sensitive.

Returns

Return type: real array

Array of indexes into argument 1 for the test string found in argument 2. If no matches are found the return value will be -1.

Example

A call to:

```
SIMPLISSearchIdx( [ '.INCLUDE' , 'X1' , '.Include' , 'C1' ] , '.INCLUDE' )
```

will return a vector [0 , 2]. Note the matches are by default case insensitive.

Passing the third argument as ’caseSensitive’ results in a case sensitive search:

```
SIMPLISSearchIdx( [ '.INCLUDE' , 'X1' , '.Include' , 'C1' ] , '.INCLUDE' , 'caseSensitive' )
```

and will return a vector [0], indicating only the first index matches the test string.

SimulationHasErrors

Determines success of most recent simulation.

Arguments

No arguments

Returns

Return type: real

Return 1 if the most recent simulation failed with an error. Otherwise returns 0.

sin

Returns the sine of the argument specified in radians.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the sine of the argument specified in radians.

sin_deg

Returns the sine of the argument. Result is in degrees.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the sine of the argument. Result is in degrees.

sinh

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Return the hyperbolic sine of the argument specified in radians.

Sleep

Executes a timed delay.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Time in seconds

Argument 1

Delay in seconds. The function has a resolution of 100mS and so the delay will be integral multiples of that amount.

Returns

Return type: real

Function returns the value of the argument.

Sort

Performs alphanumeric sort on string array.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		String data
2	string	No		Options

Argument 1

String array to be sorted.

Argument 2

May be set to 'unique' in which case any duplicates in argument 1 will be eliminated.

Returns

Return type: string array

Result is string array containing the contents of argument 1 sorted in alphanumeric order.

SortIdx

Sorts the items in argument 1 but instead of returning the actual sorted data the function returns the indexes of the sorted values into the original array. The method of sorting depends on the data type as follows:

string	Alphabetic
real	Numeric
complex	Numeric - uses magnitude

Arguments

Number	Type	Compulsory	Default	Description
1	any array	Yes		Items to sort
2	string	No	'forward'	Sort direction

Argument 2

Sort option, value either 'forward' or 'reverse'.

Returns

Return type: real array

An array of indexes into the input array, sorted by the method specified in argument 2.

SourceDialog

This is a special purpose function used to select a voltage or current signal source. It opens a dialog box whose controls are initialised according to the string passed as the function's arguments. It returns a string giving the definition of the source selected by the user. The string may be used as the value for a current or voltage source.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	⟨⟨empty⟩⟩	Initialisation string

Returns

Return type: string

SplitPath

Splits file system pathname into its component path.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Path

Returns

Return type: string array

Return value is string array of length 4.

Index	Description
0	Drive including ':'. E.g. 'C:'
1	Directory including prefix and postfix '\'. E.g. "Program Files\SIMetrix\'
2	Filename without extension. E.g. 'SIMetrix'
3	Extension including period. E.g. '.EXE'

SplitString

Takes two values, the string and the sub string token. Returns the token removed and the string split into new sub-strings.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Input string
2	string	Yes		token

Returns

Return type: string array

String array containing the component parts of the string

Example

SplitString('fred/bill/jill', 'bill') ['fred/', '/jill'] SplitString('fred/bill/bill/jill', 'bill') ['fred/', '/', '/jill']

SprintfNumber

Returns a string formatted according to a format specification.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Format
2	real ...	No		Arguments 1-8: values

Argument 1

Format specification. The format used is essentially the same as that used for the 'printf' range of functions provided in the 'C' programming language. However, only real arguments are supported and so only format types %e, %E, %f, %g and %G are supported.

Argument 2

Values used for '%' format specs in the format string. Upto 8 argument values may be used.

Returns

Return type: string

Formatted string

sqrt

Returns the square root of the argument. If the argument is real and negative, an error will result. If however the argument is complex a complex result will be returned.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: rea/complex array

Returns the square root of the argument.

Str

Returns the argument converted to a string.

Arguments

Number	Type	Compulsory	Default	Description
1	any	Yes		Input

Returns

Return type: string

The argument converted to a string.

StringLength

Returns the number of characters in the supplied string.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Input string

Returns

Return type: real

Length of the given string.

StringStartsWith

Checks whether a string starts with another string.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		String to test
2	string	Yes		String to search for

Returns

Return type: real

Returns 1 if the string starts with the given string, 0 otherwise.

StrStr

Locates the sub string in argument 2 in the input string. If found the function will return the character offset of the sub string. If not found the function will return -1.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Input string
2	string	Yes		Sub string
3	real	No	0	Offset

Argument 1

String to search

Argument 2

Sub-string

Argument 3

Offset into search string where search should begin.

Returns

Return type: real

Number of characters from start of search string where sub string starts. -1 if substring is not found.

StyleInfo

Returns the style information for the requested styles. If a requested style does not exist, the default style information is returned (unless the global flag has been set, when no data would be returned).

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Style names
2	string	No		Options flag

Argument 1

A list of style names to return the style information for. Each array element is a different style name.

Argument 2

If set to *"global"*, only global styles are returned.

Returns

Return type: string array

The style information for the requested styles. If a style does not exist and the global flag has not been set, the default style will be returned. If a style does not exist and the global flag has been set, no style information is returned for that style.

StyleLineTypes

Returns list of possible style line types.

Arguments

No arguments

Returns

Return type: string array

List of available style line types.

StyleNames

Returns a list of existing style names.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No		Optional arguments

Argument 1

If set, each element can provide an optional argument. Options are:

Argument	Description
global	Returns only global styles.
NotProperty	Returns only styles that are not property styles.
Property	Returns only styles that are property styles.

Returns

Return type: string array

List of in use style names.

SubstChar

Scans string in arg 1 and replaces characters found in arg 2 with the character specified in arg 3. This function is case sensitive. Returns the result.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		string to process
2	string	Yes		characters to replace
3	string	Yes		character to substitute

Returns

Return type: string

SubstString

Replaces a substring in a string. This function is case sensitive.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		String to process
2	string	Yes		Search string
3	string	Yes		Substitute string
4	string	No		Options

Argument 1

Input string.

Argument 2

Substring searched in input string. This is case sensitive when it searches.

Argument 3

The substring defined in argument 2 found in the input string is replaced with this value. If arg 4 is set to 'all' all substrings found will be replaced, otherwise only the first will be replaced.

Argument 4

Options. If set to 'all', then all substrings located in the string will be replaced. Otherwise, only the first occurrence will be replaced.

Returns

Return type: string

Result of string substitution. Note that only the first occurrence of the substring is replaced.

sum

Returns the sum of all values in supplied argument. If the argument is complex the result will also be complex.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the sum of the supplied arguments

SumNoise

Similar to the function RMS1 (page 333) but returns the root of the sum without performing an average.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Vector
2	real	No	Start of input vector	Start x value
3	real	No	End of input vector	End x value

Returns

Return type: real array

Notes

This is identical to the function RootSumOfSquares (page 334).

SupportedReadFormats

SIMetrix schematics and symbols can display graphical bitmap images. This function returns the formats supported.

Arguments

No arguments

Returns

Return type: string

SupportedWriteFormats

SIMetrix schematics and graphs Save Picture features can write the displayed image to a graphical file. This function returns the formats supported. See CopyClipSchem (page 451) and CopyClipGraph (page 450) for commands that can generate image files.

Arguments

No arguments

Returns

Return type: string array

SymbolInfoDialog

Opens a dialog box allowing the specification of symbol details.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No		Initial settings
2	string	No		Available catalogs

Argument 1

String array length 5 specifying initial settings:

0 Symbol name
1 Display name
2 Catalog
3 Path
4 If 'component', save as component initially selected
5 If '1' "All references to symbol automatically updated" box will be checked.

Argument 2

List of available catalogs entered into catalog list box.

Returns

Return type: string array

String array of length 6 as follows

Index	Description
0	Symbol name entry
1	Display name entry
2	Catalog selected
3	'Save to' radio button: 1 Global library, 2 Current schematic only, 3 Both
4	File path
5	'1' if 'All references to symbol automatically updated' box is checked, otherwise '0'

SymbolLibraryManagerDialog

Opens the Symbol Library Manager dialog box. See *User's Manual/Symbol Editor and Library/Symbol Library Manager* for details of this feature.

Arguments

No arguments

Returns

Return type: string array

Index	Description
0	User operation: 0 Close button pressed 1 Place button pressed 2 Edit button pressed
1	Internal name of selected symbol
2	Full path of selected library file
3	Empty - reserved for future use.

SymbolName

Returns symbol name of specified instance.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name
2	string	Yes		Property value
3	real	No	-1	Schematic ID

Argument 1

Along with argument 2, property name and value to identify instance. If these arguments are not supplied, the selected instance, if any, will be used instead. If there are no selected instances or no instances that match the arguments, the function will return an empty vector. If the arguments identify more than one instance, the function will return information for one of them but there are no rules to define which one.

Argument 2

See argument 1.

Argument 3

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string

Returns the symbol name used by the instance defined by property name and value supplied in arguments 1 and 2.

SymbolNames

Returns symbol names of schematic instances.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	-1	Schematic ID
2	string	No	Use selected	Property name
3	string	No	Use all with property name in arg 2	Property value

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Argument 2

Along with argument 3, if present these arguments identify the instances to be examined. If only argument 2 is specified then all instances on the specified schematic that possess that property will be used. If argument 3 is also present then the instance name and value must match argument 2 and 3 respectively. If neither are present the selected instances will be used.

Returns

Return type: string array

String array containing the symbol names for the instances identified by this functions arguments.

Note that this function complements PropValues2 (page 310) and PropFlags2 (page 304), and will return the same number of values and in the same order as those function given the same arguments.

SymbolPinOrder

Returns pin order of symbol in currently open symbol editor sheet. Also sets new pin order if argument supplied.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No		New pin order

Argument 1

Array of strings with names of pins in the required order.

Returns

Return type: string array

Array of strings containing pin names of current symbol in the current order. If no symbol editor sheets are open, the function returns an empty vector.

SymbolPinPoints

SymbolEditor function. Returns the location of specified pin.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Pin name

Returns

Return type: real array

Returns the position of the pin as x and y values.

SymbolPropertyAutoOrder

Arguments

No arguments

Returns

Return type:

SystemValue

*** UNSUPPORTED *** – See page 26 for more information

Returns the value of a system defined variable. System defined variables are values that are 'hard-wired' in the program. This function provides access to these variables. The function is used by some internal scripts.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Value name

Returns

Return type: string

SystemValuePath

*** UNSUPPORTED *** – See page 26 for more information

Returns the value of a system defined variable. System defined variables are values that are 'hard-wired' in the program. This function provides access to these variables. The function is used by some internal scripts.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Value name

Returns

Return type: string

SystemWidgetExistsInSelectedWindow

Returns true if the system view of the type specified exists within the highlighted window.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		System view type

Argument 1

The name of the type of system view to check for. Options are:

Command Shell

File View

Part Selector

Returns

Return type: boolean

True if the system view exists within the highlighted window, false otherwise.

TableDialog

Displays a spreadsheet style table to allow the user to enter tabular data. See example below for a picture.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Geometry
2	string array	No		Cell initial values

Argument 1

Real array of length 2. First element is the number of rows initially displayed and the second element is the number of columns. Note that these are just the initial values. The user may subsequently add or delete rows and columns.

Argument 2

An array of strings to define the initial cell entries. If not supplied. the cells will begin empty.

Each element in the array is a semi-colon delimited string and defines a complete row. The cell entries are sequentially loaded from the delimited fields in each row.

Returns

Return type: string array

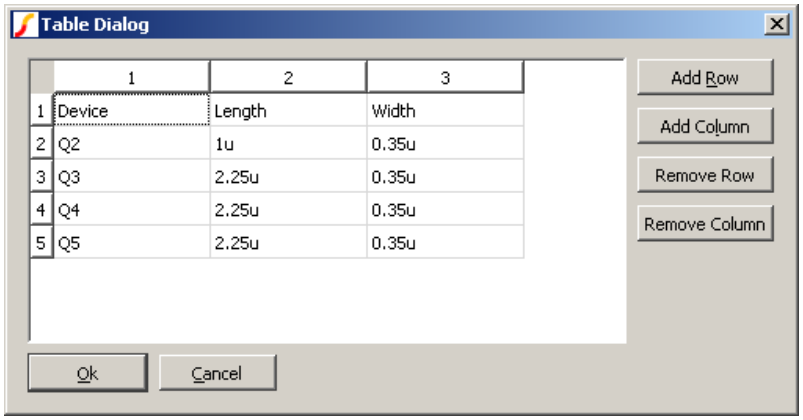
Return value will be in the same format at argument 2 and provide the contents of the cells as entered by the user.

Example

A call to:

```
TableDialog([5,3],["`Device;Length;Width;', `Q2;1u;0.35u;',
+ `Q3;2.25u;0.35u;', `Q4;2.25u;0.35u;', `Q5;2.25u;0.35u;'"])
```

will show this dialog:



TableEditor

Displays a table of combo boxes to allow select tabular data

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Combo box entries
2	string array	Yes		Initial selection and row count
3	string array	Yes		Column, row and button labels

Argument 1

Array of strings the length of which determines the number of columns. Each entry is a '|' delimited list of strings that are used to fill the combo boxes in each cell in the corresponding column.

Argument 2

Array of strings expected to be the same length as argument 1. Specifies the initial value for the combo boxes. Can be '|' delimited in which case number of tokens determines number of rows filled for the corresponding column.

Argument 3

Length 3 array of strings providing column, row and button labels. The first element is a '|' delimited string containing the column labels. The second element is a '|' delimeted string containing the row labels. The third element is 1 or 2 '|' delimited strings containing the labels for the 'Add Row' and 'Remove Row' buttons respectively.

Any or all of the elements may be empty strings in which case the default row and column labels are '1', '2', '3' etc and the button labels are 'Add Row' and 'Remove Row'.

Returns

Return type: string array

Array of strings of length equal to the number of columns. Each element is a '|' delimited string with each token holding the selected value for the corresponding row

TabValueDialog

Arguments

No arguments

Returns

Return type:

tan

Returns the tangent of its argument. Result is in radians.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the tangent of its argument. Result is in radians.

tan_deg

Returns the tangent of the argument. Result is in degrees.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Returns the tangent of the argument. Result is in degrees.

tanh

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		vector

Returns

Return type: real/complex array

Return the hyperbolic tangent of the argument specified in radians.

TemplateGetPropValue

This function may only be used in Template scripts. These are used for advanced netlist customisation. See "Schematic Template Scripts" on page 584 for more details.

Function returns the value of the property defined in argument 2 for the schematic instance defined by the REF property value given in argument 1.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		REF propert value
2	string	Yes		Property name

Returns

Return type: string

TemplateResolve

This function may only be used in Template scripts. These are used for advanced netlist customisation. See "Schematic Template Scripts" on page 584 for more details.

Function processes argument 2 as if it were a TEMPLATE property for the instance defined by argument 1. The return value is what the template resolves to.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		
2	string	Yes		Template value

Argument 1

REF property value

Returns

Return type: string

TextEditorHasComments

Returns whether the editor supports comments

Arguments

No arguments

Returns

Return type: boolean

ThdWeight

Returns a real array of 34 elements containing the weighting coeficients from 10Hz to 20kHz. The weighting coeificient vector can be used to calculate the weighted THD of a time-domain vector using a FFT. Note that the

The weighting coefficients are defined in the IEC 61672-1 and IEC 60537 publications. For further information, see the ⟨externalreference href="http:

Arguments

Number	Type	Compulsory	Default	Description
1	String	Yes		The type of weighting to return

Argument 1

Specifies the type of weighting, one of:

- “a” A-type weighting
- “b” B-type weighting
- “c” C-type weighting
- “d” D-type weighting

The weighting coefficient argument is not case sensitive.

Returns

Return type: real array

Vector of weighting coefficients with reference values from 10Hz to 20kHz.

TickCount

Returns a time in seconds since current system was started. Function may be used for timing measurement

Arguments

No arguments

Returns

Return type: real

Time in seconds since current system was started.

Time

Returns the current time in the format specified in control panel.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	⟨⟨empty⟩⟩	Options

Returns

Return type: string

ToLower

Converts a string to all lower case

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Input string

Returns

Return type: string

The input string with all characters in lower case.

TransformerDialog

Special purpose function used for selection of non linear magnetic components. Opens 1 of three styles of dialog box depending on the winding configuration. The user can either select a standard core configuration or define custom core parameters. In the latter case, the Core part index will be -1 otherwise an index into the array specified in argument 2 will be returned. The same rules apply to the initialisation data supplied in argument 3.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Array of core Materials
2	string	Yes		Array of core parts
3	real	Yes		Initialisation data

Argument 3

Value from:

Value	Description
1	Material index (arg 1) (element 2 = -1)
2	Core part index (arg2).
3	Number of primaries
4	Number of secondaries
5	Effective area (element 2 = -1)
6	Effective length (element 2 = -1)
7	Effective relative permeability (element 2 = -1)
8	Number of turns, winding 1
9	Number of turns, winding 2
10	Coupling coefficient winding 1 - 2
11	Number of turns, winding 3
12	Coupling factor, winding 1 - 3
13	Coupling factor, winding 2 - 3

Returns

Return type: real array

Has a return value from:

1	Material index (arg 1) (element 2 = -1)
2	Core part index (arg 2).
3	Effective area (element 2 = -1)
4	Effective length (element 2 = -1)
5	Effective relative permeability (element 2 = -1)
6	Number of turns, winding 1
7	Number of turns, winding 2
8	Coupling coefficient winding 1 - 2
9	Number of turns, winding 3
10	Coupling factor, winding 1 - 3
11	Coupling factor, winding 2 - 3

TranslateLogicalPath

Converts symbolic path to a physical path.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Symbolic path

Argument 1

Symbolic path as described in *User's Manual/Sundry Topics/Symbolic Path Names*.

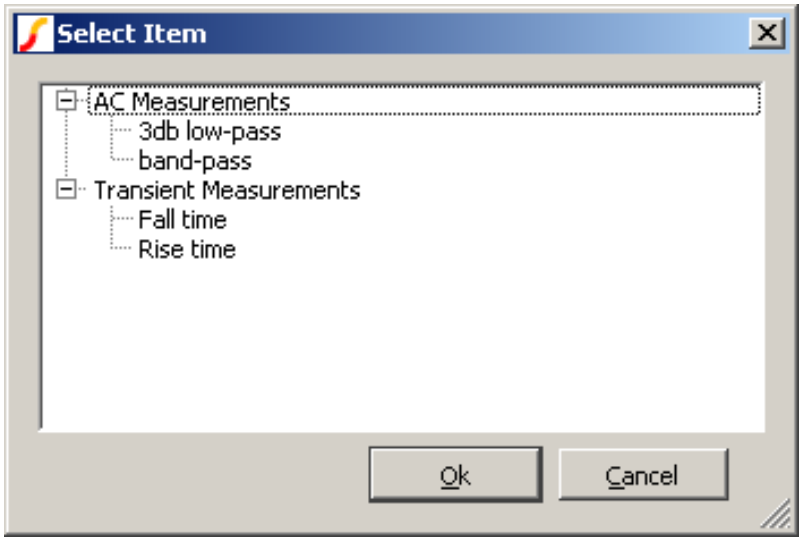
Returns

Return type: string

Returns actual file system path.

TreeListDialog

Opens the following dialog box allowing the user to specify an item in tree structured list.



Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		strings
2	string array	No	['Select Item', '', '0', 'sort', 'false']	Options

Argument 1

Specifies the items to be displayed in the tree list. These are arranged in semi-colon delimited fields with each field specifying a "branch" of the tree. For example, in the above diagram, the item shown as "Full" would be specified as an element of argument 1 as "Measure;Transient;RMS;Full".

Argument 2

An array of strings of max length 5 specifying various other characteristics as defined below:

0	Dialog caption
1	Identifies an item to be initially selected using the same format as the entries in argument 1.
2	Initial expand level. '0' for no expansion, '1' expands first level of tree etc.
3	Items will be alphabetically sorted unless this is set to 'nosort'
4	Items may selected and the box closed by double clicking unless this item is set to 'true'

Returns

Return type: real

Returns index into argument 1 of selected item. If no item is selected, the function returns -1. If the user selects Cancel the function returns an empty vector.

Example

The following will disply the dialog box shown in the above picture:

```
Show TreeListDialog(["'AC Measurements;3db low-pass', 'AC Measurements;band-pass',
+ 'Transient Measurements;Rise time', 'Transient Measurements;Fall time'"])
```

True

Returns TRUE (1) if the vector specified by name in argument 1 exists AND is nonzero. If argument 2 is set to 'SearchCurrent', the current group as well as the local and global groups will be searched for the vector, otherwise only the local and global groups will be searched. See "Groups" on page 18 for an explanation of groups.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Vector name
2	string	No	⟨⟨empty⟩⟩	Option

Returns

Return type: real

Truncate

Returns a portion of the input vector with defined start and end points. Interpolation will be used to create the first and last points of the result if the start and end values do not coincide with actual points in the input vector.

Arguments 2 and 3 define the beginning and end of the vector.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		Vector
2	real	No	start of vector	Start x value
3	real	No	end of vector	end x value

Returns

Return type: real array

Example

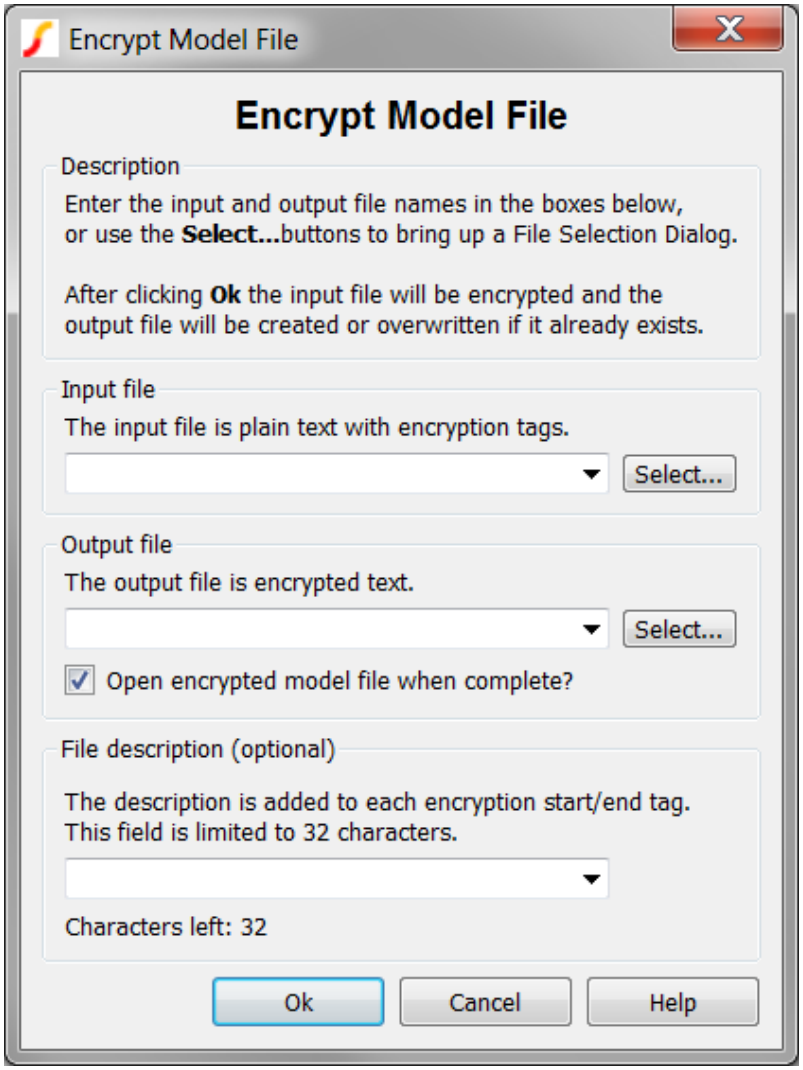
Suppose we have a vector called VOUT which was the result of a simulation running from 0 to 1mS. We want to perform some analysis on a portion of it from 250μS to 750μS. The following call to Truncate would do this:

```
Truncate(VOUT, 250u, 750u)
```

If VOUT did not actually have points at 250μS and 750μS then the function would create them by interpolation. Note that the function will not extrapolate points before the start or after the end of the input vector.

TwoFileSelectionDialog

Opens a dialog to define two file names. While originally intended for file parsing applications, this dialog function has been made general purpose for any application where the user needs to be prompted to select two file names. The dialog has file selection buttons which open a typical File Selection Dialog. The first file is the Input file and must exist on disk when the dialog is closed. The second file is the Output file and doesn't need to exist when the dialog is closed.



TwoFileSelectionDialog Configured as the Encryption Dialog

The first argument defines the two file names and the description combo box text.

The second argument configures the displayed text on the dialog including the caption, title, group box titles and so on.

The third argument configures how the program remembers the input and output file names, description text and checkbox state. Each of these strings is a key in the user's configuration file, allowing the dialog to be used for many different applications with different memories. These remembered values will be displayed in the file and descriptive text combo boxes the next time the dialog is opened. The program remembers the last 10 file and description entries.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	No	⟨⟨empty⟩⟩	Initial files and description combo box text
2	string array	No	⟨⟨empty⟩⟩	Dialog Configuration
3	string array	No	⟨⟨empty⟩⟩	File history an other configuration

Argument 1

The argument is a string array of length 3 which defines the input file, output file and description text.

Index	Purpose	Notes	Default
0	Input file name	populates the input file name combo box.	⟨⟨empty⟩⟩
1	Output file name	populates the output file name combo box.	⟨⟨empty⟩⟩
2	Description text	populates the description combo box.	⟨⟨empty⟩⟩

Argument 2

The argument is a string array of length 13 which defines the dialog text.

Index	Purpose	Notes	Default
0	Dialog Box Caption		⟨⟨empty⟩⟩
1	Box Title		⟨⟨empty⟩⟩
2	Upper group box title		Description
3	Upper group box text		⟨⟨empty⟩⟩
4	Input file group box title		Input file
5	Input group box text		⟨⟨empty⟩⟩
6	Output file group box title		Output file
7	Output group box text		⟨⟨empty⟩⟩
8	Checkbox text		Open output file when complete?
9	Description group box title		File description (optional)
10	Description group box text		⟨⟨empty⟩⟩

Index	Purpose	Notes	Default
11	Flag to hide the description groupbox	If set to '1' the description groupbox will be hidden.	'1'
12	Help context id	For internal use only	⟨⟨empty⟩⟩

Argument 3

The argument is a string array of length 8 which defines the memory and file selection dialog filters.

Index	Purpose	Notes	Default
0	Input file history key name	Any text without strings, if omitted or empty string, no files will be remembered.	⟨⟨empty⟩⟩
1	Output file history key name	Any text without strings, if omitted or empty string, no files will be remembered.	⟨⟨empty⟩⟩
2	Description history key name	Any text without strings, if omitted or empty string, no description text will be remembered.	⟨⟨empty⟩⟩
3	Checkbox history key name	Any text without strings, if omitted or empty string, no checkbox state will be remembered. Unlike the other memories, this only remembers the last checkbox state.	⟨⟨empty⟩⟩
4	Input file type	SIMetrix/SIMPLIS has several internally defined (and user customizable) input file types. 'Schematic' Schematic files 'Model' Model files 'Netlist' Netlist files 'Graph' Graph binary files 'Script' Script files 'VerilogA' Verilog-A files 'VerilogHDL' Verilog-HDL files 'Data' Data files 'Text' Text files 'AsciiFileEditor' Schematic ASCII Files 'LogicDef' Logic definition files used with arbitrary logic block 'Init' SIMPLIS Initialzaition files. An empty string will open the file browser with all files displayed.	⟨⟨empty⟩⟩
5	Output file type	Same as the Input file type but for the output file extension	⟨⟨empty⟩⟩

Index	Purpose	Notes		Default
6	Output file replacement mode	'none'	no replacement is performed on the output file string.	
		'file'	the replacement text supplied in index 8 is applied to the end of the file name before the extension. This occurs when the user selects a file using the file browser selection button.	
		'ext'	the replacement text supplied in index 8 is applied to the end of the file extension. This occurs when the user selects a file using the file browser selection button.	
7	replacement text for argument 6.			

Returns

Return type: string array

The function returns a string array of length 4. The return is in this order:

Index	Description
0	Input file name
1	Output file name
2	Description text
3	Checkbox state

If the user selects Cancel the function returns an empty vector.

UD

Alias of Distribution (page 102)

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Tolerance
2	real array	Yes		Distribution definition

Returns

Return type: real

Unif

Returns a random number with a uniform distribution. This function is intended to be used for SIMPLIS Monte Carlo analyses and would typically be used in device value expressions.

This function is only available in the Simulator process and cannot be called from scripts running in the context of the front end. The function is only active when used by the netlist pre-processor with Monte Carlo analysis enabled. When used in other contexts, the function returns 1.0.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Tolerance

Returns

Return type: real

Random number with a uniform distribution between 1.0-tolerance and 1.0+tolerance.

Returns 1.0 when used in non Monte Carlo contexts.

Example

1k*Unif(0.1) will return 1000 +/- 10% with uniform probability distribution. Returns 1.0 in a non Monte Carlo run.

Notes

See Also

Gauss (page 146)

GaussTrunc (page 148)

Distribution (page 102) - also alias UD (page 387)

WC (page 396)

Units

Returns the physical units of the argument.

Arguments

Number	Type	Compulsory	Default	Description
1	any	Yes		vector or vector name

Returns

Return type: string

Possible return values are:

‘’ (meaning dimensionless)

‘?’ (meaning unknown)

‘V’

‘A’

‘Secs’

‘Hertz’

‘Ohm’

‘Sie’

‘F’

‘H’

‘J’

‘W’

‘C’

‘Vs’

‘V^2’

‘V^2/Hz’

‘V/rtHz’

‘A^2’

‘A^2/Hz’

‘A/rtHz’

‘V/s’

See Also

“PhysType” on page 298

unitvec

Returns a vector consisting of all 1’s. Argument specifies length of vector.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		

Argument 1

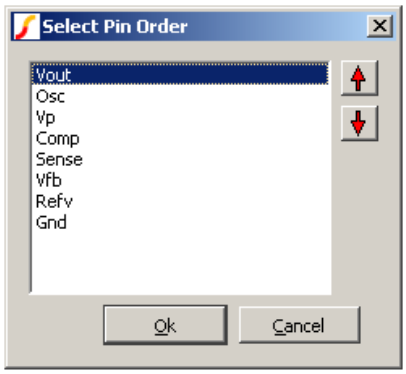
Number of elements in result

Returns

Return type: real array

UpDownDialog

Opens the following dialog box to allow the user to rearrange the order of a list of strings.



The box displays the strings given in argument 1 in the order supplied. The user can rearrange these using the up and down arrow buttons. When the user presses OK the function return the strings in the new order. If the user cancels the box the function returns an empty vector.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Strings to sort
2	string	No	'Select Item Order'	Box caption

Returns

Return type: string array

The strings in the new order, or an empty string if cancel is pressed.

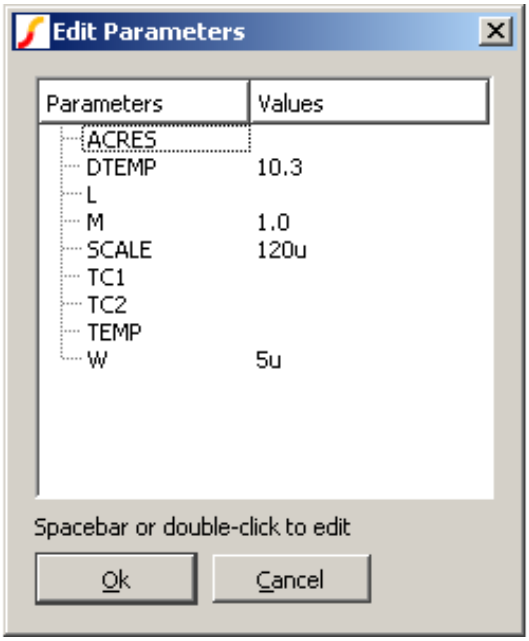
Example

The following statement will open the box as shown in the above picture

```
Show UpDownDialog(['Vout', 'Osc', 'Vp', 'Comp', 'Sense', 'Vfb', 'Refv', 'Gnd'], 'Select Pir
```

UserParametersDialog

Opens the following dialog box and enters the names and values specified in the arguments.



The user may edit any of the values by double clicking an entry or pressing the space bar. The function returns a string array holding the new values for each parameter.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Names
2	string	Yes		Values
3	string	No	'Edit Device Parameters'	Title

Returns

Return type: string array

Example

The following would open a dialog box as shown in the above picture:

```
Show UserParametersDialog(['ACRES', 'DTEMP', 'L', 'M', 'SCALE', 'TC1', 'TC2', 'TEMP', 'W'],
+ ['', '10.3', '', '1.0', '120u', '', '', '', '5u'])
```

Val

Returns argument converted to a value. The conversion assumes that the string supplied is an expression.

Arguments

Number	Type	Compulsory	Default	Description
1	any	Yes		Input value

Returns

Return type: real/complex

See Also

"Str" on page 362

ValueDialog

Opens a dialog box with up to 10 edit controls allowing numeric values to be entered.

The function returns an array representing the user selected value in each box. If cancelled it returns an empty vector.

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	1	Initial edit control values
2	string	No	⟨⟨empty⟩⟩	Edit control labels
3	string	No	⟨⟨empty⟩⟩	Dialog box caption
4	string	No	⟨⟨empty⟩⟩	

Argument 1

The number of edit controls displayed is determined by the length of the first argument. If this is omitted, all 10 will be displayed. Argument 1 specifies the initial values set in each of the controls.

Argument 2

Supplies the text of the label displayed to the left of each edit control. The width of the dialog box will be adjusted to accommodate the length of this text.

Argument 3

Specifies the text in the title bar of the dialog box.

Argument 4

Attaches special characteristics for particular applications. The value of this argument and meaning is as follows:

Value	Action
'Switch'	For use to specify VC switches. Assumes box 1 is for 'On resistance' and box 2 for 'Off resistance'. Action is modified to ensure 'On resistance' ⟨'Off resistance'
'Transformer'	For use to specify ideal transformers. Assumes box 1 is 'Turns ratio', box 2 'Primary Inductance' and box 3 is 'Coupling Factor' Hides up-down control for box 3. Min values for boxes 1 and 2 set to 1e-18 Box 3 range 0 to 0.999999
'TransmissionLine'	For use to specify lossless transmission lines. Assumes box 1 is 'Characteristic Impedance' and box 2 is 'Delay'. Sets box 1 minimum value to 1e-18 and box 2 minimum value to 1e-21

Any other value supplied for argument 4 will be treated as the default. In this case all boxes are allowed to vary over a range of -1e18 to +1e18. The function returns an array representing the user selected value in each box. If cancelled it returns an empty vector.

Returns

Return type: real array

See Also

"NewValueDialog" on page 279

"BoolSelect" on page 65

"EditSelect" on page 121

"RadioSelect" on page 319

Vec

Returns the data for the vector specified by the arguments.

The purpose of this function is to provide a means of obtaining the data for vectors whose names violate vector name rules. Such vectors can be generated by the simulator if there are - for example

- net names containing arithmetic characters. The simulator will create a vector of the same name but because the vector name contains an arithmetic character it is not possible to access the vector's data by the normal method.

For example, suppose a simulation was run on a circuit that contains a net called "IN+". A vector will be created called IN+. If the command to plot this vector were executed - "Plot IN+" - an error would result because "IN+" is an incomplete arithmetic expression. Instead the following can be used:

```
Plot Vec(`IN+')
```

The schematic cross-probing mechanism will automatically use this syntax when needed.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Vector name
2	string	No	Current group	Group name

Returns

Return type: depends on arg 1

vector

Returns a vector with length specified by the argument. The value in each element of the vector equals its index.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Number of elements in result

Returns

Return type: real array

See Also

"UnitVec" on page 389

VectorsInGroup

Returns the names or optionally the physical type of all vectors in the specified group. Argument 2 is a string array that may contain values of 'PhysType' and/or 'RealOnly'. If 'PhysType' is present the physical type (e.g. 'voltage', 'current', 'time' etc.) of the vectors will be returned otherwise the function will return their names. If 'RealOnly' is present, only values of type 'Real' will be returned. Complex values, string values and aliases values will be excluded.

Arguments

Number	Type	Compulsory	Default	Description
1	string	No	Current group	group name
2	string array	No		Options

Returns

Return type: string array

VersionInfo

Returns version information about running copy of SIMetrix

Arguments

No arguments

Returns

Return type: string array

Returns a string array of length 7 defined as follows:

0 Product name. E.g. “SIMetrix/SIMPLIS Elite with DVM”

1 Major Version number (3.1, 4.0 etc.)

2 Maintenance version. (empty or a single letter)

3 Internal product name. (E.g. “SIMPLIS-Elite”)

4 Feature string allowing script to determine available functionality. This will be a combination of the following separated by the ‘|’ character:

Basic	Always present
AD	Digital simulator enabled
Micron	CMOS device models enabled
Schematic	Schematic enabled
Advanced	Advanced analysis modes enabled
Scripts	Scripting enabled
Rtn	Real time noise enabled
Simplis_If	SIMPLIS simulator interface present

5 Full version string - usually element 1 and 2 concatenated

6 Base product name

7 Architecture : either x86 (32 bit) or x64 (64 bit). This is the architecture of the program not the operating system on which it is running

ViewFormattedText

View HTML formatted text. The viewer supports basic HTML text formatting including hyperlinks to external sites.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		HTML formatted test

Argument 1

1 or 2 element string array. Element 1 is an HTML formatted text string that will be displayed in a stand-alone viewer. Element 2 if supplied defines the title in the caption bar of the viewer.

Returns

Return type: string

Always returns 'ok'

WC

Returns a random number with a worst case distribution. This function is intended to be used for SIMPLIS Monte Carlo analyses and would typically be used in device value expressions.

This function is only available in the Simulator process and cannot be called from scripts running in the context of the front end. The function is only active when used by the netlist pre-processor with Monte Carlo analysis enabled. When used in other contexts, the function returns 1.0.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Tolerance

Returns

Return type: real

Random number which is either 1.0+tolerance or 1.0-tolerance

Example

1k*WC(0.1) will return 900 or 1100 chosen at random. Returns 1.0 in a non Monte Carlo run.

See Also

Gauss (page 146)

GaussTrunc (page 148)

Distribution (page 102) - also alias UD (page 387)

Unif (page 388)

WirePoints

Returns location of specified wire.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Wire handle
2	real	No	-1	Schematic ID

Argument 1

Handle of schematic wire segment. Wire handles are returned by the functions Wires (page 398), NetWires (page 277) and SelectedWires (page 343).

Argument 2

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: real array

Returns a numeric vector of length 4 providing the sheet locations of the each termination of the specified wire.

The four values in the vector are defined in the table. The functions returns an empty vector if the wire handle supplied is invalid.

Index	Description
0	X-co-ordinate for termination 1
1	Y-co-ordinate for termination 1
2	X-co-ordinate for termination 2
3	Y-co-ordinate for termination 2

See Also

"InstPoints" on page 248

Wires

Returns array of strings holding handles for all wires in the specified schematic. Wire handles are used by the function WirePoints (page 397) and the commands Select (page 529) and SetHighlight (page 534).

Arguments

Number	Type	Compulsory	Default	Description
1	real	No	-1	Schematic ID

Argument 1

Schematic ID as returned by the function OpenSchematic (page 286). This allows this function to be used with a schematic that is not open or not currently selected. If omitted or -1, the currently selected schematic will be used.

Returns

Return type: string array

See Also

"NetWires" on page 277

"SelectedWires" on page 343

WM_CanRevertToSaved

Returns whether the chosen editor can be reverted to a previous saved state.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Editor ID

Argument 1

The ID of the editor to check.

Returns

Return type: boolean

Returns true (1) if the editor can be reverted to a saved state, false (0) otherwise.

WM_GetCentralWidgetGeometry

Returns window geometry information for the editor region of the window.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Window name

Argument 1

Window name as returned from the function WM_GetWindowNames (page 403).

Returns

Return type: string

Geometry information for the editor region.

WM_GetContentWidgetNames

Returns names of all content widgets (editors etc.) in the given window.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Window name

Argument 1

The window name, as given by the function WM_GetWindowNames (page 403).

Returns

Return type: string list

Names of the content widgets within the chosen window.

WM_GetContentWidgetSessionInfo

Returns a single line string for each content widget that can be used to restore itself.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Window name

Argument 1

The window name, as given by the function WM_GetWindowNames (page 403).

Returns

Return type: string array

Each element is a string that can be used to restore the widget.

WM_GetContentWidgetsLayout

Returns layout information for the content widgets (editors etc.) that can be used to restore the positioning within the window.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Window name

Argument 1

The window name, as given by the function WM_GetWindowNames (page 403).

Returns

Return type: string

Layout information for the content widgets as a single string.

WM_GetContentWidgetTypes

Returns the workspace view types in a particular window.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Window name

Argument 1

The window name, as stated on the window title bar, of the window to report the workspace view elements for.

Returns

Return type: string array

List of workspace view types in the window requested.

WM_GetCurrentWindowName

Returns the name of the highlighted window.

Arguments

No arguments

Returns

Return type: string

Name of the highlighted window.

WM_GetNumberModifiedEditors

Returns the number of editors that have a modified status across all windows.

Arguments

No arguments

Returns

Return type: real

Number of editors that are modified.

WM_GetPrimaryWindowName

Returns the name of the primary window.

Arguments

No arguments

Returns

Return type: string

The name of the primary window.

WM_GetSystemWidgetSessionInfo

Returns a single line string for each system widget that can be used to restore itself.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Window name

Argument 1

The window name, as given by the function WM_GetWindowNames (page 403).

Returns

Return type: string array

Each element is a string that can be used to restore the widget.

WM_GetSystemWidgetsLayout

Returns layout information for the system widgets that can be used to restore the positioning within the window.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Window name

Argument 1

The window name, as given by the function WM_GetWindowNames (page 403).

Returns

Return type: string

Layout information for the system widgets as a single string.

WM_GetWindowGeometry

Returns window geometry information that can be used to restore the size and position of the chosen window.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Window name

Argument 1

The window name, as given by the function WM_GetWindowNames (page 403).

Returns

Return type: string

A string representing the geometry of the window.

WM_GetWindowNames

Returns the names of all windows. This function superscedes GetWindowNames (page 230).

Arguments

No arguments

Returns

Return type: string array

A list of the window names. The first name will always be the primary window.

WM_NumberContentWidgets

Returns the number of content widgets in use.

Arguments

No arguments

Returns

Return type: Integer

The number of content widgets in use.

WM_NumberSystemWidgets

Returns the number of system widgets in use.

Arguments

No arguments

Returns

Return type: Integer

The number of system widgets.

WriteConfigSetting

Writes a configuration setting. Configuration settings are stored in the configuration file. See *User's Manual/Sundry Topics/Configuration Settings* for more information. Settings are defined by a key-value pair and are arranged into sections. The function writes the value in argument three to the specified key and section. If the value is missing, the setting will be deleted.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Section
2	string	Yes		Key
3	string	No		Value

Argument 1

Section name

Argument 2

Key name

Argument 3

Value to set. Setting will be deleted if this is omitted.

Returns

Return type: real

See Also

"ReadConfigSetting" on page 321

WriteF11Lines

Writes lines directly to the F11 window overwriting any existing lines.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Lines

Argument 1

Lines to write in the form of a string array. Each element in the array creates a new line.

Returns

Return type: real

Returns 1.0 if the function is successful otherwise returns 0.0. The function will only fail if there are no schematics open.

See Also

ReadF11Options (page 322)

WriteF11Options (page 405)

GetF11Lines (page 171)

AppendTextWindow (page 444)

WriteF11Options

Write SIMetrix simulator options to the F11 window.

Arguments

Number	Type	Compulsory	Default	Description
1	string array	Yes		Option values

Argument 1

Array of semi-colon delimited string in form:

name;value;type

name	Name of option
value	Value of option
type	Type. One of 'BOOL', 'INT', 'REAL' or 'STRING'

The given type determines how the value is interpreted. REAL values can use engineering suffixes, e.g. 1k will be interprted as 1000. BOOL options can have values of 'true' or '1' to indicate a true condition. All other values will be treated as false. STRING values will entered literally.

Unlike ReadF11Options (page 322), this function does not check that the option names entered are valid.

Returns

Return type:

See Also

ReadF11Options (page 322)

WriteF11Lines (page 404)

GetF11Lines (page 171)

AppendTextWindow (page 444)

WriteIniKey

Writes a value to an 'INI' file. See the function ReadIniKey (page 323) for more information on INI files.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		File
2	string	Yes		Section
3	string	Yes		Key
4	string	No	Empty string	Value

Argument 1

File name. You should always supply a full path for this argument. If you supply just a file name, the system will assume that the file is in the WINDOWS directory. This behaviour may be changed in future versions. For maximum future compatibility, always use a full path.

Argument 2

Section name.

Argument 3

Key name.

Argument 4

Key value

Returns

Return type: real

Returns 1 if function successful. Otherwise returns 0.

WriteRawData

Writes data to the specified file in a SPICE3 raw file compatible format. See the built in script write_raw_file for an application example. This can be found on the install CD.

Arguments

Number	Type	Compulsory	Default	Description
1	real/complex array	Yes		data
2	string	Yes		File name
3	string	No		Options
4	string	No	'%d'	Format of index display

Returns

Return type: string

The function returns a single string according to the success or otherwise of the operation. Possible values are: 'success' , 'nodata' and 'fileopenfail'.

WriteRegSetting

Writes a string value to the windows registry.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Key path
2	string	Yes		Value name
3	string	Yes		Value to be written
4	string	No	'HKCU'	Top level tree

Argument 1

Name of key. This must be a full path from the top level. E.g. 'Software\SIMetrix\Version42\Options'

Argument 2

Name of value to be read

Argument 3

Value to be written to key

Argument 4

Top level tree. This may be either 'HKEY_CURRENT_USER' or 'HKEY_LOCAL_MACHINE' or their respective abbreviations HKCU and HKLM. Note that you must have administrator rights to write to the HKEY_LOCAL_MACHINE tree.

Returns

Return type: string

Returns one of three string values as defined below:

'Ok'	Function executed successfully
'WriteFailed'	Could not write that value
'InvalidTreeName'	Arg 4 invalid.

WriteSchemProp

Writes a schematic window property. If argument 3 is set to 'Create' the function will create the property if it doesn't already exist, otherwise the function can only change the value of an existing property. There are three writeable properties that are built-in, namely 'RootPath', 'Reference' and 'UserStatus'. See the function ReadSchemProp (page 325) for details.

Schematic window properties may be written to the schematic file so that they become persistent. Specify 'Save' for argument 3 to enable saving to the schematic file.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Property name
2	string	Yes		Propert value
3	string array	No		Options

Argument 3

Legal values: 'Create', 'Save'. Note that 'Save' does not imply 'Create'. Both need to be specified to create a saveable property, i.e. ['create', 'save']

Returns

Return type: real

The function returns an integer that indicates the success of the operation as follows:

-1	No schematic windows open
0	Success
1	Property does not exist and 'Create' not specified
2	Property is read only. (e.g. the 'Path' property)
3	Property successfully created

Example

To create a new persistent property:

Let WriteSchemProp('myproperty', 'somevalue', ['Create', 'Save'])

XCursor

Returns x location of graph cursor.

Arguments

No arguments

Returns

Return type: real

Returns the horizontal position of the graph measurement cursor. If there is no graph open or cursors are not enabled, the function returns 0.

XDatum

Returns x location of graph reference cursor.

Arguments

No arguments

Returns

Return type: real

Returns the horizontal position of the graph reference cursor. If there is no graph open or cursors are not enabled, the function returns 0.

XFromY

Returns an array of values specifying the horizontal location(s) where the specified vector (argument 1) crosses the given y value (argument 2). If the vector never crosses the given value, an empty result is returned. The sampled input vector is interpolated to produce the final result. Interpolation order is specified by argument 3.

Argument 4 specifies edge direction. If set to 0 either direction will be accepted. If set to 1 only positive edges will be detected and if set to -1 only negative edges will be detected.

Note that unlike other functions that use interpolation, XFromY can only use an interpolation order of 1 or 2. If a value larger than 2 is specified, 2 will be assumed.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Input vector
2	real	Yes		Y value
3	real	No	2	Interpolation order (1 or 2)
4	real	No	0	Direction

Returns

Return type: real array

XMLCountElements

Returns the number of elements of a particular type at the current focus element.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Tag name
2	string	Yes		XML reference

Returns

Return type: String

The number of elements with the given tag name at the current focus level.

XMLGetAttribute

Returns the attribute value for given name at the current focus element.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		Attribute name
2	string	Yes		XML reference

Returns

Return type: String

The attribute value for the given name.

XMLGetElements

Lists elements at the current focus level.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		XML reference

Argument 1

The reference of the XML document to list the elements for.

Returns

Return type: String array

The elements that are direct children of the current focus level.

XMLGetText

Returns the text for the current focus element.

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		XML reference

Returns

Return type: String

The text for the current focus element.

XMLToString

Returns the XML document as a string⟨

Arguments

Number	Type	Compulsory	Default	Description
1	string	Yes		XML reference

Returns

Return type: String

The XML document as a string.

XY

Creates an XY Vector from two separate vectors. An XY Vector is a vector that has a reference (see "Vector References" on page 21). The resulting vector will have y values defined by argument 1 and the x values (i.e. its reference) of argument 2.

Arguments

Number	Type	Compulsory	Default	Description
1	real array	Yes		y vector
2	real array	Yes		x vector

Returns

Return type: real array

YCursor

Returns y location of graph cursor.

Arguments

No arguments

Returns

Return type: real

Returns the vertical position of the graph measurement cursor. If there is no graph open or cursors are not enabled, the function returns 0.

YDatum

Returns x location of graph reference cursor.

Arguments

No arguments

Returns

Return type: real

Returns the vertical position of the graph reference cursor. If there is no graph open or cursors are not enabled, the function returns 0.

YFromX

Returns array of values specifying the vertical value of the specified vector at the given x value.

Arguments

Number	Type	Compulsory	Default	Description
1	real	Yes		Input vector
2	real	Yes		X value
3	real	No	2	Interpolation order (1 or greater)

Returns

Return type: real array

Returns an array of values (usually a single value) specifying the vertical value of the specified vector (argument 1) at the given x value (argument 2). If the given x-value is out of range an empty result (see page 28) is returned. The sampled input vector is interpolated to produce the final result. Interpolation order is specified by argument 3.

Chapter 5

Command Summary

The following table lists all commands available

Command Name	Description
Abort	Aborts the current simulation
AbortSIMPLIS	Sends a signal to the SIMPLIS simulator instructing it to abort
About	Displays the about box
AddAnnotationText	Adds text to an annotation
AddArc	Symbol Definition Command. Create whole circles and ellipses as well as arcs of circles and ellipses
AddCirc	Symbol Definition Command. Creates a circle.
AddCurveMarker	Adds a curve marker to the currently selected graph sheet
AddDoubleClickAction	Applies a double click action to the selected elements
AddFileViewMenuItem	Adds a FileView menu item
AddFloodFill	Symbol Definition Command. Adds a flood filled region to a symbol
AddFreeText	Adds a free text item to the currently selected graph sheet
AddGlobalStyle	Adds an additional global style.
AddGraphDimension	Adds a dimension object to a graph
AddImage	Adds an image to the current schematic
AddImageScript	Symbol Definition Command. Adds an image.
AddLegend	Adds a legend box to the currently selected graph
AddLegendProp	Adds a property to a graph legend

Command Name	Description
AddPin	Symbol Definition Command. Adds a pin to a symbol
AddProp	Symbol Definition Command. Adds a property to a symbol definition
AddProperty	Adds a property to the selected schematic elements
AddSeg	Symbol Definition Command. Adds a line segment to a symbol
AddSymbolProperty	Adds a property to the symbol currently open in the symbol editor
AddTextBox	Adds a Text Box to the currently selected graph
AddTitleBlock	Adds a title block to a schematic
AlignText	Aligns the text of a text annotation
Anno	Annotate schematic with unique component references
AppendGroup	Appends a data group with another group
AppendTextWindow	Inserts text into the schematic editor's simulator command window (F11 Window)
Arguments	Declares arguments for a script.
BuildDefaultOptions	Resets preference settings to factory defaults
Cancel	Cancel schematic interactive command
CaptureWaveformImage	Captures an image of the current highlighted graph
Cd	Change current working directory
ChangeArcAttributes	Modify symbol arc attributes
ChangeSelectedStyleNames	Changes the styles of the selected elements
ChangeStyle	Changes the style of the selected elements
ChangeSymbolProperty	Modify property value/attributes in symbol editor
ClearMessageWindow	Clears the command shell message window
Close	Closes either the selected schematic or graph
CloseGraphSheet	Closes the current tabbed sheet in the selected graph window
ClosePrinter	Conclude print job
CloseSchem	Closes the current schematic
CloseSheet	Closes the currently selected schematic or symbol editor tabbed sheet
CloseSimplisStatusBox	Closes the SIMPLIS simulation status box.

Command Name	Description
CloseTextEditor	Closes the current text editor
CollectGarbage	Deletes temporary vectors
CombineMenu	Combines several menus into a separate menu
CompareSymbolLibs	Compares two symbol libraries
Copy	Copy selected schematic components then paste (Interactive)
CopyClipGraph	Copy graph to clipboard to paste to other applications
CopyClipSchem	Copy schematic to clipboard to paste to other applications
CopyFile	Copy a file
CopyLocalSymbol	Copy local symbol to global library
CreateFont	Create a named font object
CreateGroup	Creates a data group
CreateRunningDialog	Creates a dialog for displaying progress whilst a script is running
CreateSym	Symbol definition: Start definition
CreateToolBar	Creates a new empty toolbar
CreateToolButton	Creates or redefines a tool bar button
CursorMode	Enable/disable/step graph cursors
Curve	Create new curve in existing graph
CurveEditCopy	Copy specified curves to the internal clipboard
DefButton	Defines the command executed when a button is pressed
DefineToolBar	Defines the action for a schematic button
DefKey	Define keyboard key
DefMenu	Define fixed or popup menu item
Del	Delete file
DelCrv	Delete curve
Delete	Delete selected schematic items
DeleteAxis	Delete specified y-axis or grid
DeleteGraphAnno	Delete graph annotation object
DeleteSymbolProperty	Delete property in symbol editor
DelGroup	Delete group (of simulation data)
DelLegendProp	Delete graph legend property
DelMenu	Deletes specified menu item, or submenu.

Command Name	Description
DelProp	Delete schematic instance property
DelSym	Delete symbol definition
DestroyRunningDialog	Destroys a process running dialog
Detach	Detach selected wires. (Disables rubberbanding)
Discard	Free up memory used by vectors
Display	Display variables in current group
DrawArc	Initiate arc drawing mode in symbol editor
DrawArrow	Draws an arrow in the schematic editor
DrawPin	Initiate pin placement mode in symbol editor
Echo	Display text in message window or write text to file
EditColour	Edit a colour
EditCopy	Copy selected schematic items to clipboard for pasting to other schematics or other applications.
EditCut	Deletes selected components and places them in the clipboard
EditFile	Opens a text file in the text editor.
EditFont	Edit a font
EditGroupTitle	Edit a group's title
EditPaste	Paste clipboard data to schematic. (Interactive)
EditPin	Edit a pin name of a symbol in the currently installed symbol library
EndAllInteractions	
EndSym	Symbol definition: terminate definition
Execute	Execute script
ExecuteMenu	Executes the menu with given identifier
FileViewCleanUpFileWatchers	Removes unnecessary file watchers
FloodFillSymbol	Flood fills a symbol
Focus	Focus on a window
FocusCommandShell	Selects the Command Shell and assigns it keyboard focus
FocusShell	Selects the Command Shell and assigns it keyboard focus
GraphZoomMode	Select mode for next cursor zoom function
GroupSelected	Groups all selected schematic elements
Help	Display help system

Command Name	Description
HideCurve	Hides specified curve.
HighlightCurve	Highlights the selected curve
HighlightWidget	Highlights a particular content view
Hint	Display a hint to the user
HourGlass	Displays the hourglass cursor shape indicating that some action is in progress
ImportSymbol	Import symbol to symbol editor
Inst	Place component on schematic. (Interactive unless `/loc` specified)
KeepGroup	Prevent group (simulation data) from being automatically deleted.
Let	Evaluate expression
Listing	Display or write to file current netlist.
ListModels	Create dictionary of currently installed models
ListOptions	List all global options to file
ListStdKeys	Write standard key definitions to file
LoadModelIndex	Reload model library indexes into memory
LoadSimulatorStyleSheet	Applies a style sheet to simulator GUI elements.
LoadStyleSheet	Applies a style sheet to the whole application.
MakeAlias	Make alias variable
MakeCatalog	Makes OUT.CAT file for use by parts browser
MakeSymbolScript	Build script for symbol(s)
MakeTree	Creates the specified directory path
MCD	Make and change current working directory
MD	Make directory
Message	Display message in schematic status window
MessageBox	Displays message box
Move	Move selected schematic items (Interactive)
MoveCurve	Move specified curve to new axis
MoveFile	Moves a file to a new location
MoveMenu	Moves the position of a menu item by a specified count
MoveProperty	Move a property on a schematic instance
Netlist	Create netlist of current schematic
NewAnnotation	Interactive placement of a new annotation

Command Name	Description
NewAxis	Create new y-axis
NewBasicTextEditor	Create a new plain text document
NewFileView	Creates a new File View
NewGraphWindow	Open new graph window
NewGrid	Create new graph grid
NewLabel	Adds a new unplaced text label to a schematic
NewLogicDefinitionEditor	Create a new plain text document
NewNetlist	Create a new plain text document
NewPartSelector	Creates a new Part Selector
NewPrinterPage	Start new page in print job
NewSchem	Open new schematic window.
NewScript	Create a new plain text document
NewStyle	Creates a new style
NewSymbol	Opens a new symbol editor view
NewVerilogA	Create a Verilog A editor
NewVerilogHDL	Create a Verilog HDL editor
NoPaint	Disable graph painting for duration of current script
NoUndo	Inhibits saving to undo buffer
OpenAsciiFile	Opens a schematic ASCII file in the text editor.
OpenBasicTextEditor	Opens a text file in the text editor.
OpenDirectory	Opens the directory given
OpenExternalFile	Opens the file in the operating system default
OpenGraph	Opens a SIMetrix graph file
OpenGroup	Create new group (of simulation data) from data file.
OpenLogicDefinitionEditor	Opens a logic definition file in the text editor.
OpenNetlist	Opens a SPICE netlist or model file in the text editor.
OpenPrinter	Begin print job
OpenRawFile	Opens a SPICE 3 format ASCII raw file.
OpenSchem	Open existing schematic
OpenScript	Opens a script source file in the text editor.
OpenSimplisStatusBox	Opens the SIMPLIS simulation status box.
OpenVerilogA	Opens a Verilog-A source file in the text editor.

Command Name	Description
OpenVerilogHDL	Opens a Verilog-HDL source file in the text editor.
OpenWebPage	Opens a web page in the system default browser
OptionsDialog	Open options dialog box
Pan	Pan (scroll) schematic specified number of grid squares
PasteGraphImageToSchematic	Copies a picture of the graph to a schematic.
Pause	Pause current simulation
PlaceCursor	Position graph cursor
Plot	Create new graph window and plot curve
PreProcessNetlist	Pre-processes a netlist. Intended for use with SIMPLIS but is general purpose in nature
PrintGraph	Print graph. (Interactive)
PrintSchematic	Print current schematic in non-interactive print job
Probe	Change schematic cursor to probe and wait for mouse click. (Interactive)
Prop	Change/add property of/to schematic instance
Protect	Protect selected schematic components
Quit	Exit SIMetrix
RD	Remove directory
ReadLogicCompatibility	Read logic compatibility tables
RebuildSymbols	Reload symbols from library file
Redirect	Redirect messages to message window to file
RedirectMessages	Redirects all command shell messages to a file
RegisterUserFunction	Register a user defined function
RenameLibs	Run rename model utility
RenameMenu	Renames a menu item
RepeatLastMenu	Executes most recently selected the menu
ReplayTraces	Re-builds graph curves created by fixed probe definitions
Reset	Release memory used for simulation
ResizeWindow	Resizes the current window
RestartTran	Restart a transient analysis
RestoreCommandShell	Re-opens the command shell if closed
RestoreDefaultStyles	Restores default styles

Command Name	Description
Resume	Resumes a previously paused simulation.
RotInst	Rotate component or block
Run	Runs a simulation on specified netlist.
RunAsync	Spawns a new simulator process and runs specified netlist.
RunCurrentScript	Runs the script currently open in the text editor.
RunSIMPLIS	Runs the SIMPLIS simulator
Save	Save selected schematic
SaveAs	Saves the currently selected schematic
SaveGraph	Saves the currently selected graph to a binary file
SaveGroup	Saves the current data group
SaveRhs	Create nodeset file to speed DC convergence
SaveSnapShot	Saves the current state of a transient analysis to a snapshot file
SaveSymbol	Save a symbol to a library or as a component
SaveSymlib	Writes the entire global symbol library or a specified installed symbol library file to *filename*. Note that the action of this command has changed significantly from that of version 4.0 and earlier.
SaveTextEditor	Saves current text editor
SaveTextEditorAs	Saves the current text editor to a specific file
SchematicEnableFileWatcher	Enables the file watcher on the schematic
SchematicFileWatcherIgnoreChanges	Disables the file watcher on a schematic editor
SchematicFileWatcherWatchChanges	Enables the file watcher on a schematic editor
ScreenShotWindow	Captures a screen shot of the current window
ScriptAbort	Abort currently executing script
ScriptPause	Pause currently executing script
ScriptResume	Resume paused script
ScriptStep	Single step script
Select	Select schematic items (Interactive)
SelectCurve	Select specified curve
SelectGraph	Switches the graph tabbed sheet
SelectLegends	Selects or unselects all graph window legends
SelectSchematic	Focuses on the specified schematic
SelectSimulator	Selects current simulator for selected schematic
SelectSymbolPin	Selects the symbol pin with given name

Command Name	Description
SelectWireConnected	Selects all wires connected to the currently selected elements
Set	Set option
SetAnnotationTextPosition	Sets the position of text within a shape based annotation
SetCurveName	Change curve name
SetDefaultEncoding	Sets the default encoding for reading text files when detected as not UTF-8.
SetGraphAnnoProperty	Change a graph object property value
SetGroup	Change current group
SetHighlight	Highlights or unhighlights schematic objects
SetOrigin	Set origin of symbol in symbol editor
SetPinPrefix	Sets the prefix for the selected pin property
SetPinSuffix	Sets the suffix for the selected pin property
SetReadOnly	Sets a vector to be read-only
SetRef	Change/attach reference to variable
SetSnapGrid	Sets schematic snap grid
SetStyleColour	Sets the style with the specified colour
SetSymbolFillStyle	Applies a fill style to a symbol
SetSymbolOriginVisibility	Controls the visibility of the origin marker in the symbol editor
SetUnits	Change physical units of variable
Shell	Execute external application or system command
ShellOld	Execute external application or system command
Show	Display or write to file specified variable
ShowCurve	Show hidden curve
ShowSimulatorWindow	Display simulator status box
SizeGraph	Zoom or scroll graph
TemplateEditProperty	Template script command. Edits the property of a schematic instance
TemplateSetValue	Template script command. Sets the template value
TextEditorCommentLines	Comments highlighted lines in the selected text editor
TextEditorFileWatcherIgnoreChanges	Disables file watcher for current text editor
TextEditorFileWatcherWatchChanges	Enables file watcher for current text editor

Command Name	Description
TextEditorFind	Displays the find pop-up window for the selected text editor
TextEditorFindNext	Triggers a find next event on the current text editor
TextEditorGoToLine	Moves the cursor to the given line in the text editor
TextEditorUncommentLines	Uncomments highlighted lines in the selected text editor
TextWin	Show/hide/toggle schematic text window
Title	Change title of graph or schematic
TitleSchem	Sets the title of the current schematic
Trace	Define trace (live graphing during simulation)
UndoGraphZoom	Restore previous graph view area
UngroupSelected	Ungroups selected schematic elements
UnHighlightCurves	Unhighlights all curves.
UnLet	Delete variable
Unprotect	Unprotect and select all protected schematic instances
Unselect	Unselect all schematic instances
UnSet	Delete option
UpdateAllSymbols	Conditionally updates all symbols in open schematics
UpdateAnnotationText	Updates the text within the selected annotation
UpdateDefaultStyle	Updates the default global style.
UpdateGlobalStyle	Updates an existing global style.
UpdateProperties	Restores properties on specified schematic instances to symbol defaults
UpdateRunningDialog	Updates a process running dialog by one step
UpdateStyleInfo	Updates the style information
UpdateSymbol	Updates specified symbol on selected schematic
UpdateSystemStyleInfo	Updates the style information at the system level
UpdateTitleBlock	Updates the content of a title block
ViewFile	View file in read-only mode
WebOpen	Opens a web page with the given url
Wire	Start/continue schematic wire. (Interactive unless /loc specified)
WireMode	Enter/exit schematic wiring mode

Command Name	Description
WM_CloseAllSystemWidgets	Closes all System Views in current window.
WM_CloseNonPrimaryWindows	Closes all windows except the main window
WM_ProgressWindowClose	Closes the specified progress window
WM_ProgressWindowCloseAll	Forces all progress windows to be closed
WM_ProgressWindowCreate	Creates a progress window
WM_ProgressWindowReport	Increments the progress bar and allows status message to be updated
WM_RevertToSaved	Reverts a widget back to its last saved state.
WM_Undock	Undocks a content widget from its window.
WriteImportedModels	Write referenced models of netlist to specified file
XMLAddAttribute	Adds an attribute to the XML at the current location
XMLAddElement	Adds an element to the XML at the current location
XMLClose	Closes the XML reference
XMLGoUpLevel	Moves the current focus element up to its parent
XMLNew	Creates a new XML reference object
XMLOpenElement	Opens the XML element and sets it as the current focus level
XMLOpenFile	Opens an XML document from a file creating a new XML reference object
Zoom	Zoom selected schematic

5.1 Commands by Application

5.1.1 File

Cd
CopyFile
Del
MakeTree
MCD
MD
RD

5.1.2 Graph

AddCurveMarker
AddFreeText
AddGraphDimension
AddLegend
AddLegendProp
AddTextBox
CloseGraphSheet
CopyClipGraph
Curve
DelCrv
DeleteAxis
DeleteGraphAnno
DelLegendProp
GraphZoomMode
HideCurve

HighlightCurve
MoveCurve
NewAxis
NewGraphWindow
NewGrid
NoPaint
OpenGraph
PlaceCursor
Plot
SaveGraph
SelectCurve
SelectGraph
SelectLegends
SetCurveName
SetGraphAnnoProperty
SetHighlight
ShowCurve
SizeGraph
Trace
UndoGraphZoom
UnHighlightCurves

5.1.3 Lib

ListModels
LoadModelIndex
MakeCatalog
RenameLibs

5.1.4 Miscellaneous

About
Close
CreateFont
EditColour
EditFont
Help
MoveFile
OpenWebPage
Quit
Title
ViewFile

5.1.5 Printing

ClosePrinter
NewPrinterPage
OpenPrinter
PrintGraph
PrintSchematic

5.1.6 Schematic

AddArc
AddCirc
AddFloodFill
AddImage
AddImageScript
AddPin
AddProp
AddProperty
AddSeg
AddSymbolProperty
AddTitleBlock
AlignText
Anno
AppendTextWindow
Cancel
ChangeArcAttributes
ChangeSelectedStyleNames
ChangeStyle
ChangeSymbolProperty
CloseSheet
CompareSymbolLibs
Copy
CopyClipSchem
CopyLocalSymbol
CreateSym
Delete
DeleteSymbolProperty
DelProp
DelSym
Detach
DrawArc
DrawArrow
DrawPin
EditCopy
EditCut
EditPaste
EditPin
EndSym
GroupSelected
ImportSymbol
Inst
MakeSymbolScript

Message
Move
MoveProperty
Netlist
NewAnnotation
NewLabel
NewSchem
NewStyle
NewSymbol
NoUndo
OpenSchem
Pan
Probe
Prop
Protect
RebuildSymbols
RestoreDefaultStyles
RotInst
Save
SaveAs
SaveSymbol
SaveSymlib
Select
SelectSchematic
SelectSimulator
SelectWireConnected
SetAnnotationTextPosition
SetOrigin
SetSnapGrid
SetStyleColour
SetSymbolFillStyle
SetSymbolOriginVisibility
TemplateEditProperty
TemplateSetValue
TextWin
TitleSchem
UngroupSelected
Unprotect
Unselect
UpdateAllSymbols
UpdateAnnotationText
UpdateProperties
UpdateStyleInfo
UpdateSymbol
UpdateSystemStyleInfo
UpdateTitleBlock
Wire
WireMode
Zoom

5.1.7 Simulator

CloseSimplisStatusBox
Listing
OpenSimplisStatusBox
Pause
PreProcessNetlist
Reset
RestartTran
Resume
Run
RunSIMPLIS
SaveRhs
SaveSnapShot
ShowSimulatorWindow
WriteImportedModels

5.1.8 Text Editor

CloseTextEditor
SaveTextEditor
SaveTextEditorAs
SetDefaultEncoding
TextEditorCommentLines
TextEditorFileWatcherIgnoreChanges
TextEditorFileWatcherWatchChanges
TextEditorFind
TextEditorFindNext
TextEditorGoToLine
TextEditorUncommentLines

5.1.9 User Interface

Arguments
ClearMessageWindow
CloseSchem
CombineMenu
CreateRunningDialog
CreateToolBar
CreateToolButton
DefineToolBar
DefKey
DefMenu
DelMenu
DestroyRunningDialog
Echo
EditFile
Execute

ExecuteMenu
FileViewCleanUpFileWatchers
Focus
FocusCommandShell
FocusShell
HighlightWidget
Hint
HourGlass
ListOptions
ListStdKeys
MessageBox
MoveMenu
NewFileView
NewPartSelector
OptionsDialog
Redirect
RegisterUserFunction
RenameMenu
RepeatLastMenu
ResizeWindow
RestoreCommandShell
SchematicEnableFileWatcher
SchematicFileWatcherIgnoreChanges
SchematicFileWatcherWatchChanges
ScreenShotWindow
ScriptAbort
ScriptPause
ScriptResume
ScriptStep
Set
Shell
UnSet
UpdateRunningDialog
VM_RevertToSaved

5.1.10 Vectors/Groups

AppendGroup
CollectGarbage
CreateGroup
DelGroup
Discard
Display
EditGroupTitle
KeepGroup
Let
MakeAlias
OpenGroup
OpenRawFile
ReplayTraces
SaveGroup
SetGroup
SetReadOnly
SetRef
SetUnits
Show
UnLet

Chapter 6

Command Reference

Abort

Abort

Aborts the current simulation. Abort performs the same action as Pause (page 505) followed by Reset (page 517). It stops the current run and then deletes all data associated with it except for any simulation vectors.

Note that this command can only be executed by an assigned key or menu with the direct execution option specified.

AbortSIMPLIS

AbortSIMPLIS

Aborts the current simulation. Abort performs the same action as Pause (page 505) followed by Reset (page 517). It stops the current run and then deletes all data associated with it except for any simulation vectors.

Note that this command can only be executed by an assigned key or menu with the direct execution option specified.

About

About

Displays the *about box* which provides version and copyright information.

AddAnnotationText

AddAnnotationText ⟨text⟩

Adds text to the centre of the selected annotation.

Parameters

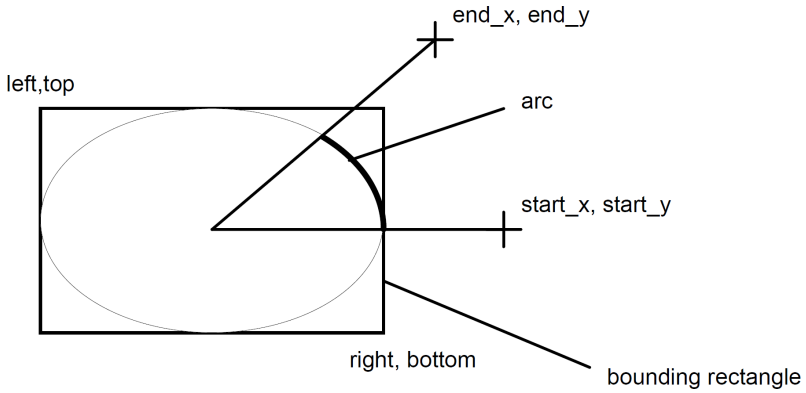
text	The text to add

AddArc

AddArc ⟨left⟩⟨top⟩⟨right⟩⟨bottom⟩⟨start-x⟩⟨start-y⟩⟨end-x⟩⟨end-y⟩

AddArc is a Symbol Definition Command. It is used to create whole circles and ellipses as well as arcs of circles and ellipses.

The command line arguments are integers describing symbol co-ordinates and all are compulsory. Their meaning is described by the following diagram:



The arc drawn by this command is a segment of an ellipse specified by a bounding rectangle described by the first four arguments. The last four arguments describe two lines drawn from the centre of the ellipse which specify the start and end of the arc. The arc is drawn anti clockwise.

Note that it is better to define a complete 360 degree circle (or ellipse) as two 180 degree arcs. 360 degree circles, where the start and end are coincident or near coincident do not always work reliably with some printer drivers.

See Also

"Schematic Symbol Script Definition" on page 564

AddCirc

AddCirc ⟨x-org⟩⟨y-org⟩⟨radius⟩

AddCirc is a Symbol Definition Command. Creates a circle.

Parameters

x-org	x co-ordinate of circle centre
y-org	y co-ordinate of circle centre
radius	radius of circle

AddCurveMarker

AddCurveMarker ⟨curve-id⟩⟨division⟩⟨x-position⟩⟨y-position⟩⟨label⟩[length [angle]]

Adds a curve marker to the currently selected graph sheet. A curve marker is a graph annotation object and its purpose is to label a curve for the purposes of identification or to highlight a feature. See "Graph Objects" on page 569 for more information.

Parameters

curve-id	Id for curve to which marker will be attached.
division	Division of curve if curve-id refers to a curve group created by a multi-step run. Divisions are numbered from 0 up to 1 minus the number of curves in the group. For single curves set this to zero.
x-position	X-axis location of marker.
y-position	Y-axis location of marker. This is only used if the curve is non monotonic and has more than one point at *x-position*. The marker will be placed at the point on the curve with the *y-axis* value that is nearest to y-position.
label	Label for marker. This may use symbolic values enclosed by '%'. See "SymbolicValues" on page 571 for details.
length	Length of marker line in view units. See "GraphCoordinateSystems" on page 580 for an explanation of view units and the view co-ordinate space. If omitted length defaults to 0.1.
angle	Angle of the marker line in the view co-ordinate space (See "GraphCoordinateSystems" on page 580). Default is 45°.

AddDoubleClickAction

AddDoubleClickAction

Adds a double click action to the selected elements. Must provide both a type and a command for the action.

Parameters

/command	The argument used when performing the type of action selected.
/type	The type of double click action. Options are:

OpenSchematic	Opens the schematic defined by the command.
OpenWebPage	Opens the webpage defined by the command.
RunScript	Runs the script defined by the command.

AddFileViewMenuItem

AddFileViewMenuItem ⟨file-type⟩⟨text⟩⟨command⟩

Adds a menu item to a for a FileView context menu.

Parameters

/directory	Flag to say associate this with directories.
file-type	The file format to associate this with, for example 'Schematic'. This corresponds to the File Extensions list in the General Options dialog. This is not required if the directory flag is set. The following values can be used: Component Schematic Script VerilogA VerilogHDL Netlist Model
text	The name of the menu that will be shown.
command	The script command to call if the menu item is executed.

AddFloodFill

AddFloodFill ⟨start-x⟩⟨start-y⟩

AddFloodFill is a Symbol Definition Command. It is used to flood fill from the specified point in a symbol being created.

Parameters

position-x	Integer. Symbol x co-ordinate of position to flood fill from
position-y	Integer. Symbol y co-ordinate of position to flood fille from

See Also

"Schematic Symbol Script Definition" on page 564

AddFreeText

AddFreeText [/font ⟨font-name⟩] [/colour ⟨colour-name⟩] [/align ⟨align⟩] ⟨text⟩[⟨x-pos⟩[⟨y-pos⟩]]

Adds a free text item to the currently selected graph sheet. Free Text is a graph annotation object. See "Graph Objects" on page 569 for full details.

Parameters

/align — Integer that specifies alignment of text. Possible values:

0	Left bottom
1	Centre bottom
2	Right bottom
4	Left base line
5	Centre base line
6	Right base line
8	Left top
9	Centre top
10	Right top
12	Left middle
13	Centre middle
14	Right middle

/colour — Name of colour to be used for text. Name of option setting that will store the colour of the object in the form #rrggbb. Default is "GraphColourFreeText"

/font — Name of font object to be used for text object. This must with the CreateFont command. See CreateFont (page 452) for details. Default is "Graph Free Text"

text — The text to be displayed

x-pos — x-co-ordinate of the text in view units (See "Graph Co-ordinate Systems" on page 580). Default = 0.5.

y-pos — y-co-ordinate of the text in view units (See "Graph Co-ordinate Systems" on page 580). Default = 0.5.

AddGlobalStyle

AddGlobalStyle ⟨name⟩/lineType [type] /lineColour [colour] /lineThickness [thickness] /fontName [name] /fontSize [size] /fontColour [colour] /italics /bold /overline /underline /propertyStyle

Adds an additional global style to the available styles.

This will overwrite any styles with the same name unless the `nooverride` flag is set.

Parameters

/bold — Bold font.

/fontColour — As an AABGGRR value.

/fontName — Font family name.

/fontSize	A number.
/italics	Italic font.
/lineColour	As an AABBGGRR value, 0x00ff00ff for blue=255, green=0, red=255.
/lineThickness	A number.
/lineType	Options are Solid, Dash, Dot, DashDot, DashDotDot.
/nooverride	Use this to ensure that the style is only added if it does not already exist as a global style.
/overline	Overline the text.
/propertyStyle	Font should appear in the Property style options drop down box.
/underline	Underline the text.
name	Name of the style to use.

AddGraphDimension

AddGraphDimension [/vert] [/label ⟨label⟩] ⟨curve-id1⟩[⟨pos1⟩[⟨curve-id2⟩[⟨pos2⟩]]]

Adds a dimension object to a graph. The dimension object is not yet supported by the GUI.

Parameters

/label	Text to add to the dimension object.
/vert	If present, a vertical dimension is displayed, otherwise it will be horizontal.
curve-id1	Id of first curve
pos1	Initial position on curve of dimension. X value if horizontal, otherwise a Y value
curve-id2	Id of second curve
pos2	Initial position on second curve of dimension. X value if horizontal, otherwise a Y value

AddImage

AddImage [/dimension ⟨target_size⟩] ⟨filename⟩

Adds an image to the current schematic. This is an interactive action and will attach the image to the cursor until it is placed on the schematic.

Parameters

/dimension	Target size in grid units squared. Optional.

/reference	If set, states that filename is actually a reference.
filename	The name of the file to import as a full path or reference if the reference flag is set.

AddImageScript

AddImageScript ⟨left⟩⟨top⟩⟨right⟩⟨bottom⟩⟨image-base64⟩

A Symbol Definition Command that adds an image to a symbol.

Parameters

left	Integer. Left position of image.
top	Integer. Top position of image.
right	Integer. Right position of image.
bottom	Integer. Bottom position of image.
image-base64	String. Base64 representation of the image.

AddLegend

AddLegend [/autowidth] [/font ⟨font-name⟩] [/colour ⟨colour-name⟩]
[⟨label⟩[⟨x-pos⟩[⟨y-pos⟩[⟨width⟩[⟨height⟩]]]]]

Adds a legend box to the currently selected graph. A "Legend Box" is a graph annotation object which consist of a rectangle containing a list of curve labels. See "Graph Objects" on page 569 for more information.

Parameters

/autoWidth	If specified, the width of the box will be adjusted automatically according to its contents.
/colour	Name of colour to be used for text. Name of option setting that will store the colour of the object in the form #rrggbb. Default is "GraphColourLegendBox"
/font	Name of font object to be used for text object. This must with the CreateFont command. See CreateFont (page 452) for details. Default is "Legend Box"

label — This is the text that will copied to each entry. To be meaningful this must contain a symbolic value enclosed by '%'. Symbolic values for graph objects are explained more fully on "Symbolic Values" on page 571. The default value for label if omitted if %DefaultLabel%. This will result in the curves name and measurements being displayed in the legend box. Some alternatives are:

%Curve:Label%	displays just the label with no measurements
%Curve:Measurements%	displays just the measurements
%Curve%	displays the curve's ID only
%Curve:Label%/%Curve:YUnit%	displays the curve name and y-axis units

x-pos — X position of box in view units (See "Graph Coordinate System" on page 580). If the value is 1.0 or greater, the box will be placed such that its left hand edge is to the right of the graph's grid area. Default = 0.

y-pos — Y position of box in view units (See "Graph Coordinate System" on page 580). If the value is 1.0 or greater, the box will be placed such that its bottom edge is above the graph's grid area. Default = 1

width — Physical width of box in mm. (For CRT monitors this won't be exact. They are typically assumed to be 75 pixels/inch so 1mm is approx. 3 pixels). Note that this value will be ignored if /autowidth is specified. Default = 50.

height — Physical height of box in mm. (See notes above wrt CRT monitors)

AddLegendProp

AddLegendProp ⟨curveId⟩⟨property-name⟩⟨property-value⟩

Adds a property to a graph legend. Legend properties are generally used to display measurement information for a curve. Their name and value is displayed below a curve's legend (or label).

Parameters

curveId — The curve ID. Curve id is returned by the functions GetSelectedCurves (page 207), GetAxisCurves (page 153) and GetAllCurves (page 150).

property-name — Name of property. May be any string and may contain spaces.

property-value — Value of property. May be any string and may contain spaces.

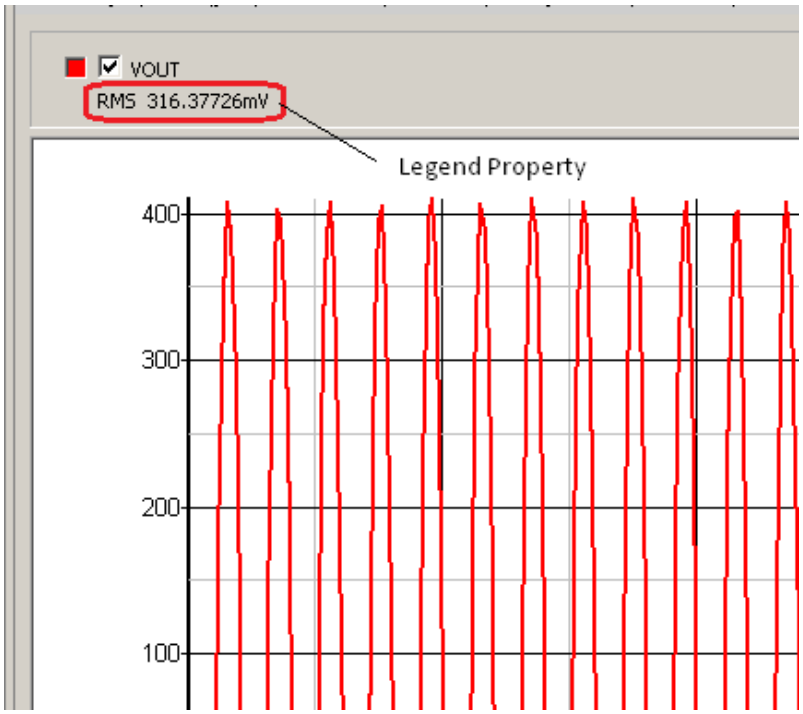
Example

The following iterates through selected curves and adds a RMS measurement.

```
let curves=GetSelectedCurves()
let numCurves = length(curves)

...

for idx=0 to numCurves-1
       *** Script lines to retrieve RMS value ...
    AddLegendProp {curves[idx]} "RMS" {rms_value}
next idx
```



A typical result is displayed above. In this example the property name is 'RMS' and its value is 316.37726mV

AddPin

AddPin ⟨pin-name⟩⟨pin-number⟩⟨x⟩⟨y⟩[⟨label-x⟩⟨label-y⟩⟨label-flags⟩] [⟨qualifier-list⟩]

AddPin is a Symbol Definition Command. A pin is a point on a symbol where wires can be connected. Refer to "Schematic Symbol Script Definition" on page 564 for more details.

Parameters

pin-name	Text string. Any pin name can be used as long as it does not contain spaces. However, in order to allow the plotting of currents from the schematic, certain pin names must be used for primitive components.

pin-number Integer. Determines the order in which the pins appear on the device's netlist entry. Must be in a certain order for primitive components.

x,y Integer. Symbol co-ordinates of pin. As wires always snap to grid points pins must lie on grid points if is to be possible to connect to them. This means that the x and y co-ordinates must be a multiple of 100.

label-x, label-y X and Y position relative to pin of pin label. Text of label will be pin name. Scaling is 100 points per grid square. Justification is determined by label_flags - see below.

label-flags Justification of pin label text. Values as follows:

0: left top

1: centre top

2: right top

8: left baseline

9: centre baseline

10: right baseline

Baseline means the base for upper case characters. The tails of some lower case characters go below the baseline.

qualifier-list One or more qualifiers used for XSPICE devices. For more information refer to *Simulator Reference Manual/Simulator Devices/Using XSPICE Devices*. Qualifiers may be one of:

vecclose	Pin closes a vector connection. This causes a ']' to be placed after the pin's connection in the netlist
vecopen	Pin opens a vector connection. This causes a '[' to be placed before the pin's connection in the netlist
vecopenl	As vecopen except that it forces the '[' to always be placed before any other qualifiers.
invert	Inverts a digital pin. Places a ' ' before it in the netlist
%d	Forces pin to be of digital type.
%g	Forces pin to be of type "grounded conductance".
%gd	Forces pin and the one following to be of type "differential conductance"
%h	Forces pin to be of type "grounded resistance".
%hd	Forces pin and the one following to be of type "differential resistance"
%i	Forces pin to be of type "single ended current".
%id	Forces pin and the one following to be of type "differential current"
%v	Forces pin to be of type "single ended voltage".
%vd	Forces pin and the one following to be of type "differential voltage"

See Also

"Schematic Symbol Script Definition" on page 564

AddProp

AddProp [/font ⟨font⟩] [/sel] ⟨name⟩[⟨init-value⟩] [⟨flags⟩] [⟨x-pos⟩⟨y-pos⟩]

AddProp is a Symbol Definition Command. A Property is a text string that can be attached to a symbol which is normally used to describe a special characteristic such as a component reference or value. A comprehensive explanation on properties can be found in *User's manual/Schematic Editor/Properties*.

Parameters

/font Integer from 1 - 8 that specifies one of 8 fonts as follows:

1	Default
2	Caption
3	Free text
4	Annotation
5	User 1
6	User 2
7	User 3
8	User 4

The value specified by /font *fontIndex* overrides bits 11-13 of the *flags* value (see above).

/sel If specified the property is marked "selectable". This means that the selection boundary of the instance which owns the property will be extended to include the property text. This is usually used for symbols that consist only of properties and have no body.

/styleOverride Optional override style for the property. This property will then use this style instead of the infered default style.

name Text string. This can be anything but usually would be one of the special properties which convey a special meaning. A full listing of these is given in the "Schematic Editor" chapter of the User's manual. The important ones are listed below:

ref	Component reference.
value	Component value or model name (E.g. BC547)
model	Single letter to signify type of device.
netname	If present forces netlister to assign value of value property to all nets connected to component. This property is used by the 'Terminal' component in the Symbols menu.
schematic_path	File system pathname for a hierarchical block.
valuescript	Script that is called when F7 is pressed or the menu Edit Value/Model is selected.

Some other property names are used in scripts such as biasv which is used by the bias point annotation scripts and is attached to the bias point annotation markers.

initvalue Text string, integer or real. The initial value of the property when the component is first placed. It may be changed subsequently with the Prop command. Examples: the value of a ref property would be something like 'R23' or 'Q4'. The value of a value property maybe '33k' or 'IRF640'.

flags	This is the property's attribute flags. It is a single integer that describes a number of attributes for the property. For full information see "Attribute Flags in the Prop command" on page 510.
x-pos, y-pos	If specified, the property will be placed at an absolute location specified by X_pos and Y_pos relative to the reference point of the symbol. The flags value specifies the justification of the text as described in "Attribute Flags in the Prop command" on page 510. If X_pos and Y_pos are specified, the text will be displayed vertically in 90 and 270 degree rotated orientations.

Example

```
AddProp ref Q? 26
```

A symbol containing this line in its definition will possess the property of name ref and when first placed on a schematic will have the initial value of Q?. The text Q? will be displayed on the schematic to the right of the symbol when in normal orientation and underneath the symbol when in a 90° rotated orientation.

```
AddProp ref Q? 8 100 200
```

The same property as the above example but instead it will be placed 100 units horizontally and 200 unit vertically from the symbol origin. The text of the property will be left justified and positioned vertically referenced to its base line.

See Also

"Schematic Symbol Script Definition" on page 564

AddProperty

AddProperty [/name ⟨name⟩] [/value ⟨value⟩]

Adds a property to the selected schematic elements.

Parameters

/name	Name of the property.
/value	Value of the property.

AddSeg

AddSeg ⟨start-x⟩⟨start-y⟩⟨end-x⟩⟨end-y⟩

AddSeg is a Symbol Definition Command. It is used to add a line segment to a symbol.

Parameters

start-x	Integer. Symbol x co-ordinate of start of segment
start-y	Integer. Symbol y co-ordinate of start of segment
end-x	Integer. Symbol x co-ordinate of end of segment
end-y	Integer. Symbol y co-ordinate of end of segment

See Also

"Schematic Symbol Script Definition" on page 564

AddSymbolProperty

AddSymbolProperty ⟨name⟩⟨flags⟩⟨value⟩[⟨x⟩⟨y⟩] [/styleoverride ⟨style-name⟩]

Adds a property to the symbol currently open in the symbol editor. See the User's Manual for detailed information on properties.

Parameters

/styleoverride	Style name to use instead of the inferred style.
name	Property name
flags	Property attribute flags. See "Attribute Flags in the Prop command" on page 510.
value	Property value
x,y	If both specified the property will automatically be given a fixed position attribute and will be located at the position given. The position is relative to the symbol's origin

AddTextBox

AddTextBox [/font ⟨font-name⟩] [/colour ⟨colour-name⟩] ⟨text⟩[⟨x-position⟩[⟨y-position⟩]]

Adds a Text Box to the currently selected graph. A text box is an item of text enclosed by a border.

Parameters

/colour	Name of colour to be used for text. Name of option setting that will store the colour of the object in the form #rrggbb. Default is GraphColourTextBoxText
/font	Name of font to be used for text. This must either be a built in font or one created using CreateFont. Default is "Graph Text Box"

text	Text to be displayed in the box. This may use symbolic value enclosed by '%'. The following are meaningful for Text Box objects: %Date% The date when the object was created %Time% The time when the object was created %Version% The name and current version of the program See "Symbolic Values" on page 571 for more information on symbolic values.
x-position	The x position of the box in view units (See "Graph Coordinate Systems" on page 580)
y-position	The y position of the box in view units (See "Graph Coordinate Systems" on page 580)

AddTitleBlock

AddTitleBlock [/company ⟨company name⟩] [/title ⟨title name⟩] [/author ⟨author name⟩] [/loc ⟨x⟩⟨y⟩] [/notes ⟨notes⟩] [/layout ⟨layout⟩] [/logo ⟨imagedata⟩] [/date ⟨date⟩] [/version ⟨version⟩]

Adds a title block to the currently selected schematic.

Parameters

/author	The name of the author.
/company	The authoring company name.
/date	Optional string representing the date. If «auto» is used, this will use auto date on saving.
/layout	Either 'horizontal' or 'vertical'.
/loc	The location on the schematic to place the title block. Two integer arguments, first is x-position, second is y-position.
/logo	Full path to an image file to use as the logo image. Only available in the horizontal layout.
/notes	Notes about the schematic. Only available in the horizontal layout. The notes section can be long, however you must include a backslash n within the string to indicate where line breaks should happen in the text, otherwise the entire notes section will appear on a single line.
/title	The title of the schematic.
/version	Optional string representing the version number. If «auto» is used, this will use auto version on saving.

AlignText

AlignText

Aligns the text of a text annotation. Options are left, right or center aligned.

Parameters

/center	For center alignment.
/left	For left alignment.
/right	For right alignment.

Anno

Anno [/prop property_name] [/nopaint] [/bypos] [/minSuffix min_suffix]

Automatically allocates unique component references to all components on currently selected schematic.

Typically Anno is used prior to running the Netlist command. The latter requires unique references to function.

Note that Anno will not allocate a new reference to a component unless it is necessary to do so to avoid a duplication. When there is a duplication, the component which was most recently added to the schematic will be modified.

Parameters

/bypos	If specified, all references will be reassigned according to their position on the schematic working left to right. Unlike /minSuffix this switch does reassign all references. It can be used with /minSuffix to reassign all references in a schematic according to a desired specification.
/minSuffix	Minimum suffix value that will be used for new references. The anno command works by locating duplicate references then searching for the first suffix value that resolves the duplicate. The minSuffix switch specifies the lowest value that will be used. So if set to 100 for example, the lowest resistor reference would be R100. Note that this will not force existing references to be updated to values greater than *min-suffix*. Only values that need changing will be affected.
/nopaint	The anno command always forces the schematic window to refresh if any changes to properties were made. This action is inhibited if this switch is specified. This is usually used if the property being annotated is hidden and therefore will cause no visual change.
/prop	If specified, annotates properties of name *property-name*. Otherwise properties of name "ref" are annotated.

AppendGroup

AppendGroup ⟨group⟩⟨appending-group⟩

Appends a data group with another group. Appending a group joins vectors with the same name and type in both groups to add a new division. (Refer to "Multi-division Vectors" on page 19)

This is used for Multi-core multi-step SIMPLIS simulations. Each SIMPLIS process runs independently creating its own data file. When the processes have completed their simulations, the data

files are loaded to create groups which are then appended using this command. The end result is a multi-division vector which looks the same as if it were created by a conventional single-core run.

See Also

CreateGroup (page 452)

DelGroup (page 467)

OpenGroup (page 498)

Groups (page 233)

Product

SIMetrix and SIMetrix/SIMPLIS Pro and Elite

AppendTextWindow

AppendTextWindow [/file ⟨filename⟩] [/text]

Inserts text into the schematic editor's simulator command window also known as the *F11 window*.

Parameters

/copy	If specified the text is copied to the F11 window replacing the existing text. Otherwise text is appended.
/file	
filename	If specified, the contents of the specified file is placed in the F11 window
text	If '/file *filename*' is absent, text is inserted in the F11 window

Notes

Text is always is always appended to the end of the window's existing contents.

See Also

ReadF11Options (page 322)

WriteF11Options (page 405)

WriteF11Lines (page 404)

GetF11Lines (page 171)

Arguments

Arguments ⟨argument⟩...

BuildDefaultOptions

BuildDefaultOptions

Resets preference settings to factory defaults

Cancel

Cancel

Cancel current schematic editing operation (wiring, moving etc.). As the command line is inactive while editing operations are in progress this command is only of value when used in a key or menu definition with the flag set to 5 or with /immediate switch for DefMenu command. For more information see "User Defined Key and Menu Definitions" on page 556.

CaptureWaveformImage

CaptureWaveformImage

Captures an image of the current highlighted graph.

By default it will store the image to the clipboard. If /file is set, then it will output to the given filename.

Parameters

/file	Specifies the filename to output to.
/size	Sepcifies the size of the image to capture. Values are width and height.
/sleep	Optional argument for controlling the sleep time in milliseconds. A sleep time is required to ensure the graph has completed rendering before an image capture occurs. The internal system will use intervals of 50 milliseconds to measure the Sleep. If the value given is below 50, no sleep will occur. Default value is 1000.

Cd

Cd [⟨pathname⟩]

Cd is almost identical to the DOS cd or chdir commands. It changes the current directory to that specified. Unlike the DOS command, however, it will also change the current drive if it is included in the directory name. If no directory name is specified, the current directory will be displayed.

ChangeArcAttributes

ChangeArcAttributes [⟨theta⟩] [⟨v-over-h⟩]

Modifies the attributes of the selected arc or arcs in the currently open symbol editor sheet.

Parameters

theta	Arc swept angle in degrees. Default = 90.
v-over-h	vertical radius/horizontal radius. Default = 1 (i.e. a circular arc)

ChangeSelectedStyleNames

ChangeSelectedStyleNames [/noupdate] [/normal ⟨name⟩] [/selected ⟨name⟩]

Changes the styles of the selected elements.

Parameters

/normal	The name of the new normal style to use.
/noupdate	Do not make a visual update.
/selected	The name of the new selected style to use.

ChangeStyle

ChangeStyle ⟨style-name⟩

Changes the style of the selected elements.

Parameters

/selected	If set, will change the *selected* style used.
style-name	The name of the style to apply.

ChangeSymbolProperty

ChangeSymbolProperty [/value ⟨value⟩] [/flags ⟨flags⟩] [/loc ⟨x⟩⟨y⟩] [/code ⟨security-code⟩] [/overridestyle ⟨override-style-name⟩] [⟨prop-name⟩]

Modifies a named or selected symbol editor property. In the symbol editor, pin names are also represented as properties, so this command is also used to edit pin names.

Parameters

/code	If specified the property of the specified name will be modified. Otherwise all selected properties will be modified.
/flags	New property attribute flags. See "Attribute Flags in the Prop command" on page 510

/loc	New absolute location. If the location was previously relative, this will be changed to absolute if this value is specified.
/overridestyle	Style name to use instead of the inferred style.
/value	New property value

See Also

"Prop" on page 510

"AddProp" on page 438

ClearMessageWindow

ClearMessageWindow

Clears the command shell message window.

Close

Close schem|graph

Closes either the selected schematic or graph, depending on argument given.

Parameters

schem	Use schem to close the selected schematic.
graph	Use graph to close all graphs.

CloseGraphSheet

CloseGraphSheet

Closes the current tabbed sheet in the selected graph window. If the window has only one sheet, the whole window will be closed.

ClosePrinter

ClosePrinter

ClosePrinter is one of a number of commands and functions used for non-interactive printing. This is explained in "Non-interactive and Customised Printing" on page 582. Printing sessions are started with OpenPrinter (page 500) after which print output commands such as PrintGraph (page 508) and PrintSchematic (page 509) may be called. The session is terminated with ClosePrinter which actually initiates the printing activity. If the `/abort` switch is specified, the print job is terminated and no print output will be produced.

Parameters

/abort	Any print job will be aborted and no print output will be produced.

See Also

"NewPrinterPage" on page 493

"OpenPrinter" on page 500

"PrintGraph" on page 508

"PrintSchematic" on page 509

"GenPrintDialog" on page 148

"GetPrinterInfo" on page 203

CloseSchem

CloseSchem

Closes the currently selected schematic.

CloseSheet

CloseSheet

Closes the currently selected schematic or symbol editor tabbed sheet. If the sheet is the last in its window, the window will also be closed.

If /force is specified, the sheet will be closed unconditionally. Otherwise user interaction will be required if the schematic or symbol has not been saved.

Parameters

/force	If specified, the sheet will close unconditionally.

CloseSimplisStatusBox

CloseSimplisStatusBox

See Also

"OpenSimplisStatusBox" on page 503

CloseTextEditor

CloseTextEditor

Closes the currently selected text editor based widget.

Parameters

/type	Optional. Specifies the type of editor to close. Options are: *LogicDefinitionEditor*, *NetlistEditor*, *ScriptEditor*, *TextEditor*, *VerilogAEditor*, *VerilogHDLEditor*.

CollectGarbage

CollectGarbage

Deletes temporary vectors. This command is only needed for scripts running endless or very long loops. SIMetrix creates temporary vectors when calculating vector expressions. These do not get deleted until control is returned to the command line. In the case of a script that calculates many expressions, it is possible for the memory used by the temporary vectors to become excessive. Calling CollectGarbage at regular intervals will resolve this problem.

CombineMenu

CombineMenu ⟨menu1|menu2|...⟩⟨new_menu_name⟩

Combines several menus into a separate menu.

Parameters

menus	Set of menu names to merge, separted by '|'.
new_menu_name	The name of the new menu to merge to.

CompareSymbolLibs

CompareSymbolLibs [/detail] ⟨file1⟩⟨file2⟩

Compares two symbol libraries by comparing each symbol in turn. A message will be output for each symbol that is different or is not found in one of the libraries. Symbols are classed as identical if:

1. All graphical elements are identical. Graphical elements are segments and arc segments. (Circles are classed as arc segments)

2. All pins have the same name, location and order

3. All protected properties are identical.

Unprotected properties are not compared. If no differences are found the command will output the message "The symbol files are identical".

Parameters

/detail	If specified, a detailed report is given when two symbols do not match. Detail about what doesn't match will be provided. This could be mismatched segments, properties or pins.
/difflib	If specified the second library is expected to be a difference library. Symbols not found will not be reported.
lib1	Path of first symbol library file
lib2	Path of second symbol library file

Copy

Copy

Initiates the schematic 'copy' editing operation. This performs exactly the same function as the "Duplicate" button on the schematic sheet and the equivalent menu. Note that the clipboard is bypassed for this operation.

CopyClipGraph

CopyClipGraph

Copies a graphical picture of the graph to the clipboard or to a specified file.

Parameters

/file	If specified, the graph is written output in the format specified by the format switch. If not specified the graph picture is written to the clipboard.
/format	Picture format used. Choices are: wmf Enhanced metafile format. svg "Scalable Vector Graphics" format. A scalable format compatible across platforms. Not supported in clipboard mode jpeg JPEG format png PNG format bmp Windows bitmap format In clipboard mode jpeg, png and bmp do the same thing - that is write an uncompressed bitmapped image of the graph. If /format is omitted, wmf will be used.
/mark	If specified, markers are displayed on each curve as a means of identification. This is enabled automatically if /mono is specified.
/mono	Copy graph in monochromatic form.
/vp	Viewport dimensions in pixels. This is used to specify the size of the image if a bitmapped format (png, jpeg, bmp) is specified. x is the width, y is the height.

Notes

This command makes it possible to export graphs into other windows applications such as word processors. The clipboard is a central store within operating system which is accessible by all applications. Refer to system documentation for more information.

CopyClipSchem

CopyClipSchem

Parameters

/file — If specified, the schematic is written output in the format specified by the format switch. If not specified the schematic picture is written to the clipboard.

/format — Picture format used. Choices are:

- wmf — Enhanced metafile format. (Windows only)
- svg — "Scalable Vector Graphics" format. A scalable format compatible across platforms. Not supported in clipboard mode
- jpeg — JPEG format
- png — PNG format
- bmp — Windows bitmap format

In clipboard mode jpeg, png and bmp do the same thing - that is write an uncompressed bitmapped image of the graph.
If /format is omitted, wmf will be used.

/mono — Copy schematic in monochromatic form.

/vp — Viewport dimensions in pixels. This is used to specify the size of the image if a bitmapped format (png, jpeg, bmp) is specified. x is the width, y is the height.

Notes

This command makes it possible to export schematics into other windows applications such as word processors. The clipboard is a central store within operating system which is accessible by all applications. Refer to system documentation for more information.

CopyFile

CopyFile [/force] ⟨from-file⟩⟨to-file⟩

Copies a file.

Parameters

/force	If specified, *to-file* will be overwritten if it exists. Otherwise if *to-file* exists, the command will fail.
from-file	Source file
to-file	Destination file

CopyLocalSymbol

CopyLocalSymbol ⟨symbol-name⟩[⟨new-symbol-name

Copies a symbol in the currently selected schematic to the global library.

Parameters

symbol-name	Name of local symbol to copy
new-symbol-name	New name for symbol when copied to global library. If omitted, the original name is used. If the symbol already

CreateFont

CreateFont ⟨font-name⟩⟨font-base⟩

Creates a new font object based on an existing font. The name given to the font can be used to specify the font for some graph annotation objects. Once CreateFont is called, its name will be displayed in the list displayed when the **File | Options | Font...** menu is selected.

Parameters

font-name	Name of new font
font-base	Name of font to be used to set initial properties. May be any font listed in the menu File|Options|Font... or one of the following: Standard, StandardMedium or StandardLarge.

CreateGroup

CreateGroup [/title ⟨title⟩] ⟨label⟩

Creates a data group. All vectors (or variables) are organised into groups. Each simulation run creates a new group and all data for that simulation is placed there. For more information, see "Groups" on page 18.

Parameters

/title	Optional title. This will be displayed in the box displayed when selecting a Change Data Group... menu. It is also returned by a call to Groups('title')
label	Base name of group. The actual group name will be appended by a number to make it unique. The new group will become the current group. To find the name actually used, you can call the function "Groups" on page 233 immediately after calling this command. The first element of Groups (i.e. `Groups())[0]` is always the current group.

See Also

DelGroup (page 467)

OpenGroup (page 498)

Groups (page 233)

CreateRunningDialog

CreateRunningDialog

Creates a dialog for displaying progress whilst a script is running.

Parameters

/abortcommand	Command to be executed when Abort accepted. Typically this would be a command to assign a global variable which the running script would test. For example, 'Let global:abortScript=1'. The script would test this value at appropriate times then exit cleanly. If this switch is omitted, the script will execute the ScriptAbort (page 528) command which will abort the execution of the script immediately.
/abortmessage	Message shown when pressing abort
/caption	Title bar caption.
/displaymessage	The message displayed inside the dialog
/status	Initial status message.
/steps	The number of progress steps that will occur. If 0 or not set, no progress bar will be shown.

See Also

"UpdateRunningDialog" on page 548

"DestroyRunningDialog" on page 469

CreateSym

CreateSym [/local] [/file ⟨libfile⟩] [/flags ⟨flags⟩] ⟨symbol-name⟩[⟨description⟩[⟨catalog⟩]]

Parameters

/file	If specified, the symbol will be saved to libfile. If neither /file nor /local are specified, the symbol will be saved to the file default.sxslb in the SymbolLibs directory.
/flags	If flags=1 then the symbol will be stored with tracking enabled. This means that any existing instances of the symbol with the specified name will be automatically be updated when the symbol is edited.
/local	If specified, the symbol will be created in the currently open schematic and will not be saved to the global library.
symbol-name	Text string. Name of symbol being defined. This can be anything not already used in a previous symbol definition and must not contain spaces. This is known as the "internal name" in the user interface.
symbol-description	Text string. Description of symbol. If specified this will appear in the choose symbol dialog box opened by the menu **Place | From Symbol Library...** . (This menu calls the function GetSymbols (page 222)). This is known as the "user name" in the user interface.
catalogue	This permits the implementation of multiple catalogues for symbols. This is a method of categorising symbols so that they can be easily located. The menu **Place | From Symbol Library...** lists available symbols in a tree structure and the catalogue name is used to define its location in that tree. Branch names are separated by semi-colons. E.g. "Digital;Flip-flops" creates a top level called "Digital" and a sub-branch called "Flip-flops".

CreateToolBar

CreateToolBar ⟨window-name⟩⟨toolbar-name⟩

Creates a new empty toolbar. To add buttons to the toolbar use command "DefineToolBar" on page 459.

Parameters

window-name Name of window where toolbar is to reside. Must be one of:

CommandShell	Command shell window
Schematic	Schematic windows
Symbol	Symbol editor windows
Graph	Graph windows

toolbar-name

User assigned name for toolbar. You can use any name that doesn't clash with a pre-defined toolbar name as defined in the table below. The name must not contain spaces. Pre-defined toolbars are:

CommandShellMain	Command Shell toolbar
SchematicMain	Main schematic toolbar
SchematicFile	Schematic file operations toolbar
SchematicComponents	Schematic component toolbar (SIMetrix mode)
SIMPLISComponents	Schematic components toolbar (SIMPLIS mode)
SymbolMain	Symbol editor toolbar
GraphMain	Graph window toolbar

This name is used to reference the tool bar in the DefineToolBar (page 459) command.

See Also

"CreateToolButton" on page 455

"DefButton" on page 458

"GetToolButtons" on page 226

CreateToolButton

CreateToolButton [/toggle] [/shortcut key] [/class class-name] ⟨name⟩[⟨graphic⟩[⟨hint⟩]]

Creates or redefines a tool bar button. This command creates the properties of the button but not the command it executes when it is pressed. To define the command, use "DefButton" on page 458.

Parameters

/class

This is used with the function "GetToolButtons" on page 226 to select buttons according to their function. Set this value to 'component' if you wish the button to be displayed in the GUI which selects component button.

/shortcut

Specifies a shortcut key that will perform the same action as the tool button. For key codes see "DefKey" on page 460.

/toggle

If specified, the button will have a toggle action and will have two commands associated with it. One command will be executed when the button is pressed and another when it is released. The 'Wire' pre-defined button is defined in this manner.

name

Name of button. This may be one of the pre-defined types described in "DefineToolBar" on page 459 in which case this command will redefine its properties. You may also specify a new name to create a completely new button.

graphic	Graphical image to be displayed on the button. This may be one of the pre-defined images listed in "DefineToolBar" on page 459 or you may use a user defined image specified in a file. The file must be located at simetrix-root/support/images. where simetrix-root is the top level directory in the SIMetrix tree. The file may use windows bitmap (.bmp), portable network graphic (.png) or JPEG (.jpg) formats. The PNG format supports masks and this format must be used if transparent areas are needed in the graphic.
hint	Text that describes the operation of the button. This will be displayed when the user passes the mouse cursor over the button.

See Also

"CreateToolBar" on page 454

"GetToolButtons" on page 226

CursorMode

CursorMode on|off|toggle|step|stepref|stepshift|steprefshift

Switches cursor mode of selected graph. In cursor mode, two cursors are displayed allowing measurements to be made. See the User's manual for more information on cursors.

Parameters

on	Switch cursors on
off	Switch cursors off
toggle	Toggles on|off
step	Step cursor to next curve
stepref	Step reference cursor to next curve
stepShift	Steps cursor to next curve within a group. Curves are grouped - for example - for Monte Carlo runs.
stepRefShift	Steps reference cursor to next curve within a group. Curves are grouped - for example - for Monte Carlo runs.

Curve

Curve [/xl ⟨xlimit_low⟩⟨xlimit_high⟩] [/yl ⟨ylimit_low⟩⟨ylimit_high⟩] [/xdelta ⟨xdelta⟩] [/ydelta ⟨ydelta⟩] [/ylabel ⟨ylabel⟩] [/xlabel ⟨xlabel⟩] [/yunit ⟨yunit⟩] [/xunit ⟨xunit⟩] [/title] [/xauto] [/yauto] [/xlog] [/ylog] [/loglog] [/dig] [/select] [/newaxis] [/newgrid] [/axisid ⟨id⟩] [/autoaxis] [/coll] [/name] [/bus ⟨bus-spec⟩] [/icb ⟨objid⟩] [/new] [/newsheet] [/autoxlog] [/autoylog] ⟨y-expression⟩[⟨x-expression⟩]

Curve can be used to add a new curve to an existing graph created with Plot or to change the way it is displayed.

Parameters

/autoaxis	If specified, the new curve will be plotted on a digital axis and will be plotted as a bus curve. type may be 'hex', 'dec' or 'bin' specifying hexadecimal, decimal or binary display respectively.
/autoXlog	
/autoYlog	
/axisid	If specified, the new curve will be added to a y-axis with the id specified by axis_id. Axis id is returned by the functions "GetAllYAxes" on page 151, "GetCurveAxis" on page 162 and "GetSelectedYAxis" on page 208.
/bus	If specified, the new curve will be plotted on a digital axis and will be plotted as a bus curve. type may be 'hex', 'dec' or 'bin' specifying hexadecimal, decimal or binary display respectively.
/coll	Does nothing. For compatibility with version 3.1 and earlier.
/dig	If specified, new curve will be plotted on new digital axis. Digital axes are stacked on top of main axes and are sized and labelled appropriately for digital waveforms.
/icb	Specifies the internal clipboard as the source of the curve data. clipboard-index is a value of 0 or more that indicates which curve in the internal clipboard is to be used. The function "HaveInternalClipboardData" on page 238 may be used to determine the number of curves available. The maximum acceptable value for clipboard-index is thus one less than the value returned by HaveInternalClipboardData (page 238).
/loglog	Only effective when graph sheet is empty. Forces both y and x axes to be logarithmic
/name	If specified, curve will be named curve-name.
/new	
/newAxis	If specified, the new curve will be plotted on a new y-axis.
/newGrid	If specified, the new curve will be plotted on a new grid.
/newSheet	
/select	If specified, the new curve will be selected.
/title	Does nothing. Included for compatibility with Plot command.
/xauto	Flag. Use automatic limits for x-axis. If this appears after a /xl specification /xauto will override it and vice-versa.
/xdelta	Specify spacing between major grid lines on x-axis. Followed by *x-grid-spacing*, a real value. For default spacing use 0.
/xl	Use fixed limit for x-axis. Followed by *x-low-limit* and *x-high-limit*, which are real valued lower and upper limit of the x-axis.
/xlabel	Specify a label for the x-axis. If the label name argument contains any spaces, the whole string must be enclosed in double quotes.
/xlog	Only effective when graph sheet is empty. Forces logarithmic xaxis.

/xunit	Specify units for the x-axis (Volts, Watts etc.), followed by the unit name as a string. If the string contains spaces, the whole string must be enclosed in quotes (""). You should not include an engineering prefix (m, K etc.).
/yauto	Flag. Use automatic limits for y-axis. If this appears after a /yl specification /yauto will override it and vice-versa.
/ydelta	Specify spacing between major grid lines on y-axis. Followed by *y-grid-spacing*, a real value. For default spacing use 0.
/yl	Use fixed limit for y-axis. Followed by *y-low-limit* and *y-high-limit*, which are real valued lower and upper limit of the y-axis.
/ylabel	Specify a label for the y-axis. If the label name argument contains any spaces, the whole string must be enclosed in double quotes.
/ylog	Only effective when graph sheet is empty. Forces logarithmic yaxis.
/yunit	Specify units for the y-axis (Volts, Watts etc.), followed by the unit name as a string. If the string contains spaces, the whole string must be enclosed in quotes (""). You should not include an engineering prefix (m, K etc.).
y-expression	Text string. Expression describing curve to be added to graph.
x-expression	Text string. Expression describing x values of curve defined by y expression. If omitted, reference of y_expression will be used.

CurveEditCopy

CurveEditCopy ⟨curve-id⟩[⟨curve-id⟩...]

Copy specified curves to the internal clipboard. Curves so copied may be subsequently plotted using the command "Curve" on page 456 with the /icb switch.

Parameters

curve-id	Id of curve. A number of functions return this value including "GetSelectedCurves" on page 207.

See Also

"Curve" on page 456

"HaveInternalClipboardData" on page 238

DefButton

DefButton [/immediate] [/comgroup ⟨command-group⟩]
⟨button-name⟩⟨command⟩[⟨upCommand⟩] [/menu ⟨menu-item-title⟩] [/features
⟨features-required-for-menu-item⟩]

Defines the command executed when a button is pressed.

Parameters

/comgroup	This can be used with the function GetLastCommand (page 187). GetLastCommand returns the text of the most recent command executed which specifed the supplied command group value. The command DefMenu (page 462) also uses this feature.
/immediate	If specified, the command will be enabled for immediate execution. That is the command will be executed immediately even if another command - such as a simulation run - is currently in progress. This will only be accepted when the command specified is one of a small number of built-in command enabled for immediate execution. For the list of commands, see the command DefMenu (page 462). You may not call a script if immediate execution is specified.
/menu	Flags whether this entry is a submenu of the button.
button-name	Name of button. Either a pre-defined button as listed in the command DefineToolBar (page 459) or a new button created with CreateToolButton (page 455).
command	Command to be executed when the button is pressed. If `/immediate` is *not* specified this may be any valid command including a script.
up-command	Command to be executed when a toggle button is released. The button must be defined to have a toggle action using the `/toggle` switch for the command CreateToolButton (page 455).

See Also

GetToolButtons (page 226)

DefineToolBar

DefineToolBar ⟨toolbar-name⟩⟨button-defs⟩

Defines the buttons for a user defined toolbar created using the command CreateToolBar (page 454). To define the buttons for a pre-defined toolbar, the associated option setting must be set using the command Set (page 531).

Parameters

toolbar-name	Name of toolbar. This must be a toolbar created using CreateToolBar (page 454).
button-defs	Semi-colon delimited list of button names to add to the toolbar. Buttons may either be one defined using CreateToolButton (page 455) or one of the pre-defined types shown in the table below. The '-' character may also be used to specify a spacer For a list of buttons, see "Pre-defined Buttons" on page 596. The graphic images for all pre-defined buttons are built-in to the program, but the image files from which they were created can be found on the install CD.

See Also

"DefButton" on page 458

"GetToolButtons" on page 226

DefKey

DefKey ⟨key-label⟩[⟨command-string⟩[⟨options⟩]]

DefKey is used to define custom key strokes.

Parameters

key-label

Code to signify key to define. See table below for list of possible labels. All labels may be suffixed with one of the following:

:SCHEM	Key defined only when a schematic window is currently active
:GRAPH	Key defined only when a graph window is currently active
:SHELL	Key defined only when the command shell is currently active.
:SYMBOL	Key defined only when a symbol editor window is currently active

If no suffix is provided the key definition will be active in all windows.
Valid key labels are:

F1	F2	F3	F4	F5	F6
F7	F8	F9	F10	F11	F12
INS	DEL	HOME	END	PGUP	PGDN
LEFT	RIGHT	UP	DOWN	TAB	BACK
ESC	NUM1	NUM2	NUM4	NUM5	NUM6
NUM7	NUM8	NUM9	NUM0	NUM*	NUM/
NUM+	NUM-	NUM.			

Additionally, all letter and number keys, referred to by letter/number alone. The space bar can be used (_SPACE), but must always be shifted.
Shifted keys are keys that have shift, control or alt also pressed at the same time. Any of the above keys can be prefixed with any combination of 'S' for shift, 'C' for control or 'A' for alt. Note that in windows, the right hand ALT key performs the same action as CONTROL-ALT.

command-string

A command line command or commands to be executed when the specified key is pressed. Multiple commands must be separated by semi-colons (';'). Unless the command string has no spaces, it must wholly enclosed in double quotation marks ('').

option-flag A number between 0 and 5 to specify the manner in which the command is executed. These are as follows:

0, 4	Default. Command is echoed and executed. Any text already in command line is overwritten.
5	Immediate mode. Command is executed immediately even if another operation - such as a simulation run or schematic editing operation - is currently in progress. For other options the command is not executed until the current operation is completed. Only a few commands can be assigned with this option.

The following commands can be used with the flag set to immediate mode:

Cancel (page 445)
DefMenu (page 462)
DefKey
Echo (page 471)
Let (page 482)
Move (page 487)
Pan (page 505)
Pause (page 505)
Quit (page 512)
RotInst (page 519)
Select (page 529)
ScriptAbort (page 528)
ScriptPause (page 528)
ScriptResume (page 528)
Shell (page 538)
Wire (page 550)
Zoom (page 555)

Note, the command Let (page 482) can be used to set a global variable which can then be tested in running script. This is a convenient method of providing user control of script execution.

Notes

Unshifted letter and number key definitions will not function when a text edit window such as the simulator command window (F11) is active. Space bar definitions must always be shifted.

The same codes can be used for menu short cuts. See "DefMenu" on page 462.

Key definition will be lost when SIMetrix exits. To make a key or menu definition permanent you can place the command to define it in the startup script. To do this, select command shell menu **File | Options | Edit Startup Script** and add the line above.

Example

To define control-R to place a resistor on the schematic sheet, enter the command:

```
DefKey CR "inst res" 4
```

The built in definition for F12 to zoom out a schematic is

```
DefKey F12:SCHEM "zoom out" 4
```

This definition only functions when a schematic is active. A similar definition for F12:GRAPH zooms out a graph when a graph window is active.

DefMenu

DefMenu [/immediate] [/shortcut] [/norepeat] [/id ⟨command-id⟩] [/comgroup ⟨command-group⟩] ⟨menu-path⟩[⟨command-string⟩[⟨when-enabled⟩]]

Defines custom menu. Supersedes DefItem.

Parameters

/comgroup This can be used with the function GetLastCommand (page 187). GetLastCommand returns the text of the most recent command executed which specifed the supplied command group value. The command DefButton (page 458) also uses this feature.

/forceUpdateCommand If set, this will force any update that occurs to also update the command, even if the command is an empty string.

/forceUpdateExpression If set, this will force any update that occurs to also update the expression, even if the expression is an empty string.

/id This item is used by the edit menu GUI. It is not needed for regular use.

/immediate Immediate mode. Command is executed immediately even if another operation - such as a simulation run or schematic editing operation - is currently in progress. For other options the command is not executed until the current operation is completed. Only a few commands can be assigned with this option. These are:

Abort (page 428)
AbortSIMPLIS (page 428)
Cancel (page 445)
DefMenu
DefKey (page 460)
Echo (page 471)
Let (page 482)
Move (page 487)
Pan (page 505)
Pause (page 505)
Quit (page 512)
RotInst (page 519)
Select (page 529)
ScriptAbort (page 528)
ScriptPause (page 528)
ScriptResume (page 528)
Shell (page 538)
Wire (page 550)
Zoom (page 555)

/noRepeat Do not save menu action in “repeat last menu” buffer. This must be used for any menu that recalls a previously executed menu.

/pos Position of menu. '1' means the top position. If omitted, the menu is placed at the bottom. Position must also take into account any link breaks within a menu.

/shortcut Specify key or key combination to activate menu. Key description is placed on right hand side of menu item. For list of possible values see DefKey (page 460), but note that key pad keys (e.g. NUM1, NUM* etc.) cannot be assigned as menu shortcuts. Also note that DefKey has precedence in the event of the key or key combination being defined by both DefKey and DefMenu.

menuname Composed of strings separated by pipe symbol: '|'. First name must be one of the following:

AsciiFileEditor Schematic ASCII file text editor

GraphMain Graph main menu

LogicDefinitionEditor Logic definition file text editor

NetlistEditor Netlist/Model file text editor

ScriptEditor Script file text editor

Shell Command shell menu

SimetrixMain Schematic main menu - SIMetrix mode

SimplisMain Schematic main menu - SIMPLIS mode

SymbolMain Symbol editor fixed menu

TextEditor Basic text editor

VerilogAEditor Verilog-A file text editor

VerilogHDLEditor Verilog-HDL file text editor

WebView Web browser

Graph Graph context menu

Simetrix Schematic context menu SIMetrix mode

Simplis Schematic context menu - SIMPLIS mode

Symbol Symbol editor context menu

The menuname for fixed menus must be followed by two or more names separated by '|' . The first is the menu name as it appears on the menu bar. The second can be the name of a menu item (which is actioned when selected) or a sub menu containing menu items or further sub menus. Sub menus can be nested to any level.
Use the '&' symbol to define an underlined ALT-key access letter.
The menuname for context menus must be followed by at least one name. Sub menus may also be defined for these.
To define a menu separator use the item text '-' Note that if any of the menu name contains spaces it must be enclosed in quotation marks.
Names defined using the CombineMenu command may also be used. The names SchemMain and Schem are defined in the standard startup script using CombineMenu (page 449) and provide compatibility with version 7.2 and earlier
See examples below.

when-enabled A Boolean expression specifying under what circumstances the menu should be enabled. (The menu text turns grey when disabled). If omitted the menu will always be enabled. The expression may contain the following values:

SchemOpen	TRUE when there is at least one schematic open.
InstSelected	TRUE when at least one component is selected on the selected schematic
Selected	TRUE when at least one component or at least one wire is selected on the current schematic
PropertiesSelected	TRUE if schematic properties are selected
ClipboardEmpty	TRUE if there is no schematic clipboard data available
SimPaused	TRUE when the simulator has been paused.
SimRunning	TRUE when the simulator is running.
CircuitLoaded	TRUE when a circuit has been loaded to the simulator. (This happens when ever a simulation is run. A circuit can be unloaded with the Reset command).
GraphOpen	TRUE when there is at least one graph window open.
GraphCursorOn	TRUE when graph cursors are switched on
GraphObjectSelected	TRUE if any graph annotation object, such as a legend box, is currently selected.
CurvesSelected	TRUE if any curves are selected
LiveMode	TRUE when a command has not completed.
Never	Always FALSE i.e menu permanently disabled.

These values can be combined with the operators:

&&	logical AND
||	logical OR
==	equals
!=	not equal
!	NOT

Parentheses may also be used. Note that this expression is not related to vector expressions or the expressions that can be used in netlists or the command line.

Expressions enclosed in curly braces may also be used. Such expressions may contain any script expression to make customised menu enables. Care should be taken when using this feature and it should be used sparingly. Expressions can take a long time to evaluate and this will lead to sluggish menu activation response.

Notes

You can use DefMenu to redefine an existing menu. In this situation the position of the menu will not change but the command it executes and any shortcut key can be altered. Note that *menuname* is not case-sensitive, so if an existing menu exists the existing menu will be modified. This allows filenames to be used for menu names.

Note that it isn't possible to add or remove a top level main menu definition while the window is open. For schematic, graph and symbol editor windows, this means that the definition of a new top level menu will not take effect until the windows are closed and reopened. For the command shell, top level main menu definitions can only be made in the startup script which runs before the command shell is visible.

This restriction only applies to the top level menu, that is the menu name that is permanently visible in the menu bar. Menu items and sub menus under the top level menu can be added, removed and redefined at will.

Example

The following are definitions for some of the standard menus. Definitions for all the standard menus can be found on the install CD in the Scripts folder. (A CD image may be downloaded from our web site if you do not have the physical CD).

Change value schematic popup menu by calling the value script. (Note this must be entered on one line)

```
DefMenu "Schem|Change &Value" "value /ne" "InstSelected && !LiveMode"
```

Separator in schematic popup

```
DefMenu "Schem|-"
```

Graph popup to enable cursors

```
DefMenu "Graph|Cursors &On" "cursormode /ne on" "!LiveMode"
```

Del

Del [/noerror] filespec

Deletes the specified file. Wildcards may be used for filename e.g. *.*. '*' matches any sequence of zero or more characters. '?' matches a single character. Any file matching the specification will be deleted.

Parameters

/noerror

DelCrv

DelCrv ⟨curve-id⟩|⟨curve-name⟩[...]

Deletes the specified curve or curves on the selected graph. *curve_id* is returned by the functions

GetSelectedCurves (page 207), GetAxisCurves (page 153) and GetAllCurves (page 150).

Optionally a curve name may be specified. This must be the whole text of the curve legend. It is the value returned by the function GetCurves (page 163).

Delete

Delete

Deletes the currently selected components and/or wires in the selected schematic sheet.

DeleteAxis

DeleteAxis ⟨axis-id⟩

Deletes the specified axis.

Parameters

axis-id	Axis id as returned by functions GetAllYAxes (page 151), GetSelectedYAxis (page 208) or GetCurveAxis (page 162).

Notes

An axis may only be deleted if it is empty i.e. has no attached curves. Also the main axis may not be deleted.

DeleteGraphAnno

DeleteGraphAnno ⟨object-id⟩

Deletes a graph annotation object such as a curve marker or legend box. See "Graph Objects" on page 569 for details on graph annotation objects.

Parameters

object-id	Id of object to be deleted.

DeleteSymbolProperty

DeleteSymbolProperty ⟨property-name⟩

Deletes the specified property from a symbol editor symbol.

Parameters

property-name	Name of property to be deleted. The command will yield an error if this is omitted. If a property of that name is not found, no action will be taken.

DelGroup

DelGroup [/cleanUp] [/noDelete] /all | ⟨Group-Name⟩[Group-Name] ...

Deletes specified groups. See "Groups" on page 18 for more information.

Parameters

/all	If specified all groups except the user group are destroyed.
/cleanUp	Inhibits delete of associated temporary data file. This file will only be deleted any way if the option variable DataGroupDelete is set to OnDelete.
/noDelete	Specify this switch if the associated data file is going to be reused as it may speed up the read operation especially if the data was created by a simulation that was paused. If the file will be deleted then this switch has no benefit but will do no harm other than to slow the execution of this command a little.

See Also

CreateGroup (page 452)

OpenGroup (page 498)

Groups (page 233)

DelLegendProp

DelLegendProp ⟨curve-id⟩⟨legend-name⟩

Delete graph legend property.

Parameters

curve-id	Id of curve which possesses property. Curve id is returned by the functions GetSelectedCurves (page 207), GetAxisCurves (page 153) and GetAllCurves (page 150).
property-name	Name of property to be deleted. The function GetLegendProperties (page 188) returns legend properties owned by a specified curve.

DelMenu

DelMenu [/bypos ⟨pos⟩] [/force] [/keepid] ⟨menuname⟩

Deletes specified menu item, or submenu.

Parameters

/bypos — The menu to be deleted is identified by its position. The first item in the menu is at position zero.

/force — If specified, will allow complete submenus to be deleted. Otherwise this command will only delete a single menu item.

menuname — Composed of strings separated by pipe symbol: '|'. First name must be one of the following:

SHELL	Command shell menu
SCHEM	Schematic popup menu
GRAPH	Graph popup menu
LEGEND	Popup menu in graph "legend panel"
SCHEMMAIN	Schematic main menu
SYMBOL	Symbol editor popup menu
SYMBOLMAIN	Symbol editor fixed menu

The remaining strings identify the menu and item names. See DefMenu (page 462) for details on menu names.

DelProp

DelProp ⟨property name⟩

Delete specified property from selected schematic instances.

The optional arguments can be used to filter which schematic elements are to have the requested property deleted from them.

Parameters

/handle — If set, filters elements by those that contain the specified handle value.

/prop — If set, filters elements that contain a property with the given name.

/propval — If set, filters elements that contain a property with the given name (arg1) and given value (arg2).

property name — Name of property to be deleted.

DelSym

DelSym [/local] ⟨symbol-name⟩

Deletes a schematic symbol from the global library or from the current schematic.

Parameters

/local	Whether to remove from the local symbol library or not.

See Also

"Schematic Symbol Script Definition" on page 564

DestroyRunningDialog

DestroyRunningDialog

Destroys a process running dialog

See Also

"CreateRunningDialog" on page 453

"UpdateRunningDialog" on page 548

Detach

Detach

Unselects partially selected wires on schematic. A partially selected wire is one which is selected at one end only. Executing this command immediately prior to a move operation effectively disables 'rubberbanding'.

Discard

Discard [/vec ⟨vecname⟩] | [⟨groupname⟩]

Frees up memory used for vectors. This does not destroy the vectors, just removes any copies that reside in RAM. The data is always stored on disc and can be recovered to RAM when needed.

Parameters

/vec	If specified *vecname* specifies a single vector.
groupname	Name of group data is to be discarded. Use current group if omitted.

Notes

It is rare that this command is needed but may be useful if you are running long simulations and the data generated is so large that a great deal of disk swapping is taking place.

The vectors created by the simulator are initially stored in a file. If they are needed - usually for plotting a graph - the data is copied to memory. Once the data has been copied to memory, it will stay there until the group to which the vector belongs is destroyed. Simply closing the graph that used the data will not free up the memory as it is assumed that the data may be needed again and the process of reading from the disk can be time consuming. If the data is very large it will consume a lot of memory which can have adverse consequences.

The discard command deletes the data stored in memory for all vectors in the specified group or a single vector if `/vec` is specified. It does *not* delete the vectors altogether as they are still stored on disc in the temporary file. After discarding a group, it is still possible to plot all vectors that it contains.

Display

Display [/file ⟨filename⟩] [/append ⟨filename⟩] [/notype] [/notitle] [/type ⟨type⟩]

Displays list of all vectors in specified groups or current group by default. Lists the name, physical type (e.g. voltage, current etc.) data type (real, complex, string, alias) and size of each vector.

Parameters

/append	Append result to *filename*
/file	Output result to *filename*
/list	
/noTitle	Do not display te header showing the group name
/notype	Do not list the data type
/type	Filter result according to type. type is a list of typenames separated by '|'. Possible values are: real complex string alias

See Also

"Expressions" on page 11

DrawArc

DrawArc [⟨theta⟩[⟨v-over-h⟩]]

Initiates "arc draw" mode in the currently highlighted symbol editor. This is an interactive command.

Parameters

theta	Swept angle in degrees (integer). Default = 90
v-over-h	Vertical radius/Horizontal radius. Default = 1 (circle)

DrawArrow

DrawArrow [/loc ⟨x1⟩⟨y1⟩⟨x2⟩⟨y2⟩]

Draws an arrow in the schematic editor, as specified by the *loc* parameter..

Parameters

/loc	Defines the positioning of the arrow as 4 integer values relating to position within the schematic: x1, y1, x2, y2.

DrawPin

DrawPin [/forcerepeat] [/loc ⟨x⟩⟨y⟩] [⟨base-name⟩]

Initiates "pin draw" mode in the currently open symbol editor. In this mode a pin symbol is presented for the user to place at the desired location on the symbol sheet.

Parameters

/forceRepeat	If specified, the operation will be repeated until the user cancels with the right mouse button. Each new pin be named according to the base name appended with an integer to make it unique.
/loc	
base-name	Name of pin. If a pin of that name is already present on the schematic, the name will be appended with a number to make it unique. If the base name is already appended with a number, that number will be incremented until an unused name is found.

Echo

Echo ⟨text⟩

Echoes text to the message window or to a file

Parameters

/append	If present *text* is appended to *filename*. If *filename* does not exist, it is created.

/box	Text is output inside a box composed of asterix characters. This is useful for titles and headings. Currently only works correctly when used with `/file` or `/append`.
/debug	
/file	If present *text* is output to *filename*. If *filename* exists, it is overwritten.
/handle	File handle as returned by the function OpenFile (page 283). Text will output the file referenced by this handle.
/html	If present *text* is assumed to be html formatted.
/list	
/page	Prefixes output with a ASCII form feed character.

EditColour

EditColour ⟨colour-name⟩⟨colour-spec⟩

Changes the spec for the named colour object. Named colour objects are simply option variables used to store colour information. This command will write the value to the variable in the form #rrggbb where rr, gg and bb are two digit hex values representing the magnitude of the red, green and blue components respectively.

Parameters

colour-name	Name of colour object. May be the name of a pre-v8 graph colour object. See notes.
colour-spec	Text string that defines the colour. The functions GetColourSpec (page 156) and SelectColourDialog (page 339) return colour spec values. A value in the form #rrggbb or the name of another colour object may also be entered.

Notes

Note that version 7.2 and earlier stored colour information differently and used different names. This command will still recognise the names of colour objects used for graphs and set the correct new colour object. Schematic colour objects used in version 7.2 and earlier are not supported. Refer to documentation on schematic styles in *User's Manual/Schematic Editor/Styles*.

EditCopy

EditCopy

Copies selected schematic items to clipboard for pasting to SIMetrix and other applications.

The EditCopy - in conjunction with EditPaste (page 474) - make it possible to copy blocks of schematic from one schematic window to another.

The EditCopy commands differs from the older command CopyClipSchem (page 451) in that only selected items are copied. Further, schematics copied with CopyClipSchem can only be pasted into other applications.

Parameters

/mono	If specified, the image obtained when pasting to other applications will be monochromatic. This switch has no effect when pasting to SIMetrix windows.

See Also

"EditPaste" on page 474

"CopyClipSchem" on page 451

EditCut

EditCut

Deletes selected components and places them in the clipboard. Equivalent to the sequence:

Detach (page 469)

EditCopy (page 472)

Delete (page 466)

Parameters

/mono

EditFile

EditFile

This is an alias to the command "OpenBasicTextEditor" on page 497.

EditFont

EditFont ⟨font-name⟩⟨font-spec⟩

Changes the spec for the named font object.

Parameters

font-name	Name of font object. This can be any of the names returned by the function GetFonts (page 176). (These are listed when the menu **File | Options | Font...** is selected.)
font-spec	Text string that defines the font. The functions GetFontSpec (page 177) and SelectFontDialog (page 344) return font spec values.

EditGroupTitle

EditGroupTitle ⟨group-name⟩⟨group-title⟩

Edit a group's title

EditPaste

EditPaste

Pastes items from clipboard to a schematic sheet. Only items copied by SIMetrix (using the command EditCopy (page 472)) may be pasted, with the exception of text and pictures into the schematic and symbol editors.

EditPin

EditPin [/name ⟨new-pin-name⟩] ⟨symbol-name⟩⟨pin-number⟩

Edit a pin name of a symbol in the currently installed symbol library.

Parameters

/name	New pin name for symbol pin. This may not contain spaces.
symbol-name	Internal name of symbol owning the pin to be edited.
pin-number	Number of pin to be edited.

EndAllInteractions

EndAllInteractions

EndSym

EndSym

EndSym is a Symbol Definition Command. All symbol definitions must end with this command and begin with the command CreateSym (page 454).

See Also

"Schematic Symbol Scription Definition" on page 564

Execute

Execute [/echo] ⟨command⟩

Run the script or command *command*.

Scripts are usually run by simply entering their name in the same way as a command is entered. However, the script is executed slightly differently if run using the Execute command. If a script is called from another script in the normal way, the called script is read in and parsed before the main script is executed. If the Execute command is used, the called script is not read in until and unless the Execute command is actually executed. This has two main applications.

1. The name of the called script is not known initially, for example if its selected from a file dialog box.
2. The called script is very long and is not always called by the calling script. It may take some time to read in and parse the called script. This time would be wasted if the script is not actually called.

Avoid using Execute if a script is called within a loop. The script would be read in and parsed each time around the loop which is very inefficient.

Parameters

/allowextbi	
/echo	Command is copied to the command history drop down box in the commend shell.
/literal	Indicates the text in *command* should be read literally. This switch should be used if the complete command along with any arguments are stored in a variable, to be accessed by Execute through braced substituion. See the example for further explanation.
/startup	Used by initialisation scripts to indicate that a command is being executed on startup. The function CommandStatus (page 72) can be used to test this state. This switch must not be used in user scripts.
command	Command to be executed with arguments if required. See `/literal` above for more information.

Example

Use of the literal flag. If you have a script where a command to execute is contained within a variable, for example:

```
Let command = `inst npn'
```

Then the literal flag should be used to enable the following braced substitution to work:

```
Execute /literal {command}
```

Here is another example of using the literal flag. Both of the following will do the same thing:

```
Execute /literal "inst npn"
Execute inst npn
```

But this will throw an error:

```
Execute "inst npn"
```

The problem with the last example is that the Execute command interprets the first token in *command* as the actual command or script name and the remainder of *command* as the arguments to it. Because "inst npn" is enclosed in quotation marks, it is treated as a single item specifying the command name "inst npn" which is incorrect.

ExecuteMenu

ExecuteMenu ⟨menu-identifier⟩

Executes the menu with the given full identifier. These identifiers should match those used to create the menu in DefMenu (page 462).

See Also

"DefMenu" on page 462

FileViewCleanUpFileWatchers

FileViewCleanUpFileWatchers

Removes unnecessary file watchers.

File watchers are created by the *File View* to keep track of when changes to a directory occur. These watchers ensure the *File View* is kept up-to-date, however in some circumstances it may be beneficial to release the system resources used by file watchers that are not deemed necessary.

Generally this operation occurs automatically.

FloodFillSymbol

FloodFillSymbol

Flood fills a symbol, either interactively or from a specific point. Default behaviour is interactive mode.

Parameters

/loc	Defines the location to attempt a flood fill.

Focus

Focus [/named ⟨window-name⟩] [/userid ⟨window-id⟩] [schem|graph]

Focus on a window.

Only one of the options can be used at a time.

Parameters

schem/graph	Currently or most recently selected schematic or graph window receives input focus.

See Also

"GetWindowNames" on page 230

FocusCommandShell

FocusCommandShell

Selects the Command Shell and assigns it keyboard focus.

FocusShell

FocusShell

Selects the Command Shell and assigns it keyboard focus.

GraphZoomMode

GraphZoomMode X|Y

Specifies mode of next mouse zoom operation. All subsequent zoom operations will be applied to both axes.

Parameters

X	Only X axis will be zoomed.
Y	Only Y axis will be zoomed.

GroupSelected

GroupSelected

Groups all selected schematic elements. If the selected elements include a set of elements within a group, a hierarchy of groups are created.

Help

Help [/file ⟨filename⟩] /contents | /context ⟨context-id⟩| ⟨topic⟩

Opens the SIMetrix help system.

Parameters

/contents	Opens help in main contents page
/context	Included only for backward compatibility. 'Help /context id' does the same as 'Help id'
/file	If specified, help will be obtained from *filename*. Otherwise help file will be SIMetrix.chm
topic	If specified, help system will display page relating to *topic*. If *topic* does not exist, a list of available topics will be displayed.

Example

To display help on the .TRAN simulator directive type:

```
Help .tran
```

HideCurve

HideCurve ⟨curve-id⟩

Hides specified curve.

Parameters

curve-id	Id of curve to hide. Curve id is returned by the functions GetSelectedCurves (page 207), GetAxisCurves (page 153) and GetAllCurves (page 150).

See Also

"ShowCurve" on page 540

HighlightCurve

HighlightCurve [/clear | /unique] curveId

Highlights the selected curve. A curve is highlighted by displaying it in a brighter colour and bringing it to the top - i.e. it is drawn last. Also, highlighted curves are displayed in increased thickness, the amount determined by the *HighlightIncrement* option setting.

Parameters

/clear	The specified curve will be unhighlighted.

/unique	The specified curve will be highlighted and all others will be unhighlighted.
curveId	Id of curve to be highlighted (or unhighlighted if `/clear` is specified)

HighlightWidget

HighlightWidget ⟨widget-id⟩

Highlights a particular content view.

Parameters

widget-id	The ID of the content view to highlight.

Hint

Hint [/help help-context] [/id id] [/icon info|warn|error|question] message

Displays a message box intended to be used to provide hints to the user. The box contains a check box allowing the user to choose not to receive such hints again.

Parameters

/help	If specified, the box will show a help button which will display the help topic specified by *help-context*. This is used in some internal scripts but has limited user application.
/icon	Controls the icon displayed in the hint box. This may be one of: info — An icon showing the letter 'i' indicating that this message is for information only. This is the default. warn — An icon showing an exclamation mark in a yellow triangle indicating that the message is a warning error — An icon showing a cross in a red background indicating an error condition. This is usually inappropriate for a hint, but is included for completeness. question — An icon showing a question mark indicating a question. Currently the hint box is not interactive so the usefulness of this is limited.
/id	Identifier used to identify hint for the purposes of saving the redisplay status controlled by the "Don't show this message again" check box . If not supplied, a default will be used derived from the message text. This is satisfactory in most cases and there is rarely ever a need to use this switch.
message	Message to be displayed.

HourGlass

HourGlass

Displays the hourglass cursor shape indicating that some action is in progress. The normal cursor is automatically restored when control returns to the command line.

Parameters

/clear	Returns cursor to normal. HourGlass maintains a count of the number of times it is called and in order to release the cursor, it must be called an equal number of times with the `/clear` switch specified.
/off	
/on	

ImportSymbol

ImportSymbol [/loc ⟨x⟩⟨y⟩] [/local] [/path ⟨pathname⟩] [/comp] ⟨name⟩

Imports an existing symbol to the currently open symbol editor sheet.

Parameters

/comp	Opens the symbol for a component whose path is specified by *name*.
/fromschematic	Will load the symbol from the last selected schematic. Used internally.
/loc	If /loc switch specified, the symbol is placed at the location specified by *x* and *y*. In practice this location may only be used in a relative manner as the exact location on the symbol sheet of the origin will be adjusted to ensure that the symbol is in view.
/local	The symbol will be obtained from the local library of the current schematic. If not specified the symbol will be obtained from the global library.
/path	If specified, the symbol will be converted to a component to be saved in the file specified by *pathname*.
name	Symbol name.

Notes

If the current symbol sheet is empty, the named symbol will become the current symbol in that sheet. This will be reflected in the caption bar text and the default symbol to be saved when **File | Save...** is selected.

Inst

Inst [/centre] [/select] [/repeat] [/norepeat] [/repeatalways] [/loc ⟨x⟩⟨y⟩⟨orient⟩] [/orient] [/comp] [/nolocal] [/useph] ⟨symbolname⟩[propname] [propvalue]

Places an instance of *symbolname* onto the current schematic. User must press left mouse key to fix the symbol to the schematic.

Parameters

/centre — If specified the cursor will be positioned in the centre of the selected schematic window. Otherwise the cursor will remain at whatever position it happens to occupy when the command is executed.

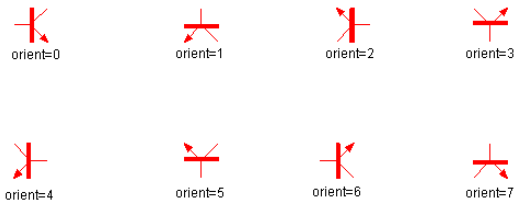
/comp — Places a component symbol whose path is specified by *symbolname*.

/loc — If specified, instance is placed directly on sheet without user interaction at the location specified by x and y and orientation specified by *orient*. These values are relative. The origin of the schematic is not fixed. Usually the values used would have been returned from a call to the function InstPoints (page 248).

/nolocal — Only effective if `/comp` also specified. Forces reloading of the component symbol from the original file instead of using a local cached copy. This may be different if the source file has changed.

/norepeat — If specified a single instance will be placed regardless of the value of the 'RepeatPlace' global option.

/orient — Specifies orientation of symbol. Value from 0 - 7 as illustrated below.



/repeat — If specified the instantiation is repetitive. This means that once one instance has been placed, another will be presented. This continues until the user presses the right mouse key. This switch will be ignored if the RepeatPlace option is set to 'Never' (Placement options set to 'Never' in schematic sheet of options dialog). If RepeatPlace is set to 'Always', the repeat action will be enabled even if this switch is not present as long as `/norepeat` isn't present. If the `/loc` switch is present repeat action is disabled in all circumstances.

/repeatalways — If specified, instance is placed directly on sheet without user interaction at the location specified by x and y and orientation specified by *orient*. These values are relative. The origin of the schematic is not fixed. Usually the values used would have been returned from a call to the function InstPoints (page 248).

/select — If specified, the instance is selected after being placed on the schematic.

/useph	Only effective if `/comp` also specified. Will place a place holder symbol if the component symbol specified is not found. Without this switch an error message will be displayed if a component symbol is missing.
symbolname	Name of symbol. Symbol names "caption" and "free_text" are treated specially. See notes.
propname	If specified, property of this name is changed to *propvalue*.
propvalue	See above.

Notes

The symbol name 'caption' will instantiate the built-in caption annotation object and not a symbol called 'caption'. Similarly the symbol name 'free_text' will instantiate the built-in free text annotation object. In both cases the text displayed will be the property value given. The property name will be ignored. If no property value is provided, the default values "Caption" and "Text" will be used respectively.

KeepGroup

KeepGroup [⟨group-name⟩[on|off]]

Switches *keep status* of current group.

Groups generated by the simulator start with their *keep status* set to off. This means that it will automatically be deleted when a certain number (set by the GroupPersistence option) of new groups are created. If the *keep status* is set to on then automatic deletion is disabled. Groups read from a file using OpenGroup start with their *keep status* set to on.

Let

Let [⟨vector-expression⟩]

Evaluates a vector expression.

To be meaningful *vector-expression* must contain the assignment operator '=' . If *vector-expression* is omitted, a list of vectors in the current group will be displayed.

Parameters

vector-expression	Vector expression to be evaluated. Information on vector expressions can be found in "Expressions" on page 11.

Listing

Listing [/error] [/filename ⟨filename⟩] [/append ⟨filename⟩] [/anno]

Displays or outputs to a file a listing of the current netlist.

Note the current netlist is the netlist for the circuit most recently run or checked. It will include all models and subcircuits pulled in from libraries.

Parameters

/anno	
/append	Result is appended to file of name *filename*.
/converted	
/errors	Only lines that are in error are output.
/fileName	Result is written to file of name *filename*.
/icap	
/pspice	
/spice	

ListModels

ListModels ⟨filename⟩

Generates a dictionary of all models and subcircuits currently available to the simulator (e.g. installed with menu **File | Model Libraries | Add/Remove Libraries** see *User's Manual/Device Library and Parts Management*). Result is written to *filename*. A single line will be produced for each model or subcircuit found containing the device name, its type (NPN, JFET, subcircuit etc.) and the filename in which it was found along with the line number.

Parameters

/name

ListOptions

ListOptions ⟨filename⟩

List all global options to file. Global options are set using the command Set (page 531).

Listing contains one line per option with each line being a semi-colon delimited list in the following form:

```
name;type;default-value
```

where:

name	Name of option
type	Type of option. One of 'bool', 'string' or 'real'
default_value	Default value if not set, or if unset using command UnSet (page 545).

Parameters

filename	File to receive options

ListStdKeys

ListStdKeys ⟨filename⟩

Writes built in key definitions to *filename*.

LoadModelIndex

LoadModelIndex

Forces model library indexes to be re-checked and loaded. Model library indexes are binary files that allow the rapid location of simulation models. When SIMetrix starts, it checks that the indexes are up to date by comparing file dates. If any files have been changed, the appropriate index file will be rebuilt. When this process is complete, the indexes are read in to memory for fast access.

This command forces SIMetrix to repeat the above procedure. This may be necessary if additional files are added to a directory where models reside while SIMetrix is running. SIMetrix can usually detect this automatically if the drive is local but cannot always do so for network drives.

Note the menu **Model Library | Rebuild Catalog** calls this command.

The work of reloading indexes is actually performed by the simulator in the background so this command returns immediately even though the process can take several seconds. If you start a simulation immediately after executing this command, there will be a pause until the reload is complete.

LoadSimulatorStyleSheet

LoadSimulatorStyleSheet

Applies a style sheet to simulator GUI elements.

Parameters

/clear	Clears the current style sheet first.
/direct	Loads style sheet directly from input string.
/file	Loads style sheet from a file.

LoadStyleSheet

LoadStyleSheet

Applies a style sheet to the whole application.

Parameters

/clear	Clears the current style sheet first.
/direct	Loads style sheet directly from input string.
/file	Loads style sheet from a file.

MakeAlias

MakeAlias ⟨vector-name⟩

Converts a string variable to an alias.

An alias is a string representing a numeric expression. For more information see "Aliases" on page 14.

Parameters

vector-name	Variable to be converted

MakeCatalog

MakeCatalog ⟨out-catalog⟩⟨all-catalog⟩[⟨user-catalog⟩]

This command builds a catalog file for use by the parts browser. This is normally called OUT.CAT and resides in the SCRIPT directory.

The MakeCatalog command is one of the components of the Parts Browser system. The parts browser requires a catalog file which lists all the models available to the simulator and for each provides the name of a suitable schematic symbol, a category, pin mapping if relevant, a symbol model property (e.g. X for subcircuits, Q for BJTs) and a preferred pathname if there is more than one model of that name. The MakeCatalog command builds this catalog using the data files *all-catalog* and *user-catalog* to obtain information about known parts.

Parameters

/force	
/listDups	
out-catalog	File name for catalog. This must be OUT.CAT for use with browser.
all-catalog	Main database of parts. This would usually be ALL.CAT which resides in the SIMetrix root directory.
user-catalog	User database of parts. This would usually be called USER.CAT which resides in the script directory.

MakeSymbolScript

MakeSymbolScript [/all] [/append] [/sortprops] [/catalog ⟨catalog-name⟩]
⟨filename⟩[⟨symbol-name⟩...]

Creates a script definition of a symbol or group of symbols. For details of script definitions see "Schematic Symbol Script Definition" on page 564.

Parameters

/all	If specified, scripts for all symbols in the global library will be created.
/append	Result will be appended to specified file.
/catalog	If specified, scripts for all symbols in the specified catalog of the global library will be created. This overrides `/all`.
/sortProps	If specified, all visible properties are ordered alphabetically in the output script. Properties are defined with the command AddProp (page 438).
filename	Path of file to be written.
symbol-name	Name of symbol to be scripted. Any number may be specified. If `/all` or `/catalog` are specified, this argument will be ignored. If they are not this argument becomes compulsory.

MakeTree

MakeTree ⟨pathname⟩

Creates the specified directory path. Unlike the MD command, MakeTree will create any subdirectories required to make the whole path.

MCD

MCD ⟨directory-name⟩

Makes a directory and sets it as current (same as MD (page 486) followed by Cd (page 445)).

Parameters

directory-name	Name of directory to be created.

MD

MD ⟨directory-name⟩

Creates a new directory. MD is similar to the DOS MD and MKDIR commands.

Parameters

directory-name	Name of directory to be created.

Message

Message [⟨message⟩]

Displays a message in the status window of the currently selected schematic. This will temporarily overwrite status information at the base of the schematic until Message is called with no arguments.

Parameters

message	Text to be displayed. If omitted, status window returns to normal view.

MessageBox

MessageBox ⟨message⟩[⟨caption⟩]

Displays pop-up message box with the specified *message* and *caption*. Note that there is also the function MessageBox (page 269) which is more flexible.

Parameters

message	The message to display in the message box.
caption	The title caption to use in the message box.

Move

Move

Initiates the schematic move operation. User interactive command.

Parameters

/mode	Specifies editing mode to use for move operation. Options are:

"default"	Use option setting "SchematicMoveMode"
"ClassicMove"	Basic rubberbanding mode
"Orthogonal"	Wires edited so that they remain at right angles as much as possible

MoveCurve

MoveCurve ⟨curve-id⟩⟨axis-id⟩

Moves a curve to a new y-axis.

Parameters

curve-id	Id of curve as returned by Curve id is returned by the functions GetSelectedCurves (page 207), GetAxisCurves (page 153) and GetAllCurves (page 150).
axis-id	Axis id as returned by functions GetAllYAxes (page 151), GetSelectedYAxis (page 208) or GetCurveAxis (page 162).

MoveFile

MoveFile [/force] ⟨path-1⟩⟨path-2⟩

Moves a file from *path-1* to *path-2*.

Parameters

/force	If specified, *path-2* will be overwritten if it already exists. If not specified, the command will fail if *path-2* exists.

MoveMenu

MoveMenu [/bypos position] ⟨menu-path⟩⟨shift-by⟩

Moves the position of a menu item by a specified count.

Parameters

/bypos	Value *position* is an optional number that identifies a menu item by its position within a sub-menu. If this is specified the menupath must identify a sub-menu rather than a menu item.
menu-path	Path to the menu to move, see DefMenu (page 462) for full details of path names.
shift-by	Number of positions by which menu is moved. A positive number moves the menu down, a negative number moves it up.

MoveProperty

MoveProperty [⟨property-name⟩]

This is an interactive command. It switches the schematic editor into 'move property' mode. In this mode the user can move the specified property for all selected instances. The mode is completed by pressing the left or right mouse key. The left key will fix the new property position and the right key will cancel the mode and leave the properties unmodified.

Notes

In SIMetrix, property positions can be defined in one of two ways namely 'Auto' and 'Absolute'. Most of the standard symbols have their properties defined as 'Auto'. This means that SIMetrix chooses the location of the property on a specified edge of the symbol and ensures that it doesn't clash with other properties on the same edge. 'Auto' properties are always horizontal and therefore easily readable. The position of 'Absolute' properties is fixed relative to the symbol body regardless of the orientation of the symbol and location of other properties. When the symbol is rotated through 90 degrees, absolute text will also rotate.

When a visible property on a symbol is moved using the MoveProperty command, it and all other visible properties on that symbol are converted to 'Absolute' locations. This is the only way that the positions of all properties can be preserved.

Netlist

Netlist [/num] [/subckt] [/nopinnames] [/noOutput] [/template] [/sep] [/diag] [/top] [/plain] [/lang] [/wireTemplate] [/dotEnd] [/noDescend] [/f11Top] [/simplis] [/nodemap] [filename]

Generates a netlist for the currently selected schematic. The netlist command also assigns names to schematic nets. If the schematic contains hierarchical blocks, their underlying schematics will also be netlisted and included in the main netlist as subcircuits.

Parameters

/diag	If specified, a diagnostic report will be produced. This details: Implicit node connections (using terminal symbol). Bus name translations. These occur if two buses with different names are connected. Dangling wires and unused device pins. If the diag is set to partial, only dangling wires and pins are reported.
/dotEnd	Forces .END to be placed at the end of the netlist.
/f11Top	The contents of the F11 window are placed before the netlist lines generated by the schematic. Otherwise they are placed after the schematic netlist lines.
/lang	Name of language to be output at the top of the netlist output. This is in the form "*#language" and is used by SIMetrix for compatibility with other simulators. Default is "SIMETRIX".
/nodemap	Generates SIMPLIS .NODE_MAP controls for user named nets.
/noDescend	Netlister does not descend into hierarchy and processes items at the top level only.
/noOutput	If specified, no netlist output is generated. The net names attached to wires are updated.
/nopinnames	If specified, the *pinnames* specifier is not output for X devices. The pinnames specifier is proprietary to SIMetrix and is not supported by other simulators. Use this option if you are creating the netlist for another purpose e.g. to input to an LVS program.
/num	If specified, a SPICE 2 compatible netlist using node numbers is created.

/paramsSeparator

/path — If specified, the netlist operation will be performed on the schematic at the specified file system path. If the specified schematic is currently open, the netlist generated will reflect the displayed version rather than the contents of the file.

/plain — Equivalent to `/noPinnames /top /lang none`.

/selSubOut

/sep — May be a single character or "none". Default is '$'. To comply with SPICE syntax each device line starts with a letter that identifies the type of device. Usually this letter is determined by the MODEL property. If the component reference of the device does not begin with the correct letter it is prefixed with the correct letter followed by the character specified by this option.

/simplis — Specify this if creating a netlist for use with SIMPLIS. Forces switches: `/dotEnd /f11Top /nodemap /num /nopinnames /sort`. If /template is not specified, a default of `/template simplis_template|template` will be forced. Finally if `/wireTemplate` is not specified, a default of `/wireTemplate %busname%$%wirenum%` will be forced.

/sort — If specified, the netlist lines will be output in alphanumeric sorted order.

/subckt — If specified, circuit is netlisted as subcircuit. In this case the netlist is enclosed with a .subckt control at the beginning and a .ends control at the end.

/template — Property names to be used as templates. A template is a string that specifies a format to be used for the netlist line for the device that owns it. By default the template property name is "TEMPLATE". This can be overridden with this switch. Multiple template property names may be specified by separating them with a pipe symbol ('|'). See the description of the template property in *User's Manual/Schematic Editor/Template Property*.

/top — For hierarchical schematics, the line ".KEEP /subs" is automatically output to tell the simulator to output data for all subcircuits. Specifying this switch inhibits this action thus restricting data output to the top level.

/wireTemplate — Format for bus wires. wire_template may contain the keywords %BUSNAME% and %WIRENUM%. These resolve to the bus name and wire number respectively. So a spec set to %BUSNAME%#%WIRENUM% would give the default, i.e. bus names like BUS1#2. A spec of %busname%[%wirenum%] would give bus names like BUS1[2].

filename — File to which netlist is written. If not specified, the netlist is displayed in the message window.

NewAnnotation

NewAnnotation [/rect] [/elipse |/arrow] |/line] [/roundedrect] [/triangle] [/octagon]

Interactive placement of a new annotation. The new annotation type is attached to the cusor, such that when the cursor is next clicked on the schematic the annotation placement begins.

Use one of the flags to set the type of annotation to create.

Parameters

/arrow	Creates an arrow.
/ellipse	Creates an ellipse.
/line	Creates a line.
/octagon	Creates a octangon.
/rect	Creates a rectangle.
/rhombus	Creates a rhombus.
/roundedrect	Creates a rounded rectangle.
/triangle	Creates a triangle.

NewAxis

NewAxis

Creates a new y-axis. This will be initially empty and selected. See *User's Manual/Graphs, Probes and Data Analysis/Graph Layout* for more information on multiple y-axes.

NewBasicTextEditor

NewBasicTextEditor

Creates a new plain text document in the SIMetrix environment. Use this for files with no recognised format. Use one of the following commands to create documents with specific formats:

"NewNetlist" on page 493 to create a model file or netlist file

"NewLogicDefinitionEditor" on page 493 to create a logic definition file for the abritrary logic block

"NewScript" on page 494 to create a script

"NewVerilogA" on page 495 to create a Verilog-A source file

"NewVerilogHDL" on page 495 to create a Verilog-HDL source file

NewFileView

NewFileView

Creates a new File View and attaches it to the current window. If a File View already exists in the window, this command does nothing.

Parameters

/restore	Identifies this is part of a restore session call, argument is the object name.

NewGraphWindow

NewGraphWindow ⟨window-title⟩

Creates a new graph window to which new graphs may be directed.

NewGrid

NewGrid

Creates a new grid. See *User's Manual/Graphs,Probes and Data Analysis/Graph Layout* for more information on axes and grids.

NewLabel

NewLabel ⟨label-text⟩[/italics] [/bold] [/font ⟨font-family⟩] [/size ⟨point-size⟩] [/style ⟨style-name⟩] [/repeating] [/loc ⟨x⟩⟨y⟩]

Adds a new unplaced text label to a schematic. This is an interactive command, with the label being initially attached to the cursor, unless the `loc` flag is set.

If a style is given, that style is applied. If bold, italics, size, or font are given, a new style is created using those. If style is given as well as a font, size, bold or italics option, the given options will override the existing style and a new style will be created for this element.

Parameters

/bold	Uses bold.
/font	Sets the font family, argument is the name of the font family to use.
/italics	Uses italics.
/loc	If set, places the label at the given position.
/repeating	Causes repeated placement of the label until a cancel request is made (right click or escape press).
/size	Sets the font size, argument is point size of the font to use.
/style	Sets the name of the style to apply to the label.
label-text	The text of the label. Use backslash n to set line breaks within the text.

NewLogicDefinitionEditor

NewLogicDefinitionEditor

Creates a new plain text document in the SIMetrix environment. Use this for files with no recognised format. Use one of the following commands to create documents with specific formats:

"NewNetlist" on page 493 to create a model file or netlist file

"NewBasicTextEditor" on page 491 to create a plain text file

"NewScript" on page 494 to create a script

"NewVerilogA" on page 495 to create a Verilog-A source file

"NewVerilogHDL" on page 495 to create a Verilog-HDL source file

NewNetlist

NewNetlist

Creates a new plain text document in the SIMetrix environment. Use this for files with no recognised format. Use one of the following commands to create documents with specific formats:

"NewLogicDefinitionEditor" on page 493 to create a logic definition file for the abritrary logic block

"NewBasicTextEditor" on page 491 to create a plain text file

"NewScript" on page 494 to create a script

"NewVerilogA" on page 495 to create a Verilog-A source file

"NewVerilogHDL" on page 495 to create a Verilog-HDL source file

NewPartSelector

NewPartSelector

Creates a new Part Selector and attaches it to the current window. If the window already contains a part selector, the command does nothing.

Parameters

/restore	Whether this is a restore session call, argument is the object name to use.

NewPrinterPage

NewPrinterPage

Advances printer to the a new page. This may be used for customised or noninteractive printing. See "Non-interactive and Customised Printing" on page 582.

NewSchem

NewSchem [/newWindow] [/simulator simulator] ⟨window-title⟩

Creates a new schematic sheet within the currently selected schematic window. If no schematic window is open, one will be created.

Parameters

/newWindow	If specified, a new schematic window will be created.
/simulator	Specifies initial simulaor mode. Set to 'SIMPLIS' to open an empty schematic switched to SIMPLIS mode or 'SIMetrix' to open in SIMetrix mode. If not specified, the schematic will open in a mode determined by the 'InitSchematicSimulator' option setting. (Defined using command Set (page 531)).
window-title	The name of the schematic, which will appear in the schematics title bar and will be the default filename that will be used if **File | Save** is used. Note that no file is created by the NewSchem command.

NewScript

NewScript

Creates a new plain text document in the SIMetrix environment. Use this for files with no recognised format. Use one of the following commands to create documents with specific formats:

"NewNetlist" on page 493 to create a model file or netlist file

"NewBasicTextEditor" on page 491 to create a plain text file

"NewLogicDefinitionEditor" on page 493 to create a logic definition file for the abritrary logic block

"NewVerilogA" on page 495 to create a Verilog-A source file

"NewVerilogHDL" on page 495 to create a Verilog-HDL source file

NewStyle

NewStyle [/name ⟨style-name⟩] [/linecolour ⟨hex-bgr-colour⟩] [/linestyle ⟨pen-style⟩] [/linethickness ⟨thickness⟩] [/fontcolour ⟨hex-bgr-colour⟩] [/fontfamily ⟨family⟩] [/fontsize ⟨point-size⟩] [/fontitalics] [/fontbold]

Creates a new style.

Parameters

/fontbold	Switches on the use of bold font.
/fontcolour	The colour of the font, argument in the form `0x00bbggrr`.
/fontfamily	The font family to use, argument is the name of a font family.

/fontitalics	Switches on the use of italic font.
/fontsize	The size of the font, argument is a integer point size.
/linecolour	The line colour to use, argument in the form `0x00bbggrr`.
/linestyle	The style of the line to use. Options are: *Solid*, *Dash*, *Dot*, *Dashdot*, *Dashdotdot*.
/linethickness	The thickness of the line.
/name	The name of the style, argument is the name.

Notes

Colours are defined as a hex value with blue-green-red specified components in the form `0x00bbggrr`.

NewSymbol

NewSymbol

Opens a new symbol editor view.

NewVerilogA

NewVerilogA

Creates a new Verilog A editor.

See Also

"NewNetlist" on page 493 to create a model file or netlist file

"NewBasicTextEditor" on page 491 to create a plain text file

"NewScript" on page 494 to create a script

"NewLogicDefinitionEditor" on page 493 to create a logic definition file for the abritrary logic block

"NewVerilogHDL" on page 495 to create a Verilog-HDL source file

NewVerilogHDL

NewVerilogHDL

Creates a new Verilog HDL editor.

See Also

"NewNetlist" on page 493 to create a model file or netlist file

"NewBasicTextEditor" on page 491 to create a plain text file

"NewScript" on page 494 to create a script

"NewVerilogA" on page 495 to create a Verilog-A source file

"NewLogicDefinitionEditor" on page 493 to create a logic definition file for the abritrary logic block

Product

SIMetrix and SIMetrix/SIMPLIS Pro and Elite

NoPaint

NoPaint

This command has no effect unless executed from within a script. It inhibits all updates to graphs until script execution is complete. This is useful when a number of operations are performed on a graph. By calling this command at the start of a script, multiple graph operations can be performed much faster and more smoothly.

Parameters

/reenable	Flag to indicate whether to re-enable painting or not. Default is false.

NoUndo

NoUndo

Inhibits saving to undo buffer until command returns to the command line. This allows multiple operation to be treated as one for the purposes of the Undo feature. For example, suppose you have a script that edits a number of schematic instances. Normally, if you run the script then select Undo, only the most recent change will be undone. The user would need to select Undo many times to return the circuit to the state before the script was run. If NoUndo is called at the start of the script, Undo will return the schematic to the start state in a single operation.

Parameters

/nocapture	Normally NoUndo, saves the current state so that the next undo operation will restore the state to immediately before NoUndo was called. The /nocapture switch inhibits this.
/release	Restores undo buffer save operations. This happens automatically when control returns to the command line.

OpenAsciiFile

OpenAsciiFile ⟨filename⟩

Open a schematic ASCII format file for manual text editing. This can be useful for debugging or for some operations that are difficult to perform using the GUI editor.

Parameters

/encoding	encoding. For details see documentation of second argument to LoadFile (page 259)
/fws	File watcher status, enable|disable|auto

See Also

"OpenSchem" on page 502

OpenBasicTextEditor

OpenBasicTextEditor ⟨filename⟩

Open a plain text file for manual text editing. This command opens the text file with no syntax highlighting. Use one of the following commands to open files with specific formats:

"OpenNetlist" on page 500 to open a model file or netlist file

"OpenLogicDefinitionEditor" on page 499 to open a logic definition file for the abritrary logic block

"OpenScript" on page 502 to open a script

"OpenVerilogA" on page 503 to open a Verilog-A source file

"OpenVerilogHDL" on page 504 to open a Verilog-HDL source file

"OpenAsciiFile" on page 496 to open a schematic file in the text editor

Parameters

/encoding	encoding. For details see documentation of second argument to LoadFile (page 259)
/fws	File watcher status, enable|disable|auto
filename	Path of text file to open

OpenDirectory

OpenDirectory ⟨path⟩

Opens the directory as given by the argument.

Parameters

path	The path of the directory to be opened.

OpenExternalFile

OpenExternalFile ⟨filename⟩

Opens the given file path in the operating systems default program associated with that file.

Parameters

filename	The path of the file to be opened.

OpenGraph

OpenGraph ⟨file name⟩

Opens the graph file *filename* and displays it.

Parameters

/newwindow	If specified, a new window will be opened for the graph. Otherwise the graph will be displayed in a new tabbed sheet in a the currently selected graph window - if any.

OpenGroup

OpenGroup [/text] [/spice2] [/spice3] [/purge] [/overwrite] [/forcereadopen] [/deleteonclose] [/ign] [⟨filename⟩]

Reads in a data file and creates a new Group. If `/text` is not specified then the name of the group will be that with which it was stored provided the name does not conflict with an existing group. If there is a conflict the name will be modified to be unique unless `/overwrite` is specified in which case the original group will be destroyed. If `/text` is specified then the group will be named textn where n is chosen to make the name unique.

Parameters

/append	
/deleteonclose	If specified, the file will be marked as volatile and will be deleted once it is no longer needed.
/forcereadopen	If specified, read lock is ignored. The read lock prevents a data file from being opened for read and would typically be set when the file is being written out during a simulation. This switch overrides the lock.
/ign	
/overwrite	Forces existing group of the same name to be overwritten. If not specified, the group being read in will be renamed if a group of the same name already exists.

/purge	If specified, the loaded data group will be treated like a normal simulation group and will be automatically deleted after a specified number of runs. Otherwise it will not be deleted unless the user does so explicitly - e.g. by using the menu **Simulator | Manage Data Groups...** menu (which uses DelGroup).
/simplis	
/spice2	If specified, *filename* will be read in as a SPICE2 raw file as generated by SPICE2g.6. This is an unsupported feature.
/spice3	If specified, *filename*, will be read in as a SPICE3 raw file. OpenGroup will readin the whole file into RAM. This may be inappropriate if the file is large. The command OpenRawFile (page 501) is usually a better choise for reading SPICE3 raw files as this rewrites the data to a native data file for access on demand.
/text	If specified, data file is assumed to be in text format. Otherwise the file is input as a SIMetrix binary data file as saved by the SaveGroup command. See "Data Files Text Format" on page 568 for full details on the text format.
filename	Name of file to be input. If not specified, an open file dialog box will be opened allowing the user to choose from available files.

See Also

CreateGroup (page 452)

DelGroup (page 467)

SaveGroup (page 524)

Groups (page 233)

OpenLogicDefinitionEditor

OpenLogicDefinitionEditor ⟨filename⟩

Opens a logic definition file for the arbitrary logic device in the text editor. This will apply syntax highlighting for the logic definition language.

Parameters

/encoding	encoding. For details see documentation of second argument to LoadFile (page 259)
/fws	File watcher status, enable|disable|auto
filename	Path of logic definition file to open

See Also

"OpenNetlist" on page 500 to open a model file or netlist file

"OpenBasicTextEditor" on page 497 to open a plain text file

"OpenScript" on page 502 to open a script

"OpenVerilogA" on page 503 to open a Verilog-A source file

"OpenVerilogHDL" on page 504 to open a Verilog-HDL source file

"OpenAsciiFile" on page 496 to open a schematic file in the text editor

OpenNetlist

OpenNetlist ⟨filename⟩

Opens a SPICE netlist or model file in the text editor. This will apply syntax highlighting for the simulator command language.

Parameters

/encoding	encoding. For details see documentation of second argument to LoadFile (page 259)
/fws	File watcher status, enable|disable|auto
filename	Path of netlist or model file to open

See Also

"OpenLogicDefinitionEditor" on page 499 to open a logic definition file for the abritrary logic block

"OpenBasicTextEditor" on page 497 to open a plain text file

"OpenScript" on page 502 to open a script

"OpenVerilogA" on page 503 to open a Verilog-A source file

"OpenVerilogHDL" on page 504 to open a Verilog-HDL source file

"OpenAsciiFile" on page 496 to open a schematic file in the text editor

OpenPrinter

OpenPrinter [/portrait] [/numCopies ⟨num-copies⟩] [/index ⟨index⟩] [/title ⟨title⟩] [/printer ⟨printer⟩] [/greyscale on|off]

Starts a print session. This may be used for customised or non-interactive printing. See "Non-interactive and Customised Printing" on page 582

Parameters

/greyscale	Set to 'on' to enable grey-scale printing
/index	Printer to use. This can be found from the function GetPrinterInfo (page 203). If omitted, the application default printer will be used.

/numCopies	Number of copies to print.
/portrait	If specified, print will be in portrait orientation, otherwise it will be landscape
/printer	Specify printer by name. If omitted, printer will be defined by its index (see below) or the application default printer will be used.
/title	Title of *print job*. This is used to identify a print job and will be displayed in the list of current print jobs that can be viewed for each installed printer from control panel. title is not printed on the final document.

OpenRawFile

OpenRawFile [/purge] [/bufsize buffer_size] [/spice2] rawfile [datafile]

Opens a SPICE 3 format ASCII raw file.

Parameters

/bufsize	Specifies the percentage proportion of installed RAM that is used for buffering the data. See Notes below for more details. Default value is 10 (%).
/csdf	If specified, the datafile is assumed to be in CSDF format.
/purge	If specified, the loaded data group will be treated like a normal simulation group and will be automatically deleted after three runs. Otherwise it will not be deleted unless the user does so explicitly - e.g. by using the **Simulator | Manage Data Groups...** menu.
/spice2	If specified, datafile is assumed to be in SPICE format. This is an unsupported option.
rawfile	Raw file to open.
datafile	SIMetrix data file to which data is written - see Notes. If omitted, a file will be created in the temporary data directory as specified by the TempDataDir option setting.

Notes

The command reads the raw file and writes the data out to a SIMetrix native data file. It then loads the SIMetrix native data file as if it were created by a SIMetrix simulation. The SIMetrix data file format is more efficient that the raw file format as it stores the data for each vector in large contiguous blocks. The raw file format stores data on a per simulation point basis which leaves the data for multiple vectors interleaved. This arrangement makes data recovery for a single vector slow.

To perform the reformatting, the command needs to buffer the rawfile data in RAM while writing the data out to the SIMetrix data file. The amount of RAM space allowed for this controls the size of the contiguous blocks in the SIMetrix data file. The larger these blocks are, the faster the read in time for each vector. This is the same issue that affects the simulator and which is explained in *Simulator Reference Manual/Runing the Simulator/Configuration Settings*. Here RAM used for

this can be controlled by the `/bufsize` switch value. Note that the RAM is only needed while this command is being executed.

Note that the data file generated by this command can be reloaded at a later time using the OpenGroup command (or menu **File | Data | Load...**). By specifying the *datafile* argument you can choose the name and location of this file which can be useful for archival purposes.

OpenSchem

OpenSchem [/cd] [/readonly] [/backup] filename

Reads a schematic file a draws it in a new schematic window. If the schematic is already open, it will be brought into view.

Parameters

/backup	Restore temporary backup file. Same as normal restore except: The 'modified' flag is restored to its state when the file was saved. Normally the 'modified' flag is cleared. The pathname is restored to the path of the original file (if any) not the path of the backup file. This command assumes that the original file was saved as a backup. This switch is used for the save/restore session feature and for recovering auto-saved schematics after an unexpected program exit.
/cd	If specified, the directory holding *filename* is made current.
/readonly	Opens schematic in read-only mode. When opened in this mode, the file is not locked so that other users may open the file and write to it. If the file is already opened in non-readonly mode by another user, this switch must be specified in order to be able to open the file.
filename	The name of the file to load the schematic from.

OpenScript

OpenScript ⟨filename⟩

Opens a script source file in the text editor. This will apply syntax highlighting for the script language along with prompts for function names and commands.

Parameters

/encoding	encoding. For details see documentation of second argument to Load-File (page 259)
/fws	File watcher status, enable|disable|auto
filename	Path of script source file to open

See Also

"OpenNetlist" on page 500 to open a model file or netlist file

"OpenBasicTextEditor" on page 497 to open a plain text file

"OpenLogicDefinitionEditor" on page 499 to open a logic definition file for the abritrary logic block

"OpenVerilogA" on page 503 to open a Verilog-A source file

"OpenVerilogHDL" on page 504 to open a Verilog-HDL source file

"OpenAsciiFile" on page 496 to open a schematic file in the text editor

OpenSimplisStatusBox

OpenSimplisStatusBox

Opens the SIMPLIS simulation status box.

See Also

"CloseSimplisStatusBox" on page 448

OpenVerilogA

OpenVerilogA ⟨filename⟩

Opens a Verilog-A source file in the text editor. This will apply syntax highlighting for the Verilog-A language.

Parameters

/encoding	encoding. For details see documentation of second argument to LoadFile (page 259)
/fws	File watcher status, enable|disable|auto
filename	Path of Verilog-A source file to open

See Also

"OpenNetlist" on page 500 to open a model file or netlist file

"OpenBasicTextEditor" on page 497 to open a plain text file

"OpenScript" on page 502 to open a script

"OpenLogicDefinitionEditor" on page 499 to open a logic definition file for the abritrary logic block

"OpenVerilogHDL" on page 504 to open a Verilog-HDL source file

"OpenAsciiFile" on page 496 to open a schematic file in the text editor

Product

SIMetrix and SIMetrix/SIMPLIS Pro and Elite

OpenVerilogHDL

OpenVerilogHDL ⟨filename⟩

Opens a Verilog-HDL source file in the text editor. This will apply syntax highlighting for the Verilog-HDL language.

Parameters

/encoding	encoding. For details see documentation of second argument to LoadFile (page 259)
/fws	File watcher status, enable|disable|auto
filename	Path of Verilog-HDL source file to open

See Also

"OpenNetlist" on page 500 to open a model file or netlist file

"OpenBasicTextEditor" on page 497 to open a plain text file

"OpenScript" on page 502 to open a script

"OpenVerilogA" on page 503 to open a Verilog-A source file

"OpenLogicDefinitionEditor" on page 499 to open a logic definition file for the abritrary logic block

"OpenAsciiFile" on page 496 to open a schematic file in the text editor

Product

SIMetrix and SIMetrix/SIMPLIS Pro and Elite

OpenWebPage

OpenWebPage ⟨URL⟩

Opens a web page in the system default browser. Argument must be the full path URL.

OptionsDialog

OptionsDialog

Opens the options dialog box. This is the action performed by the menu **File | Options | General...**. All option processing is performed directly by this command.

Pan

Pan ⟨x⟩⟨y⟩

Pan (scroll) schematic specified number of grid squares.

Parameters

x	Movement in x direction. A positive value moves the schematic to the left.
y	Movement in y direction. A positive value moves the schematic up.

PasteGraphImageToSchematic

PasteGraphImageToSchematic

Copies a picture of the last selected graph to the last selected schematic. When placed on the schematic, the image can be stretched to the required size.

Parameters

/size	Sepcifies the resolution of the image to capture. Values are width and height. Values too small may cause parts of the graph to disappear. Default values are 400 300.

Pause

Pause

Pauses current simulation (if any). Note that this command can only be executed by assigning it to a key or menu item with the direct execution option specified (option flag 5). For more information see "User Defined Key and Menu Definitions" on page 556.

A paused simulation can be restarted with the command Resume (page 518).

PlaceCursor

PlaceCursor [/main x-main y-main] [/datum x-datum y-datum]

Positions graph cursors if they are enabled.

Parameters

/datum	Location of reference cursor. Position is determined by *x-datum*. *y_datum* is only used for non-monotonic curves (e.g. nyquist plots) where there is more than one y value for a given x value.

/main	Location of main measurement cursor. Position is determined by *x-main*. *y-main* is only used for non-monotonic curves (e.g. Nyquist plots) where there is more than one y value for a given x value.

Plot

Plot [/xl ⟨xlimit-low⟩⟨xlimit-high⟩] [/yl ⟨ylimit_low⟩⟨ylimit_high⟩] [/xdelta ⟨xdelta⟩] [/ydelta ⟨ydelta⟩] [/ylabel ⟨ylabel⟩] [/xlabel ⟨xlabel⟩] [/yunit ⟨yunit⟩] [/xunit ⟨xunit⟩] [/title graph-title] [/xlog] [/ylog] [/loglog] [/dig] [/new] [/select] [/name] [/autoxlog] [/autoylog] [/xauto] [/yauto] [/newaxis] [/newgrid] [/axisid ⟨id⟩] [/autoaxis] [/bus hex|dec|decsigned|bin] [⟨y-expression⟩] [⟨x-expression⟩]

Plot can be used to add a new curve to an existing graph created with Plot or to change the way it is displayed.

Parameters

/autoAxis	Does nothing. For compatibility with the command Curve (page 456).
/autoXlog	If specified, the x-axis will be logarithmic if the x-values are logarithmically spaced.
/autoYlog	Same as /autoxlog except that if x-values are logarithmically spaced, the Y axis will be logarithmic.
/axisid	Does nothing. For compatibility with the command Curve (page 456).
/bus	Specifies that the curve is displaying a bus value.
/dig	If specified, the curve will be plotted on a digital axis. Digital axes are stacked on top of main axes and are sized and labelled appropriately for digital waveforms.
/loglog	Forces both y and x axes to be logarithmic.
/name	If specified, curve will be named *curve-name*.
/new	Opens a new graph window.
/newAxis	Does nothing. For compatibility with the command Curve (page 456).
/newGrid	Does nothing. For compatibility with the command Curve (page 456).
/newSheet	Creates a new empty sheet. Does not plot any curves.
/select	If specified, the new curve will be selected.
/title	Specify title of graph with *graph-title*.
/xauto	Does nothing. For compatibility with the command Curve (page 456).
/xdelta	Specify spacing between major grid lines on x-axis with real value *xdelta*. For default spacing use '0'.

/xl	Specify fixed limit for x-axis, *xlimit-low* is a real value stating the lower limit of the x-axis, whilst *xlimit-high* is a real value stating the higher limit of the x-axis.
/xlabel	Specify label for the x-axis with *xlabel*.
/xlog	Forces logarithmic x-axis, only effective when graph sheet is empty.
/xunit	Specify units for x-axis (Volts, Watts etc.) with string *xunit*. If it contains spaces, the whole string must be enclosed in quotes (“”). You should not include an engineering prefix (m, K etc.).
/yauto	Does nothing. For compatibility with the command Curve (page 456).
/ydelta	Specify spacing between major grid lines on y-axis with real value *ydelta*. For default spacing use ‘0’.
/yl	Specify fixed limit for y-axis, *ylimit-low* is a real value stating the lower limit of the y-axis, whilst *ylimit-high* is a real value stating the higher limit of the y-axis.
/ylabel	Specify label for the y-axis with *ylabel*.
/ylog	Forces logarithmic y-axis, only effective when graph sheet is empty.
/yunit	Specify units for y-axis (Volts, Watts etc.) with string *yunit*. If it contains spaces, the whole string must be enclosed in quotes (“”). You should not include an engineering prefix (m, K etc.).
y-expression	Expression describing curve to be added to graph.
x-expression	Expression describing x values of curve defined by y expression. If omitted, reference of *y_expression* will be used.

Notes

/autoxlog and /autoxylog log test

The x-values are deemed to be logarithmically spaced if three values satisfy the following:

$$1.0000001 > \frac{x_1^2}{x_0 * x_2} > 0.9999999$$

Where:

$$x_0 = x[0]$$

i.e the first point in the data.

If there are an even number of points:

$$x_1 = x[\frac{n}{2} - 1]$$

$$x_2 = x[n - 2]$$

where n is the number of points in the data.

If there are an odd number of points:

$$x_1 = x[\frac{n-1}{2}]$$

$$x_2 = x[n - 1]$$

where n is the number of points in the data.

If there are fewer than three points or any of the values is less than or equal to zero, a linear axis will be selected.

PreProcessNetlist

PreProcessNetlist

Pre-processes the specified netlist. The netlist pre-processor was developed for use with the SIMPLIS simulator but is general purpose in nature and may also be used with SIMetrix. Currently this command is automatically called when a SIMPLIS simulation is run from the GUI.

Some SIMetrix models do make use of the pre-processor. For example the multi-level capacitor and inductor models employ the pre-processor. Placing 'vars:' followed by any parameters at the end of a SIMetrix subcircuit call will result in the subcircuit model being pre-processed.

Documentation for the pre-processor language syntax may be found in *SIMPLIS Reference Manual/Running SIMPLIS/Netlist Preprocessor*.

PrintGraph

PrintGraph [/caption ⟨caption⟩] [/margin l t r b] [/major on|off] [/minor on|off] [/mono] [dim-left, dim-top, dim-right, dim-bottom]

Prints the current graph sheet.

Parameters

/caption	Caption printed at the bottom of the page.
/interactive	
/major	Specify whether major grid lines should be printed. options are 'on' or 'off'. Default is 'on'.
/margin	Page margins in mm, stated in the form *left, top, right, bottom.*
/minor	Specify whether minor grid lines should be printed. options are 'on' or 'off'. Default is 'on'.
/mono	If specified, the graph will be printed in black and white.
/nointeractive	
dim-left, dim-top, dim-right, dim-bottom	Dimensions and position of printed image on page. Values are relative to page size less the specified margins in units equal to 1/1000 of the page width/height. The default is 0 0 1000 1000 which would place the image to fill the entire area within the margins. 0 500 1000 1000 would place the image at the bottom half of the page. 0 0 2000 1000 would place the left half of the image in the full page while -1000 0 1000 1000 would place the right half. This allows the printing on multiple sheets. Note that if values greater than 1000 or less than 0 are used, part of the printed image will lie in the margins. This provides a convenient overlap for multiple sheets.

PrintSchematic

PrintSchematic [/caption ⟨caption⟩] [/fixed ⟨grid-size⟩] [/margin l t r b] [/mono on|off] [⟨dim-left⟩⟨dim-top⟩⟨dim-right⟩⟨dim-bottom⟩]

Prints the current schematic.

Parameters

/caption	Caption printed at the bottom of the page.
/fixed	If specified, fixed scaling will be used. *grid-size* is the size of a single grid square on the printed sheet in inches. Otherwise the schematic scale will be chosen to fill the print area. The scaling is *isotropic*. That is the aspect ratio will be maintained.
/margin	Page margins in mm, stated in the form *left, top, right, bottom*.
/mono	If specified, the graph will be printed in black and white.
dim-left, dim-top, dim-right, dim-bottom	Dimensions and position of printed image on page. Values are relative to page size less the specified margins in units equal to 1/1000 of the page width/height. The default is 0 0 1000 1000 which would place the image to fill the entire area within the margins. 0 500 1000 1000 would place the image at the bottom half of the page. 0 0 2000 1000 would place the left half of the image in the full page while -1000 0 1000 1000 would place the right half. This allows the printing on multiple sheets. Note that if values greater than 1000 or less than 0 are used, part of the printed image will lie in the margins. This provides a convenient overlap for multiple sheets.

Probe

Probe [/type 1|2|P|N] [⟨probe-message⟩]

Moves mouse cursor to currently selected schematic, changes cursor shape to a symbol depicting an oscilloscope probe then suspends command execution. When any mouse key is clicked, the cursor shape reverts to normal and command execution is resumed. Probe does not suspend commands executed directly on assignment to keystrokes or menu items. This allows the Cancel command, when assigned to a key or menu, to terminate a probe command. Note that the Probe command completes on both up and down strokes of a mouse key.

Parameters

/type Alters slightly the cursor shape by adding a single character as follows:

1	adds '1'
2	adds '2'
P	adds a '+' character
N	adds a '-' character

Prop

Prop Prop [/hide|/show|/toggle] [/flags ⟨attrib. flags⟩] [/noAdd] [/showName] [/hideName] [/code 0|1|2|3] [/overridestyle styleName] ⟨name⟩[⟨value⟩]

Modifies a property value of a schematic component if it exists. If it doesn't exist the property is added.

Parameters

/all	
/code	
/flags	Argument is either a value or a property. If a value is specified, it changes/assigns the *flags* value of the property. The flags value defines the properties attributes. How this number is composed is detailed below. If a property is specified, it copies the flags value from the specified property so the new/changed property defined by *property-name* will have the same flags as the already existing *property*. The flags define the property's attributes.
/handle	
/hide	Make property invisible.
/hideName	If specified, the name of the property will be hidden.
/hideNew	Hide property value if a new property is being added. If the property already exists, its visibility will remain unchanged.
/noAdd	If specified, property will not be added if the instance does not already possess it.
/order	Override of order for auto positioned properties. Set this value to be 0 or above to manually adjust property order. Set to -1 to revert back to default ordering.
/overridestyle	Style name to use, overriding any styles inheritted from the parent instance. If unset or the value is "", the style of the instance it is associated with will be used.
/pinloc	If specified, the property will be positioned at a fixed location next to the pin specified by pinnumber.
/prop	
/propval	
/show	Make property visible.
/showName	If specified, the name of the property will be made visible along with its value in the form "name=value".
/toggle	

Notes

Attribute flags

The attributes flag value is a 16 bit number with each bit having a defined function. These bits are defined in the following table:

Bit 0,1 Auto text location for normal orientation:

- 00 Left
- 01 Top
- 10 Right
- 11 Bottom

If fixed position, value controls left-right justification:

- 00 left
- 01 centre
- 10 right

Unused set to 0

Bit 3,4 Auto text location for 90 degree rotated orientation:

- 00 Left
- 01 Top
- 10 Right
- 11 Bottom

If fixed position, value controls top-bottom justification, where baseline means the base for upper case characters, the tails of some lower case characters go below the baseline:

- 00 top
- 01 baseline

Bit 5 Unused set to 0

Bit 6 Visibility

- 0 Visible
- 1 Hidden

Bit 7 Protected status

- 0 Not protected
- 1 Protected

Bit 8 Location method

- 0 Auto (use bits 0,1,3,4 to define)
- 1 Fixed pos (actual location can only be defined in symbol)

Bit 9 Text scale method

- 0 Optimum readability
- 1 Linear

Bit 10 Does property text define select border

- 0 No
- 1 Yes

Bits 11-13 Font index

0	Default
1	Caption
2	Free text
3	Annotation
4	User 1
5	User 2
6	User 3
7	User 4

Bit 14 Rotated. Property at 90 degrees to symbol orientation. Ignored if location method = auto.

Bit 15 Display property name with value.

Bit 16 Resolve symbolic value if specified. Currently only three are permitted namely, <version>, <date> and <time>. If this flag is set any of the above strings are found in the property, they will be replaced by their value. <version> will be replaced by an integer that is incremented each time the schematic is saved. <date> and <time> will be replaced by the date and time of the schematic file respectively.

The final value has to be entered as a decimal value. Note that attributes are usually edited using the popup menu Edit Properties... dialog.

Example

To change a R3's component reference to R4 (i.e. change its *ref* property from R3 to R4) select R3 then enter:

```
Prop ref R4
```

Protect

Protect

Protects selected schematic components. Protected components cannot be selected. This command is used for schematic worksheets so that they remain in a fixed position. The Unprotect command removes protected status.

Quit

Quit

Terminates SIMetrix. If there are any modified schematics open, the user will be prompted to save them first.

RD

RD ⟨directory-name⟩

Remove a directory. Rd is similar to the DOS RD and RMDIR commands.

Parameters

directory-name	Name of directory to be removed.

ReadLogicCompatibility

ReadLogicCompatibility ⟨filename⟩

Reads a file to define the compatibility relationship between logic families. For an example of a compatibility table, see the file COMPAT.TXT which you will find in the CD in directory Docs/Manuals/Supporting Files. This file is actually identical to the built-in definitions except for the "UNIV" family which cannot be redefined.

Please refer to the "Digital Simulation" chapter of the Simulator Reference Manual for full details on logic compatibility tables.

File format

The file format consists of the following sections:

Header

In-Out resolution table

In-In resolution table

Out-Out resolution table

Header: The names of all the logic families listed in one line. The names must not use the underscore ('_') character.

In-Out resolution table: A table with the number of rows and columns equal to the number of logic families listed in the header. The columns represent outputs and the rows inputs. The entry in the table specifies the compatibility between the output and the input when connected to each other. The entry may be one of three values:

OK	Fully compatible
WARN	Not compatible but would usually function. Warn user but allow simulation to continue.
ERR	Not compatible and would never function. Abort simulation.

In-In resolution table A table with the number of rows and columns equal to the number of logic families listed in the header. Both column and rows represent inputs. The table defines how inputs from different families are treated when they are connected. The entry may be one of four values:

ROW	Row take precedence
COL	Column takes precedence
OK	Doesn't matter. (Currently identical to ROW)
ERR	Incompatible, inputs cannot be connected.

Out-out resolution table A table with the number of rows and columns equal to the number of logic families listed in the header. Both column and rows represent outputs. The table defines how outputs from different families are treated when they are connected. The entry may be one of four values:

ROW	Row take precedence
COL	Column takes precedence
OK	Doesn't matter. (Currently identical to ROW)
ERR	Incompatible, outputs cannot be connected.

Parameters

filename	Logic compatbility file

RebuildSymbols

RebuildSymbols

The installed symbol library is usually stored in RAM during normal operation. When a symbol is needed, the modified date of original source file is checked and if it has changed, that library file will be reloaded. This happens anyway whenever a symbol is required for any purpose.

RebuildSymbols forces the checking of all stored symbol libraries and any that are out of date will be reloaded from the source file.

There aren't many reasons for using this command. However, it is sometimes useful to call it in the startup script so that the symbols are automatically loaded when the program starts. Normally the symbols aren't loaded until they are first needed and this can introduce a slight delay.

Redirect

Redirect /err|/out [⟨filename⟩]

Redirects messages (i.e. text which is normally displayed in the message window) to a file. One or both of `/err` or `/out` must be specified.

Parameters

/err	Specifies that error and warning messages are to be redirected.
/out	Specifies that messages other than errors and warnings are to be redirected.
filename	Name of file to which messages are sent. If not specified messages are sent to the message window the specified redirect mode is cancelled and messages of that type will be sent to the command shell.

See Also

RedirectMessages (page 515) redirects everything to a file.

RedirectMessages

RedirectMessages on ⟨filename⟩|dup ⟨filename⟩|off|flush

Redirects all command shell messages to a file. Everything that would normally be displayed in the command shell such as error messages will be sent to the specified file. An option is available to copy command shell output to a file, that is the command shell messages continue to be displayed but are also written to a file.

Note that some messages are sent in HTML format to show bold text and other formatting. These will be shown in the file in their native form including the HTML tags.

Parameters

on	Switch on redirect. All messages will go to *filename* and no output will appear in the message window
append	As **on** but appends text to file if it already exists
dup	Switch on redirect. All messages will go to *filename* and to the message window
off	Switch off redirect. Restore message output to command shell and close redirect file
flush	Flush file. When redirect is switched on, messages are buffered before being written to the target file. This will flush the buffer so that the file contents will be up to date

RegisterUserFunction

RegisterUserFunction ⟨Function-Name⟩⟨Script-Name⟩[⟨min-number-args⟩] [⟨max-number-args⟩]

Creates a user defined function based on a script.

Parameters

Function-Name	Name of function. This must start with a letter and contain only letters, digits and underscores. The name must not be one of the built-in functions.
Script-Name	Name of script that will be called to execute function.
min-number-args	Minimum number of arguments required by the function. Range 0 - 7. Default=0
max-number-args	Maximum number of arguments that may be supplied to the function. Range 0 - 7. Default=7

Notes

When an expression is evaluated that calls the function defined by this command, the specified script will be called. The script receives the arguments to the function through its argument

numbers 2-8. (There is a maximum limit of seven arguments). The function's returned value is the script's first argument passed by reference.

Further details including an example are given in "User Defined Script Based Functions" on page 581.

RenameLibs

RenameLibs [/report] [/check] [/log logfile] ⟨filename⟩⟨suffix⟩[catalog-file] [user-catalog-file]

Runs the rename model utility. This renames models inside installed model files if they are found to have duplicates. This command is called by the rename_libs script which is documented in the User's Manual.

Parameters

/check	If specified a dummy renaming process will be performed. All reports, logs and messages will be output but no actual renaming will take place.
/log	If specified, all renamed models will be listed in *logfile*.
/report	If specified a report of progress will be displayed in the command shell.
filename	Name of model library file or file spec to be processed. This may include '*' or '?' wild card characters. Any models within this file that have duplicates already installed in the global model library will be renamed using the suffix supplied.
suffix	Suffix applied to duplicate model name.
catalog-file	Usually called OUT.CAT. If specified alongside *user-catalogfile*, any user association of renamed models will be appropriately modified.
user-catalog-file	If specified a report of progress will be displayed in the command shell.

RenameMenu

RenameMenu ⟨menu-path⟩⟨new-item-name⟩

Renames a menu item.

Parameters

menu-path	The full path of the menu to change the name for.
new-item-name	The new name to use for the menu item.

RepeatLastMenu

RepeatLastMenu ⟨window-name⟩⟨top-menu-name⟩

Executes the menu most recently selected by the user. SIMetrix remembers the last command executed for each top level menu and this menu must be specified with this command.

Parameters

window-name	Identifies the window type that owns the menu. See DefMenu (page 462) for list of possible values.
top-menu-name	The top level menu name. This is the name that appears in the menu bar.

ReplayTraces

ReplayTraces ⟨group-name⟩

The definitions for graph curves that are created by fixed probes are stored in the simulation data group. Normally these are automatically executed when the simulation is run. This command can be used to execute those curve definitions at any later time.

Parameters

groupname	Name of group from which the fixed probe definition will be retrieved

Reset

Reset

Frees memory associated with most recent simulation run.

It is not normally necessary to use this command unless available memory is low and is needed for plotting graphs or other applications. Note that Reset does not delete the data generated by a simulation only the internal data structures set up to perform a run. These are automatically deleted at the beginning of a new run.

ResizeWindow

ResizeWindow /width [width] /height [height]

Resizes the current window.

Parameters

/height	The height in pixels to use.

/width	The width in pixels to use.

RestartTran

RestartTran ⟨stop-time⟩

Restarts a transient simulation that had previously run to completion. To work, the most recent simulation must have been a transient analysis. If another analysis has since been run or if the analysis has been cleared using the Reset command, this command will be inoperative.

Parameters

stop-time	The restarted run will continue until it reaches this time.

RestoreCommandShell

RestoreCommandShell

Re-opens the command shell if closed or brings the command shell to the front if it is not visible.

Parameters

/force	If set, this will force the command shell to appear in the currently selected window.

RestoreDefaultStyles

RestoreDefaultStyles [/all] [/selected]

Restores default styles. One of the switches must be applied, otherwise no changes will be made.

Parameters

/all	All elements are changed back to their default style settings and any overrides to the default styles are removed.
/selected	Causes the selected elements to be changed back to their default styles. Any overrides of these styles are not checked for or removed.

Resume

Resume

Resumes a previously paused simulation.

RotInst

RotInst [⟨orientation⟩]

Changes orientation of selected items.

Parameters

orientation	Integer from 0 to 7 to specify how symbol should be oriented: 0 No change 1 Rotate clockwise 90° 2 Rotate clockwise 180° 3 Rotate clockwise 270° 4 Mirror through vertical axis 5 Mirrored + 90°Rotation 6 Mirrored + 180°Rotation 7 Mirrored + 270°Rotation

Run

Run [/check] [/an ⟨analysis-spec⟩] [/options ⟨options-string⟩] [/optforce ⟨options-string⟩] [/list ⟨list-file⟩] [/local] [/nolist] [/force] [/label ⟨division-label] [/append ⟨group-name⟩] [/pauseAt ⟨pause-time⟩] [/noData] [/noStatus] [/sweep start|continue|finish] [/cd ⟨directory⟩] [/extraLine ⟨extra-line⟩] netlist [datafile]

Runs a simulation on specified netlist.

Parameters

/an	If specified, any analysis controls (e.g .TRAN, .AC etc.) in the netlist are ignored and the statement in *analysis-spec* is executed instead.
/append	Append data created to *group-name* which would always be the data group created by the first run in the sequence. '/sweep continue' or '/sweep finish' must also be specified for this to function. The data is appended by adding new divisions to existing vectors so creating or extending a multi-division vector.
/cd	Simulator process current working directory is set to *directory*. If not specified the current working directory is set to the location of *netlist*
/check	Performs a check on the netlist for syntax errrors but does not run the simulation
/extraLine	Adds *extra-line* to the end of the netlist. Use .include to append multiple lines

/force	*datafile* will be overwritten if it already exists. Otherwise an error message will be displayed.
/label	Used with /sweep to name the division of a linked run.
/list	Override default name for list file with *list-file*
/local	Save data using simulator local process. Normally data is sent through the front end.
/noData	Only data explicitly specified by .PRINT or .KEEP controls will be output. Usually all top level data is saved. Equivalent to placing ".KEEP /nov /noi /nodig" in netlist.
/nolist	Inhibits creation of list file.
/noStatus	Inhibits update of the GUI status box. Use in conjunction with /nofocus to run a hidden simulation
/optforce	Same as /options but overrides any .OPTIONS setting in the netlist
/pauseAt	Pauses simulation at first time point after *pause-time*
/sweep	May be set to 'start', 'continue' or 'finish'. This is used to create linked runs that save their data to the same group using multi-division vectors. The first run in such a sequence should specify '/sweep start' while the final run should specify '/sweep finish'. All intermediate runs should specify ï£¡/sweep continueï£¡. All runs except the first must also specify '/append'
netlist	Input netlist filename
datafile	Specifies path name of file to receive simulation data. If omitted, the data is placed in a temporary data file.

Notes

The Run command does not run a simulation on the currently open schematic but on the specified netlist. Normally a run is initiated using the **Simulator | Run** menu item. This annotates the schematic then generates the netlist using the Netlist (page 489) command. Run is then executed specifying the new netlist.

The Run command may also be used to run a simulation on a netlist generated by hand or by another schematic editor.

Linking Runs

The data from multiple runs may be linked together in the same manner as multi-step runs such as Monte Carlo. This makes it possible to develop customised multi-step runs using the script language. Simple multi-step runs may be defined using the simulator's built in features which cover a wide range of applications. The simulator's multi-step features allow the stepping of a single component or a parameter which can define several components. But it doesn't allow, for example, a complete model to be changed, or any kind of topological changes.

The script language may be used to control multiple runs of a circuit with no limit as to the changes that may be performed between each run. In such situations it is useful to be able to organise the data in the same way that the native multi-step facilities use. This can be done by linking runs using the /sweep, /append and /label switches. By running simulations in this manner, the data generated by the simulator will be organised using multi-division vectors which are similar to 2 dimensional arrays.

Care must be taken when making topological changes between runs. Names of nodes that are of interest must always be preserved otherwise the data generated for their voltage may be lost of mixed up with other nodes. Note also that the data for new nodes created since the first run will not be available. The same problems arise for device pin currents.

Note that the netlist for a linked run must specify a single analysis only. E.g. a single .TRAN or .AC but not both. Also, do not add .OP lines to the netlist.

Linked Run Example

```
** First run
Run /sweep start /label "Run=1" netlist.net
** save group name
Let grp1 = (Groups())[0]
... changes to netlist
** second run
Run /sweep continue /label "Run=2" /append {grp1} netlist.net
... changes to netlist

** third run
Run /sweep continue /label "Run=3" /append {grp1} netlist.net
... changes to netlist
** fourth and final run
Run /sweep finish /label "Run=4" /append {grp1} netlist.net
```

RunAsync

RunAsync ⟨netlist⟩[⟨datafile⟩]

Spawns a new simulator process and runs specified netlist.

RunAsync has the benefit over Run (page 519) in that it is possible to carry on working in the front end normally while the simulation runs in the background. The disadvantage is that the asynchronous process cannot communicate with the front end. This means that incremental graph updates are not possible and the data for the simulation needs to be manually loaded after the simulation is complete.

To load the data use the OpenGroup (page 498) command.

Parameters

netlist	Path to simulation netlist
datafile	Path to data file. If omitted, data will be saved to a temporary file in the temporary data directory.

RunCurrentScript

RunCurrentScript

Runs the script currently open in the text editor. The script must have been opened using the "OpenScript" on page 502 command, created with the "NewScript" on page 494 command or recovered from a restore session operation. The script will be run as it is displayed in the editor including any unsaved edits.

Notes

When a script is run using this command it will be referred to by the path of the file in the editor if there is one. If there isn't (i.e. the editor has never been saved, the script will be referred to as '<LocalScript>' in any error messages. This will also be the return value from the "ScriptName" on page 336 function.

RunSIMPLIS

RunSIMPLIS [/fresh] [/append] [/label division-label] [/sweep start|continue|finish] [/checkAbort] filename

Runs the SIMPLIS simulator. Note that you must have a SIMetrix/SIMPLIS license for this command to work.

The RunSIMPLIS command will not pre-process the netlist. This must be done separately using the PreProcessNetlist (page 508) command.

Parameters

/append	Append data to current group. Otherwise creates a new data group.
/checkAbort	Instructs SIMPLIS to check abort requests.
/fresh	Instructs SIMPLIS to run simulation afresh and not to use any state information saved from previous runs.
/label	Used with `/sweep` to name the division of a linked run
/sweep	Used for multi-step runs. See Run (page 519) command above for details.

Notes

RunSIMPLIS is the primitive SIMetrix command that launches SIMPLIS. However, when running a simulation on a schematic, a number of other activities are performed. These include pre-processing the netlist generated by the schematic editor and also resolving a trigger device for POP analysis. If you wish to simulate a schematic in exactly the same manner as the Run menu, you need to execute the script simplis_run. This simulates the currently open schematic. The full source for simplis_run can be found on the install CD.

Save

Save [/all]

Saves the currently selected schematic.

Parameters

/all	If specified, all open schematics will be saved. Note that schematics that have not previously been saved will not be saved by this command.
/nostyle	If specified, the style library will not be written to the schematic.

SaveAs

SaveAs [/force] [/binary] [/writeSymbol] [/tab ⟨tabnum⟩] [/id id] ⟨filename⟩

Saves the currently selected schematic.

Parameters

/binary	File will be written in binary format. This is only required if the file needs to be read by a version earlier than 5.0.
/export	Saves the schematic to specified file but does not change the file, if any, to which the schematic is linked. It also does not update the modified status of the schematic
/force	If specified and *filename* already exists it will be overwritten without prompting. Otherwise if the file exists an error will be reported.
/id	Use id obtained from OpenSchematic (page 286) or GetSchematicTabs (page 205)
/nostyle	If specified, the style library will not be written to the schematic.
/tab	Tab id - used to specify which tabbed sheet within a schematic window is to be saved. *tab_id* is a number between zero and 1 less than the number of tabbed sheets in the window. The function GetOpenSchematics (page 201) can be used to determine the number of tabs open in a window.
/ui	Ignored. This is retained for compatibility with version 7.2 and earlier. This was used in conjunction with /tab to idenify a schematic from a window id and tab id. From version 8, the GetOpenSchematics (page 201) function returns all schematics that are open independent of which window, so /ui is no longer required
/wid	Use id from WM_GetContentWidgetNames (page 399)
/writeSymbol	If the schematic being saved has an embedded symbol (that forms part of a hierarchical component), the symbol will be written out if this switch is specified. Otherwise the symbol will not be written out. If *filename* already exists and already has a symbol, that symbol will remain intact if this switch is not specified
filename	Name of file to which schematic is saved (*filename* is not optional as it was with earlier versions of SIMetrix).

SaveGraph

SaveGraph [/version data-version] [/id graph-id] ⟨filename⟩

Saves the currently selected graph to a binary file. This can subsequently be restored using OpenGraph (page 498).

Parameters

/id	Graph object id. If more than one graph is displayed, *graph-id* can be used to identify which graph is saved. If omitted the currently selected graph is used. All currently open graphs can be obtained from the function GetGraphObjects (page 178), using `GetGraphObjects('graph')`, while GetGraphTabs (page 180) can be used to obtain the graph objects within a single window.
/version	Ignored. Retained for backward compatibility
filename	Path of file.

SaveGroup

SaveGroup [/force] [/version version] [⟨filename⟩]

Saves the current group in binary format. Data groups can be opened with OpenGroup (page 498)

Parameters

/force	If is specified, any existing file will be overwritten. Otherwise the command will fail and display an error message
/version	Ignored. Retained for backward compatibility.
filename	Save to the *filename*. Data can later be restored with the command OpenGroup (page 498). If *filename* is not specified, a dialog box will be opened allowing the user to choose from available files.

See Also

CreateGroup (page 452)

DelGroup (page 467)

SaveGroup (page 524)

Groups (page 233)

SaveRhs

SaveRhs [/nodeset] ⟨filename⟩

Creates a file containing every node voltage, inductor current and voltage source current calculated at the most recent analysis point. The values generated can be read back in as nodesets to initialise the dc operating point solution. There are a number of applications for this command - see notes below.

Parameters

/nodeset	If specified the values are output in the form of a .nodeset command which can be read back in directly. Only node voltages are output if this switch is specified. Otherwise, currents in voltage sources and inductors are also output.
filename	File where output is written.

Notes

This command is intended as an aid to DC operating point convergence. Sometimes the dc operating point solution is known from a previous run but took a long time to calculate. By applying the known solution voltages as nodesets prior to the operating point solution, the new DC bias point will be found much more rapidly. The method is tolerant of minor changes to the circuit. The old solution may not be exact, but if it is close this may be sufficient for the new solution to be found quickly.

If SaveRhs is executed after an AC analysis, the values output will be the real part only.

SaveSnapShot

SaveSnapShot

Saves the current state of a transient analysis to a snapshot file. This can be retrieved later to initialise an AC analysis. For more information on snapshots see *User's Manual/Analysis Modes/Transient Analysis/Transient Snapshots* and *Simulator Reference Manual/Command Reference/.TRAN/Snapshots*.

SaveSymbol

SaveSymbol [/comp] [/file ⟨filename⟩] [/lib ⟨lib-symbol-name⟩] [/flags ⟨flags⟩]
⟨symbol-name⟩[⟨symbol-description⟩[⟨catalog⟩]]

Save a symbol to a library or as a component. Source may be the current symbol editor symbol or a specified symbol in the global library.

Parameters

/comp	Saves symbol as a component to path *symbol-name*.
/file	Symbol saved to specified library file. This is ignored if `/comp` is specified. If a full path is not supplied, the path will be relative to the SymbolLibs directory.
/flags	If flags=1, symbol is saved with tracking enabled. This forces all instances of the symbol to always be loaded from the global symbol library rather than from the local schematic. This is the action of the *"All references to symbol automatically updated"* check box in the symbol editor's **File | Save...** dialog box.

/lib	Use specified library symbol as source instead of the symbol editor. *lib-symbol-name* must be the internal name for a symbol in an installed library.
symbol-name	Name of symbol. This is known as the 'internal name' in the user interface. This is the name that the software uses to identify the symbol. It is stored in schematic files and it is used for a number of script functions and commands, for example the command Inst (page 481) to place a symbol uses this name. This name may not contain spaces or special characters and cannot be changed once the symbol is created.
symbol-description	Symbol description. This is the name that is displayed in the dialog opened with **Place | From Symbol Library...**. Unlike the *symbol-name* (above) it has no naming restrictions and can be changed at any time without affecting any existing instances of the symbol.
catalog	Symbol catalog. This determines how the symbol is categorised in **Place | From Symbol Library...**. This may be a list of strings separated by semi-colons, each identifying a node in the tree list display shown in the place symbol dialog box.

SaveSymlib

SaveSymlib [/v25] [/append] [/force] /lib ⟨libname⟩|/all ⟨filename⟩

Parameters

/all	Write out all installed symbols.
/append	Symbols are appended to *filename*. Otherwise *filename* will be overwritten if it already exists. Note that any symbols written that are already present in *filename* will be overwritten. It is not possible to have duplicate symbols within the same library file.
/ascii	Force save to ascii file format (default).
/binary	Force save to binary file format.
/force	Allows symbols to be written to an existing library file. Otherwise if *filename* is an existing installed library, the command will abort with an error message.
/lib	Name of library file to write out. This must be an installed file.
/v25	If specified, the file will be written in a format compatible with all SIMetrix versions 2.5, 3.0, 3.1 and 4.0. Otherwise the format used will work only with versions 4.1 or later
filename	File to receive symbols.

SaveTextEditor

SaveTextEditor

Saves the current text editor.

Parameters

/type

SaveTextEditorAs

SaveTextEditorAs [⟨filename⟩]

Saves the current text editor to a specific file.

Parameters

/type The text editor type to save.

SchematicEnableFileWatcher

SchematicEnableFileWatcher ⟨filename⟩

Enabled the file watcher on the current schematic. Argument the name of the file that should be watched.

SchematicFileWatcherIgnoreChanges

SchematicFileWatcherIgnoreChanges ⟨filename⟩

Disables the file watcher on a schematic editor. Argument is the filename of the schematic to disable the file watcher for.

SchematicFileWatcherWatchChanges

SchematicFileWatcherWatchChanges ⟨filename⟩

Enables the file watcher on a schematic editor. Argument is the filename of the schematic to disable the file watcher for.

ScreenShotWindow

ScreenShotWindow

Captures a screen shot of the current window, saves the image to the clipboard. Resulting image will not include the window frame.

ScriptAbort

ScriptAbort

Aborts execution of script. Note that this command can only be usefully executed from a key or menu item which has been defined with the direct execution option specified (option flag 5 or /immediate switch for DefMenu (page 462)). See "User Defined Key and Menu Definitions" on page 556.

See Also

"ScriptStep" on page 528

"ScriptResume" on page 528

"ScriptPause" on page 528

ScriptPause

ScriptPause

Pauses a script. Execution can later be resumed with ScriptResume (page 528) or single stepped with ScriptStep. Note that this command is often executed from a key or menu item which has been defined with the direct execution option specified (option flag 5 or `/immediate` for DefMenu (page 462)). ScriptPause is assigned to shift-F2 by default. Note that it is not possible to use the normal user interface while a script is paused. The main use of script pause is to allow single-stepping for debug purposes.

Scripts can be single stepped by executing ScriptPause immediately before starting the script. If the EchoOn option is also enabled, each line of the script as it is executed will be displayed in the message window. See "Debugging Scripts" on page 25.

See Also

"ScriptStep" on page 528 "ScriptResume" on page 528 "ScriptAbort" on page 528

ScriptResume

ScriptResume

Resumes script that has been paused with ScriptPause (page 528).

See Also

"ScriptStep" on page 528 "ScriptPause" on page 528 "ScriptAbort" on page 528

ScriptStep

ScriptStep

Steps a paused script by one command. See "Debugging Scripts" on page 25.

See Also

"ScriptAbort" on page 528

"ScriptPause" on page 528

"ScriptResume" on page 528

Select

Select [/wires] [/prop ⟨prop-name⟩|/wire ⟨wire-name⟩|/all]

Select items on selected schematic. If the /prop switch is not specified the interactive select mode is entered.

Parameters

/all	If specified, all items on the current schematic sheet will be selected.
/prop	If *value* is specified, all components on the current schematic with property of name *name* and value *value* will be selected. If value is not specified then all components possessing the property *name* will be selected.
/wire	Select wire with handle defined by *wirehandle*.
/wires	If specified, only wires will be selected. Otherwise both components and wires will be selected.

Notes

The `/prop` switch makes it possible to automate modification of component values using a script. For example, supposing you have a circuit with a resistor R2 and capacitors C4 and C5, you could modify the values of all of them with a script something like:

```
Unselect
Select /prop ref R2
Prop value 1.1K
Unselect
Select /prop ref C4
Prop value 120p
Unselect
Select /prop ref C5
Prop value 1.2n
```

The above script would change R2, C4 and C5 to 1.1k, 120p and 1.2n respectively.

SelectCurve

SelectCurve [/unselect] /all|⟨curveId⟩

Selects/unselects the identified curve or all curves.

If the `/all` flag is used, then all curves on the currently selected graph are selected or unselected, depending on the `/unselect` flag. Otherwise, a single curve must be specified with *curveId*.

Parameters

/all	All curves will be selected or unselected.
/unselect	Curve or curves will be unselected.
curveId	Only used if `/all` flag is not used. Specifies a particular curve by it's ID, which can be obtained from the functions GetSelectedCurves (page 207), GetAxisCurves (page 153) and GetAllCurves (page 150).

SelectGraph

SelectGraph ⟨graph-id⟩

Switches the graph tabbed sheet to the graph specified by *graph-id*.

Parameters

/focuswin	If specified, the window containing the specified graph will be brought into focus.

SelectLegends

SelectLegends [/unselect]

Selects or unselects all graph window legends.

Parameters

/unselect	If specified, all legends are unselected. Otherwise they are selected.

SelectSchematic

SelectSchematic /id ⟨schematic-id⟩| ⟨schematic path⟩

Focuses on the specified schematic. Use either id or path.

Parameters

/id	Specifies that the input argument is a schematic ID. This can be obtained from OpenSchematic (page 286) or GetSchematicTabs (page 205).

See Also

GetSchematicTabs (page 205) GetOpenSchematics (page 201)

SelectSimulator

SelectSimulator simulator name

Selects current simulator for selected schematic.

Parameters

simulator name	Name of simulator to be selected. Current valid values are "SIMetrix" and "SIMPLIS".

SelectSymbolPin

SelectSymbolPin ⟨base-name⟩

Parameters

base-name	The name of the pin to select.

SelectWireConnected

SelectWireConnected

Selects all wires connected to the currently selected elements. This will trace all wires and select all connected wires.

Set

Set [/temp] [option-spec [option-spec ...]]

Defines an option.

Parameters

/temp	If specified, the setting will only remain for the duration of the current script execution. Value will return to its original setting when control returns to the command line.
/temp2	

option-spec	Can be one of two forms: Form1: *option-name* Form2: *option-name* = *option-value* *option-name* can be any of the names listed in the options section of the *Sundry Topics Chapter*um:SundryTopics of the *User's Manual*. For options of type Boolean, use form1. For others, use form 2.

SetAnnotationTextPosition

SetAnnotationTextPosition [/x ⟨x⟩] [/y ⟨y⟩] [/positionJustification ⟨justification⟩]

Sets the position of text within a shape based annotation.

Parameters

/positionJustification	Where to make position offset relative to, options are: *TopLeft*, *TopCenter*, *TopRight*, *MiddleLeft*, *MiddleCenter*, *MiddleRight*, *BottomLeft*, *BottomCenter* and *BottomRight*.
/x	x-position of the text.
/y	y-position of the text.

SetCurveName

SetCurveName ⟨curve-id⟩⟨curve-name⟩

Changes curves label. This is the text displayed in the legend panel.

Parameters

curve-id	Curve Id. Curve id is returned by the functions GetSelectedCurves (page 207), GetAxisCurves (page 153) and GetAllCurves (page 150).
curve-label	New label for curve. To restore a label to its default value set this to %DefaultLabel%.

Notes

Curve labels can also be edited using the command SetGraphAnnoProperty (page 533) to edit the curve's Label property.

SetDefaultEncoding

SetDefaultEncoding ⟨encoding⟩

When text files such as scripts, netlists and Verilog-A files are open in text editors and when processed, the encoding is expected to be in UTF-8 (8 bit UNICODE). The encoding affects

how characters are encoded in the file. UTF-8 is a universal format that is able to render all characters world-wide but retains compatibility with 7 bit ASCII. If at least one character in an input sequence is detected that is not a valid UTF-8 sequence, an assumption has to be made as to what the encoding is. The default is to use the setting defined by the system locale which can be set in the control panel. This function can be used to set an alternative encoding.

The argument to the command is the encoding. Some possible values are:

default - resets to system locale

windows-1252 - the default on English language windows systems

shift-jis - Japanese characters

UTF-8 - Input unconditionally assumed to be UTF-8

A complete list of valid values is returned by the function GetCodecNames (page 156). Note that the default encoding only affects behaviour when an input sequence does not comply with UTF-8. Some character encoding schemes (e.g. UTF-16) cannot be easily differentiated from UTF-8 and so are not easily detected. It is usually not appropriate to use this command to set such a default encoding.

SetGraphAnnoProperty

SetGraphAnnoProperty ⟨object-id⟩⟨property-name⟩⟨property-value⟩

Sets a property value for a graph object. Note that this command's name is a little misleading as it can edit the values of the properties of any graph object not just annotation objects. For more information on graph objects and properties see "Graph Objects" on page 569.

Parameters

object-id	Id of object which owns the property to be edited.
property-name	Name of property to be edited.
property-value	New value of property.

SetGroup

SetGroup ⟨group-name⟩

Changes the current group.

Parameters

group-name	Name of new group. An array of current group names is returned by the function Groups (page 233).

See Also

"Groups" on page 233

SetHighlight

SetHighlight /prop ⟨propname⟩[⟨propvalue⟩] | /wire ⟨wirehandle⟩[⟨colourindex⟩] | /net ⟨netname⟩[⟨colour⟩] /all 1 | /all 0 | /clearallopen | 1 | 0

Highlights or unhighlights schematic objects.

At most one parameter switch at may be used.

Parameters

/all	If '1' specified, highlights all objects on selected schematic. Otherwise, unhighlights all objects on selected schematic.
/clearAllOpen	Clears all highlighting on all open schematics.
/net	
/prop	Property name. If specified without propvalue all instances possessing propname will be highlighted. Otherwise only instances possessing propname with propvalue will be highlighted.
/wire	Handle of wire to be highlighted.
1/0	When no switches are given, if set to '1', all selected objects highlighted, otherwise all selected objects unhighlighted.

Notes

Usage is one of the following:

1. SetHighlight /prop *propname* [*propvalue*]
2. SetHighlight /wire *wirehandle*
3. SetHighlight /all 1|0
4. SetHighlight /clearAllOpen
5. SetHighlight 1|0

SetOrigin

SetOrigin ⟨x⟩⟨y⟩

Sets the origin of the current symbol.

Parameters

x, y	The co-ordinates of the origin in units of 100 per grid square. The origin is placed relative to a location defined by the top left of a rectangle that encloses all the pins of the symbol.

Notes

The symbol's origin is a reference point used to define the location of all the elements of the symbol. In the majority of applications the position of the origin is immaterial as long as it does not change once an instance of the symbol has been placed on a schematic. If a new symbol is created from scratch to replace an old one, its origin would have to be maintained and this command would be needed for this. In practice, however, the user would usually modify an existing symbol in which case the origin would be maintained automatically.

See Also

"GetSymbolOrigin" on page 221 "SetSymbolOriginVisibility" on page 537

SetPinPrefix

SetPinPrefix ⟨pin-name⟩⟨prefix-text⟩

Sets the prefix for the selected pin property. This is a symbol editor command.

Parameters

pin-name	The name of the pin to change
prefix-text	The prefix to apply to the pin. Leave blank if no prefix is to be set.

SetPinSuffix

SetPinSuffix ⟨pin-name⟩⟨suffix-text⟩

Sets the suffix for the selected pin property. This is a symbol editor command.

Parameters

pin-name	The name of the pin to change
prefix-text	The suffix to apply to the pin. Leave blank if no suffix is to be set.

SetReadOnly

SetReadOnly ⟨vecname⟩

Sets a vector to be read-only. Once so assigned a vector can not be written to. Note that this is a one-way operation. It is not possible to remove the read-only status of a vector.

This command is intended for use when the program starts (possibly called from the startup script) to assign values as constants which can never be changed or deleted.

SetRef

SetRef ⟨vector-name⟩⟨reference-expression⟩

Attaches *reference-expression* to *vector-name*. Previous reference is detached and deleted if no longer used. See "Expressions" on page 11 for details on references.

See Also

"Expressions" on page 11

SetSnapGrid

SetSnapGrid ⟨snapgrid⟩

Warning: only change the snap grid if there is no alternative. We strongly recommend against changing the snap grid simply to satisfy personal preferences as doing so may introduce compatibility problems, especially if applied to symbols.

Sets the snap grid for the currently selected schematic or symbol editor window. The snap grid is the grid on which wires and symbol pins lie. The default value is 120 but may be changed to 60, 40, 30 or 24. Note that this command will not allow the snap grid to be changed to something that would place existing wires or symbols off grid.

Parameters

snapgrid	Snap grid in sheet units. May be 120 (default), 60, 40, 30 or 24.

SetStyleColour

SetStyleColour

Sets the style with the specified colour. The colour is specified as a hex colour code, in blue-green-red format using `0x00bbggrr`.

Parameters

/colour	The new colour to apply using a blue-gree-red hex code.
/stylename	The name of the style to change the colour for.

SetSymbolFillStyle

SetSymbolFillStyle ⟨style-name⟩

Applies a fill style to a symbol. If symbols have a filled region, the colour of those regions can be specified to be different from the rest of the symbol.

The style name to use should be given as an argument.

Parameters

style-name	The name of the style to apply.

SetSymbolOriginVisibility

SetSymbolOriginVisibility show|hide|toggle

Controls the visibility of the origin marker in the symbol editor.

SetUnits

SetUnits ⟨vector-name⟩⟨units⟩

Changes physical type of *vector-name* to *physical-type*. Physical type may be any of the following:

'unknown'	'?'
'Voltage'	'V'
'Current'	'A'
'Time'	'Secs'
'Frequency'	'Hertz'
'Resistance'	'Ohm'
'Conductance'	'Sie'
'Capacitance'	'F'
'Inductance'	'H'
'Energy'	'J'
'Power'	'W'
'Charge'	'C'
'Flux'	'Vs'
'Volt^2'	'V^2'
'Volt^2/Hz'	'V^2/Hz'
'Volt/rtHz'	'V/rtHz'
'Amp^2'	'A^2'
'Amp^2/Hz'	'A^2/Hz'
'Amp/rtHz'	'A/rtHz'
'' (means dimensionless - see notes)	

The physical type of a vector is the name of the physical quantity it represents e.g. Voltage, Current, Time etc. This is used by graph plotting routines to set appropriate units for axes. To set a vector as dimensionless, use the following syntax:

```
SetUnits vector {''}
```

Shell

Shell [/wait] [/displayStdout] [/displayStderr] [/command] ⟨command-string⟩

Launches an application.

Parameters

/command	Calls system command processor to execute *command-string*. This is necessary to run internal commands such as Copy and Move. The command processor is usually CMD.EXE.
/displayStderr	
/displayStdout	Displays in the message window any standard output from the program.
/noConnectOutPipes	
/wait	If specified, application is launched synchronously. This means that SIMetrix will not continue until the application has closed.
command-string	File system path to executable file. This would usually be a binary executable but may be any file that is defined as executable by the operating system. If a full path is not specified, a search will be made for the file using the rules described in the function Shell (page 353).

Notes

Console mode applications will be launched without the console. To run a console mode application in a manner such that the console is displayed, use the command ShellOld (page 538).

ShellOld

ShellOld [/wait] [/hide] [/icon] [/command] ⟨command-name⟩

Launches an application. This behaves identically to the Shell command implemented on version 4.5 and earlier.

Parameters

/command	Calls system command processor to execute *command-string*. This is necessary to run internal commands such as Copy and Move. The command processor is usually CMD.EXE
/console	
/hide	Start the program with the main window initially hidden.
/icon	Start the program in a minimised state.
/wait	If specified, application is launched synchronously. This means that SIMetrix will not continue until the application has closed.

command-name	File system path to executable file. This would usually be a binary executable but may be any file that is defined as executable by the operating system. If a full path is not specified, a search will be made for the file using the rules described in "Shell" on page 353.

Show

Show [/file ⟨filename⟩] [/append ⟨filename⟩] [/noindex] [/plain] [/noHeader] [/clipboard] [/names ⟨names⟩] [/force] [/width ⟨width⟩] [/lock] [/detail] [/unix] expression [expression ...]

Displays the value of an expression.

Parameters

/append	As `/file` except that file is appended if it already exists.
/clipboard	If specified, the result is copied to the windows clipboard.
/detail	
/file	If specified, outputs result to *filename*. The values are output in a format compatible with OpenGroup (page 498) and the `/text` switch.
/force	File specified by `/file` will be unconditionally overwritten if it exists.
/interactive	
/list	
/lock	If specified with */file*, a lock file will be created while the write operation is being performed. The file will have the extension .lck. This can be used to synchronise data transfers with other applications. The file will be locked for write operations.
/names	Semicolon delimited list of column labels. If specified, each vector column will be labelled by the corresponding name given in *names*. Otherwise, vector name is used as label.
/noHeader	
/noindex	If the vector has no reference, the index value for each element is output if this switch is *not* specified.
/plain	If specified, no index (as `/noindex`), and no header (as `/noHeader`) will be output. In addition, string values will be output less the quotation marks.
/unix	
/width	Page width in columns.
expression	Expression to be displayed. If expression is an array, all values will be displayed.

Notes

To enter multiple expressions, separate each with a comma.

The display of arrays with a very large number of elements (>500) can take a long time. For large arrays it is recommended that the /file or /clipboard switch is used to output the results to a file or the windows clipboard respectively. The data can then be examined with a text editor or spreadsheet program.

The results will be tabulated if all vectors are compatible that is have the same xvalues. If the any vectors listed are not compatible, each vector's data will be listed separately.

The precision of numeric values can be controlled using the "Precision" option setting. Use the command: `Set precision = value`. This sets the precision in terms of the column width.

ShowCurve

ShowCurve ⟨curve-id⟩

Shows specified curve having been hidden using HideCurve (page 478).

See Also

"HideCurve" on page 478

ShowSimulatorWindow

ShowSimulatorWindow

Displays simulator status window if it is currently hidden.

SizeGraph

SizeGraph [/axisid id] ⟨x-offset⟩⟨y-offset⟩⟨x-scale⟩⟨y-scale⟩

General purpose command to zoom or scroll a graph.

Parameters

/axisid	Specify which y-axis to resize. If omitted, all y-axes on selected graph will be affected.
/xfull	If specified, the x-axis is zoomed to fit whole graph. xscale and *x-offset* will be ignored.
/yfull	If specified, the y-axis is zoomed to fit whole graph. yscale and *y-offset* will be ignored.
x-offset	Extent of X-shift as proportion of full width of graph. E.g. 0.25 will shift by a quarter. 0 has no effect.
y-offset	As *x-offset* but for y-axis
x-scale	View width required as proportion to current width. E.g. 0.8 will zoom in by 20%. 1 has no effect. 0 is illegal.
y-scale	As *x-scale* but for y-axis.

TemplateEditProperty

TemplateEditProperty [/hidenew] ⟨ref⟩⟨propname⟩⟨propvalue⟩

Edits the property of a schematic instance.

This command may only be executed in a template script. It records an instruction to edit an instance property but the instruction will not be actioned until the netlist operation has completed. So a subsequent call to TemplateGetPropValue, for example, will return the unedited value of the property.

Please see "Schematic Template Scripts" on page 584 for more information. In other situations use the command Prop (page 510).

Parameters

/hidenew	Hide added property. Does not affect any property already present on the instance
ref	Component reference of instance to be edited. This would usually be the REF value passed to the template script.
propname	Name of property to be changed.
propvalue	New value for property

TemplateSetValue

TemplateSetValue ⟨ref⟩⟨template-value⟩

Sets the value that will be used for the specified device's template during the current netlist operation. Note that this command does not change the value of the TEMPLATE property stored on the instance itself.

This command may only be executed in a template script. Please see "Schematic Template Scripts" on page 584 for more information.

Parameters

ref	Component reference of instance. This would usually be the REF value passed to the template script.
template-value	Template value.

TextEditorCommentLines

TextEditorCommentLines

Comments highlighted lines in the selected text editor. Works for all text based editors and will apply the correct commenting formats for the editor type.

TextEditorFileWatcherIgnoreChanges

TextEditorFileWatcherIgnoreChanges

Disables the file watcher for current text editor. The file watcher detects when the file changes and prompts the user to reload it.

TextEditorFileWatcherWatchChanges

TextEditorFileWatcherWatchChanges

Enables the file watcher for current text editor. The file watcher detects when the file changes and prompts the user to reload it.

TextEditorFind

TextEditorFind

Displays the find pop-up window for the selected text editor.

TextEditorFindNext

TextEditorFindNext

Triggers a find next event on the current text editor. If the find dialog is not currently open, it will display the find dialog. If the dialog is open, it will trigger the find next event on that dialog.

TextEditorGoToLine

TextEditorGoToLine ⟨line number⟩

Moves the cursor to the given line in the selected text editor.

Parameters

line number	The line number to move the cursor to.

TextEditorUncommentLines

TextEditorUncommentLines

Uncomments highlighted lines in the selected text editor. Works for all text based editors.

TextWin

TextWin show|hide|toggle

Hide/Show the schematic's text window (also known as the "F11 Window") for entering simulator controls.

Using `TextWin toggle` will hide the text window if it is currently visible and vice-versa.

Title

Title schem|graph ⟨title⟩

Changes a window's title.

Parameters

schem	Apply to selected schematic window.
graph	Apply to selected graph window.
title	New window title.

Notes

The title is displayed in the window's caption bar and is also placed at the bottom of printed graphs and schematics.

TitleSchem

TitleSchem ⟨title⟩

Sets the title of the current schematic.

Parameters

title	The new title for the schematic.

Trace

Trace signal-name trace-id

The trace command is used to set up a simulation trace while a simulation is running. To set up a trace before a simulation is started, use the .TRACE or .GRAPH simulator controls.

Parameters

signal-name	Net name or pin name for voltage or current to be traced.
trave-id	Integer value used to group traces together on the same graph. All traces with the same *trace-id* will go to the same graph.

Notes

Traces set up with this command only remain in effect until the end of the simulation. A Trace command executed before a simulation starts will have no effect.

UndoGraphZoom

UndoGraphZoom

Restores previous graph view area. Successive execution of this command will retrace the entire history of graph magnification and scroll positions.

UngroupSelected

UngroupSelected [/all]

Ungroups selected schematic elements. If the elements are grouped several times only the most recent grouping is removed, unless the *all* flag is set.

Parameters

/all	If set, all groupings are removed for the selected elements in cases where the elements are grouped several times.

UnHighlightCurves

UnHighlightCurves

Unhighlights all curves.

UnLet

UnLet ⟨vector-name⟩...

Destroy vector.

Parameters

vector-name	Name of vector to be destroyed. Unless the vector is in the *user* group, the vector's full qualified name must be used.

See Also

"Expressions" on page 11 "Let" on page 482

Unprotect

Unprotect

Unprotects and selects protected schematic components.

See Also

"Protect" on page 512

Unselect

Unselect

Unselects all components and wires on selected schematic.

Parameters

/rect

/rectmode

/wires

See Also

"Select" on page 529

UnSet

UnSet name [name ...]

Deletes specified option.

Parameters

/temp	Deletes only temporarily. Will revert to original value once control returns to the command line.

Notes

Some Option values are *internal*. This means that they always have a value. If such an option is UnSet, it will be restored to its default value and not deleted.

See Also

"Set" on page 531

UpdateAllSymbols

UpdateAllSymbols

Checks all symbols in all open schematics and updates them if they are defined with the "All references to symbol automatically updated" flag is set in the library symbol definition.

It isn't usually necessary to call this command. It is automatically called in any situation where changes might result from it.

UpdateAnnotationText

UpdateAnnotationText [/handle ⟨handle⟩] [/text ⟨text⟩]

Updates the text within the selected annotation. Uses the currently highlighted schematic editor.

Parameters

/handle	The handle of the annotation to update.
/text	The new text to apply to the annotation.

UpdateDefaultStyle

UpdateDefaultStyle /lineType [type] /lineColour [colour] /lineThickness [thickness] /fontName [name] /fontSize [size] /fontColour [colour] /italics /bold /overline /underline /propertyStyle

Updates the default global style.

Parameters

/bold	Bold font.
/fontColour	As an AABBGGRR value.
/fontName	Font family name.
/fontSize	A number.
/italics	Italic font.
/lineColour	As an AABBGGRR value, 0x00ff00ff for blue=255, green=0, red=255.
/lineThickness	A number.
/lineType	Options are Solid, Dash, Dot, DashDot, DashDotDot.
/overline	Overline the text.
/underline	Underline the text.

UpdateGlobalStyle

UpdateGlobalStyle ⟨name⟩/lineType [type] /lineColour [colour] /lineThickness [thickness] /fontName [name] /fontSize [size] /fontColour [colour] /italics /bold /overline /underline /propertyStyle

Updates an existing global style. Will only update the options used.

Parameters

/bold	Bold font.
/fontColour	As an AABBGGRR value.
/fontName	Font family name.
/fontSize	A number.
/italics	Italic font.
/lineColour	As an AABBGGRR value, 0x00ff00ff for blue=255, green=0, red=255.
/lineThickness	A number.
/lineType	Options are Solid, Dash, Dot, DashDot, DashDotDot.
/overline	Overline the text.
/propertyStyle	Font should appear in the Property style options drop down box.
/underline	Underline the text.
/updateall	Optional flag that will notify and update all Editors and update the configuration file. Use once after a batch change of style settings.
name	Name of the style to use.

UpdateProperties

UpdateProperties [/all] [⟨property-name⟩[⟨property-value⟩]]

Restores properties on specified schematic instances to symbol defaults.

Command has two modes of operation. If /all is specified then all properties will be restored to the state defined in the symbol. If /all is omitted, properties that exist on the symbol but are missing on the instance will be added. All existing instance properties will be unaffected.

Parameters

/all	Restore all properties to symbol state. If omitted only new properties added. See description for details
property-name	Property name used to identify instances to process. Use selected instances if omitted

property-value Property value used to identify instances to process. If omitted but *property-name* is specified, all instances with *property-name* will be processed.

UpdateRunningDialog

UpdateRunningDialog ⟨status⟩

Updates a process running dialog by one step. Also allows for the status message to be udpated.

See Also

"CreateRunningDialog" on page 453

"DestroyRunningDialog" on page 469

UpdateStyleInfo

UpdateStyleInfo [⟨style-info⟩]

Updates the style information for a schematic.

Input argument is a list of strings, each line defines a style in: *Name*/*LineType*/*LineThickness*/*LineColour*.

Parameters

/fromScriptDefinitions Set this if definitions come straight from a script (fixes problem with "" around font name missing)

/hierarchy

style-info A list of string defining each style per string.

UpdateSymbol

UpdateSymbol ⟨symbol-name⟩

Updates symbols on currently selected schematic from global symbol library.

Schematics store local copies of any symbols that it uses. If the copy of that symbol in the global library is modified, the schematics own copy is unaffected. This command causes the specified symbol to be updated from global library. See "How Symbols are Stored" on page 567.

Parameters

symbol-name Name of the symbol to be updated.

UpdateSystemStyleInfo

UpdateSystemStyleInfo [⟨style-info⟩]

Updates the style information for a schematic at the system level. The results will be stored in the users options file.

Input argument is a list of strings, each line defines a style in: *Name*/*LineType*/*LineThickness*/*LineColour*.

Parameters

style-info	A list of string defining each style per string.

UpdateTitleBlock

UpdateTitleBlock [/company ⟨company name⟩] [/title ⟨title name⟩] [/author ⟨author name⟩] [/loc ⟨x⟩⟨y⟩]

Updates the content of a title block.

Uses the currently selected schematic editor with the selected title block.

Parameters

/author	Updated author name.
/company	Updated company name.
/date	Updated date string, use «auto» for assigning the date automatically when the schematic is saved.
/force	Use this to force selection of a title block. This will cause the first title block it comes across to be used. Use this if its possible no title block will be selected, for example operating on a file that has been opened by a script call.
/layout	Updated layout, either *Horizontal* or *Vertical*.
/logo	Updated logo image filename.
/notes	Updated notes. Use backslash n to mark new lines within the text.
/title	Updated title.
/updategiven	Flag that will force an update of only those elements that are defined in the command call. All other items use the values as they are currently.
/version	Updated version string, use «auto» for assigning the version number automatically when the schematic is saved.

ViewFile

ViewFile ⟨file name⟩

Opens a read only file viewer with specified file name. The file viewer is internal while the file editor called by EditFile is an external program.

WebOpen

WebOpen ⟨URL⟩[/title ⟨title⟩]

Parameters

/restore	Identifies this is part of a restore session call, the argument is the widget name.
/title	Sets the title of the View.
/welcome	Identifies that this is the welcome page.
URL	The URL to open.

Wire

Wire [/start] [/loc ⟨x1⟩⟨y1⟩⟨x2⟩⟨y2⟩] [/mode] [/startloc ⟨x1⟩⟨y1⟩]

Enter schematic wiring mode.

Parameters

/loc	If specified, command in non-interactive and wire is placed at location specified by x1 y1 x2 y2. Co-ordinates are relative and would usually be derived from a call to WirePoints (page 397).
/mode	If specified, the schematic editor is placed in a temporary wiring mode. The next left click will start a wire and wiring may proceed in the usual manner. After pressing the right mouse button, wiring mode will be cancelled.
/start	If specified, a new wire is started.
/startloc	

WireMode

WireMode On|Off

Switches schematic wiring mode on or off.

WM_CloseAllSystemWidgets

WM_CloseAllSystemWidgets

Closes all the System Views from the currently selected window.

WM_CloseNonPrimaryWindows

WM_CloseNonPrimaryWindows

This will close all windows that are not the primary window. If the window does not close, for example due to a user pressing cancel on a file modified save or not box, then this will report an error.

WM_ProgressWindowClose

WM_ProgressWindowClose ⟨identifier⟩

Closes the specified progress window.

See Also

WM_ProgressWindowCreate (page 551)

WM_ProgressWindowCloseAll (page 551)

WM_ProgressWindowReport (page 552)

WM_ProgressWindowCloseAll

WM_ProgressWindowCloseAll

Forces all progress windows to be closed.

WM_ProgressWindowCreate

WM_ProgressWindowCreate ⟨number steps⟩⟨identifier⟩[/title ⟨window title⟩] [/caption ⟨caption message⟩] [/message ⟨progress message⟩]

Creates a progress window, with given number of steps and identifier.

The window contains a progress bar that increments each time WM_ProgressWindowReport (page 552) is called.

Parameters

/caption	The caption of the window. This appears above the progress bar and cannot be changed after the window is created.
/message	The status message of the progress window. This appears below the window and can be changed after the window is created.
/title	The title of the window.
number steps	The number of times WM_ProgressWindowReport (page 552) has to be called to make the progress bar be completely full.

identifier	The identifier that will be used to reference the progress window on update and close calls.

See Also

WM_ProgressWindowClose (page 551)

WM_ProgressWindowCloseAll (page 551)

WM_ProgressWindowReport (page 552)

WM_ProgressWindowReport

WM_ProgressWindowReport ⟨identifier⟩⟨progress message⟩

Increments the progress bar and allows status message to be updated.

Parameters

identifier	The identifier of the progress window to update.
progress message	The new progress message to show in the window.

See Also

WM_ProgressWindowClose (page 551)

WM_ProgressWindowCloseAll (page 551)

WM_ProgressWindowCreate (page 551)

WM_RevertToSaved

WM_RevertToSaved [/id ⟨widget-id⟩]

Reverts a widget back to its last saved state. By default this will be the currently active widget (active window, highlighted widget).

Optional /id <widget-id> flag to select a particular widget.

Parameters

/id

WM_Undock

WM_Undock [/dock ⟨window name⟩] ⟨window-name⟩⟨widget-name⟩

Undocks the specified content widget from the window it is in. Optionally the widget can be docked to another specified window.

Parameters

/dock	Optional flag, provide the name of the window to dock the widget to. If not given, the widget is docked within a new window.
window-name	The name of the window the widget is currently in.
widget-name	The name of the widget to undock.

WriteImportedModels

WriteImportedModels [/include] ⟨netlist⟩⟨filename⟩

Writes all library models required by *netlist* to *filename*.

Parameters

/include

XMLAddAttribute

XMLAddAttribute ⟨attribute-name⟩⟨attribute-value⟩⟨reference⟩

Adds an attribute to the XML at the current location.

Parameters

attribute-name	The attribute name for the element being created.
attribute-value	The attribute value for the element being created.
reference	Reference for the XML document.

XMLAddElement

XMLAddElement ⟨element-name⟩⟨reference⟩

Adds an element to the XML at the current location, then sets the new element as the current focus element.

Parameters

element-name	The tag name for the element being created.

reference Reference for the XML document.

XMLClose

XMLClose ⟨reference⟩

Closes the XML reference.

Parameters

reference Reference for the XML document.

XMLGoUpLevel

XMLGoUpLevel ⟨reference⟩

Moves the current focus element up to its parent.

Parameters

reference Reference for the XML document.

XMLNew

XMLNew ⟨reference⟩

Creates a new XML reference object.

Parameters

reference Reference for the created XML document to be used to refer to it later.

XMLOpenElement

XMLOpenElement /index [idx] /tag [tag-name] ⟨reference⟩

Opens the XML element and sets it as the current focus level.

Parameters

/index Chooses the element based on the index number, as defined by XMLGetElements (page 411).

/tag	Chooses the element based on the tag name. If there are multiple tags with the same name, it opens the first one, unless index is defined, then it uses that index position in the elements of the type requested.
reference	Reference for the XML document.

XMLOpenFile

XMLOpenFile ⟨xml-path⟩⟨reference⟩

Opens an XML document from a file, creating a new XML reference object.

Parameters

xml-path	Path to the XML document to open.
reference	Reference for the created XML document to be used to refer to it later.

Zoom

Zoom rect|rectbutton|full|out|in|⟨new scale⟩

Changes magnification of currently selected schematic.

Parameters

rect	User selects area to be viewed with mouse.
full	Fits schematic to the current window.
out	Magnification is reduced one step.
in	Magnification is increased one step.

Chapter 7

Applications

User Interface

A full description of the user interface is outside the scope of this manual. Instead, in this section, we provide a few pointers on how to go about finding how a particular feature works so that it can be altered or adapted.

User Defined Key and Menu Definitions

Virtually the entire user interface is accessed through menus, keyboard keys or tool bar buttons all of which may be redefined, deleted or replaced. The only parts of the UI which are not accessible are the mouse keys. These have fixed definitions and may not be modified by the user.

In principle it is possible to define completely new menus or/and toolbars which bear no similarity with the built-in definitions. A more normal use of menu, button and key redefinition would probably be to add a special function or perhaps to delete some unused items.

Menus are defined using the command DefMenu (page 462) and keys can be defined with the DefKey (page 460). To define toolbars and buttons, see "Creating and Modifying Toolbars" on page 586. Commands to define new user interface elements such as menus are usually placed in the "Startup Script" on page 26.

Key definitions may be *context sensitive*. That is, the definition is dependent on which type of window is currently active.

Rearranging or Renaming the Standard Menus

The standard menu definitions are loaded from the built in script 'menu' when the program first starts. The source for all built in (or internal) scripts can be found on the install CD the latest version of which may be downloaded from our web site (http://www.simetrix.co.uk). To modify any of the standard menus, you need to modify the 'menu' script. For details on how to modify internal scripts, see "Modifying Internal Scripts" on page 557.

When editing menu.sxscr, please note the following:

- Each menu definition must occupy a single line.
- Menus are created in the order they appear in the script. To change the order, simply rearrange the lines.

- You can disable a menu definition by putting a '*' as the first character of the line. This makes it easy to later undelete it.

Menu Shortcuts

These are keys which activate defined menus. The key name is displayed to the right of the menu text. All menu definitions may have shortcuts specified using the `/shortcut` switch for the DefMenu (page 462) command. A potential problem arises if the same key is used for a shortcut and a key definition using DefKey (page 460). If this happens, the DefKey definition takes precedence.

Editing Schematic Component Values

When you press F7 or select the schematic popup menu Edit Value/Model the internal script 'value' is called. 'value' is a complicated script that identifies the type of component that is selected and performs an action appropriate for it. However the first thing this script does is find out if the component (or components) selected have a *valuescript* property. If it does then that script is called. This feature is used by all types of component developed since release 3 but some older devices are handled differently.

If you wish to modify the behaviour for a particular component type when F7 is pressed, first check to see if it has a *valuescript* property. If it has you can edit the script that it calls or change the property's value to call a different one. If it hasn't you can add such a property and provide a script for it.

There are two other properties associated with component values. These are *incscript* and *decscript*. These increment and decrement a components value when the shift-up and shift-down keys are pressed. Currently only the resistors, capacitor, inductor and potentiometer symbols use this property but you can add your own to any other symbol.

Modifying Internal Scripts

The SIMetrix user interface is implemented with about 550 internal (or built-in) scripts. These are built in to the executable file but can be bypassed so that their function can be changed. The code for all of these scripts can be found on the installation CD in directory script/builtin. The procedure for replacing an internal script is very straightforward. Simply place a script with the same name but with the extension .sxscr in the built-in script directory. The location of this directory is set in the file locations sheet of the options dialog box (menu File|Options|General...). On Windows this is usually *<SIMetrix root>/support/biscript*. SIMetrix always searches this directory first when executing an internal script.

Custom Curve Analysis

The menus Probe|More Probe Functions... and the graph menu Measure|More Functions... each open a tree list dialog box that displays the function available. In this section we describe how this system works and how it can be extended.

We have only skimmed over the basics. For more information, please refer to the scripts themselves.

Adding New Functions

The operations listed for the menus described above are obtained from one of two built-in text files. These files are:

analysis_tree.sxscr	For curve analysis functions
probe_tree.sxscr	For probe functions

Like built in scripts, these are embedded in the binary executable but can also be overridden by placing files of the same name in the biscript directory.

Both files use the same format. Each entry in the tree list is defined by a single line in the file. Each line contains a number of fields separated by semi-colons. The first field is that command that is called to perform the action while the remaining fields describe the hierarchy for the entry in the tree list control. The command is usually a script often with a number of arguments. To add a new function, simply add a new line to the relevant file. The order is not important.

'measure', 'measure_span' Scripts

These are the "driver" scripts that perform the curve analysis and curve analysis over cursor span analysis respectively. These don't perform the actual calculations but carry out a number of housekeeping tasks. The calculations themselves are performed by a script whose name is passed as an argument. To add a new function you need to create one of these scripts. For simple functions the script is not complicated. In the example below we show how the "Mean" function is implemented and you will see that it is very simple.

An Example: The 'Mean' Function

The entry for the full version of this in analysis_tree.txt is:

```
measure_mean;Measure;Transient;Mean;Full
```

This means that the script 'measure_mean' will be called when this function is selected. 'measure_mean' is quite simple, it is just a single line

```
measure /ne 'calculate_mean' 'Mean'
```

`/ne` is not that important, it just tells the script system not to enter the command in the history list.

'calculate_mean' specifies the script to call to perform the calculation.

'Mean' specifies the y-axis label.

The 'calculate_mean' script is as follows:

```
Arguments data xLower xUpper @result @error

if xUpper>xLower then
    Let result = Mean1(data, xLower, xUpper)
else
    Let result = Mean1(data)
endif
```

The argument `data` is the data that is to be processed. In this case we simply need to find its Mean. `xUpper` and `xLower` specify the range over which the mean should be calculated. These would be specified if the "cursor span" version of the mean function was selected by the user. The result of the calculation is assigned to the argument `result` which has been "passed by reference". The error argument is not used here but it can be used to signal an error condition which will abort the operation. This is done by setting it to 1.

Automating Simulations

Overview

The script language allows you to automate simulations, that is automatically run a number of simulation runs with different component values, test conditions or analysis modes. This section describes the various commands needed to do this.

Running the Simulator

Simulations are started using the Run (page 519) command. The Run command runs a netlist not a schematic, so you must first create the netlist using the Netlist (page 489) command. Some notes about the Run command:

1. The /an switch is very useful and allows you to run different analyses on the same circuit without having to modify it. /an specifies the analysis mode instead and overrides any analysis controls (e.g. .TRAN, .DC etc.) in the circuit itself.
2. If the run fails (e.g. due to non-convergence), the script will abort without performing any remaining runs. This behaviour can, however, be inhibited with the /noerr switch which must be placed immediately after the Run word:

   ```
   Run /noerr /file design.net
   ```

   `/noerr` is a general switch that can be applied to any command. See "Command Switches" on page 15 for details. If you want to test whether or a run was successful, use the GetLastError (page 188) function.

Changing Component Values or Test Conditions

It is likely that in an automated run you will want to change component values or stimulus sources between runs. There are a number of ways of doing this, each with its own advantages and disadvantages.

Edit Schematic

With this method, the changes are made to the schematic which is then re-netlisted. To do this you need to become familiar with the commands Prop (page 510), Select (page 529) and Unselect (page 545). The procedure is first unselect everything, then select the component you wish to change and then use the Prop command to change the value. The following will change the value of R5 to 12k:

```
Unselect
Select /prop Ref R5
Prop value 12k
```

The second line says "select the component with a Ref property of R5". The third line says "change the value property of the selected component(s) to 12k".

You use the same basic method to edit a stimulus. The following sets V1 to be a pulse source with 0V start, 5V end, zero delay $10nS$ rise and fall times, $1\mu S$ pulse width and $2.5\mu S$ period.

```
Unselect
Select /prop Ref V1
Prop value "Pulse 0 5 0 10n 10n 1u 2.5u"
```

Note the quotation marks.

You must ensure that you re-netlist the circuit before running the simulation.

Circuit Parameters

Rather than edit the schematic and re-netlist, an alternative is to specify the component values as parameters then vary the parameter using the Let command. To do this, you must first edit the value of the components to be varied so that they are represented as a parameter expression enclosed by curly braces '{' and '}'. Again we will use the example of a resistor R5 whose value we wish to set to 12K. Proceed as follows:

1. Select R5 then press shift-F7. Enter R5 as the new value.
2. Now in the script you can set the value of R5 with Let e.g.

   ```
   Let global:R5=12k
   ```

   The `global:` prefix is necessary to make the parameter global. Note we have named the parameter 'R5'. This is an obvious choice of parameter name but you could use anything as long as it starts with a letter and consists of letters numbers and the underscore character. (You *can* use other characters but we don't recommend it).

   You must use curly braces when defining parameters in this manner. Expressions enclosed in quotation marks will not evaluate if they access global parameters. You can however define another parameter using `.PARAM` which will be accessible in quoted expressions. E.g.

   ```
   .PARAM local_R5={R5}
   ```

   `local_R5` as defined above will be accessible in any type of expression in the netlist.

Expressions in curly braces that consist entirely of global parameters or/and constants and which have no local (.PARAM defined) parameters, may also be used to define simulator control values as well as component values. E.g.

```
.TRAN {stop_time}
```

is permissible as long as `stop_time` is defined using the Let (page 482) command in a script.

An alternative, and somewhat more sophisticated approach is to change the component value to parameter version (e.g. "{R5}") in the script itself. You could then call Netlist (page 489) to create the netlist with parameterised values after which the components can be restored to their original values. That way the schematic is preserved with its original values. To do this correctly you would need to save the original values so that they can be restored. This can be done using the PropValue (page 309) function which returns the value of a property. The example shown below uses this technique.

Mulitple Netlists

Conceptually this is probably the simplest approach but not very flexible. Simply create multiple versions of the netlist manually with different file names then run them one at a time.

Include Files

A method of making complex changes to a netlist is to incorporate part of it in a separate file and include it in the main netlist using the `.INCLUDE` simulator control. A script can then generate the lines in the include file. This can be done using the command Show (page 539) with the switch `/plain` to write a string array to a file. The string array can be created using the function MakeString (page 263) and built using custom code.

Organising Data Output from Automated Runs

A feature is available to organise data from multiple automated runs in the same way as for multi-step runs i.e. in the form of multi-division vectors. This is explained in the section describing the command Run (page 519).

An Advanced Example - Reading Values from a File

In this section we supply an example of quite an advanced script that runs several simulations on a circuit. On each run a number of components are changed to values read in from a file. This script is general purpose and can be used for any circuit without modification. The script is quite complicated but is well commented throughout to explain in detail how it works. The basic sequence is as follows:

1. Get configuration file name from user
2. Read first line of file. This has the names of the components to be modified
3. Temporarily edit the modifiable components' values to reference a parameter
4. Create netlist
5. Restore original values
6. Read the rest of the file and write the values for each run to an array
7. Run the simulations
8. Clean up before exit

Here is the script. It is also supplied on the install CD under the script directory.

```
** Script to run multiple simulations using component values
** read from a file

** First ask the user for a file
Let filename = GetSIMetrixFile('Text', ['open', 'all'])

if Length(filename)=0 then
    ** User cancelled box
    exit script
endif

** Read the file
Let lines = ReadFile(filename)
Let numLines = Length(lines)

** Test it has enough lines
if numLines<2 then
    Echo "Definition file must have at least two lines"
```

```
    exit script
endif


** We now parse the file and read in the component values
** to the array "compValues". We do the whole file at the
** beginning so that the user will know straight away if it
** has any errors.

** The first line is the list of components that will be changed
Let components=Parse(lines[0])
Let numComponents = Length(components)
if numComponents=0 then
    Echo "No component names specified"
    Echo "or first line of config file empty"
    exit script
endif

** Before we read the rest of the file, we will attempt to
** replace the values of all listed components with parameters
** and netlist the circuit. If any of the components don't
** exist then we will find out here.

** array to store original values so that we can restore
** them later
Let origValues = MakeString(numComponents)
Unselect
Let error = 0
** Scan through list of components
for idx = 0 to numComponents-1
    ** Select it
    Select /prop ref {components[idx]}
    if SelectCount()=0 then
        ** Select count is zero so select failed.
        ** This means the circuit doesn't have this component
        ** Output a message and set error flag.
        Echo "Cannot find component " {components[idx]}
        Let error = 1
    else
        if HasProperty('value') then
            ** Save original value to be restored later
            Let origValues[idx] = PropValue('value')

            ** Set value as a parameter of name which is the same
            ** as the ref
            Let newVal = "'{' & PropValue('ref') & '}'"
            Prop value {newVal}
        else
            ** The component does not have a value
            ** property to alter.
            Echo "Component " {components[idx]}
            Echo "does not have a value"
            Let error = 1
        endif
    endif
    Unselect
```

```
next idx

** We have changed all the components so now we can netlist
** the circuit
if NOT error then
    Netlist design.net
endif

** Once we have the netlist we can restore the original values
Unselect
for idx = 0 to numComponents-1
    Select /prop ref {components[idx]}

    if SelectCount()<>0 then
        if HasProperty('value') then
            Prop value {origValues[idx]}
        endif
    endif

    Unselect
next idx

** If we had an error we must now abort
if error then
    exit script
endif

** Now read the rest of the file.
** Create an array large enough to hold all the values.
** The values are actually stored as strings.
** That way we can vary
** model names as well as values.
Let compValues = MakeString(numComponents*(numLines-1))
Let error = 0
Let resIdx=0
for lineIdx=1 to numLines-1

    ** Parse the line into individual values
    Let vals = Parse(lines[lineidx])
    if Length(vals)<>numComponents then
        ** A line found with the wrong number of values.
        ** This is assumed
        ** to be a mistake unless the line is completely empty
        if Length(vals)<>0 then
            Echo "Wrong number of values at line " {lineIdx}
            Let error = 1
        endif
    else
        ** line is OK so write the values to compValues
        for idx=0 to numComponents-1
            Let compValues[resIdx*numComponents+idx]=vals[idx]
        next idx

        ** Because some lines may be empty we have to use
        ** a different index counter for the compValues entries
```

```
        Let resIdx = resIdx+1
    endif
next idx

if error then
    exit script
endif

** resIdx finishes with the number of non-blank data lines
Let numRuns = resIdx

** Now, at last, we can run the circuit
for idx=0 to numRuns-1
    for compIdx=0 to numComponents-1
        Let paramName = 'global:' & components[compIdx]
        Let {paramName}= compValues[idx*numComponents+compIdx]
    next compIdx

    Run /file design.net
    next idx

** This isn't essential, but it is always best to delete
** global variables when we are finished with them
for compIdx=0 to numComponents-1
    Let paramName = 'global:' & components[compIdx]
    UnLet {paramName}
next compIdx
```

Schematic Symbol Script Definition

It is possible to define a schematic symbol using a script. This method is used in some of the internal scripts to create dynamic symbols. For example the transformer devices allow the user to define the number of both primary and secondary windings. The symbols for these are not stored in the symbol library but generated programmatically using the commands described in this section.

Symbol scripts can also be useful to edit symbols using a text editor. Some operations can be more rapidly performed by editing a text definition than by using a graphical editor. To support this method, SIMetrix includes the MakeSymbolScript (page 485) command that writes a script definition of a symbol in ASCII form.

The following sections describe how to define a symbol using a script.

Defining New Symbol

To define a new symbol (as opposed to modifying an existing one) proceed as follows:

1. Enter the text definition as described in "Symbol Definition Format" on page 565 into a text file (using NOTEPAD for example)
2. Load the new definition by simply typing the name of the file at the command line
3. Test that your new symbol is as you expect. Use the menu Place|From Symbol Library to place your symbol on a schematic

Note that as the schematic stores its own copy of each symbol, if you modify the symbol after first defining it, the changes will not be reflected in any existing schematics unless the "track" flag is set. This is done by providing the switch `/flags 1` on the CreateSym (page 454) command line. This performs the same function as the "All references to symbol automatically updated" check box in the symbol editor save symbol dialog box.

To update the symbol on a schematic from the global library use the popup menu Update Symbols.

Symbol Definition Format

The following commands are used to define schematic symbols:

AddArc (page 429)

AddCirc (page 429)

AddPin (page 436)

AddProp (page 438)

AddSeg (page 440)

CreateSym (page 454)

DelSym (page 469)

EndSym (page 474)

To describe the symbol definition format consider the definition for the npn transistor supplied in the standard symbol library. In text form this is:

```
* NPN BJT
CreateSym npn "NPN bipolar" analog
AddSeg 0 0 0 200
AddSeg 0 100 100 0
AddSeg 0 100 100 200
AddSeg 100 200 80 160
AddSeg 100 200 60 180
AddSeg 0 100 -100 100
AddPin C 1 100 0
AddPin B 2 -100 100
AddPin E 3 100 200
AddProp ref Q? 26
AddProp value NPN_MODEL 26
AddProp model Q 64
EndSym
```

Let's go through it line by line. The first line:

```
* NPN BJT
```

is a comment. Any text may placed after a '*' as the first character will be ignored. The next line:

```
CreateSym npn "NPN bipolar" analog
```

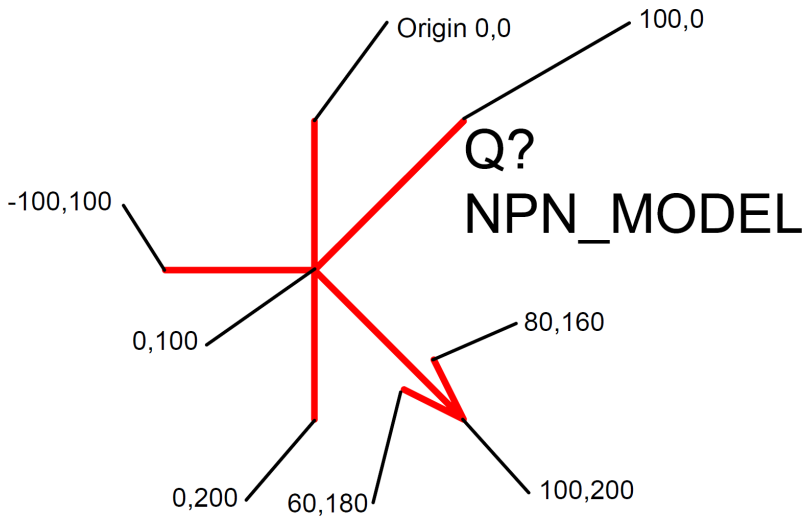
begins the symbol definition. The first argument - npn - is the symbol name. This must be unique and cannot contain spaces. It is used to place the symbol on a schematic. The second argument is the description and is optional. This is what will appear in the *choose symbol* dialog box opened by the schematic popup Place|From Symbol LibraryâĂę menu item. If no description is given the symbol's name will appear in this dialog box. The final parameter is the catalog name. This is

used to categorise symbols. Although the parameter is optional, it is strongly recommend that it is included.

The following six lines:

```
AddSeg 0 0 0 200
AddSeg 0 100 100 0
AddSeg 0 100 100 200
AddSeg 100 200 80 160
AddSeg 100 200 60 180
AddSeg 0 100 -100 100
```

describe the symbol's six straight line segments. The four numbers on each line are the x and y co-ordinates of the start and end of each segment. 100 units represents one grid square (at X1 mag) on the schematic. The diagram shows the co-ordinates of each segment end.



The next three lines:

```
AddPin C 1 100 0
AddPin B 2 -100 100
AddPin E 3 100 200
```

describe the location and attributes of the symbol's three pins. The first parameter on each AddPin command is the pin's name. This must be the same as the pin name used by the simulator for that type of device. If the name is different it will not be possible to cross-probe currents for that type of device. See *User's Manual/Further Information/Summary of Simulator Devices* for details of pin names for devices supported by the simulator. If the device is a subcircuit then any pinname may be used. The second parameter is the pin's number. This affects the order in which the pin's connected nets appear in the netlist. This must comply with the netlist format. Again refer to "Summary of Simulator Devices" for full details of each device. The last two parameters specify the co-ordinates of the pins on the schematic. They *must* be a multiple of 100. If they are not it will not be possible to connect to them as wire ends *always* snap to a grid point. See AddPin (page 436) for more details.

The next three lines:

```
AddProp ref Q? 26
AddProp value NPN_MODEL 26
AddProp model Q 64
```

are the symbol's properties. A symbol's component reference, value (or model name) and the type of device are all specified by properties. The first line above attaches a "ref" property (aka component reference) and gives it an initial value of Q?. The final parameter '26' specifies how it should be displayed on the schematic. The model property in the third line specifies the type of device (e.g. resistor, capacitor, BJT etc.) and is always a single letter. It is not compulsory. If it is omitted the first letter of the ref property is used instead. See "Summary of Simulator Devices" for full list of devices supported by the simulator and their required model properties. Full details on properties are given in the User's manual. For more information, see "AddProp command" on page 438.

The final line:

```
EndSym
```

terminates the model definition. The symbol will not be recognised until this is executed.

How Symbols are Stored

Symbol definitions are first stored in a .sxslb file which resides in the SymbolLibs directory. These files are managed by the symbol library manager. When a symbol is placed on a schematic, a copy of that symbol definition is stored in the schematic and from then on the schematic will use that copy of it. This means that if you change a symbol definition for a schematic that is saved, when you open that schematic, it may still be using the old definition as it is saved with the schematic. Whether or not the symbol is updated automatically depends on how it was saved. If `/flags 1` was included with the CreateSym (page 454) command, then it will be automatically updated.

If you wish to force the schematic to use the new symbol, select the symbol or symbols then select the popup menu Update Symbols. Note that all instances of the symbol will be updated. It is not possible to have two versions of a symbol on the same schematic.

Data Import and Export

This section is also in the User's manual. It is reproduced here for convenience.

SIMetrix provides the capability to export simulation data to a file in text form and also to import data from a file in text form. This makes it possible to process simulation data using another application such as a spreadsheet or custom program.

Importing Data

To import data use the OpenGroup (page 498) command with the `/text` switch. E.g. at the command line type:

```
OpenGroup /text data.txt
```

This will read in the file data.txt and create a new group called text$n$, where n is an index as described in "Data Files Text Format" on page 568 below for details of format.

Note that if you create the file using another program such as a spreadsheet, the above command may fail if the file is still open in the other application. Closing the file in the other application will resolve this.

Exporting Data

To export data, use the Show (page 539) command with the `/file` switch. E.g:

```
Show /file data.txt vout r1_p q1#c
```

will output to data.txt the vectors `vout`, `r1_p`, and `q1#c`. The values will be output in a form compatible with `OpenGroup /text`.

Vector Names

In the above example the vector names are `vout`, `r1_p` and `q1#c`. If you simulate a schematic, the names used for voltage signals are the same as the node names in the netlist which in turn are assigned by the schematic's netlist generator. To find out what these names are, place the mouse cursor on the node of interest on the schematic then press ctrl-S. The node name - and therefore the vector name - will be displayed in the command shell. A similar procedure can be used for currents. Place the mouse cursor on the device pin of interest and press ctrl-P.

Launching Other Applications

Data import and export makes it possible to process simulation data using other applications. SIMetrix has a facility to launch other programs using the Shell command. You could therefore write a script to export data, process it with your own program then read the processed data back in for plotting. To do this you must specify the `/wait` switch for the Shell command to force SIMetrix to wait until the external application has finished. E.g.

```
Shell /wait procdata.exe
```

will launch the program procdata.exe and will not return until procdata.exe has closed.

Data Files Text Format

There are two alternative formats.

The first is simply a series of values separated by whitespace. This will be read in as a single vector with a reference equal to its index.

The second format is as follows:

A text data file may contain any number of *blocks*. Each block has a *header* followed by a list of *datapoints*. The header and each *datapoint* must be on one line. The *header* is of the form:

```
reference_nameydata1_name[ ydata2_name ... ]
```

Each *datapoint* must be of the form:

```
reference_valueydata1_value[ ydata2_value ... ]
```

The number of entries in each *datapoint* must correspond to the number of entries in the *header*.

The *reference* is the x data (e.g. time or frequency).

Example

```
Time       Voltage1    Voltage2

0          14.5396     14.6916
1e-09      14.5397     14.6917
2e-09      14.5398     14.6917
4e-09      14.54       14.6917
8e-09      14.5408     14.6911
1.6e-08    14.5439     14.688
3.2e-08    14.5555     14.6766
6.4e-08    14.5909     14.641
1e-07      14.6404     14.5905
1.064e-07  14.6483     14.5821
```

If the above was read in as a text file (using `OpenGroup /text`), a new group called textn where n is a number would be generated. The group would contain three vectors called: "Time", "Voltage1" and "Voltage2". The vectors "Voltage1" and "Voltage2" would have a reference of "Time". "Time" itself would not have a reference.

To read in complex values, enclose the real and imaginary parts in parentheses and separate with a comma. E.g:

```
Frequency : VOUT
1000       (-5.94260997 ,0.002837811 )
1004.61579 (-5.94260997 ,0.00285091 )
1009.252886 (-5.94260996 ,0.002864069 )
1013.911386 (-5.94260995 ,0.002877289 )
1018.591388 (-5.94260994 ,0.00289057 )
1023.292992 (-5.94260993 ,0.002903912 )
1028.016298 (-5.94260992 ,0.002917316 )
1032.761406 (-5.94260991 ,0.002930782 )
1037.528416 (-5.9426099 ,0.00294431 )
1042.317429 (-5.94260989 ,0.0029579 )
1047.128548 (-5.94260988 ,0.002971553 )
1051.961874 (-5.94260987 ,0.002985269 )
```

Graph Objects

Overview

Graph objects are the items displayed in a graph window. These include curves, axes, cursors and the various objects used for annotation. All graph objects possess a number of named properties all of which may be read and some may also be written. Each graph object also has a unique id which is used to identify it.

A knowledge of the inner workings of graph objects will be useful if you wish to customise some of the annotation features provided by the waveform viewer. However, the interface is at a low level with much work carried out by internal scripts. Consequently there is quite a steep learning curve to climb in order to make good use of the features available.

Object Types

The following table lists all the available object types:

Object Name	Description
Axis	Axes and grids
Crosshair	Crosshair part of cursor
CrosshairDimension	Object used to dimension cursors. Forms part of cursor. Cannot be displayed on its own
Curve	Curve
CurveMarker	Marker used to annotate curves
FreeText	Free Text annotation object. Displays unboxed text on graph
Graph	Graph sheet
LegendBox	Box enclosing LegendText objects
LegendText	Text objects used in legend boxes and linked to a displayed curve.
TextBox	Box enclosing FreeText object

Properties

Properties are the most important aspect of graph objects. Each type of graph object possesses a number of properties which determine characteristics of the object. Some properties are read only and are either never altered or can only be altered indirectly. Other properties can be changed directly using the command SetGraphAnnoProperty (page 533). The labels for curves, axes and the various annotation objects are examples of properties that may be edited.

A full list of all object types and their properties is given in "Objects and Their Properties" on page 571.

Graph Object Identifiers - the "ID"

Each instance of a graph object is uniquely identified by an integer value known as its "ID". Valid IDs always have a value of 1 or greater. IDs are returned by a number of functions (see below) and also a number of the objects possess properties whose value is the ID of a related object.

Once the ID of an object has been obtained, its property names can be read and it property values may be read and/or modified.

The following functions return graph object IDs. Note that all functions return object IDs belonging to the currently selected graph only except for GetGraphObjects (page 178) which can optionally return IDs for objects on a specified graph.

AddGraphCrossHair (page 58)	Add a new cursor to the currently selected graph and return its and its dimension's Ids
GetAllCurves (page 150)	Returns the IDs for all curves
GetAllYAxes (page 151)	Returns the IDs for all Y-axes
GetAxisCurves (page 153)	Returns IDs for all curves attached to specified y-axis
GetCurrentGraph (page 161)	Returns the ID for the currently selected graph sheet
GetCursorCurve (page 162)	Returns information about curve attached to the main cursor including its ID
GetCurveAxis (page 162)	Returns ID of y-axis associated with a curve.

GetDatumCurve (page 164)	Returns information about curve attached to the reference cursor including its ID
GetGraphObjects (page 178)	Returns all objects on a graph, or objects of a specified type
GetSelectedCurves (page 207)	Returns IDs of all selected curves
GetSelectedGraphAnno (page 207)	Returns ID of the selected annotation object
GetSelectedYAxis (page 208)	Returns the ID of the selected Y-axis
GetXAxis (page 231)	Returns the ID of the X-axis

Some of the functions in the above list are technically redundant. For example the value obtained by GetCurveAxis (page 162)() can also be obtained by reading the value of the 'Y-axis' property of the curve. This can be done with the general purpose GetGraphObjPropValue (page 179) function.

Symbolic Values

Some properties used for labels may be given symbolic values. Symbolic values consist of a property name enclosed with the '%' character. When the label is actually displayed the property name is replaced with its value.

Symbolic values may also be indirect. Some properties return the id of some other associated object and the value of a property for that object may be referenced with a symbolic value. The ':' character is used to denote indirect symbolic values. For example, this method is used with curve markers. The default value for a curve marker's label is:

```
%curve:label%
```

`curve` is a property of a curve marker that returns the id of the curve that it points to. `label` is a property of a curve that returns the label assigned to it. So `curve:label` returns the label of the curve that the curve marker points to.

Other curve properties can be used for this label. For example, curve measurements (as displayed below the legend in the legend panel) can also be accessed via property named "measurements". So the curve marker label:

```
%curve:label% %curve:measurements%
```

would display the curve's name followed by its measurements.

Finally the character sequence `<n>` can be used to denote a new line.

Objects and Their Properties

The following lists all the properties available for all objects. Note that all objects have a 'Type' property that resolves to the object's type name. Also all objects except Graph have a 'Graph' property that returns the ID of the object's parent graph sheet.

Axis

Axis objects represent both x and y graph axes.

Name	Description	Read Only?
Type	Type of object - always 'Axis'	Yes
Graph	ID of parent graph	Yes
AxisType	'X', 'Y' or 'Dig'	Yes
Label	Label used to annotate axis. (Actual displayed text is ⟨label⟩/ ⟨unit⟩). Default = %DefaultLabel%	No
Name	Axis name. ('Y1', 'Y2' etc.). Empty for X and Dig axes	Yes
Unit	Physical units of axis. (E.g. 'V', 'A' etc.). Default = %DefaultUnit%	No
Min	Minimum limit of axis	No
Max	Maximum limit of axis	No
AutoLimit	'On' or 'Off' determines whether axis limits are adjusted automatically according to attached curves	No
Grad	Grading of axis: "Log" or "Lin".	No
Delta	Value that determines the minor grid line spacing	No
VertOrder	Vertical order. Arbitrary string used to specify vertical display order	No
DefaultLabel	Label property is given default value of %DefaultLabel% which resolves to the value of this property.	Yes
DefaultUnit	Unit property is given default value of %DefaultUnit% which resolves to the value of this property.	Yes

Crosshair

Object used to display cursor. Each graph cursor consists of a Crosshair and two CrosshairDimensions.

Name	Description	Read Only?
COM1	Common reference value. Only meaningful with X-Y plots such as Nyquist plots. Shows the value of the common reference to X and Y. This is frequency in a Nyquist plot	Yes
Dimensions	Comma delimited string providing the dimension objects attached to this cursor	Yes
Graph	ID of parent graph	Yes
ID	ID of this object	Yes
Point	1 = Main cursor. 2 = Reference cursor	Yes
Type	Type of object - always 'Crosshair'	Yes
XDimension	The ID for the CrosshairDimension object that displays the X dimension and positions	Yes
YDimension	The ID for the CrosshairDimension object that displays the Y dimension and positions	Yes
Curve	ID of attached curve	No
Division	Division index of attached curve. See page for details on multi-division vectors	No

Name	Description	Read Only?
Frozen	'On' or 'Off'. If 'On' the user will not be able to move the cursor with the mouse	No
Hidden	Cursor is hidden	No
Label	Cursor label displayed at base	No
LineStyle	Style of line used for crosshair. Comma delimited string of numbers representing mark-space values. E.g. '1,1' defines short evenly spaced dots, '3,1,1,1' defines a dotdash style	No
OldStepMethod	'On' or 'Off'. Selects method of choosing the position of the cursor when stepped to a new curve using the TAB key.	No
Style	Style of crosshair. Possible values: 'Crosshair' or 'Cursor'. 'Crosshair' means the object is displayed as a crosshair with a width and height that extends to cover the whole grid. 'Cursor' means that the object is a small bitmap representing a cross.	No
X1	X data value of crosshair position	No
Y1	Y data value of crosshair position. The value can be written but this can only affects nonmonotonic curves where there are multiple y crossings at a given x value.	No

CrosshairDimension

Object used to display the dimensions and positions of cursors. There are two types, namely horizontal and vertical.

Name	Description	Read Only?
Curve1	ID of curve attached to crosshair 1	Yes
Curve2	ID of curve attached to crosshair 2	Yes
Graph	ID of parent graph	Yes
ID	ID of this object	Yes
Type	Type of object - always 'CrosshairDimension'	Yes
Vertical	0 = Horizontal dimension, 1 = Vertical dimension	Yes
XDiff	= X2-X1	Yes
YDiff	= Y2-Y1	Yes
Crosshair1	ID of crosshair 1	No
Crosshair2	ID of crosshair 2	No
Extent	Value used to define space occupied by dimension as a proportion of font size. For horizontal dimensions this is the vertical space as a proportion of font height and for vertical dimensions this is horizontal space as a proprtion of average font width	No
Font	Font used to display labels. Can either be the name of a font object or a font spec as returned by GetFontSpec (page 177).	No
Hidden	Dimension is hidden	No

Name	Description		Read Only?
Label1	Label positioned to depict value of first crosshair. Default = %x1% for horizontal types, %y1% for vertical.		No
Label2	Label positioned to depict value of second crosshair. Default = %x2% for horizontal types, %y2% for vertical.		No
Label3	Label positioned to depict the separation between crosshairs. Default = %XDiff% for horizontal types, %YDiff% for vertical.		No
Position	Value defines display order of dimension. For vertical dimensions this defines the order left to right and for horizontal dimensions this defines the order bottom to top		No
Style	Controls display of dimension labels. Possible values:		No
	Internal	Show difference only (label3) - internal position	
	External	Show difference only (label3) - external position	
	Auto	Show difference only (label3), position chosen automatically	
	P2P1	Show absolute labels (label1 and label2)	
	P2P1Auto	Show all labels. Difference position chosen automatically	
	None	No controls selected	
VerticalText	If set to 1, text is displayed vertically		No
X1	For horizontal types, holds the value of the x data position of the first crosshair and is readonly. For vertical types holds the x view coordinate location of the object on the screen and is writeable		No
Y1	For vertical types, holds the value of the y data position of the first crosshair and is readonly. For horizontal types holds the x view coordinate location of the object on the screen and is writeable		No
X2	For horizontal types, holds the value of the x data position of the second crosshair and is readonly. For vertical types holds the view coordinate location of the object on the screen and is writeable		No
Y2	For vertical types, holds the value of the y data position of the second crosshair and is readonly. For horizontal types holds the x view co-ordinate location of the object on the screen and is writeable		No

Curve

Curve objects represent all graph curves.

Name	Description	Read Only?
Analysis	Analysis type used to create curve's data	Yes

Name	Description	Read Only?
DefaultLabel	This is composed from Name, Suffix and GroupName to form a text string that is the default label for the curve	Yes
DisplayType	May be: 'analog' curve is regular analog trace 'decimal' bus display showing decimal values 'hex' bus display showing hexadecimal values 'binary' bus display showing binary values	Yes
Division	Division index if plotting a multi-division vector. See "Multi-division Vectors" on page 19.	Yes
Expression	Expression that created this curve	Yes
Graph	ID of parent graph	Yes
GroupName	The data group that was current when the curve was created	Yes
ID	ID of this object	Yes
Limits	The X an Y limits of the curve in the form `[xmin, xmax, ymin, ymax]`	Yes
Measurements	Measurements added to a curve	Yes
NumDivisions	Number of divisions in curves data. I.e. the number of separate traces in a group of curves. Groups of curves are usually produced by Monte Carlo analyses	Yes
ProbeId	Name used to uniquely identify fixed probe (i.e. .GRAPH statement) that created this curve. Used to maintain persistence. Empty for randomly plotted curves.	Yes
ShortLabel	A label composed from Name and Suffix but without group name	Yes
Type	Type of object - always 'Curve'	Yes
XAxis	ID of x-axis attached to curve	Yes
XExpression	Expression that defines X-values	Yes
XUnit	Physical type of curve's x-data	Yes
YAxis	ID of y-axis attached to curve	Yes
YUnit	Physical type of curve's y-data	Yes
Frozen	If 'true' curve will not be purged. That is it will not be removed to satisfy the persistence setting for a fixed probe	No
Label	The curve's label. This is the text that appears in the legend panel. This can use a symbolic constant and in fact defaults to %DefaultLabel%. Note that when reading back a symbolic value assigned to this property, the resolved value will be returned	No
Name	The curve's base name. This is the value passed to the `/name` switch of the Curve/Plot command or the name of the vector plotted if no `/name` switch is supplied.	No
RGBColour	Colour of curve. Can be entered as value returned from GetColourSpec (page 156) or using format #rrggbb where rr, gg and bb are two digit hex values representing the red, green and blue colour content respectively	No

Name	Description	Read Only?
Sequence	Integer value that is used to define default colour. The actual colour used may be set globally using options dialog box	No
ShowPoints	If 'true' data point markers will be displayed	No
Suffix	This is assigned when the result of a multistep analysis is plotted to give information about the step. E.g. if you stepped a resistor value the suffix would hold the name and value of the resistor at the step.	No
Visible	If 'false', curve will be hidden, but its legend display will remain	No

CurveMarker

An object used to title a curve or mark a feature.

Name	Description	Read Only?
Division	Division index of attached curve	Yes
Graph	ID of parent graph	Yes
ID	ID of this object	Yes
Type	Type of object - always 'CurveMarker'	Yes
Curve	ID of attached curve	No
Font	Font for label	No
Hidden	Not implemented	No
Label	Label of curve marker. May be a symbolic value. Default is %curve:label% which returns the label of the attached curve	No
LabelJustification	Text Alignment. May be one of these values: -1 Automatic 0 Left-Bottom 1 Centre-Bottom 2 Right-Bottom 12 Left-Middle 13 Centre-Middle 14 Right-Middle 8 Left-Top 9 Centre-Top 10 Right-Top	No
SnapToCurve	'On' or 'Off'. If 'On' marker tracks attached curve i.e its y position is determined by the y value of the curve at the marker's x position. If 'Off' marker may be freely located.	No
X1	X-data value at arrowhead	No

Name	Description	Read Only?
Y1	Y-data value at arrowhead	No
X2	X position of label in view units relative to arrowhead	No
Y2	Y position of label in view units relative to arrowhead	No

FreeText

Free text objects are items of text with no border or background that are not attached to any other object.

Name	Description	Read Only?
Date	Date that the object was created. If the object is on a graph that has been saved to a file then subsequently restored, the date will be the date that the object was originally created.	Yes
Graph	ID of parent graph	Yes
ID	ID of this object	Yes
Parent	ID of parent object. If text is placed freely on the graph, this will be the same as the Graph property. FreeText objects. however are also used in TextBoxes in which case this returns the id for the TextBox	Yes
Time	Time that the object was created. If the object is on a graph that has been saved to a file then subsequently restored, the time will be the time that the object was originally created.	Yes
Type	Type of object - always 'FreeText'	Yes
Version	Product name and version	Yes
Font	Font for label	No
Hidden	Not implemented	No
Label	Text displayed. Symbolic values may be used. E.g. %Time% will display the time the object was created.	No
LabelJustification	As CurveMarker (see above) except -1 (automatic) not allowed	No
X1	X location of object in view units	No
Y1	Y location of object in view units	No

Graph

Name	Description	Read Only?
FirstCurve	ID of the oldest curve on the graph	Yes
GroupTitle	Title of the data group that was current when the graph was created	Yes

Name	Description	Read Only?
ID	ID of this object	Yes
MainCursor	ID of Crosshair object comprising the main cursor. Value = -1 if cursors are not enabled.	Yes
RefCursor	ID of Crosshair object comprising the reference cursor. Value = -1 if cursors are not enabled.	Yes
SourceGroup	The data group that was current when the graph was created	Yes
Type	Type of object - always 'Graph'	Yes
CursorStatusDisplay	Sets method of displaying cursor positions and dimensions. Possible values: Graph — Display on graph using CrosshairDimension — object StatusBar — Display on status bar Both — Display on graph and status bar	No
Path	Path of file to save to. This is the file that will be used by the "File|Save" menu. When saving a graph, this property will be set to the full path name of the file.	No
TabTitle	The text in the title of the tabbed sheet. This can be symbolic. Default is %SourceGroup% %FirstCurve:Label%	No
TitleBar	Text to be displayed in the graph window title bar when the graph's sheet is in view. This may be symbolic. Default is %SourceGroup% (%GroupTitle%)	No

LegendBox

The LegendBox is used to display labels for every curve on the graph sheet. It consists of a box that is loaded with LegendText objects - one for each curve on the graph. The LegendText objects are automatically loaded when a curve is added to the graph and automatically deleted when a curve is deleted. LegendBox is very similar to the text box and shares the same properties with the following differences and additions:

1. Type property has the value 'LegendBox'
2. LegendBox has two additional properties as shown below

Name	Description	Read Only?
Labels	Semicolon delimited string defining text entries in the box. Each entry is usually %DefaultLabel% which resolves to the value of the DefaultLabel property of the LegendText object. Other symbolic values for LegendText properties may also be used	No
LegendLabel	Text of label that is loaded into box when a curve is added to the graph. This can be symbolic in which case it references properties of the LegendText object that displays the text. The default value is %DefaultLabel%	No

LegendText

LegendText objects are used to load legend boxes and cannot be instantiated independently. They are similar to FreeText objects and share the same properties with the following differences and additions:

1. Type property has the value 'LegendText'
2. The Label property is set to the value of the legend box's LegendLabel property when it is added to the box.
3. LegendBox has two additional properties as shown below

Name	Description	Read Only?
Curve	ID of attached curve	Yes
DefaultLabel	The default value for the label. Actually equivalent to %Curve:Label%⟨n⟩%Curve:Measurements%. (⟨n⟩denotes a new line).	Yes

TextBox

A TextBox consists of a border with a definable background colour into which a FreeText object may be added. TextBox is also the basis of the LegendBox object.

Name	Description	Read Only?
Graph	ID of parent graph	Yes
ID	ID of this object	Yes
Type	Type of object - always 'TextBox'	Yes
AutoWidth	'On or 'Off'. If 'On' the width of the box is automatically adjusted according to its contents subject to MaxHeight	No
Colour	Background colour. Either the name of a colour object or a colour specification.	No
Font	Font used for text objects added to the box. In practice this only affects the LegendBox object which is based on TextBox.	No
FontColour	Colour used for text. Either the name of a colour object or a colour specification	
Hidden	Not implemented	No
Label	Text displayed in box	No
MaxHeight	Maximum physical height in mm of box. This is only used when AutoWidth='On'	No
X1	X location of object in view units	No
Y1	Y location of object in view units	No
X2	Physical width of box in mm. (Ignored if AotoWidth='On')	No
Y2	Physical height of box in mm	No

Graph Co-ordinate Systems

Three different units of measure are used to define the location and dimensions of an object on a graph sheet. These are 'View units', 'Physical units' and 'Data units'. These are explained as follows:

'Physical Units' relate to the physical size of the displayed object and have units of millimetres. Physical units are only used for dimensions of some annotation objects and are not used for location. When objects are displayed on a screen an assumption is made for the number of pixels per inch. This depends on the display driver but is typically in the range 75 - 100.

'Data Units' relate to the units of the X and Y axes. Typically an object such as curve marker is located using data units so that it always points to the same point on a curve regardless of how the graph is zoomed or scrolled.

'View Units' relate to the current viewable area of the graph. View units use a coordinate system whereby the bottom left of the grid area is co-ordinate (0,0) and the top right corner of the grid is co-ordinate (1,1). View units are used to define the location of objects that need to be at a fixed location on the graph irrespective of zoom magnification.

Event Scripts

There are three special scripts that are automatically called by the SIMetrix system in response to user events. These scripts are detailed in the following table:

on_graph_anno_doubleclick	Called when the user double clicks on certain graph objects
on_accept_file_drop	Called when a file of directory is dropped on a SIMetrix window.
on_schem_double_click	Called when the left mouse button is double clicked in the schematic window.

All three scripts are defined internally but can be customised if desired. (See "Modifying Internal Scripts" on page 557). Details on these event scripts follow.

on_graph_anno_doubleclick

The script is called when some graph objects are double clicked.

The script is passed two arguments when it is called. The first is the object's ID and the second is specific to the object that is double clicked. Currently the second argument is only used by curves and is set to its division index.

on_accept_file_drop

This is called when an a file, folder or group or files and/or folders is dropped on the command shell or a schematic or graph window.

Two arguments are passed. The first identifies the window type. This may be one of:

Schematic	Schematic window
Graph	Graph window

The second argument contains a list of full path names of the objects dropped. The items are separated by semi-colons.

on_schem_double_click

Script is called when the left mouse button is double clicked in the schematic window. Two arguments are supplied providing the x and y coordinates of the mouse at the time the double click event occurred.

IMPORTANT: This script is only called if the schematic double click mode is set to 'Edit Selected Component'. See options dialog box (menu File|Options|General...). In 'Classic' mode it is not called at all.

User Defined Script Based Functions

Overview

The SIMetrix script language provides a method of creating user defined functions that can be used in any front end expression. These expressions may be used in scripts, on the command line and even within a schematic template property.

User defined functions are used to define some of the goal functions designed for performance and histogram analysis. The scripts for these all begin "uf_" and are registered using the script "reg_user_funcs". The source for these can be found on the installation CD.

Defining the Function

User defined functions are defined as a script. The arguments to the function and the return value from the function are passed as the script's arguments. The script's first argument is passed by reference and is the return value while the remaining arguments are the arguments passed in the call to the function. The function may have up to seven arguments and they may be of any type. See example below.

Registering the Script

For the expression evaluator to recognise the function name, the script and function name must be registered. This is done with the RegisterUserFunction (page 515) command. The definition of this is:

```
RegisterUserFunction Function-Name Script-Name [min-num-args] [max-num-args]
```

For details see "RegisterUserFunction" on page 515.

Note that function registration is not persistent. That is the registration only lasts for the current session. If you wish to make a permanent function definition, place the RegisterUserFunction command in the startup script.

Example

Here is a trivial example. The following shows the steps to create a function that multiplies a number by 2. First the script

```
Arguments @rv arg1
Let rv = 2*arg1
```

Save this to a file called - say - times_two.sxscr and place it in the script directory. Now, register the script as a function called "Times2". To do this, execute the command:

```
RegisterUserFunction Times2 times_two 1 1
```

The definition is now complete. To test it type at the command line:

```
Show Times2(2)
```

You should see the result:

```
Times2(2) = 4
```

User Defined Binary Functions

Overview

From version 5, it is possible to develop script functions written in 'C' or 'C++' and compile them into a DLL/shared library to be loaded into SIMetrix as a plugin.

This makes it possible to perform complex processing on data that would run too slowly using the interpreted script language.

Documentation

Documentation and associated header and example files are provided on the install CD. See the directory CD/Script/user-function-interface.

Non-interactive and Customised Printing

Overview

The SIMetrix script language provides a number of functions and commands that allow *non-interactive printing*. That is printing without user intervention. This is useful for - say - running multiple simulations in the background and automatically printing the results when the simulation is complete. The same printing facilities may also be used to customise the layout of printed schematics and graphs. The user interface provides a method of printing a single graph and schematic on the same sheet, but other arrangements are possible using the underlying printing commands.

The available printing commands are:

"ClosePrinter" on page 447

"NewPrinterPage" on page 493

"OpenPrinter" on page 500

"PrintGraph" on page 508

"PrintSchematic" on page 509

The functions are:

"GenPrintDialog" on page 148 (for interactive printing)

"GetPrinterInfo" on page 203

Each of these commands and functions is described in detail in its relevant section. Here we give a general overview for the printing procedure.

Procedure

The sequence for a print job is:

1. Open printer. At this stage the printer to be used, page orientation, title and number of copies may be selected.
2. Print pages. The actual graphs/schematics to be printed along with scaling and margins are specified here. Any number of pages can be printed.
3. Close printer. This actually starts the physical printing. It is also possible to abort the print job.

Example

Suppose we wish to create a PDF file using 'Acrobat Distiller' for the current graph. Of course you can readily do this by selecting File|Print... and making the appropriate selections using the dialog box. This is no good, however, if you want to create a PDF file for a graph created using an automated simulation, perhaps run overnight. The following script will do this without user intervention.

```
** Get info on system printers
Let printInfo = GetPrinterInfo()

** Search for acrobat distiller. The printer list from GetPrinterInfo
** starts at index 2 so we subtract 2 to get the index
** needed by OpenPrinter
Let distillerIndex = Search(printInfo, 'Acrobat Distiller')-2

** If Acrobat distiller is not on the system
** Search will return -1
if distillerIndex<0 then
    Echo "Acrobat Distiller is not installed"
    exit script
endif

** Open Printer using distiller.
** Orientation will be landscape which is the default
** Number of copies = 1.
** The title will be used by distiller to compose the file name
** for the PDF file i.e. Graph1.PDF
OpenPrinter /title Graph1 /index {distillerIndex}
```

```
** Now print the graph
** Major axis on minor axis off. All margins 20mm.
PrintGraph /major on /minor off /margin 20 20 20 20 /caption
  "Test Print"

** Close Printer. This will actually start the print
ClosePrinter
```

You can of course replace 'Acrobat Distiller' with any printer that is on your system. You must use the printer's name as listed in the Printers section of the system control panel. You can also find a list of system printers from within SIMetrix by typing at the command line:

```
Show GetPrinterInfo()
```

The first two values are numbers but the remaining are the currently installed printers on your system.

If you omit /index switch for the OpenPrinter (page 500) command, the application default printer (not the *system* default printer) will be used. The application default printer is the same as the system default printer when SIMetrix starts but will change whenever the user selects a different printer using the SIMetrix File|Print... dialog box.

Schematic Template Scripts

Overview

Schematic template scripts are a method of performing advanced netlist processing. The TEMPLATE property can be used to customise the netlist entry for a device and it has a number of features that allow quite complex devices to be created. However, the template syntax is not as powerful as a full featured programming language and this makes more complex devices very difficult to implement.

To overcome this the template script feature was developed. With this method a script is called during the netlist generation phase for every instance that possesses a TEMPLATESCRIPT property. A script can then generate the netlist entry for that instance. With this method there is no limit to the complexity of generated devices.

Defining a Symbol for a Template Script

To use the template script feature, the schematic symbol must specify the script to be called. This is done quite simply by adding a property with the name TEMPLATESCRIPT and giving it a value that defines the path of the script. If a full path isn't given (and we recommend that you don't use a full path), SIMetrix will search the directory where the netlist resides followed by the SCRIPT directory for the specified file. If the file is not found, no error message will be output and the device netlist line will be created as if no template script was defined.

To use the template script feature, the schematic symbol must specify the script to be called. This is done quite simply by adding a property with the name TEMPLATESCRIPT and giving it a value that defines the path of the script. If a full path isnâĂŹt given (and we recommend that you donâĂŹt use a full path), SIMetrix will search the directory where the netlist resides followed by the SCRIPT directory for the specified file. If the file is not found, no error message will be output and the device netlist line will be created as if no template script was defined.

When is the Template Script Called?

The template script is called for each instance just before its netlist entry is generated. The REF property of the instance is passed to the script as an argument along with the name of the property used for the template. The script controls the netlist output by calling the TemplateSetValue (page 541) command.

The Template Script

The script is passed two string arguments. These are:

1. The value of the REF property of the instance being processed.
2. The name of the template property being used for that instance. This is usually 'TEMPLATE' but for SIMPLIS netlists it is usually 'SIMPLIS_TEMPLATE'. There is also a netlist option to change the name of the template property.

There are two functions and two commands that are designed specifically for template scripts and indeed they cannot be used anywhere else. The commands and functions are listed below.

The most important command is TemplateSetValue (page 541). This is what you must use to define the netlist entry. The value supplied to this command defines the template that will be used to create the netlist entry. It can of course provide a completely literal netlist line, but more usually some template keywords would be used.

Template Commands and Functions

This a brief summary. See the entries in the reference pages for more details.

TemplateResolve(ref, template)

Performs the same process that is usually done on a template property except that is uses the template that you supply as an argument not the device's template. *ref* is the REF property of device being processed.

TemplateGetPropValue(ref, prop)

Returns the value of the property *prop*. You should use this function not PropValues (page 309) to get at property values. It is faster than PropValues() but won't work in regular scripts.

TemplateEditProperty ref propname propvalue

Edits a property's value. Like TemplateGetPropValue it is much faster than the regular commands but only works in a template script. Note that this command records an instruction to edit a property's value but the instruction will not be actioned until the netlist operation has completed.

TemplateSetValue ref templatevalue

Changes the value of the template used to create the netlist line currently being compiled. Does *not* change the template property itself.

Creating and Modifying Toolbars

From version 5, SIMetrix allows the complete customisation of toolbars. You can modify the definitions of existing toolbars and buttons, as well as create new toolbars and new tool buttons. This section explains how.

Modifying Existing Toolbars and Buttons

You can rearrange the button layout of existing toolbars by modifying the 'Set' option variables that define them. In the case of the schematic component buttons, this can be done via a simple GUI. See menu View|Configure Toolbar... .

For other toolbars use the command Set (page 531) to reassign the buttons. The following table shows the name of the 'Set' variable to use for each one.

'Set' Variable Name	Toolbar
ComponentButtons	SchematicComponents (non 'Micron' versions)
MicronComponentButtons	SchematicComponents ('Micron'versions)
CommandShellMainButtons	CommandShellMain
CommandShellMainNoSchemButtons	CommandShellMain (if schematic disabled - OEM versions only)
SIMPLISComponentButtons	SIMPLISComponents
SchematicMainButtons	SchematicMain
SchematicFileButtons	SchematicFile
GraphMainButtons	GraphMain

The 'Set' variable should be set to a value consisting of a semi-colon delimited list of valid button names. For a list of pre-defined buttons, see "Pre-defined Buttons" on page 588.

For example, the following will add a 'New Schematic' button to the schematic file tool bar:

```
Set SchematicFileButtons="SchemNew;SchemOpen;SchemClose;SchemSave"
```

You can also use 'Unset' to restore a toolbar to its default setting. E.g.

```
Unset SchematicFileButtons
```

will restore the schematic file toolbar to just three buttons without the new schematic button.

To determine the current definition, use the GetOption (page 201) function with the 'Set' variable name as described in the table above. For example:

```
Show GetOption('SchematicFileButtons')
```

will display in the message window the current definition for the SchematicFile tool bar.

Redefining Button Commands

You can change the command executed when a button is pressed using the command DefButton (page 458). This is useful if you want to change the symbol placed for one of the component buttons. For example if you wanted to change one of the NMOS buttons, you could do something like:

```
DefButton NMOS4 "inst /ne my_nmos"
```

redefines the four-terminal NMOS button to place a symbol with name my_nmos.

You can redefine any of the pre-defined buttons. See"Pre-defined Buttons" on page 588 for a complete list.

Defining New Buttons and Editing Buttons

You can define completely new buttons with your own graphic design and add them to an existing toolbar. The same method can also be used to redefine the graphics for existing buttons.

This is done using the command CreateToolButton (page 455). These are the steps to take:

1. Create a graphical image for the button. This should be in a windows bitmap (.bmp), portable network graphic (.png) or JPEG (.jpg) format. You can use almost any paint application to do this. But, if you want to define a mask - that is you wish to define transparent areas - then you must use an editor capable of creating 'portable network graphics' (PNG) images. However, this is rarely necessary in practice and none of the built in graphics define a mask. This is because SIMetrix will automatically create one that makes the area outside the perimeter of the image transparent. The result is usually satisfactory.

   You can make your graphic any size, but to be compatible with the built-in images, you should make them 16x16 pixels. The built-in graphics are all 16 colour, but you can use any colour depth supported by your system.

   When you have created your image, you should save or copy it to the images directory. This is located at `simetrix-root/support/images`, where `simetrix-root` is the top level directory in the SIMetrix tree.

2. Execute the command CreateToolButton (page 455). As with menu and key definitions, the definitions created by this command are not *persistent* that is they will be lost when SIMetrix exits. To make permanent definitions, you should place the commands in the start up script. See "Startup Script" on page 26 for more details.

   CreateToolButton will not add the button to any toolbar nor does it assign a command to be executed when it is pressed. These operations are described in the following steps.

3. Define a command to be executed when this button is pressed. This is done using the command DefButton (page 458). Again, this should be place in your startup script.

4. Add the button to a toolbar. See "Modifying Existing Toolbars and Buttons" on page 586 to find out how to add this to an existing toolbar. If you wish to create a new toolbar for the new button, see "Creating New Toolbars" on page 588.

For example, suppose you created a symbol for a diffused resistor and wanted to assign this to a toolbar button that is distinct from the regular resistor button. These are the steps:

1. First you would create a graphical image called, for example, diffres.png. Copy this to the images directory as described above.

2. Execute (or place in startup script):

   ```
   CreateToolButton /class component diffres diffres.png
      "Place Diffused Resistor"
   ```

   (This must all be on one line)

   This will create a button called 'diffres' that we will refer to in the following steps. The switch `/class component` identifies the button as one that places a component and so will be listed in the GUI based system to edit component toolbars. (See schematic menu View|Configure Toolbar...) . This will make adding the button to a component toolbar a simple operation.

3. Execute (or place in startup script):

```
DefButton diffres "inst /ne diffressym"
```

   where diffressym is the name of the schematic symbol created for the diffused resistor.

4. To add to the button to a component toolbar, simply select schematic menu View|Configure Toolbar... You should see 'Place Diffused Resistor' on the left hand side. Select and press *Add* to add to the toolbar, then use the up down buttons to choose a suitable position.

Its a little harder to edit non-component toolbars as there is currently no GUI to perform the operation in step 4 above. For pre-defined toolbars you can obtain the current specification using the GetOption (page 201) function and then add your new button to the resulting value at an appropriate location. Then use the Set command to redefine the toolbar. See "Modifying Existing Toolbars and Buttons" on page 586 for more details.

Creating New Toolbars

To create a completely new toolbar, use the command CreateToolBar (page 454). This will create an empty toolbar.

To add buttons to a new toolbar, you must use the command DefineToolBar (page 459). You can add both pre-defined and user-defined buttons to a custom toolbar.

Pre-defined Buttons

The following table lists all the buttons that are pre-defined. All of these buttons may be redefined if required.

The bitmaps are embedded in the SIMetrix binary, but can also be found on the install CD in the directory script/images.

Button name	Description	Bitmap
AddCurve	Add Curve	newcurve.bmp
AddFourier	Fourier...	newfourier.bmp
BiasV	Place Bias Marker	biasv.bmp
CalcAveragePower	Display Average Power/Cycle	avg.bmp
CalcFall	Display Fall Time	falltime.bmp
CalcHighPass3db	Display -3dB Point (High Pass)	3dbhighpass.bmp
CalcLowPass3db	Display -3dB Point (Low Pass)	3dblowpass.bmp
CalcRise	Display Rise Time	risetime.bmp
CalcRMS	Display RMS/Cycle	rms.bmp
Capacitor	Place Capacitor	cap.bmp
Copy	Duplicate	copy.bmp
Delete	Cut	erase.bmp
DeleteAxis	Delete Axis/Grid	delgrid.bmp
DeleteCurve	Delete Curve	delete.bmp
Diode	Place Diode	diode.bmp
Flip	Flip	flip.bmp

Button name	Description	Bitmap
GraphClose	Close Graph	fileclose.bmp
GraphOpen	Open Graph	fileopen.bmp
GraphSave	Save Graph	filesave.bmp
Ground	Place Ground	gnd.bmp
HideCurves	Hide Selected Curves	hide.bmp
IGBT	Place IGBT	igbt.bmp
Inductor	Place Inductor	ind.bmp
IProbe	Place Current Probe	iprobe.bmp
ISource	Place Current Source	isource.bmp
Mirror	Mirror	mirror.bmp
MoveCurve	Move Curve to Selected Axis/Grid	movecurve.bmp
NewAxis	New Axis	newaxis.bmp
NewGrid	New Grid	newgrid.bmp
NJFET	Place N-channel JFET	njfet.bmp
NMOS	Place N-channel MOSFET	nmos.bmp
NMOS3IC	Place 3 term Nchannel MOSFET	nmos_ic3.bmp
NMOS4	Place 4 term Nchannel MOSFET	nmos_ic.bmp
NPN	Place NPN Transistor	npn.bmp
Opamp	Place Opamp	opamp.bmp
Options	Options	options.bmp
PJFET	Place P-channel JFET	pjfet.bmp
PMOS	Place P-channel MOSFET	pmos.bmp
PMOS3IC	Place 3 term Pchannel MOSFET	pmos_ic3.bmp
PMOS4	Place 4 term Pchannel MOSFET	pmos_ic.bmp
PNP	Place PNP Transistor	pnp.bmp
Print	Print	print.bmp
PSU	Place PSU	psu.bmp
Resistor	Place Resistor (Box shape)	res.bmp
ResistorZ	Place Resistor (Z shape)	resz.bmp
Rotate	Rotate	rotate.bmp
SatInd	Place Saturable Inductor	sat_ind.bmp
SatTx	Place Saturable Transformer	tx_sat.bmp
SchemClose	Close Schematic	fileclose.bmp
SchemNew	New Schematic	newschem.bmp
SchemOpen	Open Schematic	fileopen.bmp
SchemSave	Save Schematic	filesave.bmp
SchemSaveAll	Save All Schematics	saveall.bmp
SCR	Place Thyristor	scr.bmp
ShowCurves	Show Selected Curves	show.bmp
SimPause	Pause Simulation	pause.bmp

Button name	Description	Bitmap
SimRunNetlist	Run Netlist	run.bmp
SimRunSchem	Run Schematic	run.bmp
SymbolNew	New Symbol	newsymbol.bmp
TitleCurve	Change Curve Name	curvetitle.bmp
TL	Place Transmission Line	tl.bmp
Tx	Place Transformer	tx.bmp
Undo	Undo	undo.bmp
UndoZoom	Undo Zoom	undo.bmp
VProbe	Place Voltage Probe	vprobe.bmp
VSource	Place Voltage Source	vsource.bmp
Waveform	Place Waveform Generator	vsig.bmp
Wire	Wire Mode	pencil.bmp
Zener	Place Zener Diode	zener.bmp
ZoomFull	Fit Window	zoomfull.bmp
ZoomIn	Zoom In	zoomin.bmp
ZoomOut	Zoom Out	zoomout.bmp
ZoomRect	Zoom Box	zoomrect.bmp
ZoomXAuto	Fit Width	zoomwidth.bmp
ZoomYAuto	Fit Height	zoomheight.bmp

Custom Dialog Boxes

Overview

SIMetrix has a feature that permits the creation of custom dialog boxes without the need to write program code. This can be done using a special graphical tool called the "SIMetrix Dialog Designer" supplied with SIMetrix from version 5.3. SIMetrix Dialog Designer is derived from a commericial tool developed by Trolltech AS who supply us with the Qt library used for SIMetrix UI development. Trolltech have kindly given us permission to ship this tool with SIMetrix. Note that "SIMetrix Dialog Designer" is a stripped down version of the full commercial product.

Currently we supply only a Windows version of this tool, but the dialogs generated will work with Linux versions of SIMetrix.

Starting "SIMetrix Dialog Designer"

The tool is installed with the rest of the SIMetrix binaries and is called "designer.exe". Use windows explorer to locate designer.exe in the "bin" folder under the SIMetrix root. The SIMetrix installer does not create a short cut to this but you may create one yourself if required.

Developing Dialogs

The basic procedure is:

1. Start Designer
2. Select “Dialog” under “New File/Project”
3. Set the form’s name property to the required name of the SIMetrix function.
4. Edit caption property as required
5. Add widgets as required. See next section for further details. See also “Using Geometry Management” on page 594.
6. Save result as an .sxdlg file to the directory support/dialogs under SIMetrix root (Windows) or /usr/local/share/dialogs (Linux). This is the default location for user dialogs. There is an option setting that allows them to be located elsewhere. See below for details.

The dialog is now designed. If SIMetrix is currently running, shut it down and restart it to register the new dialog function.

Note that you do not need to restart after editing the dialog - only when creating it for the first time or when changing the function name. SIMetrix registers the filename and function name on startup, but will reread it when the function is called. This means that you can make changes to your dialog without having to shut down and restart SIMetrix each time.

You can select a different location for user dialogs with the option setting UserDialogsDir. Type this at the command line:

```
Set UserDialogsDir=path
```

where path is the full path of the new dialogs location. You may use logical path symbols in the definition. For example “%SXAPPDATAPATH%/userdialogs” resolves to a directory under the application data path. Note that you must restart SIMetrix after changing the path.

The Widgets

“Widgets” are the dialog elements such as edit boxes and push buttons that you use to enter data and choices. In Windows “Widgets” are sometimes called “Controls”.

A range of special widgets is supplied that have some extra properties to define how they will be initialised when the dialog is opened and what they will return through the SIMetrix script function call mechanism. These widgets can be found under the “SIMetrix” group. Always use these for anything used for data entry. Other widgets that do not require initialisation nor output data may also be used. E.g. the items under âĂIJContainersâĂİ. Note that the “Radio Button” widget in the “Buttons” group can only be used inside a “RadioGroup” which you will find in the SIMetrix group.

In general data is transferred to the dialog widgets by the arguments of the SIMetrix script function. Each argument is an array of strings and each widget may specify through its properties the argument index and the array element index where the data is located. In every case the data is a single string. If multiple values are required for a widget, it will either have multiple properties to define them, or, in the case of lists of values, the items will be delimited by a pipe (‘|’) symbol.

Data is returned in a similar manner. But as there is only one return value, just a single array element is specified.

General Properties

There are five user settable properties in use by the various widgets, but not all widgets use all of the properties. Some widgets may have aditional special purpose properties. These five general properties are:

Property Name	Description
argIndex	Index of script function argument used for initialisation of widget. First argument has index=0. You may use a maximum of 8 arguments so this property may not be larger than 7
inElementIndex	Index into array supplied to argIndex for value used to initialise widget. First element has index=0
outElementIndex	Index into array returned by script function for user entered value
itemsArgIndex	Index of script function argument used to supply items to initialise list. Items separated by pipe ('|') symbol. Currently used by list boxes and combo boxes.
itemsElementIndex	Index into array supplied to itemsArgIndex for items to initialise list. Items separated by pipe ('|') symbol. Currently used by list boxes and combo boxes

Full details and examples for each widget type follow.

EditBox

The properties argIndex, inElementIndex and outElementIndex initialise and return the text value stored in a single line edit box.

TextEdit

As EditBox but multi-line.

Spinner

Used for entering numeric values. argIndex, inElementIndex and outElementIndex used to initialise and return. Note that box stores a numeric value, but the script arguments must still be strings. This widget has the following properties that govern its behaviour:

Property Name	Description
engMode	Boolean. If true, value is always displayed in engineering notaion using suffixes such as m, u, k etc
step125	Boolean. If true, spinner buttons step in 1-2-5 sequence. Otherwise they step in a linear sequence controlled by the 'increment' property
increment	Increment for spinner buttons. Only effective if 'step125' property is false
max	Maximum value allowed for widget
min	Minimum value allowed for widget
precision	Value displayed and returned to precision specified.

Property Name	Description
allowExpressions	If true, the user may enter expressions enclosed with curly braces: '{' and '}'. If false, only numeric values will be allowed.

CheckBox

A check box providing a simple on-off selection. argIndex, inElementIndex and outElementIndex used to define initial setting and return value in normal way. '1' indicates checked and '0' indicates unchecked. Label Static label. Can be set with static value in which case argIndex and inElementIndex should be -1. Alternatively can be initialised via function call using argIndex an inElementIndex. Does not return a value.

RadioGroup

A container that should be filled with one or more Radio Buttons (these may be found under the "Buttons" group). Only one of the radio buttons in the group maybe checked at any time. The usual properties are used to initialise and the return values. '0' means check the top most button, '1' the second button, '2' the third etc.

PushButton

A push button with two alternative modes of operation. If the property 'toggleButton' is false, then this may be used to close the dialog box. In this case the property 'action' must be set to either 'reject' or 'accept'. If 'reject' is set then the dialog box function will return an 'empty vector'. That is the array returned will have a length of zero. (You must test this with the script langauge's length() function). If set to 'accept' the normal data will be returned. The 'outElementIndex' property may be set in this case in which case the value returned will be 'clicked' if the button was clicked to close the box or 'notclicked'.

If 'toggleButton' is set to true then 'action' must be set to 'none' to be meaningful. In this case the button will toggle on or off. The return value controlled by outElementIndex will be either 'on' or 'off'. Currently there is no method to initialise the toggle state. This will be corrected in a later release.

CancelButton and OkButton

These are identical to PushButton except for changes to default values of some properties. âĂIJCancel ButtonâĂİ behaves as a button to cancel a dialog and will cause the calling function to return an empty vector. âĂIJOk ButtonâĂİ closes a dialog and accepts the userâĂŹs input.

ListBox

A list box containing a list of values. The values themselves are defined using itemsArgIndex and itemsElementIndex properties and must be in the form of a single string containing a list of values separated by a pipe symbol.

The initial value selected is defined by argIndex and inElementIndex. This is the actual value not the index into the list. The item selected in the list is returned in outElementIndex.

ComboBox

A drop down “combo box” otherwise the same as the ListBox.

ParameterView

This is experimental and currently unsupported.

Using Geometry Management

SIMetrix Dialog Designer features an advanced system, known as geometry management, that automatically arranges widgets in the dialog. Geometry management controls the position and size of the widgets in a manner that maintains the layout in an aethestically pleasing form even if the dialog is resized.

These features are available via the “Layout” menu, via the toolbar and also with the context popup menu. The features available are:

1. Layout horizontally. Lays out selected widgets in a horizontal line
2. Layout vertically. Lays out selected widgets in a vertical line
3. Layout in a grid. Lays out widgets in a grid arrangement using their initial position as a guide
4. Layout vertically/horizontally in a splitter. Lays out two widgets with a splitter bar in between allowing the user to control their relative sizes

The geometry management actions work on either selected widgets or all the widgets in a selected container. If no widget or container is selected, the action will be applied to all the widgets in the form. A container is a widget that is designed to hold other widgets. The containers are the widgets in the containers group and also the RadioGroup widget in the SIMetrix group.

The best way to learn about geometry management is to experiment with various widgets and containers. You may need to use the “spacer” widget available from the toolbar to provide empty spaces. Some widgets (e.g. buttons) resize to fill the space available and this is not always desirable. Further documentation on the Designer tool can be found at the developer’s web site:

http://doc.trolltech.com. The version currently in use is 3.3. See under “Tools”, the SIMetrix dialog designer is based on “Qt Designer”.

Examples

A number of trivial examples are supplied that demonstrate each of the widgets. These are supplied in the examples directory under scripts/dialogs. To use them you must copy them to the support/dialogs folder (Windows) or /usr/local/share/dialogs folder (Linux). Here is a list:

EditDialog

Simple dialog with an edit box and an Ok button. Type:

```
Show EditDialog(âĂŸInitial messageâĂŹ)
```

to see what it does.

TestCombo

Demo of combo box, try this:

```
Show TestCombo('bill', 'fred|bill|john')
```

TestFunction

A spinner and a check box. Try:

```
Show TestFunction([âĂŸ2.345âĂŹ, âĂŸ1âĂŹ])
```

ListBoxFunction

A list box and a check box, Try this:

```
Show listboxfunction(['john','1'], 'fred|bill|john')
```

TextEditTest

TextEdit and two push buttons, one of them with toggle action. Try this:

```
Show texteditttest('A message')
```

JohnsModelDialog

Bits and pieces. Try this:

```
Show johnsmodeldialog(['bill', '2.345', '4.567', '1'],
  'fred|bill|john')
```

RadioTest

A couple of radio buttons and a toggle button

```
Show radiotest('1')
```

ExecuteDialog Function

The ExecuteDialog function executes a .sxdlg file directly using the dialog definitionâĂŹs full path name. The first argument to this function is the full path to the dialog .sxdlg file and subsequent arguments are the dialogâĂŹs arguments shifted one place. So argument 0 of the dialog function is argument 1 of ExecuteDialog. Note that the first argument must be a full path, but you may use logical path symbols.

ExecuteDialog does not require the .sxdlg file to present when SIMetrix starts up unlike the usual method of calling the dialog functions.

All script functions are limited to a maximum of 8 arguments and ExecuteDialog is not an exception. Because the first argument is reserved for the path name, this means that the maximum number of arguments that can be passed to the dialog is 7. If calling the dialog directly, the limit is 8.

Performance

Complex dialog designs can take a noticeable time to open. This is because the definition file is read and parsed every time the dialog function is called.

Pre-defined Buttons

This is a list of predefined buttons that can be used with DefineToolBar (page 459) for creating custom toolbars.

Button Name	Graphic	Function
AddCurve	newcurve.bmp	Add Curve
AddFourier	newfourier.bmp	Fourier...
CalcAveragePower	avg.bmp	Display Average Power/Cycle
CalcFall	falltime.bmp	Display Fall Time
CalcHighPass3db	3dbhighpass.bmp	Display -3dB Point (High Pass)
CalcLowPass3db	3dblowpass.bmp	Display -3dB Point (Low Pass)
CalcRise	risetime.bmp	Display Rise Time
CalcRMS	rms.bmp	Display RMS/Cycle
Capacitor	cap.bmp	Place Capacitor
Copy	copy.bmp	Duplicate
Delete	erase.bmp	Cut
DeleteAxis	delgrid.bmp	Delete Axis/Grid
DeleteCurve	delete.bmp	Delete Curve
Diode	diode.bmp	Place Diode
Flip	flip.bmp	Flip
GraphClose	fileclose.bmp	Close Graph
GraphOpen	fileopen.bmp	Open Graph
GraphSave	filesave.bmp	Save Graph
Ground	gnd.bmp	Place Ground
HideCurves	hide.bmp	Hide Selected Curves
IGBT	igbt.bmp	Place IGBT
Inductor	ind.bmp	Place Inductor
IProbe	iprobe.bmp	Place Current Probe
ISource	isource.bmp	Place Current Source
Mirror	mirror.bmp	Mirror
MoveCurve	movecurve.bmp	Move Curve to Selected Axis/Grid
NewAxis	newaxis.bmp	New Axis
NewGrid	newgrid.bmp	New Grid
NJFET	njfet.bmp	Place N-channel JFET
NMOS	nmos.bmp	Place N-channel MOSFET
NMOS3IC	nmos_ic3.bmp	Place 3 term Nchannel MOSFET

Button Name	Graphic	Function
NMOS4	nmos_ic.bmp	Place 4 term Nchannel MOSFET
NPN	npn.bmp	Place NPN Transistor
Opamp	opamp.bmp	Place Opamp
Options	options.bmp	Options
PJFET	pjfet.bmp	Place P-channel JFET
PMOS	pmos.bmp	Place P-channel MOSFET
PMOS3IC	pmos_ic3.bmp	Place 3 term Pchannel MOSFET
PMOS4	pmos_ic.bmp	Place 4 term Pchannel MOSFET
PNP	pnp.bmp	Place PNP Transistor
Print	print.bmp	Print
PSU	psu.bmp	Place PSU
Resistor	res.bmp	Place Resistor (Box shape)
ResistorZ	resz.bmp	Place Resistor (Z shape)
Rotate	rotate.bmp	Rotate
SatInd	sat_ind.bmp	Place Saturable Inductor
SatTx	tx_sat.bmp	Place Saturable Transformer
SchemClose	fileclose.bmp	Close Schematic
SchemNew	newschem.bmp	New Schematic
SchemOpen	fileopen.bmp	Open Schematic
SchemSave	filesave.bmp	Save Schematic
SchemSaveAll	saveall.bmp	Save All Schematics
SCR	scr.bmp	Place Thyristor
ShowCurves	show.bmp	Show Selected Curves
SimPause	pause.bmp	Pause Simulation
SimRunNetlist	run.bmp	Run Netlist
SimRunSchem	run.bmp	Run Schematic
SymbolNew	newsymbol.bmp	New Symbol
TitleCurve	curvetitle.bmp	Change Curve Name
TL	tl.bmp	Place Transmission Line
Tx	tx.bmp	Place Transformer
Undo	undo.bmp	Undo
UndoZoom	undo.bmp	Undo Zoom
VProbe	vprobe.bmp	Place Voltage Probe
VSource	vsource.bmp	Place Voltage Source
Waveform	vsig.bmp	Place Waveform Generator
Wire	pencil.bmp	Wire Mode
Zener	zener.bmp	Place Zener Diode
ZoomFull	zoomfull.bmp	Fit Window
ZoomIn	zoomin.bmp	Zoom In
ZoomOut	zoomout.bmp	Zoom Out

Button Name	Graphic	Function
ZoomRect	zoomrect.bmp	Zoom Box
ZoomXAuto	zoomwidth.bmp	Fit Width
ZoomYAuto	zoomheight.bmp	Fit Height

SIMetrix/SIMPLIS 8.0 Script Reference Manual