Virtuoso ADE SKILL Reference - Part I

Product Version ICADVM20.1
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Contents

Preface

This manual describes the SKILL functions that you can use with Virtuoso Analog Design Environment L. You can use these functions to modify Virtuoso Analog Design Environment L to better suit your needs. You can also use these functions to help you integrate tools or simulators into Virtuoso Analog Design Environment L.

This user guide is aimed at developers and designers of integrated circuits and assumes that you are familiar with the Cadence SKILL™ language.

This preface contains the following topics:

Scope

Unless otherwise noted, the functionality described in this guide can be used in both mature node (for example, IC6.1.8) and advanced node and methodologies (for example, ICADVM20.1) releases.

Label	Meaning
(ICADVM20.1 Only)	Features supported only in the ICADVM20.1 advanced nodes and advanced methodologies release.

(IC6.1.8 Only)	Features supported only in mature node releases.

Licensing Requirements

For information about licensing in the Virtuoso design environment, see *Virtuoso Software Licensing and Configuration Guide*.

Related Documentation

Installation, Environment, and Infrastructure

- *Cadence Installation Guide*
- *Cadence SKILL Language User Guide*
- *Cadence SKILL Language Reference*
- *Cadence SKILL++ Object System Reference*
- *Virtuoso Design Environment SKILL Functions Reference*

Virtuoso Tools

- *VirtuosoAnalog Design Environment L User Guide*
- *OCEAN Reference*
- *Virtuoso Schematic Editor L User Guide*
- *Virtuoso Layout Suite L User Guide*

Additional Learning Resources

Video Library

The Video Library on the Cadence Online Support website provides a comprehensive list of videos on various Cadence products.

To view a list of videos related to a specific product, you can use the *Filter Results* feature available in the pane on the left. For example, click the *Virtuoso Layout Suite* product link to view a list of videos available for the product.

You can also save your product preferences in the Product Selection form, which opens when you click the *Edit* icon located next to *My Products*.

Virtuoso Videos Book

You can access certain videos directly from Cadence Help. To learn more about this feature and to access the list of available videos, see Virtuoso Videos.

Rapid Adoption Kits

Cadence provides a number of Rapid Adoption Kits that demonstrate how to use Virtuoso applications in your design flows. These kits contain design databases and instructions on how to run the design flow.

To explore the full range of training courses provided by Cadence in your region, visit Cadence Training or write to training_enroll@cadence.com.

Note: The links in this section open in a separate web browser window when clicked in Cadence Help.

Help and Support Facilities

Virtuoso offers several built-in features to let you access help and support directly from the software.

- The Virtuoso *Help* menu provides consistent help system access across Virtuoso tools and applications. The standard Virtuoso *Help* menu lets you access the most useful help and support resources from the Cadence support and corporate websites directly from the CIW or any Virtuoso application.
- The Virtuoso Welcome Page is a self-help launch pad offering access to a host of useful knowledge resources, including quick links to content available within the Virtuoso installation as well as to other popular online content.

  The Welcome Page is displayed by default when you open Cadence Help in standalone mode from a Virtuoso installation. You can also access it at any time by selecting *Help – Virtuoso Documentation Library* from any application window, or by clicking the *Home* button on the Cadence Help toolbar (provided you have not set a custom home page).

For more information, see Getting Help in *Virtuoso Design Environment User Guide.*

Customer Support

For assistance with Cadence products:

- Contact Cadence Customer Support

  Cadence is committed to keeping your design teams productive by providing answers to technical questions and to any queries about the latest software updates and training needs. For more information, visit https://www.cadence.com/support.

- Log on to Cadence Online Support

  Customers with a maintenance contract with Cadence can obtain the latest information about various tools at https://support.cadence.com.

Feedback about Documentation

You can contact Cadence Customer Support to open a service request if you:

- Find erroneous information in a product manual
- Cannot find in a product manual the information you are looking for
- Face an issue while accessing documentation by using Cadence Help

You can also submit feedback by using the following methods:

- In the Cadence Help window, click the *Feedback* button and follow instructions.
- On the Cadence Online Support Product Manuals page, select the required product and submit your feedback by using the *Provide Feedback* box.

Understanding Cadence SKILL

Cadence SKILL is a high-level, interactive programming language based on the popular artificial intelligence language, Lisp. It lets you customize and extend your design environment. Using SKILL you can validate the steps of your algorithm incrementally before incorporating them into a larger program.

For more information about the SKILL language, see Getting Started in the *SKILL Language User Guide*.

Using SKILL Code Examples

The SKILL APIs in this user manual are explained with illustrative code examples.

You can copy these examples from the manual and paste them directly into the Command Interpreter Window (CIW) or use the code in non-graphical SKILL mode.

Sample SKILL Code

The following code sample shows the syntax of a SKILL API that accepts three arguments.

axlGetRunStatus

```
axlGetRunStatus(
    t_sessionName                              Required argument
    [ ?optionName t_optionName ]               Optional keyword argument
    [ ?historyName t_historyName ]             Optional keyword argument
    )
    => l_statusValues                          Return value
```

The first argument `t_sessionName` is a required argument, where `t` signifies the data type of the argument. The second and third arguments `?optionName t_optionName` and `?historyName t_historyName` are optional keyword arguments (identified by a question mark), which are specified in name-value pairs and can be placed in any order during the function call.

The return value is the value that the SKILL API returns after evaluating the expression. In this case, it is a list of status values, *`l_statusValues`*.

Example

```
axlSession=axlGetWindowSession( hiGetCurrentWindow())
=> "session0"
axlGetRunStatus("session0" ?historyName "Interactive.10" ?optionName "tests")
=> (1 2)
```

Return value

Value of the session name argument

Question mark and argument name before the value of the keyword argument

Question mark and argument name before the value of the keyword argument

Accessing API Help

Quick reference information for SKILL APIs is available from the CIW and the SKILL API Finder. To access the reference information for a particular SKILL API, do one of the following:

- Type `help <function_name>` in the CIW.
- Type `startFinder ( [ ?funcName` *`t_functionName`* `] )` in the CIW.
- Start the SKILL API Finder from the CIW by choosing *Tools – Finder* or type `cdsFinder` on the UNIX command line.

  In the *Search in* field of the displayed Cadence SKILL API Finder window, type the SKILL API name for which you want to display the help information and click *Go*.

  The matches for the searched SKILL API appear in the *Results* area.

  To view the complete documentation of the searched SKILL API, select the API name in the *Results* area and click the *More Info* button. The complete documentation of the selected SKILL API appears in a new Cadence Help window.

Typographic and Syntax Conventions

The following typographic and syntax conventions are used in this manual.

text	Indicates names of manuals, menu commands, buttons, and fields.
`text`	Indicates text that you must type exactly as presented. Typically used to denote command, function, routine, or argument names that must be typed literally.
`z_argument`	Indicates text that you must replace with an appropriate argument value. The prefix (in this example, *`z_`*) indicates the data type the argument can accept and must not be typed.
|	Separates a choice of options.
`{ }`	Encloses a list of choices, separated by vertical bars, from which you **must** choose one.
`[ ]`	Encloses an optional argument or a list of choices separated by vertical bars, from which you **may** choose one.
`[ ?argName` *`t_arg`* `]`	
	Denotes a *key argument*. The question mark and argument name must be typed as they appear in the syntax and must be followed by the required value for that argument.
`...`	Indicates that you can repeat the previous argument.
	Used with brackets to indicate that you can specify zero or more arguments.
	Used without brackets to indicate that you must specify at least one argument.
`,...`	Indicates that multiple arguments must be separated by commas.
`=>`	Indicates the values returned by a Cadence® SKILL® language function.
`/`	Separates the values that can be returned by a Cadence SKILL language function.

If a command-line or SKILL expression is too long to fit within the paragraph margins of this document, the remainder of the expression is moved to the next line and indented. In code excerpts, a backslash (\ ) indicates that the current line continues on to the next line.

Identifiers Used to Denote Data Types

Data type identifiers are used to indicate the type of value required by an API argument. These data types are denoted by a single letter that is prefixed to the argument label and is separated from the argument by an underscore; for example, *t* is the data type in *t_viewName*. Data types and underscores are used only as identifiers; they must not be typed when specifying the argument in a function.

Prefix	Internal Name	Data Type
a	array	array
A	amsobject	AMS object
b	ddUserType	DDPI object
B	ddCatUserType	DDPI category object
C	opfcontext	OPF context
d	dbobject	Cadence database object (CDBA)
e	envobj	environment
f	flonum	floating-point number
F	opffile	OPF file ID
g	general	any data type
G	gdmSpecIlUserType	generic design management (GDM) spec object
h	hdbobject	hierarchical database configuration object
I	dbgenobject	CDB generator object
K	mapiobject	MAPI object
l	list	linked list
L	tc	Technology file time stamp
m	nmpIlUserType	nmpIl user type
M	cdsEvalObject	cdsEvalObject
n	number	integer or floating-point number
o	userType	user-defined type (other)
p	port	I/O port
q	gdmspecListIlUserType	gdm spec list

Prefix	Internal Name	Data Type
r	defstruct	defstruct
R	rodObj	relative object design (ROD) object
s	symbol	symbol
S	stringSymbol	symbol or character string
t	string	character string (text)
T	txobject	transient object
u	function	function object, either the name of a function (symbol) or a lambda function body (list)
U	funobj	function object
v	hdbpath	hdbpath
w	wtype	window type
sw	swtype	subtype session window
dw	dwtype	subtype dockable window
x	integer	integer number
y	binary	binary function
&	pointer	pointer type

For more information, see *Cadence SKILL Language User Guide*.

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Introduction

The Virtuoso Analog Design Environment L SKILL functions in this manual are organized into chapters according to their purpose. Within each chapter, the functions are in alphabetical order.

You can use the functions in this manual to do the following:

- Change the values of existing variables, such as the default values of model paths or simulator options.

  For more information, see “Tools and Sessions” on page 39.

- Help you integrate a simulator into the Virtuoso analog design environment. An integrator is someone responsible for making the changes necessary to include a circuit in the Virtuoso analog design environment (You need to purchase the OASIS product in order to integrate a simulator.)

- Add new features to existing simulators.

  For more information, see “Adding Features to Simulators” on page 46.

If you need to change the menus for the Simulation window, see “Changing Virtuoso Analog Design Environment Banner Menus” on page 48.

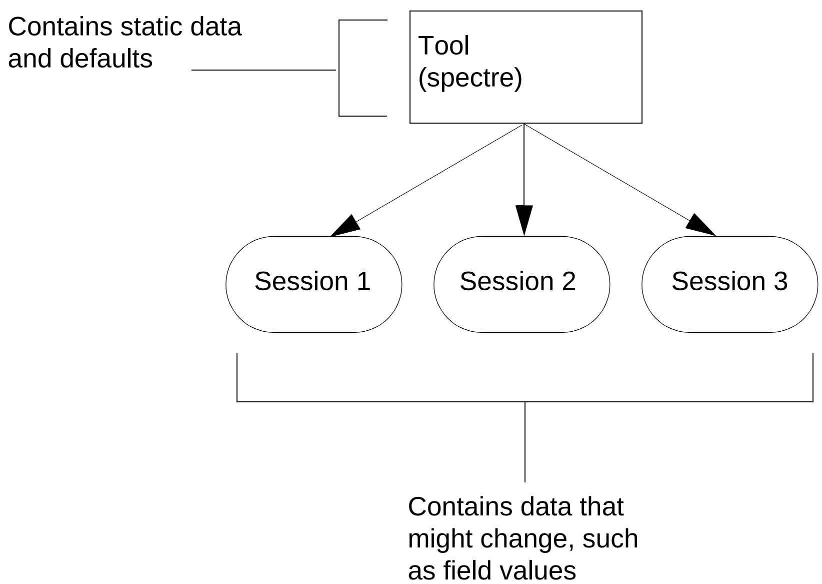
Note: Read this entire chapter before you use any of the functions in this manual.

Cadence has integrated simulators into the analog design environment by using the direct simulation approach. With direct simulation, the netlist uses the syntax of the simulator you are using, without any processing to evaluate expressions. The passed parameters, design variables, functions, and so on are all resolved by the simulator. The netlist is a direct reflection of the design.

Tools and Sessions

Understanding the difference between a tool object and a session object will help you use many of the routines in this manual. A *tool* object is a data structure that contains all the default and static data for a simulator. For example, the fields on an analysis form are static (a transient analysis always has a *From, To,* and *By* field). A *session* object contains data that might change between simulator uses, such as the values of the *From*, *To*, and *By* fields, or design variables or model paths.

Several sessions can be associated with one tool. This means you can start several Cadence sessions, each with different transient analysis settings, for example. However, all these sessions are associated with one tool (`spectree`).



Most of the routines in this manual take the `tool` argument. Some take either the `tool` or the `session` argument, and some take only the `session` argument. For example, `asiSetEnvOptionVal` takes the following arguments:

```
asiSetEnvOptionVal( {o_tool | o_session} s_name g_value)
```

This means you can pass in either a tool or a session object. If you pass in a tool object, you are modifying the tool and every session created *after* this. If you pass in a session object, your changes affect the current session only.

Example

Suppose you have a `cdsSpice` tool with the model path set to `~/models`, and a schematic window open with your design. When you open a Simulation window, which is set to use the `cdsSpice` simulator by default, you are starting a `cdsSpice` session. If you bring up the Environment Options form, the model path is set to `~/models`. You can change the model path for the tool by typing the following in the CIW:

```
asiSetEnvOptionVal( asiGetTool('cdsSpice) 'modelPath
"~/processA/best/models")
```

Now if you check the model path from your existing `cdsSpice` simulation window, it is still set to `~/models`. This is because this session was previously created based on the original tool. However, if you open a second `cdsSpice` simulation window, a new session is created based on the modified `cdsSpice` tool. In this session, the model path is set to `~/processA/best/models`.

If you do not want to open another session, but you want to change the model path in the current session, you might type the following command in the CIW:

```
asiSetEnvOptionVal( asiGetCurrentSession() 'modelPath
"~/processA/best/models")
```

This changes the model path in the existing session only. If you open another session, the `modelPath` value is still set to `~/models.` This is because the command did not change the default value of the model path, it changed the session value only.

You can think of a tool as the template from which sessions are created. Changing a tool affects all sessions created after the tool is changed, but does not affect existing sessions.

Note: The functions in this manual are contained primarily in the `oasis.cxt` and `analog.cxt` files. You must load these context files before using the functions. (Bringing up the Simulation window automatically loads these contexts.)

Use Models

There are two common use models for the routines that take the tool and/or session object.

Working with Tools

Often you need to modify an item or option related to a tool. These types of operations might include the following:

- Adding an option to a tool
- Changing a tool option
- Deleting a tool option
- Setting a tool option's value
- Getting a tool option (object)

You can set up a routine in your `.cdsinit` file to do this. For example, suppose you wanted to set the following options for every new `spectreS` session.

- Model path set to `~/processA/best/models`
- Include file set to `~/processA/best/models/include`

You might add the following routines to your `.cdsinit` file:

```
asiSetEnvOptionVal( asiGetTool('spectreS) 'modelPath
"~/processA/best/models")
asiSetEnvOptionVal( asiGetTool('spectreS) 'includeFile
"~/processA/best/models/include")
```

Because these calls to `asiSetEnvOptionVal` are in the `.cdsinit` (before any sessions are opened), all subsequent sessions contain the specified model path and include file.

Getting Values from Sessions

Sometimes you want to get a value from an existing session.

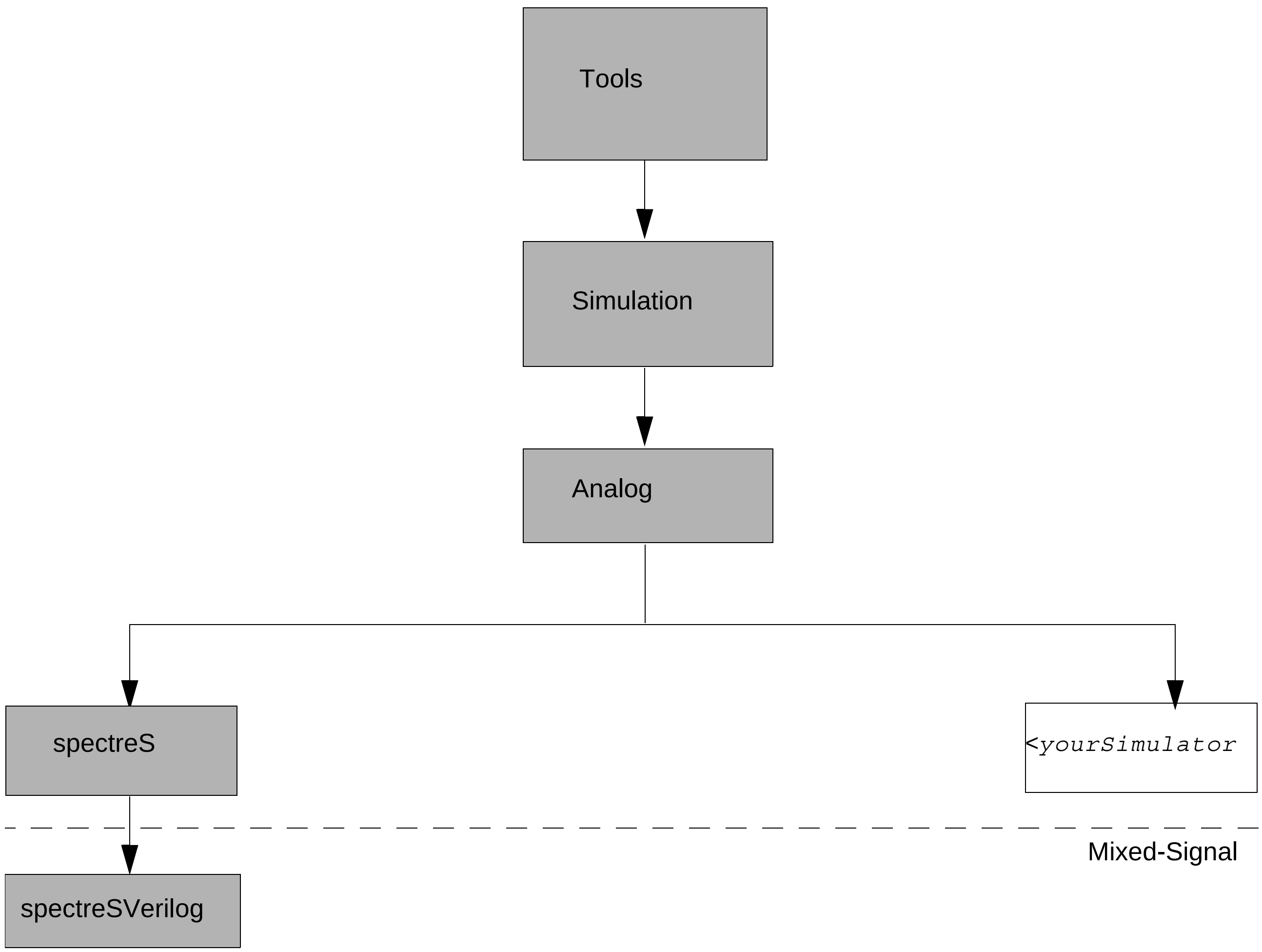
For example, suppose you are writing some custom SKILL code in which you need to get the value of the transient *to* field for the existing session. In this case, you might use the following code:

```
session = asiGetCurrentSession()
analysis = asiGetAnalysis(session 'tran)
valueOfTo=asiGetAnalysisFieldVal( analysis 'to)
```

Class Structures

In Virtuoso analog design environment, much of the underlying code utilizes *classes*. A class determines the structure and behavior of its instances, which are known as objects. A class inherits information from its parent class (or super class) and passes information to its subclass. Understanding classes will help you use some of the functions in this manual that utilize the inheritance mechanism. (These functions are called methods and are explained in the section Methods in the Virtuoso Analog Design Environment on page 44“.)

The following figure shows how the classes are organized in Virtuoso analog design environment.



The class structure is organized as follows:

- The *Tools Class* is the base or root class. Anything declared in the Tools Class is inherited by all the other subclasses.
- *The Simulation Class* inherits everything from the Tools Class. Simulation is the base class for all simulators, and anything declared in the Simulation Class is inherited by all the simulators.
- *The Analog Class* inherits everything from the Simulation Class. The Analog Class adds all the generic analog simulation features to the set. Anything declared in the Analog Class is inherited by all the analog simulators.

If an inherited feature from any level is not applicable to a lower level, you can delete or change the feature at the lower level.

Methods in the Virtuoso Analog Design Environment

Some of the functions in this manual are defined as *methods* for integrators. A method is a function that can be *overloaded*. In other words, the same function can be defined in different ways depending on the class of the arguments that users pass to the function. With methods, the same function name can specify a general class of actions. The user, by supplying an initial argument of a particular class to the function, determines the specific action of the function. (The SKILL++ object system analyzes the class of the initial argument to determine which variant of the function to call.) The methods in this manual have examples for integrators.

When using methods, the space after the name of the procedure is required. (When using SKILL procedures, the space after the name of the procedure is not allowed.)

This space is required when using methods.

```
defmethod(asiSendOptions ( (session analog_session) )
    println("asiSendOptions for the analog class")
)
```

You can use `defmethod` to create a method that is specialized for a particular class. If a user calls a function with an initial argument of this class, the SKILL++ object system looks for the corresponding method for that class. If there isn't a match for that class, the SKILL++ object system looks for a match in the class above, and so on.

Using methods gives you the following advantages:

- You can overload an existing method for your own simulator-specific classes. In other words, you can customize an existing Virtuoso analog design environment function for your simulator.
- You can use the `callNextMethod` procedure to use an inherited method and add some code before or after it.

For more information about methods, consult the Cadence SKILL++ Object System Reference.

Overloading Methods

You can overload an existing method for your own simulator-specific classes. For example, there is a method to send simulation options (`asiSendOptions`) in the Analog Class. You probably need to create a different method to send your options. To do this, create your own method named `asiSendOptions` that is used by your simulator. You do not have to modify the routine that calls `asiSendOptions`. Your procedure takes precedence over the method in the Analog Class.

For example, the following is an Analog Class method declaration to send options:

This space is required when using methods.

```
defmethod(asiSendOptions ( (session analog_session) )
    println("asiSendOptions for the analog class")
)
```

To create your own `asiSendOptions` procedure, use the following declaration:

```
defmethod(asiSendOptions ( (session <yourSimulator>_session) )
    println("asiSendOptions for your simulator class")
)
```

When Virtuoso analog design environment sends the simulation options for your simulator, your `asiSendOptions` method is called because the first argument is of the class <*yourSimulator*>_session. For more information about *defmethod*, consult the Cadence SKILL++ Object System Reference.

Note: You should replace <*yourSimulator*> with the name of your simulator. Do not include the angle brackets (<>).

Customizing an Inherited Method for Your Simulator

The `callNextMethod` procedure lets you use an inherited method and add some code before or after it.

For example, suppose you need to modify the transient analysis to add transient options for your simulator. You need to write a method to send the information to Cadence SPICE. There is already a method defined to send a transient analysis to Cadence SPICE. Because there are no transient options in the default analysis, the code does not send options. So you can use `callNextMethod`*()* to call the method to format the analysis, then call your procedure to format the options.

```
defmethod(asiFormatAnalysis (
    (analysis <yourSimulator>_tran_analysis) fp)
    callNextMethod()
    asiFormatAnalysisOption(analysis fp)
```

```
    t
)
```

In this example, `callNextMethod` calls the analog `asiFormatAnalysis` method to format the transient analysis and send it to Cadence SPICE. Then your `asiFormatAnalysis` method calls `asiFormatAnalysisOption` to format and send the options.

For more information about *callNextMethod*, consult the Cadence SKILL++ Object System Reference.

Adding Features to Simulators

You can use the functions in this manual to add new features to existing simulators. Create a SKILL file to hold your information.

1. Use the `asiGetTool` function to get the tool object associated with the simulator you want to modify.
2. Add the features you want by using the procedures in this manual and passing in the *tool* argument.

   For example, you might use `asiAddEnvOption` to add an environment option or `asiAddSimOption` to add a simulator option.
3. If needed, add the code to send your option to Cadence SPICE (to send to your target simulator).
4. If needed, add the code to invalidate the flowchart step if the value of your option changes.
5. Load your code changes into your `.cdsinit` file.

   Later, you can add your changes to your site `.cdsinit` file.
6. Add any necessary changes to the `.cdsenv` file.
   - ❑ Type `virtuoso` in a UNIX shell.
   - ❑ Type the following command in the CIW and substitute the appropriate simulator name for <*simulator*>. Do not include the angle brackets (<>).

```
asiCreateCdsenvFile('<simulator>)
```

A file called <*simulator*>`CdsenvFile` is created in your current working directory.

- ❑ Use this file to replace the existing `.cdsenv` file in the `<`*`install_dir`*`>/tools/dfII/etc/tools/<`*`simulator`*`>` directory. Be sure to save a backup copy of the existing `.cdsenv` file before completing this step. Use the following command to replace the existing `.cdsenv` file with your new file:

```
mv <simulator>CdsenvFile <install_dir>/tools/dfII/etc/
    tools/<simulator>/.cdsenv
```

Example

The following example shows how you might add an environment option called `myFile` to the environment options form for spectreS. The steps from the previous procedure are called out in the comments.

```
; get the spectreS tool
tool=asiGetTool('spectreS) ; This is step 1.
; add the environment option myFile
asiAddEnvOption( tool       ; This is step 2.
    ?name                   'myFile
    ?type                   'fileName
    ?prompt                 "My File"
    ?value                  ""
    ?invalidateFunc         'asiInvalidateControlStmts
                            ; This is step 4. See the note
                            ; following this example.
)

; modify the step that sends control statements,to send myFile also.
flowchart = asiGetFlowchart( tool ) ; This is step 3.
asiChangeFlowchartStep( flowchart
    ?name                   'asiSendControlStmts
    ?postFunc               'mySendMyFile
)

; Write the routine (mySendMyFile) to send (the contents of) myFile to cdsSpice.
defmethod( mySendMyFile ( ( session spectreS_session ) )
; This is also step 3.
    let(( netlistDir customInclude customIncludeFile )

        ; Check if the option is set.
        if( nequal( asiGetEnvOptionVal( session 'myFile) "") then

        ; There is a mechanism in cdsSpice that allows you to
        ' create a file
        ; called: .customInclude in the netlist directory. If you
        ; then send
        ; a 'ptptop' command to cdsSpice, it includes the contents of
        ; .customInclude in the final netlist for your target
        ; simulator.

        ; Open the .customInclude file in the netlist directory.
        netlistDir = asiGetNetlistDir(session)
        when( rexMatchp( "Verilog" asiGetSimName( session ) )
                netlistDir = strcat( netlistDir "/analog" )
        )
        customInclude=strcat(netlistDir ".customInclude")
        customIncludeFile = outfile( customInclude "w")
```

```
        ; Add whatever you need to add to this file.
        ; In this case, perhaps it is the contents of 'myFile'.

        ; When you are finished, close the file.
        close( customIncludeFile )

        ; Send the 'ptprop' command to cdsSpice to include the
        ; contents of this file in the final netlist.
        asiSendSim( session "ptprop analog CustomIncludeFile 1" nil
        nil nil )
     else
        ; Send the command to turn off the inclusion of the file in
        ; the final netlist.
        asiSendSim( session "deprop analog CustomIncludeFile"  nil
        nil nil )
     )
     t
    )
)
```

Note: `asiInvalidateControlStmts` is a wrapper to `asiInvalidateFlowchartStep`, which invalidates the `asiSendControlStmts` step (as shown below):

```
defmethod( asiInvalidateControlStmts ( ( session spectreS_session ) )
asiInvalidateFlowchartStep( session 'asiSendControlStmts )
)
```

Changing Virtuoso Analog Design Environment Banner Menus

You can change the banner menus in the Simulation window by creating a copy of the `simui.menus` file and make required modifications required in it. The `simui.menus` file is located at

`<install_dir>/tools/dfII/etc/tools/menus/simui.menus`

The beginning of this file explains the syntax for menu definitions.

Place a copy of the file at the following location:

`<install_dir>/tools/dfII/local/menus/simui.menus`

This location is for site customization. You can also put `menus/simui.menus` in

- The workArea (if there is any) or the current working directory
- The projectArea (if TDM is in use)
- Your home directory.

Note: You must create the `menus` directory to hold the *`simui.menus`* file.

Add the definition for the appropriate callback routine and associated code to the appropriate SKILL files.

Note: You can also add menus by using the SKILL *hi* calls.

Changing Banner Menus for a Particular Simulator

You can also customize the banner menus (in the Simulation window) for a particular simulator by modifying the <*simulator*>.menus file.Look for the file in the following location.

`<install_dir>/tools/dfII/etc/tools/menus/<simulator>.menus`

If the file you need is here, make a copy of the file and make any modifications you want. If the file you need is not here, you can use the spectreS file (or another simulator file) as an example. Rename this file for your simulator and make any changes you want. (Do not include the angle brackets (<>) in the file name.)

Note: The <*simulator*>.menus file can be for a Cadence simulator or a non-Cadence simulator.

Place a copy of the file in the following location.

`<install_dir>/tools/dfII/local/menus/<simulator>.menus`

This location is for site customization. You can also put menus/<*simulator*>.menus in

- The workArea (if there is any) or the current working directory
- The projectArea (if TDM is in use)
- Your home directory

Add the definition for the appropriate callback routine and associated code to your appropriate SKILL files.

Note: You can also add menus by using the SKILL *hi* calls.

Searching for SKILL Functions from the Finder

Use the Cadence SKILL API Finder tool to display the description and syntax of the Virtuoso Analog Design Environment SKILL functions. To open the SKILL API Finder from the CIW, select *Tools – SKILL Finder*. The Cadence SKILL API Finder appears.

For information about using the SKILL API Finder, refer to the Using SKILL API Finder appendix in the *Cadence SKILL IDE User Guide* or click *Help – Finder Help* in the Finder.

2

Initialization Functions

This chapter describes the functions that let you initialize the simulation environment for your simulator and register your simulator.

asiInit<yourSimulator>

```
asiInit<yourSimulator>(
     o_tool
     )
     => t
```

Description

Calls the procedures to initialize your simulator's environment. This function must be defined for socket interfaces. Do not use it for direct interfaces.

You must write `asiInit`<*yourSimulator*>, where <*yourSimulator*> is the name of your simulator. Do not include the angle brackets (<>).

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when your simulator's environment is initialized. You must write `asiInit`<*yourSimulator*> to return `t`.

Example

```
procedure ( asiInitXYZ( tool )
    <insert your code>
    t
)
```

Creates the procedure that initializes the simulator environment for the XYZ simulator.

asiRegisterTool

```
asiRegisterTool(
     '<simulatorName>
     [ ?class       s_className ]
     [ ?private     s_private ]
     [ ?initFunc    s_initFunc ]
     [ ?mixedSig    s_mixedSig ]
     )
     => t
```

Description

Registers your simulator and your initialization function.

Note: Replace <*yourSimulator*> with the name of your simulator. Do not include the angle brackets <>.

Arguments

`<`*`simulatorName`*`>`	Name of your simulator preceded by an apostrophe (').
`?class` *`s_className`*	Specifies the class from which your simulator inherits information. Default Value: '`analog`.
`?private` *`s_private`*	Optional argument that declares a simulator as "private," which means it does not appear in the list of simulators in the UI. Valid Values: `t` indicates that the option does not appear in the list of simulators in the UI, `nil` indicates that the option appears in the list of simulators in the UI Default Value: `nil` **Note:** You can also use this argument to create a parent class from which other classes inherit information. Designers cannot see or directly use a parent class if *private* is set to `t`.
`?initFunc` *`s_initFunc`*	Initialization function for your simulator. Default Value: `asiInit`<*`yourSimulator`*>, where <*`yourSimulator`*> is the name of your simulator.
`?mixedSig` *`s_mixedSig`*	Set this argument to non-nil to specify a mixed-signal simulator. Default Value: `nil`

Value Returned

`t`	Returns `t` when your simulator is registered.

Example

```
asiRegisterTool('XYZ)
```

Registers the XYZ simulator under the Analog Class.

asiInitDataAccessFunction

```
asiInitDataAccessFunction(
     o_tool
     )
     => t / nil
```

Description

Initializes the data access function for the tool. This function can be used by a third-party integrator to define their own data access functions.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when your data access function is initialized.
`nil`	Returns `nil` when the function does not run successfully.

Example

```
(defmethod asiInitDataAccessFunction ( ( tool <yourSimulator> ) )
    asiDefineDataAccessFunction( tool 'VT '<yourSimulator>VT))
procedure( '<yourSimulator>VT(specifier dataDir simData)
    asiGetDrlData('tran specifier dataDir))
```

asiInitEnvOption

```
asiInitEnvOption(
     o_tool
     )
     => t / nil
```

Description

Initializes the tool-specific environment options for the tools that are derived from the asiAnalog class. This is not applicable for tools derived from the asiSocket class. This function can be used by third-party integrators to define their own environment options.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when your tool-specific environment options are initialized.
`nil`	Returns `nil` when the function does not run successfully.

Example

```
defmethod( asiInitEnvOption ( ( tool <yourSimulator> ) )
    ;;; Initialize the environment options from the base class.
    callNextMethod()
    asiAddEnvOption( tool
    ?name        'MyOpt
    ?prompt      "Any String Option"
    ?value        "xyz"
    ?type        'string
    )
)
```

asiInitAnalysis

```
asiInitAnalysis(
     o_tool
     )
     => t / nil
```

Description

Initializes the tool-specific analysis options for the tools that are derived from the asiAnalog class. This is not applicable for tools derived from the asiSocket class. This function can be used by third-party integrators to define their own analysis options.

Arguments

o_tool	Simulation tool object.

Value Returned

t	Returns `t` when your tool-specific analysis options are initialized.
nil	Returns `nil` when the function does not run successfully.

Example

```
defmethod( asiInitAnalysis ( ( tool <yourSimulator> ) )
    asiAddAnalysis( tool
        ?name 'myAnal
        ?prompt "My Analysis"
    )
)
```

asiInitAdvAnalysis

```
asiInitAdvAnalysis(
     o_tool
     )
     => t / nil
```

Description

Initializes the tool-specific analysis options for the tools derived from the `asiAnalog` class. This method can be used by third-party integrators to define their own analysis options in ADE XL.

Arguments

o_tool	Simulation tool object.

Values Returned

`t`	Returns `t` if tool-specific analysis options are initialized.
`nil`	Returns `nil` if tool-specific analysis options are not initialized

Example

```
defmethod( asiInitAdvAnalysis (( tool <yourSimulator> ) )
    asiAddAnalysis( tool
        ?name 'myAdvancedAnalysis
        ?prompt "My Advanced Analysis"
    )
)
```

asiInitSimOption

```
asiInitSimOption(
     o_tool
     )
     => t / nil
```

Description

Initializes the simulation options for the tools that are derived from the asiAnalog class. This is not applicable for tools derived from the asiSocket class. This function can be used by third-party integrators to define their own simulation options.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when your tool-specific simulation options are initialized.
`nil`	Returns `nil` when the function does not run successfully.

Example

```
(defmethod asiInitSimOption ( ( tool <yourSimulator> ) )
    asiAddSimOption( tool
        ?name 'mySimOption
        ?prompt "My Simulation Option"
    )
)
```

asiGetPageCallBack

```
asiGetPageCallBack(
    o_obj
    )
    => s_func / nil
```

Description

Returns the callback function name when changing tabs in a multi-tab form.

Arguments

o_obj	The form object.

Value Returned

s_func	The callback function name.

Example

```
asiGetPageCallBack(formObj)
```

asiSetPageCallBack

```
asiSetPageCallBack(
     o_obj
     s_func
     )
     => t/ nil
```

Description

Returns the status (whether successful or failed) of the specified callback function, when changing tabs in a multi-tab form.

Arguments

o_obj	The form object.
s_func	The callback function name.

Value Returned

`t`	Returns `t` when the callback function is set successfully.
`nil`	Returns `nil` when setting the callback function fails.

Example

```
asiSetPageCallBack(formObj, 'callbackFunctionName)
```

3

Netlisting Invocation Functions for Direct Integration

This chapter describes functions that let you invoke netlisting options for direct integration.

Overview of Standalone Invocation

The `si` flow supports all OSS-based backend netlisters and the ADE netlisters `spectre` and `Ultrasim`. The `si` flow does not work for any other simulator netlister integrated in ADE.

To use the `si` executable for the ADE netlisters, copy the `si.env` file into a new directory and execute the following command:

```
si -batch -cdslib <complete path to cds.lib>
```

This command generates the netlist as well as runs the simulation. Alternatively, use either the following command or the SKILL function `nl` to only generate the netlist:

```
si -batch -command nl
```

Important

The `-command netlist` option of the `si` command does not work for ADE netlisters and generates an error. Therefore, use the `-command nl` option as depicted above.

Note: The variable `nlFormatterClass` is used in addition to the usual OSS variables. It represents the symbolic name of the formatter class.

asiGetNetlistFormatterClass

```
asiGetNetlistFormatterClass(
     o_tool
     )
     => s_class / nil
```

Description

Returns the netlist formatter class for the specified tool.

Arguments

o_tool	The object representing the simulator interface.

Value Returned

s_class	A symbol representing the formatter class.
`nil`	Returns `nil` if there is an error.

Example

```
tool_name = asiGetTool( session )
asiGetNetlistFormatterClass( tool_name )
=> spectreFormatter
```

asiSetNetlistFormatterClass

```
asiSetNetlistFormatterClass(
     o_tool
     s_class
     )
     => s_class
```

Description

Registers the netlist formatter class with the tool. This function is normally called from the `asiInitFormatter` method and should be defined for the interface.

Arguments

o_tool	The object representing the simulator interface.
s_class	A symbol representing the formatter class for the simulator of interest.

Value Returned

s_class	A symbol representing the formatter class for the simulator of interest.

Example

```
asiSetNetlistFormatterClass( o_tool 'spectreFormatter) => spectreFormatter
```

asiCreateFormatter

```
asiCreateFormatter(
     o_session
     )
     => o_formatter
```

Description

First, a design object is created with the `nlCreateDesign` call, using the information on the OASIS session. Subsequently, the formatter is created with a call to `nlCreateFormatter`, using the information on the session. The formatter is added to the session and can be obtained with `asiGetFormatter`. This is a convenience routine that you cannot redefine, and the interface should not call it.

Arguments

o_session	The OASIS session object

Value Returned

o_formatter	The formatter object created.

Example

```
asiCreateFormatter( session )
```

asiCreateCdsenvFile

```
asiCreateCdsenvFile(
     s_toolName
     )
     => t / nil
```

Description

Creates a .cdsenv file for the specified tool and dumps it to the current working directory. This is meant as a development utility for integrators only.

Arguments

s_toolName	The name of the tool. For example, spectre, spectreS, cdsSpice, hspiceS etc.

Value Returned

`t`	`.cdsenv` file created.
`nil`	No `.cdsenv` file created.

Example

```
asiCreateCdsenvFile('spectre )
```

Creates a file called `spectreCdsenvFile` containing spectre tool information in your current working directory.

```
asiCreateCdsenvFile('spectreS)
```

Creates `./spectreSCdsenvFile` for SpectreS tool.

asiGetFormatter

```
asiGetFormatter(
     o_session
     )
     => o_formatter / nil
```

Description

Returns the formatter created with the last `asiCreateFormatter` call. This is a convenience routine that you should not redefine and the interface should not call.

Arguments

o_session	The OASIS session object.

Value Returned

o_formatter	The formatter object.
`nil`	No formatter object is available for the session.

Example

```
asiGetFormatter( session )
```

asiGetSimInputFileName

```
asiGetSimInputFileName(
     o_session
     )
     => t_name
```

Description

Returns the name of the simulator input file. For the `asiAnalog_session` class, this is `input` followed by the return value of `asiGetSimInputFileSuffix`.

Arguments

o_session	The OASIS session object.

Value Returned

t_name	The name of the simulator input file.

Example

```
asiGetSimInputFileName( session ) => "input.ckt"
```

asiGetSimInputFileSuffix

```
asiGetSimInputFileSuffix(
     o_session
     )
     => t_name
```

Description

Returns the suffix used for the simulator input file. This method can be redefined, and must return a string, or a SKILL error will result.

Arguments

o_session	The OASIS session object.

Value Returned

t_name	The suffix of the simulator input file.

Example

```
asiGetSimInputFileSuffix( session ) => ".ckt"
```

4

Netlist Functions

This chapter describes the following types of netlist functions:

The nlAnalogFormatter Class

The `nlAnalogFormatter` class represents the object that formats the design for the netlist file. It is responsible for printing the instances, the subcircuits, the comments, the global statements, and other information associated with the design connectivity.

The netlister calls several methods, such as `nlPrintInst`. The netlister traverses the design and calls the methods of the `nlAnalogFormatter` class. This class is tailored to the Spice 3 simulator and is derived from the more generic `nlFormatter` class:

Except as noted, the methods documented in this chapter may be redefined.

nlFormatter

nlAnalogFormatter

nlGetNetlister

```
nlGetNetlister(
     o_formatter
     )
     => o_netlister
```

OR

```
nlGetNetlister(
     o_instance
     )
     => o_netlister
```

Description

Returns an object representing the netlister.

Note: You can call this function, but do not redefine it.

Arguments

o_formatter	The formatter object.
o_instance	The instance object.

Value Returned

o_netlister	Returns the netlister object.

Example

```
o_netlister = nlGetNetlister(formatter)
nlGetNetlister( inst )
```

nlGetPCellParamSource

```
nlGetPCellParamSource(
     o_cellView
     l_parameters
     )
     => l_booleanValues / nil
```

Description

Identifies the source of value of the Pcell parameters of the given cellview.

Arguments

o_cellview	cellView ID of the Pcell.
l_parameters	List of parameters for which the source needs to be determined

Value Returned

l_booleanValues	List of boolean values where each element of the list indicates whether corresponding parameter in input list is overridden on instances (for this Pcell variant) or is taking a default value. The value t in this list indicates that the parameter is overridden on instance and nil indicates that the parameter has taken the default value.
nil	If there is an error, which can be because the cellview is called outside the context of netlister, or the cellView id is not a valid Pcell.

Example

```
nlGetParamList (o_cellView)
l_parameters
nlGetPCellParamSource (o_cellView, l_parameters)
t nil nil t
```

netlistDir

```
netlistDir(
     t_dirName
     )
     => g_undefined / nil
```

Description

Specifies the directory where the final netlist is to be created.

Arguments

t_dirName	Name of the directory where the final netlist is to be created.

Value Returned

g_undefined	Returns undefined value.
`nil`	Returns `nil` if the specified directory does not exist or there is an error.

Example

The below example specifies the netlist directory as the directory to store the netlist files.

```
netlistDir("~/simulation/ckt/spectre/schematic/netlist") => "~/simulation/ckt/
spectre/schematic/netlist"
```

This example returns the path of the netlist directory.

```
netlistDir() => "~/simulation/ckt/spectre/schematic/netlist"
```

nlGetScratchInstance

```
nlGetScratchInstance(
     t_libName
     t_cellName
     t_viewName
     t_instanceName
     )
     => d_databaseID / nil
```

Description

Returns the database ID of the scratch instance to be used for Pcell evaluations.

If a maestro view is not open, set the environment variable switchViewList before using this function.

Arguments

t_libName	Name of the library.
t_cellName	Name of the cell.
t_viewName	Name of the view.
t_instanceName	Name of the instance.

Value Returned

d_databaseID	Returns the database ID.
nil	If the specified arguments are invalid or the instance with the given name does not exist in the specified cell view.

Example

The following example shows how this function returns the database ID of the scratch instance to be used for Pcell evaluations.

```
nlGetScratchInstance("Two_Stage_Opamp" "OpAmp" "schematic" "M4")
=> db:0x654321bb
```

nlGetSwitchMaster

```
nlGetSwitchMaster(
     t_libName
     t_cellName
     t_viewName
     t_instanceName
     )
     => d_databaseID / nil
```

Description

Returns the database ID of the switch master.

If a maestro view is not open, set the environment variable switchViewList before using this function.

Arguments

t_libName	Name of the library.
t_cellName	Name of the cell.
t_viewName	Name of the view.
t_instanceName	Name of the instance.
t_deviceParamName	Name of the device parameter.

Value Returned

d_databaseID	Returns the database ID.
nil	If the specified arguments are invalid or the instance with the given name does not exist in the specified cell view.

Example

The following examples show how this function returns the database id of the switch master.

```
nlGetSwitchMaster("Two_Stage_Opamp" "OpAmp" "schematic" "M4")
=> db:0x123456aa
```

nlGetToolName

```
nlGetToolName(
     o_formatter
     )
     => s_toolName
```

Description

Returns a symbol representing the simulator. It returns the value of the tool name. This name is used for the selection of the simulator information on the library component.

Note: You can call this function, but do not redefine it.

Arguments

o_formatter	The formatter object.

Value Returned

s_toolName	Returns the name of the tool.

Example

```
nlGetToolName( formatter )
```

nlInitialize

```
nlInitialize(
     o_formatter
     )
     => o_formatter / nil
```

Description

For the `nlFormatter` class, this method initializes the netlister. This method can be redefined for the simulator-specific netlister and is called by `nlCreateFormatter`. This method initializes all simulator-specific aspects of netlisting such as name mapping. For the `nlAnalogFormatter` class, this method sets a number of netlist options. These options and their values are shown in the table below. To inspect the value of an option, use `nlGetOption`.

For a description of all netlist options see "The Netlister Object" on page 116.

Option	value
`hierarchyDelimiter`	`"."`
`globalParamPrefix`	`"_gpar"`
`globalNetPrefix`	`""`
`instNamePrefix`	`"_inst"`
`invalidNetNames`	`'(("gnd!" "0"))`
`inhModelName`	`t` / `nil` specifies whether the simulator provides support for model name passing. A nil value would result in an error if model name is passed through the hierarchy for a stopping instance.
`linePrefix`	`"+"`
`linePostfix`	`nil`
`netNamePrefix`	`"_net"`
`mapInstFirstChar`	special characters and numbers
`mapInstInName`	all special characters
`mapModelFirstChar`	all special characters and numbers
`mapModelInName`	all special characters
`mapNetFirstChar`	all special characters and numbers

Option	value
`mapNetInName`	special characters
`maxNameLength`	`1024`
`modulePrefix`	`"_sub"`
`paramNamePrefix`	`"_par"`
`subcktIndentString`	four spaces
`useInstNamePrefix`	`t`

If you need to change any of these settings, use `callNextMethod()` to inherit as much as possible and then make the changes.

Arguments

o_formatter	The formatter object.

Value Returned

o_formatter	Returns the formatter object, if successful.
`nil`	Returns `nil` if the operation failed.

Example

```
defmethod( nlInitialize((formatter <yourSimulator>Formatter))
    let( (nlForm)
callNextMethod( formatter)
nlForm=nlGetNetlister( formatter )
nlSetOption( nlForm 'hierarchyDelimiter ":")
nlSetOption( nlForm 'maxNameLength 64)
formatter
) )
```

The above example uses `callNextMethod` to do the initialization in the `nlAnalogFormatter` class and then

- Changes the hierarchy delimiter from "." to ":"
- Changes the maximum name length from 1024 chars to 64 chars

nlPrintHeader

```
nlPrintHeader(
     o_formatter
     )
     => t / nil
```

Description

This method writes the beginning comment, adds `.GLOBAL`, and prints header comments.

Arguments

o_formatter	The formatter object.

Value Returned

`t`	Returns `t` when the comment is written.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintHeader ((formatter nlAnalogFormatter))
let( ((netlister nlGetNetlister(formatter)))
nlPrintString( netlister (nlGetOption netlister 'begComment))
nlPrintString( netlister "\n")
nlPrintString( netlister ".GLOBAL")
foreach( glob
    setof( x (nlGetGlobalNets netlister) (nequal x "gnd!"))
    nlPrintString(netlister " ")
    nlPrintString( netlister (nlMapGlobalNet netlister glob))
)
nlPrintHeaderComments( formatter)
nlPrintString(netlister "\n")
t
)
)
```

nlIncludePspiceFile

```
nlIncludePspiceFile(
     o_formatter
     t_fileName
     t_masterName
     )
     => t / nil
```

Description

Prints the include statement for `pspice` cellviews in the design. This function is called before printing the footer for the netlist for all `pspice` modules. If your simulator does not support `pspice` views, call nlError function in this method.

Arguments

o_formatter	The formatter object.
t_fileName	The file name in which the include statements should be printed.
t_masterName	The master name of the model added through include statement.

Value Returned

`t`	Returns `t` if the include statement is printed in the specified file.
`nil`	Returns `nil` if there is an error.

Example

The following example prints the include statement for `pspice` cellviews in the `TopCell.pspice` file:

```
nlIncludePspiceFile(spectre_formatter "/home/TopCell.pspice" "TopCell_amplifier")
=> t
```

nlIncludeVerilogaFile

```
nlIncludeVerilogaFile(
     o_formatter
     t_filename
     t_master
     )
     => t / nil
```

Description

Prints the include statement for verilog-a cell views in the design. This is called before printing the footer for the netlist for all verilog-a modules. If your simulator does not support verilog-a views, call nlError in this method.

Note: The third argument (*t_master*) has been added from the 4.4.6 release onwards.

Arguments

o_formatter	The formatter object.
t_filename	The name of the file to include
t_master	The value for `-master` option on the include line

Value Returned

`t`	Success
`nil`	Failure

Example

```
(defmethod nlIncludeVerilogaFile ((obj <yourSimulator>Formatter) file master)
(when master
    (nlError (nlGetNetlister obj) "Cannot support multile modules with the same
name"))
    (nlPrintStringNoFold (nlGetNetlister obj) "ahdl_include \"" file "\"\n")
    )
```

nlIncludeVerilogFile

```
nlIncludeVerilogFile(
     o_formatter
     t_filename
     t_master
     )
     => t / nil
```

Description

Prints the include statement for verilog type text cell view in the design. This is called before printing the footer for the netlist for all verilog text cell views. If your simulator does not support verilog-a views, call nlError in this method.

Arguments

o_formatter	The formatter object.
t_filename	The name of the file to include
t_master	The value for `-master` option on the include line

Value Returned

`t`	Success
`nil`	Failure

Example

```
(defgeneric nlIncludeVerilogFile (obj_file_master))
```

nlIncludeDbDSPFTextFile

```
nlIncludeDbDSPFTextFile(
     o_formatter
     t_filename
     t_master
     )
     => t / nil
```

Description

Prints the dspf_include statement for DSPF type text cellview in the design.

Arguments

o_formatter	The OASIS session object.
t_filename	The name of the file to include in the design.
t_master	The value for `-master` option on the include line.

Value Returned

`t`	Returns `t` if the dspf_include statement is printed in the design.
`nil`	Returns `nil` otherwise.

Example

```
nlIncludeDbDSPFTextFile( formatter  cvFilePath master )
```

nlIncludeDbSPICEMODELTextFile

```
nlIncludeDbSPICEMODELTextFile(
     o_formatter
     t_filename
     )
     => t / nil
```

Description

Prints the include statement for SPICEMODEL cellviews in the design. This function is called before printing the footer for the netlist for all SPICEMODEL modules. If your simulator does not support SPICEMODEL views, call the nlError function in this method.

Arguments

o_formatter	The formatter object.
t_filename	The file name in which the include statements should be printed.

Value Returned

`t`	Returns `t` if the include statement is printed in the specified file.
`nil`	Returns `nil` if there is an error.

Example

```
nlIncludeDbSPICEMODELTextFile (spectre_formatter "/home/TopCell.mod")
=> t
```

The function above prints the include statement for SPICEMODEL cellviews in the `TopCell.mod` file.

nlIsPcellInstance

```
nlIsPcellInstance(
     t_libName
     t_cellName
     t_viewName
     t_instanceName
     )
     => t / nil
```

Description

Checks if the specified instance name represents a schematic Pcell instance.

If a maestro view is not open, set the environment variable switchViewList before using this function.

Arguments

t_libName	Name of the library.
t_cellName	Name of the cell.
t_viewName	Name of the view.
t_instanceName	Name of the instance.

Value Returned

`t`	If the specified instance name represents a schematic Pcell instance.
`nil`	■ If the arguments specified for the function are invalid. ■ When the instance with the given name does not exist in the specified cell view. ■ If the specified instance does not represent a schematic Pcell instance.

Examples

```
nlIsPcellInstance("Two_Stage_Opamp" "OpAmp" "schematic" "M4")
=> t
```

```
nlIsPcellInstance("Two_Stage_Opamp" "OpAmp" "schematic" "V0")
=> nil
```

nlIsPcellParam

```
nlIsPcellParam(
     t_libName
     t_cellName
     t_viewName
     t_instanceName
     t_deviceParamName
     )
     => t / nil
```

Description

Checks if the specified device parameter represents a Pcell parameter.

If a maestro view is not open, set the environment variable switchViewList before using this function.

Arguments

t_libName	Name of the library.
t_cellName	Name of the cell.
t_viewName	Name of the view.
t_instanceName	Name of the instance.
t_deviceParamName	Name of the device parameter.

Value Returned

t	If the specified device parameter represents a Pcell parameter.
nil	If the specified device parameter does not represent a Pcell parameter or the provided arguments are invalid.

Examples

```
nlIsPcellParam("Two_Stage_Opamp" "OpAmp" "schematic" "M4" "simM")
=> t
```

```
nlIsPcellParam("Two_Stage_Opamp" "OpAmp" "schematic" "M4" "w")
=> nil
```

nlIsSmartExtractedView

```
nlIsSmartExtractedView(
     o_cellViewHandle
     )
     => t / nil
```

Description

Identifies if the currently netlisted cellview is of the type *smart_view*. You can use this function in custom netlist procedures to modify the syntax printed to the netlist as required. For example, you can modify the syntax to determine if the printing of parenthesis needs to be enabled or disabled when printing the port connections of the instance.

Arguments

o_cellViewHandle	A handle to the current cellview that is being netlisted.

Value Returned

`t`	Returns `t` when the cellview is netlisted.
`nil`	Returns `nil` if there is an error.

Example

```
(nlIsSmartExtractedView ((nlGetCurrentCellView (nlGetNetlister inst)))
=> t/nil
```

The following snippet shows how to use this function in a custom netlist procedure:

```
(defun _myCustomNetlistProc (instance)
        (let (netlister isNextGenExtrCV currentCV signalList)
        netlister = (nlGetNetlister instance)
        currentCV = (nlGetCurrentCellView netlister)
        isNextGenExtrCV = (nlIsSmartExtractedView currentCV)
        signalList = (nlGetSignalList instance)
            (when (not isNextGenExtrCV) nlPrintString(netlister sprintf(nil "(")))
                (foreach signal signalList nlPrintString(netlister sprintf(nil "%s
            " signal)))
            (when (not isNextGenExtrCV) nlPrintString(netlister sprintf(nil ")
")))
    )
)
```

nlPrintFooter

```
nlPrintFooter(
     o_formatter
     )
     => t / nil
```

Description

This method is called at the end of netlisting. It does not print anything at the end of the netlist for the `nlAnalogFormatter` class.

Arguments

o_formatter	The formatter object.

Value Returned

`t`	Returns `t` if the footer is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintFooter ((formatter xyzFormatter))
     callNextMethod()
     nlPrintComment( nlGetNetlister( xyzFormatter )
                 "End of netlist\n")
)
```

nlPrintSubcktHeaderComments

```
nlPrintSubcktHeaderComments(
     o_formatter
     o_cellView
     )
     => t
```

Description

Prints the comments for the subcircuit header and the mapping information when the `printSubcktComments` option is set.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cell view.

Value Returned

`t`	Returns `t` in all cases.

Example

```
defmethod( nlPrintSubcktHeaderComments ((formatter
                                 xyzFormatter) cv)
let( (nl)
     callNextMethod()
     nl = nlGetNetlister(formatter)
nlPrintComment( nl "anything else")
) )
```

nlPrintTopCellHeaderComments

```
nlPrintTopCellHeaderComments(
     o_formatter
     o_cellView
     )
     => t
```

Description

Calls `nlPrintSubcktHeaderComments` for the `nlAnalogFormatter` class.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cell view.

Value Returned

`t`	Returns `t` in all cases.

Example

```
defmethod( nlPrintTopCellHeaderComments ((formatter
                               xyzFormatter) cv)
nlPrintSubcktHeaderComments( formatter cv)
)
```

nlPrintTopCellFooterComments

```
nlPrintTopCellFooterComments(
     o_formatter
     o_cellView
     )
     => t
```

Description

Returns `t` at the `analogFormatter` level.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cell view.

Value Returned

`t`	Returns `t` in all cases.

Example

```
defmethod( nlPrintTopCellFooterComments ((formatter
                              xyzFormatter) cv)
let( (nl)
     callNextMethod()
     nl = nlGetNetlister(formatter)
nlPrintComment( nl "anything else")
) )
```

nlPrintTopCellHeader

```
nlPrintTopCellHeader(
     o_formatter
     o_cellView
     )
     => t / nil
```

Description

Prints the header of the top-level circuit by calling `nlPrintTopCellHeaderComments`.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cell view.

Value Returned

`t`	Returns `t` if the header is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintTopCellHeader((formatter xyzformatter) cv)
       (nlPrintTopCellHeaderComments formatter cv)
)
```

nlPrintTopCellFooter

```
nlPrintTopCellFooter(
     o_formatter
     o_cellView
     )
     => t / nil
```

Description

Writes the top cell view footer. This function prints an empty line and calls `nlPrintTopCellFooterComments`.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cell view.

Value Returned

`t`	Returns `t` if the footer is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintTopCellFooter ((formatter
                              xyzFormatter) cv)
     callNextMethod()
     myTopCellFooter()
t
)
```

nlPrintSubcktHeader

```
nlPrint SubcktHeader(
     o_formatter
     o_cellView
     )
     => t / nil
```

Description

Writes the header for a subcircuit following these steps: prints comments by calling `nlPrintSubcktHeaderComments`; prints the subckt begin keyword by calling `nlPrintSubcktBegin`; prints the subckt name by calling `nlPrintSubcktName`; prints the subckt terminal list by calling `nlPrintSubcktTerminalList`.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cell view.

Value Returned

`t`	Returns `t` if the header for the subcircuit is added.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintSubcktHeader((formatter xyzformatter) cv )
let( (nl)
nl = nlGetNetlister(formatter)
    (nlPrintSubcktHeaderComments formatter cv)
    (nlPrintSubcktBegin formatter cv)
    (nlPrintSubcktName formatter cv)
    (nlPrintSubcktTerminalList formatter cv)
    (nlPrintString nl "\n")
) )
```

nlPrintSubcktFooter

```
nlPrintSubcktFooter(
     o_formatter
     o_cellView
     )
     => t / nil
```

Description

Writes the footer for the subcircuit. For the `nlAnalogFormatter` class, it prints `.ends`.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cell view.

Value Returned

`t`	Returns `t` if the footer for the subcircuit is written.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintSubcktFooter ((formatter
                          xyzFormatter) cv)
nlPrintSubcktEnd( formatter cv)
nlPrintTopCellFooterComments( formatter cv)
t)
```

nlPrintSubcktFooterComments

```
nlPrintSubcktFooterComments(
     o_formatter
     o_cellView
     )
     => t
```

Description

Prints the comments for the subcircuit footer by printing the string '`End of subcircuit definition.`' preceded by the comment begin string.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cell view.

Value Returned

`t`	Returns `t` if the subcircuit footer comments are printed.

Example

```
defmethod( nlPrintSubcktFooterComments ((formatter
                              xyzFormatter) cv)
let( (nl)
     callNextMethod()
     nl = nlGetNetlister(formatter)
nlPrintComment( nl "anything else")
) )
```

nlPrintInstComments

```
nlPrintInstComments(
     o_formatter
     o_instance
     )
     => t
```

Description

Prints the comments for an instance.

Arguments

o_formatter	The formatter object.
o_instance	The object representing the instance.

Value Returned

`t`	Returns `t` if the comments for the instance are printed.

Example

```
defmethod( nlPrintInstComments ((formatter
                             xyzFormatter) inst)
let( (nl)
     callNextMethod()
     nl = nlGetNetlister(formatter)
nlPrintComment( nl "anything else")
) )
```

nlPrintInst

```
nlPrintInst(
     o_formatter
     o_instance
     )
     => t / nil
```

Description

Prints the netlist statement for an instance. This is the default netlist procedure for a component.

It prints the following:

- instance comments by calling `nlPrintInstComments`
- a string to indent (for the top-level circuit, this is an empty string; for subcircuits, this is the value of the `subcktIndentString` netlist option.)
- instance name
- signals
- model name
- instance parameters in name=value pairs.

Note: If a netlist procedure is specified as a `netlistProcedure` in the CDF simInfo, that procedure is called instead of `nlPrintInst`.

Note: The end of the instance line, `\n`, is not printed by this method or the netlist procedure. The end of the line is printed by the `nlPrintInstEnd` method.

Arguments

o_formatter	The formatter object.
o_instance	The object representing the instance.

Value Returned

`t`	Returns `t` if the netlist statement is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintInst ((formatter nlAnalogFormatter) inst)
nlPrintInstComments( formatter inst)
nlPrintIndentString( nlGetNetlister( formatter ))
nlPrintInstName( formatter inst)
nlPrintInstSignals( formatter inst)
nlPrintModelName( formatter inst)
nlPrintInstParameters( formatter inst)
t
)
```

nlPrintInstEnd

```
nlPrintInstEnd(
     o_formatter
     o_instance
     )
     => t / nil
```

Description

Prints the end of the instance statement, which is a return (`\n`). This method is called by the netlister after the netlist procedure or by `nlPrintInst`.

Arguments

o_formatter	The formatter object.
o_instance	The object representing the instance.

Value Returned

`t`	Returns `t` if the end of the instance statement is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintInstEnd ((formatter nlAnalogFormatter) inst)
    nlPrintString( nlGetNetlister( formatter) "\n")
    t
)
```

nlPrintSubcktBegin

```
nlPrintSubcktBegin(
     o_formatter
     o_cellView
     )
     => t / nil
```

Description

Prints the `.subckt` keyword for the `nlAnalogFormatter` class. This method is called by `nlSubcktHeader`.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cellview.

Value Returned

`t`	Returns `t` if the keyword is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintSubcktBegin ((formatter nlAnalogFormatter) _cv)
    nlPrintString( nlGetNetlister( formatter) ".subckt")
    t
)
```

nlPrintSubcktName

```
nlPrintSubcktName(
     o_formatter
     o_cellView
     )
     => t / nil
```

Description

Prints a space and the simulator name of the subcircuit. This method is used by `nlSubcktHeader`.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cellview.

Value Returned

`t`	Returns t if the simulator name is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintSubcktName ((formatter nlAnalogFormatter) cv)
    let( ( (nl nlGetNetlister(formatter))
    nlPrintString( nl " ")
    nlPrintString( nl nlGetSimName (cv) )
    t )
)
```

nlPrintSubcktEnd

```
nlPrintSubcktEnd(
     o_formatter
     o_cellView
     )
     => t / nil
```

Description

For the `nlAnalogFormatter` class, prints the `.ends` keyword, followed by a space and the simulator name of the subcircuit, to mark the end of the subcircuit definition. It is called by `nlPrintSubcktFooter`.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cellview.

Value Returned

`t`	Returns `t` if the keyword followed by a space and the simulator name is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintSubcktEnd ((formatter nlAnalogFormatter) cv)
    let( ( (nl nlGetNetlister(formatter))
    nlPrintString( nl ".ends")
    nlPrintString( nl nlGetSimName (cv) )
    nlPrintString( nl "\n")
    t
) )
```

nlPrintHeaderComments

```
nlPrintHeaderComments(
     o_formatter
     )
     => t / nil
```

Description

Prints the comments for the netlist file, including the library, cell, and view names of the top-level cellview of the design netlisted. This method only has effect when the `printFileComments` netlist option is set.

Arguments

o_formatter	The formatter object.

Value Returned

`t`	Returns `t` if the comments are printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintHeaderComments ((formatter
                                  xyzFormatter) inst)
let( (nl)
nl = nlGetNetlister(formatter)
     callNextMethod()
     nl = nlGetNetlister(formatter)
     nlPrintComment( nl "anything else")
) )
```

nlPrintSubcktParameters

```
nlPrintSubcktParameters(
     o_formatter
     o_cellView
     )
     => t / nil
```

Description

Prints the passed parameters for the subcircuit definition.

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cellview.

Value Returned

`t`	Returns `t` if the parameters are printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintSubcktParameters
                 ((formatter nlAnalogFormatter) cv)
let( ((plist nlGetParamList( cv))
                    (nl nlGetNetlister( formatter)))
when( plist
      nlPrintString( nl ".PARAMETERS")
           foreach( param plist
               cond(
                    ((cadr param) nlPrintString( nl " "
                              (car param) "=" (cadr param)))
                     (t nlPrintString( nl " " (car param)))
                  )
          )
      nlPrintString( nl "\n")
)))
```

nlPrintSubcktTerminalList

```
nlPrintSubcktTerminalList(
     o_formatter
     o_cellView
     )
     => t / nil
```

Description

Prints the simulator names of the signals connected to the terminals for a subcircuit definition and handles the signals resulting from inherited connections at a lower level .

Arguments

o_formatter	The formatter object.
o_cellView	The object representing the cellview

Value Returned

`t`	Returns `t` if the simulator names are printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintSubcktTerminalList ((formatter
                             xyzFormatter) cv )
     let( ( (nl nlGetNetlister(formatter))
     foreach( net nlGetSimTerminalNets( cv )
          nlPrintString( nl " " )
     nlPrintString( nl net ) )
) )
```

nlPrintInstName

```
nlPrintInstName(
     o_formatter
     o_instance
     )
     => t / nil
```

Description

Prints the simulator name of the instance, taking the instance name prefix specified on the component into account when the simulator so requires. This is determined with the `useInstNamePrefix` netlist option.

Arguments

o_formatter	The formatter object.
o_instance	The object representing the instance.

Value Returned

`t`	Returns `t` if the simulator name is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintInstName ((formatter
                              xyzFormatter) inst)
nlPrintString( nlGetNetlister( formatter)
                          nlGetSimName (inst ) ) )
```

nlPrintInstSignals

```
nlPrintInstSignals(
     o_formatter
     o_instance
     )
     => t / nil
```

Description

Prints the simulator names of the signals according to the terminal order specified on the component, using the `nlGetSignalList` method of the instance.

Arguments

o_formatter	The formatter object.
o_instance	The object representing the instance.

Value Returned

`t`	Returns `t` if the simulator names of the signals are printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintInstSignals ((formatter
                                xyzFormatter) inst)
let( (sigs (fp nlGetNetlister(formatter)) )
      ;; print terminals
      when( sigs = (nlGetSignalList inst)
           foreach( sig sigs|
                nlPrintString( fp sig " ")
           ))))
```

nlPrintModelName

```
nlPrintModelName(
     o_formatter
     o_instance
     )
     => t / nil
```

Description

Prints the model name. The `nlGetModelName` for the instance is used for the model name.

Arguments

o_formatter	The formatter object.
o_instance	The object representing the instance.

Value Returned

`t`	Returns `t` if the model name is printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintModelName ((formatter xyzFormatter) inst)
     nlPrintString( nlGetNetlister( formatter ) " "
              nlGetModelName( inst ))
)
```

Note: If your simulator supports model name passing, you can use the function `nlIsModelNameInherited` and alter the formatting of the instance line for the scenario as per the requirements of your simulator.

nlPrintInstParameters

```
nlPrintInstParameters(
     o_formatter
     o_instance
     )
     => t / nil
```

Description

Prints the instance parameters in name=value pairs.

Arguments

o_formatter	The formatter object.
o_instance	The object representing the instance

Value Returned

`t`	Returns `t` if the instance parameters are printed.
`nil`	Returns `nil` if there is an error.

Example

```
defmethod( nlPrintInstParameters
                      ((formatter nlAnalogFormatter) inst)
let( (val (nl nlGetNetlister( inst) ) )
;; print properties
foreach( par nlGetParamList( inst)
     unless(
          val = nlGetParamStringValue( inst par)
          nlPrintString( nl)
                              " " get_string (par) "=" val)
      ))))
```

The Netlister Object

The netlister object represents the engine that produces the netlist. This object drives the format object and provides all necessary services such as name mapping. The netlister is the incremental, hierarchical netlister. You can obtain the netlister object from the formatter using `nlGetNetlister`.

Caution

None of the methods defined for the netlister can be redefined.

The options that can be set with the `nlSetOption` method are given in the table below. The values for the `nlAnalogFormatter` are provided in "nlInitialize" on page 81.

This object represents the incremental hierarchical netlister. The netlist options are set with nlSetOption. This section also lists the netlist options.

Netlist Options

A number of options have been added for direct simulation.

Note: Call `nlGetOptionNameList` to get a complete list of netlist options.

begComment

Comment string for lines that begin with a comment for your simulator.

constantsList

A list of names which are used as constant names by your simulator. These names are mapped by the netlister when used as passed parameter names.

forceAlwaysAddPrefixInInstName

Determines whether to add a prefix in the instance name while generating the netlist.

When the `forceAlwaysAddPrefixInInstName` variable is set to `true`, it checks the value of `alwaysAddPrefixInInstName` and then during netlisting update the `simAlwaysAddPrefixInInstName` variable according to the value specified in the `alwaysAddPrefixInInstName` variable. It also restores the value of `simAlwaysAddPrefixInInstName` to its original value after the netlisting is finished.

When the `forceAlwaysAddPrefixInInstName` variable is set to `nil`, the default value of `simAlwaysAddPrefixInInstName` is used.

alwaysAddPrefixInInstName

Controls the behavior of `simAlwaysAddPrefixInInstName` variable for analog class simulators. When the `alwaysAddPrefixInInstName` variable is set to `true`, it sets the `simAlwaysAddPrefixInInstName` variable to `true` and when the `alwaysAddPrefixInInstName` variable is set to `nil`, it sets the `simAlwaysAddPrefixInInstName` variable to `nil`.

globalNetPrefix

Specifies the string the formatter should use as the prefix for all global nets in a netlist.

globalParamPrefix

Specifies the string the formatter should use as the prefix for all global parameters in a netlist.

hierarchyDelimiter

Character used by the simulator for delimiting levels of hierarchy when it flattens the hierarchical netlist. Used for mapping result names.

instNameDifferentFrom

A list that contains the name types that the instance names cannot collide with. The types can be one or more of "model", "net", and "parameter".

instNamePrefix

Specifies the name prefix to be used when the netlister generates a unique instance name.

instTermDelimiter

The delimiter between the instance and the terminal used by the simulator.

invalidModelNames

A list of names which are invalid as model names for your simulator.

invalidInstNames

A list of names which are invalid as instance names for your simulator.

invalidNetNames

A list of names which are invalid as net names in the target tool net name space.

invalidParamNames

A list of names which are invalid as parameter names for your simulator.

linePostfix

String placed at the end of the current line when a line output to the netlist exceeds the maximum line length of the simulator and must be split into two lines. This variable is used by the `nlPrintString` function.

linePrefix

String placed at the beginning of the next line when a line output to the netlist exceeds the maximum line length of the simulator and must be split into two lines. This variable is used by the `nlPrintString` method.

mapInstFirstChar

A SKILL list that specifies which characters may not begin an instance name for the target simulator. Each element in the list may be either a string or another list. If it is a string, it should contain a single character. This specifies that there is no replacement for this character and any name beginning with this character must be replaced. If an element is another list, it should contain two elements. The first element should be a string containing a single character that is the invalid character. If the second element of the sublist does not exist or is `nil`, the character specified by the first element is removed. If the second element is a string, that string replaces the character if it is encountered. This list is used when mapping instance names.For example, if the value of this option is

```
'( "." )
```

then the name ".`inst24`" is mapped to a name that is generated by the netlister, starting with the value of the `instNamePrefix` option. For the `nlAnalogFormatter` class the name could be "`_inst3`".

mapInstInName

A SKILL list that specifies which characters may not be contained in an instance name for the target simulator. Each element in the list may be either a string or another list. If it is a string, it should contain a single character. This specifies that there is no replacement for this character and any name beginning with this character must be replaced. If an element is another list, it should contain two elements. The first element should be a string containing a single character that is the invalid character.

If the second element of the sublist does not exist or is `nil`, the character specified by the first element is removed. If the second element is a string, that string replaces the character if it is encountered. This list is used when mapping instance names.

For example, if the value of this option is

```
'( "." ("<" "_") (">") )
```

then the name "`inst.24`" is mapped to a name that is generated by the netlister, starting with the value of the `instNamePrefix` option. For the `nlAnalogFormatter` class the name could be "`_inst3`". The name "`inst<1>`" could be mapped to "`inst5_1`".

mapModelFirstChar

A SKILL list that specifies which characters may not begin a subcircuit name for the target simulator. Each element in the list may be either a string or another list. If it is a string, it should contain a single character.

This specifies that there is no replacement for this character and any name beginning with this character must be replaced. If an element is another list, it should contain two elements. The first element should be a string containing a single character that is the invalid character. If the second element of the sublist does not exist or is `nil`, the character specified by the first element is removed. If the second element is a string, that string replaces the character if it is encountered. This list is used when mapping subcircuit names. For example, if the value of this option is

```
'( "." )
```

then the name "`.sub24`" is mapped to a name that is generated by the netlister, starting with the value of the `modulePrefix` option. For the `nlAnalogFormatter` class the name could be "`_sub3`".

mapModelInName

A SKILL list that specifies which characters may not be contained in an subcircuit name for the target simulator. Each element in the list may be either a string or another list. If it is a string, it should contain a single character. This specifies that there is no replacement for this character and any name beginning with this character must be replaced. If an element is another list, it should contain two elements.

The first element should be a string containing a single character that is the invalid character. If the second element of the sublist does not exist or is `nil`, the character specified by the first element is removed. If the second element is a string, that string replaces the character if it is encountered. This list is used when mapping subcircuit names.

For example, if the value of this option is

```
'( "." )
```

then the name "`sub.24`" is mapped to a name that is generated by the netlister, starting with the value of the `modulePrefix` option. For the `nlAnalogFormatter` class the name could be "`_sub3`".

mapNetFirstChar

A SKILL list that specifies which characters may not begin a name for the target simulator. Each element in the list may be either a string or another list. If it is a string, it should contain a single character. This specifies that there is no replacement for this character and any name beginning with this character must be replaced. If an element is another list, it should contain two elements. The first element should be a string containing a single character that is the invalid character.

If the second element of the sublist does not exist or is `nil`, the character specified by the first element is removed. If the second element is a string, that string replaces the character if it is encountered. This list is used when mapping net names. For example, if the value of this option is

```
'( "." )
```

then the name "`.net24`" is mapped to a name that is generated by the netlister, starting with the value of the netNamePrefix option. For the `nlAnalogFormatter` class the name could be "`_net3`".

mapNetInName

A SKILL list that specifies which characters may not be contained in a name for the target simulator. Each element in the list may be either a string or another list. If it is a string, it should contain a single character. This specifies that there is no replacement for this character and any name containing this character must be replaced. If an element is another list, it should contain two elements. The first element should be a string containing a single character that is the invalid character. If the second element of the sublist does not exist or is `nil`, the character specified by the first element is removed. If the second element is a string, that string replaces the character when it is encountered. This list is used when mapping net names. For example, if the value of this option is

```
'( "." ("<" "_") (">") )
```

then the name "`net.24`" is mapped to a name that is generated by the netlister, starting with the value of the `netNamePrefix` option. For the `nlAnalogFormatter` class the name could be "`_net3`". The name "`net5<1>`" could be mapped to "`net5_1`"

mapSubcktTermsToOrder

When set, the subcircuit terminal names are mapped to the order of the terminal.

maxLineLength

Maximum line length of a line output to the netlist file when using the `nlPrintString` function. When the maximum is reached, the line is broken at the first blank space before this limit is and continued on the next line. If there is no blank space on the line, the line is broke at the limit and continued on the next line.

maxNameLength

Maximum number of character allowed in a simulator name. Used for mapping.

modelNameDifferentFrom

A list that contains the name types that the subcircuit names cannot collide with. The types can be one or more of "instance", "net", and "parameter".

modulePrefix

Specifies the string the formatter uses as the prefix for a mapped subcircuit name in a netlist.

netNameDifferentFrom

A list that contains the name types that the net names cannot collide with. The types can be one or more of "model", "instance", and "parameter".

netNamePrefix

Specifies the name prefix to be used when the netlister generates a unique signal name.

paramNameDifferentFrom

A list that contains the name types that the parameter names cannot collide with. The types can be one or more of "model", "net", and "instance".

paramNamePrefix

Specifies the name prefix to be used when the netlister generates a unique parameter name.

printFileComments (t)

Print the standard comments at the beginning and end of the netlist file.

printInstComments(nil)

Print the standard comment before each instance line.

printSubcktComments (t)

Print the standard comments at the beginning and end of each subcircuit, including the top-level circuit

printSubcktTerminalComments(nil)

Print the mapping of the subckt terminals to the beginning of the subcircuit

softLineLength

The desirable maximum line length of a line output to the netlist file when using the `nlPrintString` function. When the maximum is reached, the line is broken at first blank space before this limit, and continued on the next line. If no space is available, the output is continued on the same line until a space is encountered, or until `maxLineLength` is reached.

subcktIndentString

A string that represents the indentation in a subcircuit.

subcktInstPrefix

If `useInstNamePrefix` is set, and no prefix is specified on the CDF, then this prefix is used for subcircuit instances.

suffixMap

A SKILL list which specifies the suffixes that need to be mapped. Each element in the list could be a symbol or a string or another list which has either one or two elements. For example, if the value of this option is

```
'( '( "M" "Meg" ) '( 'Y ) 'm)
```

then "`M`" must be mapped to "`Meg`", and "`Y`" and "`m`" must be mapped to the internal default.

useInstNamePrefix (t)

When set, the name prefix is taken into account for instance names.

nlError

```
nlError(
     o_netlister
     t_error
     )
     => nil
```

Description

Issues a user error. The error is printed immediately and it is collected on the object. In this way, if netlisting is interrupted, the user is aware of any errors that occurred during netlisting. All errors are printed to the netlist log file.

Arguments

o_netlister	The netlister object.
t_error	The description of the error in the form of a format string.

Value Returned

`nil`	Returns `nil` in all cases.

Example

```
nlError(nl sprintf("Missing Parameter '%s' in %s" param
    nlGetSimName(inst) ) )
```

nlObjError

```
nlObjError(
     o_netlister
     o_object
     t_error
     )
     => nil
```

Description

Similar to nlError, but prints a description of the object along with the error message. The description includes the library name, the cell name, the view name, and the instance name in case the object is an instance.

Arguments

o_netlister	The netlister object.
o_object	The instance or the cellview object.
t_error	The description of the error in the form of a format string.

Value Returned

`nil`	Returns `nil` in all cases.

Example

```
nlObjError(nl inst sprintf("Missing Parameter ‘%s’ in" param ) )
```

nlGetDesign

```
nlGetDesign(
     o_netlister
     )
     => o_design
```

Description

Returns the design object.

Arguments

o_netlister	The netlister object.

Value Returned

o_design	Returns the design object.

Example

```
nlGetDesign( netlister )
```

nlGetGlobalNets

```
nlGetGlobalNets(
     o_netlister
     )
     => l_globalNets
```

Description

Returns the list of global nets. This method should only be used in the `nlPrintHeader` method of the formatter.

Globals may be included that are not used, due to inherited connections.

Arguments

o_netlister	The netlister object.

Value Returned

l_globalNets	Returns the list of global signals.

Example

```
nlGetGlobalNets( netlister )
```

nlGetNetlistDir

```
nlGetNetlistDir(
     o_netlister
     )
     => t_netlistDir
```

Description

Returns the netlist directory.

Arguments

o_netlister	The netlister object.

Value Returned

t_netlistDir	Returns the netlist directory.

Example

```
nlGetNetlistDir( netlister )
```

nlDisplayOption

```
nlDisplayOption(
     o_netlister
     )
     => t
```

Description

Prints the option names available on this object along with their values.

Arguments

o_netlister	The netlister object.

Value Returned

`t`	Returns `t` in all cases.

Example

```
nlDisplayOption( netlister )
```

nlGetCurrentSwitchMaster

```
nlGetCurrentSwitchMaster(
     o_netlister
     )
     => S_id
```

Description

This function returns the database ID for the current switch master for the instance in hierarchical incremental netlisting . This function should only be used while printing the instance statement. Avoid using this function if possible.

Arguments

o_netlister	The netlister object

Value Returned

S_id	The Database ID for the current switch master.

Example

```
nlGetCurrentSwitchMaster( netlister )
```

nlGetNetlistedStopCellViewList

```
nlGetNetlistedStopCellViewList(
     o_netlister
     )
     => l_cellView
```

Description

Returns a list of cellview objects treated as stop cells for the specified netlister object.

Arguments

o_netlister	The netlister object.

Value Returned

l_cellView	Returns a list of cellview objects.

Example

```
obj = (nlGetNetlister formatter)
cvList = nlGetNetlistedStopCellViewList(obj)
=> (stdobj@0x2601d470 stdobj@0x2601d458 stdobj@0x2601d440 stdobj@0x2601d428)
cvList~>cellName
=>("cap" "res" "idc" "vsin" )
```

nlGetOption

```
nlGetOption(
     o_netlister
     s_name
     )
     => g_value
```

Description

Returns the value of the option.

Arguments

o_netlister	The netlister object.
s_name	The name of the netlist option.

Value Returned

g_value	Returns the value of the netlist option.

Example

```
nlGetOption( netlister 'begComment)
```

nlGetOptionNameList

```
nlGetOptionNameList(
     o_netlister
     )
     => l_names
```

Description

Returns the list of option names available on this object.

Arguments

o_netlister	The netlister object.

Value Returned

l_names	Returns the list of option names.

Example

```
nlGetOptionNameList( netlister )
```

nlMapGlobalNet

```
nlMapGlobalNet(
     o_netlister
     t_net
     )
     => t_map
```

Description

Maps a global net (signal) to the simulator name. This should only be used in the `nlPrintHeader` method of the formatter. Use at any other time is an error.

Arguments

o_netlister	The netlister object.
t_net	The schematic name of the global net.

Value Returned

t_map	Returns the mapped name of the global net.

Example

```
nlMapGlobalNet( netlister globalNet )
```

nlInfo

```
nlInfo(
     o_netlister
     t_info
     [ g_arg ... ]
     )
     => t
```

Description

Sends an informational message to the calling application.

Arguments

o_netlister	The netlister object.
t_info	The message description, a format string.
g_arg	Arguments used for printing with the format string.

Value Returned

`t`	Returns `t` in all cases.

Example

```
nlInfo(nl "My info message.\n")
```

nlSetOption

```
nlSetOption(
     o_netlister
     s_option
     g_value
     )
     => t / nil
```

Description

Sets an option value. For information about options, see Netlist Options on page 4-41.

Note: This function can only be called during initialization. If it is called during netlisting, an error results.

Arguments

o_netlister	The netlister object.
s_name	The name of the option.
g_value	The value to which the option is set. The value type must be appropriate for the option name.

Value Returned

`t`	Returns `t` if the option value is set.
`nil`	Returns `nil` if there is an error.

Example

```
nlSetOption( netlister 'maxNameLength 1024)
nlSetOption( netlister 'hierarchyDelimiter ".")
```

nlWarning

```
nlWarning(
     o_netlister
     t_warning
     [ g_arg ... ]
     )
     => t
```

Description

Issue a warning to the user.

Arguments

o_netlister	The netlister object.
t_warning	The description of the warning message in the form of a format string.
g_arg	Arguments used for printing with the format string.

Value Returned

`t`	Returns `t` in all cases.

Example

```
nlWarning(nl "My warning message.\n")
```

nlPrintComment

```
nlPrintComment(
     o_netlister
     [ t_arg1 t_arg2 ... ]
     )
     => t / nil
```

Description

Prints a comment. Use this method to print all comments. This method uses the comment character and line wrapping. A subsequent `nlPrintf` call inserts the end comment string.

Arguments

o_netlister	The netlister object.
t_arg1, *t_arg2*	Arguments to formatted output.

Value Returned

`t`	Returns `t` if the comments are printed.
`nil`	Returns `nil` if there is an error.

Example

```
nlPrintComment( netlister "My comment" )
```

nlPrintIndentString

```
nlPrintIndentString(
     o_netlister
     )
     => t / nil
```

Description

Prints the indent string for the instance statement. When inside the top-level circuit, the empty string is printed. When inside subcircuit definitions, the value of the `subcktIndentString` netlist option is printed.

Arguments

`o_netlister`	The netlister object.

Value Returned

`t`	Returns `t` if the indent string is printed.
`nil`	Returns `nil` if there is an error.

Example

```
nlPrintIndentString( netlister )
```

nlPrintString

```
nlPrintString(
     o_netlister,
     [ @rest t_args ]
     )
     => t / nil
```

Description

Prints the string arguments to the file. This function does the required line folding, prefixing, and, postfixing.

Arguments

o_netlister	The netlister object.
@rest *t_args*	The strings to be printed.

Value Returned

`t`	Returns `t` if the string argument is printed.
`nil`	Returns `nil` if there is an error.

Example

```
nlPrintString( netlister, "my string\n" )
```

nlPrintStringNoFold

```
nlPrintStringNoFold(
     o_netlister,
     [ @rest t_args ]
     )
     => t / nil
```

Description

Prints the string arguments to the file, like the function `nlPrintString`. This function does the required prefixing and postfixing, but does not fold the line until a newline character or `maxLineLength` is encountered. While in a 'no fold' print mode, calls cannot be made to nlPrintString.

Arguments

`o_netlister`	The netlister object.
`@rest` *`t_args`*	The strings to be printed.

Value Returned

`t`	Returns `t` if the string argument is printed.
`nil`	Returns `nil` if there is an error.

Example

```
nlPrintStringNoFold( netlister, "my string\n" )
```

Methods for Instances

During netlisting, instances are represented by objects. These objects cannot be redefined by the simulator interface.

Important

Do not redefine any of the methods in this section.

nlIsModelNameInherited

```
nlIsModelNameInherited(
     o_instance
     )
     => t / nil
```

Description

Returns `t` if the model name for the stopping instance is passed through the hierarchy through parameters.

Arguments

o_instance	The instance object.

Value Returned

`t`	The model name will be passed from a higher level.
`nil`	The model name is specified at the instance.

Example

```
nlIsModelNameInherited( inst )
```

nlGetFormatter

```
nlGetFormatter(
     o_instance
     )
     => o_formatter
```

Description

Returns the formatter.

Arguments

o_instance	The instance object.

Value Returned

o_formatter	Returns the formatter object used for netlisting.

Example

```
nlGetFormatter( inst )
```

nlGetSimName

```
nlGetSimName(
     o_instance
     )
     => t_name
```

OR

```
nlGetSimName(
     o_cellView
     )
     => t_simName
```

Description

If the input type is cellview object, then returns the simulator name of the subcircuit. If the input type is instance object, then returns the mapped name of the instance. The name returned depends on the `useInstNamePrefix` netlist option. When it is not set, the name prefix is not taken into account. However, for instances representing interface elements, the name prefix is always taken into account. No mapping is performed for interface elements.

For instance object, when the `useInstNamePrefix` netlist option is set, this method takes the name prefix into account. The prefix of a subcircuit does not have to be specified on the CDF of each subcircuit. If the prefix is specified on the CDF, it is used. Otherwise, the subcktInstPrefix netlist option is used.

Arguments

o_instance	The instance object.
o_cellView	The cellview object.

Value Returned

t_name	Returns the mapped instance name if the input type is instance object.
t_simName	Returns the simulator name if the input type is cellview object.

Example

```
nlGetSimName( inst )
nlGetSimName( cv )
```

nlGetSignalList

```
nlGetSignalList(
     o_instance
     )
     => l_signals
```

Description

Returns the list of mapped signal names for the instance according to the terminal order specified for the cellview. Use this method for printing instances to the netlist by the `nlPrintInst` method of the formatter. The terminal order for schematic subcircuits is determined by the pin order property on the schematic, or by the termOrder property on the CDF, or by the system, in that order.

Note: Ordering requirements, such as the Verilog® requirement that outputs occur before inputs, are not satisfied in this release.

Signal buses are handled in scalar form. For example, `net10<0:3>` is mapped as `net10_0`, `net10_1`, `net10_2`, and `net10_3`.

Arguments

o_instance	The instance object.

Value Returned

l_signals	Returns the list of mapped signals for the instance.

Example

```
nlGetSignalList( inst )
```

nlGetTerminalList

```
nlGetTerminalList(
     o_instance
     )
     => l_terminals
```

Description

Returns the list of terminal names in the order specified on the pin order property on the schematic, or on the termOrder property on the CDF, or on the cellview of the instance, in that order. This method should not be used by the formatter. In contrast to `nlGetSignalList`, buses are not handled individually: a terminal such as `out<0:3>` is represented in its original form.

Arguments

o_instance	The instance object.

Value Returned

l_terminals	Returns the list of terminals of the instance.

Example

```
nlGetTerminalList( inst )
```

nlGetTerminalSignalName

```
nlGetTerminalSignalName(
     o_instance
     t_terminal
     [ x_bit ]
     )
     => t_signal
```

Description

Returns the name of the signal connected to the terminal.

Arguments

o_instance	The instance object.
t_terminal	The schematic name of the terminal.
x_bit	A non-negative integer value representing the bit number. The default is `0`.

Value Returned

t_signal	Returns the simulator name of the signal.

Example

```
nlGetTerminalSignalName( inst "in" )
```

nlGetNumberOfBits

```
nlGetNumberOfBits(
     o_instance
     t_terminal
     )
     => x_bits
```

Description

Returns the number of bits on the instance and terminal specified.

Arguments

o_instance	The instance object.
t_terminal	The schematic name of the terminal.

Value Returned

x_bits	Returns a non-negative integer value representing the bit number.

Example

```
nlGetNumberOfBits( inst "in")
```

nlGetModelName

```
nlGetModelName(
    o_instance
    )
    => t_modelName
```

Description

This method must be used to obtain the model name of an instance. Use of this method assures consistency in netlisting across interfaces. For instances that represent subcircuits, this method returns a name chosen by the netlister, using the `modulePrefix` netlist option.

The method `nlGetModelName` returns the following value:

1. The value of the model parameter on the instance, if this instance has CDF and if this parameter has a value.
2. The value of the `modelName` parameter on the instance if this instance has no CDF and if this parameter has a value.
3. The `componentName` entry on the view-specific information or on the simulator section on the `simInfo` section of the instance CDF if this has a value.
4. The name of the cell.

These rules have consequences for the `simInfo` section for cells of which the views are used as stop cell-views. A number of simulators such as Spectre require a component or model name to define the type of component. An example of a component name is `resistor`, and an example of a model name is `nmos101`. This method addresses both model names and component names. For these simulators the `useInstNamePrefix` option is set to `nil`. For the "`spectre`" interface the `analogLib` `res` cell has a `componentName` entry set to "`resistor`". When the model name is not specified on an instance of a `res` cell, this value is used.

Arguments

o_instance	The instance object.

Value Returne

t_modelName	Returns the name of the model.

Example

```
nlGetModelName( inst )
```

nlGetParamList

```
nlGetParamList(
     o_instance
     )
     => l_parameters
```

OR

```
nlGetParamList(
     o_cellView
     )
     => l_parameters
```

Description

Returns the list of parameters of the specified instance or cellview.

These parameters have been collected while the netlist was generated. In other words, all `pPar` and `atPar` expressions are collected. In addition, any `atPar` expressions from lower levels that are not resolved in the cellview are collected. Any interdependence of default values is handled by ordering the parameters so that those with independent default values are first.

Arguments

o_instance	The instance object.
o_cellView	The cellview object.

Value Returned

l_parameters	Returns the list of parameters. Each element is a symbol, representing the name of the parameter.

Example

```
nlGetParamList( inst )
nlGetParamList( cv )
```

nlGetParamStringValue

```
nlGetParamStringValue(
     o_instance
     s_parameter
     )
     => t_value / nil
```

Description

Returns a string representing the parameter value for the instance and parameter name.

The parameter name is the simulator name for the parameter. Values returned are strings irrespective of their original type. If the parameter does not exist or if the value is a blank string, `nil` is returned.

Note: `none` is no longer recognized as a special keyword. Previously it was treated as being equivalent to `nil`, but now it is treated as a design variable.

The parameters are evaluated according to the common evaluator. For details, see Chapter 9 of the Compatibility Guide. This means that values of CDF parameters can reference parameters with `iPar` or `pPar` that have NLP expressions. The CDF default value can be overridden with an instance property. The property type of that property must be a string.

The following table shows a synopsis of that scheme:

This property...	Is CDF?	And evaluates to...
NLP	yes	nil
NLP	no	As NLP
string	yes	As specified on the CDF
string	no	The literal string

If the parameter is a CDF parameter, this routine takes all aspects into account, including the CDF parameter type and the `parseAsCEL` attribute.

This procedure handles all look-up for `pPar`, `iPar`, and `atPar`, as well as the parameter name map specified for the component.

The AEL `pPar` and the NLP “`+`” calls are replaced by the enclosed variable. The passed parameter found is automatically collected. The netlister tracks these parameters for appropriate invalidation purposes.

The AEL `iPar` and the NLP “`~`” calls are replaced by the appropriate property values.

The use of the AEL `atPar` function and the NLP “`@`” calls is discouraged. Like `pPar`, these are replaced with the variable specified, and the parameter specified is declared as a passed parameter in the subcircuit.

Important

> The AEL `dotPar` function and the NLP “`.`” are not supported, and a netlist error is reported if they are used.

The suffixes are substituted according to the suffix mapping specified. Thus, a schematic value “`1n`” may result in “`1e-9`”.

Note: Only a limited set of NLP expressions is translated appropriately. The format accepted is limited to:

```
[<operator> <parameter name>],
[<operator> <parameter name>: % ],
[<operator> <parameter name>: % : <default value>],
```

with the operator being `@`, `+`, or `~`.

Many NLP expressions are therefore not supported:

- Complex formatting such as `:abc%d%e`
- Formatting on the default clause
- Modifiers in front of the operator, such as time and capacitance scaling
- Nesting in the default value or value formatting section

Note: For information about `iPar`, `pPar`, `atPar` and `dotPar` functions, refer to the Passing Parameters in a Design section in the Component Description Format user guide.

Arguments

o_instance	The instance object.
s_parameter	The name of the parameter.

Value Returned

t_value	The string form of the parameter value.
nil	The parameter was not found, the value was `nil`, the value was an empty string, or the value was a string consisting of only white space.

Example

```
nlGetParamStringValue( inst 'tvpairs )
```

nlGetId

```
nlGetId(
     o_cellView
     )
     => g_id
```

OR

```
nlGetId(
     o_instance
     )
     => t_id
```

Description

Returns the database ID for the instance. If the instance represents a cdba instance, this id is a database ID. Avoid using this function if possible, and use type-checking precautions.

Arguments

o_cellView	The cellview object.
o_instance	The instance object.

Value Returned

t_id	Returns the database ID of the instance or the cellview object.

Example

```
nlGetId( inst )
nlGetId( cv )
```

nlIncludeSrcFile

```
nlIncludeSrcFile(
     o_formatter
     t_filename
     )
     => t / nil
```

Description

Prints the include statement for instances bound to source files using Hierarchy Editor. This is called while printing the footer for the netlist for all the source files to which any instance in the design is bound. If your simulator does not support source file bindings, call nlError in this method.

Arguments

o_formatter	The formatter object.
t_filename	The name of the source file bound to an instance.

Value Returned

`t`	Returns `t` if the include statement is printed.
`nil`	Returns `nil` if the operation failed.

Example

```
(defmethod nlIncludeSrcFile ((obj <yourSimulator>Formatter) file)
(let ((nl (nlGetNetlister obj)))
(nlPrintStringNoFold nl "include '" simplifyFilename(file) "'")
(nlPrintStringNoFold nl "\n")
))
```

nlPrintComments

```
nlPrintComments(
     o_instance
     )
     => t
```

Description

Prints the comments for the instance being netlisted.

Arguments

o_instance	The instance object.

Value Returned

`t`	Returns `t` if the comments for the instance are printed.

Example

```
nlPrintComments( inst )
```

hnlGetInstanceCount

```
hnlGetInstanceCount(
      )
      => x_numberOfInstances
```

Description

Returns the number of instances in the design most recently netlisted in the same session. This does not include instances with the `nlAction=ignore` property that are ignored during netlisting.

For more information, see the `hnlInstanceCount` function in the *Digital Design Netlisting and Simulation SKILL Reference*.

Cellviews

Cellviews are represented by an object. The `nlGetCurrentCellView` method of the `nlFormatter` class returns such an object. This object is used by formatter methods such as `nlPrintSubcktName` and `nlPrintSubcktParameters`. It is primarily used in the `nlPrintSubcktHeader` and `nlPrintSubcktFooter` methods of the formatter.

Important

Do not redefine any of the methods in this section.

nlGetCellName

```
nlGetCellName(
     o_inst
     )
     => t_cellName
```

Description

Gets the cell name of the specified instance.

Arguments

o_inst	The instance object.

Values Returned

t_cellName	The cell name given as a string

Example

```
printf("Cell name is %s.\n" nlGetCellName(inst))
```

nlGetLibName

```
nlGetLibName(
     o_inst
     )
     => t_libName
```

Description

Gets the library name of the specified instance.

Argument

o_inst	The instance object.

Values Returned

t_libName	The library name given as a string.

Example

```
printf("Library name is %s.\n" nlGetLibName(inst))
```

nlGetSimTerminalNets

```
nlGetSimTerminalNets(
     o_cellView
     )
     => l_signals
```

Description

Returns the list of mapped names of signals connecting to the terminals of the cellview based on the terminal order specified for the cellview. Several signals may come from inherited connections. Signal buses are handled in scalar form. For example, net10<0:3> is mapped as net10_0, net10_1, net10_2 and net10_3. Use this function while printing the subcircuit definition.

Arguments

o_cellView	The cellview object.

Value Returned

l_signals	Returns the list of mapped signal names connected to the terminals of the subcircuit.

Example

```
nlGetSimTerminalNets( cv )
```

nlGetTerminalNets

```
nlGetTerminalNets(
     o_cellView
     )
     => l_signals
```

Description

Returns the schematic names of the signals connected to the terminals. Many of the signals may come from inherited connections.

Arguments

o_cellView	The cellview object.

Value Returned

l_signals	Returns the list of signals connected to the terminals of the subcircuit. Each element is a string.

Example

```
nlGetTerminalNets( cv )
```

nlGetSwitchViewList

```
nlGetSwitchViewList(
     o_cellView
     )
     => l_switchViews
```

Description

Returns the switch view list for the cellView.

Arguments

o_cellView	The cellview object.

Value Returned

l_switchViews	Returns the switch view list for the cell view. Each element is a string.

Example

```
nlGetSwitchViewList( cv )
```

nlGetViewName

```
nlGetViewName(
    o_cellView
    )
    => t_cellViewName
```

Description

Returns the view name of the specified cellview object.

Arguments

o_cellView	The cellview object.

Value Returned

t_cellViewName	Returns the view name of the specified celview object.

Example

```
nlGetViewName( cv )
=> "schematic"
```

Designs

Designs are represented by an object. The `nlGetDesign` method applied on the `netlister` object returns such an object.

Important

Do not redefine any of the methods in this section.

nlGetTopLibName

```
nlGetTopLibName(
     o_design
     )
     => t_topLibName
```

Description

Returns the library name of the design.

Arguments

o_design	The design object.

Value Returned

t_topLibName	Returns the library name.

Example

```
nlGetTopLibName( design )
```

nlGetTopCellName

```
nlGetTopCellName(
     o_design
     )
     => t_topCellName
```

Description

Returns the cell name of the design.

Arguments

o_design	The design object.

Value Returned

t_topCellName	Returns the cell name.

Example

```
nlGetTopCellName( design )
```

nlGetTopViewName

```
nlGetTopViewName(
     o_design
     )
     => t_topViewName
```

Description

Returns the view name of the design.

Arguments

o_design	The design object.

Value Returned

t_topViewName	Returns the view name.

Example

```
nlGetTopViewName( design )
```

nlTranslateFlatIEPathName

```
nlTranslateFlatIEPathName(
     o_formatter
     t_hierDelimiter
     t_iePathName
     )
     => t_iePathName
```

Description

Parses a hierachical IE instance path and returns the path of the IE instance that is to be printed in the digital netlist.

Arguments

o_formatter	The formatter object.
t_hierDelimiter	The delimiter used to parse the hierachical IE instance path.
t_iePathName	The hierachical IE instance path.

Value Returned

t_iePathName	The path of the IE instance to be printed in the digital netlist.

Example

```
defmethod( nlTranslateFlatIEPathName ((formatter yourFormatter) hierDelimiter
iePathName)
iePathComponents = parseString(iePathName hierDelimiter)
yourFunctionToModifyIEPathName(iePathComponents)
)
```

Other Customization procedures

nlSetPcellName

```
nlSetPcellName (
     S_cv
     t_paramNames
```

```
    g_paramValues
    )
    => t / nil
```

Description

Define this function if the default generic OSS naming convention for Pcells needs to be customized.

Arguments

S_cv	cellView ID of the Pcell.
t_paramNames	Pcell parameter Names.
g_paramValues	Pcell parameter Values.

Value Returned

`t`	Return `t` if the function runs successfully.
`nil`	Returns `nil` otherwise.

Example

Function Name: nlSetPcellName

cv: cellView ID

paramNames: Pcell parameter Names

paramValues: Pcell parameter Values

Redefine this function to rename your Pcell subckt's. In the example below, the subckt's are renamed as `paramName1_paramValue1_paramName2_paramValue2_cellName`

```
procedure( nlSetPcellName( cv paramNames paramValues )
    let( ( name value (subcktName  ""))
    foreach( (name value) paramNames paramValues
        subcktName = strcat( subcktName name "_" value  "_")
    )
    strcat(subcktName cv->cellName )
    )
)
```

ansCdlCompPrim

```
ansCdlCompPrim(
      )
```

Description

Enables printing of device information for primitives in the auCdl netlist. Specify this function as a netlist procedure in the CDF for the primitive devices for which you want the device information to be printed in the auCdl netlist. For more information about the `ansCdlCompPrim` netlist procedure, see the *Virtuoso Analog Design Environment L User Guide*.

Arguments

None

Value Returned

None

Example

```
ansCdlCompPrim
```

ansCdlHnlPrintInst

```
ansCdlHnlPrintInst(
      )
```

Description

Customizes how device information is written in the auCdl netlist. Specify this function as a netlist procedure in the CDF for the devices for which you want to customize the device information in the auCdl netlist.

Arguments

None

Value Returned

None

Example

```
ansCdlHnlPrintInst
```

ansCdlPrintString

```
ansCdlPrintString(
     &_fp
     S_inst
     S_master
     S_parent
     )
```

Description

Prints comment strings in the device information for instances in the auCdl netlist. To print comment strings in the device information, you must also use the `'string` argument in the `auCdlInstPrintOrder` variable defined in the `.simrc` file. For more information about the `auCdlInstPrintOrder` variable, see the *Virtuoso Analog Design Environment L User Guide*.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
S_inst	Database ID of the current instance being printed in the netlist.
S_master	Database ID of the switch master of the current instance being printed in the netlist.
S_parent	Database ID of the cell for the current instance being printed in the netlist.

Value Returned

None

Example

```
procedure(ansCdlPrintString(fp inst master parent)
artFprintf(fp "*** CurrentInst = %s" inst~>name))
```

ansCdlPrintInheritedParams

```
ansCdlPrintInheritedParams(
     &_fp
     l_pairList
     )
```

Description

Customizes how inherited parameters are written in the auCdl netlist.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
l_pairList	List of property name and property value pairs that should be evaluated.

Value Returned

None

Example

```
procedure(ansCdlPrintInheritedParams(fp pairList)
foreach( param pairList
unless( !cadr(param)
artFprintf( fp "%s=%s " car(param) artMakeString(cadr(param) ) )
)
)
)
```

ansCdlPrintInstParams

```
ansCdlPrintInstParams(
     &_fp
     l_pairList
     )
```

Description

Customizes how instance parameters are written in the auCdl netlist.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
l_pairList	List of property name and property value pairs that should be evaluated.

Value Returned

None

Example

```
procedure( ansCdlPrintInstParams(fp pairList)
    foreach( pair pairList
        artFprintf( fp "%s=%s " car(pair) artMakeString(cadr(pair)) )
        ))
```

ansCdlPrintInstProps

```
ansCdlPrintInstProps(
      &_fp
      l_pairList
      )
```

Description

Enables printing of user-defined instance properties and also customizes the format in which the properties are printed in the netlist. To print user-defined properties in the netlist, you must also use the `'instProps` argument in the `auCdlInstPrintOrder` variable defined in the `.simrc` file. For more information about the `auCdlInstPrintOrder` variable, see the *Virtuoso Analog Design Environment L User Guide*.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
l_pairList	List of property name and property value pairs that should be evaluated.

Value Returned

None

Example

```
procedure( ansCdlPrintInstProps(fp pairList)
    foreach( pair pairList
        artFprintf( fp "%s=%s " car(pair) artMakeString(cadr(pair)) )
        ))
```

ansCdlPrintInstName

```
ansCdlPrintInstName(
     &_fp
     t_prefix
     t_name
     t_mappedName
     g_isPrimitive
     S_inst
     S_master
     )
```

Description

Customizes how instance names are written in the `auCdl` netlist.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
t_prefix	Name prefix defined in the device CDF.
t_name	Instance name specified for the instance.
t_mappedName	Mapped name which auCdl would otherwise use to print instance name.
g_isPrimitive	Whether this is an instance of a leaf-level device (primitive).
S_inst	Database ID of the current instance being printed in the netlist.
S_master	Database ID of the switch master of the current instance being printed in the netlist.

Value Returned

None

Example

```
procedure( ansCdlPrintInstName(fp prefix name mappedName isPrimitive inst master)
        artFprintf(fp "%s " mappedName ))
```

ansCdlPrintModelName

```
ansCdlPrintModelName(
     &_fp
     g_isAPrimitive
     g_definedPropVal
     g_modelPropInstVal
     g_componentPropInstVal
     g_cdfModelName
     g_cdfComponentName
     )
```

Description

Customizes the order in which auCdl looks for model names for primitives and the format in which the model information is written in the netlist.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
g_isAPrimitive	Whether this is an instance of a leaf-level device(primitive).
g_definedPropVal	Value of the instance property defined using `auCdlHnlInstModelPropName` parameter in the `.simrc` file. For more information about the `auCdlHnlInstModelPropName` parameter, see the *Virtuoso Analog Design Environment L User Guide*.
g_modelPropInstVal	Value of the `'model` property on the instance.
g_componentPropInstVal	Value of the `'componentName` property on the instance.
g_cdfModelName	Value of the `'modelName` parameter in the device CDF.
g_cdfComponentName	Value of the `'componentName` parameter in the device CDF.

Value Returned

None

Example

```
procedure( ansCdlPrintModelName(fp isAPrimitive definedPropVal
                                    modelPropInstVal
                                    componentPropInstVal
                                    cdfModelName
                                    cdfComponentName
                            )
        when( isAPrimitive
        let( (model)
                model = nil
                if( definedPropVal
                    model  = definedPropVal
                )
                if( !model && modelPropInstVal
                    model =  definedPropVal
                )
                if( !model && cdfModelName
                    model = cdfModelName
                )
                if( !model && componentPropInstVal
                    model = componentPropInstVal
                )
                if( !model && cdfComponentName
                    model = cdfComponentName
                )
                    artFprintf(fp "model=%s " artMakeString( model ) )
                )
            ))
```

ansCdlPrintModuleName

```
ansCdlPrintModuleName(
     &_fp
     g_isAPrimitive
     S_inst
     S_master
     S_parent
     t_appedModuleName
     )
```

Description

Customizes how module names are written in the auCdl netlist for subcircuits.

Arguments

&_fpt	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
g_isAPrimitive	Whether this is an instance of a leaf-level device(primitive).
S_inst	Database ID of the current instance being printed in the netlist.
S_master	Database ID of the master device for the current instance being printed in the netlist.
S_parent	Database ID of the cell for the current instance being printed in the netlist.
t_mappedModuleName	Module name which auCdl would write by default for subcircuits.

Value Returned

None

Example

```
procedure( ansCdlPrintModuleName(fp isAPrimitive inst master parent
mappedModuleName)
        unless( isAPrimitive
        artFprintf( fp " / %s " mappedModuleName )
        ))
```

ansCdlPrintConnections

```
ansCdlPrintConnections(
     &_fp
     l_connections
     )
```

Description

Customizes how the nets connected to a device are written in the auCdl netlist.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
l_connections	List of pairs of instance terminals and nets connected to the terminals.

Value Returned

None

Example

```
procedure( ansCdlPrintConnections(fp connections )
        artFprintf( fp "$PINS " )
        foreach( cn connections
            artFprintf( fp "%s=%s " car(cn) cadr(cn) )  ))
```

ansCdlGetSegmentConnections

```
ansCdlGetSegmentConnections(
     S_inst
     l_connectionPairs
     n_iterSeg
     n_iterMult
     n_numSegments
     n_multiplicityFactor
     t_segmentConnType
     n_netCount
     )
```

Description

This function is used to customize the auCdl netlist when the `ansCdlHnlPrintInst` function is specified as a netlist procedure in the CDF for the device. It controls how connectivity information is written in the netlist for instances for which a multiplicity factor is specified using the `m` or `M` property. For example, if an instance with a connection list like `((termA netA) (termB netB))` has to be converted into two segments connected in series, the modified connection list for the first segment will be `((termA netA) (termB tempnet_0))` and `((termA tempnet_0) (termB netB))` for the second segment. Define this function as a procedure in the `.simrc` file.

Arguments

S_inst	Database ID of original instance.
l_connectionPairs	List of pairs of instance terminals and nets connected to the terminals of the instance.
n_iterSeg	If current replication needs to be converted into 3 segments connected in series or parallel, then this function is called for which iteration is from 1- 3.
n_iterMult	If the current instance needs to be converted into 5 instances connected in parallel, then this function is called for which iteration is from 1 - 5.
n_numSegments	Number of segments in each replication of the instance.
n_multiplicityFactor	Number of replications of the instance.
t_segmentConnType	Connection type of the segments. Valid values: `"series"` or `"parallel"` or any other user defined value.
n_netCount	A pretty ordinary number which keeps on incrementing with calls to this function. This will help you create temporary nets to connect segments in series.

Value Returned

None

Example

```
procedure( ansCdlGetSegmentConnections( inst connectionPairs iterSeg iterMult
numSegments multiplicityFactor segmentConnType netCount  )
    let( ( firstTerm secondTerm pairList )
    if( "series" == segmentConnType
        then
        cond(
        ( (1 == iterSeg )
        secondTerm = cadr( connectionPairs )
        secondTerm = list( car(secondTerm) sprintf( nil "CdnsNet_%d"
            netCount) )
        pairList = list( car(connectionPairs) secondTerm )
        pairList = append( pairList  cddr(connectionPairs) )
        )
        ( ( iterSeg == numSegments )
        firstTerm = car(connectionPairs)
        firstTerm = list( car(firstTerm) sprintf(nil "%s_%d" "CdnsNet"
            netCount-1 ) )
```

```
        pairList = append( list(firstTerm) cdr(connectionPairs))
        )
        (t
        firstTerm = car(connectionPairs)
        secondTerm = cadr(connectionPairs)
        firstTerm = list( car(firstTerm) sprintf(nil "CdnsNet_%d"
            netCount-1) )
        secondTerm = list( car(secondTerm) sprintf(nil "CdnsNet_%d"
            netCount ) )
        pairList = append1( list(firstTerm) secondTerm )
        pairList = append( pairList cddr(connectionPairs))
        )
        )
        else
        pairList = connectionPairs
    )
    pairList
    )
    )
```

Related Functions

- ansCdlGetMultiplicity on page 195
- ansCdlGetSegmentInfo on page 189

ansCdlPrintSwitchPCellInst

```
ansCdlPrintSwitchPCellInst(
     )
```

Description

Writes the switch Pcell instance in the auCdl netlist based on the size and input values of the instance.

Arguments

None

Value Returned

None

Example

```
XI0_31 a out switch_open lay="M3"
XI0_32 b out switch_close lay="M3"
XI0_33 b out switch_open lay="M3"
```

Schematic instance `I0` with size value `3` and input value `2` is written in the auCdl netlist.

ansCdlPrintSwitchPCellInstParam

```
ansCdlPrintSwitchPCellInstParam(
     &_fp
     l_paramsNameValuePairList
     )
```

Description

Writes into the auCdl netlist the list of CDF parameters and values defined for switch Pcell instances.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
l_paramsNameValuePairList	List of pairs of parameter names and parameter values.

Value Returned

None

Example

You can use `anCdlPrintSwitchPCellInstParam` to print the parameter names and values as needed. The following example prints the value of the parameter `metal` in double quotes:

```
procedure(anCdlPrintSwitchPCellInstParam( fp pairList )
  let( ( paramName )
    foreach( pair pairList
      paramName = car(pair)
      if( paramName == "metal" then
        artFprintf( fp "%s=\"%s\" " paramName artMakeString(cadr(pair)) )
      else
        artFprintf( fp "%s=%s " paramName artMakeString(cadr(pair)) )
      )
    )
  )
)
```

ansCdlPrintSwitchPCellSubcktConn

```
ansCdlPrintSwitchPCellSubcktConn(
     &_fp
     l_connections
     )
```

Description

Writes into the auCdl netlist the switch Pcell connections specified by `hnlSpecialPCellLibCell` in the .simrc file.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.
l_connections	List of terminals specified for the switch Pcells.

Value Returned

None

Example

Consider that `hnlSpecialPCellLibCell` is defined in .simrc as shown below:

```
hnlSpecialPCellLibCell = list( list("lib1" "SW") list("lib2" "cell2"))
```

By default, the value of connections is a list `("POS" "NEG")` and subckt definition for the cell `SW` and `cell2` is as below.

```
.SUBCKT SW_close POS NEG
.ENDS

.SUBCKT SW_open POS NEG
.ENDS

.SUBCKT cell2_close POS NEG
.ENDS

.SUBCKT cell2_open POS NEG
.ENDS
```

You can use the following procedure to modify connections.

```
procedure(ansCdlPrintSwitchPCellSubcktConn( fp connections )
    foreach( cn connections
      artFprintf( fp "%s " cn)
    )
)
```

ansCdlPrintSwitchPCellSubCircuit

```
ansCdlPrintSwitchPCellSubCircuit(
     &_fp
     )
```

Description

Writes into the auCdl netlist the subckt definitions specified by `hnlSpecialPCellLibCell` in the .simrc file.

Arguments

&_fp	File handle used to write the string in the netlist using the `artFprintf` SKILL function.

Value Returned

None

Example

Assume that `hnlSpecialPCellLibCell` is defined in .simrc as show below:

```
hnlSpecialPCellLibCell = list( list("lib1" "SW") list("lib2" "cell2"))
```

Following definitions for subckts are printed in the auCDL netlist:

```
.SUBCKT SW_close POS NEG
.ENDS

.SUBCKT SW_open POS NEG
.ENDS

.SUBCKT cell2_close POS NEG
.ENDS

.SUBCKT cell2_open POS NEG
.ENDS
```

ansCdlGetSegmentInfo

```
ansCdlGetSegmentInfo(
     S_inst
     S_master
     S_parent
     )
     => l_segment
```

Description

This function is used to customize the auCdl netlist when the `ansCdlHnlPrintInst` function is specified as a netlist procedure in the CDF for the device. It returns the number of segments for an instance and the connection type (`series`, `parallel`, or user defined connection type name) between the segments. Define this function as a procedure in the `.simrc` file.

Arguments

S_inst	Database ID of the current instance being printed in the netlist.
S_master	Database ID of the switch master of the current instance being printed in the netlist.
S_parent	Database ID of the cell for the current instance being printed in the netlist.

Value Returned

l_segment	Number of segments for the instance and the connection type (`series`, `parallel`, or user defined) between segments.

Example

```
procedure( ansCdlGetSegmentInfo( inst master parent)
        prog( (val type )
        val = ansCdlGetSimPropValue( 'segments )
            when( val
                when( stringp(val) val = atoi( val) )
                when( numberp(val) val = fix(val) )
            )
            unless( val return() )
                type = ansCdlGetSimPropValue( 'connection )
            when( type && symbolp( type)
                type = symbolToString( type ) )
```

```
            return( list( val type))
        )
    )
```

Related Function

- ansCdlGetMultiplicity on page 195
- ansCdlGetSegmentConnections on page 181

ansCdlGetSegmentInstParams

```
ansCdlGetSegmentInstParams(
     S_inst
     l_propsList
     n_iterSeg
     n_iterMult
     n_numSegments
     n_multiplicityFactor
     t_segmentConnType
     )
     => l_segment
```

Description

This function is used to customize the auCdl netlist when the `ansCdlHnlPrintInst` function is specified as a netlist procedure in the CDF for the device. It controls how values of parameters are printed on segments of an instance. auCdl calls this function with a list of property name and property value pairs for all those properties that are specified in device CDF simulation information instance parameters. Define this function as a procedure in the `.simrc` file.

Arguments

S_inst	Database ID of original instance.
l_propsList	List of property name and property value pairs that should be evaluated.
n_iterSeg	If current replication needs to be converted into 3 segments connected in series or parallel, then this function is called for which iteration is from 1- 3.
n_iterMult	If the current instance needs to be converted into 5 instances connected in parallel, then this function is called for which iteration is from 1 - 5.
n_numSegments	Number of segments in each replication of the instance.
n_multiplicityFactor	Number of replications of the instance.
t_segmentConnType	Connection type of the segments. Valid values: `"series"` or `"parallel"` or any other user defined value.

Value Returned

l_segment	A modified list of property name and property value pairs for each segment. By default, auCdl divides the length of the instance by the number of segments in case of series connection, and divides the width of the instance by the number of segments in case of parallel connection.

Example

```
procedure( ansCdlGetSegmentInstParams( inst propsList iterSeg iterMult
    numSegments multiplicityFactor segmentConnType )
    let((pairList value)
    foreach( pair propsList
        case( car(pair)
        ("l"
        value = cadr(pair)
        when( "series" == segmentConnType
            when( stringp(value)
            value = atoi(value) )
            value = value/numSegments )
        pairList = cons( list( "l" value) pairList )
        )
        ("w"
        value = cadr(pair )
```

```
        when( "parallel" == segmentConnType
            when( stringp(value)
            value = atoi(value))
            value = value/numSegments )
        pairList = cons( list( "w" value ) pairList )
        )
        (t
        pairList = cons( pair pairList )
        )
        )
        )
    pairList = reverse( pairList )
    )
    )
```

Related Function

- ansCdlGetMultiplicity on page 195
- ansCdlGetSegmentInfo on page 189

ansCdlGetSimPropValue

```
ansCdlGetSimPropValue (
     t_propName
     )
     => t_propVal / nil
```

Description

Returns the value of a specified property on the current instance being netlisted when the `ansCdlHnlPrintInst` function is specified as a netlist procedure in the CDF for the device.

Arguments

t_propName	Name of the property on the current instance being netlisted for which the value is to be returned.

Value Returned

t_propVal	Returns the value corresponding to a property.
`nil`	Returns `nil` otherwise.

Example

```
ansCdlSimGetPropValue( 'vendorName )
```

ansCdlGetMultiplicity

```
ansCdlGetMultiplicity(
     S_inst
     S_master
     S_parent
     )
     => n_multiplicityFactor
```

Description

Controls how multiplicity (converting an instance into multiple instances connected in parallel) is handled for an instance in the design when the `ansCdlHnlPrintInst` function is specified as a netlist procedure in the CDF for the master of the instance.

You can specify that an instance should be treated as *n* instances connected in parallel by specifying *n* as the value of the `m` or `M` property on the instance. For example, you can specify that an instance be treated as five instances connected in parallel by specifying `5` as the value of the `m` or `M` property on the instance. By default the `ansCdlHnlPrintInst` netlist procedure does not give special treatment to the `m` or `M` property on an instance.

If you want the `ansCdlHnlPrintInst` netlist procedure to support multiplicity on instances using the `m` or `M` property, do one of the following:

- Define the `ansCdlGetMultiplicity` procedure in your `.simrc` file.
- Define `ansCdlGetMultiplicity_<LIBNAME>` in `libInit.il` file of the device library when the `libSpecificDevicePrint` flag is set in device `instParameters`.

Arguments

S_inst	Database ID of the current instance being printed in the netlist.
S_master	Database ID of the switch master of the current instance being printed in the netlist.
S_parent	Database ID of the cell for the current instance being printed in the netlist.

Value Returned

n_multiplicityFactor	Multiplicity factor.

Example

```
procedure( ansCdlGetMultiplicity( inst master parent )
     ansCdlGetSimPropValue( 'm )
     )
```

Related Function

- ansCdlGetSegmentInfo on page 189
- ansCdlGetSegmentConnections on page 181
- ansCdlGetSegmentInstParams on page 191

auCdl

```
auCdl(
     )
     => t / nil
```

Description

This function sets defaults of all the variables defined in `si.env` like `preserveRES`, `shortRES` as well as other global variables like `cdlSimViewList`, `cdlPrintComments` etc. The function also sets the list of functions and variables that must be unbound when environments(simulators) are changed.

Arguments

None

Values Returned

`t`	Returns `t` when all the required defaults of variables as well as list of functions and variables are set successfully
`nil`	Returns `nil` otherwise.

Other Backend Netlister Functions

acdlArtPrintIncludedNetlist

```
acdlArtPrintIncludedNetlist(
     x_artOutfile_file_pointer
     t_filePath
     )
     => userSpecified
```

Description

Controls how an included netlist is included in the main netlist file. This function can be overridden by user settings. If user-override is not specified, the included netlist is copied without any modification. However, if both `acdlPrintIncludedNetlist` and `acdlArtPrintIncludedNetlist` are defined, `acdlPrintIncludedNetlist` is called. `acdlArtPrintIncludedNetlist` is preferred because the file pointer is not closed and re-initialized.

Arguments

x_artOutfile_file_pointer

An open file pointer to the main netlist.

You can write to this pointer using the `artFprintf` SKILL function.

t_filePath	Path to the netlist to be included.

Value Returned

userSpecified	Return value is as specified by the user.

Example

```
;; (unless getd ... prevents multiple definition warning message.
(unless (getd 'acdlArtPrintIncludedNetlist)
  ;; The identity function, Copy the input to the output without modification. If
you are overriding this function, you are likely doing some preprocessing or
decoration in artFprintf().
  (define (acdlArtPrintIncludedNetlistBase fp filePath)
    (let ((inport (infile filePath))
          buffer)
      while( gets( buffer inport )
```

```
        (artFprintf fp "%s" buffer )
      )
  t
  ))
```

auLvs

```
auLvs(
    )
    => t / nil
```

Description

This is the primary function for LVS. It sets up all the actions needed to netlist the layout and schematics design as well as invoke LVS (for comparison) itself.

Argument

None

Values Returned

Returns `t` or `nil` based on the status of the netlisting and the status returned by the LVS routine which carries out the comparison between the netlist from the schematic view and the layout view.

`t`	For a successful netlisting and comparison `t` is returned with the relevant messages printed in the UI and the `si.log` file.
`nil`	For any error, `nil` is returned with the relevant messages printed in the UI and the `si.log` file.

Example

```
auLvs()
```

auProbeAddDevsForNet

```
auProbeAddDevsForNet(
    )
    => t / nil
```

Description

This procedure enables you to select nets using the cursor or by typing the names in the CIW in order to add probes for all devices connected to the selected net. Thus, the function displays the prompt, `Point to net or enter net name in CIW`. On pointing to the net or typing the net name in CIW, probes would be added on all the devices connected to the selected net.

Argument

None

Values Returned

`t`	Returns `t` if the function runs successfully.
`nil`	Returns `nil` otherwise.

LVS

```
LVS(
    )
    => t / nil
```

Description

This is the primary function for LVS. It sets up all the actions needed to netlist the layout and schematics design as well as invoke LVS itself.

Arguments

None

Value Returned

`t`	Returns `t` if all the required actions are set.
`nil`	Returns `nil` otherwise.

Example

```
LVS()
```

HSPICE Functions

hnlHspicePrintInstPropVal

```
hnlHspicePrintInstPropVal(
     t_propName
     )
     => t_propVal / nil
```

Description

This procedure returns the value of the property specified by *propName* if it exists on the current instance. If the value of this property has the syntax specifying an inherited value it returns the name of the property whose value is being inherited without the surrounding syntax.

Arguments

t_propName	Specifies the property name.

Value Returned

t_propVal	Returns the value corresponding to a property. The return value for this procedure is always a string.
nil	Returns `nil` otherwise.

hnlHspiceInstPropVal

```
hnlHspiceInstPropVal(
     l_paramList
     )
     => t / nil
```

Description

This procedure is prints a list of property values to the netlist.

Arguments

l_paramList	List of strings containing the property names.

Value Returned

`t`	Returns `t` if the property values are successfully printed to the netlist.
`nil`	Returns `nil` otherwise.

hnlHspicePrintInstPropEqVal

```
hnlHspicePrintInstPropEqVal(
     l_paramList
     )
     => t / nil
```

Description

This procedure prints a list of property values to the netlist. It is similar to the procedure `hnlHspicePrintInstPropVal` except that the property name and the symbol, `=` is included before the value.

Arguments

`l_paramList`	List of strings containing the property names.

Value Returned

`t`	It returns `t` if the property values are successfully printed to the netlist.
`nil`	Returns `nil` otherwise.

hnlHspicePrintMOSfetModel

```
hnlHspicePrintMOSfetModel(
    )
    => t / nil
```

Description

This function prints out the line for a MOSfet model.

Arguments

None

Value Returned

`t`	It returns `t` if the mosfet model is successfully printed to the netlist file.
`nil`	Returns `nil` otherwise.

hnlHspicePrintNMOSfetElement

```
hnlHspicePrintNMOSfetElement(
    )
    => t / nil
```

Description

This function prints out the line for a NMOSfet model.

Arguments

None

Value Returned

`t`	It returns `t` if the nmosfet model is successfully printed to the netlist file.
`nil`	Returns `nil` otherwise.

Name Mapping Variables

Spectre

Described below are the name mapping variables for Spectre Direct netlister:

Variable	Description
`hnlSpectreMapInstInName`	List of characters that are invalid internal to an inst name.
`hnlSpectreMapNetInName`	List of characters that are invalid internal to a net name.
`hnlSpectreMapInstFirstChar`	List of characters that are invalid for the first character of a inst name.
`hnlSpectreMapNetFirstChar`	List of characters that are invalid for the first character of a net name.

Default Behavior

- Replace the invalid characters by their escaped equivalent.
- If the invalid character is a number, replace it by an underscore followed by the number.

Customization

- You can directly set any/all of the above mentioned variables to customize the character substitution and therefore the mapping.
- Each of these variables is checked separately to determine whether it is to be set or not.
- In case a variable is set, it is used to determine character substitution and hence mapping.

Flow

- The variables are used if they are set explicitly.
- Otherwise, the first time you netlist, all the variables are populated with their default values. The second time onwards the variable values will be used. If you need to modify just a part of the character substitution list, you can do it by modifying the variable in the CIW window. Otherwise the default values are used throughout.

HspiceD

Described below are the name mapping variables for HspiceD netlister:

Variable	Description
`hnlHspiceDMapInstInName`	List of characters that are invalid internal to an inst name.
`hnlHspiceDMapNetInName`	List of characters that are invalid internal to a net name.

Default Behavior

These variables do not have default values.

Customization

- You can directly set any/all of the above mentioned variables to customize the character substitution and therefore the mapping.
- Each of these variables is checked separately to determine whether it is to be set or not.
- In case a variable is set, it is used to determine character substitution and hence mapping.

Flow

- The variables are used if they are set explicitly.
- If these variables are not set explicitly, HspiceD netlister uses the following values:
    - For mapping nets, it uses:

      ((">" ">") ("<" "<") "." ("#" "__") "$" "%" "^" "&" "*" "(" ")" "\\" ("|" "__") "+" "-" "=" "{" "}" ("[" "__") ("]" "__") "\"" ("'" "__") (":" "__") ";" "~" ("`" "__") "," "?" "/" "@")

    - For mapping instances, it uses:

      ((">" ">") ("<" "<") "." "!" ("#" "__") "$" "%" "^" "&" "*" "(" ")" "\\" ("|" "__") "+" "-" "=" "{" "}" ("[" "__") ("]" "__") "\"" "'" (":" "__") ";" "~" "`" "," "?" "/" "@")

5

Netlisting Option Functions for Socket Interfaces

This chapter describes the functions that let you work with netlist options for socket interfaces.

asiDisplayNetlistOption

```
asiDisplayNetlistOption(
     o_tool
     )
     => t / nil
```

Description

Displays the current set of netlist options and values. Use this function only to determine which netlist options you can modify.

Note: Do not use this function as part of another procedure.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Displays the set of netlist option names and values and returns `t`.
`nil`	Prints an error message and returns `nil` if there is an error.

Example

```
asiDisplayNetlistOption( asiGetTool( 'spectreS ) )
```

Displays the *spectreS* netlist options.

asiGetNetlistOption

```
asiGetNetlistOption(
     { o_session | o_tool }
     s_name
     )
     => g_value / nil
```

Description

Gets the value of the specified netlist option.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Netlist option for which you want the value.

Value Returned

g_value	Returns the value of the netlist option.
`nil`	Returns `nil` if there is an error.

Example

```
asiGetNetlistOption( session 'modelNamePrefix )
```

Gets the value of the `modelNamePrefix` netlist option.

Related Function

To display the current set of netlist options, see the asiDisplayNetlistOption function.

asiInit<yourSimulator>NetlistOption

```
asiInit<yourSimulator>NetlistOption(
     o_tool
     )
     => t
```

Description

Calls the procedures that modify your simulator's netlist options.

Note: You must write `asiInit<yourSimulator>NetlistOption`, where <*yourSimulator*> is the name of your simulator. Do not include the angle brackets (<>).

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when your procedures for modifying netlist options are called. **Note:** You must write `asiInit<yourSimulator>NetlistOption` to return `t`.

Example

```
procedure( asiInitXYZNetlistOption( tool )
    <insert your code>
    t
)
```

Creates the procedure that calls the procedures to modify the netlist options for the XYZ simulator.

asiSetNetlistOption

```
asiSetNetlistOption(
     { o_session | o_tool }
     s_name
     g_value
     )
     => g_value / nil
```

Description

Sets a netlisting option.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name of the netlist option you want to set.
g_value	Value for the netlist option.

Value Returned

g_value	Returns the value of the netlist option.
`nil`	Returns an error message and `nil` if unsuccessful.

Example

```
asiSetNetlistOption( session 'maxNameLength 16 )
```

Changes the maximum length of the net name to 16.

Related Function

To display the names of the netlist options that you can set, see the asiDisplayNetlistOption function.

6

OASIS Functions

This chapter describes the functions that let you print and manage OASIS files.

asiGetAnalogSimulator

```
asiGetAnalogSimulator(
     { o_session | o_tool }
     )
     => s_simulatorName
```

Description

Gets the value of the analog simulator for a tool or session object.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.

Value Returned

s_simulatorName	Name of the analog simulator.

Example

```
asiGetAnalogSimulator(asiGetTool('spectreS))
```

Displays the analog simulator for the tool spectreS as `spectreS`.

asiGetAdvAnalysis

```
asiGetAdvAnalysis(
     { o_session | o_tool }
     s_analysisName
     )
     => o_analysis / nil
```

Description

Returns the object of advanced analyses, such as Monte Carlo. This function is similar to the `asiGetAnalysis` function and is normally used by third party integrator to implement the simulator interface for their simulators.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_analysisName	Name of the analysis you want to return.

Values Returned

s_analysisName	Returns the analysis object for the specified analysis.
`nil`	Returns `nil` if the specified analysis does not exist or there is an error.

Example

```
asiGetAdvAnalysis(session 'mc)
```

This example returns the object of the analysis `mc`.

asiGetEMIROptionVal

```
asiGetEMIROptionVal(
     o_session
     s_name
     )
     => g_value / nil
```

Description

Returns the value of the specified EMIR option.

Arguments

o_session	Simulation session object.
s_name	Name of the EMIR option of which you want the value.

Values Returned

g_value	Returns the value of the specified EMIR option.
`nil`	Returns `nil` if the specified option does not exist.

Example

The following example shows how this function returns the name of the QRC technology file specified in the *qrcTechFile* field of the *EMIR Analysis Setup* form.

```
session = asiGetCurrentSession()
=> stdobj@0x30dd91b8

asiGetEMIROptionVal(stdobj@0x30dd91b8 'qrcTechFile)
=> "$WORKDIR/em.ict"
```

asiGetNetlistFileListToSymLink

```
asiGetNetlistFileListToSymLink(
     o_session
     )
     => l_files / nil
```

Description

Returns the list of files present in the netlist directory and created by the `asiNetlist` procedure.

Arguments

o_session	Simulation session object.

Values Returned

l_files	Returns the list of files.
`nil`	Returns `nil` if there is an error.

Example

```
(defmethod asiGetNetlistFileListToSymLink ( (session asiAnalog_session) )
    list("netlistHeader" "netlistFooter" ".__master.termorder"
".__master.optionFile" ".control" ".includedModels" "netlist" "si.env"
"si.foregnd.log" "designInfo" "ihnl" "amap" "map")
```

asiGetDigitalSimulator

```
asiGetDigitalSimulator(
     { o_session | o_tool }
     )
     => s_simulatorName / nil
```

Description

Gets the value of the digital simulator for a tool or session object.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.

Value Returned

s_simulatorName	Name of the digital simulator.
nil	Returns `nil` if there is no digital simulator.

Example

```
asiGetDigitalSimulator(asiGetTool('spectreS))
```

Displays the digital simulator for the tool spectreS as `nil` as there is no digital simulator for spectreS.

asiAnalogAutoloadProc

```
asiAnalogAutoloadProc(
    )
    => t
```

Description

Called by OASIS for the purpose of autoloading the context. This is done so that the classes are defined before the tool is created and initialization is started.

Argument

None

Value Returned

`t`	The context is autoloaded successfully.

Example

```
asiAnalogAutoloadProc
```

ansAnalogRegCDFsimInfo

```
ansAnalogRegCDFsimInfo(
    )
    => t
```

Description

This is a utility function used to create the CDF for the `<yourSimulator>` simulator.The `ansAnalogRegCDFsimInfo` functions are called by the CDF editor. These functions are used to provide data type information for all the simInfo attributes.

Argument

None

Values Returned

`t`	Function defined successfully.

Example

The following illustrates the declaration of `ansAnalogRegCDFsimInfo`:

```
procedure( ansAnalogRegCDFsimInfo()
    '( (nil name netlistProcedure type symbol)
       (nil name otherParameters type list)
       (nil name instParameters type list)
       (nil name componentName type symbol)
       (nil name namePrefix type string)
       (nil name termOrder type list)
       (nil name termMapping type list)
       (nil name propMapping type list)
    )
)
```

The following is a sample `<yourSimulator>.ini` file for `<yourSimulator>` simulator:

```
asiRegisterTool( '<yourSimulator> ?class 'asiAnalog ?initFunc
'asiInitialize)
procedure( ansRegCDFsimInfo_<yourSimulator>()
    ansAnalogRegCDFsimInfo()
)
```

Note: To assure consistency in netlisting across simulators, the parameters returned by `ansAnalogRegCDFsimInfo` must not be redefined. If the formatter of your simulator has the `useInstNamePrefix netlist` option set to `nil`, the namePrefix parameter must be removed.

asiCheckAcEnabledWhenNoiseEnabled

```
asiCheckAcEnabledWhenNoiseEnabled(
     o_session
     r_form
     )
     => t / nil
```

Description

This method verifies that an AC analysis is enabled when a noise analysis is selected. If this is not the case, it displays an error message in the analysis form's error dialog box and sets the error status of the form. It is called during the form apply callback.

Arguments

o_session	The simulation session object.
r_form	Form created by a call to `hiCreateAppForm` or `hiCreateForm`.

Values Returned

`t`	Returns `t` when check is successful.
`nil`	Returns an error message and `nil` if unsuccessful.

asiCheckAnalysis

```
asiCheckAnalysis(
    o_analog
    r_form
    )
    => t / nil
```

Description

Checking function for the analysis class. e.g. for Spectre simulator object it checks each field value in the environment, highlights any errors, returns `t` or `nil`. Can be used for different analog simulator analysis objects.

Note: The only difference between this and the check method in the analog class is that this one does not give an error if ’step’ is not set.

Arguments

o_analog	derived object of the analog simulator class
r_form	form created by a call to hiCreateAppForm or hiCreateForm.

Values Returned

`t`	Returns `t` if check is successful
`nil`	Else, returns `nil`.

asiCheckBlank

```
asiCheckBlank(
     o_obj
     r_form
     s_fieldName
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is non-blank.

Arguments

o_obj	Can be one of the following objects: `o_analysis`, `o_anaOption`, `o_envOption`, `o_simOption`, `o_keepOption`.
r_form	Form created by a call to `hiCreateAppForm` or `hiCreateForm`.
s_fieldName	Handle to this field within a form. It may be referenced as `formHandle->hiFieldSym`

Values Returned

`t`	Returns `t` if the check is successful.
`nil`	Otherwise, returns `nil`.

asiCreateIncludeStatementFile

```
asiCreateIncludeStatementFile(
     o_simulatorSession
     t_netlistFile
     t_includeNetlistFile
     )
     => t_includeNetlistFile / nil
```

Description

Creates a file that contains a statement to include netlist for simulation. Override this function to create a customized include statement according to the the simulator netlisting procedure and syntax.

The default include statement is as per Spectre format, as shown below.

`include “netlist”`

Arguments

o_simulatorSession	An object of the simulator session class
t_netlistFile	Name of the netlist file
t_includeNetlistFile	Name of the temporary file that contains the statement to include netlist

Values Returned

t_includeNetlistFile	Name of the temporary file that contains the statement to include netlist
nil	Returns `nil` otherwise

Example

```
session =  asiGetCurrentSession()
=> stdobj@0x3157a0b0
; Session for other simulators can be fetched accordingly.

asiCreateIncludeStatementFile with (stdobj@0x3157a0b0 "netlist" "tmpNetlistFile")
=> "tmpNetlistFile"
```

asiGetAnalysisField

```
asiGetAnalysisField(
     o_analysis
     s_fieldName
     )
     => o_fieldEnvVar / nil
```

Description

Returns the specified analysis field object.

Arguments

o_analysis	The analysis object for which you want the field object.
s_fieldName	Handle to this field within a form. It may be referenced as `formHandle->hiFieldSym`.

Values Returned

o_fieldEnvVar	Object of field environment variable.
`nil`	Returns `nil` if no analysis field is present.

Example

```
analysis = asiGetAnalysis( session 'tran )
asiGetAnalysisField( analysis 'stop )
```

Gets the tran analysis, stop field object.

asiGetHighPerformanceOptionVal

```
asiGetHighPerformanceOptionVal(
     o_session
     s_varName
     )
     => t_varNameVal / nil
```

Description

Returns the field value of the High Performance form with the passed session object.

Note: This method returns the field value of the High Performance form for spectre class (`spectre_session`) or AMS class (`ams_session`) only. For other classes, this method returns `nil`.

Arguments

o_session	The simulation session object.
s_varName	The field name of the High Performance form.

Values Returned

t_varNameVal	The value of the specified field.
`nil`	Returns `nil` when function call is unsuccessful.

Example

```
session = asiGetCurrentSession()
asiGetHighPerformanceOptionVal( session 'uniMode )
```

Returns the value of uniMode field for spectre class or AMS class.

asiSetHighPerformanceOptionVal

```
asiSetHighPerformanceOptionVal(
     s_sessionName
     s_varName
     s_varValue
     )
     => t_Value / nil
```

Description

Sets the value for the specified High Performance option variable.

Arguments

o_sessionName	The session for the simulator.
s_varName	Name of the variable in the High Performance Option form that you want to set.
s_varValue	The value of the variable field.

Values Returned

t_Value	Returns the value of the specified field.
nil	Returns `nil` if unsuccessful.

Example

```
Session = asiGetCurrentSession()
asiSetHighPerformanceOptionVal(Session 'uniMode "APS")
=> "APS"
```

Sets the value of uniMode field to APS for spectre class or AMS class.

asiDisplayHighPerformanceOption

```
asiDisplayHighPerformanceOption(
     o_toolName
     )
     => t / nil
```

Description

Displays a list of variable and values of the High Performance Simulation Option form.

Arguments

o_toolName	The tool object according to the simulator.

Values Returned

`t`	Displays the list of options and values of the High Performance Simulation Option form and returns `t`.
`nil`	Returns `nil` if unsuccessful.

Example 1

```
asiDisplayHighPerformanceOption(asiGetTool('spectre))
    uniMode:    "Spectre"
    turboSwitch:    nil
    envSwitch:    nil
    uniSeparate:
    errorLevel:    "Do not override"
    mtOption:    "Auto"
    numThreads:    ""
    apsplus:    nil
    cktpreset:    "None"
    proc_affinity:    ""
    pseparate:
    srSwitch:    nil
    psrOption:    "Default"
    psrFmax:    ""
    preserveOption:    "None"
    preserveInst:    nil
    preserveSelect:
    preserveClear:
    rfseparate:
    rfmtOption:    "Disable"
    numRFThreads:    ""
```

Example 2

```
asiDisplayHighPerformanceOption(asiGetTool('ams))
=> ERROR (ADE-5032): asiEnvDisplayVar: No variables defined in partition
'turboOpts' of tool 'ams'.
nil
```

asiGetDesignCellName

```
asiGetDesignCellName(
     o_session
     )
     => t_cellName / nil
```

Description

Returns the cell name of the design associated with the passed session object.

Arguments

o_session	The simulation session object.

Values Returned

t_cellName	Name of the cell associated with the session object.
nil	The function failed to give cell name.

Example

```
session = asiGetCurrentSession()
asiGetDesignCellName(session)
```

asiGetDesignLibName

```
asiGetDesignLibName(
     o_session
     )
     => t_libName / nil
```

Description

Returns the library name of the design associated with the passed object.

Arguments

o_session	The simulation session object.

Values Returned

t_libName	Name of the library containing the cellview
nil	Returns `nil` when function call fails.

Example

```
session = asiGetCurrentSession()
asiGetDesignLibName(session)
```

asiGetDesignViewName

```
asiGetDesignViewName(
     o_session
     )
     => t_viewName / nil
```

Description

Returns the view name of the design associated with the passed object.

Arguments

o_session	The simulation session object.

Values Returned

t_viewName	Name of the view related with the passed session object
nil	Returns `nil` when func call fails.

Example

```
session = asiGetCurrentSession()
asiGetDesignViewName(session)
```

asiGetDrlData

```
asiGetDrlData(
     t_anaType
     l_specifier
     t_dataDir
     )
     => g_familyOrWaveform / nil
```

Description

Returns the results data for the given specifier from the given data directory.

Arguments

t_anaType	Type of analysis. This can be any type of basic analysis. For example, `tran`, `ac`, `dc`, `noise`, and so on.
l_specifier	The specifier name list.

Depending on the value of the *t_anaType* argument or the data you need to return, this argument can contain the following:

- For basic analyses, a list containing a single node name or element name for which you want to return the results data. For example, `list("in_m")`, where `in_m` is a net name.
- For `info` analysis, a list containing the node name and the parameter name for which you want to return the results data. For example, `list("R0" "v")`, where `R0` is an instance name here and `v` is an instance parameter.
- `?` – This is a wildcard to be used to get the names of all the nodes available in the results data.
- `??` – This is a wildcard to be used to get the names of all the nodes available in the results data along with their values.

t_dataDir	Data directory name.

Values Returned

g_family	Family data
Waveform	Waveform data
`nil`	Otherwise

Note: This function is required for 3rd party simulator integrations. For related information, you can also refer to the `asiDefineDataAccess` function.

Example

In the following code example, the function returns a list of all the signal names available for the specified analysis type, `tran`.

```
asiGetDrlData(list('tran) list("?") dir)
=>("in_m" "in_p" "net10" "net35" "out"
    "V0:p" "V1:p" "V2:p" "vdd!" "vss!"
    "I1.gnode" "I1.net6" "I1.net26" "I1.net52" "I1.Q3"
    "I1.Q2" "I1.Q4" "I1.Q0" "I1.M2" "I1.M5"
    "I1.M3" "I1.M1" "I1.C0" "I1.C1" "I0"
    "R0" "R2" "R1" "I1.R0" "E0"
    "V0" "V1" "V2" "I1.Q3.kpnp_mod" "I1.Q2.kpnp_mod"
    "I1.Q4.kpnp_mod" "I1.Q0.knpn_mod" "I1.M2.nch_mod" "I1.M5.nch_mod"
"I1.M3.pch_mod"
    "I1.M1.pch_mod" "capacitor" "resistor"
)
```

In the following code example, the function returns the operating point value of the instance parameter, `v`, for instance `R0`.

```
asiGetDrlData("info" list("R0" "v") dir)
=>0.004584486
```

In the following code example, the function returns the waveform read from the specified analysis type,`tran`, for the given specifier, `in_m`.

```
asiGetDrlData(list('tran) list("in_m") dir)
=>srrWave:0x150e4020
```

asiGetId

```
asiGetId(
     o_session
     )
     => x_id
```

Description

Returns the name of the session ID associated with the given OASIS session.

Arguments

o_session	The simulation session object.

Values Returned

x_id	OASIS session ID.

Example

```
asiGetId( asiGetCurrentSession() ) => 1
```

Gets the ID of the current OASIS session.

asiGetIterationUpdateFile

```
asiGetIterationUpdateFile(
     o_session
     )
     => t_fileName / nil
```

Description

Returns the name and path to the simulator-specific file in which the iteration number and the corresponding PSF data location is written after each Monte Carlo iteration completes. This file is used to monitor the progress of the Monte Carlo run and to get the directory path from where the PSF data corresponding to an iteration is read.

Note the following:

- The file should be in the following format:

```
1       ../psf/mc1_separate/mc1-001/
2       ../psf/mc1_separate/mc1-002/
3       ../psf/mc1_separate/mc1-003/
4       ../psf/mc1_separate/mc1-004/
```

- The file should be updated with the iteration number and the corresponding PSF data location only after the completion of each iteration.

Arguments

o_session	Specifies the session object.

Values Returned

t_fileName	Returns the name and path to the simulator-specific file in which the iteration number and the corresponding PSF data location is written after each Monte Carlo iteration completes.
nil	Returns `nil` if no such file is associated with the current session.

Example

```
defmethod( asiGetIterationUpdateFile (( session XYZ_session )
    "mcdata.iter"
)
```

asiGetResultsPsfDir

```
asiGetResultsPsfDir(
     o_session
     )
     => t_PsfDir / nil
```

Description

Returns the name of the PSF directory for the current or last-run simulation.

Arguments

o_session	The oasis session.

Value Returned

t_PsfDir	Returns the path of the PSF directory for the last simulation results.
nil	Returns nil if the directory is not present.

Examples

The following example returns the PSF directory for the current simulation session.

```
asiGetResultsNetlistDir(asiGetCurrentSession())
=> "/servers/scratch02/aakhil/testcases/newtest/simulation/ampTest/spectre/
schematic/distributed/job026/psf"
```

asiGetResultsNetlistDir

```
asiGetResultsNetlistDir(
     o_session
     )
     => t_netlistDir / nil
```

Description

Returns the name of the netlist directory for the current or last-run simulation.

Arguments

o_session	The oasis session.

Value Returned

t_netlistDir	Returns the path of the netlist directory for the last simulation results.
nil	Returns nil if the directory is not present.

Examples

The following example returns the netlist directory for the current simulation session.

```
asiGetResultsNetlistDir(asiGetCurrentSession())
=> "/servers/scratch02/aakhil/testcases/newtest/simulation/ampTest/spectre/
schematic/distributed/job026/netlist"
```

asiGetSimulatorList

```
asiGetSimulatorList(
     @optional s_subclass
     )
     => l_simulatorNameList / nil
```

Description

The function returns a list of all simulation interfaces within the specified simulator subclass.

Arguments

`@optional s_subclass`	Name of the sub-class containing the OASIS simulation interfaces.

Values Returned

l_simulatorNameList	List containing simulation interfaces associated with the simulator subclass.
`nil`	Returns `nil` if there are no entries.

Example

```
asiGetSimulatorList()
("ats" "cdsSpice" "cdsSpiceVerilog" "hspiceS" "hspiceSVerilog"
"spectre" "spectreS" "spectreSVerilog" "spectreVerilog"
)
```

For specific subclasses like `asiAnalog` & `asiSocket` this function returns the corresponding simulatorNamelist.

```
asiGetSimulatorList('asiAnalog)
("ats" "cdsSpice" "cdsSpiceVerilog" "hspiceS" "hspiceSVerilog"
    "spectre" "spectreS" "spectreSVerilog" "spectreVerilog"
)
asiGetSimulatorList('asiSocket)
("cdsSpice" "cdsSpiceVerilog" "hspiceS" "hspiceSVerilog" "spectreS"
    "spectreSVerilog"
)
```

asiGetSimCommandLineOrder

```
asiGetSimCommandLineOrder(
     o_session
     )
     => s_optionList / nil
```

Description

Returns the order of options used in the simulator run command. By default, it returns the options in the following order:

`simulatorName inputFile simOptions scriptOptions`

To get a different order of the options in the list returned, overload the function to specify the desired order. For example,

```
defmethod( asiGetSimCommandLineOrder( o_session )
'(simulatorName simOptions scriptOptions inputFile)
)
```

Argument

o_session	Simulation session object.

Value Returned

s_optionList	List of the options in the default or specified order.
nil	Returns `nil` otherwise.

Example

```
asiGetSimCommandLineOrder( spectre_seesion )
```

Displays the options used to run the spectre simulator.

asiGetStimulusGlobals

```
asiGetStimulusGlobals(
     o_session
     )
     => l_globals / nil
```

Description

This method retrieves the list of global stimuli from the session.

Arguments

o_session	Specifies the session object.

Values Returned

l_globals	List of global stimuli.
nil	Returns `nil` if there is no global stimuli associated with the current session.

asiGetStimulusInputs

```
asiGetStimulusInputs(
     o_session
     )
     => l_inputs / nil
```

Description

This method retrieves the list of input stimuli from the session.

Arguments

o_session	Specifies the session object.

Value Returned

l_inputs	List of input stimuli.
`nil`	Returns `nil` if there is no input stimuli associated with the current session.

asiIsConfigDesign

```
asiIsConfigDesign(
     o_session
     )
     => t / nil
```

Description

The function returns `t` if the design associated with the session is a Cadence 5.x configuration.

Arguments

o_session	The simulation session object.

Values Returned

`t`	When the design belongs to `5.x` config.
`nil`	Returns `nil` otherwise.

Example

```
asiIsConfigDesign( session )
```

asiSetValid

```
asiSetValid(
     o_analysis
     g_value
     )
     => t / nil
```

Description

The functions sets valid analysis in the current simulation environment. The call to `asiSetValid` should be used with `asiCheck`/`asiCheckAnalysis` method for the analysis.

Arguments

o_analysis	The analysis object used
g_value	The value you want to choose either `t` or `nil`.

Values Returned

`t`	Returns `t` when the function sets value as true.
`nil`	Returns `nil` otherwise.

asiCheckBlankNumericLeq

```
asiCheckBlankNumericLeq(
     o_obj
     r_form
     s_fieldName
     g_value
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is a numeric value less than or equal to *g_value*.

Arguments

o_obj	Can be one of the following objects: `o_analysis`, `o_anaOption`, `o_envOption`, `o_simOption`, `o_keepOption`.
r_form	Form created by a call to `hiCreateAppForm` or `hiCreateForm`.
s_fieldName	Handle to this field within a form. It may be referenced as `formHandle->hiFieldSym`
g_value	The value you want to choose.

Values Returned

`t`	When the check is successful.
`nil`	Returns `nil` otherwise.

asiCheckBlankNumericGeq

```
asiCheckBlankNumericGeq(
     o_obj
     r_form
     s_fieldName
     g_value
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is a numeric value greater than or equal to *g_value*.

Arguments

o_obj	Can be one of the following objects: `o_analysis`, `o_anaOption`, `o_envOption`, `o_simOption`, `o_keepOption`.
r_form	Form created by a call to `hiCreateAppForm` or `hiCreateForm`.
s_fieldName	Handle to this field within a form. It may be referenced as `formHandle->hiFieldSym`
g_value	The value you want to choose.

Values Returned

`t`	When the check is successful.
`nil`	Returns `nil` otherwise.

asiFormatGraphicalStimuli

```
asiFormatGraphicalStimuli(
     o_session
     p_fp
     )
     => t / nil
```

Description

Formats the graphical stimuli statements to send to Cadence SPICE.

Note: For Integrators, the function `asiFormatGraphicalStimuli` needs to be overloaded for the simulator session to create a file which contains the graphical stimuli. If you define a graphical stimuli, it is mandatory for this to be overloaded , else an error stating that the function `asiFormatGraphicalStimuli` is not defined for the appropriate class, is displayed:

```
… *Error* asiFormatGraphicalStimuli: no applicable method for the class -
<yoursimulator>_session
```

Also, the function `asiPrintSource` needs to be written by the integrator.

Arguments

o_session	Simulation session object. For example, an XYZ session is XYZ_session for a 3rd party.
p_fp	Specifies a file pointer to the file containing the graphical stimuli statements to send to the simulator (for simulators that are not in the Cadence SPICE socket).

Value Returned

`t`	Returns `t` if the stimuli statements are generated.
`nil`	Returns `nil` otherwise.

Example

The function prototype is as follows:

```
asiFormatGraphicalStimuli ((session XYZ_session) fp)
```

where, `fp` is the pointer to the file where graphical stimuli will be written.

asiFormatGraphicalStimulusFileList

```
asiFormatGraphicalStimulusFileList(
     o_session
     &_fp
     )
     => t_string
```

Description

Formats the statement that includes the graphical stimulus files.

Arguments

o_session	Simulation session object.
&_fp	Pointer to the control statement file.

Value Returned

t_string	Formatted string that includes the graphical stimulus file.

Example

```
defmethod ( asiFormatGraphicalStimulusFileList ( (session xyz_session) fp )
    (artFprintf fp "include \"%s\"\n" "./_graphical_stimuli.scs")
)
```

asiAddOceanAlias

```
asiAddOceanAlias(
     s_simulatorName
     s_alias
     s_analysisName )
     => t / nil
```

Description

Adds an ocean alias to the current simulator. This is useful for defining ocean related data access aliases for third party simulator integration.

Arguments

s_simulatorName	Simulator or Tool’s class name
s_alias	Data access alias for specified analysis name
s_analysisName	Equivalent analysis name recognized by 3rd party simulator

Values Returned

`t`	When the alias is added and defined.
`nil`	Returns `nil` otherwise.

Example

For a 3rd party simulator integration if the simulator PSF maps transient analysis name as `analysisTran1-tran` then following OCEAN aliasing should be used:

```
asiAddOceanAlias( ’spice3 ’tran "analysisTran1-tran")
```

This would make `selectResults(’tran)` work in the auto generated OCEAN script file

asiGetAvailableMCOptions

```
asiGetAvailableMCOptions(
     )
     => l_list / nil
```

Description

Returns a list of Monte Carlo analysis options supported by ADE XL along with their description. The supported Monte Carlo analysis options are displayed in the <*OptionName*, *Description*> format.

Arguments

None

Values Returned

l_list	Returns a list of Monte Carlo analysis options supported in ADE XL.
nil	Returns `nil` if there are no Monte Carlo analysis options associated with the current session.

Example

```
asiGetAvailableMCOptions()
    <mcmethod, "Level of statistical variation to apply. Possible values are
    process, mismatch or all">
    <mcnumpoints, "Number of Monte Carlo iterations to perform">
    <samplingmode, "Method of statistical sampling to apply. Possible values are
    standard or lhs">
    <mcnumbins, "Number of bins for lhs (latin-hypercube) method. The number is
    checked against numruns + firstrun - 1, and Max(numbins, numruns + firstrun -
    1 ) is used for the lhs.">
    <saveprocess, "Whether or not to save scalar data for statistically varying
    process parameters which are subject to process variation. Possible values are
    no or yes">
    <savemismatch, "Whether or not to save scalar data for statistically varying
    mismatch parameters which are subject to mismatch variation. Possible values
    are no or yes">
    <donominal, "This parameter controls whether or not simulator runs a nominal
    run before starting the main Monte Carlo loop of iterations">
    <saveallplots, " Whether or not to save data for family plots">
```

```
<montecarloseed, "Optional starting seed for random number generator">

<mcstartingrunnumber, "Starting iteration number">

<dutsummary, "Subcircuit instances to which mismatch variations must be
applied. Mismatch variations will also be applied to all subcircuits
instantiated under the selected instances.">

<ignoreflag, "If set, mismatch variations will not be applied to subcircuit
instances selected in dut. Mismatch variations will also not be applied to all
subcircuits instantiated under the selected instances.">
```

asiGetSupportedMCOptions

```
asiGetSupportedMCOptions(
     o_session
     )
     => l_list / nil
```

Description

Returns a list of Monte Carlo analysis options supported by your simulator. Ensure that the option names returned by this method match with the option names returned by `asiGetAvailableMCOptions`.

Arguments

o_session	Specifies the session object.

Values Returned

l_list	Returns a list of Monte Carlo options supported by your simulator.
nil	Returns `nil` if your simulator does not support Monte Carlo analysis options.

Example

```
defmethod(  asiGetSupportedMCOptions ( session XYZ_session )
            list("mcstartingrunnumber" "mcnumpoints" "saveallplots" "mcmethod"
"samplingmode" "saveprocess" "savemismatch" "donominal" "montecarloseed"
"dutsummary" "ignoreflag")
)
```

asiSetEMIROptionVal

```
asiSetEMIROptionVal(
     o_session
     s_name
     g_value
     )
     => t / nil
```

Description

Sets the given value for the specified EMIR option.

Arguments

o_session	Simulation session object.
s_name	Name of the EMIR option to which you want to assign a value.
g_value	The value to be set for the specified EMIR option.

Values Returned

`t`	Successful operation.
`nil`	Returns `nil`, along with an error message if the option does not exist.

Example

The following example shows how this function sets the specified QRC technology file in the *qrcTechFile* field of the *EMIR Analysis Setup* form.

```
session = asiGetCurrentSession()

=> stdobj@0x30dd91b8


asiSetEMIROptionVal(stdobj@0x30dd91b8 'qrcTechFile "techfile.txt")
=> t
```

OASIS Print Functions

artOutfile

```
artOutfile(
     t_name
     t_mode
     x_len
     t_break
     t_cont
     t_begCom
     t_endCom
     t_tab
     t_comments
     )
     => x_handle
```

Description

Opens the named file. The first argument is mandatory. The other arguments keep their default values if they are not set.

Arguments

t_name	Name of the file.
t_mode	Mode in which to open the file, either `w` or `a`. The default value is `w`.
x_len	Maximum number of chars before each new line. The default value is `internal default`.
t_break	Break characters, where breaking the line is legal. For example,"\t])". The default value is `null`.
t_cont	Continuation convention. For example, "\\\n" or "\n+". The default value is `null`.
t_begCom	Comment convention. For example, ";" or "slash-asterisk". The default value is `null`.
t_endCom	Complement of *beginComment*. For example, "\n" or asterisk-slash.
t_tab	Indicates if a tab should be replaced with a blank. The default value is `1`.
t_comments	Indicates if comments can be ignored. The default value is `1`.

Value Returned

x_handle	The named file.

Example

```
fHandle = artOutfile( "aFile" "a" )
```

artFprintf

```
artFprintf(
     x_handle
     t_text
     g_args
     )
     => t / nil
```

Description

Prints out data like the standard C library `fprintf`, with the handle returned from `artOutfile()` as the first argument.

Arguments

x_handle	File handle returned from `artOutfile`.
t_text	Formatting string.
g_args	Data to be printed.

Value Returned

`t`	Returns `t` if the data is printed.
`nil`	Returns `nil` if there is an error.

Example

```
artFprintf( fHandle "%s" "test" )
```

artClose

```
artClose(
     x_handle
     )
     => t / nil
```

Description

Closes the file associated with the given handle.

Arguments

x_handle	File handle returned from `artOutfile`.

Value Returned

`t`	Returns `t` if the file is closed.
`nil`	Returns `nil` if there is an error.

Example

```
artClose( fHandle )
```

artCloseAllFiles

```
artCloseAllFiles(
     )
     => t / nil
```

Description

Closes all files opened with `artOutfile()`.

Arguments

None

Value Returned

`t`	Returns `t` if the files are closed.
`nil`	Returns `nil` if there is an error.

Example

```
artCloseAllFiles()
```

artFlush

```
artFlush(
    x_handle
    )
    => t / nil
```

Description

Flushes the file associated with the given handle.

Argument

x_handle	File handle returned from `artOutfile`.

Value Returned

`t`	Returns `t` if the file is flushed.
`nil`	Returns `nil` if there is an error.

Example

```
artFlush( fHandle )
```

artListOpenFiles

```
artListOpenFiles(
    )
    => l_names / nil
```

Description

Lists names of all files opened with artOutfile()

Arguments

None

Value Returned

`t`	Returns `t` if the file names are listed.
`nil`	Returns `nil` if there is an error.

Example

```
fNameList = artListOpenFiles()
```

7

Environment Variable Functions

This chapter describes functions that let you work with environment variables.

asiAddEnvOption

```
asiAddEnvOption(
     o_tool
     [ ?name s_name ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?browse g_browse ]
     [ ?mode t_browseMode ]
     [ ?invalidateFunc s_invalidateFunc ]
     [ ?defaultSubcircuitCall s_defaultSubcircuitCall ]
     )
     => o_envVar / nil
```

Description

Adds a new simulation environment option.

Arguments

o_tool	Simulation tool object.
?name *s_name*	Name of the environment option you want to add.
?prompt *t_prompt*	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: `s_name`
?type *s_type*	Type of the option. Valid Values: `string`, `integer`, `float`, `toggle`, `cyclic`, `radio`, `boolean`, `list`, `radioToggle`, `listBox`, `fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` See the asiAddSimOption function in the "Simulator Option Functions" chapter for an example that shows how to use the *separator* argument.
?choices *l_choices*	
	List of choices if *s_type* is `cyclic`, `radio`, `radioToggle` or `listBox`, or the list of switches if *s_type* is `toggle`. **Note:** This argument is valid only if *s_type* is `cyclic`, `toggle`, `radio`, `radioToggle`, or `listBox`.
?itemsPerRow *x_itemsPerRow*	
	Numbers of choices per row for `radio`, `cyclic`, `toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in *l_choices*
?value *g_value*	Default value of the option.
?min *g_min*	Specifies the minimum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `-infinity`

`?max g_max` Specifies the maximum value of an `integer`, `float`, or `scale` option.

Default Value: `nil`, which means `+infinity`

`?allowExpr s_allowExpr`

Specifies whether *`g_value`* can contain expressions.

Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions)

Default Value: `nil`

`?row x_row` Row in the form where the field appears.

Note: This argument is valid only for *'twoD* type forms.

`?column x_column` Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form.

Note: This argument is valid only for *'twoD* type forms.

`?width x_width` Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels.

Note: This argument is valid only for *'twoD* type forms.

Default Value: `1`

`?coordinates l_coordinates`

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.)

Note: This argument is valid only for *'custom* type forms.

`?displayOrder x_displayOrder`

Position (from the top) of the option in the form. Use *x_displayOrder* to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first. The value of *x_displayOrder* must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form.

Note: This argument is valid only for *'oneD* type forms.

Valid Values: Any integer

`?labelText` *t_labelText*

Optional label displayed with frame type fields.

Default Value: `nil`

`?private` *s_private*

Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software. Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)

Default Value: `nil`

`?display` *s_display*

Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable` *s_editable*

Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

This argument only applies to type-in fields.

`?appCB` *`s_appCB`*	Specifies a callback function that is executed when the value of the option is changed. Callback parameter list: (*`o_session`*)
`?callback` *`t_callback`*	Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)
`?formApplyCB` *`s_formApplyCB`*	Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field. Callback parameter list: (*`o_session`* *`r_form`* *`r_field`*)
`?changeCB` *`st_changeCB`*	Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.
`?doubleClickCB` *`st_doubleClickCB`*	Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.
`?numRows` *`x_numRows`*	Number of rows shown on the form for a `listBox` type field.
`?multipleSelect` *`s_multipleSelect`*	Boolean flag that specifies whether multiple items can be selected from the `listBox` type field. Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)
`?browse` *`g_browse`*	Adds a browse button (*...*) for the specified option. This button can be used to open a file selection form to browse and select a file. The mode of file selection is specified by the *`t_mode`* argument. Valid values: `t`, `nil` Default value: `nil`

`?mode` *`t_mode`* — Specifies mode for the file selection form that is displayed when the *`g_browse`* argument is set to `t`.

Valid values: `anyFile` specifies that you can open any file type; `existingFile` specifies that you can open any existing file; and `existingFiles` specifies that you can select multiple files.

Default value: `anyFile`

`?invalidateFunc` *`s_invalidateFunc`*

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*`o_session`*)

`?defaultSubcircuitCall` *`s_defaultSubcircuitCall`*

Specifies the name of the netlist procedure added to the cdf simInfo for sub-circuits that is added by the cell-view to cell-view utility. For interfaces derived from the `asiAnalog` class this is an empty string, and no netlist procedure is added. For interfaces derived from the `asiSocket` class this is "`ansSpiceSubcktCall`". To change the value, use `asiChangeEnvOption` in your `envOption.il` file.

Value Returned

`o_envVar`	Returns the environment option object.
`nil`	Returns `nil` if there is an error.

Example

```
asiAddEnvOption( tool ?name 'XYZfile ?prompt "XYZ file" ?value
"~/XYZfile/XYZfile" ?displayOrder 4 )
```

Adds a new environment option called XYZ file in the fourth position in the Environment Options form.

Related Functions

To display the current set of environment options, see the asiDisplayEnvOption function.

To change the display characteristics of your Environment Options form, see the asiChangeEnvOptionFormProperties function.

asiChangeEnvOption

```
asiChangeEnvOption(
     o_tool
     [ ?name s_name ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?invalidateFunc s_invalidateFunc ]
     )
     => o_envVar / nil
```

Description

Changes a simulation environment option.

Arguments

`o_tool`	Simulation tool object.
`?name s_name`	Name of the environment option you want to change.
`?prompt t_prompt`	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: `s_name`
`?type s_type`	Type of the option. Valid Values: `string`, `integer`, `float`, `toggle`, `cyclic`, `radio`, `boolean`, `list`, `radioToggle`, `listBox`, `fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` See the asiAddSimOption function in the “Simulator Option Functions” chapter for an example that shows how to use the *separator* argument.
`?choices l_choices`	List of choices if `s_type` is `cyclic`, `radio`, `radioToggle` or `listBox`, or the list of switches if `s_type` is `toggle`. **Note:** This argument is valid only if `s_type` is `cyclic`, `toggle`, `radio`, `radioToggle`, or `listBox`.
`?itemsPerRow x_itemsPerRow`	Numbers of choices per row for `radio`, `cyclic`, `toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in `l_choices`
`?value g_value`	Default value of the option.
`?min g_min`	Specifies the minimum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `-infinity`

`?max` *`g_max`*	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`
`?allowExpr` *`s_allowExpr`*	
	Specifies whether *`g_value`* can contain expressions. Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions) Default Value: `nil`
`?row` *`x_row`*	Row in the form where the field appears. **Note:** This argument is valid only for *’twoD* type forms.
`?column` *`x_column`*	Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. **Note:** This argument is valid only for *’twoD* type forms.
`?width` *`x_width`*	Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. **Note:** This argument is valid only for *’twoD* type forms. Default Value: `1`
`?coordinates` *`l_coordinates`*	
	List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) **Note:** This argument is valid only for *’custom* type forms.
`?displayOrder` *`x_displayOrder`*	

Position (from the top) of the option in the form. Use `x_displayOrder` to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first.

Note: The value of `x_displayOrder` must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form. This argument is valid only for `'oneD` type forms.

Valid Values: Any integer

`?labelText t_labelText`

Optional label displayed with frame type fields.

Default Value: `nil`

`?private s_private`

Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software. Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)

Default Value: `nil`

`?display s_display`

Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable s_editable`

Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

Note: This argument only applies to type-in fields.

`?appCB` *`s_appCB`*

Specifies a callback function that is executed when the value of the option is changed.

Callback parameter list: (*`o_session`*)

`?callback` *`t_callback`*

Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB` *`s_formApplyCB`*

Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.

Callback parameter list: (*`o_session`* *`r_form`* *`r_field`*

`?changeCB` *`st_changeCB`*

Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB` *`st_doubleClickCB`*

Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.

`?numRows` *`x_numRows`*

Number of rows shown on the form for a `listBox` type field.

`?multipleSelect` *`s_multipleSelect`*

Boolean flag that specifies whether multiple items can be selected from the `listBox` type field.

Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?invalidateFunc` *`s_invalidateFunc`*

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*o_session*)

Value Returned

o_envVar	Returns the changed environment option object.
nil	Returns an error message and nil if unsuccessful.

Example

```
asiChangeEnvOption( tool ?name 'switchViewList
?value '("XYZ" "spice" "cmos.sch" "schematic" "symbol"))
```

Changes the default value of the switch view list.

Related Functions

To display the current set of environment options, see the asiDisplayEnvOption function.

To change the display characteristics of your Environment Options form, see the asiChangeEnvOptionFormProperties function.

asiChangeEnvOptionFormProperties

```
asiChangeEnvOptionFormProperties(
     o_tool
     [ ?type s_type ]
     [ ?width x_width ]
     [ ?columns x_columns ]
     )
     => o_formObj / nil
```

Description

Changes the display characteristics of the Environment Options form.

Arguments

o_tool	Simulation tool object.
?type *s_type*	Specifies the form type. Valid Values: ■ 'oneD – Specifies a sequential display of fields in one column. ■ 'twoD – Specifies a two dimensional display of fields based on row and column positions. (Use the `asiAddEnvOption` or `asiChangeEnvOption` function to specify values for the rows and columns.) ■ 'custom – Lets you specify the exact coordinate locations for each field.)Use the `asiAddEnvOption` or `asiChangeEnvOption` function to specify the coordinates.) ■ 'matrix – Specifies a matrix of equally sized fields. Default Value: `'oneD`
?width *x_width*	Width of the form, in pixels. Default Value: The minimum default width of the form is `400` pixels. If the fields require more space than this, the form defaults to the smallest width that can accommodate the fields.
?columns *x_columns*	Number of columns. Use this argument only with matrix type forms. Default Value: `2`

Value Returned

o_formObj	Returns the environment option form object if successful.
nil	Returns `nil` otherwise.

Example

```
asiChangeEnvOptionFormProperties( asiGetTool('spectreS)
```

```
?width 450)
```

Changes the width of the Environment Options form for the Spectre simulator.

asiDeleteEnvOption

```
asiDeleteEnvOption(
     o_tool
     s_name
     )
     => t / nil
```

Description

Deletes a simulation environment option.

Arguments

o_tool	Simulation tool object.
s_name	Name of the environment option you want to remove from the form.

Value Returned

t	Returns `t` when the option is deleted.
nil	Returns an error message and `nil` if the option does not exist.

Example

```
asiDeleteEnvOption( tool 'stimulusFile )
```

Removes the *stimulusFile* option from the Environment Options form.

Related Function

To display the current set of environment options, see the asiDisplayEnvOption function.

asiDisplayEnvOption

```
asiDisplayEnvOption(
    o_tool
    )
    => t / nil
```

Description

Displays the current set of simulation environment option names and values. Use this function only to determine which environment options you want to modify. Do not use this function as part of another procedure.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Displays the list of environment option names and values and returns `t`.
`nil`	Returns `nil` otherwise.

Example

```
asiDisplayEnvOption( asiGetTool( 'spectreS ) )
```

Displays the *spectreS* environment options.

asiDisplayEnvOptionFormProperties

```
asiDisplayEnvOptionFormProperties(
     o_tool
     )
     => t / nil
```

Description

Displays the form characteristics for the Environment Options form. Use this function only to determine which form characteristics you want to modify. Do not use this function as part of another procedure.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Displays a list of Environment Option form characteristics and returns `t`.
`nil`	Returns `nil` otherwise.

Example

```
asiDisplayEnvOptionFormProperties( asiGetTool('spectreS))
```

Displays the form characteristics for the Spectre Environment Options form and returns `t`.

asiGetEnvOptionChoices

```
asiGetEnvOptionChoices(
     { o_session | o_tool }
     s_name
     )
     => l_choices / nil
```

Description

Gets the list of choices for an environment option that is set up as a list box.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name of the option for which you want the list of choices.

Value Returned

l_choices	Returns the list of choices for the specified simulation environment option.
`nil`	Returns `nil` if the option does not exist.

Related Function

To display the current set of environment options, see the asiDisplayEnvOption function.

asiGetEnvOptionVal

```
asiGetEnvOptionVal(
     { o_session | o_tool }
     s_name
     )
     => g_value / nil
```

Description

Gets the value for the specified simulation environment option.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name of the option for which you want the value.

Value Returned

g_value	Returns the value for the specified simulation environment option.
`nil`	Returns `nil` if the option does not exist.

Example

```
asiGetEnvOptionVal( session 'modelPath )
```

Gets the value for the *modelPath* simulation environment option.

Related Function

To display the current set of environment options, see the asiDisplayEnvOption function.

asiInit<yourSimulator>EnvOption

```
asiInit<yourSimulator>EnvOption(
     o_tool
     )
     => t
```

Description

Calls your procedures to modify the Virtuoso analog design environment simulation options.

Note: You must write `asiInit<yourSimulator>EnvOption`, where <*yourSimulator*> is the name of your simulator. Do not include the angle brackets (<>).

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when the procedures are called. **Note:** You must write `asiInit<yourSimulator>EnvOption` to return `t`.

Example

```
procedure( asiInitXYZEnvOption( tool )
    <insert your code>
    t
)
```

Creates the procedure that calls the procedures to add environment options for the XYZ simulator.

asiSetEnvOptionChoices

```
asiSetEnvOptionChoices(
     { o_session | o_tool }
     s_name
     l_choices
     )
     => l_choices / nil
```

Description

Specifies the list of choices to appear in the list box field for the specified environment option.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name a simulation environment option of the type `listBox`.
l_choices	List of choices to appear in the list box field.

Value Returned

l_choices	Returns the new list of choices to appear in the list box field.
`nil`	Returns `nil` if the option does not exist.

asiSetEnvOptionVal

```
asiSetEnvOptionVal(
     { o_session | o_tool }
     s_name
     g_value
     )
     => g_value / nil
```

Description

Sets the value of the specified simulation environment option.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name of the simulation environment option to which you want to assign a value.
g_value	Value for the simulation option.

Value Returned

g_value	Returns the new value for the simulation environment option.
`nil`	Returns an error message and `nil` if the option does not exist.

Example

```
asiSetEnvOptionVal(session "modelFiles" '("/mypath/mySpectreModels.scs"))
```

Sets the value of modelFiles to `/mypath/mySpectreModels.scs` for Spectre Direct.

```
asiSetEnvOptionVal(session "modelFiles" '(("/mypath/mySpectreModels.scs"
"cmos")))
```

Sets the value of modelFiles to `/mypath/mySpectreModels.scs` and the section name to `cmos` for Spectre Direct.

```
asiSetEnvOptionVal( session 'modelPath "~models/nmos" )
```

Sets the value of the *modelPath* simulation environment option to `~models/nmos` for spectreS.

Related Function

To display the current set of environment options, see the asiDisplayEnvOption function.

8

Simulator Option Functions

This chapter describes functioNs that let you modify your simulator-specific options.

asiAddSimOption

```
asiAddSimOption(
     o_tool
     [ ?name s_name ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?browse g_browse ]
     [ ?mode t_browseMode ]
     [ ?invalidateFunc s_invalidateFunc ]
     [ ?genericName s_genericName ]
     [ ?sendMethod s_sendMethod ]
     )
     => o_envVar / nil
```

Description

Adds a new simulator option.

Arguments

o_tool	Simulation tool object.
?name *s_name*	Name of the simulator option you want to define.
?prompt *t_prompt*	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: *s_name*
?type *s_type*	Type of the option. Valid Values: `string, integer, float, toggle, cyclic, radio, boolean, list, radioToggle, listBox, fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` **Note:** The example that follows shows how to use the separator argument.
?choices *l_choices*	List of choices if *s_type* is `cyclic, radio, radioToggle` or `listBox`, or the list of switches if *s_type* is `toggle`. This argument is valid only if *s_type* is `cyclic, toggle, radio, radioToggle`, or `listBox`.
?itemsPerRow *x_itemsPerRow*	Numbers of choices per row for `radio, cyclic, toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in *l_choices*
?value *g_value*	Default value of the option.
?min *g_min*	Specifies the minimum value of an `integer, float`, or `scale` option. Default Value: `nil`, which means `-infinity`
?max *g_max*	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`

`?allowExpr` *`s_allowExpr`*

Specifies whether *`g_value`* can contain expressions.

Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions)

Default Value: `nil`

`?row` *`x_row`*

Row in the form where the field appears. This argument is valid only for *'twoD* type forms.

`?column` *`x_column`*

Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. This argument is valid only for *'twoD* type forms.

`?width` *`x_width`*

Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available.

For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. This argument is valid only for *'twoD* type forms.

Default Value: 1

`?coordinates` *`l_coordinates`*

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) This argument is valid only for *'custom* type forms.

`?displayOrder` *`x_displayOrder`*

Position (from the top) of the option in the form. Use *`x_displayOrder`* to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first.

The value of *`x_displayOrder`* must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form. This argument is valid only for *'oneD* type forms.

Valid Values: Any integer

`?labelText` *`t_labelText`*

Optional label displayed with frame type fields.

Default Value: `nil`

`?private` *`s_private`* Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software.

Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)

Default Value: `nil`

`?display` *`s_display`* Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable` *`s_editable`*

Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

Note: This argument only applies to type-in fields.

`?appCB` *`s_appCB`* Specifies a callback function that is executed when the value of the option is changed.

Callback parameter list: (*`o_session`*)

`?callback` *`t_callback`*

Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB` *`s_formApplyCB`*

Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.

Callback parameter list: (*`o_session`* *`r_form`* *`r_field`*)

`?changeCB` *`st_changeCB`*

Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB` *`st_doubleClickCB`*

Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.

`?numRows` *`x_numRows`* Number of rows shown on the form for a `listBox` type field.

`?multipleSelect` *`s_multipleSelect`*

Boolean flag that specifies whether multiple items can be selected from the `listBox` type field.

Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?browse` *`g_browse`* Adds a browse button (*...*) for the specified option. This button can be used to open a file selection form to browse and select a file. The mode of file selection is specified by the *`t_mode`* argument.

Valid values: `t`, `nil`

Default value: `nil`

`?mode t_mode` — Specifies mode for the file selection form that is displayed when the *g_browse* argument is set to `t`.

Valid values: `anyFile` specifies that you can open any file type; `existingFile` specifies that you can open any existing file; and `existingFiles` specifies that you can select multiple files.

Default value: `anyFile`

`?invalidateFunc s_invalidateFunc`

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*o_session*)

`?genericName s_genericName`

Specifies the name of the generic variable that the option represents. This argument applies to temperature options only.

Valid Values: `temperature` specifies that the option represents the temperature for the simulator, `nominalTemp` specifies that the option represents the nominal temperature for the simulator

`?sendMethod s_sendMethod`

Specifies how simulator options are sent to Cadence SPICE. (Use this argument only if your simulator is in the SPICE Socket.

Valid Values:

- `set` — Specifies options known by Cadence SPICE (for example, `tempdc` and `dcoppt`)
- `ptprop` — Specifies numbers
- `psprop` — Specifies strings

Default Value: `ptprop`

Note: You can specify other values for the *sendMethod* argument. However, options must be sent to Cadence SPICE with the appropriate `set`, `ptprop`, or `psprop` statements.

Value Returned

o_envVar	Returns the simulator option object.
nil	Returns `nil` if there is an error.

Example

```
asiAddSimOption( tool ?name 'gmin ?value "1e-12" )
```

Adds the `gmin` simulator option, which is set to the value of *1e-12*.

```
procedure( asiInit<yourSimulator>SimOption( tool )
;*************************************************************
; TOLERANCE OPTIONS
;***********************************************
asiAddSimOption( tool
    ?name           'separator1
    ?type           'separator
)
asiAddSimOption( tool
    ?name           'label1
    ?type           'label
    ?prompt         "TOLERANCE OPTIONS"
)
asiAddSimOption( tool
    ?name           'reltol
    ?type           'string
    ?value          "1e-3"
)
asiAddSimOption( tool
    ?name           'conv
    ?type           'cyclic
    ?value          "off"
    ?choices        '( "off" "on" )
    ?sendMethod          'psprop
)
;*************************************************************
; TEMPERATURE OPTIONS
;***********************************************

asiAddSimOption( tool
    ?name           'separator2
    ?type           'separator
)
asiAddSimOption( tool
    ?name           'label2
    ?type           'label
    ?prompt         "TEMPERATURE OPTIONS"
)
asiAddSimOption( tool
    ?name           'temp
    ?type           'string
    ?value          "27"
```

```
    ?genericName    'temperature
)
```

Adds the `reltol, conv`, and `temp` options. Separator lines are drawn between these sections on the form.

Note: This example is for a ’oneD form.

Related Functions

To display the current set of simulator options, see the asiDisplaySimOption function.

To change the display characteristics for your Simulator Options form, see the asiChangeSimOptionFormProperties function.

asiChangeSimOption

```
asiChangeSimOption(
     o_tool
     [ ?name s_name ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?invalidateFunc s_invalidateFunc ]
     [ ?genericName s_genericName ]
     [ ?sendMethod s_sendMethod ]
     )
     => o_envVar / nil
```

Description

Changes a simulator option.

Arguments

`o_tool`	Simulation tool object.
`?name s_name`	Name of the simulator option you want to change.
`?prompt t_prompt`	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: `s_name`
`?type s_type`	Type of the option. Valid Values: `string, integer, float, toggle, cyclic, radio, boolean, list, radioToggle, listBox, fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` **Note:** See the asiAddSimOption function for an example that shows how to use the *separator* argument.
`?choices l_choices`	List of choices if `s_type` is `cyclic`, `radio`, `radioToggle` or `listBox`, or the list of switches if `s_type` is `toggle`. This argument is valid only if `s_type` is `cyclic`, `toggle`, `radio`, `radioToggle`, or `listBox`.
`?itemsPerRows x_itemsPerRow`	
	Numbers of choices per row for `radio, cyclic, toggle,` and `radioToggle` fields. Default Value: Total number of choices specified in `l_choices`
`?value g_value`	Default value of the option.
`?min g_min`	Specifies the minimum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `-infinity`
`?max g_max`	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`

`?allowExpr` *`s_allowExpr`*

Specifies whether *`g_value`* can contain expressions.

Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions)

Default Value: `nil`

`?row` *`x_row`* Row in the form where the field appears. This argument is valid only for ’twoD type forms.

`?column` *`x_column`* Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. This argument is valid only for ’twoD type forms.

`?width` *`x_width`* Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. This argument is valid only for *’twoD* type forms.

Default Value: 1

`?coordinates` *`l_coordinates`*

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) This argument is valid only for ’custom type forms.

`?displayOrder` *`x_displayOrder`*

Position (from the top) of the option in the form. Use *x_displayOrder* to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first.

The value of *x_displayOrder* must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form. This argument is valid only for 'oneD type forms.

Valid Values: Any integer

`?labelText` *t_labelText*

Optional label displayed with frame type fields.

Default Value: `nil`

`?private` *s_private* Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software. Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)

Default Value: `nil`

`?display` *s_display* Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable` *s_editable*

Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

Note: This argument only applies to type-in fields.

`?appCB s_appCB` Specifies a callback function that is executed when the value of the option is changed.

Callback parameter list: (*o_session*)

`?callback t_callback`

Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB s_formApplyCB`

Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.

Callback parameter list: (*o_session r_form r_field*)

`?changeCB st_changeCB`

Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB st_doubleClickCB`

Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.

`?numRows x_numRows` Number of rows shown on the form for a `listBox` type field.

`?multipleSelect s_multipleSelect`

Boolean flag that specifies whether multiple items can be selected from the *listBox* type field.

Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?invalidateFunc s_invalidateFunc`

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*o_session*)

`?genericName s_genericName`

Specifies the name of the generic variable that the option represents. This argument applies to temperature options only.

Valid Values: `temperature` specifies that the option represents the temperature for the simulator, `nominalTemp` specifies that the option represents the nominal temperature for the simulator

`?sendMethod` *`s_sendMethod`*

Specifies how simulator options are sent to Cadence SPICE. (Use this argument only if your simulator is in the SPICE Socket.)

Valid Values:

- set — Specifies options known by Cadence SPICE (for example, `tempdc` and `dcoppt`).
- ptprop — Specifies numbers.
- psprop — Specifies strings.

Default Value: `ptprop`

Note: You can specify other values for the `sendMethod` argument. However, options must be sent to Cadence SPICE with the appropriate `set`, `ptprop`, or `psprop` statements.

Value Returned

`o_envVar`	Returns the changed simulator option object.
`nil`	Returns an error message and `nil` if unsuccessful.

Related Functions

To display the current set of simulator options, see the asiDisplaySimOption function.

To change the display characteristics for your Simulator Options form, see the asiChangeSimOptionFormProperties function.

asiChangeSimOptionFormProperties

```
asiChangeSimOptionFormProperties(
     o_tool
     [ ?type s_type ]
     [ ?width x_width ]
     [ ?columns x_columns ]
     )
     => o_formObj / nil
```

Description

Changes the display characteristics for the Simulator Options form.

Arguments

o_tool	Simulation tool object.
?type *s_type*	Specifies the form type. Valid Values: ■ 'oneD — Specifies a sequential display of fields in one column. ■ 'twoD —Specifies a two dimensional display of fields based on row and column positions. (Use the `asiAddSimOption` or `asiChangeSimOption` function to specify values for the rows and columns.) ■ 'custom — Lets you specify the exact coordinate locations for each field. (Use the `asiAddSimOption` or `asiChangeSimOption` function to specify the coordinates.) ■ 'matrix — Specifies a matrix of equally sized fields. Default Value: `'oneD`
?width *x_width*	Width of the form, in pixels. Default Value: The minimum default width of the form is `400` pixels. If the fields require more space than this, the form defaults to the smallest width that can accommodate the fields.
?columns *x_columns*	Number of columns. Use this argument only with matrix type forms. Default Value: `2`

Value Returned

o_formObj	Returns the simulator option form object if successful.
nil	Returns `nil` otherwise.

Example

```
asiChangeSimOptionFormProperties( asiGetTool('spectreS)
    ?width 450 )
```

Changes the width of the Simulator Options form for the Spectre simulator.

asiDeleteSimOption

```
asiDeleteSimOption(
     o_tool
     s_name
     )
     => t / nil
```

Description

Deletes a simulator option.

Arguments

o_tool	Simulation tool object.
s_name	Name of the simulator option you want to delete.

Value Returned

t	Returns t when the option is deleted.
nil	Returns an error message and nil if the option does not exist.

Example

```
asiDeleteSimOption( tool 'delmax )
```

Removes the *delmax* simulator option.

Related Function

To display the current set of simulator options, see the asiDisplaySimOption function.

asiDisplaySimOption

```
asiDisplaySimOption(
     { o_tool | o_session }
     )
     => t / nil
```

Description

Displays the current set of simulator option names and values. Use this function only to determine which simulator options you want to modify. Do not use this function as part of another procedure.

Arguments

o_tool | *o_session*	Simulation tool object.

Value Returned

`t`	Displays the set of simulator option names and values and returns `t`.
`nil`	Returns `nil` if there is an error.

Example

```
asiDisplaySimOption( asiGetTool( 'spectreS ) )
```

Displays the *spectreS* simulator options.

asiDisplaySimOptionFormProperties

```
asiDisplaySimOptionFormProperties(
     o_tool
     )
     => t / nil
```

Description

Displays the characteristics of the Simulator Options form. Use this function only to determine which form characteristics you want to modify. Do not use this function as part of another procedure.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Displays a list of Simulator Option form characteristics and returns `t`.
`nil`	Returns `nil` otherwise.

Example

```
asiDisplaySimOptionFormProperties( asiGetTool('spectreS) )
```

Displays the form characteristics of the Spectre Simulator Options form and returns `t`.

asiGetReservedWordList

```
asiGetReservedWordList(
     o_session
     )
     => l_list / nil
```

Description

Returns the simulator specific reserved keyword list. All the keywords specified by `asiGetReservedWordList` will be taken as keywords and not design variables. This process will ensure that the design parameters are not printed in the simulation control file under ‘parameters’ statement. By default, this function returns `nil`.

Note: While adding a simulator in Analog Design environment, you need to overload the function `asiGetReservedWordList` . Otherwise it will return the default value.

Arguments

o_session	Simulation tool object.

Value Returned

l_list	Returns the simulator specific keyword list.
`nil`	By default, this function returns `nil`.

asiIsCaseSensitive

```
asiIsCaseSensitive(
     o_session
     )
     => t / nil
```

Description

Determines whether the simulator is case sensitive or not. Returns `t`, if the simulator is case sensitive, else returns `nil`. The default value for this function is `t`.

Note: While adding a simulator in Analog Design environment, you need to overload the function `asiIsCaseSensitive`. Otherwise it will return the default value.

Arguments

o_session	Simulation tool object.

Value Returned

`t`	Determines whether the simulator is case sensitive or not and returns `t`.
`nil`	Returns `nil` otherwise.

asiGetSimOptionChoices

```
asiGetSimOptionChoices(
    { o_session | o_tool }
    s_name
    )
    => l_choices / nil
```

Description

Gets the list of choices for a simulator option that is set up as a list box.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name of the option for which you want the list of choices.

Value Returned

l_choices	Returns the list of values for the specified simulation option.
`nil`	Returns `nil` if the option does not exist.

Related Function

To display the current set of simulator options, see the asiDisplaySimOption function.

asiGetSimOptionNameList

```
asiGetSimOptionNameList(
     o_tool
     )
     => l_nameList
```

Description

Returns the list of simulator option names.

Arguments

o_tool	Simulation tool object.

Value Returned

l_nameList	Returns a list of the names of the simulator options.

Example

Loops through the simulator options and gets the corresponding values and sendMethods for those options.

```
foreach( name asiGetSimOptionNameList(session)
    value = asiGetSimOptionVal( session name)
    sendMethod = asiGetSimOptionSendMethod( session name)
    ; Refer to asiSendOptions for a more complete example.
)
```

asiGetSimOptionSendMethod

```
asiGetSimOptionSendMethod(
     { o_session | o_tool }
     s_name
     )
     => s_sendMethod / nil
```

Description

Gets the *sendMethod* for the specified simulator option. The *sendMethod* indicates how the simulator option is sent to Cadence SPICE.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name of the simulator option.

Value Returned

s_sendMethod	Returns the *sendMethod*, which indicates how the simulator option is sent to Cadence SPICE.
`nil`	Returns `nil` if the option does not exist.

Example

```
asiGetSimOptionSendMethod( session 'abstol )
```

Gets the *sendMethod* for the *abstol* simulator option.

asiGetSimOptionVal

```
asiGetSimOptionVal(
     { o_session | o_tool }
     s_name
     )
     => g_value / nil
```

Description

Gets the value for the specified simulator option.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name of the simulator option.

Value Returned

g_value	Returns the value for the simulator option you specify.
`nil`	Returns `nil` if the option does not exist.

Example

```
asiGetSimOptionVal( session 'reltol )
```

Returns the value for the *reltol* simulator option.

asiGetSimulationRunCommand

```
asiGetSimulationRunCommand(
     o_session
     )
     => g_command / nil
```

Description

Gets the simulation run command. For direct simulators, it also creates the `runSimulation` file.

Arguments

o_session	Simulation session object.

Value Returned

g_command	Returns the simulation run command.
`nil`	Returns `nil` if an error occurs.

Example

```
asiGetSimulationRunCommand( sess )
```

For the spectre session `sess`, this command creates the runSimulation file in the netlist directory and returns `./runSimulation` as the simulation run command.

asiInit<yourSimulator>SimOption

```
asiInit<yourSimulator>SimOption(
     o_tool
     )
     => t
```

Description

Calls the procedures to add your simulator options.

Note: You must write `asiInit<yourSimulator>SimOption`, where <*yourSimulator*> is the name of your simulator. Do not include the angle brackets (<>).

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when your procedures are called. **Note:** You must write this procedure to return `t`.

Example

```
procedure( asiInitXYZSimOption( tool )
    <insert your code>
    t
)
```

Creates the procedure that calls the procedures to add the simulator options for the XYZ simulator.

asiSetHostOptions

```
asiSetHostOptions(
     o_session
     t_hostMode
     [ t_host ]
     [ t_remoteDir ]
     )
     => t / nil
```

Description

Changes the host mode, host and remote directory for simulation.

Arguments

o_session	Simulation session object.
o_hostMode	The type of simulation you want to select.
	Valid Values: `local`, `remote` and `distributed`.
	Default Value: `local`
t_host	Name of the host on which you want to run the digital simulator.
t_remoteDir	Specifies the project directory on the remote host to be used for remote simulation.

Value Returned

`t`	Returns `t` when sucessfully changes the Host options.
`nil`	Returns `nil` otherwise.

Examples

```
asiSetHostOptions( stdobj@0x18d7caa4 "local")
=> t
asiSetHostOptions( stdobj@0x18d7caa4 "distributed")
=> t
asiSetHostOptions(stdobj@0x18d7caa4 "remote" "ciclinux71" "/servers/scratch02/
aakhil/testcase/simulation")
=> t
asiSetHostOptions(stdobj@0x18d7caa4 "remote")
```

```
WARNING (ADE-3042): Unable to contact host (machine)
=> nil
```

asiSetSimOptionChoices

```
asiSetSimOptionChoices(
     { o_session | o_tool }
     s_name
     l_choices
     )
     => l_choices / nil
```

Description

Specifies the list of choices to appear in the list box field for the specified simulator option.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name a simulator option of the type `listBox`.
l_choices	List of choices to appear in the list box field.

Value Returned

l_choices	Returns the new list of choices to appear in the list box field.
`nil`	Returns `nil` if the option does not exist.

asiSetSimOptionVal

```
asiSetSimOptionVal(
     { o_session | o_tool }
     s_name
     g_value
     )
     => g_value / nil
```

Description

Sets the value of the specified simulator option.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name of the simulator option.
g_value	Value for the simulator option.

Value Returned

g_value	Returns the new value for the simulator option.
`nil`	Returns an error message and `nil` if the option does not exist.

Example

```
asiSetSimOptionVal( session 'tempdc "35" )
```

Sets the *tempdc* simulator option to 35.

asiGetSimulatorSrcList

```
asiGetSimulatorSrcList(
     o_session
     )
     => l_result
```

Description

Customizes the values in the *Function* drop-down list box of the *Setup Analog Stimuli* form.

Arguments

o_session	Simulation session object.

Value Returned

l_result	List of values in the Function drop-down list box of the Setup Analog Stimuli form.

Example

```
defmethod ( asiGetSimulatorSrcList ( (session xyz_session) )
'("dc" "pulse" "sin" "exp")
)
```

9

Analysis Functions

This chapter describes the functions that let you declare and manage simulator analyses.

If you want to use the `asiCheck` function to check values in your analyses or your analysis options, refer to Chapter 16, “Miscellaneous Functions. ”

asiAddAnalysis

```
asiAddAnalysis(
     o_tool
     [ ?name s_analysisName ]
     [ ?prompt t_prompt ]
     [ ?fieldList l_analysisFields ]
     [ ?optionList l_analysisOptions ]
     [ ?formType s_formType ]
     [ ?enable s_enable ]
     )
     => o_analysis / nil
```

Description

Adds a new analysis.

Arguments

o_tool	Simulation tool object.
?name *s_analysisName*	Name of the analysis.
?prompt *t_prompt*	Prompt for the analysis on the form.
?fieldList *l_analysisFields*	
	List of analysis fields.
?optionList *l_analysisOptions*	
	List of analysis options.
?formType *s_formType*	Specifies how the form is displayed. Valid values: ■ 'oneD – Specifies a sequential display of fields in one column. ■ 'twoD – Specifies a two dimensional display of fields based on row and column positions. The row and column positions are specified with asiAddAnalysisField, asiChangeAnalysisField, or asiCreateAnalysisField. ■ 'custom – Lets you specify exact coordinate locations for each field. The coordinate locations are specified with asiAddAnalysisField, asiChangeAnalysisField, or asiCreateAnalysisField. Default Value: 'oneD
?enable *s_enable*	Boolean flag that specifies whether the analysis is enabled by default. Valid Values: t specifies that the analysis is enabled by default, nil specifies that the analysis is not enabled by default. Default Value: nil

Value Returned

o_analysis	Returns the new analysis object if successful.
nil	Returns nil otherwise.

Example

```
tool = asiGetTool('spectre)
defclass( spectre_XYZ_analysis (analysis) nil)
anaObj = asiAddAnalysis( tool
    ?name 'XYZ
    ?prompt "XYZ"
    ?fieldList list(
        asiCreateAnalysisField(
            ?name 'from
            ?prompt "from"
            ?value "0"
            ?row 1
            ?column 1
        )
        asiCreateAnalysisField(
            ?name 'to
            ?prompt "to"
            ?row 1
            ?column 2
        )
        asiCreateAnalysisField(
            ?name 'by
            ?prompt "by"
            ?row 1
            ?column 3
        )
    )
    ?optionList list(
        asiCreateAnalysisOption(
            ?name 'XYZ1
            ?value "1e-4"
        )
        asiCreateAnalysisOption(
            ?name 'XYZ2
            ?value "1e-6"
        )
    )
)
```

Adds a new analysis called *XYZanalysis*, which has a *from*, *to,* and *by* field, and *XYZ1* and *XYZ2* analysis options.

Related Function

To display the available analyses, see the asiDisplayAnalysis function.

asiAddAnalysisField

```
asiAddAnalysisField(
     o_analysis
     [ ?name s_fieldName ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?invalidateFunc s_invalidateFunc ]
     )
     => o_envVar / nil
```

Description

Adds an analysis field to an existing analysis.

Arguments

o_analysis	Analysis object to which you want to add a new field.
?name *s_fieldName*	Name of the analysis field to add.
?prompt *t_prompt*	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: *s_name*
?type *s_type*	Type of the option. Valid Values: `string`, `integer`, `float`, `toggle`, `cyclic`, `radio`, `boolean`, `list`, `radioToggle`, `listBox`, `fileName` (string type for file names only), label (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` **Note:** See the asiAddSimOption function in the "Simulator Option Functions" chapter for an example that shows how to use the *separator* argument.
?choices *l_choices*	List of choices if *s_type* is `cyclic`, `radio`, `radioToggle` or `listBox`, or the list of switches if *s_type* is `toggle`. This argument is valid only if *s_type* is `cyclic`, `toggle`, `radio`, `radioToggle`, or `listBox`.
?itemsPerRow *x_itemsPerRow*	
	Numbers of choices per row for `radio`, `cyclic`, `toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in *l_choices*
?value *g_value*	Default value of the option.
?min *g_min*	Specifies the minimum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `-infinity`
?max *g_max*	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`

`?allowExpr` *`s_allowExpr`*

Specifies whether *`g_value`* can contain expressions.

Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions)

Default Value: `nil`

`?row` *`x_row`* Row in the form where the field appears. This argument is valid only for *'twoD* type forms.

`?column` *`x_column`* Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. This argument is valid only for *'twoD* type forms.

`?width` *`x_width`* Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. This argument is valid only for *'twoD* type forms.

Default Value: 1

`?coordinates` *`l_coordinates`*

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) This argument is valid only for *'custom* type forms.

`?displayOrder` *`x_displayOrder`*

Position (from the top) of the option in the form. Use `x_displayOrder` to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first.

The value of `x_displayOrder` must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form. This argument is valid only for *'oneD* type forms.

Valid Values: Any integer

`?labelText t_labelText`

Optional label displayed with frame type fields.
Default Value: `nil`

`?private s_private` Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software.

Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)

Default Value: `nil`

`?display s_display` Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable s_editable`

Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

Note: This argument only applies to type-in fields.

`?appCB` *`s_appCB`*

Specifies a callback function that is executed when the value of the option is changed.

Callback parameter list: (*`o_session`*)

`?callback` *`t_callback`*

Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB` *`s_formApplyCB`*

Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.

Callback parameter list: (*`o_session r_form r_field`*)

`?changeCB` *`st_changeCB`*

Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB` *`st_doubleClickCB`*

Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.

`?numRows` *`x_numRows`*

Number of rows shown on the form for a `listBox` type field.

`?s_multipleSelect` *`s_multipleSelect`*

Boolean flag that specifies whether multiple items can be selected from the `listBox` type field.

Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?invalidateFunc` *`s_invalidateFunc`*

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*`o_session`*)

Value Returned

o_envVar	Returns the environment variable object representing the field.
nil	Returns `nil` otherwise.

Example

```
o_analysisAC = asiGetAnalysis(tool 'ac)
asiAddAnalysisField( o_analysisAC
    ?name 'sweep
    ?prompt "Sweep"
    ?type 'cyclic
    ?choices '("Temperature" "Device Parameter"
                "Model Parameter")
    ?value "Model Parameter"
)
```

Adds a sweep field to an AC analysis.

Related Function

To display the current analysis field names, see the asiDisplayAnalysisField function.

asiAddAnalysisOption

```
asiAddAnalysisOption(
     o_analysis
     [ ?name s_optionName ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?browse g_browse ]
     [ ?mode t_browseMode ]
     [ ?invalidateFunc s_invalidateFunc ]
     [ ?sendMethod s_sendMethod ]
     )
     => o_envVar / nil
```

Description

Adds an option to an existing analysis.

Arguments

o_analysis	Analysis object to which you want to add an option.
?name *s_optionName*	Name of the analysis option to add.
?prompt *t_prompt*	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: *s_name*
?type *s_type*	Type of the option. Valid Values: `string, integer, float, toggle, cyclic, radio, boolean, list, radioToggle, listBox, fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), separator (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` **Note:** See the asiAddSimOption function in the “Simulator Option Functions” chapter for an example that shows how to use the *separator* argument.
?choices *l_choices*	List of choices if *s_type* is `cyclic, radio, radioToggle` or `listBox`, or the list of switches if *s_type* is `toggle`. This argument is valid only if *s_type* is `cyclic, toggle, radio, radioToggle`, or `listBox.`
?itemsPerRow *x_itemsPerRow*	Numbers of choices per row for `radio, cyclic, toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in *l_choices*
?value *g_value*	Default value of the option.
?min *g_min*	Specifies the minimum value of an `integer, float`, or `scale` option. Default Value: `nil`, which means `-infinity`

`?max` *`g_max`* Specifies the maximum value of an `integer`, `float`, or `scale` option.

Default Value: `nil`, which means `+infinity`

`?allowExpr` *`s_allowExpr`*

Specifies whether *`g_value`* can contain expressions.

Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions)

Default Value: `nil`

`?row` *`x_row`* Row in the form where the field appears. This argument is valid only for *'twoD* type forms.

`?column` *`x_column`* Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. This argument is valid only for *'twoD* type forms.

`?width` *`x_width`* Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. This argument is valid only for *'twoD* type forms.

Default Value: 1

`?coordinates` *`l_coordinates`*

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) This argument is valid only for *'custom* type forms.

`?displayOrder` *`x_displayOrder`*

Position (from the top) of the option in the form. Use *x_displayOrder* to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first.

The value of *x_displayOrder* must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form. This argument is valid only for *'oneD* type forms.

Valid Values: Any integer

`?labelText` *t_labelText*

Optional label displayed with frame type fields.

Default Value: `nil`

`?private` *s_private* Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software.
Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)
Default Value: `nil`

`?display` *s_display* Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable` *s_editable*

Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

Note: This argument only applies to type-in fields.

`?appCB s_appCB` Specifies a callback function that is executed when the value of the option is changed.

Callback parameter list: (*o_session*)

`?callback t_callback`

Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB s_formApplyCB`

Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.

Callback parameter list: (*o_session r_form r_field*)

`?changeCB st_changeCB`

Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB st_doubleClickCB`

Specifies a callback function that is executed when a designer double clicks on a *listBox* type field.

x_numRows Number of rows shown on the form for a `listBox` type field.

`?multipleSelect s_multipleSelect`

Boolean flag that specifies whether multiple items can be selected from the `listBox` type field.

Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?browse g_browse` Adds a browse button (*...*) for the specified option. This button can be used to open a file selection form to browse and select a file. The mode of file selection is specified by the *t_mode* argument.

Valid values: `t`, `nil`

Default value: `nil`

`?mode t_browseMode` Specifies mode for the file selection form that is displayed when the *`g_browse`* argument is set to `t`.

Valid values: `anyFile` specifies that you can open any file type; `existingFile` specifies that you can open any existing file; and `existingFiles` specifies that you can select multiple files.

Default value: `anyFile`

`?invalidateFunc s_invalidateFunc`

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*o_session*)

`?sendMethod s_sendMethod`

Specifies how simulator options are sent to Cadence SPICE. (Use this argument only if your simulator is in the SPICE Socket.)

Valid Values:

- `set` — Specifies options known by Cadence SPICE (for example, `tempdc` and `dcoppt`).
- `ptprop` — Specifies numbers.
- `psprop` — Specifies strings.

Default Value: `ptprop`

Note: You can specify other values for the *sendMethod* argument. However, options must be sent to Cadence SPICE with the appropriate `set, ptprop,` or `psprop` statements.

Value Returned

o_envVar	Returns the environment variable object representing the analysis option.
nil	Returns nil otherwise.

Example

```
asiAddAnalysisOption( o_XYZ
?name 'XYZ2
?value "1e-6"
)
```

Adds the *XYZ2* analysis option to the *XYZ* analysis.

Related Functions

To display the current analysis option names, see the asiDisplayAnalysisOption function.

To change the display characteristics for an analysis options form, see the asiChangeAnalysisOptionFormProperties function.

asiChangeAnalysis

```
asiChangeAnalysis(
    o_tool
    [ ?name s_analysisName ]
    [ ?prompt t_prompt ]
    [ ?fieldList l_analysisFields ]
    [ ?optionList l_analysisOptions ]
    [ ?formType s_formType ]
    )
    => o_analysis / nil
```

Description

Changes an existing analysis.

Arguments

o_tool — Simulation tool object.

?name *s_analysisName*

Name of the analysis you want to change.

?prompt *t_prompt* — Prompt for the analysis on the form.

?fieldList *l_analysisFields*

List of analysis fields.

?optionList *l_analysisOptions*

List of analysis options.

?formType *s_formType*

Specifies how the form is displayed.

Valid Values:

- `'oneD`–Specifies a sequential display of fields in one column.
- `'twoD`–Specifies a two dimensional display of fields based on row and column positions. The row and column positions are specified with `asiAddAnalysisField`, `asiChangeAnalysisField`, or `asiCreateAnalysisField`.
- `'custom`–Lets you specify exact coordinate locations for each field. The coordinate locations are specified with `asiAddAnalysisField`, `asiChangeAnalysisField`, or `asiCreateAnalysisField`.

Default Value: `'oneD`

Value Returned

o_analysis — Returns the analysis object.

`nil` — Returns `nil` otherwise.

Example

```
asiChangeAnalysis( tool
          ?name 'ac
          ?prompt "Modified AC Analysis"
          ?fieldList list(

               asiCreateAnalysisField(
                         ?name 'model
                         ?prompt "Model Name"
                         ?row 4
                         ?column 1
               )
               asiCreateAnalysisField(
                         ?name 'modelParam
                         ?prompt "Model Parameter"
                         ?row 4
                         ?column 2
                    )
               )
     )
```

Changes the form prompt for the AC analysis and adds two fields.

Related Function

To display the available analyses, see the asiDisplayAnalysis function.

asiChangeAnalysisField

```
asiChangeAnalysisField(
     o_analysis
     [ ?name s_fieldName ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?invalidateFunc s_invalidateFunc ]
     )
     => o_envVar / nil
```

Description

Changes a field in an existing analysis.

Arguments

o_analysis	Analysis object with the field you want to change.
?name *s_fieldName*	Name of the analysis field to change.
?prompt *t_prompt*	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: *s_name*
?type *s_type*	Type of the option. Valid Values: `string, integer, float, toggle, cyclic, radio, boolean, list, radioToggle, listBox, fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` **Note:** See the asiAddSimOption function in the “Simulator Option Functions” chapter for an example that shows how to use the *separator* argument.
?choices *l_choices*	List of choices if *s_type* is cyclic, radio, radioToggle or listBox, or the list of switches if *s_type* is toggle. **Note:** This argument is valid only if *s_type* is cyclic, toggle, radio, radioToggle, or listBox.
?itemsPerRow *x_itemsPerRow*	Numbers of choices per row for `radio, cyclic, toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in *l_choices*
?value *g_value*	Default value of the option.
?min *g_min*	Specifies the minimum value of an `integer, float,` or `scale` option. Default Value: `nil`, which means `-infinity`

`?max` *`g_max`*	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`
`?allowExpr` *`s_allowExpr`*	Specifies whether *`g_value`* can contain expressions. Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions) Default Value: `nil`
`?row` *`x_row`*	Row in the form where the field appears. **Note:** This argument is valid only for *'twoD* type forms.
`?column` *`x_column`*	Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. **Note:** This argument is valid only for *'twoD* type forms.
`?width` *`x_width`*	Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. Default Value: `1` **Note:** This argument is valid only for *'twoD* type forms.
`?coordinates` *`l_coordinates`*	List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) **Note:** This argument is valid only for *'custom* type forms.

`?displayOrder` *`x_displayOrder`*

Position (from the top) of the option in the form. Use *`x_displayOrder`* to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first.
The value of *`x_displayOrder`* must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form.

Valid Values: Any integer

Note: This argument is valid only for *'oneD* type forms.

`?labelText` *`t_labelText`*

Optional label displayed with frame type fields.

Default Value: `nil`

`?private` *`s_private`* Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software.

Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)

Default Value: `nil`

`?display` *`s_display`* Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable` *`s_editable`*

Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

Note: This argument only applies to type-in fields.

`?appCB` *`s_appCB`*
Specifies a callback function that is executed when the value of the option is changed.
Callback parameter list: (*`o_session`*)

`?callback` *`t_callback`*

Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB` *`s_formApplyCB`*

Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.
Callback parameter list: (*`o_session r_form r_field`*)

`?changeCB` *`st_changeCB`*

Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB` *`st_doubleClickCB`*

Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.

`?numRows` *`x_numRows`*
Number of rows shown on the form for a `listBox` type field.

`?multipleSelect` *`s_multipleSelect`*

Boolean flag that specifies whether multiple items can be selected from the `listBox` type field.

Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?invalidateFunc`
`s_invalidateFunc`

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.
Callback parameter list: (*`o_session`*)

Value Returned

`o_envVar`	Returns the new environment variable object representing the analysis field.
`nil`	Returns `nil` otherwise.

Example

```
analysis = asiGetAnalysis(tool ’tran)
asiChangeAnalysisField(analysis
    ?name       ’from
    ?prompt     "start"
)
```

Changes the `from` *prompt* to *start*.

Related Function

To display the current analysis field names, see the asiDisplayAnalysisField function.

asiChangeAnalysisOption

```
asiChangeAnalysisOption(
     o_analysis
     [ ?name s_optionName ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?invalidateFunc s_invalidateFunc ]
     [ ?sendMethod s_sendMethod ]
     )
     => o_envVar / nil
```

Description

Changes an analysis option for an existing analysis.

Arguments

o_analysis	Analysis object with the option you want to change.
?name *s_optionName*	Name of the analysis option to change.
?prompt *t_prompt*	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: *s_name*
?type *s_type*	Type of the option. Valid Values: `string, integer, float, toggle, cyclic, radio, boolean, list, radioToggle, listBox, fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string.` **Note:** See the asiAddSimOption function in the "Simulator Option Functions" chapter for an example that shows how to use the *separator* argument.
?choices *l_choices*	List of choices if *s_type* is `cyclic, radio, radioToggle` or `listBox`, or the list of switches if *s_type* is `toggle`. **Note:** This argument is valid only if *s_type* is `cyclic, toggle, radio, radioToggle`, or `listBox`.
?itemsPerRow *x_itemsPerRow*	
	Numbers of choices per row for `radio, cyclic, toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in *l_choices*
?value *g_value*	Default value of the option.
?min *g_min*	Specifies the minimum value of an `integer, float`, or `scale` option. Default Value: `nil`, which means `-infinity`

`?max` *`g_max`*	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`
`?allowExpr` *`s_allowExpr`*	
	Specifies whether *`g_value`* can contain expressions. Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions) Default Value: `nil`
`?row` *`x_row`*	Row in the form where the field appears. **Note:** This argument is valid only for *’twoD* type forms.
`?column` *`x_column`*	Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. **Note:** This argument is valid only for ’twoD type forms.
`?width` *`x_width`*	Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. Default Value: `1` **Note:** This argument is valid only for ’twoD type forms.
`?coordinates` *`l_coordinates`*	

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.)

Note: This argument is valid only for *'*custom type forms.

`?displayOrder` *`x_displayOrder`*

Position (from the top) of the option in the form. Use *`x_displayOrder`* to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first.

The value of *`x_displayOrder`* must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form.

Valid Values: Any integer

Note: This argument is valid only for *'oneD* type forms.

`?labelText` *`t_labelText`*

Optional label displayed with frame type fields.

Default Value: `nil`

`?private` *`s_private`*

Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software.

Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)

Default Value: `nil`

`?display` *`s_display`* — Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable` *`s_editable`* — Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

Note: This argument only applies to type-in fields.

`?appCB` *`s_appCB`* — Specifies a callback function that is executed when the value of the option is changed.

Callback parameter list: (*`o_session`*)

`?callback` *`t_callback`* — Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB` *`s_formApplyCB`*

Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.

Callback parameter list: (*`o_session r_form r_field`*)

`?changeCB` *`st_changeCB`* — Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB` *`st_doubleClickCB`*

Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.

`?numRows` *`x_numRows`* — Number of rows shown on the form for a `listBox` type field.

`?multipleSelect` *`s_multipleSelect`*

Boolean flag that specifies whether multiple items can be selected from the `listBox` type field.

Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?invalidateFunc` *`s_invalidateFunc`*

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*`o_session`*)

`?sendMethod` *`s_sendMethod`*

Specifies how simulator options are sent to Cadence SPICE. (Use this argument only if your simulator is in the SPICE Socket.)

Valid Values:

- `set`–Specifies options known by Cadence SPICE (for example, `tempdc` and `dcoppt`).
- `ptprop`–Specifies numbers.
- `psprop`–Specifies strings.

Default Value: `ptprop`

Note: You can specify other values for the *sendMethod* argument. However, your options will be automatically translated into the appropriate `set`, `ptprop`, or `psprop` statements to be sent to Cadence SPICE.

Value Returned

`o_envVar`	Returns the new environment variable object that represents the analysis option.
`nil`	Returns `nil` otherwise.

Example

```
asiChangeAnalysisOption( analysis
    ?name       'lvltim
```

```
    ?choices '( "0" "1" "2" )
)
```

Modifies the *lvltim* transient option by adding an extra choice ("0") to the *choices* list.

Related Functions

To display the current analysis option names, see the asiDisplayAnalysisOption function.

To change the display characteristics for an analysis options form, see the asiChangeAnalysisOptionFormProperties function.

asiChangeAnalysisOptionFormProperties

```
asiChangeAnalysisOptionFormProperties(
     o_analysis
     [ ?type s_type ]
     [ ?width x_width ]
     [ ?columns x_columns ]
     )
     => o_formObj / nil
```

Description

Changes the display characteristics for one of the analysis options forms.

Arguments

o_analysis	Analysis object.
?type *s_type*	Specifies the form type. Valid Values: ■ `'oneD`–Specifies a sequential display of fields in one column. ■ `'twoD`–Specifies a two dimensional display of fields based on row and column positions. (Use the `asiAddAnalysisField`, `asiChangeAnalysisField`, or `asiCreateAnalysisField` functions to specify values for the rows and columns.) ■ `'custom`–Lets you specify the exact coordinate locations for each field. (Use the `asiAddAnalysisField`, `asiChangeAnalysisField`, or `asiCreateAnalysisField` functions to specify the coordinates.) ■ `'matrix`–Specifies a matrix of equally sized fields. Default Value: `'oneD`
?width *x_width*	Width of the form, in pixels. Default Value: The minimum default width of the form is 400 pixels. If the fields require more space than this, the form defaults to the smallest width that can accommodate the fields.
?columns *x_columns*	Number of columns. Use this argument only with matrix type forms. Default Value: `2`

Value Returned

o_formObj	Returns the analysis option form object if successful.
`nil`	Returns `nil` otherwise.

Example

```
asiChangeAnalysisOptionFormProperties( asiGetAnalysis( asiGetTool( 'spectreS )
'tran ) ?width 500)
```

For the Spectre simulator, changes the width of the Transient Options form to 500 pixels.

asiCreateAnalysisField

```
asiCreateAnalysisField(
     [ ?name s_fieldName ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?invalidateFunc s_invalidateFunc ]
     )
     => o_envVar / nil
```

Description

Creates a new analysis field, such as *from* or *to*, for a new or changed analysis.

You can call this function from within `asiAddAnalysis` or `asiChangeAnalysis` as an argument to *?fieldList.*

Arguments

`?name` *`s_fieldName`*	Name of the analysis field to define.
`?prompt` *`t_prompt`*	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: *`s_name`*
`?type` *`s_type`*	Type of the option. Valid Values: `string, integer, float, toggle, cyclic, radio, boolean, list, radioToggle, listBox, fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` **Note:** See the asiAddSimOption function in the "Simulator Option Functions" chapter for an example that shows how to use the *separator* argument.
`?choices` *`l_choices`*	List of choices if *`s_type`* is `cyclic, radio, radioToggle` or `listBox`, or the list of switches if *`s_type`* is `toggle`. This argument is valid only if *`s_type`* is `cyclic, toggle, radio, radioToggle,` or `listBox`.
`?itemsPerRow` *`x_itemsPerRow`*	
	Numbers of choices per row for `radio, cyclic, toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in *`l_choices`*
`?value` *`g_value`*	Default value of the option.
`?min` *`g_min`*	Specifies the minimum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `-infinity`
`?max` *`g_max`*	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`

`?allowExpr` *`s_allowExpr`*

Specifies whether *`g_value`* can contain expressions.

Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions)

Default Value: `nil`

`?row` *`x_row`* — Row in the form where the field appears. This argument is valid only for *’twoD* type forms.

`?column` *`x_column`* — Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. This argument is valid only for *’twoD* type forms.

`?width` *`x_width`* — Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. This argument is valid only for *’twoD* type forms*.*

Default Value: 1

`?coordinates` *`l_coordinates`*

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) This argument is valid only for *’custom* type forms.

`?displayOrder` *`x_displayOrder`*

Position (from the top) of the option in the form. Use `x_displayOrder` to reposition your options in an `inherited` form. By default, the options appear in the order defined; therefore, inherited options appear first.

The value of `x_displayOrder` must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form. This argument is valid only for *'oneD* type forms.

Valid Values: Any integer

`?labelText` *`t_labelText`*

Optional label displayed with frame type fields.

Default Value: `nil`

`?private` *`s_private`* Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software. Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)

Default Value: `nil`

`?display` *`s_display`* Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable` *`s_editable`*

Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

Note: This argument only applies to type-in fields.

`?appCB` *`s_appCB`* Specifies a callback function that is executed when the value of the option is changed.

Callback parameter list: (*`o_session`*)

`?callback` *`t_callback`*

Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB` *`s_formApplyCB`*

Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.

Callback parameter list: (`o_session r_form r_field`)

`?changeCB` *`st_changeCB`*

Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB` *`st_doubleClickCB`*

Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.

`?numRows` *`x_numRows`* Number of rows shown on the form for a `listBox` type field.

`?multipleSelect` *`s_multipleSelect`*

Boolean flag that specifies whether multiple items can be selected from the *listBox* type field.

Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?invalidateFunc` *`s_invalidateFunc`*

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*`o_session`*)

Value Returned

`o_envVar`	Returns the environment variable object that represents the field.
`nil`	Returns `nil` otherwise.

Example

```
asiAddAnalysis( tool
    ?name 'XYZ
    ?fieldList list(
        asiCreateAnalysisField(
            ?name 'from
            ?prompt "from"
            ?value "0"
            )
        asiCreateAnalysisField(
            ?name 'to
            ?prompt "to"
            )
        asiCreateAnalysisField(
            ?name 'by
            ?prompt "by"
            )
        )
    )
```

Adds a new analysis called *XYZ* analysis. This analysis has a *from*, *to,* and *by* field. The following example shows another way to add a new XYZ analysis with a *from*, *to*, and *by* field.

```
fromField = asiCreateAnalysisField(
                        ?name 'from
                        ?prompt "from"
                        ?value "0"
        )
toField = asiCreateAnalysisField(
                        ?name 'to
```

```
                        ?prompt "to"
            )
byField = asiCreateAnalysisField(
                        ?name 'by
                        ?prompt "by"
            )
asiAddAnalysis( tool
    ?name 'XYZ
    ?prompt "XYZ"
    ?fieldList list( fromField toField byField )
)
```

Related Function

To display the current analysis field names, see the asiDisplayAnalysisField function.

asiCreateAnalysisOption

```
asiCreateAnalysisOption(
     [ ?name s_optionName ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?invalidateFunc s_invalidateFunc ]
     [ ?sendMethod s_sendMethod ]
     )
     => o_envVar / nil
```

Description

Creates a new analysis option for a new or changed analysis. You can call this function from within `asiAddAnalysis` or `asiChangeAnalysis` as an argument to *?optionList*.

Arguments

`?name` *`s_optionName`*	Name of the analysis option to define.
`?prompt` *`t_prompt`*	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: *`s_name`*
`?type` *`s_type`*	Type of the option. Valid Values: `string, integer, float, toggle, cyclic, radio, boolean, list, radioToggle, listBox, fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` **Note:** See the asiAddSimOption function in the "Simulator Option Functions" chapter for an example that shows how to use the *separator* argument.
`?choices` *`l_choices`*	List of choices if *`s_type`* is `cyclic, radio, radioToggle or listBox`, or the list of switches if *`s_type`* is `toggle`. This argument is valid only if *`s_type`* is `cyclic, toggle, radio, radioToggle`, or `listBox`.
`?itemsPerRow` *`x_itemsPerRow`*	Numbers of choices per row for `radio, cyclic, toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in *`l_choices`*
`?value` *`g_value`*	Default value of the option.
`?min` *`g_min`*	Specifies the minimum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `-infinity`
`?max` *`g_max`*	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`

`?allowExpr` *`s_allowExpr`*

Specifies whether *`g_value`* can contain expressions.

Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions)

Default Value: `nil`

`?row` *`x_row`* Row in the form where the field appears. This argument is valid only for *'twoD* type forms.

`?column` *`x_column`* Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. This argument is valid only for *'twoD* type forms.

`?width` *`x_width`* Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. This argument is valid only for *'twoD* type forms.

Default Value: 1

`?coordinates` *`l_coordinates`*

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) This argument is valid only for *'custom* type forms.

`?displayOrder` *`x_displayOrder`*

Position (from the top) of the option in the form. Use *x_displayOrder* to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first.

The value of *x_displayOrder* must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form. This argument is valid only for *'oneD* type forms.

Valid Values: Any integer

`?labelText` *t_labelText*

Optional label displayed with frame type fields.

Default Value: `nil`

`?private` *s_private*

Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software. Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI)

Default Value: `nil`

`?display` *s_display*

Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.

Default Value: `t`

`?editable` *`s_editable`*	Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form. Default Value: `t` **Note:** This argument only applies to type-in fields.
`?appCB` *`s_appCB`*	Specifies a callback function that is executed when the value of the option is changed. Callback parameter list: (*`o_session`*)
`?callback` *`t_callback`*	Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)
`?formApplyCB` *`s_formApplyCB`*	
	Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field. Callback parameter list: (*`o_session r_form r_field`*)
`?changeCB` *`st_changeCB`*	Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.
`?doubleClickCB` *`st_doubleClickCB`*	
	Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.
`?numRows` *`x_numRows`*	Number of rows shown on the form for a `listBox` type field.
`?multipleSelect` *`s_multipleSelect`*	
	Boolean flag that specifies whether multiple items can be selected from the `listBox` type field. Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)
`?invalidateFunc` *`s_invalidateFunc`*	

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*o_session*)

?sendMethod *s_sendMethod*

Specifies how simulator options are sent to Cadence SPICE. (Use this argument only if your simulator is in the SPICE Socket.)

Valid Values:

- set—Specifies options known by Cadence SPICE (for example, tempdc and dcoppt).
- ptprop—Specifies numbers.
- psprop—Specifies strings.

Default Value: ptprop

You can specify other values for the *sendMethod* argument. However, options must be sent to Cadence SPICE with the appropriate set, ptprop, or psprop statements.

Value Returned

o_envVar	Returns the environment variable object representing the analysis option.
nil	Returns nil otherwise.

Example

Adds a new analysis called *XYZanalysis* with *XYZ1* and *XYZ2* analysis options.

```
asiAddAnalysis( tool
        ?name 'XYZ
        ?prompt "XYZ"
        ?optionList list(
            asiCreateAnalysisOption(
                ?name 'XYZ1
                ?value "1e-4"
            )
            asiCreateAnalysisOption(
                ?name 'XYZ2
```

```
                ?value "1e-6"
        )
            )
)
```

The following example shows another way to add new XYZ analysis with *XYZ1* and *XYZ2* analysis options.

```
option1 = asiCreateAnalysisOption(
                    ?name 'XYZ1
                    ?value "1e-4"
             )
option2 = asiCreateAnalysisOption(
                    ?name 'XYZ2
                    ?value "1e-6"
             )
asiAddAnalysis(tool
    ?name 'XYZ
    ?prompt "XYZ"
    ?optionList list( option1 option2 )
)
```

Related Functions

To display the current analysis option names, see the asiDisplayAnalysisOption function.

To change the display characteristics for an analysis options form, see the asiChangeAnalysisOptionFormProperties function.

asiDeleteAnalysis

```
asiDeleteAnalysis(
     o_tool
     s_analysisName
     )
     => t / nil
```

Description

Deletes an analysis.

Arguments

o_tool	Simulation tool object.
s_analysisName	Name of the analysis you want to delete.

Value Returned

t	Returns `t` when the analysis is deleted.
nil	Returns an error message and `nil` if the analysis does not exist.

Example

```
tool = asiGetTool('cdsSpice)
asiDeleteAnalysis(tool 'ac)
```

Deletes an AC analysis from the Cadence SPICE tool.

Related Function

To display the current set of analyses, see the asiDisplayAnalysis function.

asiDeleteAnalysisField

```
asiDeleteAnalysisField(
     o_analysis
     s_fieldName
     )
     => t / nil
```

Description

Deletes an analysis field from an existing analysis.

Arguments

o_analysis	Existing analysis object.
s_fieldName	Name of the analysis field to delete.

Value Returned

`t`	Returns `t` when the analysis field is deleted.
`nil`	Returns `nil` if the field does not exist.

Example

```
analysis = asiGetAnalysis(tool 'tran)
asiDeleteAnalysisField(analysis 'by)
```

Deletes the *by* field from the existing transient analysis.

Related Function

To display the current set of analysis field names, see the asiDisplayAnalysisField function.

asiDeleteAnalysisOption

```
asiDeleteAnalysisOption(
    o_analysis
    s_optionName
    )
    => t / nil
```

Description

Deletes an analysis option.

Arguments

o_analysis	Analysis object with the option you want to delete.
s_optionName	Name of the analysis option to delete.

Value Returned

`t`	Returns `t` when the option is deleted.
`nil`	Returns `nil` if the option does not exist.

Example

```
analysis = asiGetAnalysis(tool 'tran)
asiDeleteAnalysisOption(analysis 'tranOpt1)
```

Deletes the *tranOpt1* analysis option from the *ran* analysis.

Related Function

To display the current analysis option names, see the asiDisplayAnalysisOption function.

asiDisableAnalysis

```
asiDisableAnalysis(
     o_analysis
     )
     => t / nil
```

Description

Disables an analysis while keeping it in the analysis list. The analysis remains in the UI, but it is not sent to the simulator.

Arguments

o_analysis	Specifies an analysis object.

Value Returned

`t`	Returns `t` when the analysis is disabled.
`nil`	Returns `nil` if the analysis does not exist.

Example

```
analysis = asiGetAnalysis(session 'tran)
asiDisableAnalysis(analysis)
```

Disables the *tran* analysis.

asiDisplayAnalysis

```
asiDisplayAnalysis(
    o_tool
    )
    => t / nil
```

Description

Displays the analyses for a tool. Use this function to determine which analyses you need to add or modify. Do not use this function as part of another procedure.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` and displays the available analyses.
`nil`	Returns `nil` otherwise.

Example

```
tool = asiGetTool('analog)
asiDisplayAnalysis(tool)
```

Displays the analyses registered for the Analog Class.

asiDisplayAnalysisField

```
asiDisplayAnalysisField(
     o_analysis
     )
     => t / nil
```

Description

Displays the analysis field names for an analysis. Use this function to determine which analysis field you want to modify. Do not use this function as part of another procedure.

Arguments

o_analysis	Analysis object.

Value Returned

`t`	Returns `t` and displays the current analysis field names.
`nil`	Returns `nil` otherwise.

Example

```
analysis = asiGetAnalysis(tool 'tran)
asiDisplayAnalysisField(analysis)
```

Displays the names of the analysis fields for the *tran* analysis.

asiDisplayAnalysisOption

```
asiDisplayAnalysisOption(
    o_analysis
    )
    => t / nil
```

Description

Displays the analysis option names for an analysis. Use this function to determine which analysis option you want to modify. Do not use this function as part of another procedure.

Arguments

o_analysis	Analysis object.

Value Returned

`t`	Returns `t` and displays the current analysis option names.
`nil`	Returns `nil` otherwise.

Example

```
analysis = asiGetAnalysis(tool 'tran)
asiDisplayAnalysisOption(analysis)
```

Displays the analysis option names for the *tran* analysis.

asiDisplayAnalysisOptionFormProperties

```
asiDisplayAnalysisOptionFormProperties(
     o_analysis
     )
     => t / nil
```

Description

Displays the characteristics for one of the analysis options forms. Use this function only to determine which form characteristics you want to modify. Do not use this function as part of another procedure.

Arguments

o_analysis	Analysis object.

Value Returned

`t`	Displays the analysis options form characteristics and returns `t`.
`nil`	Returns `nil` otherwise.

Example

```
asiDisplayAnalysisOptionFormProperties(
asiGetAnalysis( asiGetTool( 'spectreS ) 'tran))
```

Displays the form characteristics for the Transient Options form.

asiEnableAnalysis

```
asiEnableAnalysis(
     o_analysis
     )
     => t / nil
```

Description

Enables an analysis, which means the analysis is selected and sent to the simulator.

Arguments

o_analysis	Specifies an analysis object.

Value Returned

`t`	Returns `t` if the analysis instance is enabled.
`nil`	Returns `nil` if the analysis does not exist.

Example

```
analysis = asiGetAnalysis(session 'tran)
asiEnableAnalysis(analysis)
```

Enables the *tran* analysis.

asiFormatAnalysis

```
asiFormatAnalysis(
     o_analysis
     p_fp
     )
     => t / nil
```

Description

Formats the analysis statements to send to Cadence SPICE.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_analysis	Specifies the analysis object.
p_fp	Specifies a file pointer to the file containing the analysis statements to send to the simulator (for simulators that are not in the Cadence SPICE Socket).

Value Returned

`t`	Returns `t` if the statements are generated.
`nil`	Returns `nil` otherwise.

Example for Integrators

In this example, the integrator of the XYZ simulator sends the trial analysis to Cadence SPICE, which formats the analysis to send to the XYZ simulator.

```
defmethod( asiFormatAnalysis ( (analysis XYZ_trial_analysis) fp )
    let(( str ( aelEnv aelEnvCreate( 's ) ) (session asiGetSession(  analysis ))
)

        str = sprintf( nil "* Trial Analysis\n")
        str = sprintf( nil "%sptprop XYZ_trial DoIt 1\n" str )

        str = sprintf( nil "%sptprop XYZ_trial from %s\n" str
             aelEnvInterpret( aelEnv asiGetAnalysisFieldVal
            (analysis 'from )))
        str = sprintf( nil "%sptprop XYZ_trial to %s\n" str
```

```
             aelEnvInterpret( aelEnv asiGetAnalysisFieldVal
            (analysis 'to )))
        str = sprintf( nil "%sptprop XYZ_trial by %s\n" str
             aelEnvInterpret( aelEnv asiGetAnalysisFieldVal
            (analysis 'by )))

        asiSendSim( session str nil nil nil )

        asiFormatAnalysisOption( analysis fp )

        t
    )
)
```

asiGetAnalysis

```
asiGetAnalysis(
     { o_session | o_tool }
     s_analysisName
     )
     => o_analysis / nil
```

Description

Gets an analysis object.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_analysisName	Name of the analysis you want to get.

Value Returned

o_analysis	Returns the analysis object.
nil	Returns `nil` if the analysis does not exist.

Example

```
analysis = asiGetAnalysis( session ’noise )
```

Returns the *noise* analysis object.

Related Function

To display the current analysis names, see the asiDisplayAnalysis function.

asiGetAnalysisFieldChoices

```
asiGetAnalysisFieldChoices(
    o_analysis
    s_fieldName
    )
    => l_choices / nil
```

Description

Gets the list of choices for an analysis field that is set up as a list box.

Arguments

o_analysis	Specifies an analysis object.
s_fieldName	Name of the analysis field for which you want to get the list of choices.

Value Returned

l_choices	Returns the list of choices for the specified analysis field.
`nil`	Returns `nil` if the field does not exist.

Related Function

To display the current set of analysis fields, see the asiDisplayAnalysisField function.

asiGetAnalysisFieldList

```
asiGetAnalysisFieldList(
     o_analysis
     )
     => l_fieldList / nil
```

Description

Returns a list of analysis field objects defined for a particular analysis object.

Arguments

o_analysis	Specifies an analysis object.

Value Returned

l_fieldList	Returns the list of field objects for the specified analysis object.
`nil`	Returns `nil` if the analysis has no fields associated with it.

Example

```
dcAnal = asiGetAnalysis(session 'dc)
asiGetAnalysisFieldList( dcAnal )
```

Returns the list of DC analysis fields.

Related Function

To display the analysis field names for an analysis, see the asiDisplayAnalysisField function.

asiGetAnalysisFieldVal

```
asiGetAnalysisFieldVal(
     o_analysis
     s_fieldName
     )
     => g_value / nil
```

Description

Gets the value of an analysis field from the environment.

Arguments

o_analysis	Specifies an analysis object.
s_fieldName	Name of the analysis field for which you want to get the value.

Value Returned

g_value	Returns the value for the given field.
`nil`	Returns `nil` if the field does not exist.

Example

```
analysis = asiGetAnalysis( session 'tran )
asiGetAnalysisFieldVal( analysis 'from )
```

Gets the value of the `from` field for an analysis.

Related Function

To display the current analysis field names, see the asiDisplayAnalysisField function.

asiGetAnalysisFormFieldChoices

```
asiGetAnalysisFormFieldChoices(
     r_form
     s_analysisName
     s_fieldName
     )
     => l_choices / nil
```

Description

Returns the list of choices for a field in the Choosing Analyses form. This procedure can be used within the *asiCheck* method to get the list of choices for an analysis field from the form for subsequent value checking. You can also use this procedure in an expression that controls whether a field is displayed in the form.

Arguments

r_form	Form containing the analysis field.
s_analysisName	Name of the analysis.
s_fieldName	Name of an analysis field of the type `listBox`.

Value Returned

l_choices	Returns the list of choices for the specified field on the Choosing Analyses form.
`nil`	Returns `nil` if the field does not exist.

asiGetAnalysisFormObj

```
asiGetAnalysisFormObj(
     o_session
     )
     => o_analysis / nil
```

Description

Returns the current analysis selected in the *Choosing Analysis* form for the simulation session.

Arguments

o_session	Specifies a simulation session object.

Value Returned

o_analysis	Returns the current analysis.
`nil`	Returns `nil` if the session object is invalid.

Example

```
currentAnalysisObject = asiGetAnalysisFormObj(asiGetCurrentSession())
stdobj@0x2da80938
asiGetAnalysisName(currentAnalysisObject)
```

asiGetAnalysisFormFieldVal

```
asiGetAnalysisFormFieldVal(
    r_form
    s_analysisName
    s_fieldName
    )
    => g_fieldValue / nil
```

Description

Returns the value of a field in the Choosing Analyses form. This procedure can be used within the *asiCheck* method to get the values of analysis fields from the form for subsequent value checking. You can also use this procedure in an expression that controls whether a field is displayed in the form.

Arguments

r_form	Form containing the analysis field.
s_analysisName	Name of the analysis.
s_fieldName	Name of the analysis field.

Value Returned

g_fieldValue	Returns the value for a field on the Choosing Analyses form.
`nil`	Returns `nil` if the field does not exist.

Example

The following example shows how you might use the `asiGetAnalysisFormFieldVal` function to get the value of the *incrType* field (for an ac analysis) within the display expression for the *lin* field. In this example, the *lin* field is displayed on the form only when *incrType* is *"Linear".*

```
asiCreateAnalysisField(
    ?name           'lin
    ?prompt         "Step Size (Hz)"
    ?display        'equal(asiGetAnalysisFormFieldVal( form 'ac
                        'incrType ) "Linear")
)
```

The first argument must be explicitly specified for proper evaluation.

See the asiCheck function in the “Miscellaneous Functions” chapter for an example that shows how to use the `asiGetAnalysisFormFieldVal` function within the *asiCheck* method to get the values of analysis form fields for value checking.

asiGetAnalysisName

```
asiGetAnalysisName(
     o_analysis
     )
     => s_analysisName / nil
```

Description

Gets the name of the analysis.

Arguments

o_analysis	Specifies an analysis object.

Value Returned

s_analysisName	Returns the name of the analysis.
`nil`	Returns `nil` if the analysis is invalid.

asiGetAnalysisNameList

```
asiGetAnalysisNameList(
     { o_session | o_tool }
     )
     => l_analysesNames
```

Description

Returns a list of analysis names defined for a tool.

Arguments

o_session	Specifies a simulation session object.
o_tool	Specifies a simulation tool object.

Value Returned

l_analysesNames	Returns a list of analysis names.

Example

```
listOfAnalysisNames = asiGetAnalysisNameList(o_session)
```

Returns the list of analysis names for *o_session*.

asiGetAnalysisOptionChoices

```
asiGetAnalysisOptionChoices(
     o_analysis
     s_optionName
     )
     => l_choices / nil
```

Description

Gets the list of choices for an analysis option that is set up as a list box.

Arguments

o_analysis	Specifies an analysis object.
s_optionName	Name of the option for which you want to get the list of choices.

Value Returned

l_choices	Returns the list of choices for the analysis option.
nil	Returns `nil` if the option does not exist.

Related Function

To display the current analysis option names, see the asiDisplayAnalysisOption function.

asiGetAnalysisOptionList

```
asiGetAnalysisOptionList(
     o_analysis
     )
     => l_optionObjects / nil
```

Description

Gets a list of analysis option objects defined for a particular analysis object.

Arguments

o_analysis	Specifies an analysis object.

Value Returned

l_optionObjects	Returns a list of analysis option objects.
nil	Returns `nil` if the analysis has no options.

Examples

```
asiGetAnalysisOptionList( analysis )
```

Returns the list of analysis options.

The following example shows how you might use the `asiGetAnalysisOptionList` routine in your `asiFormatAnalysisOption` routine.

```
defmethod( asiFormatAnalysisOption ( ( analysis XYZ_trial_analysis )
    _fp )

    let(( name value command sendMethod (session asiGetSession
        (analysis )) )

        foreach( option asiGetAnalysisOptionList( analysis )
            name  = asiGetName( option )
            value = asiGetAnalysisOptionVal( analysis name )
            sendMethod = asiGetAnalysisOptionSendMethod( analysis
                         name)

            if( artBlankString( value ) then
                    sprintf( command "deprop XYZ_trial %s\n" name )
            else
                    caseq( sendMethod
```

```
                        ( set
                             sprintf( command "set %s=%s\n" name
                                        value )
                            )
                            ( ptprop
                                sprintf( command "ptprop XYZ_trial
                                %s %s\n" name value )
                            )
                    ( psprop
                         sprintf( command "psprop XYZ_trial %s
                                    \"%s\" \n" name value )
                    )
                    ( t
                        warn( "don't know how to send XYZ trial
                            option %s\n." name  )
                        command = nil
                    )
            )
        )

        when( command
            asiSendSim( session command nil nil nil )
        )
     )
    )
)
```

asiGetAnalysisOptionSendMethod

```
asiGetAnalysisOptionSendMethod(
     o_analysis
     s_optionName
     )
     => s_sendMethod
```

Description

Gets the `sendMethod` for an option in an analysis. The `sendMethod` indicates how the analysis option is sent to Cadence SPICE.

Arguments

o_analysis	Specifies an analysis object.
s_optionName	Name of an analysis option for which you want to get the *sendMethod*.

Value Returned

s_sendMethod	Returns the *sendMethod* for the analysis option.

Example

```
asiGetAnalysisOptionSendMethod( analysis 'delmax )
```

Returns the *sendMethod* for the *delmax* analysis option.

asiGetAnalysisOptionVal

```
asiGetAnalysisOptionVal(
     o_analysis
     s_optionName
     )
     => g_value / nil
```

Description

Gets the value for the given option in an analysis.

Arguments

o_analysis	Specifies an analysis object.
s_optionName	Name of the option for which you want to get the value.

Value Returned

g_value	Returns the value for the analysis option.
`nil`	Returns `nil` if the option does not exist.

Example

```
asiGetAnalysisOptionVal( analysis 'delmax )
```

Returns the value for the *delmax* analysis option.

Related Function

To display the current analysis option names, see the asiDisplayAnalysisOption function.

asiGetAnalysisParamNameList

```
asiGetAnalysisParamNameList(
     o_analysis
     )
     => l_analysisParamNameList / nil
```

Description

Returns a concatenated list of fields and options defined for an analysis object.

Arguments

o_analysis	Specifies an analysis object.

Value Returned

l_analysisParamNameList	
	A concatenated list of fields and options defined for the analysis object.
nil	Returns nil if the analysis has no fields or options associated with it.

Example

```
analysis = asiGetAnalysis( session 'tran )
asiGetAnalysisParamNameList(analysis)
```

Displays the names of fields and options defined for tran analysis in a list.

asiGetEnabledAnalysisList

```
asiGetEnabledAnalysisList(
    o_session
    )
    => l_analysisEnabledList / nil
```

Description

Returns a list of all the enabled analyses.

Arguments

o_session	Specifies a simulation session object.

Value Returned

l_analysisEnabledList	
	Returns a list of the enabled analyses.
nil	Returns nil if no analysis is enabled.

Example

```
l_analysisEnabledList = asiGetEnabledAnalysisList(o_session)
```

Returns the list of enabled analyses for *o_session*.

asiInit<yourSimulator>Analysis

```
asiInit<yourSimulator>Analysis(
     o_tool
     )
     => t
```

Description

Calls the procedures that modify your simulator's analyses.

Note: You must write `asiInit<yourSimulator>Analysis`, where <*yourSimulator*> is the name of your simulator. Do not include the angle brackets (<>).

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` if successful. **Note:** You must write this procedure to return `t`.

Example

```
procedure( asiInitXYZAnalysis( tool )
    <insert your code>
    t
)
```

Creates the procedure that calls the procedures to specify or change the analyses for the *XYZ* simulator.

asiIsAnalysisEnabled

```
asiIsAnalysisEnabled(
     o_analysis
     )
     => t / nil
```

Description

Tests to determine whether an analysis is enabled.

Arguments

o_analysis	Specifies an analysis object.

Value Returned

`t`	Returns `t` if the analysis is enabled
`nil`	Returns `nil` if the analysis is not enabled.

Example

```
analysis = asiGetAnalysis(session 'tran)
when( asiIsAnalysisEnabled(analysis)
println("The transient analysis is enabled")
)
```

Prints “The transient analysis is enabled” if `tran` is enabled.

asiSetAnalysisFieldChoices

```
asiSetAnalysisFieldChoices(
     o_analysis
     s_fieldName
     l_choices
     )
     => l_choices / nil
```

Description

Specifies the list of choices to appear in the list box for an analysis field.

Arguments

o_analysis	Specifies an analysis object.
s_fieldName	Name of the analysis field for which you want to set the value.
l_choices	List of choices to appear in the list box field.

Value Returned

l_choices	Returns the new list of choices for the analysis field.
nil	Returns `nil` if the field does not exist.

asiSetAnalysisFieldVal

```
asiSetAnalysisFieldVal(
     o_analysis
     s_fieldName
     g_value
     )
     => g_value / nil
```

Description

Sets the value for a field of an analysis.

Arguments

o_analysis	Specifies an analysis object.
s_fieldName	Name of the field for which you want to set the value.
g_value	Value for the field.

Value Returned

g_value	Returns the new value for the analysis field.
nil	Returns `nil` if the field does not exist.

Example

```
asiSetAnalysisFieldVal( analysis 'from "5n" )
```

Sets the `from` field to `5n`.

Related Function

To display the current analysis field names, see the asiDisplayAnalysisField function.

asiSetAnalysisFormFieldChoices

```
asiSetAnalysisFormFieldChoices(
     r_form
     s_analysisName
     s_fieldName
     l_choices
     )
     => l_choices / nil
```

Description

Sets the list of choices for the specified field on the Choosing Analyses form.

Arguments

r_form	Form containing the analysis fields.
s_analysisName	Name of the analysis.
s_fieldName	Name of an analysis field of the type `listBox`.
l_choices	List of choices for the analysis field.

Value Returned

l_choices	Returns the new list of choices for the analysis field.
`nil`	Returns `nil` if the field cannot be accessed.

asiSetAnalysisFormFieldVal

```
asiSetAnalysisFormFieldVal(
     r_form
     s_analysisName
     s_fieldName
     g_value
     )
     => g_value / nil
```

Description

Sets the value of a field on the *Choosing Analyses* form.

Arguments

r_form	Form containing the analysis fields.
s_analysisName	Name of the analysis.
s_fieldName	Name of the analysis field.
g_value	Value for the analysis field.

Value Returned

g_value	Returns the new value for the analysis field.
`nil`	Returns `nil` if the field cannot be accessed.

Example

```
asiSetAnalysisFormFieldVal( form 'tran 'to "10u")
```

Sets the `to` field to 10µ for a transient analysis.

asiSetAnalysisFormWidth

```
asiSetAnalysisFormWidth(
    o_tool
    x_width
    )
    => x_width / nil
```

Description

Sets the width of the Choosing Analyses form. You need to add a call to this procedure to the `analysis.il` file if you do not want the inherited width of the analysis form.

Arguments

o_tool	Simulation tool object.
x_width	Width of the form, in pixels.

Value Returned

x_width	Returns *x_width* when the width is set.
`nil`	Returns `nil` otherwise.

Example

```
asiSetAnalysisFormWidth( asiGetTool( 'XYZ ) 500 )
```

Sets the width of the analysis form for the XYZ simulator to 500 pixels.

asiSetAnalysisOptionFormProperties

```
asiSetAnalysisOptionFormProperties(
     o_analysis
     [ ?type s_type ]
     [ ?width x_width ]
     [ ?columns x_columns ]
     )
     => o_formObj / nil
```

Description

Sets the display characteristics for a new analysis options form.

Arguments

o_analysis Analysis object.

s_type Specifies the form type.

Valid Values:

- `'oneD`–Specifies a sequential display of fields in one column.
- `'twoD`—Specifies a two dimensional display of fields based on row and column positions. (Use the `asiAddAnalysisOption`, `asiChangeAnalysisOption`, or `asiCreateAnalysisOption` functions to specify values for the rows and columns.)
- `'custom`–Lets you specify the exact coordinate locations for each field. (Use the `asiAddAnalysisOption`, `asiChangeAnalysisOption`, or `asiCreateAnalysisOption` functions to specify the coordinates.)
- `'matrix`–Specifies a matrix of equally sized fields.

Default Value: `'oneD`

x_width Width of the form, in pixels.

Default Value: The minimum default width of the form is 400 pixels. If the fields require more space than this, the form defaults to the smallest width that can accommodate the fields.

x_columns Number of columns. Use this argument only with matrix type forms.

Default Value: 2

Value Returned

o_formObj Returns the analysis option form object if successful.

`nil` Returns `nil` otherwise.

Example

```
asiSetAnalysisOptionFormProperties( asiGetAnalysis( asiGetTool( 'XYZ_simulator )
'XYZ_analysis )
?width 500)
```

Sets the form properties for the analysis options for a new XYZ analysis.

asiSetAnalysisOptionChoices

```
asiSetAnalysisOptionChoices(
     o_analysis
     s_optionName
     l_choices
     )
     => l_choices / nil
```

Description

Specifies the list of choices for an analysis option that is set up as a list box.

Arguments

o_analysis	Specifies an analysis object.
s_optionName	Name of an analysis option of the type `listBox`.
l_choices	List of choices for the analysis option.

Value Returned

l_choices	Returns the new list of choices for the analysis option.
`nil`	Returns `nil` if the option does not exist.

asiSetAnalysisOptionVal

```
asiSetAnalysisOptionVal(
     o_analysis
     s_optionName
     g_value
     )
     => g_value / nil
```

Description

Sets the value of an option in an analysis.

Arguments

o_analysis	Specifies an analysis object.
s_optionName	Name of the analysis option for which you want to set the value.
g_value	Value for the analysis option.

Value Returned

g_value	Returns the new value for the analysis option.
`nil`	Returns `nil` if the option does not exist.

Example

```
asiSetAnalysisOptionVal( analysis 'lvltim "2" )
```

Sets the value of the *lvltim* analysis option to *2*.

Related Function

To display the current analysis option names, see the asiDisplayAnalysisOption function.

apaExport

```
apaExport(
     w_windowId
     )
     => t
```

Description

This function can be used to export the sweep specifications, specified in the given Parametric Analysis window, to a file in the comma-separated values (csv) format. When called, the function opens the *Export data in a csv format* dialog where you need to provide name of the file to which the sweep data is to be exported.

Arguments

w_windowId	The window ID of the Parametric Analysis window.

Values Returned

`t`	Always returns `t`.

Example

```
apaExport(window(5)) => t
```

apaExportCB

```
apaExportCB(
     w_windowId
     )
     => t
```

Description

Callback for the menu *File-Export to csv File* in the Parametric Analysis window.

Arguments

w_windowId	The window Id of the Parametric Analysis window.

Values Returned

t	Always returns t.

Example

```
apaExportCB(window(5)) => t
```

apaStop

```
apaStop(
    )
    => t
```

Description

This function can be used to stop a parametric analysis. Before calling this function from the CIW, make the parametric analysis window the current window. When called, this function will terminate the current simulator run and stop the parametric analysis. Any partial data created by parametric analysis will be removed. You can use the *Pause* or *Pause Now* menus to pause the parametric analysis before calling this function.

Values Returned

`t`	Always returns `t`.

Example

```
apaStop() => t
```

apaStopCB

```
apaStopCB(
     w_windowId
     )
     => t
```

Description

Callback for the future menu *Analysis-Stop* in a parametric analysis window.

Arguments

w_windowId	The window Id of the parametric analysis window.

Values Returned

t	Returns t if the analysis was stopped.
nil	Returns nil if there was an error.

Example

```
apaStopCB(hiGetCurrentWindow())
```

10

Simulation Control Functions for Direct Interfaces

This chapter documents a set of OASIS Procedural Interfaces (PI) defined for direct simulation. Except as noted, you can redefine these methods.

We recommend that you not use or overload the following methods for OASIS direct simulation because they are either not applicable or they do not fit the direct simulation use model.

`asiSendAnalysis`	`asiSendControlStmts`
`asiSendInitCond`	`asiSendNetlist`
`asiSendNodeSets`	`asiSendOptions`
`asiSendRestore`	`asiSendDesignVars`
`asiSendKeepList`	`asiSendModelPath`
`asiSendInitFile`	`asiSendSim`
`asiSendUpdateFile`	`asiFinalNetlist`
`asiRawNetlist`	`asiAddFlowchartLink`
`asiAddFlowchartStep`	`asiCreateFlowchart`
`asiChangeFlowchartStep`	`asiDeleteFlowchartLink`
`asiDeleteFlowchartStep`	`asiExecuteFlowchart`
`asiDisplayFlowchart`	`asiGetFlowchart`
`asiInvalidateFlowchartStep`	`asiGetMarchList`
`asiSetMarchList`	

The asiAnalog Class: Initialization and Simulation Control

The `asiAnalog` class is the base class for all analog simulators. A simulator derived from the `asiAnalog` class is integrated directly without using Cadence SPICE for netlisting and simulation control.

asiInitialize

```
asiInitialize(
     o_tool
     )
     => o_tool / nil
```

Description

Initializes the tools that are derived from the `asiAnalog` class. This method is not called for tools that are derived from the `asiSocket` class.

For the `asiAnalog` class, it calls:

- `asiInitStartOption`
- asiInitEnvOption
- asiInitSimOption
- asiInitFormatterClass
- asiInitAnalysis
- asiInitUI
- asiInitDataAccessFunction
- other procedures

Arguments

o_tool	The simulation session object.

Value Returned

o_tool	The simulation session object.
`nil`	Failure.

Example

```
defmethod( asiInitialize (( yourSimulator_session ))
    asiInitFormatterClass(tool)
    asiInitEnvOption(tool)
```

```
    asiInitAnalysis(tool)
)
```

asiNetlist

```
asiNetlist(
     o_session
     )
     => g_status / nil
```

Description

This method performs the creation of a design object. It then creates the formatter object with `nlCreateFormatter`, after which the netlister is run and a netlist is generated with `nlNetlist`. Netlist statistics are then printed. The netlister also provides a component count, as well as the addition of design variables found during netlisting.

This method is called by the environment, so you should not call it directly from the interface. This method can be redefined for the interface. Use `callNextMethod` in this definition.

Arguments

o_session	The OASIS session object.

Value Returned

g_status	Success.
`nil`	Netlisting errors were encountered.

Example

```
asiNetlist( session )
```

asiInterruptSim

```
asiInterruptSim(
     o_session
     )
     => g_status / nil
```

Description

This method provides an interrupt to the simulation run process for a session. It is associated with the *Simulation->Stop* action in the user interface. This method is called by the environment. Therefore, you should not call it directly from the interface. This method can be re-defined for the interface. Use *callNextMethod* in this definition.

Note for Integrators:

This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as illustrated in the example. If you want to send a soft interrupt signal to your simulator, refer to the example mentioned in the *asiQuitSimulator* function.

Arguments

o_session	The OASIS session object.

Values Returned

g_status	Success.
nil	Errors were encountered when interrupting the simulation.

Example

```
defmethod(  asiInterruptSim (( session yourSimulator_session ))
    println("yourSimulator : Simulation stopped by user")
    <insert code you need >
    callNextMethod()
    <insert code you need >
)
```

asiSetProjectDirChangeSetup

```
asiSetProjectDirChangeSetup(
     o_session
     )
     => t / nil
```

Description

Enables you to modify the simulator settings for the given session after changing the project directory. This method is called by the environment. Therefore, you should not call it directly from the interface.

Note for Integrators:

This function is defined as a method for the Analog Classand returns `t` at analog class. You can overload this method for your simulator class, as illustrated in the example.

Arguments

o_session	Simulation session object.

Value Returned

`t`	Returns `t` if the function call was successful.
`nil`	Returns `nil` otherwise.

Example

```
defmethod ( asiSetProjectDirChangeSetup ( session yourSimulator_session ))
    <insert code you need >
    callNextMethod()
    <insert code you need >
)
```

asiQuitSimulator

```
asiQuitSimulator(
     o_session
     [ ?mode g_mode ]
     )
     => g_status / nil
```

Description

This method terminates or kills the simulator run process based on the `ipc` signal being sent to the specified process. By default, the direct integration code sends a hard-kill signal to the simulator process. To change this option and send a soft-kill signal, the *?mode* option should be set to `true` and overloaded for `yourSimulator` session. This method is called by the environment, therefore, you should not call it directly from the interface. This method can be re-defined for the interface. Use, *callNextMethod* in its definition.

Note for Integrators:

The function *asiQuitSimulator* is called internally via *asiInterruptSim*. To send a hard or soft interrupt signal, *asiInterruptSim* should be overloaded for your simulator class. This is illustrated in the example. In case you are not concerned with the hard kill scenario, it is recommended that you do not overload *asiInterruptSim* or *asiQuitSimulator* methods and use the default behavior.

Arguments

o_session	OASIS session object.
g_mode	Specifies the type of `ipc` signal sent to kill the simulator process. By default, *g_mode* is `nil`, meaning a hard-kill signal (*ipcKillProcess*) is sent to the simulator. When, *g_mode* is `t`, a soft-kill signal (*ipcSoftKill*) is sent to the simulator process. Valid Values: `nil:` a hard-kill signal (*ipcKillProcess*) is sent `t : a` soft-kill signal (*ipcSoftKill*) is sent Default Value: `nil`

Values Returned

`g_status`	Success.
`nil`	Otherwise.

Example

Note: *asiQuitSimulator* is called from *asiInterruptSim*. Therefore, a simulator session can quit based on the type of signal received as follows:

- **Hard-kill signal** (default, for `asiAnalog_session`)

  In this case, you are not concerned with the `ipc` hard kill signal being sent to your simulator's session. There is no need to overload *asiQuitSimulator*. Instead, use the *callNextMethod()*, which will serve your purpose:

```
defmethod( asiInterruptSim ((session yourSimulator_session))
    println(  "yourSimulator: session  hard killed .\n" )
    println(  "yourSimulator: simulation is stopped by user.\n" )
    println(  "yourSimulator: simulation results may not be complete.\n" )
    asiSetWasInterrupted( session t )
    asiQuitSimulator( session)
)
```

- **Soft-kill signal** (customized code)

  When you need to have a soft-kill signal sent to your simulator's session, you need to overload *asiQuitSimulator* method with *`?mode`* set to `t`, as follows:

```
defmethod( asiInterruptSim ((session yourSimulator_session))
    <insert code you need>
    println(  "yourSimulator: session  soft killed .\n" )
    println(  "yourSimulator: simulation is stopped by user.\n" )
    println(  "yourSimulator: simulation results may not be complete.\n" )
    asiSetWasInterrupted( session t )
    asiQuitSimulator( session ?mode t )
    <insert code you need>

)
```

Integrator Overloadable Methods for Invoking Simulation

asiRunSimulation

```
asiRunSimulation(
     o_session
     )
     => g_status / nil
```

Description

This method performs the simulation for the session. This method is called by the environment, so you should not call it directly from the interface. This method can be redefined for the interface. Use `callNextMethod` in this definition.

Arguments

o_session	The OASIS session object.

Value Returned

g_status	Success.
`nil`	Errors were encountered when starting the simulation.

Example

```
defmethod( asiRunSimulation (( session yourSimulator_session))
    <insert code you need >
    callNextMethod()
    <insert code you need>
```

asiGetPredefinedCommandLineOption

```
asiGetPredefinedCommandLineOption(
     o_session
     )
     => t_predefinedCmdLineOption
```

Description

Gets the predefined simulation command line options. This function returns an empty string at the `asiAnalog` class. Overload this method for your simulator.

Arguments

o_session	The simulation session object.

Value Returned

t_predefinedCmdLineOption

The predefined command line options in a string.

Example

```
defmethod( asiGetPredefinedCommandLineOption (
                        ( _session yourSimulator_session ))
"any command line args that you always send to your simulator"
)
```

asiGetCommandFooter

```
asiGetCommandFooter(
     o_session
     )
     => t_commandFooter
```

Description

Specifies the footer of the simulation run command.

Argument

o_session	Simulation session object.

Value Returned

t_commandFooter	Command line footer.

Example

```
defmethod( asiGetCommandFooter (( session mySimulator_session ))
    " > mySimulator.log"
)
```

Integrator Overloadable Methods for Formatting Control Statements

asiFormatControlStmts

```
asiFormatControlStmts(
     o_session
     p_fp
     )
     => t / nil
```

Description

Creates and formats all control statements. It formats the following in the following order: node sets by calling `asiFormatNoteSet`; initial conditions by calling `asiFormatInitCond`; simulator options by calling `asiFormatSimulatorOptions`; analyses by calling `asiFormatAnalysisList`; nets/currents to save by calling `asiFormatKeepList`.

Arguments

o_session	The simulation session object.
p_fp	The file pointer.

Value Returned

`t`	The complete simulator input file was generated successfully.
`nil`	Otherwise.

Example

```
defmethod( asiFormatControlStmts (( session asiAnalog_session ) fp )
callNextMethod()
asiFormatMyControlStmt( session fp )
)
```

asiFormatDesignVarList

```
asiFormatDesignVarList(
     o_session
     )
     => t / nil
```

Description

Formats and prints the design variable statements to the design variable file. This routine first prints the string `.PARAM` followed by the design variables in name=value pairs. The design variables are obtained by calling `asiGetDesignVarList`.

Arguments

o_session	The simulation session object.

Value Returned

`t`	The design variable statements were generated successfully.
`nil`	Otherwise.

Example

```
defmethod( asiFormatDesignVarList ((session asiAnalog_session) fp )
let( ( (varList asiGetDesignVarList( session ))
         mappedVarList mappedVar)
    when( varList
      mappedVarList = asiGetDesignVarMappedList( session )
     artFprintf( fp ".PARAM")
     foreach( var varList
        mappedVar = assoc( car(var) mappedVarList)
        if( mappedVar
            artFprintf( fp " %s" (cadr mappedVar ))
            artFprintf( fp " %s" car( var ))
         )
        unless( (artBlankString (cadr var))
            artFprintf( fp "=%s" (cadr var)))
        )
```

```
        artFprintf( fp "\n" )
      )
      t
    )
  )
```

asiFormatInitCond

```
asiFormatInitCond(
     o_session
     p_fp
     )
     => t / nil
```

Description

Formats and prints the initial condition commands to the control statement file. This routine prints the string `.IC` followed by the initial conditions in V(net)=voltage pairs.

Arguments

o_session	The simulation session object.
p_fp	The pointer to the control statement file.

Value Returned

`t`	The initial condition commands were formatted successfully.
`nil`	Otherwise.

Example

```
defmethod( asiFormatInitCond (( session asiAnalog_session )  fp )
    let( ( (icList asiGetInitCondList( session ))
           ( netlistDir asiGetAnalogNetlistDir( session ) ))
        when( icList
            artFprintf(fp ".IC ")
            foreach( obj icList
                foreach( name
                    asiMapOutputName( netlistDir asiGetSelObjType( obj )
                                      asiGetSelObjName( obj ) )
                    artFprintf(fp "V( %s )=%s" name asiGetSelObjValue(obj))
                )
            )
            artFprintf(fp "\n")
        )
```

```
        t
    )
)
```

asiFormatNodeSet

```
asiFormatNodeSet (
     o_session
     p_fp
     )
     => t / nil
```

Description

Formats and prints the nodeset commands to the control statement file. This routine prints `.NODESET` and then the nodesets in V(net)=voltage pairs.

Arguments

o_session	The simulation session object.
f_fp	The pointer to the control statement file.

Value Returned

t	The nodeset commands were formatted successfully.
nil	Otherwise.

Example

```
defmethod( asiFormatNodeSet ( ( session asiAnalog_session ) fp )
    let( ( (nodeSetList asiGetNodeSetList( session ))
           ( netlistDir asiGetAnalogNetlistDir( session ) ))
        when( nodeSetList
            artFprintf(fp ".NODESET ")
            foreach( obj nodeSetList
                foreach( name
                    asiMapOutputName( netlistDir asiGetSelObjType( obj )
                                        asiGetSelObjName( obj ) )
                    artFprintf(fp "V( %s )=%s" name
                                    asiGetSelObjValue(obj))
                )
            )
            artFprintf(fp "\n")
        )
```

```
        t
    )
)
```

asiFormatKeepList

```
asiFormatKeepList(
     o_session
     p_fp
     )
     => t / nil
```

Description

Formats and prints the signal save commands to the control statement file. At the `asiAnalog` class this routine returns `t`. You need to create your own `asiFormatKeepList` routine.

Arguments

o_session	The simulation session object.
f_fp	The pointer to the control statement file.

Value Returned

`t`	The save commands were formatted successfully.
`nil`	Otherwise.

Example

```
defmethod( asiFormatKeepList ( ( session spectre_session ) fp )
   let( ((netlistDir (asiGetAnalogNetlistDir session))
         (keepList (asiGetKeepList session))
        nameList )
       when( keepList
            artFprintf(fp "save ")
            foreach( keep keepList
                when( memq( asiGetSelObjType( keep ) '( net terminal ))
                    nameList = asiMapOutputName( netlistDir
                        asiGetSelObjType( keep ) asiGetSelObjName( keep ))
                    foreach( name nameList
                        artFprintf( "%s " name )
                    )
                )
```

```
            )
            artFprintf(fp "\n")
        )
        t
    )
)
```

asiFormatSimulatorOptions

```
asiFormatSimulatorOptions(
     o_session
     p_fp
     )
     => t / nil
```

Description

Formats and prints the simulator option statements to the designated file. This routine prints `.OPTIONS` followed by name=value pairs.

Arguments

o_session	The simulation session object.
f_fp	The pointer to the control statement file.

Value Returned

`t`	The simulator options were formatted successfully.
`nil`	Otherwise.

Example

```
defmethod( asiFormatSimulatorOptions
            (( session asiAnalog_session ) fp )
    let(( value (firstOption t))
        foreach( option asiGetSimOptionList( session )
            when( value = asiGetFormattedVal( option )
                when( firstOption
                    artFprintf(fp ".OPTIONS ")
                    firstOption=nil
                )
                artFprintf(fp "%s=%s " asiGetName(option) value)

            )
        )
        t
    )
```

)

asiFormatAnalysisList

```
asiFormatAnalysisList(
     o_ana
     p_fp
     )
     => t / nil
```

Description

Formats all enabled analyses by calling `asiFormatAnalysis`.

Arguments

o_ana	The analysis object.
p_fp	The pointer to the control statement file.

Value Returned

`t`	All enabled analyses were formatted successfully.
`nil`	Otherwise.

Example

```
defmethod(asiFormatAnalysisList ((session yourSimulator_session) fp)
;; add your code
callNextMethod()
;; add your code
t
)
```

asiFormatAnalysis

```
asiFormatAnalysis(
     o_ana
     p_fp
     )
     => t / nil
```

Description

Formats and prints analysis statements to the control file. For the general asiAnalog class, it follows this routine: prints the analysis name by calling `asiGetAnalysisName`; prints the list of signals by calling `asiGetAnalysisSigList` and formats them in parentheses [for example: `(net1 net2)`]; prints the analysis field list in name=value pairs; prints the analysis options in name=value pairs; uses `asiGetFormattedVal()` to obtain the print string for an analysis field value or an analysis option value. Please see the description of `asiGetFormattedVal` routine for more details.

Arguments

o_ana	The analysis object.
p_fp	The pointer to the control statement file.

Value Returned

`t`	The analysis statements were formatted successfully.
`nil`	Otherwise.

Example

```
defmethod( asiFormatAnalysis ((ana asiAnalog_analysis) fp)
    let(( name type sigList simVal (session asiGetSession(ana) ))
        name = asiGetAnalysisName( ana )
        sigList = asiGetAnalysisSigList( session ana )
        ;;; prints analysis name
        artFprintf(fp "%s " name )

        ;;; handls analysis signals
        when( sigList
            artFprintf( fp "( ")
```

```
            foreach( netField sigList
                when( simVal = asiGetFormattedVal( netField )
                    artFprintf(fp "%s " simVal)
                )
            )
            artFprintf( fp ") ")
        )



        ;;; prints analysis fields
        foreach( f asiGetAnalysisSimFieldList( session ana )
            when( simVal = asiGetFormattedVal( f )
                artFprintf(fp "%s=%s " asiGetName(f) simVal)
            )
        )

        ;;; prints analysis options
        foreach( o asiGetAnalysisOptionList( ana )
            when( simVal = asiGetFormattedVal(o)
                artFprintf(fp "%s=%s " asiGetName(o) simVal)
            )
        )

        artFprintf(fp "\n")
        t
    )
)
```

asiFormatModelLibSelectionList

```
asiFormatModelLibSelectionList(
     o_session
     p_fp
     )
     => t / nil
```

Description

Formats the statement which specifies the model library information.

Arguments

o_session	The simulation session object.
p_fp	The pointer to the control statement file.

Value Returned

t	All model library selections were formatted successfully.
nil	Otherwise.

Example

The generic method for asiAnalog class does nothing. The simulator interface has to define its own method. The following is an example:

```
defmethod(asiFormatAnalysisList ((session xyz_session) fp)
foreach( obj asiGetModelLibSelectionList( session )
    artFprintf( fp "include %L" asiGetModelLibFile(obj))
    unless( artBlankString(section)
        artFprintf( fp " section=%s" asiGetModelLibSection(obj))
        )
        artFprintf( fp "\n")
    ) ; foreach
t )
```

asiFormatDefinitionFileList

```
asiFormatDefinitionFileList(
     o_session
     p_fp
     )
     => t / nil
```

Description

Formats the statement which includes the specified definition files.

Arguments

o_session	The simulation session object.
p_fp	The pointer to the control statement file.

Value Returned

`t`	All definition files were formatted successfully.
`nil`	Otherwise.

Example

```
defmethod( asiFormatDefinitionFileList (( session xyz_session ) fp )
    foreach( d asiGetDefinitionFileList(session)
        artFprintf( fp "include '%s'\n" d )
    )
)
```

asiFormatTextStimulusFileList

```
asiFormatTextFileList(
     o_session
     p_fp
     )
     => t / nil
```

Description

Formats the statement which includes the textual stimulus files.

Arguments

o_session	The simulation session object.
p_fp	The pointer to the control statement file.

Value Returned

`t`	All textual stimulus files were formatted successfully.
`nil`	Otherwise.

Example

```
defmethod(asiFormatTextStimulusFileList (( session xyz_session ) fp )
    foreach( d asiGetTextStimulusFileList(session)
        artFprintf( fp "include '%s'\n" d )
    )
)
```

asiNeedSuffixEvaluation

```
asiNeedSuffixEvaluation(
     o_session
     )
     => t / nil
```

Description

Specify whether the interface needs suffix evaluation or not. When this method returns t, the numeric suffixes specified in a numericString field will be evaluated. For example, suppose the start frequency field for the AC analysis has a value of 10M, asiGetFormattedVal(ac_start_fieldObj) returns 1e7 provided it is created as a ‘numericString field.

Arguments

o_session	The simulation session object.

Value Returned

`t`	The Numeric suffix needs to be evaluated by the environment
`nil`	Otherwise.

Example

```
defmethod(asiNeedSuffixEvaluation (( session xyz_session ) fp )
nil
)
```

In this case, the numeric suffix will not be evaluated

asiInvalidateControlStmts

```
asiInvalidateControlStmts (
     { o_session | o_tool }
     )
     => t / nil
```

Description

The `asiInvalidateControlStmts` function is a wrapper to `asiInvalidateFlowchartStep`, which invalidates the `asiSendControlStmts` flowchart step.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.

Values Returned

`t`	Invalidates the `asiSendControlStmts` flowchart step
`nil`	Otherwise

Example

```
defmethod( asiInvalidateControlStmts ( ( session spectreS_session ) )
asiInvalidateFlowchartStep( session 'asiSendControlStmts )
)
```

Utility Functions

Do not overload the utility functions described in this section.

asiGetSimExecName

```
asiGetSimExecName(
     o_session
     )
     => t_simulatorExecutableName
```

Description

Gets the name of the simulator executable by calling `asiGetSimName`.

Arguments

o_session	The simulation session object.

Value Returned

t_simulatorExecutableName

The simulator executable name.

Example

```
defmethod( asiGetSimExecName (( yourSimulator_session ))
    "your simulator executable name"
)
```

asiGetCommandLineOption

```
asiGetCommandLineOption(
     o_session
     )
     => t_CommandLineOption
```

Description

Gets the simulation command line options. At the `asiAnalog` class this method returns the value of the environment option `'userComdLineOption`.

Arguments

o_session	The simulation session object.

Value Returned

t_CommandLineOption

The command line options in a string.

Example

```
defmethod( asiGetCommandLineOption (
                    ( _session yourSimulator_session ))
strcat( asiGetPredefinedCommandLineOption( session )
            asiGetEnvOptionVal( session 'userCmdLineOption )
    )
)
```

asiGetAnalysisSigList

```
asiGetAnalysisSigList(
     o_session
     o_ana
     )
     => l_sigObjList
```

Description

Gets a list of analysis field objects which are of the type net. For example, the p and n nodes for the Spectre noise analysis.

Arguments

o_session	The simulation session object.
o_ana	The analysis object.

Value Returned

l_sigObjList	A list of analysis signal objects.

Example

```
asiGetAnalysisSigList( session ana )
```

asiGetAnalysisType

```
asiGetAnalysisType(
     o_analysis
     )
     => s_analysisType
```

Description

Gets the type of the analysis.

Argument

o_analysis	Specifies an analysis object

Value Returned

s_analysisType	The type of the analysis

Example

```
asiGetAnalysisType( analysis )
```

asiGetAnalysisSimFieldList

```
asiGetAnalysisSimFieldList(
     o_session
     o_ana
     )
     => l_simFieldObjList
```

Description

Gets a list of simulator analysis field objects which need to be netlisted.

Arguments

o_session	The simulation session object.
o_ana	The analysis object.

Value Returned

l_simFieldObjList	The list of simulator field objects.

Example

```
asiGetAnalysisSimFieldList( session ana )
```

asiGetModelLibSelectionList

```
asiGetModelLibSelectionList(
     o_session
     )
     => l_modelLibSelectionList / nil
```

Description

Formats the statement which specifies the model library information.

Arguments

o_session	The simulation session object.

Value Returned

l_modelLibSelectionList	
	The list of model library selection objects.
nil	Otherwise.

Example

The following example shows how to get the list of model file names in the current ADE L session:

```
session = asiGetCurrentSession()
=> stdobj@0x235ff080

modelList = asiGetModelLibSelectionList( session )
=> (("./Models/myModels.scs" "FF")
("./Models/InlineModels.scs" "")
("./Models/mySingle.scs" "fastfast")
)
;The following statement returns the model file name for the first model library
in the current ADE L session
asiGetModelLibFile(car(modelList))
=> "./Models/myModels.scs"
```

asiGetModelLibFile

```
asiGetModelLibFile(
     o_modelLibSelection
     )
     => t_fileName / nil
```

Description

Gets the file name of a model library selection object.

Arguments

o_modelLibSelection	The model library selection object.

Value Returned

t_fileName	The model file name.
nil	Otherwise.

Example

The following example shows how to get the model file names for the first model library in the current ADE L session:

```
session = asiGetCurrentSession()
=> stdobj@0x235ff080

modelList = asiGetModelLibSelectionList( session )
=> (("./Models/myModels.scs" "FF")
("./Models/InlineModels.scs" "")
("./Models/mySingle.scs" "fastfast")
)

asiGetModelLibFile(car(modelList))
=> "./Models/myModels.scs"
```

asiGetModelLibSection

```
asiGetModelLibSection(
     o_modelLibSelection
     )
     => t_sectionName / nil
```

Description

Gets the section name of a model library selection object.

Arguments

o_modelLibSelection	The model library selection object.

Value Returned

t_sectionName	The section name within a model library file.
nil	Otherwise.

Example

The following example shows how to get the section name for the first model library in the current ADE L session:

```
session = asiGetCurrentSession()
=> stdobj@0x235ff080

modelList = asiGetModelLibSelectionList( session )
=> (("./Models/myModels.scs" "FF")
("./Models/InlineModels.scs" "")
("./Models/mySingle.scs" "fastfast")
)

asiGetModelLibSection(car(modelList))
=> "FF"
```

asiGetDefinitionFileList

```
asiGetDefinitionFileList(
     o_session
     )
     => l_definitionFileList / nil
```

Description

Gets the list of definition file names associated with the given simulation session.

Arguments

o_session	The simulation session object.

Value Returned

l_definitionFileList	The list of definition file names.
nil	Otherwise.

Example

```
asiGetDefinitionFileList( session )
```

asiGetTextStimulusFileList

```
asiGetDefinitionFileList(
     o_session
     )
     => l_definitionFileList / nil
```

Description

Gets the list of textual stimulus file names associated with the given simulation session.

Arguments

o_session	The simulation session object.

Value Returned

l_stimFileList	The list of textual stimulus file names.
nil	Otherwise.

Example

```
asiGetTextStimulusFileList( session )
```

asiGetFormattedVal

```
asiGetFormattedVal(
     o_anaField | o_anaOption | o_simOption
     )
     => t_formattedVal / nil
```

Description

Gets the string value of an analysis field object, an analysis option object, or a simulator option object. The format of the string values are based on the object types which are specified with functions such as `asiCreateAnalysisField`, `asiCreateAnalysisOption`, `asiAddSimOption`. A number of examples can be found in the example section.

Arguments

o_anaField	The analysis field object.
o_anaOption	The analysis option object.
o_simOption	The simulator option object.

Value Returned

t_formattedVal	The formatted simulator value.
`nil`	An object should not be printed in the control statement file.

Example

```
option = asiGetSimOptionList(session)
value = asiGetFormattedVal(option)
```

For example, if a simulator option of the type '`literalString`' is defined by :

```
asiAddSimOption( tool
    ?name 'option
    ?type 'literalString
    ?value "value1"
)
```

`asiGetFormattedVal()` for this option returns

```
"\"value1\""
```

When the simulator option is defined by:,

```
asiAddSimOption( tool
    ?name 'option
    ?type 'literalString
    ?value "value1"
    ?literalStartMarker "'"
    ?literalEndMarker  "'"
)
```

`asiGetFormattedVal()` for this option returns

```
"'value1'"
```

The following is an example of printing out a list:

```
asiAddSimOption( tool
    ?name 'option
    ?type 'list
    ?value '( 1 2 3 )
    ?startMarker "["
    ?endMarker  "]" )

asiGetFormattedVal() for this option returns
[ 1 2 3 ]
```

The following example illustrate the numericString type formatting in relation to the Value Returned of asiNeedSuffixEvaluation method.

Given that a simulator option is defined by:

```
asiAddSimOption( tool
    ?name ‘option1
    ?type ‘numericString
    ?value “1M”
)
When asiNeedSuffixEvaluation method for xyz tool returns t then
asiGetFormattedVal() for this option returns “1e6”.
Whan asiNeedSuffixEvaluation method for xyz tool returns nil then
asiGetFormattedVal(0 for this option returns “1M”.
```

asiGetSelObjName

```
asiGetSelObjName(
     o_selObj
     )
     => t_name
```

Description

Returns the schematic name of the selected signal object.

Arguments

o_selObj	Selected signal object. Initial condition, nodeset, and keep objects are all selection objects.

Value Returned

t_name	Name of the selected signal object.

Example

An example usage of this routine can be found in the example of `asiFormatInitCond`.

asiGetSelObjType

```
asiGetSelObjType(
     o_selObj
     )
     => t_signalType
```

Description

Returns the type of the selected signal object.

Arguments

o_selObj	Selected signal object. Initial condition, nodeset, and keep objects are all signal objects

Value Returned

t_signalType	Name of the selected signal object. The possible values are `` `net ``, `` `terminal ``, and `` `instance ``.

Example

An example usage of this routine can be found in the example of `asiFormatInitCond`.

asiGetSelObjValue

```
asiGetSelObjValue(
     o_selObj
     )
     => t_value
```

Description

Returns the initial condition or nodeset values specified on the selected signal object.

Arguments

o_selObj	Selected signal object. Initial condition, nodeset, and keep objects are all signal objects

Value Returned

t_value	The initial condition value or nodeset voltage value specified on the selected signal object.

Example

An example usage of this routine can be found in the example of `asiFormatInitCond`.

asiMapOutputName

```
asiMapOutputName(
     t_dir
     s_type
     t_name
     [ ?formatflag s_formatflag ]
     )
     => l_nameList
```

Description

Maps the given schematic name of the given type using the netlist directory. The result is a list of mapped strings.

Arguments

t_dir	Netlist directory.
s_type	Type of object. Valid types are `'net`, `'instance` and `'terminal`.
t_name	Schematic name.
s_formatflag	Performs name mapping of transient simulation data available in SST2 format. Set the value to `"t"` if this function is used in context of transient simulation data analysis and the transient simulation data is available in SST2 format.

Value Returned

l_nameList	List of mapped names.
`nil`	On failure.

Example

```
asiMapOutputName( "netlistDir" 'net "/net13" )
```

Another example of the usage of this routine can be found in the example section of `asiFormatInitCond`.

asiGetSimInputFileList

```
asiGetSimInputFileList(
     o_session
     )
     => l_fileNamesList
```

Description

Returns a list of all file names concatenated to generate the input file to the simulator. You can override this method to add/delete files used to generate the final input file to your simulator.

Arguments

o_session	Specifies a simulation session object.

Value Returned

l_fileNames	List list of file names used to generate input file to the simulator.

Example

```
defmethod( asiGetSimInputFileList (( session <yourSimulator>_session>))
    cons( "veriloga.inc" callNextMethod() )
)
```

Adds the contents of file `veriloga.inc` to the final input file to the simulator.

artInvalidateAmap

```
artInvalidateAmap(
      )
      => t / nil
```

Description

Resets the in-memory Amap cache. Further mapping function calls will result in re-reading the amap files from disk.

Arguments

None

Value Returned

t	It returns `t` if the call is successful.
nil	It returns `nil` if the call is unsuccessful.

11

Flowchart Functions

This chapter describes the functions that modify the simulation flowchart for socket and direct interfaces. You can modify the flowchart for the direct interface, if required. The flowchart describes the tool flow (the order in which certain events are expected to occur).

asiAddFlowchartLink

```
asiAddFlowchartLink(
     o_flowchart
     s_parentStep
     s_childStep
     )
     => t / nil
```

Description

Creates a new link between the specified parent and child steps, which were created with `asiAddFlowchartStep`.

Arguments

o_flowchart	Flowchart object.
s_parentStep	Name of the parent step.
s_childStep	Name of the child step.

Value Returned

`t`	Returns `t` if the link is created.
`nil`	Returns an error message and `nil` otherwise.

Example

```
flowchart = asiGetFlowchart( session )
asiAddFlowchartLink( flowchart ’asiRawNetlist
    ’asiRunSimulation )
```

Adds a flowchart link between the netlist and simulate steps.

asiAddFlowchartStep

```
asiAddFlowchartStep(
     o_flowchart
     [ ?name s_name ]
     [ ?description t_description ]
     [ ?runMessage t_runMessage ]
     [ ?function s_function ]
     [ ?checkFunc s_checkFunc ]
     [ ?preFunc s_preFunc ]
     [ ?postFunc s_postFunc ]
     [ ?ignoreFunc s_ignoreFunc ]
     )
     => o_step / nil
```

Description

Adds a new step to an existing flowchart.

Arguments

`o_flowchart`	Flowchart object to which you want to add a step.
`?name s_name`	Name of the step to add.
`?description t_description`	Textual description of the step.
`?runMessage t_runMessage`	Message to print when this step is executed.
`?function s_function`	The (primary) procedure to call to execute this step. Callback parameter list: (*o_session*)
`?checkFunc s_checkFunc`	Function to evaluate to update the status of this step. This function is executed after the dependency requirement is met. If this function returns `nil`, the step function and its children are invalidated. Callback parameter list: (*o_session*)
`?preFunc s_preFunc`	Function to evaluate immediately before the primary procedure, *s_function* is executed. It can be added to a step instance to customize an existing step. Callback parameter list: (*o_session*)
`?postFunc s_postFunc`	Procedure to execute after *s_function*. Callback parameter list: (*o_session*)
`?ignoreFunc s_ignoreFunc`	Function to skip this step. If this function returns `t`, this step in flowchart is not executed.

Value Returned

o_step	Returns the flowchart step object.
`nil`	Returns `nil` if there is an error.

Example

```
asiAddFlowchartStep( flowchart
?name ’sendABCfile
?description "Send the ABC file"
?runMessage "sending ABC file..."
?function ’sendABCfile
)
```

For the XYZ simulator, add a new step to send the ABC file to Cadence SPICE.

asiChangeFlowchartStep

```
asiChangeFlowchartStep(
     o_flowchart
     [ ?name t_name ]
     [ ?description t_description ]
     [ ?runMessage t_runMessage ]
     [ ?function s_function ]
     [ ?checkFunc s_checkFunc ]
     [ ?preFunc s_preFunc ]
     [ ?postFunc s_postFunc ]
     [ ?ignoreFunc s_ignoreFunc ]
     )
     => o_step / nil
```

Description

Changes a flowchart step in an existing flowchart

Arguments

o_flowchart	Flowchart object in which you want to modify a step.
?name *s_name*	Name of the step to be modified.
?description *t_description*	
	Textual description of the step.
?runMessage *t_runMessage*	
	Message to print when this step is executed.
?function *s_function*	The (primary) procedure to call to execute this step. Callback parameter list: (*o_session*)
?checkFunc *s_checkFunc*	
	Function to evaluate to update the status of this step. This function is executed after the dependency requirement is met. If this function returns `nil`, the step function and its children are invalidated. Callback parameter list: (*o_session*)
?preFunc *s_preFunc*	Function to evaluate immediately before the primary procedure, *s_function* is executed. It can be added to a step instance to customize an existing step. Callback parameter list: (*o_session*)
?postFunc *s_postFunc*	Procedure to execute after *s_function*. Callback parameter list: (*o_session*)
?ignoreFunc *s_ignoreFunc*	
	Function to skip this step. If this function returns `t`, this step in flowchart is not executed.

Value Returned

o_step	Returns the new step object.
nil	Returns `nil` if the specified step does not exist.

Example

```
asiChangeFlowchartStep( o_flowchart
    ?name sendXYZFile
    ?runMessage "Sending XYZ file"
)
```

Changes the run message for the *sendXYZFile* flowchart step.

Related Function

To display the current flowchart steps and links, see the asiDisplayFlowchart function on page 11-485.

asiCreateFlowchart

```
asiCreateFlowchart(
     o_tool
     )
     => o_flowchart
```

Description

Creates a new flowchart.

Arguments

o_tool	Simulation tool object.

Value Returned

o_flowchart	Returns the flowchart object.

asiDeleteFlowchartLink

```
asiDeleteFlowchartLink(
     o_flowchart
     s_parentStep
     s_childStep
     )
     => t / nil
```

Description

Deletes the link between the specified parent and child steps.

Arguments

o_flowchart	Flowchart object.
s_parentStep	Name of the parent step.
s_childStep	Name of the child step.

Value Returned

`t`	Returns `t` if the link between the steps is removed.
`nil`	Returns `nil` otherwise.

Example

```
asiDeleteFlowchartLink( flowchart
'asiSendControlStmts 'asiRunSimulation
)
```

Removes the link connecting the `asiSendControlStmts` step to the `asiRunSimulation` step.

Related Function

To display the current flowchart steps and links, see the asiDisplayFlowchart function on page 11-485.

asiDeleteFlowchartStep

```
asiDeleteFlowchartStep(
     o_flowchart
     s_name
     [ s_splice ]
     )
     => t / nil
```

Description

Deletes a step and any attached links from an existing flowchart. Typically, you do not need this function because you can *unlink* any flowchart step that you do not want to use with the `asiDeleteFlowchartLink` function.

Arguments

o_flowchart	Flowchart object with the step you want to delete.
s_name	Name of the step to delete.
s_splice	Specifies whether the parents of the deleted step are to be linked directly to the children of the deleted step. Valid Values: t specifies that the new link is to be created, nil specifies that the new link is not to be created

Value Returned

`t`	Returns `t` if the step is deleted.
`nil`	Returns `nil` otherwise.

Example

```
flowchart = asiGetFlowchart( asiGetTool( 'XYZ ))
asiDeleteFlowchartStep( flowchart 'asiSendOptions )
```

Deletes the `asiSendOptions` step from flowchart for the XYZ simulation.

Related Function

To display the current flowchart steps and links, see the asiDisplayFlowchart function on page 11-485.

To delete a flowchart link, see the asiDeleteFlowchartLink function on page 11-482.

asiDisplayFlowchart

```
asiDisplayFlowchart(
     o_tool
     [ s_rootstep ]
     )
     => t / nil
```

Description

Displays the current steps and links for the flowchart. You can display all the step and link information, or you can display the steps and links that are below the *rootstep* step. Use this function only to determine which part of the flowchart you want to modify. Do not use this function as part of another procedure.

Arguments

o_tool	Simulation tool object.
s_rootstep	Name of the highest step (in the flowchart) to be displayed. The function returns this step and all the links and steps below it. If you do not specify this step, all the flowchart steps are displayed.

Value Returned

`t`	Returns `t` and displays a list of the current steps and links for the flowchart.
`nil`	Returns `nil` otherwise.

Example

```
asiDisplayFlowchart( asiGetTool( 'analog ) )
```

Returns the flowchart description for the *analog* tool.

asiExecuteFlowchart

```
asiExecuteFlowchart(
     o_session
     s_goalStep
     [ s_printMessages ]
     )
     => t / nil
```

Description

Executes the flowchart for a given session up to and including the goal step.

Arguments

o_session	Simulation session object.
s_goalStep	Name of the last flowchart step to execute.
s_printMessages	Specifies whether or not the *runmessages* for the steps are suppressed as they are executed. Valid Values: `t` displays the *runmessages*, `nil` suppresses the *runmessages* Default Value: `t`

Value Returned

`t`	Returns `t` if the flowchart executes as far as the goal step.
`nil`	Returns `nil` if errors are encountered.

Example

```
asiExecuteFlowchart( session 'asiRawNetlist )
```

Executes the flowchart as far as the raw netlisting step.

asiFinalNetlist

```
asiFinalNetlist(
     o_session
     )
     => t | l_dpl
```

Description

Creates the final netlist.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Returns `t` when the final netlist is created (for analog only).
l_dpl	Returns a disembodied property list with the following properties (for mixed-signal only): ■ netlistDir—Name of the netlist directory. ■ finalFileList—List of final netlist files.

Example for Integrators

```
defmethod( asiFinalNetlist (( session <yourSimulator>_session ))

    <insert any code you need>

)
```

asiGetFlowchart

```
asiGetFlowchart(
     { o_tool | o_session }
     )
     => o_flowchart
```

Description

Gets the flowchart object for a tool or session.

Arguments

o_tool	Simulation tool object.
o_session	Simulation session object.

Value Returned

o_flowchart	Returns the flowchart object.

Example

```
flowchart = asiGetFlowchart( asiGetTool('analog) )
```

Returns the flowchart object for the *analog* tool.

asiInit<yourSimulator>Flowchart

```
asiInit<yourSimulator>Flowchart(
     o_tool
     )
     => t
```

Description

Calls the procedures to initialize the flowchart for your simulator.

Note: You must write `asiInit<yourSimulator>Flowchart`, where <*yourSimulator*> is the name of your simulator. Do not include the angle brackets (<>).

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when your procedures are called. **Note:** Write `asiInit<yourSimulator>Flowchart` to return `t`.

Example

The following procedure initializes the flowchart for the XYZ simulator. It adds the step to send the library path, then inserts that step between the step to send the update file and the step to send the control statements.

```
procedure( asiInitXYZFlowchart( tool )
    let( ( flowchart )

        flowchart = asiGetFlowchart( session )

        ;;; SEND THE LIB PATH
        asiAddFlowchartStep( flowchart
            ?name               'asiSendLibPath
            ?description        "Sends the library path"
            ?runMessage         "send lib path"
            ?function           'asiSendLibPath
        )
```

```
        asiDeleteFlowchartLink( flowchart 'asiSendUpdateFile
            'asiSendControlStmts )
        asiAddFlowchartLink(    flowchart 'asiSendUpdateFile
            'asiSendLibPath )
        asiAddFlowchartLink(    flowchart 'asiSendLibPath
            'asiSendControlStmts )

        t
    )
)
```

Note: It is preferable to include the code for sending the `lib` path in the `asiSendControlStmts` step if possible. In other words, do not add extra links if they are not needed. (See the asiSendControlStmts function on page 11-494 for an example.)

asiInvalidateFlowchartStep

```
asiInvalidateFlowchartStep(
    o_session
    s_step
    )
    => t / nil
```

Description

Invalidates a flowchart step for a particular session.

You can use this function to invalidate a particular step that has become obsolete or out of date. This way, when a step that is dependent on the invalidated step must be executed, the system will first re-execute the invalidated to step to make it current.

Arguments

o_session	Simulation session object.
s_step	Name of the flowchart step that you want to invalidate.

Value Returned

`t`	Returns `t` if the flowchart step is invalidated.
`nil`	Returns `nil` otherwise.

Example

```
asiInvalidateFlowchartStep( session 'asiRawNetlist )
```

Invalidates the netlisting step for the session.

Related Function

To display the current flowchart steps and links, see the asiDisplayFlowchart function on page 11-485.

asiRawNetlist

```
asiRawNetlist(
     o_session
     )
     => t / nil
```

Description

Creates a raw netlist.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

t	Returns t if the raw netlist is created.
nil	Returns nil otherwise.

Example for Integrators

```
defmethod( asiRawNetlist (( session <yourSimulator>_session ))

    <insert any code you need>

)
```

asiSendAnalysis

```
asiSendAnalysis(
     o_session
     )
     => t / nil
```

Description

Sends analyses to Cadence SPICE by calling `asiFormatAnalysis` for each analysis.

Note for Integrators: This function is defined as a method for the Analog Class and is called by `asiSendControlStmts`. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Returns `t` when the analyses are sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendAnalysis (( session <yourSimulator>_session ))

    <insert any code you need>

)
```

asiSendControlStmts

```
asiSendControlStmts(
     o_session
     )
     => t / nil
```

Description

Sends information such as nodesets, initial conditions, keep lists or output, analyses, restore files, include files, and stimulus files to Cadence SPICE.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Returns `t` when the different commands are sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendControlStmts (( session <yourSimulator>_session ))

    <insert any code you need>

)
```

Note: You might want to send more information for your simulator. For example, you might send the information to send the lib path to your simulator. In this case, you can use `callNextMethod`, as shown in the following example:

```
defmethod( asiSendControlStmts (( session <yourSimulator>_session ))

    ;Use callNextMethod to send nodesets, intitial
    ;conditions, force nodes, keepLists, and analyses

    callNextMethod()
    ;Now call your routine to send the lib path

    <yourSimulator>SendLib( session )
```

)

asiSendDesignVars

```
asiSendDesignVars(
     o_session
     )
     => t / nil
```

Description

Sends the design variables to Cadence SPICE.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Returns `t` if the design variables are sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendDesignVars (( session <yourSimulator>_session ))
<insert any code you need>
)
```

asiSendInitCond

```
asiSendInitCond(
     o_session
     )
     => t / nil
```

Description

Places all the initial conditions in `<`*`netlistDirectory`*`>/raw/ics` and sends a `ptprop` command to Cadence SPICE.

There is a mechanism in the `simdot.f` file that gets the value of the `ptprop` command (if the `ptprop` command was sent). If the `ptprop` command was sent, the `ics` file is automatically included in the final netlist. If the `ptprop` command was not sent, the `ics` file is not included. The initial conditions are of the form:

```
ic v(node)=value
```

Note for Integrators: This function is defined as a method for the Analog Class and is called by `asiSendControlStmts`. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Returns `t` when the initial conditions are sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendInitCond(( session <yourSimulator>_session ) )
    let( ( icStr )

        icStr = ".ic v(%s) = %s\n"
        asiiSendInitCond( session icStr )

        t
    )
)
```

asiSendInitFile

```
asiSendInitFile(
     o_session
     )
     => t / nil
```

Description

Sends the `init.s` file to Cadence SPICE.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Returns `t` when the initialization file is sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendInitFile (( session <yourSimulator>_session ))
<insert any code you need>
)
```

asiSendKeepList

```
asiSendKeepList(
     o_session
     )
     => t / nil
```

Description

Sends the keep list to Cadence SPICE. The keep list can contain a list of nets or currents to save and it can contain statements to *keep all nets* or *keep all currents*.

Note for Integrators: This function is defined as a method for the Analog Class and is called by `asiSendControlStmts`. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Returns `t` when the keep list is sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendKeepList (( session <yourSimulator>_session ))

    <insert any code you need>
)
```

asiSendModelPath

```
asiSendModelPath(
     o_session
     )
     => t / nil
```

Description

Sends the model path to Cadence SPICE.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Returns `t` when the model path is sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendModelPath (( session <yourSimulator>_session ))

    <insert any code you need>

)
```

asiSendNetlist

```
asiSendNetlist(
     o_session
     )
     => t / nil
```

Description

Sends the raw netlist to Cadence SPICE using the Cadence SPICE `sim` command.

For more information about the `sim` command, refer to the *Cadence SPICE Reference.*

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

`o_session`	Specifies the session object.

Value Returned

`t`	Returns `t` when the raw netlist is sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendNetlist (( session <yourSimulator>_session ))
    <insert any code you need>
)
```

asiSendNodeSets

```
asiSendNodeSets(
     o_session
     )
     => t / nil
```

Description

Places all the nodesets in <*netlistDirectory*>`/raw/nodesets` and sends a `ptprop` command to Cadence SPICE.

There is a mechanism in the `simdot.f` file that gets the value of the `ptprop` command (if the `ptprop` command was sent). If the `ptprop` command was sent, the `nodesets` file is automatically included in the final netlist. If the `ptprop` command was not sent, the `nodesets` file is not included. The nodesets are of the form:

```
.nodeset v(node)=value
```

Note for Integrators: This function is defined as a method for the Analog Class and is called by `asiSendControlStmts`. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.
`nil`	Returns `nil` if there is an error.

Value Returned

`t`	Returns `t` when the nodesets are sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod(asiSendNodeSets(( session <yourSimulator>_session ))
    let( ( nodesetStr )

        nodesetStr = ".nodeset v(%s) = %s\n"
        asiiSendNodeSets( session nodesetStr )

        t
```

```
    )
)
```

asiSendOptions

```
asiSendOptions(
     o_session
     )
     => t / nil
```

Description

Sends the simulation options to Cadence SPICE.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

t	Returns `t` when the simulation options are sent to Cadence SPICE.
nil	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendOptions ( ( session XYZ_session ))
    let( ( sendMethod simulatorOptionVariableList value command )

        simulatorOptionVariableList = asiGetSimOptionNameList(
            session )

        foreach( name simulatorOptionVariableList

            value = asiGetSimOptionVal( session name )
            sendMethod = asiGetSimOptionSendMethod( session name )

            if( artBlankString( value )  then
                 sprintf( command "deprop XYZ_Opt %s\n" name )
            else
                 caseq( sendMethod
                        ( set
                             sprintf( command "set %s=%s\n"
                                name value )
                        )
                        ( ptprop
                             sprintf( command "ptprop XYZ_Opt
```

```
                            %s %s\n"name value )
                    )
                    ( psprop
                        sprintf( command "psprop XYZ_Opt
                            %s \"%s\" \n"name value )
                    )
                    ( t
                        warn( "don't know how to send XYZ
                            option %s\n." name  )
                        command = nil
                    )
                )
            )
            when( command
                    asiSendSim( session command nil nil nil )
            )
        )

        t
    )
)
```

asiSendRestore

```
asiSendRestore(
     o_session
     )
     => t
```

Description

If DC restore is *on*, send the commands to restore the DC node voltages to Cadence SPICE. If DC restore is *off*, sends the commands to turn off the DC restore function to Cadence SPICE. This function also works for the transient restore function.

Note for Integrators: This routine is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Sends the commands to Cadence SPICE and returns `t`.

Example for Integrators

```
defmethod( asiSendRestore ( ( session <yourSimulator>_session ) )

   <insert any code you need>

)
```

asiSendUpdateFile

```
asiSendUpdateFile(
     o_session
     )
     => t / nil
```

Description

Sends the `update.s` file to Cadence SPICE.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.

Value Returned

`t`	Returns `t` when the update file is sent to Cadence SPICE.
`nil`	Returns `nil` if there is an error.

Example for Integrators

```
defmethod( asiSendUpdateFile (( session <yourSimulator>_session ))

    <insert any code you need>

)
```

12

Keep Option Functions

The keep option functions let you specify whether or not *all* the outputs of a particular type of signal are saved during simulation. For example, you might use a keep option function to save all the node voltages or all the port currents.

For information about functions that let you save specific signals, refer to Chapter 12, “Miscellaneous Functions.”

asiAddKeepOption

```
asiAddKeepOption(
     o_tool
     [ ?name s_name ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?invalidateFunc s_invalidateFunc ]
     )
     => o_envVar / nil
```

Description

Adds a simulator keep option variable.

Arguments

o_tool	Simulation tool object.
?name *s_name*	Name of the keep option.
?prompt *t_prompt*	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: *s_name*
?type *s_type*	Type of the option. Valid Values: string, integer, float, toggle, cyclic, radio, boolean, list, radioToggle, listBox, fileName (string type for file names only), label (for the label on the UI form), frame (for a graphic frame around a field), separator (for the separator line on the UI form), button (for a button on the UI form), scale (for a slider field on the UI form) Default Value: string **Note:** See the asiAddSimOption function in the "Simulator Option Functions" chapter for an example that shows how to use the *separator* argument.
?choices *l_choices*	List of choices if *s_type* is cyclic, radio, radioToggle or listBox, or the list of switches if *s_type* is toggle. This argument is valid only if *s_type* is cyclic, toggle, radio, radioToggle, or listBox.
?itemsPerRow *x_itemsPerRow*	Numbers of choices per row for radio, cyclic, toggle, and radioToggle fields. Default Value: Total number of choices specified in *l_choices*
?value *g_value*	Default value of the option.
?min *g_min*	Specifies the minimum value of an integer, float, or scale option. Default Value: nil, which means -infinity

`?max` *`g_max`*	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`
`?allowExpr` *`s_allowExpr`*	Specifies whether *`g_value`* can contain expressions. Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions) Default Value: `nil`
`?row` *`x_row`*	Row in the form where the field appears. This argument is valid only for *'twoD* type forms.
`?column` *`x_column`*	Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. This argument is valid only for *'twoD* type forms.
`?width` *`x_width`*	Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. This argument is valid only for *'twoD* type forms. Default Value: 1

`?coordinates` *`l_coordinates`*

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) This argument is valid only for *'custom* type forms.

`?displayOrder` *`x_displayOrder`*

	Position (from the top) of the option in the form. Use *x_displayOrder* to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first.
	The value of *x_displayOrder* must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form. This argument is valid only for *'oneD* type forms.
	Valid Values: Any integer
`?labelText` *t_labelText*	Optional label displayed with frame type fields.
	Default Value: `nil`
`?private` *s_private*	Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software. Valid Values: `t` (option does not appear in the UI), (option appears in the UI)
	Default Value: `nil`
`?display` *s_display*	Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.
	Default Value: `t`
`?editable` *s_editable*	Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form.
	Default Value: `t`
	Note: This argument only applies to type-in fields.

`?appCB` *`s_appCB`*
: Specifies a callback function that is executed when the value of the option is changed.

  Callback parameter list: (*`o_session`*)

`?callback` *`t_callback`*
: Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB` *`s_formApplyCB`*
: Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.

  Callback parameter list: (*`o_session r_form r_field`*)

`?changeCB` *`st_changeCB`*
: Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB` *`st_doubleClickCB`*
: Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.

`?numRows` *`x_numRows`*
: Number of rows shown on the form for a `listBox` type field.

`?multipleSelect` *`s_multipleSelect`*
: Boolean flag that specifies whether multiple items can be selected from the `listBox` type field.

  Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?invalidateFunc` *`s_invalidateFunc`*
: Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

  Callback parameter list: (*`o_session`*)

Value Returned

`o_envVar`	Returns the keep option environment variable object created by the procedure.
`nil`	Returns `nil` if there is an error.

Example

```
asiAddKeepOption( tool
    ?name           'allDigitalNV
    ?prompt         "Select all digital node voltages"
    ?type           'boolean
    ?value          t
)
```

Adds a keep option to the tool to save all digital node voltages.

Related Functions

To display the current set of keep options, see the asiDisplayKeepOption function on page 12-526.

To change the display characteristics of your Keep Options form, see the asiChangeKeepOptionFormProperties function on page 12-522.

asiChangeKeepOption

```
asiChangeKeepOption(
     o_tool
     [ ?name s_name ]
     [ ?prompt t_prompt ]
     [ ?type s_type ]
     [ ?choices l_choices ]
     [ ?itemsPerRow x_itemsPerRow ]
     [ ?value g_value ]
     [ ?min g_min ]
     [ ?max g_max ]
     [ ?allowExpr s_allowExpr ]
     [ ?row x_row ]
     [ ?column x_column ]
     [ ?width x_width ]
     [ ?coordinates l_coordinates ]
     [ ?displayOrder x_displayOrder ]
     [ ?labelText t_labelText ]
     [ ?private s_private ]
     [ ?display s_display ]
     [ ?editable s_editable ]
     [ ?appCB s_appCB ]
     [ ?callback t_callback ]
     [ ?formApplyCB s_formApplyCB ]
     [ ?changeCB st_changeCB ]
     [ ?doubleClickCB st_doubleClickCB ]
     [ ?numRows x_numRows ]
     [ ?multipleSelect s_multipleSelect ]
     [ ?invalidateFunc s_invalidateFunc ]
     )
     => o_envVar / nil
```

Description

Modifies an existing keep option variable for a simulator.

Arguments

`o_tool`	Simulation tool object.
`?name s_name`	Name of the keep option.
`?prompt t_prompt`	Optional argument that specifies the prompt (on the UI form) for the given option. Default Value: `s_name`
`?type s_type`	Type of the option. Valid Values: `string, integer, float, toggle, cyclic, radio, boolean, list, radioToggle, listBox, fileName` (string type for file names only), `label` (for the label on the UI form), `frame` (for a graphic frame around a field), `separator` (for the separator line on the UI form), `button` (for a button on the UI form), `scale` (for a slider field on the UI form) Default Value: `string` **Note:** See the asiAddSimOption function in the "Simulator Option Functions" chapter for an example that shows how to use the *separator* argument.
`?choices l_choices`	List of choices if `s_type` is `cyclic, radio, radioToggle` or `listBox`, or the list of switches if `s_type` is `toggle`. This argument is valid only if `s_type` is `cyclic,toggle,radio,radioToggle`, or `listBox`.
`?itemsPerRow x_itemsPerRow`	Numbers of choices per row for `radio, cyclic, toggle`, and `radioToggle` fields. Default Value: Total number of choices specified in `l_choices`
`?value g_value`	Default value of the option.
`?min g_min`	Specifies the minimum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `-infinity`

`?max` *`g_max`*	Specifies the maximum value of an `integer`, `float`, or `scale` option. Default Value: `nil`, which means `+infinity`
`?allowExpr` *`s_allowExpr`*	Specifies whether *`g_value`* can contain expressions. Valid Values: `t` (value can contain expressions), `nil` (value cannot contain expressions) Default Value: `nil`
`?row` *`x_row`*	Row in the form where the field appears. This argument is valid only for *’twoD* type forms.
`?column` *`x_column`*	Column in the form where the field appears. The fields are created according to their required widths and are not meant to align with fields in other rows of the form. This argument is valid only for *’twoD* type forms.
`?width` *`x_width`*	Specifies the width of the field in relation to other fields on the form. Numbers that you enter for this argument are relative values whose values are determined by the amount of space available. For example, assume there are three fields for a row that is 400 pixels wide. If the first two fields have an *`x_width`* of 1, and the last field has an *`x_width`* of 2, then the widths for the fields are as follows: 100, 100, and 200 pixels. This argument is valid only for *’twoD* type forms. Default Value: 1

`?coordinates` *`l_coordinates`*

List specifying the coordinates for the field on the UI form. (The format is the same as for the corresponding *hi* field.) This argument is valid only for *’custom* type forms.

`?displayOrder` *`x_displayOrder`*

	Position (from the top) of the option in the form. Use *x_displayOrder* to reposition your options in an *inherited* form. By default, the options appear in the order defined; therefore, inherited options appear first. The value of *x_displayOrder* must be an integer that specifies the position you want relative to the top of the form. If more than one option has the same display order integer, the last option found (yours) takes precedence. The remaining options shift down on the form. This argument is valid only for *'oneD* type forms. Valid Values: Any integer
`?labelText` *t_labelText*	Optional label displayed with frame type fields. Default Value: `nil`
`?private` *s_private*	Optional argument that declares an option as private, which means the option is not visible to the user. Private options are not part of the UI and their values are not saved when a user saves the environment. You might use this argument for values that are constant for all users of the software. Valid Values: `t` (option does not appear in the UI), `nil` (option appears in the UI) Default Value: `nil`
`?display` *s_display*	Specifies an expression that determines whether the field is to be displayed on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form. Default Value: `t`
`?editable` *s_editable*	Specifies an expression that determines whether the field is to be editable on the UI form. This expression is evaluated when the form is first displayed and whenever a callback is executed on *any* field in the form. Default Value: `t` **Note:** This argument only applies to type-in fields.

`?appCB` *`s_appCB`*

Specifies a callback function that is executed when the value of the option is changed.

Callback parameter list: (*`o_session`*)

`?callback` *`t_callback`*

Specifies a callback function that is executed when a field is changed on the form while the form is displayed. (You can use this function to do error checking on the value entered by the designer.)

`?formApplyCB` *`s_formApplyCB`*

Specifies a callback function that is executed when the designer clicks on *Apply* or *OK* on the form containing the associated field.

Callback parameter list: (*`o_session r_form r_field`*)

`?changeCB` *`st_changeCB`*

Specifies a callback function that is executed when the value of a `listBox` type field is changed on the form.

`?doubleClickCB` *`st_doubleClickCB`*

Specifies a callback function that is executed when a designer double clicks on a `listBox` type field.

`?numRows` *`x_numRows`*

Number of rows shown on the form for a `listBox` type field.

`?multipleSelect` *`s_multipleSelect`*

Boolean flag that specifies whether multiple items can be selected from the `listBox` type field.

Valid Values: `t` (multiple items can be selected), `nil` (only one item can be selected at a time)

`?invalidateFunc` *`s_invalidateFunc`*

Specifies a function that is executed when the value of the option is changed. This function invalidates a step in the flowchart.

Callback parameter list: (*`o_session`*)

Value Returned

o_envVar	Returns the new keep option object.
nil	Returns nil if there is an error.

Example

```
asiChangeKeepOption( asiGetTool('XYZ)
    ?name       'allAnalogTC
    ?value      t
)
```

Changes the default value of the allAnalogTC keep option to t.

Related Functions

To display the current set of keep options, see the asiDisplayKeepOption function on page 12-526.

To change the display characteristics of your Keep Options form, see the asiChangeKeepOptionFormProperties function on page 12-522.

asiChangeKeepOptionFormProperties

```
asiChangeKeepOptionFormProperties(
    o_tool
    [ ?type s_type ]
    [ ?width x_width ]
    [ ?columns x_columns ]
    )
    => o_formObj / nil
```

Description

Changes the display characteristics of the Keep Options form.

Arguments

o_tool	Simulation tool object.
?type *s_type*	Specifies the form type. Valid Values: ■ ’oneD—Specifies a sequential display of fields in one column. ■ ’twoD—Specifies a two dimensional display of fields based on row and column positions. (Use the asiAddKeepOption or asiChangeKeepOption function to specify values for the rows and columns.) ■ ’custom—Lets you specify the exact coordinate locations for each field. (Use the asiAddKeepOption or asiChangeKeepOption function to specify the coordinates.) ■ ’matrix—Specifies a matrix of equally sized fields. Default Value: `’oneD`
?width *x_width*	Width of the form, in pixels. Default Value: The minimum default width of the form is 400 pixels. If the fields require more space than this, the form defaults to the smallest width that can accommodate the fields.
?columns *x_columns*	Number of columns. Use this argument only with matrix type forms. Default Value: 2

Value Returned

o_formObj	Returns the keep option form object if successful.
nil	Returns `nil` otherwise.

Example

```
asiChangetKeepOptionFormProperties( asiGetTool(’spectreS)
?width 300 )
```

For the Spectre simulator, changes the width of the Keep Options form to 300.

asiDeleteKeepOption

```
asiDeleteKeepOption(
     o_tool
     s_name
     )
     => t / nil
```

Description

Deletes a simulator keep option variable.

Arguments

o_tool	Simulation tool object.
s_name	Name of the keep option variable to delete.

Value Returned

`t`	Returns `t` when the keep option variable is deleted.
`nil`	Returns `nil` if the option does not exist.

Example

```
asiDeleteKeepOption( asiGetTool('XYZ)
    'allAnalogTC
)
```

Deletes the keep option to save all analog terminal currents for the XYZ simulator.

asiDisplayKeepOption

```
asiDisplayKeepOption(
     o_tool
     )
     => t / nil
```

Description

Displays the current simulator keep option names. Use this function to determine which options you want to modify. Do not use this function as part of another procedure.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Displays the current keep option names and returns `t`.
`nil`	Returns `nil` if there is an error.

Example

```
asiDisplayKeepOption( asiGetTool( 'spectreS ))
```

Displays the keep option names for the *spectreS* simulator.

asiDisplayKeepOptionFormProperties

```
asiDisplayKeepOptionFormProperties(
    o_tool
    )
    => t / nil
```

Description

Displays the form characteristics for the Keep Options form. Use this function only to determine which form characteristics you want to modify. Do not use this function as part of another procedure.

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Displays a list of the Keep Option form characteristics and returns `t`.
`nil`	Returns `nil` otherwise.

Example

```
asiDisplayKeepOptionFormProperties( asiGetTool('spectreS))
```

For the Spectre simulator, displays the form characteristics for the Keep Options form and returns `t`.

asiGetKeepOptionChoices

```
asiGetKeepOptionChoices(
     { o_session | o_tool }
     s_name
     )
     => l_choices / nil
```

Description

Gets the list of choices for a keep option that is set up as a list box.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name of the option for which you want the list of choices.

Value Returned

l_choices	Returns the list of choices for the specified keep option.
`nil`	Returns `nil` if the option does not exist.

Related Function

To display the current set of keep options, see the asiDisplayKeepOption function on page 12-526.

asiGetKeepOptionVal

```
asiGetKeepOptionVal(
    { o_tool | o_session }
    s_name
    )
    => g_value
```

Description

Gets the value of a keep option variable for a tool or session object.

Arguments

o_tool	Simulation tool object.
o_session	Simulation session object.
s_name	Name of the simulation option variable for which you want to get the value.

Value Returned

g_value	Returns the value for the keep option variable.

Example

```
asiGetKeepOptionVal( asiGetTool( 'XYZ ) 'allAnalogTC )
```

Gets the value of the `allAnalogTC` keep option for the XYZ simulator.

asiInit<yourSimulator>KeepOption

```
asiInit<yourSimulator>KeepOption(
     o_tool
     )
     => t
```

Description

Calls the procedures to initialize your simulator keep option variables.

Note: You must write `asiInit<yourSimulator>KeepOption`, where <*yourSimulator*> is the name of your simulator. Do not include the angle brackets (<>).

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when your procedures for initializing the keep option variables are called. **Note:** Write `asiInit<yourSimulator>KeepOption` to return `t`.

Example

```
procedure( asiInitXYZKeepOption( tool )
    <insert your code>
    t
)
```

Creates the procedure that initializes the keep options for the XYZ simulator.

asiSetKeepOptionChoices

```
asiSetKeepOptionChoices(
    { o_session | o_tool }
    s_name
    l_choices
    )
    => l_choices / nil
```

Description

Specifies the list of choices to appear in the list box field for the specified keep option.

Arguments

o_session	Simulation session object.
o_tool	Simulation tool object.
s_name	Name a keep option of the type `listBox`.
l_choices	List of choices to appear in the list box field.

Value Returned

l_choices	Returns the new list of choices to appear in the list box field.
`nil`	Returns `nil` if the option does not exist.

asiSetKeepOptionVal

```
asiSetKeepOptionVal(
     { o_tool | o_session }
     s_name
     g_value
     )
     => g_value / nil
```

Description

Sets the value for the specified keep option variable for a tool or session object.

Arguments

o_tool	Simulation tool object.
o_session	Simulation session object.
s_name	Name of the keep option variable that you want to set.
g_value	Value for the keep option variable.

Value Returned

g_value	Returns the new value for the keep option.
nil	Returns `nil` if the keep option does not exist.

Example

```
asiSetKeepOptionVal( session 'allAnalogNV t)
```

Saves all analog node voltages for the specified session.

13

Direct Plot Functions

The direct plot functions calculate the simulation result of some pre-defined analysis. Currently, direct plot SKILL functions are available to calculate simulation results for RF circuits only.

ADE L provides the following direct plot SKILL functions:

Function	**Use**
`drplMcpValue`	Returns the main channel power value.
`drplWrlsAcprValue`	Returns the adjacent channel power ratio value.
`drplEvmWrls`	Displays the error vector magnitude value on the constellation plot.
`drplACPRWithMask`	Plots `acpr` and `spectrum` masks if one of standards defined in Channel Definitions on `envlp` result Direct Plot form is selected.
`drplPacVolGnExpDen`	Plots the PAC voltage wave.
`drplJitter`	Calculates jitter for synchronous or autonomous circuits.
`drplRFJc`	Calculates cycle jitter for single event.
`drplRFJcc`	Calculates cycle-to-cycle jitter for single event.
`drplParamSweepRFJc`	Calculates cycle jitter for parametric sweep with multiple events.
`drplParamSweepRFJcc`	Calculates cycle-to-cycle jitter for parametric sweep with multiple events.
`drplRFValueAt`	Returns the Y-axis value corresponding to the specified X-axis value of the given waveform.
`drplSwpHp`	Returns the hybrid matrix for sweep port SP analysis.

drplSwpSp	Returns the S-parameter waveform for sweep port SP analysis.
drplSwpYp	Returns the admittance matrix for sweep port SP analysis.
drplSwpZm	Returns the port input impedance matrix for sweep port SP analysis.
drplSwpZp	Returns the impedance matrix for sweep port SP analysis.

drplMcpValue

```
drplMcpValue(
     s_probe
     )
     => f_power
```

Description

Returns the main channel power value.

Arguments

s_probe	The name of the probe for which the main channel power needs to be calculated.

Value Returned

f_power	The main channel power value.

Example

The following example returns the main channel power for the `WPRB0` probe:

```
drplMcpValue('WPRB0)
=> 6.87651
```

drplWrlsAcprValue

```
drplWrlsAcprValue(
     s_probe
     n_idx
     )
     => f_acpr
```

Description

Returns the adjacent channel power ratio value.

Arguments

s_probe	The name of the probe for which the adjacent channel power ratio needs to be calculated.
n_idx	The index of symbol used for channel estimation.

Value Returned

f_acpr	The adjacent channel power ratio.

Example

The following example returns the adjacent channel power ratio for the `WPRB0` probe:

```
drplWrlsAcprValue('WPRB0 ?idx 1)
=> -25.63478
```

drplEvmWrls

```
drplEvmWrls(
     s_probe
     g_percent
     g_sweepValue
     )
     => o_waveform
```

Description

Displays the error vector magnitude value on the constellation plot.

Arguments

s_probe	The name of the probe for which the error vector magnitude needs to be calculated.
g_percent	Specify whether to select the percent format or not.
g_sweepValue	The value of sweep to retrieve.

Value Returned

o_waveform	Returns the waveform object representing the error magnitude.

Example

The following example returns the error vector magnitude for the `WPRB0.mea` probe:

```
drplEvmWrls("WPRB0.mea" ?percent t ?sweepValue nil)
=> srrWave:0x340d42a0
```

drplACPRWithMask

```
drplACPRWithMask(
     t_acprw
     t_sig
     )
     => o_waveform / nil
```

Description

This function plots `acpr` and `spectrum` masks if you select one of standards defined in Channel Definitions on `envlp` result Direct Plot form. These masks confirm that the `acpr` reaches the mask requirement defined in communication standards.

Arguments

t_acprw	Name of the `acpr` wave.
t_sig	The signal standard, such as `802_11a`.

Value Returned

o_waveform	Returns the waveform of `acpr` and `mask`.
`nil`	Returns `nil`, if result `envlp_fd` does not exist or power spectral density can not be calculated.

Example

```
drplACPRWithMask(db10(psdbb(real(harmonic(v("/net9" ?result "envlp_fd") '1))
imag(harmonic(v("/net9" ?result "envlp_fd") '1)) 0 0.00016 12800 ?windowSize 64
?windowName "Cosine4" ?detrending "none")) "802_11a")
```

The above example returns a waveform that shows sweep variable on the X-axis and jitter value plotted on the Y-axis.

drplEvmBpsk

```
drplEvmBpsk(
     o_waveform1
     o_waveform2
     n_tDelay
     n_sampling
     b_autoLevelDetect
     n_voltage
     n_offset
     b_normalize
     [ ?percent b_percent ]
     )
     => o_waveform / nil
```

Description

Processes the I and Q waveform outputs from the transient simulation run to calculate the Error Vector Magnitude (EVM) and plot the I versus Q scatterplot. EVM is a useful measurement to describe the overall signal amplitude and phase modulated signal quality. It is based on a statistical error distribution normalized from an ideal digital modulation. Binary Phase Shift Keying (BPSK) is a typical modulation scheme where EVM is useful. The EVM is calculated by detecting the I and Q signal levels corresponding to the two possible I and Q symbol combinations, and calculating the difference between the signal level and the ideal signal level. Compared to other types of phase shift keying, such as QPSK, QAM16 and QAM64, BPSK has lowest bit error rate for the same signal to noise ratio.

Note: This function is not supported for family of waveforms.

Arguments

o_waveform1	The waveform for I signal.
o_waveform2	The waveform for Q signal.
n_tDelay	The start time for the first valid symbol. This can be obtained from the *Waveform Viewer* window by recording the time of the first minimum or maximum of the valid symbol (whichever is earlier), on the selected signal stream.
n_sampling	A period for the symbol. Each period is represented by a data rate. The data rate at the output is determined by the particular modulation scheme being used.

b_autoLevelDetect Indicates that you want the amplitude, `n_voltage`, and DC offset, `n_offset`, to be calculated automatically. Amplitude is calculated by averaging the rectified voltage level of the signal streams. DC offset is calculated by averaging the sum of an equal number of positive and negative symbols in each signal stream. These values are used to determine the EVM value.

If the `b_autoLevelDetect` is `nil`, the values for `n_voltage` and `n_offset` are required.
Valid values: `t`, `nil`
Default value: `t`

n_voltage The amplitude of the signal.

n_offset The DC offset value.

b_normalize An option to see the scatter plot normalized to the ideal values `+1` and `-1` (for example, when superimposing scatter plots from different stages in the signal flow, where the levels may be different, but you want to see relative degradation or improvement in the scatter). This option does not affect the calculation of the EVM number.
Valid values: `t`, `nil`
Default value: `nil`

?percent b_percent

Specifies whether to print the average EVM in percentage or in dB scale. If the value is set to `t`, average EVM is printed in percentage, otherwise, average EVM is printed in dB scale.
Valid values: `t`, `nil`
Default value: `nil`

Value Returned

o_waveform Returns a waveform object representing the EVM value computed from the waveforms.

`nil` Returns `nil` and prints the error message if the function is unsuccessful.

Examples

Example 1

```
drplEvmBpsk( v("samp_out_Q"), v("samp_out_I") 1.5u, 181.81n, t, nil, nil, nil)
```

Calculates the EVM value when `b_autoLevelDetect` is set to `t` . In this case, values are not specified for `n_voltage` and `n_offset`.

Example 2

```
drplEvmBpsk( v("samp_out_Q"), v("samp_out_I") 1.5u, 181.81n, nil, 1.3, 0, nil)
```

Calculates the EVM value when `b_autoLevelDetect` is set to `nil`. In this case, values are specified for `n_voltage` and `n_offset`.

drplPacVolGnExpDen

```
drplPacVolGnExpDen(
     t_denSigStr
     rh
     t_name
     )
     => o_waveform / nil
```

Description

Plots the PAC voltage wave.

Arguments

t_denSigStr	The defined signal string.
rh	The reference harmonic.
t_name	Name.

Value Returned

o_waveform	Returns the waveform of PAC voltage.
`nil`	Returns `nil`, otherwise.

Example

```
drplPacVolGnExpDen("v(\"/VLO\" ?result \"hbac\")" '(0) nil)
```

drplJitter

```
drplJitter(
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     [ ?freq n_freq ]
     [ ?k n_k ]
     [ ?unit t_unit ]
     [ ?ber g_ber ]
     [ ?event n_event ]
     )
     => value / nil
```

Description

Calculates jitter from the result of pnoise analysis, where *noisetype* is set as `pmjitter`.

Arguments

`?result` *`result`*	Name of the result of pnoise analysis. By default, the name for the result of pnoise jitter analysis is `pnoise_pmjitter`.
`?resultsDir` *`resultsDir`*	Path to the results directory.
`?freq` *`freq`*	Frequency at which you want to calculate jitter. This value is used in case of an autonomous circuit only. Specify it as `nil`, in case of a driven circuit.
`?k` *`k`*	The number of cycles. The default value of k is `1`.
`?unit` *`unit`*	Unit to measure jitters. Possible values are `Second`, `UI`, and `ppm`.
`?ber` *`ber`*	The value of BER (Bit Error Rate) when the signal level is peak-to-peak.
`?event` *`event`*	Index of an event in the result. The jitter value is calculated for each event.

Value Returned

`value`	Returns the jitter value.
`nil`	Returns `nil`, if the result name is incorrect and jitter cannot be calculated.

Example

```
drplJitter(?result "pnoise_pmjitter" ?unit "Second" ?event 3 ?k 1)
```

The above SKILL function returns a jitter value.

drplRFJc

```
drplRFJc(
     [ ?from n_from ]
     [ ?to n_to ]
     [ ?k n_k ]
     [ ?multiplier n_multiplier ]
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     [ ?unit t_unit ]
     [ ?ber g_ber ]
     [ ?event S_event ]
     )
     => value / nil
```

Description

Calculates cycle jitter from the result of a single event of pnoise analysis where *`noisetype`* is set as `pmjitter`, or from the result of pnoise analysis of oscillators where *`noiseout`* is set as `[pm]`.

Arguments

`?from` *from*	The lower frequency limiter.
`?to` *to*	The upper frequency limiter.
`?k` *k*	The number of cycles.
`?multiplier` *multiplier*	The frequency multiplier. By default, it is set to `1`.
`?result` *result*	Name of the result of pnoise jitter analysis.
`?resultsDir` *resultsDir*	Path to the results directory.
`?unit` *unit*	Unit to measure jitters. Possible values are `Second`, `UI`, and `ppm`.
`?ber` *ber*	The value of BER (Bit Error Rate) when the signal level is peak-to-peak.
`?event` *event*	Index ID of an event.

Value Returned

value	Returns the value of cycle jitter.
`nil`	Returns `nil`, if the result name is incorrect and jitter cannot be calculated.

Example

```
drplRFJc( ?from 100 ?to 50000000 ?k 1 ?result "pnoise_pmjitter" ?unit "Second"
?event 0 )
```

Returns the cycle jitter value.

drplRFJcc

```
drplRFJcc(
     [ ?from n_from ]
     [ ?to n_to ]
     [ ?k n_k ]
     [ ?multiplier n_multiplier ]
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     [ ?unit t_unit ]
     [ ?ber g_ber ]
     [ ?event S_event ]
     )
     => value / nil
```

Description

Calculates cycle-to-cycle jitter from the result of pnoise analysis for a single event. where *noisetype* is set as pmjitter, or from the result of pnoise analysis of oscillators where *noiseout* is set as [pm].

Arguments

`?from` *from*	The lower frequency limiter.
`?to` *to*	The upper frequency limiter.
`?k` *k*	The number of cycles.
`?multiplier` *multiplier*	The frequency multiplier. By default, it is set to `1`.
`?result` *result*	Name of the result of pnoise jitter analysis.
`?resultsDir` *resultsDir*	Path to the results directory.
`?unit` *unit*	Unit to measure jitters. Possible values are `Second`, `UI`, and `ppm`.
`?ber` *ber*	The value of BER (Bit Error Rate) when the signal level is peak-to-peak.
`?event` *event*	Index ID of an event.

Value Returned

value	Returns the value of cycle jitter.
`nil`	Returns `nil`, if the result name is incorrect and jitter cannot be calculated.

Example

```
drplRFJcc( ?from 100 ?to 50000000 ?k 1 ?result "pnoise_pmjitter" ?unit "Second"
?event 0)
```

Returns cycle-to-cycle jitter value.

drplParamSweepRFJc

```
drplParamSweepRFJc(
     [ ?from n_from ]
     [ ?to n_to ]
     [ ?k n_k ]
     [ ?multiplier n_multiplier ]
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     [ ?unit t_unit ]
     [ ?ber g_ber ]
     [ ?eventList S_eventList ]
     )
     => o_waveform / nil
```

Description

Calculates cycle jitter for parametric sweep with multiple events from the result of pnoise analysis where *noisetype* is set as `pmjitter`.

Arguments

`?from` *from*	The lower frequency limiter.
`?to` *to*	The upper frequency limiter.
`?k` *k*	The number of cycles.
`?multiplier` *multiplier*	The frequency multiplier. By default, it is set to `1`.
`?result` *result*	Name of the result of pnoise analysis.
`?resultsDir` *resultsDir*	Path to the results directory.
`?unit` *unit*	Unit to measure jitters. Possible values are `Second`, `UI`, and `ppm`.
`?ber` *ber*	The value of BER (Bit Error Rate) when the signal level is peak-to-peak.
`?eventList` *eventList*	List of index ID for each event of parameter sweep.

Value Returned

o_waveform	Returns the waveform of cycle jitter.
`nil`	Returns `nil`, if the result name is incorrect and jitter cannot be calculated.

Example

```
drplParamSweepRFJc (?from 1000000 ?to 100000000 ?k 1 ?multiplier 1 ?result
"pnoise_pmjitter" ?unit "Second" ?eventList '("-10.0   (1  1.25143e-10)" "-10.0
(2  6.57854e-10)" "-9.0   (1  1.27759e-10)" "-9.0   (2  6.5234e-10)"))
```

The above example returns a waveform that shows sweep variable on the X-axis and jitter value plotted on the Y-axis.

drplParamSweepRFJcc

```
drplParamSweepRFJcc(
     [ ?from n_from ]
     [ ?to n_to ]
     [ ?k n_k ]
     [ ?multiplier n_multiplier ]
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     [ ?unit t_unit ]
     [ ?ber g_ber ]
     [ ?eventList S_eventList ]
     )
     => o_waveform / nil
```

Description

Calculates cycle-to-cycle jitter for parametric sweep with multiple events from the result of pnoise analysis where *noisetype* is set as `pmjitter`.

Arguments

`?from` *from*	The lower frequency limiter.
`?to` *to*	The upper frequency limiter.
`?k` *k*	The number of cycles.
`?multiplier` *multiplier*	The frequency multiplier. By default, it is set to `1`.
`?result` *result*	Name of the result of pnoise analysis.
`?resultsDir` *resultsDir*	Path to the results directory.
`?unit` *unit*	Unit to measure jitters. Possible values are `Second`, `UI`, and `ppm`.
`?ber` *ber*	The value of BER (Bit Error Rate) when the signal level is peak-to-peak.
`?eventList` *eventList*	List of index ID for each event of parameter sweep.

Value Returned

o_waveform	Returns the waveform of cycle jitter.
`nil`	Returns `nil`, if the result name is incorrect and jitter cannot be calculated.

Example

```
drplParamSweepRFJc ?from 1000000 ?to 100000000 ?k 1 ?multiplier 1 ?result
"pnoise_pmjitter" ?unit "Second" ?eventList '("-10.0   (1  1.25143e-10)" "-10.0
(2  6.57854e-10)" "-9.0   (1  1.27759e-10)" "-9.0   (2  6.5234e-10)")
```

Returns cycle-to-cycle jitter value and its corresponding waveform.

The above example returns a waveform that shows sweep variable on the X-axis and jitter value is plotted on the Y-axis.

drplRFValueAt

```
drplRFValueAt(
     o_waveform
     g_xValue
     )
     => g_yValue / nil
```

Description

Returns the Y-axis value corresponding to the specified X-axis value on the given waveform.

Arguments

o_waveform	The waveform object.
g_xValue	The X-axis value at which you want to find the corresponding Y-axis value.

Value Returned

g_yValue	Returns the Y-axis value corresponding to the specified X-axis value.
`nil`	Returns `nil` if there is an error.

Example

```
drplRFValueAt(rfOutputNoise("v/sqrt(Hz)" ?result "pnoise")"200K")
=> 37.5n
```

When the X-axis value is `200 KHz`, the function above returns `37.5n`, which is the Y-axis value of the Output Noise waveform from pnoise analysis.

drplSwpHp

```
drplSwpHp(
     n_iIndex
     n_jIndex
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     )
     => o_waveform / nil
```

Description

Returns the hybrid matrix for sweep port SP analysis.

Arguments

n_iIndex	Index of the first port.
n_jIndex	Index of the second port.
?result *result*	Name of the result of SP analysis.
?resultsDir *resultsDir*	Path to the results directory.

Value Returned

o_waveform	Returns the waveform of cycle jitter.
nil	Returns nil, if the result name is incorrect and jitter cannot be calculated.

Example

```
drplSwpHp( 1 1 ?result "sp" )
```

Returns a waveform with frequency on the X-axis and the hybrid matrix on the Y-axis.

drplSwpSp

```
drplSwpSp(
     n_iIndex
     n_jIndex
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     )
     => o_waveform / nil
```

Description

Returns the S-parameter waveform for sweep port SP analysis.

Arguments

n_iIndex	Index of the first port.
n_jIndex	Index of the second port.
?result *t_result*	Name of the result of SP analysis.
?resultsDir *t_resultsDir*	Path to the results directory.

Value Returned

o_waveform	Returns the waveform of cycle jitter.
nil	Returns `nil`.

Example

```
drplSwpSp( 1 1 ?result "sp" )
```

Returns a waveform with frequency on the X-axis and the S-parameter waveform on the Y-axis.

drplSwpYp

```
drplSwpYp(
     n_iIndex
     n_jIndex
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     )
     => o_waveform / nil
```

Description

Returns the admittance matrix for sweep port SP analysis.

Arguments

n_iIndex	Index of the first port.
n_jIndex	Index of the second port.
?result *t_result*	Name of the result of SP analysis.
?resultsDir *t_resultsDir*	Path to the results directory.

Value Returned

o_waveform	Returns the waveform of cycle jitter.
nil	Returns nil.

Example

```
drplSwpYp( 1 2 ?result "yp" )
```

Returns a waveform with frequency on the X-axis and the admittance matrix on the Y-axis.

drplSwpZm

```
drplSwpZm(
     n_iIndex
     n_jIndex
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     )
     => o_waveform / nil
```

Description

Returns the port input impedance waveform for sweep port SP analysis.

Arguments

n_iIndex	Index of the first port.
n_jIndex	Index of the second port.
?result *result*	Name of the result of SP analysis.
?resultsDir *resultsDir*	Path to the results directory.

Value Returned

o_waveform	Returns the waveform of cycle jitter.
nil	Returns `nil`.

Example

```
drplSwpZm( 2 2 ?result "sp")
```

Returns a waveform with frequency on the X-axis and the port input impedance matrix on the Y-axis.

drplSwpZp

```
drplSwpZp(
     iIndex
     jIndex
     [ ?result t_result ]
     [ ?resultsDir t_resultsDir ]
     )
     => o_waveform / nil
```

Description

Returns the impedance matrix for sweep port SP analysis.

Arguments

iIndex	Index of the first port.
jIndex	Index of the second port.
`?result` *result*	Name of the result of SP analysis.
`?resultsDir` *resultsDir*	Path to the results directory.

Value Returned

o_waveform	Returns the waveform of cycle jitter.
`nil`	Returns `nil`.

Example

```
drplSwpZp(2 2 ?result "sp")
```

Returns a waveform with frequency on the X-axis and the impedance matrix on the Y-axis.

14

Data Access Functions

This chapter describes the functions that let you define data access functions and data mapping functions.

For more information, see Chapter 16, “Miscellaneous Functions,”.

asiDefineDataAccessFunction

```
asiDefineDataAccessFunction(
     o_tool
     s_dataType
     s_dataFunction
     )
     => s_dataFunction
```

Description

Redefines a data access function.

Note: Typically you do not need to redefine a data access function.

Arguments

o_tool	Simulation tool object.
s_dataType	Data type for the data access function.
	Valid Values: `VT, VF, VS, IT, IF, IS, VDC, IDC, VTRE, OP, OPT, MP, VN2, VNP`, or `VNPP`
s_dataFunction	Name of the data access function that you write to access the data from the Parameter Storage Format (PSF) file.

Value Returned

s_dataFunction	Returns the name of the data access function.

Example

```
asiDefineDataAccessFunction( tool 'VT 'XYZVT )
```

Calls the XYZVT function, which gets the VT information from the PSF file.

```
    procedure( XYZVT(specifier dataDir simData)
        let((wave daf)
            daf = asiGetDataAccessFunction(asiGetTool('analog) 'VT)
            wave = apply( daf list(specifier dataDir simData))
            wave
        )
```

```
)
```

You can use an alternative to `asiDefineDataAccessFunction`, to achieve the same functionality. This would be helpful for user defined data access types. For example, the existing code would work with VT, IT etc., but the code below would work with a new analysis called "sp".

```
procedure( XYZDataAccessSp(specifier dataDir simData)
    let((wave)
        wave = asiGetDrlData("sp" specifier dataDir)
        wave
    )
)
procedure( XYZMapNetNameSp( dataDir specifier )
    let(()
    specifier = parseString((concat "s" car(specifier) "_" cadr(specifier)))
    specifier
    )
)
```

asiDefineDataMappingFunction

```
asiDefineDataMappingFunction(
     o_tool
     s_dataType
     s_function
     )
     => s_function
```

Description

Defines the data mapping functions.

Arguments

o_tool	Simulation tool object.
s_dataType	Datatype for the data access function.
	Valid Values: *VT, VF, VS, IT, IF, IS, VDC, IDC, VTRE, OP, OPT, MP, VN2, VNP*, or *VNPP*
s_function	Name of the data mapping function that you write to convert the Cadence SPICE PSF name to your name. Typically, you use one of the following
	`asi<yourSimulator>MapNetName`
	`asi<yourSimulator>MapTerminalName`
	`asi<yourSimulator>MapInstanceName`
	Callback parameter list: (*s_dataDir l_specifier*) *s_dataDir* specifies the data directory, and *l_specifier* is a list containing the name of the item to look for in the `PSF` file.

Value Returned

s_function	Returns the name of the data mapping function.

Example

```
asiDefineDataMappingFunction( tool 'VT 'asiXYZMapNetName )
```

```
procedure( asiXYZMapNetName( dataDir specifier )
    ; replace ^ by . in net names...
```

```
    specifier = asiMapNetName( dataDir specifier )
    rplaca(
        specifier
        artStrSubstitute( car( specifier ) "^" "." )
    )
)
```

Calls the `XYZMapNetName` function to convert the *cdsSpice*-like net name to the net name in the PSF file of the XYZ simulator. For example, you might use this function to convert lower case characters to uppercase, or you might convert the hierarchical delimiter (^) to the hierarchical delimiter for your simulator.

asiGetCalcResultsDir

```
asiGetCalcResultsDir(
     )
     => t_Datadir / nil
```

Description

Returns the results directory currently used by calculator functions.

Arguments

None

Values Returned

t_Datadir	Returns the results directory currently used by calculator functions.
nil	Returns `nil` if no results are selected.

Example

```
asiGetCalcResultsDir()
```

Returns the current results directory that is being used by calculator functions.

asiInit<yourSimulator>DataAccessFunction

```
asiInit<yourSimulator>DataAccessFunction(
     o_tool
     )
     => t
```

Description

Calls the procedures that modify your data access routines.

Note: You must write `asiInit<yourSimulator>DataAccessFunction`, where <*yourSimulator*> is the name of your simulator. Do not include the angle brackets (<>).

Arguments

o_tool	Simulation tool object.

Value Returned

`t`	Returns `t` when your procedures are called. **Note:** You must write this procedure to return `t`.

Example

```
procedure( asiInitXYZDataAccessFunction(tool)
    <insert your code>
    t
)
```

Creates the procedure that calls the functions to modify the data access routines for the XYZ simulator.

All functions described in the following section accept an optional argument called *data-directory*. If this argument is not provided, open results are used by the function. For example, VT("out") will return the transient voltage at the "out" from the currently open results. If the data-directory is provided, this argument will only be used internally and will not alter the currently selected results.

The Ocean commands `openResults` and `selectResult` do not have any effect on these functions. In case multiple analyses of the same type are present, the first found occurrence of that analysis will be used.

VAR

```
VAR(
     t_variableNname
     [ t_dataDir ]
     )
     => n_number / nil
```

Description

Returns the value of the specified design variable.

Arguments

t_variableName	Name of the variable.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

n_number	Returns the value of the specified design variable.
`nil`	Returns `nil` if the design variable was not found. Prints an error message if the data-directory does not contain valid PSF data.

Examples

```
VAR("R1")
=>  1000.0
VAR("temp" "./simulation/test/spectre/schematic-save")
=>  27.0
```

DATA

```
DATA(
     t_netName
     t_analysis
     [ t_dataDir ]
     )
     => o_data / nil
```

Description

This is a basic data access function. It returns data for the specified node and analysis.

Arguments

t_net_name	Net name.
t_analysis	Name of the analysis.
t_dataDir	Directory containing the PSF files (results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

o_data	The waveform for specified net and analysis.
`nil`	Returns `nil` if no data was found.

Examples

```
DATA("net1" "tran-tran")
=>srrWave:49610776
plot(DATA("net1" "ac-ac"))
=>t (plot window comes up)
```

VS

```
VS(
     t_netName
     [ t_dataDir ]
     )
     => o_wave / nil
```

Description

Returns dc sweep waveform for the specified net.

Arguments

t_netName	Net name.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

o_wave	The dc sweep waveform for specified net.
nil	Returns `nil` if no data was found.

Examples

```
plot(VS("out"))
=>t  (plot window comes up)
value(VS("net14") 4)
=> 1.3  (value at sweep variable = 4)
```

OP

```
OP(
     t_instanceName
     t_parameterName
     [ t_dataDir ]
     )
     => n_number / nil
```

Description

Returns the value of the operating point parameter for the specified instance.

Arguments

t_instanceName	Instance name.
t_parameterName	Parameter name.
t_dataDir	Directory containing the PSF files (results). When specified, this argument will only be used internally and will not alter the currently selected results. The default is the currently selected results directory.

Value Returned

n_number	Returns value of the specified operating point.
nil	Returns `nil` is the design variable was not found.

Examples

```
OP("R1" "pwr")
=> 0.001
OP("R1" "pwr" "./simulation/test/spectre/schematic-save")
=> 0.002
```

OPT

```
OPT(
     t_instanceName
     t_parameterName
     [ t_dataDir ]
     )
     => n_number / nil
```

Description

Returns the transient operating point for the specified instance parameter.

Arguments

t_instanceName	Instance name.
t_parameterName	Parameter name.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

n_number	Returns value of the specified operating point
nil	Returns nil is the design variable was not found.

Examples

```
OPT("R7" "pwr")
=>0.0
OPT("R7" "pwr" "./simulation/test/spectre/schematic-save")
=>0.00025
```

MP

```
MP(
     t_instanceName
     t_parameterName
     [ t_dataDir ]
     )
     => n_number / nil
```

Description

Returns the specified model parameter for the instance.

Arguments

t_instanceName	Instance name.
t_parameterName	Parameter name.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results. The default is the currently selected results directory.

Value Returned

n_number	Returns value of the specified model parameter.
nil	Returns nil is the design variable was not found.

Examples

```
MP("I8.M3" "vpb")
=> -0.13
```

NG

```
NG(
     [ t_dataDir ]
     )
     => nw_noiseGain / nil
```

Description

Returns the noise gain waveform.

Arguments

t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

nw_noiseGain	Returns the noise gain waveform.
nil	Returns nil if no data was found

Examples

```
NG()
=>srrWave:34428932
NG("./simulation/test/spectre/schematic-save")
=>srrWave:23847792
```

VN

```
VN(
     [ t_dataDir ]
     )
     => nw_noise / nil
```

Description

Returns the noise waveform specified in V/sqrt (Hz).

Arguments

t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

nw_noise	Returns the noise waveform.
nil	Returns `nil` if no data was found.

Examples

```
VN()
=>srrWave:82374923
VN("./simulation/test/spectre/schematic-save")
=>srrWave:23749823
```

VN2

```
VN2(
    [ t_dataDir ]
    )
    => nw_noise / nil
```

Description

Returns the noise waveform in V^2/Hz.

Arguments

t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results. The default is the currently selected results directory.

Value Returned

nw_noise	Returns the noise waveform.
nil	Returns `nil` if no data was found.

Examples

```
VN2()
=>srrWave:82374923
VN2("./simulation/test/spectre/schematic-save")
=>srrWave:23749823
```

VNP

```
VNP(
     t_name
     [ t_dataDir ]
     )
     => g_value / nil
```

Description

Returns any single level noise parameter available in the PSF database.

Arguments

t_name	Name of the noise parameter.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results. The default is the currently selected results directory.

Value Returned

g_value	Value of the specified noise parameter.
nil	Specified noise parameter not found.

Example

```
VNP("F")
=>srrWave:49610808
plot(VNP("NF"))
=>t  (plot window comes up)
```

VNPP

```
VNPP(
     t_name
     t_param
     [ t_dataDir ]
     )
     => g_value / nil
```

Description

VNPP accesses any double level noise parameter available in the PSF database.

Arguments

t_name	Name of the component.
t_param	Name of the noise parameter.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

g_value	Value of the specified noise parameter.
nil	Specified noise parameter not found.

Example

```
VNPP("R1" "fn")
=>srrWave:49610992
```

VPD

```
VPD(
     t_net1
     t_net2
     [ t_dataDir ]
     )
     => wave / nil
```

Description

Returns the waveform representing phase difference between voltages at the two nets.

Arguments

t_net1	Name of the 1st net.
t_net2	Name of 2nd net.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

wave	Phase difference between voltages at the two nets.
nil	Returns nil if no data was found.

Examples

```
VPD("net1" "net2")
=>srrWave:49610872
```

VF

```
VF(
     t_netName
     [ t_dataDir ]
     )
     => wave / nil
```

Description

Returns the waveform representing the ac sweep net voltage.

Arguments

t_netName	Name of the net.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

wave	Returns the AC sweep voltage for specified net.
`nil`	Returns `nil` if no data was found

Examples

```
VF("out")
=>srrWave:78782738
VF("out" "./simulation/test/spectre/schematic-save")
=>srrWave:43985992
```

IS

```
IS(
     t_terminal
     [ t_dataDir ]
     )
     => data / nil
```

Description

Returns waveform representing the dc sweep terminal current.

Arguments

t_terminal	name of the terminal.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

data	Returns the dc sweep current for specified terminal.
`nil`	Returns `nil` if no data was found

Examples

```
IS("/V0/PLUS")
=>srrWave:49090909
IS("/V1/PLUS" "./simulation/test/spectre/schematic-save")
=>srrWave:40349095
```

IT

```
IT(
     t_terminal
     [ t_dataDir ]
     )
     => data / nil
```

Description

Returns waveform representing the transient sweep terminal current.

Arguments

t_terminal	Name of the terminal.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

data	Returns the transient current for specified terminal.
nil	Returns `nil` if no data was found.

Examples

```
IT("/V0/PLUS")
=>srrWave:48729090
IT("/V1/PLUS" "./simulation/test/spectre/schematic-save")
=>srrWave:40345345
```

IF

```
IF(
     t_terminal
     [ t_dataDir ]
     )
     => data / nil
```

Description

Returns the waveform representing the ac sweep terminal current.

Arguments

t_terminal	name of the terminal.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

data	Returns the ac current for specified terminal.
`nil`	Returns `nil` if no data was found.

Examples

```
IF("/V0/PLUS")
=>srrWave:49610872
IF("/V1/PLUS" "./simulation/test/spectre/schematic-save")
=>srrWave:44510345
```

IDC

```
IDC(
    t_terminal
    [ t_dataDir ]
    )
    => data / nil
```

Description

Returns the waveform representing the DC terminal current.

Arguments

t_terminal	Name of the terminal.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

data	Returns the dc current for specified terminal.
`nil`	Returns `nil` if no data was found

Examples

```
IDC("/V0/PLUS")
=>3.143
IDC("/V1/PLUS" "./simulation/test/spectre/schematic-save")
=>4.23
```

VDC

```
VDC(
     t_netname
     [ t_dataDir ]
     )
     => data / nil
```

Description

Returns dc voltage for the specified net.

Arguments

t_netname	name of the net.
t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

data	Returns the dc voltage for specified net.
nil	Returns `nil` if no data was found

Examples

```
VDC("net15")
=>3.143
VDC("out" "./simulation/test/spectre/schematic-save")
=>4.23
```

SIMULATOR

```
SIMULATOR(
     [ t_dataDir ]
     )
     => t_name / nil
```

Description

Returns the name of simulator.

Arguments

t_dataDir	Directory containing the PSF files(results). When specified, this argument will only be used internally and will not alter the currently selected results.The default is the currently selected results directory.

Value Returned

t_name	Name of the simulator.
nil	Returns `nil` if could not determine the simulator.

Examples

```
SIMULATOR()
=> "spectre"
SIMULATOR("./simulation/test/hspiceS/schematic")
=> "hspiceS"
```

15

Selection Functions

Selection functions can be useful if you are responsible for setting up forms for designers. With selection functions, you can make it easier and quicker for a designer to enter schematic data in a type-in field. You give the designer the option of clicking on an item in the schematic window and having the information for that option automatically fill in the field. Typically, selection functions are used as callbacks in code that creates form fields and options.

The following example shows how you might use one of the selection functions as part of some code that creates a *net1* button with an associated type-in field.

```
hiCreateStringField(
    ?name 'net1
    ?prompt "Net Name"
    ?value ""
)
hiCreateButton(
    ?name 'netSelect1
    ?buttonText "Select"
    ?callback "asiSelectNet('net1 ?prompt \"Select net1\")"
)
```

When the designer clicks on the button, the `asiSelectNet` function displays the *"Select net1"* prompt on the schematic window. The designer can click a net in the schematic window to automatically fill in the type-in field.

Note: Currently there is an *hi* limitation—if the debugger is installed for the session, the prompts are not displayed.

For more information about functions with the *hi* prefix, see the *Cadence User Interface SKILL Reference*.

The next example shows how you might use one of the analysis-specific selection functions as part of some code that creates an *outVsrc* button with an associated type-in field. (This example does not show all the code for adding a noise analysis—it only shows how you might use the `asiSelectAnalysisSource` function.)

```
asiAddAnalysis( tool
    ?name 'noise
    ?prompt "Noise"
        asiCreateAnalysisField(
            ?name       'outVsrc
            ?prompt     "Output Voltage Source"
```

```
        )
        asiCreateAnalysisField(
            ?name       'selectOutVsrc
            ?prompt     "Select"
            ?type       'button
            ?callback       "asiSelectAnalysisSource( 'noise
                                'outVsrc \"Select output voltage
                                source ...\" )"
        )
)
```

When the designer clicks on the *Select* button, the *asiSelectAnalysisSource* function displays the *"Select output voltage source"* prompt on the schematic window. The designer can click a source in the schematic window to automatically fill in the type-in field.

Note: Typically, the functions in this chapter are for integrators.

asiSelectAnalysisCompParam

```
asiSelectAnalysisCompParam(
     s_analysisName
     s_instField
     s_parField
     )
     => t / nil
```

Description

Lets the user select a component instance from the schematic to pop up a list box containing the parameters for that instance.

The name of the component automatically fills in the associated form field in the Choosing Analyses form. When the user selects a parameter from the list box, the name of the parameter automatically fills in its associated field.

Arguments

s_analysisName	Name of the analysis.
s_instField	Name of the field to contain the selected component.
s_parField	Name of the field to contain the selected parameter.

Value Returned

`t`	Returns `t` if successful.
`nil`	Returns `nil` otherwise.

Example

```
asiCreateAnalysisField(
    ?name               'device
    ?prompt             "Component Name"
)
asiCreateAnalysisField(
    ?name               'select
    ?prompt             "Select Component"
    ?type               'button
    ?callback           "asiSelectAnalysisCompParam( 'ac 'device
                            'deviceParam )"
)
asiCreateAnalysisField(
    ?name               'deviceParam
```

```
    ?prompt             "Parameter Name"
)
```

Lets the user select a component instance from the schematic in an AC analysis. The name of the component fills in the *device* field, and a list box appears showing all the parameters for that component. Then the user can select a parameter from the list box to fill in the *deviceParam* field.

asiSelectAnalysisInst

```
asiSelectAnalysisInst(
     s_analysis
     s_field
     [ t_prompt ]
     )
     => t / nil
```

Description

Lets the user select an instance from the schematic to be used as input for the specified field for the specified analysis. If the user selects any other object, the system ignores the selection and beeps.

Arguments

s_analysis	Analysis type.
s_field	Name of the analysis field.
t_prompt	Prompt string to display in the schematic window.
	Default Value: "`Select component...`"

Value Returned

`t`	Returns `t` if successful.
`nil`	Returns `nil` otherwise.

Example

```
asiSelectAnalysisInst( 'dc 'component )
```

Lets the user select an instance from the schematic to use as input for the '*component* field of a DC analysis.

asiSelectAnalysisNet

```
asiSelectAnalysisNet(
     s_analysis
     s_field
     [ t_prompt ]
     )
     => t / nil
```

Description

Lets the user select a net from the schematic to be used as input for the specified field for the specified analysis. If the user selects any other object, the system ignores the selection and beeps.

Arguments

s_analysis	Analysis type.
s_field	Name of the analysis field.
t_prompt	Prompt string to display in the schematic window.
	Default Value: "`Select net...`"

Value Returned

`t`	Returns `t` if successful.
`nil`	Returns `nil` otherwise.

Example

```
asiSelectAnalysisNet( 'noise 'outputNode)
```

Lets the user select a net from the schematic to use as input for the '*outputNode* field for a *noise* analysis.

```
asiSelectAnalysisNet( 'xf 'posNode)
```

Lets the user select a net from the schematic to use as input for the '*posNode* field for an *xf* analysis.

asiSelectAnalysisSource

```
asiSelectAnalysisSource(
     s_analysis
     s_field
     [ t_prompt ]
     )
     => t / nil
```

Description

Lets the user select a source from the schematic to be used as input for the specified field for the specified analysis. If the user selects any other object, the system ignores the selection and beeps.

Note: The property source should be set to `t` in the simInfo of the component to be selected with this function.

Arguments

s_analysis	Analysis type.
s_field	Name of the analysis field.
t_prompt	Prompt string to display in the schematic window.
	Default Value: "`Select source...`"

Value Returned

`t`	Returns `t` if successful.
`nil`	Returns `nil` otherwise.

Example

```
asiSelectAnalysisSource( 'noise 'outVsrc "Select output voltage source ..." )
```

Lets the user select a source from the schematic to use as input for the '*outVsrc* field for a noise analysis.

```
procedure( almCreateSimInfo_<comp>_<yourSimulator>()
    '( nil
       netlistProcedure    comp
       otherParameters     ( fundname noisefile
```

```
                          FNpairs F1 N1 F2 N2 F3 N3 F4 N4 F5 N5
                          F6 N6 F7 N7 F8 N8 F9 N9 F10 N10 )
      instParameters    ( dc mag phase type xfmag pacmag pacphase val0
                          val1 period delay rise fall width tc1 tc2
                          tnom )
      termOrder         ( PLUS MINUS )
      termMapping       ( nil PLUS \:p MINUS "(FUNCTION minus(root('PLUS')))" )
      propMapping       ( nil dc vdc mag acm phase acp val0 v1 val1 v2
                          period per delay td rise tr fall tf
                          width pw xfmag xfm pacmag pacm
                          pacphase pacp type srcType )
      componentName     vsource
      source            t
   )
)
```

asiSelectInst

```
asiSelectInst(
     s_field
     [ ?prompt t_prompt ]
     [ ?form r_form ]
     [ ?tab l_tab ]
     )
     => t / nil
```

Description

Lets you select an instance from the schematic. If you select any other object, the system beeps and ignores the selection.

Arguments

s_field	Name of the field to be filled in with the selected value.
?prompt *t_prompt*	Prompt string to display in the schematic window. Default Value: "`Select instance...`"
?form *r_form*	Form that contains the field to be filled in with the selected value. The default is the form returned by `hiGetCurrentForm`.
?tab *l_tab*	List containing the following: ■ Name of the tab, which is created using `hiCreateTabField` ■ Page displayed on the specified tab on which the string field exists. **Note:** Use this argument only in case the specified form has multiple tabs.

Value Returned

t	Returns `t` if successful.
nil	Returns `nil` otherwise.

Example

```
asiSelectInst( 'inst1 )
```

Lets you select an instance from the schematic to use as input for the *inst1* field of the current form. It is used when the form does not contain any tabs.

```
asiSelectInst('inst1 ?tab list('TabField 'page1))
```

Lets you select an instance *inst1* which is present in `page1` of `TabField`. It is used when a form contains multiple tabs.

asiSelectNet

```
asiSelectNet(
     s_field
     [ ?prompt t_prompt ]
     [ ?form r_form ]
     [ ?tab l_tab ]
     )
     => t / nil
```

Description

Lets you select a net from the schematic. If you select any other object, the system ignores the selection and beeps.

Arguments

s_field	Name of the field to be filled in with the selected value.
?prompt *t_prompt*	Prompt string to display in the schematic window. Default Value: "`Select net...`"
?form *r_form*	Form that contains the field to be filled in with the selected value. The default is the form returned by `hiGetCurrentForm`.
l_tab	List containing the following: ■ Name of the tab, which is created using `hiCreateTabField` ■ Page displayed on the specified tab on which the string field exists. **Note:** Use this argument only in case the specified form has multiple tabs.

Value Returned

t	Returns `t` if successful.
nil	Returns `nil` otherwise.

Example

```
asiSelectNet( ’net1 )
```

Lets you select a net from the schematic to use as input for the *net1* field of the current form. Use this when the form does not contain any tabs.

```
asiSelectNet('net1 ?tab list('TabField 'page1))
```

Lets you select a net from the schematic to use as an input for the *net1* field which is present in `page1` of `TabField`. Use this when a form contains multiple tabs.

asiSelectSourceInst

```
asiSelectSourceInst(
     s_field
     [ ?prompt t_prompt ]
     [ ?form r_form ]
     [ ?tab l_tab ]
     )
     => t / nil
```

Description

Lets you select a source instance on the schematic. If you select any other object, the system beeps and ignores the selection.

Arguments

s_field	Name of the field to be filled in with the selected value.
?prompt *t_prompt*	Prompt string to display in the schematic window. Default Value: `"Select source..."`
?form *r_form*	Form that contains the field to be filled in with the selected value. The default is the form returned by `hiGetCurrentForm`.
?tab *l_tab*	List containing the following: ■ Name of the tab, which is created using `hiCreateTabField` ■ Page displayed on the specified tab on which the string field exists. **Note:** Use this argument only in case the specified form has multiple tabs.

Value Returned

t	Returns `t` if successful.
nil	Returns `nil` otherwise.

Example

```
asiSelectSourceInst( ’srcInst ?prompt "Select voltage source or current source" )
```

Lets you select a source instance from the schematic to use as input for the *srcInst* field of the current form. Use this when the form does not contain any tabs.

```
asiSelectSourceInst( ’srcInst ?tab list('TabField 'page1) ?prompt "Select voltage
source or current source")
```

Lets you select a source instance from the schematic to use as input for the *srcInst* field present in `page1` of `TabField`. Use this when a form contains multiple tabs.

asiSelectTerm

```
asiSelectTerm(
     s_field
     [ ?prompt t_prompt ]
     [ ?form r_form ]
     [ ?tab l_tab ]
     )
     => t / nil
```

Description

Lets you select an instance terminal from the schematic. If you select any other object, the system ignores the selection and beeps.

Arguments

s_field	Name of the field to be filled in with the selected value.
?prompt *t_prompt*	Prompt string to display in the schematic window. Default Value: "`Select instance terminal...`"
?form *r_form*	Form that contains the field to be filled in with the selected value. The default is the form returned by `hiGetCurrentForm`.
?tab *l_tab*	List containing the following: ■ Name of the tab, which is created using `hiCreateTabField` ■ Page displayed on the specified tab on which the string field exists. **Note:** Use this argument only in case the specified form has multiple tabs.

Value Returned

`t`	Returns `t` if successful.
`nil`	Returns `nil` otherwise.

Example

```
asiSelectTerm( ’term )
```

Lets you select the instance terminal from the schematic to use as input for the *term* field of the current form. Use this when a form does not contain any tabs.

```
asiSelectTerm('term ?tab list('TabField 'page1))
```

Lets you select an instance terminal from the schematic to use as an input for the *term* field which is present in `page1` of `TabField`. Use this when a form contains multiple tabs.

asiSelectTermNet

```
asiSelectTermNet(
     s_field
     [ ?prompt t_prompt ]
     [ ?form r_form ]
     [ ?tab l_tab ]
     )
     => t / nil
```

Description

Lets you select either an instance terminal or a net. If you select any other object, the system beeps and ignores the selection.

Arguments

s_field	Name of the field to be filled in with the selected value.
?prompt *t_prompt*	Prompt string to display in the schematic window. Default Value: "`Select terminal or net...`"
?form *r_form*	Form that contains the field to be filled in with the selected value. The default is the form returned by `hiGetCurrentForm`.
?tab *l_tab*	List containing the following: ■ Name of the tab, which is created using `hiCreateTabField` ■ Page displayed on the specified tab on which the string field exists. **Note:** Use this argument only in case the specified form has multiple tabs.

Value Returned

t	Returns `t` if successful.
nil	Returns `nil` otherwise.

Example

```
asiSelectTermNet( ’termNet )
```

Lets you select an instance terminal or net from the schematic to use as input for the *termNet* field of the current form. Use this when a form does not contain any tabs.

```
asiSelectTermNet('termNet ?tab list('TabField 'page1))
```

Lets you select an instance terminal or net from the schematic to use as an input for the *termNet* field which is present in `page1` of `TabField`. Use this when a form contains multiple tabs.

16

Miscellaneous Functions

This chapter contains additional procedures and methods that can help you integrate your simulator or customize the simulation environment.

ahdlUpdateViewInfo

```
ahdlUpdateViewInfo(
     t_lib
     [ ?cell lt_cell ]
     [ ?view lt_view ]
     [ ?tool lt_tool ]
     )
```

Description

Updates cells and cellviews created with releases earlier than 4.4.2 so that the cells and cellviews can use cellview-specific parameters and parameter values. During the update, `ahdlUpdateViewInfo`, parses the Verilog-A or SpectreHDL modules that define the specified cellviews, issues any necessary error messages and updates the cellview CDF information.

Arguments

t_lib	The name of the library to be updated.
?cell *lt_cell*	An optional name or list of names of cells to be updated. If *lt_cell* is omitted, the function updates every `veriloga` and `ahdl` cellview in the library.
?view *lt_view*	An optional name or list of names of cellviews to be updated. If *lt_view* is omitted, the function updates every `veriloga` and `ahdl` cellview associated with the specified cell.
?tool *lt_tool*	An optional keyed argument added in order to copy the `termMapping` from the tool `simInfo`. If not specified, no copy takes place.

Value Returned

None

Examples

The first example updates all the `veriloga` and `ahdl` cellviews in a library.

```
ahdlUpdateViewInfo("myLibrary")
```

The next example updates three cells in a library.

```
ahdlUpdateViewInfo("myLibrary" ?cell "res" "cmp" "opamp")
```

The last example updates one specified cellview.

```
ahdlUpdateViewInfo("myLibrary" ?cell "res" ?view "veriloga")
```

amseGeneralSetupForm

```
amseGeneralSetupForm(
     o_session
     )
     => t / nil
```

Description

Opens the General Setup form in Virtuoso AMS Designer. The General Setup form appears when you choose *Detailed Setup* and then *General Setup* from the *AMS* menu in Hierarchy Editor.

Arguments

o_session	The simulation session object.

Value Returned

`t`	Displays the General Setup form and returns `t`.
`nil`	Returns `nil` otherwise.

Example

```
amseGeneralSetupForm( session )
```

amseQuickSetupForm

```
amseQuickSetupForm(
     o_session
     )
     => t / nil
```

Description

Opens the Quick Setup form in Virtuoso AMS Designer. The Quick Setup form appears when you choose *Quick Setup* from the *AMS* menu in Hierarchy Editor.

Arguments

o_session	The simulation session object.

Value Returned

`t`	Displays the Quick Setup form and returns `t`.
`nil`	Returns `nil` otherwise.

Example

```
amseQuickSetupForm( session )
```

amsUpdateTextviews

```
amsUpdateTextviews(
    t_libName
    [ ?cell t_cellName ]
    [ ?view t_viewName ]
    [ ?incremental g_incremental ]
    )
    => t / nil
```

Description

Creates a Virtuoso database, depending on the arguments passed for the following:

- For all the text views in the library.
- For all the text views of the specified cell in the library.
- For all the text views in the library that have the specified view name.
- For the specified text view, given that the view is a text view.
- For all the text views in the configuration, given that the specified view is a config view.
- For all the text views that do not have an existing Virtuoso database or have a database with an older timestamp than the specified text view.

Arguments

t_lib	A string, which is the name of the library to be processed.
?cell *t_cellName*	A string, which is the name of the cell to be processed.
?view *t_viewName*	A string, which is the name of the view to be processed.
?incremental *lg_incremental*	If set to `t`, the Virtuoso database is created only for the text views that do not have an existing Virtuoso database or have a database with an older timestamp than the text view.If set to `nil`, the database is created for all the text views. The default value is `t`.

Value Returned

`t`	Successful creation of the Virtuoso database.
`nil`	Failed to create the Virtuoso database.

Notes

f you have text views in read-only libraries, you must set an environment variable in .cdsinit file. It specifies the directory where the Virtuoso database for such text views must be created. You should set the environment variable as shown below:

```
envSetVal("ams.netlisterOpts" "amsTempDirForShadows" 'string'
"<pathToDirectory>")
```

Automatic creation of the Virtuoso database for read-only Verilog-A and VHDL-AMS text views is not supported.

Examples

To create a Virtuoso database for all the text views in myLib:

```
amsUpdateTextviews("myLib")
```

To create a Virtuoso database for all the text views of mycell in mylib:

```
amsUpdateTextviews("myLib" ?cellName "mycell" )
```

To create a Virtuoso databse for all the text views in the config view of mycell in mylib:

```
amsUpdateTextviews("myLib" ?cellName "mycell" ?viewName "config" ?incremental nil
)
```

vmsUpdateCellViews

```
vmsUpdateCellViews(
     [ ?lib t_lib ]
     [ ?cell t_cell ]
     [ ?view t_view ]
     [ ?viewt t_viewType ]
     )
     => t / nil
```

Description

Updates AMS Designer information with the current state of verilog, systemVerilog, veriloga, verilogams and vhdl text views. You might use this function, for example, when you have updated a Verilog-AMS source file outside of the AMS Designer environment. You might also use it when you receive a Verilog-AMS library in a single source file, bring it into the Library.Cell:View structure using xmvlog -use5x, and then need to prepare the library for use in the AMS Designer environment.

Note: If you run this function without any arguments, a pop-up appears asking for lib/cell/view and viewType information.

Argument

`?lib` *`t_lib`*	A string, which is the name of a library or a list of library names to look in for cellviews to update. If this argument is not specified (with just `""`) or is specified as `nil`, all libraries defined in the `cds.lib` file are searched.
`?cell` *`t_cell`*	A string, which is the name of a cell or a list of cell names to be searched for update in the libraries. If this argument is not specified (with just `""`) or is specified as `nil`, all cells are searched.
`?view` *`t_view`*	A string, which is the name of a cellview or a list of cellview names to be searched for update. If this argument is not specified (with just "") or is specified as `nil`, all views are searched.
`?viewt` *`t_viewType`*	The type of view that you want to update. Valid values: `text.ahdl` Analog HDL text view `text.veriloga` Verilog-A text view

`VHDLAMSText`	VHDL-AMS text view
`vhdl`	VHDL text view
`text.v`	Verilog text view
`VerilogAMSText`	Verilog-AMS text view
`systemVerilogText`	SystemVerilog text view

Value Returned

`t` Returns `t` if the function runs successfully.

`nil` Returns `nil` when:

- The function runs unsuccessfully
- The individual shadow generation results of any of the views return `nil`.
- The view is of an unsupported type.
- The source file corresponding to a cellview is read-only.

Example

This example updates the specified text cellview.

```
vmsUpdateCellViews(?lib "myLib" ?cell "myCell" ?view "verilogAMS" ?viewt
"VerilogAMSText" )
```

The next example updates verilogAMS views in all the cells in the myLib library.

```
vmsUpdateCellViews(?lib "myLib" ?view "verilogAMS" ?viewt "VerilogAMSText" )
```

annRetrieveFromEffectiveCDF

```
annRetrieveFromEffectiveCDF(
     [ l_window ]
     )
     => l_WindowList / nil
```

Description

Retrieves the data from effective CDF. This function is used to match the CDF properties of the graphical window with the global effective CDF properties and needs to be called before annotating CDF properties to reflect the changes done in effective CDF properties.

Arguments

l_window	A graphical Window ID or a list of window IDs on which you want to retrieve the effective CDF properties. When you do not specify this argument, it includes the list of all opened windows for current the current session.

Value Returned

l_windowList	Returns the list of windows when the function runs successfully.
`nil`	Returns `nil` if there is an error.

Example

Suppose you have schematic window (window ID 2) and layout window (window ID 3) open. By default, both of them are annotating `netName`. Now, toggle display to Pin Name under Terminals (`cdsTerm`) sub-tab in the Interpreted Labels tab within CDF GUI for any schematic component, such as `nmos`.

```
window = setof(win hiGetWindowList() geIsGraphicalWindow(win))
window ==> (window:2 window:3)
annRetrieveFromEffectiveCDF(window)
```

Now, if you redraw both the layout and schematic, these views will annotate Pin name for the specified component.

artEnableAnnotationBalloon

```
artEnableAnnotationBalloon(
     g_value
     [ x_firstPoint ]
     [ x_lastPoint ]
     )
     => t / nil
```

Description

Enables or disables the display of parametric sweep results annotated on the schematic. When enabled, the first six result points are displayed in a pop-up window that appears when you hover the mouse pointer over an instance on the schematic. Use *x_firstPoint* and *x_lastPoint* to specify a range of result points to be displayed in the pop-up window.

Arguments

g_value	Enables or disables the pop-up window that displays parametric sweep results annotated on the schematic. Valid Values: `t` enables the pop-up window, `nil` disables the pop-up window. Default Value: `nil`
x_firstPoint	First result point to be displayed in the pop-up window.
x_lastPoint	Last result point to be displayed in the pop-up window. **Note:** Ensure that the number of result points between *x_firstPoint* and *x_lastPoint* does not exceed six result points because the pop-up window will display only six result points.

Value Returned

`t`	Displays the pop-up window and returns `t`.
`nil`	Returns `nil` otherwise.

Example

```
artEnableAnnotationBalloon(t)
```

Enables the display of parametric sweep results in a pop-up window that appears when you hover the mouse pointer over an instance on the schematic.

```
artEnableAnnotationBalloon(t 15)
```

Displays the 15th result point in a pop-up window, when you hover the mouse pointer over an instance on the schematic.

```
artEnableAnnotationBalloon(t 10 15)
```

Displays the 10th to the 15th result points in a pop-up window, when you hover the mouse pointer over an instance on the schematic.

```
artEnableAnnotationBalloon(nil)
```

Disables the display of parametric sweep results in a pop-up window.

artGenerateHierSymbolCDF

```
artGenerateHierSymbolCDF(
     d_cellView
     [ g_overwrite ]
     )
     => t
```

Description

Creates the cell CDF for the specified cellView, in the same way as happens when you create a symbol from a schematic in Composer. The cellView will be examined for any use of `pPar()` in expressions, and the corresponding parameters will be added to the CDF if they are not already present. Whilst both schematic and symbol cellViews may be passed to this function, it is usually best to pass a schematic cellView, in order to get the `pPar()`s used into the CDF.

Arguments

d_cellView	Database object for the schematic or symbol.
g_overwrite	If the cell CDF already exists, a popup will normally be displayed to ask if you want to overwrite the CDF. If the overwrite argument is specified as non-nil, then the popup is suppressed, and the CDF will be overwritten.

Value Returned

`t`	If it was successful. An error will occur if there were any problems.

Example

```
artGenerateHierSymbolCDF(geGetEditCellView())
```

Recreates the cell CDF for the current cellView.

artGetCdfTargetCV

```
artGetCdfTargetCV(
    )
    => dbobject / nil
```

Description

This procedure returns the cell view dbobject that is the target of the update instance form or the create instance form. The function requires that either the arm property (`armGet 'cdfInfo 'currentCellView`) is set to a cellView, or that the variable *`cdfgForm`* is bound to a form with a property cellViewId attached (`getq cdfgForm cellViewId)`. If neither of these is bound, `nil` is returned.

Argument

None

Value Returned

`dbobject`	Database object.

Examples

```
artGetCdfTargetCV() => db:28458028
artGetCdfTargetCV() => nil
```

artGetCellViewDesignVarList

```
artGetCellViewDesignVarList(
     d_cellViewId
     )
     => l_nameValuePairs
```

Description

Returns the list of design variable name value pairs associated with the top level cellView.

Argument

d_cellViewId	ID of a top level cellview.

Value Returned

l_nameValuePairs	List of name value pairs.

Example

```
artGetCellViewDesignVarList(asiGetTopCellView(asiGetCurrentSession())) =>
(("Rp" "5")
          ("Q" "50")
          ("w" "2*3.14159*1.96e9")
          ("Co" "33p")
          ("Lb" "2.2n")
         )
```

artCurrentInstSimName

```
artCurrentInstSimName(
    )
    => t_extName
```

Description

This function provides the external instance name for the current instance being formatted in the netlister. The function should only be used for socket netlisters or custom netlist procedures for socket. The routine does not take into consideration case mapping registered for the tool or the prefix for the instance. It does take care of the netlisting mode (FNL, HNL or IHNL).

Argument

None

Value Returned

t_extName	Returns the external name for current instance.

Example

```
artCurrentInstSimName()
```

artListToWaveform

```
artListToWaveform(
     l_xyPairs
     )
     => o_waveform
```

Description

This function takes a list of X,Y points and translates it into a waveform. Each of the X,Y points is also in a list format. If Y points are represented in a list format, they are treated as complex numbers while creating the waveform.

Argument

l_xyPairs	X, Y points in list format.

Value Returned

o_waveform	Waveform.

Example

```
artListToWaveform( ’(( 1 2 ) ( 3 4 ) ( 5 6 )) ) => o_waveform
```

This waveform contains {1,3,5} as X and {2,4,6} as Y points.

artBlankString

```
artBlankString(
     g_value
     )
     => t / nil
```

Description

Returns `true` if the given object is equal to `nil`. If the given object is a string, checks if the string is empty or has blank space characters only and returns `true`. If the object is not `nil` and if the string has non-space characters, it returns `nil`.

Argument

g_value	Data object.

Value Returned

`t`	If the given object is `nil` and also when the object is an empty string or has blank space characters only.
`nil`	Otherwise.

Examples

```
artBlankString("    ")    => t
artBlankString("    h ")   => nil
artBlankString(nil)    => t
```

artMakeString

```
artMakeString(
     g_anyArg
     )
     => t_argAsString / nil
```

Description

Converts data of the given data type to a string. The valid data types for the *g_anyArg* argument include symbol, integer, float, and string. The floating point numbers are converted into strings by using the '%.16g' format specification to produce the most precise output.

Argument

g_anyArg	Argument of any data type.

Value Returned

t_argAsString	Returns the string representation of the input argument.
`nil`	Returns `nil` otherwise.

Examples

- With symbol data:

  ```
  artMakeString( '\1\2\3 ) => "123"
  ```

- With integer data:

  ```
  artMakeString( 2 ) => "2"
  ```

- With float/real data:

  ```
  artMakeString( 2.999 ) => "2.999"
  artMakeString( 1e-9 ) => "1e-9"
  ```

- With list data:

  ```
  artMakeString( '(1 a 2.0 ) ) => "(1 a 2.0 )"
  ```

- With CDBA inst data:

  ```
  inst = car( geGetSelSet() )
  artMakeString( inst ) => "db:123456"
  ```

- With other data types:

```
artMakeString( nil ) => “nil”
artMakeString( t ) => “t”
```

artMakeStringPrec15

```
artMakeString(
     g_anyArg
     )
     => t_argAsString / nil
```

Description

Converts data of the given data type to a string. The valid data types for the *g_anyArg* argument include symbol, integer, float, and string. It similar to the function `artMakeString`, except that it uses the ‘%.15g’ format specification to convert the floating point numbers into strings.

Argument

g_anyArg	Argument of any data type.

Value Returned

t_argAsString	Returns the string representation of the input argument.
`nil`	Returns `nil` otherwise.

Examples

```
artMakeStringPrec15( 2.0 ) => “2.0”
artMakeStringPrec15( 10p ) => “1e-11”
```

asiAddDesignVarList

```
asiAddDesignVarList(
     o_session
     l_designVarList
     )
     => l_newDesignVarList
```

Description

Adds a list of variables to the existing session design variable list.

Arguments

o_session	Simulation session object.
l_designVarList	List of design variables to add to the session design variable list.

Value Returned

l_newDesignVarList	Returns the new list of design variables.

Example

```
asiAddDesignVarList( session '(("rbias" "1k") ("ccap" "1n") ("area" "16u")))
```

Creates a list of name value pairs to add to the list of design variables.

asiAddVerilogArgs

```
asiAddVerilogArgs(
     o_session
     t_verilogArg ...
     )
     => t_verilogArg
```

Description

For a mixed-signal simulation, this method lets you change the list of arguments that are sent to the Verilog-XL simulator with the *-slave* option.

These arguments are the options from the Verilog Options form. Typically, you use this function to add the *+vmxcconfig.vmx* option.

Note for Integrators: This function is defined as a method. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Simulation session object.
t_verilogArg	Arguments (or options) to send to the Verilog-XL simulator with the *-slave* option.

Value Returned

t_verilogArg	Returns the arguments (or options) that are sent to Verilog-XL with the *-slave* option.

Example for Integrators

```
defmethod( asiAddVerilogArgs ( ( session XYZ_session ) verilogArg )
    sprintf( verilogArg "%s +vmxcconfig.vmx"  verilogArg )
)
```

Adds *+vmxcconfig.vmx* to the list of Verilog-XL arguments for the XYZ simulator class.

asiLoadState

```
asiLoadState(
     o_session
     [ ?name t_name ]
     [ ?option s_option ]
     [ ?stateDir t_stateDir ]
     [ ?lib t_lib ]
     [ ?cell t_cell ]
     [ ?simulator t_simulator ]
     )
     => t / nil
```

Description

Loads a saved state into the current simulation environment directly from the CIW without displaying the *Loading State* form.

Arguments

o_session	Simulation session object.
?name *t_name*	Name of the state.
?option *s_option*	Option to specify whether the state is to be loaded from `'dir` or `'cellview`.
?stateDir *t_stateDir*	Directory in which the state is saved. The complete location of the saved state would be *stateDir/lib/cell/simulator*. Specify *stateDir* only when *option* is set to `'dir`.
?lib *t_lib*	Library name.
?cell *t_cell*	Cell name.
?simulator *t_simulator*	Name of the simulator. Specify this when *option* is set to `'dir`.

Value Returned

t	Returns `t` if the call is successful.
nil	Returns `nil` if the call is unsuccessful.

Examples

```
asiLoadState( session1 ?name "MyState" ?option 'dir ?stateDir "~/.artist_state" )
```

Loads `MyState` directly from the CIW given the directory (`~/.artist_state`) in which the state is saved and the session (`session1`) into which the state is to be loaded.

```
asiLoadState( session2 ?name "spectre_state1" ?option 'cellview ?lib "myLib" ?cell
"myCell" )
```

Loads `spectre_state1` directly from the CIW given the library/cell path (`myLib/myCell`) and the session (`session2`) into which the state is to be loaded.

asiSaveState

```
asiSaveState(
     o_session
     [ ?name t_name ]
     [ ?option s_option ]
     [ ?stateDir t_stateDir ]
     [ ?lib t_lib ]
     [ ?cell t_cell ]
     [ ?simulator t_simulator ]
     [ ?description t_description ]
     )
     => t / nil
```

Description

Saves the current state of the current simulation environment directly from the CIW without displaying the *Saving State* form.

Arguments

o_session	Simulation session object.
?name *t_name*	Name of the state.
?option *s_option*	Option to specify whether the state is to be saved in 'dir or 'cellview.
?stateDir *t_stateDir*	Directory in which the state is to be saved. The complete location of the saved state would be *stateDir/lib/cell/simulator*. Specify *stateDir* only when *option* is set to 'dir.
?lib *t_lib*	Library name.
?cell *t_cell*	Cell name.
?simulator *t_simulator*	Name of the simulator. Specify this when *option* is set to 'dir.
?description *t_description*	Description to be saved with the state.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

Examples

```
asiSaveState( session1 ?name "NewState" ?option 'dir ?stateDir "~/.artist_state"
?description "saved on Jan 1, 2006" )
```

Saves the state NewState directly from the CIW given the directory (~/.artist_state) and session (session1) in which the state is to be saved and the description (saved on Jan 1, 2006) to be saved with the state.

asiCheck

```
asiCheck(
     o_analysis | o_anaOption | o_envOption | o_simOption | o_keepOption
     r_form
     )
     => t / nil
```

Description

Called by the environment to check values in the analysis and option fields.

Note for Integrators: This procedure is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_analysis	Specifies the analysis object.
o_anaOption	Specifies the analysis option object.
o_envOption	Specifies the environment option object.
o_simOption	Specifies the simulator option object.
o_keepOption	Specifies the keep option object.
r_form	Form containing the analysis or option fields. This argument is passed into the `asiCheck` method by the environment.

Value Returned

`t`	Returns `t` if the field values are in the correct range.
`nil`	Returns `nil` otherwise.

Example for Integrators

Checks the values of the form fields in an ac analysis.

```
defmethod( asiCheck ( ( ana analog_ac_analysis ) form )

    asiCheckBlankNumericGreater( ana form 'from 0 )
    asiCheckBlankNumericGreater( ana form 'to 0 )
```

```
    if( equal( asiGetAnalysisFormFieldVal( form ’ac ’incrType )
        "Linear" ) then asiCheckBlankNumericGreater( ana form
        ’lin 0 )
    else
        asiCheckBlankNumericGreater( ana form ’log 0 )
    )

    asiCheckMultipleGreater( ana form ’to ’from )

)
```

Checks whether the ABSTOL simulator option for Cadence SPICE has a value greater than zero. The Cadence SPICE simulator options class must be defined before the `asiCheck` function is used.

```
defclass( cdsSpice_simOption ( analog_simOption ) ( ) )

defmethod( asiCheck ( ( option cdsSpice_simOption ) form )
    asiCheckBlankNumericGreater( option form 'ABSTOL 0 )
)
```

Note: If you want to write methods for analyses, analysis options, environment options, simulator options, or keep options, you must define the appropriate class in your `classes.il` file.

SKILL Functions to Check Field Values

Listed below are SKILL functions that you can use in code that check field values. For each of these functions, *o_obj* can be any one of the following objects:

- *o_analysis*
- *o_anaOption*
- *o_envOption*
- *o_simOption*
- *o_keepOption*

asiCheckDesignVariable

```
asiCheckDesignVariable(
     o_obj
     r_form
     s_fieldName
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is a valid design variable.

asiCheckExpression

```
asiCheckExpression(
     o_obj
     r_form
     s_fieldName
     [ ?subAnaMsg t_subAnaMsg ]
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is a valid expression.

asiCheckExpressionGreater

```
asiCheckExpressionGreater(
     o_obj
     r_form
     s_fieldName
     g_value
     [ ?subAnaMsg t_subAnaMsg ]
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is an expression that evaluates to a value greater than *g_value*.

asiCheckBlankNumeric

```
asiCheckBlankNumeric(
     o_obj
     r_form
     s_fieldName
     [ ?subAnaMsg t_subAnaMsg ]
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is a numeric value.

asiCheckBlankNumericGreater

```
asiCheckBlankNumericGreater(
     o_obj
     r_form
     s_fieldName
     g_value
     [ ?subAnaMsg t_subAnaMsg ]
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is a numeric value greater than *g_value*.

asiCheckBlankNumericNequal

```
asiCheckBlankNumericNequal(
     o_obj
     r_form
     s_fieldName
     g_value
     [ ?subAnaMsg t_subAnaMsg ]
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is a numeric value not equal to *g_value*.

asiCheckBlankNetExists

```
asiCheckBlankNetExists(
     o_obj
     r_form
     s_fieldName
     [ ?subAnaMsg t_subAnaMsg ]
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is a valid net name.

asiCheckBlankInstExists

```
asiCheckBlankInstExists(
     o_obj
     r_form
     s_fieldName
     [ ?subAnaMsg t_subAnaMsg ]
     )
     => t / nil
```

Description

Verifies that the *s_fieldName* entry is a valid instance name.

asiCheckMultipleGreater

```
asiCheckMultipleGreater(
     o_obj
     r_form
     s_largerField
     s_smallerField
     )
     => t / nil
```

Description

Verifies that the value of the *s_largerField* entry is greater than that of the *s_smallerField* entry.

Note: These functions are expected to change in later versions of the Virtuoso Analog Design Environment software.

asiCheckSimulationSuccess

```
asiCheckSimulationSuccess(
     o_session
     )
     => t / nil
```

Description

Determines if a simulation was successful.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Argument

o_session	Simulation session object.

Value Returned

t	Returns t if successful.
nil	Returns nil otherwise.

Example

```
success = asiCheckSimulationSuccess( session )
```

Sets success to t if the simulation is successful. Sets success to nil otherwise.

Example for Integrators

```
defmethod( asiCheckSimulationSuccess (( session
        <yourSimulator>_session))
    let( ( success )
    ;; This checks for the existence of the PSF file.
    success = callNextMethod()
    <insert code to perform simulator-specific checking>
    success
    )
)
```

asiCreateLogFileVerilog

```
asiCreateLogFileVerilog(
     o_session
     l_entryList
     )
```

Description

Creates the file logFileVerilog in the `.../psf` directory to indicate the analysis result of Verilog-XL in a mixed-signal transient run.

Arguments

o_session	Virtuoso Analog Design Environment session.
l_entryList	Must be in the form.

- `nil`—If there is no transient analysis.
- *'(("<transient-analysis-instance-name>" "<transient-analysis-type-name>"))*–If there is a transient analysis and digital results are available.

Value Returned

None

Examples

For cdsSpiceVerilog:

```
asiCreateLogFileVerilog( o_session '(("timeSweep" "tran")) )
```

For spectreSVerilog:

```
asiCreateLogFileVerilog( o_session '(("timeSweep-tran" "tran")) )
```

When transient analysis is not performed or when no digital results are saved for Verilog:

```
asiCreateLogFileVerilog( o_session nil)
```

asiDcStore

```
asiDcStore(
     o_session
     t_fileName
     )
     => t / nil
```

Description

Copies the DC node voltages in *processId*.dc to the name you pass in *fileName*. This function assumes that your simulator writes the DC node voltages to netlistDir/raw/*processId*.dc.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.
t_fileName	Name of the file in which to store the DC node voltages.

Value Returned

t	Returns t if the DC voltages are stored in *fileName*.
nil	Returns nil otherwise.

Example for Integrators

```
defmethod( asiDcStore ( ( session XYZ_session ) fileName )
    let( ( netlistDir processId str )
        netlistDir = asiGetNetlistDir(session)
        processId = asiGetSimProcessId(session)
        str = strcat( "/bin/cp " netlistDir "/raw/" processId ".dc "
            fileName )
        system( str )
        t
    )
)
```

asiGetCurrentSession

```
asiGetCurrentSession(
    )
    => o_session / nil
```

Description

Returns the session object for the current session.

Note: Use this procedure only from within menu callbacks to get the current session.

Argument

None

Value Returned

o_session	Returns the session object for the current session.
`nil`	Returns `nil` if there is no current session defined.

asiGetDesignVarList

```
asiGetDesignVarList(
     o_session
     )
     => l_designVarList / nil
```

Description

Gets the list of design variables for the design associated with the session you specify.

Argument

o_session	Simulation session object.

Value Returned

l_designVarList	Returns the list of design variables.
`nil`	Returns `nil` if there are no design variables associated with the specified session.

Example

```
designVarList = asiGetDesignVarList( session )
```

Returns the list of design variables in `designVarList`.

asiGetFormFieldChoices

```
asiGetFormFieldChoices(
     r_form
     s_fieldName
     )
     => l_choices / nil
```

Description

Gets the list of choices for a form field that is set up as a list box.

Arguments

r_form	Form containing the field. The form can be one of the following: ■ Environment options ■ Simulator options ■ Keep options ■ Analysis options
s_fieldName	Name of a field of the type `listBox`.

Value Returned

l_choices	Returns the list of choices for the field.
`nil`	Returns `nil` if the field cannot be accessed.

Related Function

To get the list of choices for a field on the Choosing Analyses form, see the asiGetAnalysisFormFieldChoices function on page 9-394.

asiGetFormFieldVal

```
asiGetFormFieldVal(
     r_form
     s_fieldName
     )
     => g_value / nil
```

Description

Gets the value of a field on a form.

Arguments

r_form	Form containing the field. The form can be one of the following: ■ Environment options ■ Simulator options ■ Keep options ■ Analysis options
s_fieldName	Name of the field.

Value Returned

g_value	Returns the value of the field.
`nil`	Returns `nil` if the field cannot be accessed.

Example

```
asiGetFormFieldVal( form 'RELTOL )
```

Gets the value of the RELTOL field on the Simulator Options form.

Related Function

To get the value of a field on the Choosing Analyses form, see the asiGetAnalysisFormFieldVal function on page 9-396.

asiGetKeepList

```
asiGetKeepList(
     o_session
     )
     => l_keepList / nil
```

Description

Gets a list of signals and currents that are saved during simulation.

Argument

o_session	Simulation session object.

Value Returned

l_keepList	Returns the list of signals and currents to be saved during simulation.
`nil`	Returns `nil` if no signals were specified to be kept during simulation.

Example

```
keeplist = asiGetKeepList( session )
```

Returns the list of signals and currents for a given session in `keeplist`.

asiGetLogFileList

```
asiGetLogFileList(
     o_session
     )
     => l_logFiles / nil
```

Description

Returns a list of the names of the log files.

Note for Integrators: This procedure is defined as a method for the Analog Class. You can overload this method to return your list of log files, as shown in the example for integrators.

Argument

o_session	Session object.

Value Returned

l_logFiles	Returns the list of log files.
	■ For analog-only simulation, the following list is returned:
	`("logFile")`
	■ For mixed-signal simulation, the following list is returned:
	`( "logFile" "logFileVerilog" )`

`nil`	Returns `nil` if there is an error.

Example

```
asiGetLogFileList( asiGetCurrentSession())
=> ("logFile")
```

Returns the list of log files for the session.

Example for Integrators

```
defmethod( asiGetLogFileList ( ( _session <yourSimulator>_session ) )
    '( "<yourSimulator>logFile" )
)
```

Overloads the `asiGetLogFileList` function to return the log file for your simulator.

asiGetMarchList

```
asiGetMarchList(
     o_session
     )
     => l_marchList / nil
```

Description

Returns a list of signals that are to be marched during simulation.

Argument

o_session	Simulation session object.

Value Returned

l_marchList	Returns the list of signals to march during simulation.
`nil`	Returns `nil` if no signals were specified to be marched.

Example

```
marchList = asiGetMarchList( session )
```

Returns the list of march signals for the session in `marchList`.

asiGetNetlistDir

```
asiGetNetlistDir(
     o_session
     )
     => t_netlistDir
```

Description

Returns the netlist directory. If the directory does not exist, this function creates it.

Argument

o_session	Simulation session object.

Value Returned

t_netlistDir	Returns the path name for the netlist directory.

Example

```
netlistDir=asiGetNetlistDir(session)
```

Returns the netlist directory.

asiGetOutputList

```
asiGetOutputList(
     o_session
     )
     => o_outputsList / nil
```

Description

Returns a list of structures. Each structure defines a output to be saved and/or plotted after simulation.

Argument

o_session	Specifies an analysis object.

Value Returned

o_outputsList	Returns a list of structures. Each structure defines one output.
nil	Returns `nil` if there was an error.

Example

After opening an ADE session and setting up outputs, in the CIW:

```
s=asiGetCurrentSession()
=>stdobj@0x1d14060
outs=asiGetOutputList(s)
=>(sevOutputStruct@0x15e71b8 sevOutputStruct@0x15e7208 sevOutputStruct@0x153ef48)
outs~>signal
=>("/out" "/net15" nil)
outs~>expression
=>(nil nil ymax(VT("/net15")))
```

asiGetPlotList

```
asiGetPlotList(
     o_session
     )
     => l_plotList / nil
```

Description

Gets the list of signals that can be plotted for the current simulation session.

Argument

o_session	Simulation session object.

Value Returned

l_plotList	Returns the list of the items that can be plotted.
nil	Returns `nil` if no signals were specified to be plotted.

Example

```
plotList = asiGetPlotList( session )
```

Returns the list of items that can be plotted for the given session in `plotList`.

asiGetPsfDir

```
asiGetPsfDir(
     o_session
     )
     => t_dirName / nil
```

Description

Returns the name of the PSF directory.

Argument

o_session	Session object.

Value Returned

t_dirName	Returns the name of the PSF directory.
nil	Returns `nil` if there is an error.

Example

```
psfDir = asiGetPsfDir( session )
```

Returns the PSF directory.

asiGetSession

```
asiGetSession(
    { x_id | w_window | r_form | s_name | o_analysis }
    )
    => o_session / nil
```

Description

Returns the session object given one of five possible identifiers.

Arguments

x_id	Integer identifier for the session.
w_window	Encapsulation window for the session.
r_form	Form for the session, which must be one of the following: ■ Analyses ■ Environment options ■ Simulator options ■ Keep options ■ Analysis options
s_name	Symbolic name for the session, for example, *spectre0*.
o_analysis	Analysis object.

Value Returned

o_session	Returns the session object if successful.
`nil`	Returns `nil` otherwise.

Example

```
session = asiGetSession( 'spectre0 )
```

Returns the session object for the *spectre0* session.

asiGetSimName

```
asiGetSimName(
     { o_tool | o_session }
     )
     => t_simulatorName
```

Description

Gets the name of the simulator for a tool or session object.

Arguments

o_tool	Simulation tool object.
o_session	Simulation session object.

Value Returned

t_simulatorName	Returns the name of the simulator.

Example

```
simulatorName = asiGetSimName( session )
```

Returns the simulator name for the given session in `simulatorName`.

asiGetTool

```
asiGetTool(
     { t_toolName | o_session }
     )
     => o_tool
```

Description

Returns the tool object associated with the specified tool name or session. If the tool object is not found, an attempt is made to create and initialize the tool.

Arguments

ts_toolName	Name of the tool.
o_session	Session object.

Value Returned

o_tool	Returns the tool object.

Example

```
tool = asiGetTool( 'XYZ )
```

Returns the tool object for the XYZ simulator.

asiGetTopCellView

```
asiGetTopCellView(
     o_session
     )
     => d_cellView / nil
```

Description

Returns the top-level cellview associated with the session.

Arguments

o_session	Session object.

Value Returned

d_cellView	Returns the top-level cellview.
`nil`	Returns `nil` if there is an error.

Example

```
cv = asiGetTopCellView( session )
lib = cv~>libName
cell = cv~>cellName
view = cv~>viewName
```

Returns the library, cell, and view names.

asiSendSim

```
asiSendSim(
     o_session
     t_command
     t_callback
     g_param
     g_saveOutput
     )
     => t
```

Description

Sends a command to Cadence SPICE to forward to the target simulator.

Arguments

o_session	Session object.
t_command	Command (string) to send to Cadence SPICE.
t_callback	Routine to call when this command terminates. Frequently, this argument is set to `nil`. Callback parameter list: (*l_list g_param*) *l_list* is a list of strings (one string per line) that are generated by Cadence SPICE as output from *t_command*. *l_list* is generated only if *g_saveOutput* is non-`nil`.
g_param	Parameter for the callback routine. Frequently, this argument is set to `nil`.
g_saveOutput	Boolean flag that specifies whether or not the output from the command you sent to Cadence SPICE is saved in *l_list*. If you specify this argument as non-`nil`, the output is saved in *l_list*; otherwise, the output is not saved.

Value Returned

`t`	Returns `t` when the command is sent to Cadence SPICE.

Example

```
asiSendSim( session "restore off" nil nil nil )
```

Sends the "`restore off`" command to Cadence SPICE to be forwarded to the target simulator.

asiSetDesignVarList

```
asiSetDesignVarList(
     o_session
     l_designVarList
     )
     => l_designVarList
```

Description

Sets the design variable list for a session.

This function is used to set the design variable list (a list of (`varName`, `varVal`) pairs) for a session, stripping of any invalid `varName` (the one that does not match the regular expression `^[a-zA-Z_][a-zA-Z_0-9]*$`).

Arguments

o_session	Simulator session object.
l_designVarList	List of design variables you want to use. The list should be comprised of one or more 2 element sub-lists of the following format: `("variableName" "value")` If the list is `'nil'`, all design variables will be removed from the current session.

Value Returned

l_designVarList	Returns the list of design variables for the session.

Example

```
varList = '(("var1" "100") ("var2" "ABC"))
asiSetDesignVarList(asiGetCurrentSession() varList)
=> (("var2" "ABC") ("var1" "100"))
```

Here, `var1` & `var2` are valid variable names starting with a-z or A-Z characters.

If you want add more design variables you can use `asiAddDesignVarList`:

```
varList = '(("1var1" "100") ("var3" "ABC"))
```

```
    asiAddDesignVarList(asiGetCurrentSession() varList)
=>*Error* asiSetDesignVarList: bad name "1var1", not added
=> (("var3" "ABC") ("var2" "ABC") ("var1" "100"))
```

Here `var3` is a valid variable name and therefore gets added to the design variable list, but `1var1` is discarded as it is not a valid variable name (not starting with a-z or A-Z character).

asiSetFormFieldChoices

```
asiSetFormFieldChoices(
     r_form
     s_fieldName
     l_choices
     )
     => l_choices / nil
```

Description

Sets the list of choices to appear in the list box for the specified form field.

Arguments

r_form	Form containing the field. The form can be one of the following: ■ Environment options ■ Simulator options ■ Keep options ■ Analysis options
s_fieldName	Name of a field of the type `listBox`.
l_choices	List of choices for the field.

Value Returned

l_choices	Returns the new list of choices for the field.
`nil`	Returns `nil` if the field cannot be accessed.

Related Function

To set the list of choices for a field on the Choosing Analyses form, see theasiSetAnalysisFormFieldChoices function on page 9-411.

asiSetFormFieldVal

```
asiSetFormFieldVal(
     r_form
     s_fieldName
     g_value
     )
     => g_value / nil
```

Description

Sets the value of a field on a form.

Arguments

r_form	Form containing the field. The form can be one of the following: ■ Environment options ■ Simulator options ■ Keep options ■ Analysis options
s_fieldName	Name of the field.
g_value	Value for the field.

Value Returned

g_value	Returns the new value for the field.
`nil`	Returns `nil` if the field cannot be accessed.

Example

```
asiSetFormFieldVal( form 'RELTOL 1e-2 )
```

Sets the RELTOL field on the Simulator Options form to 1e-2.

Related Function

To set the value of a field on the Choosing Analyses form, see the asiSetAnalysisFieldVal function on page 9-410.

asiSetKeepList

```
asiSetKeepList(
     o_session
     l_KeepList
     )
     => l_KeepList
```

Description

Sets the list of the specific signals and currents to save during simulation.

Note: If you want to save *all* the outputs of a particular type, see Chapter 12, “Keep Option Functions.”

Arguments

o_session	Simulation session object.

l_KeepList	This is a list of selected signals (nets) or terminals comprising of the following information:
	`window_id`
	`libName`
	`CellName`
	`ViewName`

Value Returned

l_KeepList	Returns the list of signals and currents to be saved during simulation.

Example

```
asiSetKeepList( session myKeepList )
```

Sets `myKeepList` as the list of signals to be saved for the given session.

asiSetMarchList

```
asiSetMarchList(
    o_session
    l_MarchList
    )
    => l_MarchList
```

Description

Sets the list of signals to march during simulation.

Arguments

o_session	Simulation session object.

l_MarchList	List of signals to march during simulation.
	This is a list of selected signals (nets) or terminals comprising of the following information:
	`window_id`
	`libName`
	`CellName`
	`ViewName`

Value Returned

l_MarchList	Returns the list of signals to march during simulation.

Example

```
asiSetMarchList( session myMarchList )
```

Sets `myMarchList` as the list of signals to march for the given session.

asiSetPlotList

```
asiSetPlotList(
     o_session
     l_PlotList
     )
     => l_PlotList
```

Description

Sets the plot list for the current simulation session.

Arguments

o_session	Simulation session object.

l_PlotList	List of items to plot in this simulation session.
	This is a list of selected signals (nets) or terminals comprising of the following information:
	`window_id`
	`libName`
	`CellName`
	`ViewName`

Value Returned

l_PlotList	Returns the list of items that can be plotted.

Example

```
asiSetPlotList( session myPlotList )
```

Sets the plot list for the given session.

asiSetSyncFlag

```
asiSetSyncFlag(
     g_flag
     )
     => g_flag
```

Description

This function makes the simulation run in a blocking mode. This implies that control does not come back till the simulation is over. This functionality is needed in the replay files in order to wait for a simulation to finish before proceeding. Call this function (`asiSetSyncFlag(t)`) just before launching a simulation. This function should only be used for testing capabilities. OCEAN should be used for scripting simulations.

Arguments

g_flag (`t/nil`)	To synchronize the simulation.

Values Returned

`t`	When the function sets the value as `true`.
`nil`	Otherwise.

asiTransientStore

```
asiTransientStore(
     o_session
     t_fileName
     )
     => t / nil
```

Description

Copies the final transient operating points in `processId.tr` to the name you pass in `fileName`. This function assumes that your simulator writes the final transient operating points to `netlistDir/raw/processId.tr`.

Note for Integrators: This function is defined as a method for the Analog Class. You can overload this method for your simulator class, as shown in the example for integrators.

Arguments

o_session	Specifies the session object.
t_fileName	Name of the file in which to store the transient node voltages.

Value Returned

`t`	Returns `t` if the transient node voltages are stored in `fileName`.
`nil`	Returns `nil` otherwise.

Example for Integrators

```
defmethod( asiTransientStore (( session <yourSimulator>_session ))

    <insert any code you need>

)
```

Note: See the `asiDcStore` function for similar example that is more complete.

asiMapNetName

```
asiMapNetName(
     t_dataDir
     l_specifier
     [ ?formatflag s_formatflag ]
     )
     => l_specifier
```

Description

Maps the hierarchical schematic net name to the name in the netlist.

Arguments

t_dataDir	Specifies the data directory.
l_specifier	Lists the name of the net to map.

?formatflag *s_formatflag*

Performs name mapping of transient simulation data available in SST2 format.

Set the value to `"t"` if this function is used in context of transient simulation data analysis and the transient simulation data is available in SST2 format.

Value Returned

l_specifier	Returns the list containing the mapped name.

Note: The list *l_specifier* passed as the argument is also destructively modified to contain the mapped name.

asiMapTerminalName

```
asiMapTerminalName(
     t_dataDir
     l_specifier
     [ ?formatflag s_formatflag ]
     )
     => l_specifier
```

Description

Maps the hierarchical schematic terminal name to the name in the netlist.

Arguments

t_dataDir	Specifies the data directory.
l_specifier	Lists the name of the terminal to map.
?formatflag *s_formatflag*	
	Performs name mapping of transient simulation data available in SST2 format. Set the value to `"t"` if this function is used in context of transient simulation data analysis and the transient simulation data is available in SST2 format.

Value Returned

l_specifier	Returns the list containing the mapped name. **Note:** The list *l_specifier* passed as the argument is also destructively modified to contain the mapped name.

asiMapInstanceName

```
asiMapInstanceName(
     t_dataDir
     l_specifier
     [ ?formatflag s_formatflag ]
     )
     => l_specifier
```

Description

Maps the hierarchical schematic instance name to the name in the netlist.

Arguments

t_dataDir	Specifies the data directory.
l_specifier	Lists the name of the instance to map.
?formatflag *s_formatflag*	
	Performs name mapping of transient simulation data available in SST2 format.
	Set the value to `"t"` if this function is used in context of transient simulation data analysis and the transient simulation data is available in SST2 format.

Value Returned\

l_specifier	Returns the list containing the mapped name.
	Note: The list *l_specifier* passed as the argument is also destructively modified to contain the mapped name.

asiRegCallBackOnSimComp

```
asiRegCallBackOnSimComp(
     o_session
     t_callback
     )
     => t / nil
```

Description

Registers the specified user-defined callback function to run after completion of a simulation. The callback function should accept two arguments, a session object and the simulation status.

Note: In case of a simulation with multiple points, the callback is executed multiple times.

Important

The registered callback function is executed only for local simulations.

Arguments

o_session	Simulation session object.
t_callback	Name of the callback function to be registered.

Value Returned

t	Returns `t` when the callback function is registered successfully.
nil	Otherwise, returns `nil`.

Example

```
asiRegCallBackOnSimComp(asiGetCurrentSession 'myfunc)
```

In this example, the `myfunc` function is registered to run after completion of a simulation. You can define `myfunc` as:

```
(defmethod myfunc (session status)
    ....
)
```

asiUnRegCallBackOnSimComp

```
asiUnRegCallBackOnSimComp(
     t_callback
     )
     => t / nil
```

Description

Deregisters the specified callback function registered to run on completion of the simulation.

Arguments

t_callback	Name of callback function to be deregistered.

Value Returned

`t`	Returns `t` if the callback is deregistered successfully.
`nil`	Otherwise, returns `nil`.

Example

```
asiUnRegCallBackOnSimComp(asiGetCurrentSession 'myfunc)
```

In this example, the `myfunc` function is deregistered.

asiRegCallBackOnSimCompForDist

```
asiRegCallBackOnSimCompForDist(
     o_session
     t_callback
     )
     => t / nil
```

Description

Registers the specified user-defined callback function to run after completion of distributed jobs.

Arguments

o_session	The OASIS session object.
t_callback	Name of the callback function to be registered.

Value Returned

`t`	Returns `t` when the callback function is registered successfully.
`nil`	Returns `nil` if there is an error.

Example

The following example registers the `myDistributedCallbackFunc` function to run after all the distributed jobs are completed:

```
session = asiGetCurrentSession()
procedure(myDistributedCallbackFunc(session status)
  printf("Session:%L \n Status:%L \n " session status)
)
asiRegCallBackOnSimCompForDist(session 'myDistributedCallbackFunc)

=> t
```

asiUnRegCallBackOnSimCompForDist

```
asiUnRegCallBackOnSimCompForDist(
     o_session
     t_callback
     )
     => t / nil
```

Description

Unregisters the specified user-defined callback function that is registered using the asiRegCallBackOnSimComp function.

Arguments

o_session	The OASIS session object.
t_callback	Name of callback function to be unregistered.

Value Returned

`t`	Returns `t` if the function is unregistered successfully.
`nil`	Returns `nil` if there is an error.

Example

The following example unregisters the `myDistributedCallbackFunc` function:

```
asiUnRegCallBackOnSimCompForDist(asiGetCurrentSession()'myDistributedCallbackFunc
)
=> t
```

almDefineParam_accuracyMode

```
almDefineParam_accuracyMode(
    t_cellName
    )
    => s_cellParameter / nil
```

Description

This function is used to define the accuracy mode.

Arguments

t_cellName	Name of the cell.

Value Returned

s_cellParameter	The cell parameter.
nil	Returns nil otherwise.

Example

```
almDefineParam_accuracyMode(nport)
```

almDefineParam_additionalParam

```
almDefineParam_additionalParam(
     t_cellName
     )
     => s_cellParameter / nil
```

Description

This function is used to enable additional parameters.

Arguments

t_cellName	Name of the cell.

Value Returned

s_cellParameter	The cell parameter.
nil	Returns nil otherwise.

Example

```
almDefineParam_additionalParam(nport)
```

almDefineParam_fq

```
almDefineParam_fq(
     t_cellName
     )
     => s_cellParameter / nil
```

Description

This function is used to define a `fq` parameter.

Arguments

t_cellName	Name of the cell.

Value Returned

s_cellParameter	The cell parameter.
nil	Returns `nil` otherwise.

Example

```
almDefineParam_fq(indq)
```

almDefineParam_noiseParaLabel

```
almDefineParam_noiseParaLabel(
     t_cellName
     )
     => s_cellParameter / nil
```

Description

Noise parameter label.

Arguments

t_cellName	Name of the cell.

Value Returned

s_cellParameter	The cell parameter.
nil	Returns nil otherwise.

Example

```
almDefineParam_noiseParaLabel(nport)
```

almDefineParam_nportFileB

```
almDefineParam_nportFileB(
    t_cellName
    )
    => s_cellParameter / nil
```

Description

`nport` file.

Arguments

t_cellName	Name of the cell.

Value Returned

s_cellParameter	The cell parameter.
`nil`	Returns `nil` otherwise.

Example

```
almDefineParam_nportFileB(nport)
```

almDefineParam_otherParaLabel

```
almDefineParam_otherParaLabel(
     t_cellName
     )
     => s_cellParameter / nil
```

Description

This function is used to enable other paramters.

Arguments

t_cellName	Name of the cell.

Value Returned

s_cellParameter	The cell parameter.
nil	Returns nil otherwise.

Example

```
almDefineParam_otherParaLabel(nport)
```

almDefineParam_tranAdvanParaLabel

```
almDefineParam_tranAdvanParaLabel(
     t_cellName
     )
     => s_cellParameter / nil
```

Description

Advanced `tran` parameter.

Arguments

t_cellName	Name of the cell.

Value Returned

s_cellParameter	The cell parameter.
nil	Returns `nil` otherwise.

Example

```
almDefineParam_tranAdvanParaLabel(nport)
```

almDefineParam_tranParaLabel

```
almDefineParam_tranParaLabel(
     t_cellName
     )
     => s_cellParameter / nil
```

Description

`tran` parameter label.

Arguments

t_cellName	Name of the cell.

Value Returned

s_cellParameter	The cell parameter.
nil	Returns `nil` otherwise.

Example

```
almDefineParam_tranParaLabel(nport)
```

almGetModuleName

```
almGetModuleName(
     t_lib
     t_cell
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
     => s_moduleName / nil
```

Description

Returns the module name for the arguments specified. The netlist procedure is set with `almSetModuleName`.

Arguments

t_lib	Name of the library which the cell resides.
t_cell	Name of the cell.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. If the *g_view* argument has been specified, and any view-specific information is available for this view, the *g_tool* argument is ignored.

Value Returned

s_moduleName	The module name, if one is defined.
nil	Returns `nil` otherwise.

Example

```
almGetModuleName("analogLib" "vdc" ?tool “spectre”)
```

almGetNamePrefix

```
almGetNamePrefix(
     t_lib
     t_cell
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
     => t_namePrefix / nil
```

Description

Returns the name prefix for the arguments specified. The netlist procedure is set with `almSetNamePrefix`.

Arguments

t_lib	Name of the library which the cell resides.
t_cell	Name of the cell.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. If the *g_view* argument has been specified, and any view-specific information is available for this view, the *g_tool* argument is ignored.

Value Returned

t_namePrefix	The name prefix, if one is defined.
nil	Returns `nil` otherwise.

Example

```
almGetNamePrefix("analogLib" "npn" ?tool "spectreS")
```

almGetParameterList

```
almGetParameterList(
     t_lib
     t_cell
     [ ?view g_view ]
     [ ?tool g_tool ]
     [ ?entry g_entry ]
     )
     => l_parameterList / nil
```

Description

Returns the list of parameters for the arguments specified. The parameter list is set with `almSetParameterList`.

Arguments

t_lib	Name of the library which the cell resides.
t_cell	Name of the cell.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. If the *g_view* argument has been specified, and any view-specific information is available for this view, the *g_tool* argument is ignored.
?entry *g_entry*	Parameter entry. The default value is `instParameters`.

Value Returned

l_parameterList	The list of parameter names, when defined.
nil	Returns `nil` otherwise.

Example

```
almGetParameterList("analogLib" "vdc" ?tool "spectre" ?entry "instParameters")
```

almGetTerminalList

```
almGetTerminalList(
     t_lib
     t_cell
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
     => l_terminalList / nil
```

Description

Returns the list of terminal names for the arguments specified. The netlist procedure is set with `almSetTerminalList`.

Arguments

t_lib	Name of the library which the cell resides.
t_cell	Name of the cell.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. If the *g_view* argument has been specified, and any view-specific information is available for this view, the *g_tool* argument is ignored.

Value Returned

l_terminalList	The list of terminal names, when defined.
`nil`	Returns `nil` otherwise.

Example

```
almGetTerminalList("analogLib" "vdc" ?tool "spectre")
```

almGetTerminalMap

```
almGetTerminalMap(
     t_lib
     t_cell
     S_terminal
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
     => s_map / nil
```

Description

Returns the simulator name of a terminal for the arguments specified. The netlist procedure is set with `almSetTerminalMap`.

Arguments

t_lib	Name of the library which the cell resides.
t_cell	Name of the cell.
S_terminal	Name of the terminal for which the mapped name is returned.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. If the *g_view* argument has been specified, and any view-specific information is available for this view, the *g_tool* argument is ignored.

Value Returned

s_map	Mapped name of the terminal, when one is available.
nil	Returns `nil` otherwise.

Example

```
almGetTerminalMap("analogLib" "vdc" “PLUS” ?tool "spectre")
```

almSetTerminalMap

```
almSetTerminalMap(
     t_lib
     t_cell
     S_name
     g_map
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
```

Description

Sets the mapped name (simulator name) for a terminal name (schematic name) for the arguments specified. The mapped name is used for results display and it is used by the simulator interface in the simulator input file.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
S_name	Schematic name of the terminal.
g_map	Mapped simulator name of the terminal.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.

Value Returned

None

Example

```
almSetTerminalMap("analogLib" "res" “PLUS” “:1” ?tool ’spectre)
```

almGetOpPointParamMap

```
almGetOpPointParamMap(
     t_lib
     t_cell
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
     => l_opMap / nil
```

Description

Returns the operating-point parameter map for the arguments specified. The netlist procedure is set with `almSetOpPointParamMap`.

Arguments

t_lib	Name of the library which the cell resides.
t_cell	Name of the cell.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. If the *g_view* argument has been specified, and any view-specific information is available for this view, the *g_tool* argument is ignored.

Value Returned

l_opMap	Operating-point parameter map, if one is defined.
nil	Returns `nil` otherwise.

Example

```
almGetOpPointParamMap( "analogLib" "npn" ?tool "spectre" )
```

almSetOpPointParamMap

```
almSetOpPointParamMap(
     t_lib
     t_cell
     l_map
     [ ?view t_view ]
     [ ?tool t_tool ]
     )
```

Description

Sets the operating-point parameter map for the arguments specified. This map is used in results display.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
l_map	Operating-point map.
t_view	Name of the view.
t_tool	Name of the tool. This argument is ignored when the *t_view* argument is specified.

Example

```
almSetOpPointParamMap( "analogLib" "npn" nil ?tool 'spectre )
```

almGetNetlistProcedure

```
almGetNetlistProcedure(
     t_lib
     t_cell
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
     => s_procedure / nil
```

Description

Returns the netlist procedure for the arguments specified. The netlist procedure is used to netlist an instance. The netlist procedure is declared with `almSetNetlistProcedure`.

Arguments

t_lib	Name of the library which the cell resides.
t_cell	Name of the cell.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. If the *g_view* argument has been specified, and any view-specific information is available for this view, the *g_tool* argument is ignored.

Value Returned

s_procedure	Returns the netlist procedure, if one is defined.
nil	Returns `nil` if there is an error.

Example

```
almGetNetlistProcedure("analogLib" "vdc" ?tool "spectre")
```

almGetViewInfoNameList

```
almGetViewInfoNameList(
     t_lib
     t_cell
     )
     => l_view_list / nil
```

Description

Returns the list of view-name strings for which view-specific information is available, and for which the view exists.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.

Value Returned

l_view_list	A list of strings which are the names of the views that have view-specific information.
nil	If no views have view-specific information.

Example

```
almGetViewInfoNameList( "rfLib" "balun" )
```

almGetNetlistType

```
almGetNetlistType(
     t_lib
     t_cell
     [ ?view t_view ]
     )
     => t_netlistType / nil
```

Description

Returns the netlist type for the library, cell and view specified, if view-specific information is available. This procedure issued during netlisting.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
`?view` *t_view*	Name of the view.

Value Returned

t_netlistType	Netlist type for the view or the tool specified, if the view has view-specific information.
`nil`	Returns `nil` if no view-specific information is available.

Example

```
almGetNetlistType( "rfLib" "balun" ?view "veriloga")
```

almHasViewInformation

```
almHasViewInformation(
     t_lib
     t_cell
     t_view
     )
     => t / nil
```

Description

Determines if the view-specific information is available for the library, cell, and view specified.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
t_view	Name of the view.

Value Returned

t	Returns `t` when the view-specific information is available for the lib, cell, and view specified.
nil	Returns `nil` otherwise.

Example

```
almHasViewInformation("rfLib" "balun"  "veriloga")
```

almSetNamePrefix

```
almSetNamePrefix(
     t_lib
     t_cell
     t_name
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
```

Description

Sets the name prefix for the view or the tool specified.

The name prefix is used for the instance name in the netlist. The use of the name prefix in the netlist depends on the simulator interface. If the simulator requires that the instance name of a type of components starts with a certain prefix, then the interface must use this name prefix. If this is not a requirement for a simulator, then the interface should not use the name prefix. For the spectre interface, the name prefix is ignored.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
t_name	Name of the prefix.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.

Example

```
almSetNamePrefix (“analogLib” “npn” “analog” "Q” ?tool "spectreS")
```

almSetModuleName

```
almSetModuleName (
     t_lib
     t_cell
     t_name
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
```

Description

Sets the module name for the view or tool.

The module name, also referred to as component name or model name, is used in the netlist to identify the type of component.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
t_name	Module name.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.

Example

```
almSetModuleName("analogLib" "res" "resistor" ?tool "spectre")
```

almSetNetlistProcedure

```
almSetNetlistProcedure(
     t_lib
     t_cell
     s_procedure
     [ ?view g_view ]
     [ ?tool g_tool ]
     )
```

Description

Sets the netlist procedure for the arguments specified.

The netlist is used to netlist an instance.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
s_procedure	Name of the netlist procedure.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.

Example

```
almSetNetlistProcedure( "analogLib" "vdc" 'spectreSrcPrim ?tool "spectre")
```

almSetParameterList

```
almSetParameterList(
     t_lib
     t_cell
     l_parameter
     [ ?view g_view ]
     [ ?tool g_tool ]
     [ ?entry g_entry ]
     )
```

Description

Sets list of parameter names for the arguments specified.

These parameters are printed to the netlist if the user has given these values.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
l_parameter	List of parameter names. Each element must be a symbol.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.
?entry *s_entry*	Parameter entry. The default value is instParameters.

Example

```
almSetParameterList( "analogLib" "npn" '(area m trise region) ?tool "spectre"
?entry "instParameters")
```

almSetTerminalList

```
almSetTerminalList(
     t_lib
     t_cell
     l_termList
     [ ?view t_view ]
     [ ?tool t_tool ]
     )
```

Description

Sets the list of terminal names for the lib arguments specified.

The simulator names of the signals connected to these terminals are printed to the netlist, according to the order of this terminal list.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
l_termList	Terminal list.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.

Example

```
almSetTerminalList( "analogLib" "npn" '(C B E) "vdc" ?tool "spectre")
```

almSetPropMappingList

```
almSetPropMappingList(
     t_lib
     t_cell
     l_parameter
     [ ?view g_view ]
     [ ?tool g_tool ]
     [ ?entry g_entry ]
     )
```

Description

Sets the list of propMapping for the arguments specified.The parameters specified in the `l_parameter` list are mapped and printed to the netlist if the user has specified these values.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
l_parameter	List of parameter names. Each element must be a symbol.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.
?entry *s_entry*	Parameter entry. The default value is `"propMapping"`.

Example

```
almSetPropMappingList("analogLib" "mind" ’(nil coupling K1) ?tool "spectre" ?entry
"propMapping")
```

almGetPropMappingList

```
almGetPropMappingList(
     t_lib
     t_cell
     [ ?view g_view ]
     [ ?tool g_tool ]
     [ ?entry g_entry ]
     )
     => l_propMappingList / nil
```

Description

Returns the `propMapping` parameter list for the arguments specified. The propMapping list is set with `almSetPropMappingList`.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
`?view` *g_view*	Name of the view.
`?tool` *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.
`?entry` *g_entry*	Parameter entry. The default value is `"propMapping"`.

Value Returned

l_propMappingList	The list containing propMapping names, when defined.
`nil`	Returns `nil` otherwise.

Example

```
almGetPropMappingList("analogLib" "vdc"  ?tool "spectre" ?entry "propMapping")
```

almSetOtherParameterList

```
almSetOtherParameterList(
     t_lib
     t_cell
     l_parameter
     [ ?view g_view ]
     [ ?tool g_tool ]
     [ ?entry g_entry ]
     )
```

Description

Sets list of other parameter names for the arguments specified.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
l_parameter	List of parameter names. Each element must be a symbol
?view *g_view*	Name of the view.
?tool*g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.
?entry *g_entry*	Parameter entry. The default value is "otherParameters".

Example

```
almSetOtherParameterList("analogLib" "mind" '(ind1 ind2)  ?tool "spectre" ?entry
"otherParameters")
```

almGetOtherParameterList

```
almGetOtherParameterList(
     t_lib
     t_cell
     [ ?view g_view ]
     [ ?tool t_tool ]
     [ ?entry s_entry ]
     )
     => l_parameterList / nil
```

Description

Returns the `otherParameter` list for the arguments specified. The `otherParameter` list is set with `almSetOtherParameterList`.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.
?entry *g_entry*	Parameter entry. The default value is "`otherParameters`".

Value Returned

l_parameterList	The list containing otherParameter names, when defined.
nil	Returns `nil` otherwise.

Example

```
almGetOtherParameterList("analogLib" "vdc"  ?tool "spectre" ?entry
"otherParameters")
```

almGetStringParameterList

```
almGetStringParameterList(
     t_lib
     t_cell
     [ ?view g_view ]
     [ ?tool g_tool ]
     [ ?entry g_entry ]
     )=> l_parameterList / nil
```

Description

Returns the list of string type parameters for the arguments specified. The parameter list is set with `almSetStringParameterList`.

Arguments

t_lib	Name of the library which the cell resides.
t_cell	Name of the cell.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. If the *g_view* argument has been specified, and any view-specific information is available for this view, the *g_tool* argument is ignored.
?entry *g_entry*	Parameter entry. The default value is `stringParameters`.

Value Returned

l_parameterList	The list of parameter names, when defined.
nil	Returns nil otherwise.

Example

```
almGetStringParameterList("analogLib" "vdc" ?tool "spectre" ?entry
'stringParameters)
```

almSetStringParameterList

```
almSetStringParameterList(
     t_lib
     t_cell
     l_parameter
     [ ?view g_view ]
     [ ?tool g_tool ]
     [ ?entry g_entry ]
     )
```

Description

Sets list of string parameter names for the arguments specified. These parameters are printed to the netlist if the user has given these values.

Arguments

t_lib	Name of the library in which the cell resides.
t_cell	Name of the cell.
l_parameter	List of parameter names. Each element must be a symbol.
?view *g_view*	Name of the view.
?tool *g_tool*	Name of the tool. This argument is ignored when the *g_view* argument is specified.
?entry *g_entry*	Parameter entry. The default value is stringParameters.

Example

```
almSetStringParameterList( "analogLib" "vpwlf" '(fileName) ?tool "spectre" ?entry
'stringParameters)
```

ancGetSimInstName

```
ancGetSimInstName(
     l_netlistDpl
     )
     => t_extName
```

Description

This function provides the external instance name for the current instance being formatted in the netlister. The function must only be used by customized socket netlisters or custom socket netlist procedures. The routine takes into consideration the netlist mode (FNL, HNL or IHNL), case mapping (lower, upper or mixed) and the prefix for the instance.

Argument

l_netlistDpl	Netlist DPL passed to the netlist procedure.

Value Returned

t_extName	Returns the external name for current instance.

Example

```
ancGetSimInstName( netdpl )
```

ancAdjustNameCase

```
ancAdjustNameCase(
     S_name
     s_type
     )
     => S_name
```

Description

The function adjusts case for the name passed, based on the type specified.

Arguments

S_name	The name on which to operate.
s_type	The case adjustment to be made. Valid values are `'lower`, `'upper` or `'mixed`.

Value Returned

S_name	Returns the case adjusted name.

Example

```
ancAdjustNameCase( "xI0" 'upper )
```

Returns "XI0".

drbBrowseFormCB

```
drbBrowseFormCB(
     )
     => t / nil
```

Description

Opens the Browse Project Hierarchy window.

Argument

None

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

msgHelp

```
msgHelp(
    S_prodID
    S_msgID
    )
    => t / nil
```

Description

This function is used to access extended help for an error or a warning message. Currently, Distributed Processing (DP) is the only product that supports this feature.

Arguments

S_prodID	The product ID. In case of Distributed Processing, it is `'DP`.
S_msgID	The error message ID. This is the numeric identifier that is available in the error message box.

Value Returned

`t`	If a valid product ID and error message ID is passed.
`nil`	If prodID or errorID is not valid.

Example

```
(msgHelp 'DP 8)
```

Displays extended help for the DP error message, whose message ID is 28.

addCheck

```
addCheck(
    t_name
    [ ?sub t_sub ]
    [ ?dev t_dev ]
    [ ?devlist l_devlist ]
    [ ?prim t_prim ]
    [ ?mod t_mod ]
    [ ?instparam t_instparam ]
    [ ?modelparam t_modelparam ]
    [ ?opparam t_opparam ]
    [ ?parameter t_parameter ]
    [ ?expression t_expression ]
    [ ?min t_min ]
    [ ?max t_max ]
    [ ?regions t_regions ]
    [ ?duration t_duration ]
    [ ?message t_message ]
    [ ?severity t_severity ]
    [ ?analyses l_analyses ]
    )
    => t_name / nil
```

Description

Adds a new device check. Checks can be added to check a device parameter, a subcircuit parameter, a design variable or an expression. The scope of check is decided by the arguments `?sub`, `?dev`, `?mod`, and `?prim`. The `?min` and `?max` parameters can be used to set up the safe region if the parameter/expression being checked goes out of this region and a violation is reported.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Arguments

t_name	Name for the device check.
?sub *t_sub*	Subcircuit name. When specified, the check will apply to all instances of this subcircuit.

`?dev` *`t_dev`*
: Device name.
When specified, the check will apply only to that device. When specified with the subcircuit name, the check will apply to the specified device in all instances of the given subcircuit.

`?devlist` *`l_devlist`*
: List of device names.
When specified, the check will apply only to the those devices. When specified with the subcircuit name, the check will apply to the specified devices in all instances of the given subcircuit.

`?prim` *`t_prim`*
: Primitive name.
When specified, the check will apply to all instances of this primitive. When specified with the subcircuit name, the check will apply to all instances of this primitive in all instances of the given subcircuit.

`?mod` *`t_mod`*
: Model name.
When specified, the check will apply to all instances of this model. When specified with the subcircuit name, the check will apply to all instances of this model in all instances of the given subcircuit.

`?instparam` *`t_instparam`*
: Instance parameter to be checked.

`?modelparam` *`t_modelparam`*
: Model parameter to be checked.

`?opparam` *`t_opparam`*
: Operating point parameter to be checked.

`?parameter` *`t_parameter`*
: Circuit parameter (design variable) to be checked.

`?expression` *`t_expression`*
: Expression to be checked.

`?min` *`t_min`*
: Lower bound of the safe operating area.
When the value of the specified parameter/expression goes below this limit, a violation is reported.

`?max` *`t_max`*
: Upper bound of the safe operating area.
When the value of the specified parameter/expression exceeds this limit, a violation is reported.

`?regions` *`t_regions`*
: List of safe regions, specified as a space separated string or list of strings.
Only valid when *`opparam`* = `region`. If a device operates outside these regions, a violation is reported.

`?duration` *`t_duration`*	Duration for which a parameter must exceed the bound to cause a violation. Only applies to transient analysis.
`?message` *`t_message`*	Custom message that is printed when this check is violated.
`?severity` *`t_severity`*	Severity of the violation. Valid Values: `Notice`, `Warning`, `Error`.
`?analyses` *`l_analyses`*	List of analyses for which this assert should be turned on. Valid analyses are tran, dc and dcOp.

Value Returned

`t_name`	Returns the name of device check that was added.
`nil`	Returns `nil` if the command is not successful and prints an error.

Examples

```
addCheck("check1" ?primitive "bjt" ?opparam "vbe" ?min "0.7" ?severity "Warning")
```

Checks if vbe for any BJT device falls below 0.7.

```
addCheck("check2" ?primitive "mos3" ?opparam "region" ?regions "triode sat"
?severity "Notice")
```

Checks if any mos3 device goes out of triode or saturation regions.

```
addCheck("check3" ?subckt "amplifier" ?model "mynpn" ?opparam "ibc" ?max 1u
?severity "Warning")
```

Checks if any instance of the model mynpn has base to collector current greater than 1u and limits the check to all instances of the amplifier subcircuit.

deleteChecks

```
deleteChecks(
     t_check1
     [ t_check2 t_check3... ]
     )
     => l_checks / nil
```

Description

Deletes device checks.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Argument

t_check1 - t_checkn	Names of checks to be deleted.

Value Returned

l_checks	Returns list of checks passed.
`nil`	Returns `nil` and prints an error if the simulator is not Spectre.

Example

```
deleteChecks("check1" "check2" "check3")
```

densityEstimateWaveform

```
densityEstimateWaveform(
     histWf
     )
     => waveform
```

Description

Returns the density estimator waveform of a histogram.

Argument

histWf	Histogram waveform with enabled density estimator.

Value Returned

waveform	Returns the density estimator waveform.

Example

```
W00 = drCreateWaveform( drCreateVec( 'double list( 1 2 3 4 5 )) drCreateVec( 'double
list( 10 20 30 40 50 )))

histogramWf=histogram2D(W00 10 "standard" nil t)  :(histogram wave)
densityWf =densityEstimateWaveform(historgramWf)  :(density estimator waveform
wave)
plot densityWf (you can plot this wave)
```

disableAllChecks

```
disableAllChecks(
      )
      => t / nil
```

Description

Disables all device checks.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Value Returned

`t`	Returns `t` if successful.
`nil`	Returns `nil` and prints an error if the simulator is not Spectre.

Example

```
disableAllChecks()
```

disableChecks

```
disableChecks(
     t_check1
     [ t_check2 t_check3... ]
     )
     => l_checks / nil
```

Description

Disables device checks. Only enabled device checks appear in Spectre input deck.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Argument

t_check1 - t_checkn	Names of checks to be disabled.

Value Returned

l_checks	Returns list of checks passed.
`nil`	Returns `nil` and prints an error if the simulator is not Spectre.

Example

```
disableChecks("check1" "check2" "check3")
```

disableDeviceChecking

```
disableDeviceChecking(
    )
    => no / nil
```

Description

Disables device checking. It is the same as turning off the *Enable Device Checking* check box in the *Device Checking Setup* form. No checks are written to Spectre input file. No device checking happens.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Value Returned

`no`	Returns `no` if device checking was already disabled.
`nil`	Returns `nil` if device checking was already disabled.
	Returns `nil` if the command is not successful and prints an error.

Example

```
disableDeviceChecking()
```

displayChecks

```
displayChecks(
    ?resultsDir t_resultsDir
    [ t_check1 t_check2 t_check3... ]
    )
    => nil
```

Description

Displays device checks. If no name is provided, this function displays all checks that have been added so far. If no device checks have been added and a results directory is set by using the *openResults()* command, it prints device checks from the `asserts.info.asserts` file in that results directory. If the results directory is provided, it displays device checks found in the `asserts.info.asserts` file in that results directory.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Arguments

`?resultsDir` *`t_resultsDir`*	
	Directory containing the PSF files (results). When specified, this argument will only be used internally and will not alter the current results directory which was set by the *openResults()* command.
`t_check1 - t_checkn`	Names of checks to be displayed.

Value Returned

`nil`	Returns `nil`.

enableAllChecks

```
enableAllChecks(
     )
     => t / nil
```

Description

Enables all device checks.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Value Returned

`t`	Returns `t` if successful.
`nil`	Returns `nil` and prints an error if the simulator is not Spectre.

Example

```
enableAllChecks()
```

enableChecks

```
enableChecks(
     t_check1 - l_checkn
     )
     => l_checks / nil
```

Description

Enables device checks. Only enabled device checks appear in Spectre input deck.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Argument

t_check1 - t_checkn	Names of checks to be enabled.

Value Returned

l_checks	Returns list of checks passed.
`nil`	Returns `nil` and prints an error if the simulator is not Spectre.

Example

```
enableChecks("check1" "check2" "check3")
```

enableDeviceChecking

```
enableDeviceChecking(
    )
    => yes / nil
```

Description

Enables device checking. It is the same as turning on the *Enable Device Checking* check box in the *Device Checking Setup* form.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Value Returned

`yes`	Returns `yes` if the command is successful.
`nil`	Returns `nil` if the command is not successful and prints an error.

Example

```
enableDeviceChecking()
```

setDevCheckOptions

```
setDevCheckOptions(
     [ ?analysis s_analysis ]
     [ ?start t_start ]
     [ ?stop t_stop ]
     [ ?severity t_severity ]
     [ ?enableAll t_enableAll ]
     [ ?disableAll t_disableAll ]
     )
```

Description

This function can be used to set various parameters of checklimit statements. User can override the severity specified on individual asserts, provide the time interval during which the checking should be done (applies only to transient analysis), or enable/disable all device checks for the given analysis.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Arguments

`?analysis` *`s_analysis`*	Name of analysis.
`?start` *`t_start`*	Time at which device checking will start in a transient analysis. Not applicable to other analysis.
`?stop` *`t_stop`*	Time at which device checking will stop in a transient analysis. Not applicable to other analysis.
`?severity` *`t_severity`*	If specified, this severity level will override the severity specified for individual asserts. Valid values: `Warning`, `Notice`, `Error`, `None`
`?enableAll` *`g_enableAll`*	If true, all checks are enabled during this analysis.
`?disableAll` *`g_disableAll`*	If true, all checks are disabled during this analysis.

Value Returned

`nil`	Returns `nil`.

printViolations

```
printViolations(
     [ ?output t_output ]
     [ ?checks l_checks ]
     [ ?devices l_devices ]
     [ ?models l_models ]
     [ ?primitives l_primitives ]
     [ ?resultsDir t_resultsDir ]
     )
     => t / nil
```

Description

Prints a summary of all violations. Format of the output is similar to that of the output from the *Print* button on the *Violations Display* form. The `resultsDir` argument can be used to print violations from the different results directory.

Note: This function can be used only in an Analog Design Environment L session. When the `enableDeviceChecking` environment variable is set to `t`, the function can be used for an Analog Design Environment XL session too.

Arguments

`?output` *`t_output`*	Prints the violations to the specified file. If not specified, the violations are printed in the CIW.
`?checks` *`l_checks`*	Prints the violations for the specified checks. If not specified, violations for all the checks are printed.
`?devices` *`l_devices`*	Prints the violations for the specified devices. If not specified, the violations for all the devices are printed.
`?models` *`l_models`*	Prints the violations for the specified device models. If not specified, the violations for all the device models are printed.
`?primitives` *`l_primitives`*	Prints the violations for the specified primitive types or models of the specified primitive type. If not specified, the violations for all the primitives are printed.
`?resultsDir` *`t_resultsDir`*	Specifies the directory containing the PSF files (results). When specified, this argument is used internally and does not alter the current results directory which was set by the *openResults()* command.

Values Returned

`t`	The violations are printed.
`nil`	The violations are not present for the design.

Examples

Example 1

The following example prints all the violations in the CIW.

```
printViolations()
```

```
=> Violations for Check1 :
During circuit read in
Instance    Param  Value   Remark
/R1         r      20K     Warning:Exceeded upper limit 10K.

Violations for Check2 :
During circuit read in
```

```
Parameter     Value   Remark
tem           27     Warning:Exceeded upper limit 20.
```

Example 2

The following example prints the violations for `Check2` in the CIW.

```
printViolations(?checks "Check2")
```

```
=>Violations for Check2 :
During circuit read in
Parameter     Value   Remark
tem           27     Warning:Exceeded upper limit 20.
```

Example 3

The following example prints all the violations to the `printviolation` file.

```
printViolations(?output "./simulation/ampTest/printviolation")
=> t
```

Example 4

The following example prints all the violations to the `printviolation` file with results loaded from the *`./simulation2/ampTest/spectre/schematic`* directory.

```
printViolations(?output "./simulation/ampTest/printviolation" ?resultsDir "./
simulation2/ampTest/spectre/schematic")
=> t
```

Note: You can change the default simulation directory using the `projectDir` environment variable.

captabSummary

```
captabSummary(
     [ ?resultsDir t_resultsDir ]
     [ ?analysis o_analysis ]
     )
```

Description

Prints a summary of the capacitance table from the specified results directory.

Arguments

t_resultsDir	Directory containing the PSF files (results).
o_analysis	Name of the analysis for the capacitance table.

Example

```
captabSummary(?resultsDir "./simulation/psf" ?analysis “finalTimeCapinfo.captab")
```

Prints a summary of `finalTimeCapinfo.captab` from `./simulation/psf` directory.

evmOFDM

```
evmOFDM(
     waveform1 o_waveform1
     waveform2 o_waveform2
     sigStandard e_sigStandard
     tstart n_tstart
     modulationType e_modulationType
     fftSize n_fftSize
     PrefixLength n_PrefixLength
     SymbolPeriod n_SymbolPeriod
     [ ?packet n_packetLength ]
     [ ?modifier e_modifier ]
     [ ?skiplength n_skiplength ]
     [ ?idx n_idx ]
     [ ?getval g_getval ]
     )
     => constellation o_waveform evm_value / nil
```

Description

Processes the I and Q waveform outputs from the hb-envlp simulation run to calculate the Error Vector Magnitude (EVM) and plot the I versus Q scatterplot (constellation). EVM is a useful measurement to describe the overall signal amplitude and phase modulated signal quality. It is based on a statistical error distribution normalized from an ideal digital modulation. Orthogonal Frequency Division Multiplexing (OFDM) is a modern high throughput modulation scheme widely used in wireless signals, such as 802.11a,g,n, where EVM measurement is useful . The EVM is calculated by detecting the I and Q signal levels corresponding to constellation points of each modulation type (can be BPSK, QPSK, 16QAM, and 64QAM) and calculating the difference between the signal level and the ideal signal level.

Note: This method is supported for families of waveforms.

Arguments

o_waveform1	The waveform for the I signal.
o_waveform2	The waveform for the Q signal.
e_sigStandard	The standard of the signal.
	Valid values: 802_11a, 802_11g_ERP, 802_11n_20M_Mix, 802_11n_20M_Legacy, 802_11n_20M_Green, 802_11n_40M_Mix, 802_11n_40M_Legacy, 802_11n_40M_Green, 802_11ac

n_tstart	The start time for the first non-zero point of the signal.
e_modulationType	The modulation type of data carriers.
n_fftSize	The points of FFT, such as 64 for 802.11a.
n_PrefixLength	The length of cyclic prefix, number of samples.
n_SymbolPeriod	The symbol period, such as 4us for long GI 802.11a.
`?packet` *n_packetLength*	The length of one packet, can be null if there is only one packet in wave.
`?modifier` *e_modifier*	The type of showing EVM value, "Percent" or "dB20".
`?skiplength` *n_skiplength*	
	Used under customer mode, time length between start and data symbol.
`?idx` *n_idx*	The index of symbol used for channel estimation.
`?getval` *g_getval*	Based on the passed boolean value it returns the following: ■ if `nil`, it returns EVM value ■ if `t`, it returns constellation waveform Default is `nil`.

Values Returned

o_waveform	The waveform object representing the EVM value computed from input waveforms.
evm_value	The EVM value if getVal() is true.
`nil`	Function call unsuccessful.

Example

```
evmOFDM(real(harmonic(v("/net9" ?result "envlp_fd") '1)) imag(harmonic(v("/net9"
?result "envlp_fd") '1)) "802_11a" 4e-06 'QAM64 64 16 4e-06 ?modifier "Percent"
?packet 0.000173)
```

Calculates the EVM value in term of percent with packet length as 173u and FFT as 64-points.

relxOption

```
relxOption(
     [ s_option1 g_optionValue1 ]....[ s_optionN g_optionValueN ]
     )
     => undefined / nil
```

Description

Enables you to specify the RelXpert options, along with values, to be used by the simulator.

Arguments

s_optionN	Name of the RelXpert option.
g_optionValueN	Value of the RelXpert option.

Value Returned

`undefined`	Undefined.
`nil`	Returns `nil` if the function is not successful.

Example

```
relxOption( 'enableRelxpert  t )
```

Enables `Relxpert`.

asiAddModelLibSelection

```
asiAddModelLibSelection(
     { o_session | o_tool }
     t_modelLibFile
     t_section
     )
     => t / nil
```

Description

Adds a model file by adding an entry to the model library file section (corresponding environment variable modelFiles) and calls asiInvalidateControlStmts.

Arguments

o_session	Name of the session.
o_tool	Name of the tool.
t_modelLibFile	Name of the model library file. If this field is blank, no model files are added.
t_section	Name of the model library file section.

Value Returned

`t`	Returns `t` if the function is successful.
`nil`	Returns `nil` if the function is not successful.

Example

```
asiAddModelLibSelection (session "/servers/cic_ade/gashish/LAB/lab/Models/
allModels.scs" ""))
```

Adds `allModels.scs` model file and adds an entry to the model library file section.

asiRemoveAllModelLibSelection

```
asiRemoveAllModelLibSelection(
     { o_session | o_tool }
     )
     => t
```

Description

Removes all the model files by setting the modelFiles variable to nil. In addition, it also invalidates the asiSendControlStmts flowchart step by calling asiInvalidateControlStmts.

Arguments

o_session	Name of the session.
o_tool	Name of the tool.

Value Returned

t	All model files deleted.

Example

```
asiRemoveAllModelLibSelection (session)
```

Removes all the model files for `session`.

17

OCEAN Script Functions

This chapter describes the functions that let you open an OCEAN script, make changes to it, and save it.

asiOpenOceanScript

```
asiOpenOceanScript(
     t_fileName
     )
     => fptr
```

Description

Opens the specified file for writing the OCEAN script. If the file exists, it asks for your permission to overwrite it.

Arguments

t_fileName	Name of the file or directory to be opened.

Value Returned

fptr	Returns the file pointer.

Example

```
asiOpenOceanScript("/usr/mnt3/user/simulation/ckt/spectre/schematic/netlist/
oceanScript")
```

Opens the file `oceanScript`.

asiWriteOceanScript

```
asiWriteOceanScript(
     p_filePointer
     o_session
     [ ?noRun g_noRun ]
     [ ?fullKey g_fullKey ]
     [ ?calledFromCorners g_calledFromCorners ]
     )
     => t / nil
```

Description

Writes the OCEAN script.

Arguments

p_filePointer	Name of the file pointer, which was opened by calling asiOpenOceanScript.
o_session	Current session.
?noRun *g_noRun*	Flag to determine if the `run()` command and any post-processing plots should be written to the OCEAN script. For example, this flag may be used with a tool that has its own `run()` command.
?fullKey *g_fullKey*	Flag to determine if the default values should be written to the OCEAN script.
?calledFromCorners	*g_calledFromCorners*
	Flag to determine whether or not the model file information is to be written to the OCEAN script generated from the Corners tool. By default, it is set to `nil`, so no model file information is written to the OCEAN script generated from the Corners tool.

Values Returned

t	Returns `t` if the OCEAN script was written successfully.
nil	Returns `nil` if there was an error.

Example

```
saveDefaultsFlag=envGetVal("asimenv.misc" "saveDefaultsToOCEAN" )
asiWriteOceanScript( fp session ?fullKey saveDefaultsFlag )
```

Writes the current session's commands to the OCEAN script if the .cdsenv variable `saveDefaultsFlag` is nil. Otherwise, writes all commands (used as well as unused) to the OCEAN script.

```
asiWriteOceanScript( fp session)
```

Writes the current session's commands to the OCEAN script.

```
asiWriteOceanScript( fp session ?noRun t)
```

Writes the OCEAN script without adding `run()` and plots to the end.

asiCloseOceanScript

```
asiCloseOceanScript(
     p_filePointer
     )
     => t / nil
```

Description

Closes the OCEAN script

Arguments

p_filePointer	File pointer to the OCEAN script file.

Value Returned

`t`	Returns `t` if successful.
`nil`	Returns `nil` otherwise.

Example

```
asiCloseOceanScript(fptr)
```

Closes the specified file.

18

Waveform Data Objects

Waveform data objects are used in simulation results manipulation and display in the Virtuoso analog design environment. In this chapter, functions are described that you can use to create, modify, and analyze these objects.

Waveform data objects are represented by the special type *srrWaveID*. Each ID uniquely identifies a waveform data object. A waveform data object has two data-vectors, the X and the Y data vector. Similar to waveform data objects, data vectors are represented by the special type *srrVecID*. Each ID uniquely identifies a data vector.

Note: SKILL functions, such as *declare()* and *makeVector()*, return a vector object, which is conceptually similar to but structurally different from the vector returned by public APIs, such as *drCreateVec()*. The former is a (SKILL) language-supported data structure. The latter is an application-supported data structure, for example, the data vector used in functions. *srrWaveXXXX* public APIs require the application-supported vector type, not the SKILL vector type or array.

Data Values

All the values in a data vector must be of the same data type. However, the X and Y vectors in a waveform data object can be of different data types.The data types and their symbolic representation that are supported for Data Vectors in SKILL are:

- ’intlong for integer numbers
- ’double for double-precision floating-point numbers
- ’doublecomplex for complex numbers
- ’string for strings

When you create a new waveform data object, you must first create the X and Y vectors with *drCreateVec*. You can use *drCreateWaveform* with the X and the Y vectors as arguments to create a waveform.

drAddElem

```
drAddElem(
     o_vec
     g_value
     )
     => t / nil
```

Description

Puts *g_value* after the last element in the data vector *o_vec*. *g_value* must have the same data type as the data vector.

Arguments

o_vec	Data vector to which a new element *g_value* will be appended.
g_value	New element to be added at end of data vector *o_vec*.

Value Returned

t	Returns t if element is added successfully.
nil	Returns nil if there is an error.

Examples

```
vec = drCreateVec('double 5)
drAddElem(vec 10.0)
```

drGetElem

```
drGetElem(
     o_vec
     x_index
     )
     => g_result
```

Description

Returns the *x_index*th element of the data vector *drVecID*, assuming a zero- based index.

Arguments

o_vec	Target data vector.
x_index	Target element of data vector *drVecID*.

Value Returned

g_result	Returns the contents of element *x_index* of data vector *o_vec*.

Example

```
vec = drCreateVec( 'double '(1 2 3 4 5))
drGetElem(vec 2)
```

drSetElem

```
drSetElem(
     o_vec
     x_index
     g_value
     )
     => t / nil
```

Description

Replaces the *x_index*th element of the data vector *o_vec* with *g_value*. *g_value* must have the same data type as the data vector.

Arguments

o_vec	Data vector to which a new element *g_value* will be appended.
x_index	The index for which the value is replaced
g_value	New element to be added at end of data vector *o_vec*.

Value Returned

`t`	Returns `t` if the element is replaced.
`nil`	Returns `nil` if there is an error.

Example

```
vec = drCreateVec('double 5)
```

drSetElem(*vec 0 10.0)*

drCreateVec

```
drCreateVec(
     s_dataType
     x_length
     )
     => o_vec / nil
```

OR

```
drCreateVec(
     s_dataType
     l_values
     )
     => o_vec / nil
```

Description

Creates a new data vector.

Arguments

s_dataType	Data type. Possible values are described in Data Values on page 747.
x_length	Length of the vector. The value of this argument must be greater than `0`.
l_values	List of values.

Value Returned

o_vec	Returns the created vector if successful.
`nil`	Returns `nil` if there is an error.

Example

```
vec = drCreateVec('double 5)
```

drCreateEmptyWaveform

```
drCreateEmptyWaveform(
      )
      => o_waveform
```

Description

Creates an empty waveform data object.

Arguments

None

Value Returned

o_waveform	Returns the waveform object created.

Example

```
drCreateEmptyWaveform()
```

drCreateWaveform

```
drCreateWaveform(
     o_xvec
     o_yvec
     )
     => o_wave
```

Description

Creates a waveform data object with the vectors specified.

Arguments

o_xvec	X vector.
o_yvec	Y vector.

Value Returned

o_wave	Returns the created waveform if successful.
`nil`	Returns `nil` if there is an error.

Example

```
wave = drCreateWaveform( drCreateVec( 'double 5 ) drCreateVec( 'double 5 ) )
```

drGetWaveformXType

```
drGetWaveformXType(
     o_wave
     )
     => s_dataType
```

Description

Returns the X vector data type of the waveform data object *o_wave*.

Arguments

o_wave	Waveform data object.

Value Returned

s_dataType	Returns the symbol indicating X vector data type as described Data Values on page 747.

Example

```
wave = drCreateWaveform( drCreateVec( 'double 5 ) drCreateVec( 'double 5 ) )
drGetWaveformXType( wave )
```

drGetWaveformXVec

```
drGetWaveformXVec(
     o_wave
     )
     => o_vec
```

Description

Returns the X vector object ID of the waveform data object *o_wave*.

Arguments

o_wave	Waveform data object.

Value Returned

o_vec	Returns the X vector object ID.

Example

```
wave = drCreateWaveform( drCreateVec( 'double 5 ) drCreateVec( 'double 5 ) )
drGetWaveformXVec( wave )
```

drGetWaveformYType

```
drGetWaveformYType(
     o_wave
     )
     => s_dataType
```

Description

Returns the Y vector data type of the waveform data object *o_wave*.

Arguments

o_wave	Waveform data object.

Value Returned

s_dataType	Returns the symbol indicating Y vector data type as described in Data Values on page 747.

Example

```
wave = drCreateWaveform( drCreateVec( 'double 5 ) drCreateVec( 'double 5 ) )
drGetWaveformYType( wave )
```

drGetWaveformYVec

```
drGetWaveformYVec(
     o_wave
     )
     => o_vec
```

Description

Returns the Y vector object ID of the waveform data object *o_wave*.

Arguments

o_wave	Waveform data object.

Value Returned

o_vec	Returns the Y vector object ID.

Example

```
wave = drCreateWaveform( drCreateVec( 'double 5 ) drCreateVec( 'double 5 ) )
drGetWaveformYVec( wave )
```

drPutWaveformXVec

```
drPutWaveformXVec(
     o_wave
     o_vec
     )
     => t / nil
```

Description

Puts the data vector `o_vec` into the waveform data object `o_wave`. `o_vec` is the X vector of the waveform data object. If the `o_wave` already contains a Y vector, the length of `o_vec` must be the same as that of the Y vector.

Arguments

o_wave	Waveform data object.
o_vec	The new X data vector.

Value Returned

`t`	Returns `t` if data vector is added successfully.
`nil`	Returns `nil` if there is an error.

Example

```
wave = drCreateEmptyWaveform()
vec = drCreateVec( 'double '(1 2 3 4 5))
drPutWaveformXVec( wave vec )
```

drPutWaveformYVec

```
drPutWaveformYVec(
     o_wave
     o_vec
     )
     => t / nil
```

Description

Puts the data vector `o_vec` into the waveform data object `o_wave`. `o_vec` is the Y vector of the waveform data object. If the `o_wave` already contains a X vector, the length of `o_vec` must be the same as that of the X vector.

Arguments

o_wave	Waveform data object.
o_vec	The new Y data vector.

Value Returned

`t`	Returns `t` if data vector is added successfully.
`nil`	Returns `nil` if there is an error.

Example

wave = drCreateEmptyWaveform()

```
vec = drCreateVec( 'double '(1 2 3 4 5))
drPutWaveformYVec( wave vec )
```

drIsDataVector

```
drIsDataVector(
     g_value
     )
     => t / nil
```

Description

Returns t when *g_value* is a valid drVector data object and `nil` if it is not one.

Arguments

g_value	Value checked.

Value Returned

`t`	Returns `t` when *g_value* is a drVector data object.
`nil`	Returns `nil` if *g_value* is not a drVector data object.

Example

```
wave = drCreateEmptyWaveform()
drIsDataVector( wave ) => nil
```

drIsParamWave

```
drIsParamWave(
     g_value
     )
     => t / nil
```

Description

Returns t when *g_value* is a family, for example a parametric wave.

Arguments

g_value	Value checked.

Value Returned

t	Returns t when *g_value* is a family.
nil	Returns nil if *g_value* is not a family.

Example

After running a Parametric Analysis, evaluate any net expression, such as:

```
fam = VT("/out")
drIsParamWave( fam ) => t

wave = drCreateEmptyWaveform()
drIsParamWave( wave ) => nil
```

drIsWaveform

```
drIsWaveform(
     g_value
     )
     => t / nil
```

Description

Returns t when *g_value* is a waveform data object and `nil` if it is a family.

Arguments

g_value	Value checked.

Value Returned

`t`	Returns `t` when *g_value* is a waveform data object.
`nil`	Returns `nil` if *g_value* is not a waveform data object.

Example

```
wave = drCreateEmptyWaveform()
drIsWaveform( wave ) => nil
```

drType

```
drType(
     o_vec
     )
     => s_type
```

Description

Returns the data type of the data vector *o_vec*.

Possible values are described Data Values on page 747.

Arguments

o_vec	The vector for which the data type is returned.

Value Returned

s_type	Returns a symbolic representation of the type of the data vector. The values are described Data Values on page 747.

Example

```
vec = drCreateVec( 'double '(1 2 3 4 5))
drType( vec )
```

drVectorLength

```
drVectorLength(
     o_vec
     )
     => x_length
```

Description

Returns the length of the data vector *o_vec*.

Arguments

o_vec	Target data vector.

Value Returned

x_length	Returns the length of data vector *o_vec*.

Examples

```
vec = drCreateVec( 'double '(1 2 3 4 5))
drVectorLength( vec )
```

famAddValue

```
famAddValue(
     o_family
     g_sweepValue
     g_value
     )
     => o_family
```

Description

Adds a waveform associated with *sweepValue* to a family if values are specified for both *sweepValue* and *value*.

Arguments

o_family	The family to receive the new value.
g_sweepValue	The sweep value with which to associate the new waveform.
g_value	The new waveform to add.

Value Returned

o_family	The modified family.

Examples

```
fam = famCreateFamily( "prf" 'double )
srrWave:17518616
famAddValue( fam -15 wave15 )
srrWave:17518616
famAddValue( fam -10 wave10 )
srrWave:17518616
famAddValue( fam -5 wave5 )
srrWave:17518616
```

famCreateFamily

```
famCreateFamily(
     s_sweepName
     s_varType
     )
     => o_family
```

Description

Creates a empty data structure called a family. When filled with data, it is suitable to be plotted plotted as a family of curves. Each waveform has a name given by *s_varName* and the values are added with famAddValue.

Arguments

s_sweepName	The string name of the sweep variable.
s_varType	One of these variable types: `'double`, `'doublecomplex`, `'float`, `'intlong`, `'signal`, `'string`. The *varType* of `'float` is equivalent to `'double` and `'signal` is equivalent to `'string`.

Value Returned

o_family	An empty family with the variable label `s_var`.

Examples

```
fam = famCreateFamily( "prf" 'double )
srrWave:17518616

famAddValue( fam -15 wave15 )
srrWave:17518616

famAddValue( fam -10 wave10 )
srrWave:17518616

famAddValue( fam -5 wave5 )
srrWave:17518616
```

famGetSweepName

```
famGetSweepName(
     o_family
     [ x_dim ]
     )
     => s_sweepName
```

Description

Returns the name of the sweep variable of the parametric waveform and the dimension supplied.

Arguments

o_family	A family name.
x_dim	An integer that specifies how deep the function should go before returning the sweep name.

Value Returned

s_sweepName	The string name of the sweep variable.

Examples

```
fam1 = famCreateFamily( "prf" 'double )
srrWave:29335584
fam2 = famCreateFamily( "prf" 'double )
srrWave:29335592
fam3 = famCreateFamily( "ofreq" 'double )
srrWave:29335600
famAddValue( fam3 999M fam1)
srrWave:29335600
famAddValue( fam3 1G fam2)
srrWave:29335600
famGetSweepName( fam3 )
"ofreq"
famGetSweepName( fam3 0 )
"ofreq"
famGetSweepName( fam3 1 )
"prf"
```

famGetSweepValues

```
famGetSweepValues(
     o_family
     )
     => l_values
```

Description

Returns the values of the sweep variable of the family specified. The returned list is sorted in increasing order.

Arguments

o_family	A family name.

Value Returned

l_values	A list of values of the sweep variable.

Examples

```
foreach( v famGetSweepValues( fam )
printf( "%L\n" v))
```

famIsFamily

```
famIsFamily(
     g_arg
     )
     => t / nil
```

Description

Checks whether the argument specified is a family with at least one waveform.

Arguments

g_arg	Any expression.

Value Returned

`t`	Returns `t` when *g_arg* is a family.
`nil`	Returns `nil` if *g_arg* is not a family.

Examples

```
famIsFamily( 3 )
nil
fam1 = famCreateFamily( "prf" 'double )
srrWave:50152744
famIsFamily( fam1 )
nil
famAddValue( fam1 -10 drCreateEmptyWaveform() )
srrWave:50152744
famIsFamily( fam1 )
t
```

famMap

```
famMap(
     s_func
     o_family
     [args ...]
     )
     => o_result
```

Description

Applies a function with a set of arguments to each member of a family of waveforms.

Arguments

s_func	A function specified as a string or symbol.
o_family	A family.

Value Returned

o_result	A family with a structure similar to the input family.

Examples

```
;; After running parametric pnoise analysis
wave1 = getData( "out" ?result 'pnoise )
srrWave:50152592
ocnPrint( wave1 )

freq (Hz)        quotient (getD      quotient (getD
prf              -10                 -9

901M             2.39482n            2.6192n
902M             2.04681n            2.1431n
903M             1.84256n            1.89187n
904M             1.75846n            1.78815n
905M             1.71612n            1.73575n
t
ocnPrint( famMap( 'quotient wave1 2.0 ))
```

```
freq (Hz)        quotient (getD      quotient (getD
prf              -10                 -9

901M             1.19741n            1.3096n
902M             1.02341n            1.0715n
903M             0.92128n            0.94594n
904M             0.87923n            0.89408n
905M             0.85806n            0.86788n
t
;; This is equivalent to ocnPrint( wave1 | 2.0 )
```

famValue

```
famValue(
     o_family
     g_sweepValue
     )
     => o_waveformOrFamily
```

Description

Returns the waveform whose *sweepName* has the value specified using *sweepValue*.

Arguments

o_family	A family of waveforms.
o_sweepValue	The value of sweep to retrieve. This must be an exact match with the value specified using famAddValue.

Value Returned

o_waveformOrFamily	The waveform or family whose sweep value was specified in the argument.

Examples

```
wave1
srrWave:29298888

wave2
srrWave:29298896

famStr = famCreateFamily( "name" 'string )
srrWave:29298920

famAddValue( famStr "one" wave1 )
srrWave:29298920

famAddValue( famStr "two" wave2 )
srrWave:29298920

famValue( famStr "one")
srrWave:29298968
;; although it is a differen waveform it is equivalent.

equal( wave1 famValue( famStr "one" ))
t

famValue( famStr "three" )
nil
```

```
famNum = famCreateFamily( "prf" 'double )
srrWave:29299008

famAddValue(famNum 1.0 wave1)
srrWave:29299008

famAddValue( famNum 2.0 wave2 )
srrWave:29299008

famValue( famNum 1.5 )
srrWave:29299056   ;; interpolated waveform is returned
```

19

Mixed Signal Simulation Functions

This chapter contains the following sections:

Simulation Functions for Direct Interfaces

asiVerilogNetlistMoreCB

```
asiVerilogNetlistMoreCB(
      )
      => t
```

Description

Displays the Verilog HNL Netlisting Option form.

Arguments

None

Value Returned

`t`	Always returns `t`.

asiGetDigitalNetlistFileName

```
asiGetDigitalNetlistFileName(
     o_session
     )
     => t_digitalNetlistFileName
```

Description

Returns the digital netlist file name.

Arguments

o_session	Simulation session object.

Value Returned

t_digitalNetlistFileName

Returns the digital netlist file name.

asiConstructDigitalNetlist

```
asiConstructDigitalNetlist(
     o_session
     )
     => t / nil
```

Description

Constructs the digital netlist file for viewing.

This file is a concatenated form of the following files :

- The template stimulus file (`testfixture.template`)
- The verimix stimulus file (`testfixture.verimix`)
- The verimix specific defines (`simOptions.verimix`)
- The part of the netlist file that defines Interface Elements and Verimix Synchronization task statements (`IE.verimix`)
- Parasitic simulation annotate definitions (annotate_msb)
- The `$save_waveform` definitions (saveDefs)
- The hierarchical netlist blocks concatenated into one file (netlist).

Arguments

o_session	Simulation session object.

Value Returned

`t`	Returns `t` if the netlist file was created.
`nil`	Returns `nil` if there was an error.

asiInitializeNetlisterMixed

```
asiInitializeNetlisterMixed(
     o_session
     )
     => t_mixedSignalDesignObject / nil
```

Description

Initializes the mixed signal netlister. Partitions the design and then calls `nlCreateDesign` to get the design object. Does not re-partition if the design has not changed since last partition.

Arguments

o_session	The OASIS session object.

Value Returned

t_mixedSignalDesignObject	
	Returns the object representing the mixed signal design if the netlister is initialized.
`nil`	Returns `nil` if there was an error.

asiNetlistMixed

```
asiNetlistMixed(
     o_session
     )
     => g_status / nil
```

Description

This method performs mixed netlisting. It creates a formatter object with `nlCreateFormatter`, after which the netlister is run and a netlist is generated with `nlNetlist`.

This routine is called by asiNetlist . You should not make a direct call to this routine.

Arguments

o_session	Simulation session object.

Value Returned

g_status	Returns a DPL of file names created by the netlister if successful.
`nil`	Returns `nil` if there was an error.

asiGetVerilogCommandLineOption

```
asiGetVerilogCommandLineOption(
     o_session
     )
     => t_verilogCommandLineOption
```

Description

Returns the verilog simulator command line options.

Arguments

o_session	Simulation session object.

Value Returned

t_verilogCommandLineOption

Returns the command line options for the verilog simulator with mixed mode capability.

asiGetDigitalCommandLineOption

```
asiGetDigitalCommandLineOption(
     o_session
     )
     => t_digitalCommandLineOption
```

Description

Returns the digital part of the mixed simulation command line options.

Arguments

o_session	Simulation session object.

Value Returned

t_digitalCommandLineOption

Returns the digital part of the mixed simulation command line options.

asiPrepareDigitalSimulation

```
asiPrepareDigitalSimulation(
    o_session
    )
    => t / nil
```

Description

Performs digital run directory clean up. It removes the file that stores the exit code for any previous digital simulation and cleans up the digital simulator old log file.

Arguments

o_session	Simulation session object.

Value Returned

`t`	Returns t if the old log files are deleted.
`nil`	Returns `nil` if there was an error.

asiCheckDigitalSimulationSuccess

```
asiCheckDigitalSimulationSuccess(
    o_session
    )
    => t / nil
```

Description

Reports the success or failure of the simulation by looking at the digital simulator status file. Further, if no digital signals are saved by the user, this routine updates the `logFileVerilog` file to indicate that no digital waveforms are available for viewing.

Arguments

o_session	Simulation session object.

Value Returned

`t`	Returns `t` if the simulation was successful.
`nil`	Returns `nil` if there was an error.

Simulation Functions for Direct and Socket Interfaces

asiGetNetworkId

```
asiGetNetworkId(
    o_session
    )
    => o_networkId
```

Description

Returns the network ID of a mixed signal design.

Arguments

o_session	Simulation session object.

Value Returned

o_networkId	The network Id of the mixed signal design

asiGetDigitalStimulusFileName

```
asiGetDigitalStimulusFileName(
     o_session
     )
     => t_digitalStimulusFileName
```

Description

Returns the digital stimulus file name. This file name is the concatenated path string of the digital netlist run directory followed by `testfixture.verimix`.

Arguments

o_session	Simulation session object.

Value Returned

t_digitalStimulusFileName

Returns the full path of the digital stimulus file name.

asiEditDigitalStimulus

```
asiEditDigitalStimulus(
     o_session
     )
     => o_childId / nil
```

Description

This method edits the digital stimulus file. It gets the full path to the stimulus file by calling `asiGetDigitalStimulusFileName`. If the stimulus file does not exist, the `asiNetlist` flowchart step is executed to run the netlister and create a digital stimulus file. Finally the stimulus file is opened in an editor.

Arguments

o_session	The OASIS session object.

Value Returned

o_childId	Returns the handle on the child editor process.
`nil`	Returns `nil` if there was an error.

Example

```
asiInitializeNetlisterMixed( session )
```

asiPartitionDesign

```
asiPartitionDesign(
     o_session
     )
     => t / nil
```

Description

This method partitions a mixed signal design into analog and digital parts.

Arguments

o_session	Simulation session object.

Value Returned

`t`	Returns `t` if the design is successfully partitioned.
`nil`	Returns `nil` if there was an error.

Example

```
asiNetlistMixed( session )
```

asiGetDigitalSimulatorLogFileName

```
asiGetDigitalSimulatorLogFileName(
     o_session
     )
     => t_verilogLogFileName
```

Description

design.

Arguments

o_session	Simulation session object.

Value Returned

t_verilogLogFileName	Returns the digital simulator log file name.

asiGetDigitalSimExecName

```
asiGetDigitalSimExecName(
    o_session
    )
    => t_digitalSimExecName
```

Description

Displays the verimix executable name.

Arguments

o_session	Simulation session object.

Value Returned

t_digitalSimExecName	Returns the name of the digital simulator executable.

asiSetVerilogHost

```
asiSetVerilogHost(
    o_session
    t_host
    )
    => t_digitalSimulatorHostName
```

Description

Sets the digital simulator host name for mixed signal simulation.

Arguments

o_session	Simulation session object.
t_host	Name of the host on which you want to run the digital simulator.

Value Returned

t_digitalSimulatorHostName

Returns the name of the host on which you want to run the digital simulator.

asiSetVerilogHostMode

```
asiSetVerilogHostMode(
     o_session
     t_hostMode
     )
     => t_digitalSimulatorHostMode
```

Description

Specifies whether the digital simulator will run locally or on a remote host. If you specify `remote`, you must specify the host name by using the `asiSetVerilogHost` command.

Arguments

o_session	Simulation session object.
t_hostMode	Should be specified as either `local` or `remote`.

Value Returned

t_digitalSimulatorHostMode

Returns the digital Simulator host mode for mixed signal simulation.

asiGetVerilogHost

```
asiGetVerilogHost(
     o_session
     )
     => t_digitalSimulatorHostName
```

Description

Returns the digital simulator host name for mixed signal simulation. This method first verifies if host name was set using *asiSetVerilogHost*. If yes, it returns that host name. Otherwise, it returns the default value of digitalHost in the `.cdsenv` file for tool asimenv and partition startup.

Arguments

o_session	Simulation session object.

Value Returned

t_digitalSimulatorHostName	Name of the host on which the digital simulator will be run.

asiGetVerilogHostMode

```
asiGetVerilogHostMode(
     o_session
     )
     => t_digitalSimulatorHostMode
```

Description

Returns the digital simulator host mode for mixed signal simulation. This method first verifies if host mode was set using `asiSetVerilogHostMode`. If yes, it returns that mode. Otherwise, it returns the default value of `digitalHostMode` in the `.cdsenv` file for tool asimenv and partition startup.

Arguments

o_session	Simulation session object.

Value Returned

t_digitalSimulatorHostMode

Returns the digital Simulator host mode for mixed signal simulation.

asiGetAnalogRunDir

```
asiGetAnalogRunDir(
     o_session
     )
     => t_AnalogSimulatorRunDir
```

Description

Returns the analog simulator run directory.

Arguments

o_session	Simulation session object.

Value Returned

t_AnalogSimulatorRunDir

Analog simulator run directory.

asiGetDigitalRunDir

```
asiGetDigitalRunDir(
    o_session
    )
    => t_DigitalSimulatorRunDir
```

Description

Returns the digital simulator run directory.

Arguments

o_session	Simulation session object.

Value Returned

t_AnalogSimulatorRunDir

Returns the digital simulator run directory.

asiGetAnalogKeepList

```
asiGetAnalogKeepList(
     o_session
     )
     => l_AnalogSignalDescriptionList
```

Description

Returns the list of user-selected output signals that are analog. This method first checks if the current simulation session is mixed signal. If yes, then it returns all the user-selected output signals within the analog partition of the mixed signal design. Otherwise, it calls `asiGetKeepList` to get the list of signals and currents to be saved during simulation.

Arguments

o_session	Simulation session object.

Value Returned

l_AnalogSignalDescriptionList

	Returns the list of analog signals to be saved during simulation.
`nil`	Returns `nil` if no signals were specified to be kept during simulation.

asiGetDigitalKeepList

```
asiGetDigitalKeepList(
     o_session
     )
     => l_DigitalSignalDescriptionList
```

Description

Returns the list of user-selected output signals that are digital.

Arguments

o_session	Simulation session object.

Value Returned

l_DigitalSignalDescriptionList	
	Returns the list of digital signals to be saved during simulation.
`nil`	Returns `nil` if no signals were specified to be kept during simulation.

asiInitMixedKeepOption

```
asiInitMixedKeepOption(
     o_tool
     )
     => t
```

Description

Initializes the mixed signal keep options variables.

Arguments

o_tool	Tool

Values Returned

`t`	Success

Example

```
asiInitMixedKeepOption(asiGetTool('spectreSVerilog))
```

asiInitVerilog

```
asiInitVerilog(
     o_tool
     )
     => t
```

Description

Initializes the verilog tool.

Arguments

o_tool	Tool

Values Returned

t	Success

Example

```
asiInitVerilog(asiGetTool('spectreVerilog))
```

asiInitVerilogEnvOption

```
asiInitVerilogEnvOption(
     o_tool
     )
     => t
```

Description

Initializes the base Verilog environment options.

Arguments

o_tool	Tool

Values Returned

`t`	Success.

Example

```
asiInitVerilogEnvOption(asiGetTool('spectreSVerilog))
```

asiInitVerilogFNLEnvOption

```
asiInitVerilogFNLEnvOption(
     o_tool
     )
     => t
```

Description

Initializes the Verilog FNL netlisting options.

Arguments

o_tool	Tool

Values Returned

t	Success.

Example

```
asiInitVerilogFNLEnvOption(asiGetTool('spectreVerilog))
```

asiInitVerilogHNLEnvOption

```
asiInitVerilogHNLEnvOption(
     o_tool
     )
     => t
```

Description

Initializes the Verilog HNL netlisting options.

Arguments

o_tool	Tool

Values Returned

`t`	Success.

Example

```
asiInitVerilogHNLEnvOption(asiGetTool('spectreSVerilog))
```

asiInitVerilogSimOption

```
asiInitVerilogSimOption(
     o_tool
     )
     => t
```

Description

Initializes the simulation options for verilog.

Arguments

o_tool	Tool

Values Returned

t	Success.

Example

```
asiInitVerilogSimOption(asiGetTool(’spectreSVerilog))
```

asiSetAnalogSimulator

```
asiSetAnalogSimulator(
     o_tool
     s_analogSimulator
     )
     => s_analogSimulator
```

Description

Sets the analog simulator.

Arguments

o_tool	Tool
s_analogSimulator	Analog simulator name

Values Returned

s_analogSimulator	Analog simulator name that has been set

Example

```
asiSetAnalogSimulator( asiGetTool('spectreSVerilog) 'spectre )
```

asiSetDigitalSimulator

```
asiSetDigitalSimulator(
     o_tool
     s_digitalSimulator
     )
     => s_digitalSimulator
```

Description

Sets the digital simulator.

Arguments

o_tool	Tool
s_digitalSimulator	Digital simulator name

Values Returned

s_digitalSimulator	Digital simulator name that has been set

Example

```
asiSetDigitalSimulator( asiGetTool('spectreSVerilog) 'verilog )
```

mspDisplaySetPartSetupForm

```
mspDisplaySetPartSetupForm(
     )
     => t / nil
```

Description

This function displays the Partitions Options form, which can be used to edit and set the values for the Analog Stop View Set and Digital Stop View Set.

Arguments

None

Values Returned

`t`	Success
`nil`	Failure

Example

```
mspDisplaySetPartSetupForm()
```

mspEditIEProps

```
mspEditIEProps(
     t_objectType
     )
     => t / nil
```

Description

This is the main entry procedure for the Interface Element property editor. It takes an object type. The object type can be one of instTerm, instance, terminal, cellView, lib or default. This function first calls a selection function appropriate for the object type which prompts the user to select an object. When the object has been selected, the selection function will execute its callback. An exception to this is that for lib and default objectType values, no selection functions are called. Next, the IE model property editor is called to create a parameter entry form for the current ieModel. The callbacks to this form will attach properties to the object selected earlier.

Arguments

t_objectType	object type

Values Returned

`t`	Success **Note:** This value is returned immediately after the function is called denoting that the function has completed execution. The function does not wait for the actions mentioned in the description to complete. It is only responsible for invoking the selection function which generates the callback action and subsequent updation of properties is needed.

Example

```
mspEditIEProps("cellView")
```

Functions for Formatting Hierarchical Interface Elements

Formatting for pmos, rpmos, nmos, or rnmos Gates

It is not necessary to write these functions unless the default definition suffices.

hnlVerilogPrintNmosPmos

```
hnlVerilogPrintNmosPmos(
     t_name
     )
     => t
```

Description

Used by netlister to print `pmos`, `rpmos`, `nmos`, or `rnmos` gates.

Arguments

t_name	The name of the gate. Valid values are `pmos rpmos nmos` and `rnmos`.

Value Returned

`t`

Formatting for cmos and rcmos Gates

It is not necessary to write these functions unless the default definition suffices.

hnlVerilogPrintCmos

```
hnlVerilogPrintCmos(
     t_name
     )
     => t
```

Description

Used by netlister to print `cmos`, `rcmos` gates.

Arguments

t_name	The name of the gate. Valid values are `cmos`, `rcmos.`

Value Returned

`t`

nlGetCdf

```
nlGetCdf(
     o_inst
     )
     => o_cdfId
```

Description

Obtains the CDF information of the IE cell. CDF information contains the default IE parameter, default IE macro model file name and parameter mapping from CDF to simulator specific names.

Arguments

o_inst	The IE object (nlIEInstance)

Values Returned

o_cdfId	CDF data of the IE cell

Example

```
spectreSimInfo = nlGetCdf(ie_inst)->simInfo->spectre
```

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Sev Functions

The sev functions are used by the Virtuoso Analog Simulation Environment to build and maintain the information and interfaces used by the environment. Most of these functions require the `session` argument. You can obtain this argument by using the `sevSession`() function or by calling these functions from a `.menus` file.

sevGetSessionType

```
sevGetSessionType(
     t_session
     )
     => t_toolName
```

Description

Returns the name of the tool associated with the given session.

Arguments

t_session	The simulation environment session.

Value Returned

t_toolName	Returns the name of the tool in which the given session is open.
	Possible values: `adel`, `adexl`, `explorer`, and `assembler`.
`nil`	Returns `nil` if there is an error.

Example

```
sevGetSessionType('sevSession1)
=>assembler
```

The function returns the name of the tool in which the session `session1` is open.

sevSetMainWindowPulldownMenus

```
sevSetMainWindowPulldownMenus(
     l_menus
     )
     => t / nil
```

Description

Sets the menus for the Virtuoso Analog Simulation Environment window.

Arguments

l_menus	The list of menu names

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSetMTSMode

```
sevSetMTSMode(
     o_session
     g_mtsMode
     [g_noPopups ]
     )
     => t / nil
```

Description

Enables or disables the MTS mode.

Arguments

o_session	The simulation environment session object.
g_mtsMode	Enables or disables the MTS mode.
g_noPopups	Controls whether the function pops up a warning message or not when the config view is in edit mode.

Value Returned

t	When the MTS mode is set.
nil	When the MTS mode setting is unsuccessful.

Example

```
sess = (axlGetWindowSession (hiGetCurrentWindow))
sdb = (axlGetMainSetupDB sess)
(foreach testname (cadr (axlGetTests sdb) )
     (printf "Test %s\n" testname)
     sevsess = (axlGetToolSession sess testname)
     mtsmode = (sevMTSMode sevsess)
     (printf "\tMTS mode = %L\n" mtsmode)
     ;Example settng MTS mode t
     (unless mtsmode
          (sevSetMTSMode sevsess t)
     )
)
```

sevMTSMode

```
sevMTSMode(
    o_session
    )
    => t / nil
```

Description

Returns the status of the MTS mode.

Arguments

o_session	The simulation environment session object.

Value Returned

t	When the MTS mode is enabled.
nil	When the MTS mode is disabled.

sevMTSOptions

```
sevMTSOptions(
    o_session
    )
    => t / nil
```

Description

Invokes the MTS option form if MTS mode is enabled. A dialog box appears if the MTS option is disabled.

Arguments

o_session	The simulation environment session object.

Value Returned

`t`	Displays the MTS options form.
`nil`	Does not display the MTS options form.

sevOpenXterm

```
sevOpenXterm(
     t_dirPath
     )
     => t / nil
```

Description

Opens an terminal window at the given path.

Arguments

t_dirPath	The absolute path to which the terminal window should open.

Value Returned

`t`	Returns `t` if terminal window opens.
`nil`	Returns `nil` if the path is not accessible.

Example

The following example opens the terminal window in the `/home/user/debugPath` directory:

```
dirPath = "/home/user/debugPath"
(sevOpenXterm dirPath)
=> t
```

sevSetSchematicPulldownMenus

```
sevSetSchematicPulldownMenus(
     l_menus
     )
     => t / nil
```

Description

Sets the simulation menus on the schematic window.

Arguments

l_menus	The list of menu entries

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSetTypeInWindowPulldownMenus

```
sevSetTypeInWindowPulldownMenus(
    l_menus
    )
    => t / nil
```

Description

Sets the menu on the simulator type in window.

Arguments

l_menus	The list of menu entries

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSetMenuItemLists

```
sevSetMenuItemLists(
     l_lists
     )
     => t / nil
```

Description

Creates the menu item lists.

Arguments

l_lists	The list of menu entries

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevAddMenuItemLists

```
sevAddMenuItemLists(
     l_lists
     )
     => t / nil
```

Description

Adds menu items to an existing menu item list.

Arguments

l_lists	The list of menu entries

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevDirectPlotMenu

```
sevDirectPlotMenu(
     t_session
     l_items
     )
     => t / nil
```

Description

Creates the direct plot menu item list.

Arguments

t_session	The simulation environment session.
l_items	The list of menu entries.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevEnvironment

```
sevEnvironment(
     t_session
     )
     => o_session / nil
```

Description

Displays the Oasis session object tied to the simulation environment session.

Arguments

t_session	The simulation environment session.

Value Returned

o_session	Returns the Oasis session object
nil	Returns `nil` if there is no Oasis session object currently tied to the simulation environment.

sevNoEnvironment

```
sevNoEnvironment(
     t_session
     )
     => t / nil
```

Description

Indicates whether an Oasis environment is tied to the simulation environment.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSaveState

```
sevSaveState(
    t_session
    )
    => t / nil
```

Description

Displays the *Saving State* form that lets you save the current state of the simulation environment.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevLoadState

```
sevLoadState(
    t_session
    )
    => t / nil
```

Description

Displays the *Loading State* form that lets you load a saved state into the current simulation environment.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSaveOceanScript

```
sevSaveOceanScript(
    t_session
    )
    => t / nil
```

Description

Displays the Save Ocean Script to File form that lets you save an Ocean script that will regenerate the current session to the specified file.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevEditOptions

```
sevEditOptions(
     t_session
     )
     => t / nil
```

Description

Displays the Editing Session Options form that lets you edit the options for the given simulation environment session.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevOpenSchematic

```
sevOpenSchematic(
    t_session
    )
    => t / nil
```

Description

Displays a schematic window for the design that is tied to the simulation environment.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevMenuItems

```
sevMenuItems(
    t_session
    t_name
    )
    => t / nil
```

Description

Displays the menu item list that corresponds to the named menu item.

Arguments

t_session	The simulation environment session.
t_name	The name of menu item from the menu item list.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevReset

```
sevReset(
     t_session
     )
     => t / nil
```

Description

Resets the simulation environment session to its default values.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevQuit

```
sevQuit(
    t_session
    )
    => t / nil
```

Description

Quits the simulation session.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevCreateMainWindow

```
sevCreateMainWindow(
    t_session
    )
    => t / nil
```

Description

Creates the main simulation environment window.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevChooseSimulator

```
sevChooseSimulator(
    t_session
    [ g_disableProjectDir ]
    )
    => t / nil
```

Description

Displays the Choosing Simulator/Directory/Host form that lets you choose the simulator you want to use, the run directory, and the host machine.

Arguments

t_session	The simulation environment session.
g_disableProjectDir	Optional argument that disables the *Project Directory* field in the Choosing Simulator/Directory/Host form. Valid Values: `t`, disables the *Project Directory* field; `nil`, enables the *Project Directory* field. Default value: `nil`

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevChooseTemperature

```
sevChooseTemperature(
     t_session
     )
     => t / nil
```

Description

Displays the Setting Temperature form that lets you set the simulation temperature.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevMpuTool

```
sevMpuTool(
    t_session
    )
    => t / nil
```

Description

Displays the Setting Model Path form that lets you select the paths to the model files.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns `t` if the call is successful.
nil	Returns `nil` if the call is unsuccessful.

sevChooseEnvironmentOptions

```
sevChooseEnvironmentOptions(
     t_session
     )
     => t / nil
```

Description

Displays the Environment Options form that lets you select the environment options for the simulation environment session.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevEditStimulus

```
sevEditStimulus(
     t_session
     t_type
     )
     => t / nil
```

Description

Displays the specified stimulus in a window for editing.

Arguments

t_session	The simulation environment session.
t_type	The type of stimulus - `analog` or `digital`.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNonMixedSignal

```
sevNonMixedSignal(
    t_session
    )
    => t / nil
```

Description

Indicates whether the session is running a mixed signal simulation.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the session is running mixed signal simulation.
`nil`	Returns `nil` if the session is running analog simulation.

sevEditSimulationFile

```
sevEditSimulationFile(
     t_session
     t_type
     )
     => t / nil
```

Description

Displays the specified file in a window for editing.

Arguments

t_session	The simulation environment session.
t_type	The type of simulation file to edit - `include`, `model`, or `stimulus`.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevChooseDesign

```
sevChooseDesign(
    t_session
    )
    => t / nil
```

Description

Displays the Choosing Design form that lets you select the design to simulate.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns `t` if the call is successful.
nil	Returns `nil` if the call is unsuccessful.

sevEditSelectedAnas

```
sevEditSelectedAnas(
     t_session
     )
     => t / nil
```

Description

Displays the Choosing Analyses form that lets you select and edit the analyses.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns `t` if the call is successful.
nil	Returns `nil` if the call is unsuccessful.

sevEditSelectedVars

```
sevEditSelectedVars(
    t_session
    )
    => t / nil
```

Description

Displays the Editing Design Variables form that lets you edit the simulation variables and their values.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevEditSelectedOuts

```
sevEditSelectedOuts(
    t_session
    )
    => t / nil
```

Description

Displays the Setting Outputs form that lets you edit the simulation outputs.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevChangeOutsOnSchematic

```
sevChangeOutsOnSchematic(
     t_session
     t_setType
     [ ?selectionMode selectionMode ]
     )
     => t / nil
```

Description

Sets up for selection of selected output types from the schematic.

Arguments

t_session	The simulation environment session.
t_setType	The type of outputs to change - `save`, `march`, or `plot`.
`?selectionMode` *selectionMode*	The selection mode for selecting outputs.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSaveOptions

```
sevSaveOptions(
    t_session
    )
    => t / nil
```

Description

Displays the Save Options form that lets you select what voltages and currents should be automatically saved in the simulation.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevDeleteSelectedAnas

```
sevDeleteSelectedAnas(
    t_session
    )
    => t / nil
```

Description

Deletes the analyses that are currently selected in the Analysis listbox.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns `t` if the call is successful.
nil	Returns `nil` if the call is unsuccessful.

sevNoAnaSelections

```
sevNoAnaSelections(
    t_session
    )
    => t / nil
```

Description

Indicates whether any analyses are selected in the Analysis listbox.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if no analyses are selected in the analysis listbox.
`nil`	Returns `nil` if there are analyses selected in the analysis listbox.

sevActivateSelectedAnas

```
sevActivateSelectedAnas(
    t_session
    g_active
    )
    => t / nil
```

Description

Enables or disables the selected analyses.

Arguments

t_session	The simulation environment session.
g_active	Boolean (`t` / `nil`) to either activate or deactivate the selected analyses.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevDeleteSelectedVars

```
sevDeleteSelectedVars(
     t_session
     )
     => t / nil
```

Description

Deletes any variables that are selected in the Variables listbox.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns `t` if the call is successful.
nil	Returns `nil` if the call is unsuccessful.

sevNoVarSelections

```
sevNoVarSelections(
     t_session
     )
     => t / nil
```

Description

Indicates whether any variables are selected in the Variables listbox.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if no variables are selected in the Variables listbox.
`nil`	Returns `nil` if variables are selected in the Variables listbox.

sevFindSelectedVars

```
sevFindSelectedVars(
     t_session
     )
     => t / nil
```

Description

Highlights the device on the schematic where the selected variable is used.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevCopyCellViewVariables

```
sevCopyCellViewVariables(
     t_session
     )
     => t / nil
```

Description

Copies the cell view variables and their values into the simulation environment.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevCopyVariablesToCellView

```
sevCopyVariablesToCellView(
     t_session
     )
     => t / nil
```

Description

Copies the simulation session variables and their values into the cellview.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevDeleteSelectedOuts

```
sevDeleteSelectedOuts(
     t_session
     @optional l_listbox
     )
     => t / nil
```

Description

Deletes the selected items from the outputs list box.

Arguments

t_session	The simulation environment session.
l_listbox	List of items to be deleted from the outputs list box.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevExportOutputsToTxt

```
sevExportOutputsToTxt(
    t_session
    )
    => t / nil
```

Description

Exports the outputs specified in the Output listbox to a text file. This text file can be edited and imported back to ADE.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevImportOutputsFromTxt

```
sevImportOutputsFromTxt(
    t_session
    )
    => t / nil
```

Description

Imports the outputs saved in a text file to the output list box in the main ADE window.

Note: Ensure that you retain the format of the file as it was exported from ADE Output list box using *sevExportOutputsToTxt().*

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevExportOutputsToCSV

```
sevExportOutputsToCSV(
    t_sevSession
    )
    => t / nil
```

Description

Exports the outputs specified in the ADE setup to the CSV file.

Arguments

t_sevSession	The simulation environment session. For more information, refer to *sevSession*.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

Example

```
sevExportOutputsToCSV(sevSession)
=> t
```

sevExportOutputsToFile

```
sevExportOutputsToFile(
     t_sevSession
     )
     => t / nil
```

Description

Exports the output from the ADE setup to the text or CSV file, which is specified by the .cdsenv variable `outputsImportExportVersion`. If the value of `outputsImportExportVersion` variable is greater than `1.0`, then the function generates the output to the CSV file, else it generates the output to the text file.

Note: You can set the value of the .cdsenv variable `outputsImportExportVersion` using the command: `asimenv.misc outputsImportExportVersion float value`.

Arguments

t_sevSession	The simulation environment session. For more information, refer to *sevSession*.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

Example

```
envSetVal("asimenv.misc" "outputsImportExportVersion" 'float 1.1)
sevExportOutputsToFile(sevSession)
=> t
```

Generates the CSV file with the outputs specified in the ADE L session `sevSession`.

sevImportOutputsFromCSV

```
sevImportOutputsFromCSV(
    t_sevSession
    )
    => t / nil
```

Description

Imports the outputs from the CSV file to the ADE setup.

Arguments

t_sevSession	The simulation environment session. For more information, refer to *sevSession*.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

Example

```
sevImportOutputsFromCSV(sevSession)
=> t
```

sevImportOutputsFromFile

```
sevImportOutputsFromFile(
     t_sevSession
     )
     => t / nil
```

Description

Imports the output to the ADE setup from the text or CSV file, which is specified by the .cdsenv variable `outputsImportExportVersion`. If the value of `outputsImportExportVersion` variable is greater than `1.0`, then the function imports the outputs from the CSV file, else it imports the outputs from the text file.

Note: You can set the value of the .cdsenv variable `outputsImportExportVersion` using the command: `asimenv.misc outputsImportExportVersion float value`.

Arguments

t_sevSession	The simulation environment session. For more information, refer to *sevSession*.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

Example

```
envSetVal("asimenv.misc" "outputsImportExportVersion" 'float 1.1)
sevImportOutputsFromFile(sevSession)
=> t
```

Import outputs from the CSV file in the ADE L session `sevSession`.

sevNoOutSelections

```
sevNoOutSelections(
     t_session
     )
     => t / nil
```

Description

Indicates whether any output is selected in the Outputs listbox.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if no outputs are selected.
`nil`	Returns `nil` if an output is selected.

sevRemovePlotWindow

```
sevRemovePlotWindow(
     t_session
     w_windowID
     )
     => l_plotWindows / nil
```

Description

Removes the specified plot window from the list of plot windows owned by the given simulation environment session.

Arguments

t_session	The simulation environment session.
w_windowID	Window ID of a plot window owned by the given session.

Value Returned

l_plotWindows	Returns a list of remaining plot window IDs owned by the given session.
nil	Returns `nil` if there is an error.

sevSetPropertyForSelectedOuts

```
sevSetPropertyForSelectedOuts(
     t_session
     t_property
     g_value
     )
     => t / nil
```

Description

Sets the property to the specified value on the selected outputs.

Arguments

t_session	The simulation environment session.
t_property	The property name to set on the selected outputs.
g_value	The value to set the property to.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevSimulator

```
sevSimulator(
     t_session
     )
     => t_simulatorName
```

Description

Displays the name of the simulator used in the session as a string.

Arguments

t_session	The simulation environment session.

Value Returned

t_simulatorName	Returns the name of the simulator in the session.

sevRunEngine

```
sevRunEngine(
     t_session
     )
     => t / nil
```

Description

Runs a simulation from the simulation environment session.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevStopEngine

```
sevStopEngine(
     t_session
     )
     => t / nil
```

Description

Stops the currently running simulation that is tied to the session.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevIsContinuable

```
sevIsContinuable(
     t_session
     )
     => t / nil
```

Description

Indicates whether the currently run simulation can be continued from its stopping point.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSetEngineOptions

```
sevSetEngineOptions(
     t_session
     t_type
     )
     => t / nil
```

Description

Displays the Engine Options form for the selected type for editing.

Arguments

t_session	The simulation environment session.
t_type	The type of engine options to edit.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNetlistFile

```
sevNetlistFile(
     t_session
     t_type
     )
     => t / nil
```

Description

Creates the selected type of netlist file.

Arguments

t_session	The simulation environment session.
t_type	The type of netlist file to create. For socket netlisting, you may choose between `createRaw`, `displayRaw`, `createFinal`, or `displayFinal`. For direct netlisting, the options are `create`, `display`, and `recreate`.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevOpenEncap

```
sevOpenEncap(
     t_session
     )
     => t / nil
```

Description

Opens the command type in window that lets you enter commands directly to the simulator.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevViewSimulatorOutput

```
sevViewSimulatorOutput(
     t_session
     )
     => t / nil
```

Description

Displays the simulation output log.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNoOutputLog

```
sevNoOutputLog(
     t_session
     )
     => t / nil
```

Description

Indicates whether the simulation output log exists.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Return `t` if no simulation output log exists.
`nil`	Returns `nil` if the simulation output log does exist.

sevConvergence

```
sevConvergence(
     t_session
     t_type
     )
     => t / nil
```

Description

Displays the form for setting up the selected type of convergence aid.

Arguments

t_session	The simulation environment session.
t_type	The type of convergence aid to set up. The value can be any of these: `'storeRestore`, `'transientStoreRestore`, `'nodeSet`, `'initialCondition`, or `'forceNode`.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNoResults

```
sevNoResults(
     t_session
     @optional t_type
     )
     => t / nil
```

Description

Indicates whether the specified results exist.

Arguments

t_session	The simulation environment session.
t_type	The type of results to check for. The type of results to check existence of. The values can be any of these: `'dc`, `'dc_op`, `'dc_sens`, `'dc_op_sens`, `'ac`, `'ac_sens`, `'noise`, `'tran`, `'tran_op`, `'tran_ic`, `'tran_sens`, `'xf`, `'sparam`, `'spss.td.pss`, `'spss.fd.pss`, `'td.pss`, `'td.envlp`, `'tran.pss`, `'fd.pss`, `'fd.envlp`, `'fd.pdisto`, `'fi.pdisto`, `'tdr`, `'hb`, `'four`, `'disto`, `'model`, `'instance`, `'output`, `'design_variables`, `'summary`, `'hb_noise`, `'osc`.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNoPlottableOutputs

```
sevNoPlottableOutputs(
     t_session
     )
     => t / nil
```

Description

Indicates whether there are any plottable outputs.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if there are no plottable expressions.
`nil`	Returns `nil` if there are plottable expressions.

sevCircuitCond

```
sevCircuitCond(
     t_session
     )
     => t / nil
```

Description

Displays the Circuit Conditions form that lets you set or display any special circuit conditions.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNoDesign

```
sevNoDesign(
     t_session
     )
     => t / nil
```

Description

Indicates whether a design is tied to the simulation environment.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns `t` if the call is successful.
nil	Returns `nil` if the call is unsuccessful.

sevSetSimDataDir

```
sevSetSimDataDir(
     t_session
     t_dir
     )
     => t / nil
```

Description

Loads the results for the specified simulation environment session and results directory.

Arguments

t_session	The simulation environment session.
t_dir	The complete path of the results directory where the data is stored. The path should include the name of the results directory.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

Example

```
sevSetSimDataDir( ’sevSession1 “~/simulation/ampTest/spectre/myResults” )
=> t
```

Loads the results from the results directory, `myResults`, at the path `~/simulation/ampTest/spectre` for the `sevSession1` session.

sevSaveResults

```
sevSaveResults(
     t_session
     )
     => t / nil
```

Description

Displays the *Save Results* form that lets you save the current results.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSelectResults

```
sevSelectResults(
     t_session
     )
     => t / nil
```

Description

Displays the *Select Results* form that lets you select and load a previously saved set of results.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevDeleteResults

```
sevDeleteResults(
     t_session
     )
     => t / nil
```

Description

Displays the Delete Results form that lets you delete a set of previously saved results.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevEditPlottingOptions

```
sevEditPlottingOptions(
     t_session
     )
     => t / nil
```

Description

Displays the *Setting Plotting Options* form that lets you edit the plotting and printing options.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevPlotAllOutputs

```
sevPlotAllOutputs(
    t_session
    )
    => t / nil
```

Description

Plots all enabled plottable outputs.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNoPlottableSignals

```
sevNoPlottableSignals(
     t_session
     )
     => t / nil
```

Description

Indicates whether there are any plottable outputs.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevPlotSignals

```
sevPlotSignals(
     t_session
     t_type
     [ ?disableRedraw g_disableRedraw ]
     )
     => t / nil
```

Description

Plots the speacified type of signals that exist as outputs.

Arguments

t_session	The simulation environment session.
t_type	The type of signals to plot. The value can be any of these: `'tran`, `'ac`, `'dc`, or `'noise`.
`?disableRedraw` *g_disableRedraw*	
	Flag to disable redraw of plots.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevEvaluateAndPlotExpressions

```
sevEvaluateAndPlotExpressions(
     t_session
     )
     => t / nil
```

Description

Evaluates and plots all the output expressions.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNoPlottableExpressions

```
sevNoPlottableExpressions(
     t_session
     )
     => t / nil
```

Description

Indicates whether there are any plottable expressions.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevPrintResults

```
sevPrintResults(
     t_session
     t_type
     )
     => t / nil
```

Description

Displays the Print Results form that lets you print the selected type of simulation results.

Arguments

t_session	The simulation environment session.
t_type	The type of results to print. The value can be any of these: `'dcOpPoints`, `'tranOpPoints`, `'modelParameters`, `'sensitivities`, `'noiseParameters`, `'noiseSummary`, `'dcNodeVoltages`, `or` `'tranNodeVoltages`.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevRetrieveFromEffectiveCDF

```
sevRetrieveFromEffectiveCDF(
     t_sevSession
     )
     => t / nil
```

Description

Retrieves data from the effective CDF. This function should be used before the `sevAnnotateResults` function.

Arguments

t_sevSession	The simulation environment session. For more information, see *sevSession*.

Value Returned

t	Returns `t` if the function call is successful.
nil	Returns `nil` if there is an error.

Example

The following example calls the `sevRetrieveFromEffectiveCDF` function to retrieve the data from the effective CDF and then calls `sevAnnotationResults` function to annotate the selected results.

```
cellId = ddGetObj( "analogLib" "res" )
opPointLabels="v i"
cdfId=cdfCreateUserCellCDF( cellId )
cdfId->opPointLabelSet = opPointLabels
sevRetrieveFromEffectiveCDF(sevSession(hiGetCurrentWindow()))
sevAnnotateResults( sevSession(hiGetCurrentWindow()) 'dcOpPoints)
```

sevAnnotateResults

```
sevAnnotateResults(
     t_session
     t_type
     )
     => t / nil
```

Description

Annotates the selected results to the schematic window.

Arguments

t_session	The simulation environment session.
t_type	The type of results to annotate to the schematic. The value can be any of these: `'componentParameters`, `'modelParameters`, `'dcOpPoints`, `'tranOpPoints`, `'netNames`, `'dcNodeVoltages`, `'tranNodeVoltages`, `'defaults`, `'dcTermCurrents`, `'tranTermCurrents`, `'pinNames`, or `'voltageLevels`.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

Example

The following example calls the `sevRetrieveFromEffectiveCDF` function to retrieve the data from the effective CDF and then calls `sevAnnotationResults` function to annotate the selected results.

```
cellId = ddGetObj( "analogLib" "res" )
opPointLabels="v i"
cdfId=cdfCreateUserCellCDF( cellId )
cdfId->opPointLabelSet = opPointLabels
sevRetrieveFromEffectiveCDF(sevSession(hiGetCurrentWindow()))
sevAnnotateResults( sevSession(hiGetCurrentWindow()) 'dcOpPoints)
```

sevRegisterPcellsForAnnotation

```
sevRegisterPcellsForAnnotation(
     l_LibCellNames
     )
     => l_LibCellNames/ nil
```

Description

Returns a list of library and cell name pairs for the registered Pcells.

Arguments

l_LibCellNames	The list of library and cell name pairs for the Pcells to be registered.

Value Returned

l_LibCellNames	The list of library and cell name pairs for the Pcells, if registered successfully.
`nil`	Returns `nil` if the call is unsuccessful.

Example

The following example shows how you can use this function to get a list of registered Pcells:

```
sevRegisterPcellsForAnnotation(list("tsmcN5/analog_cmos_cell" "tsmcN5/
hp_analog_cell" "tsmcN5_ArrayLib/mosfet_StackGate"))

=> ("tsmcN5/analog_cmos_cell" "tsmcN5/hp_analog_cell" "tsmcN5_ArrayLib/
mosfet_StackGate")
```

sevGetRegisteredPcellsForAnnotation

```
sevGetRegisteredPcellsForAnnotation()
     => l_LibCellNames/ nil
```

Description

Returns the list of library and cell name pairs of the registered Pcells to be used in the operating point annotation flow.

Arguments

None

Value Returned

l_LibCellNames	Returns the list of library and cell name pairs for the registered Pcells.
`nil`	Returns `nil` if the call is unsuccessful.

Example

The following example shows how you can use this function to get a list of registered Pcells:

```
sevRegisterPcellsForAnnotation(list("tsmcN5/analog_cmos_cell" "tsmcN5/
hp_analog_cell" "tsmcN5_ArrayLib/mosfet_StackGate"))
=> ("tsmcN5/analog_cmos_cell" "tsmcN5/hp_analog_cell" "tsmcN5_ArrayLib/
mosfet_StackGate")
```

sevParametricTool

```
sevParametricTool(
     t_session
     )
     => t / nil
```

Description

Opens the Parametric analysis tool.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevCornersTool

```
sevCornersTool(
     t_session
     )
     => t / nil
```

Description

Opens the Corners tool.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevMonteCarloTool

```
sevMonteCarloTool(
    t_session
    )
    => t / nil
```

Description

Opens the Analog Statistical Analysis tool.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevOptimizationTool

```
sevOptimizationTool(
     t_session
     )
     => t / nil
```

Description

Opens the Optimization tool.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevOpenCalculator

```
sevOpenCalculator(
    )
    => t / nil
```

Description

Opens the Calculator.

Arguments

None

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevOpenDRLBrowser

```
sevOpenDRLBrowser(
     )
     => t / nil
```

Description

Opens the Browse Project Hierarchy window.

Arguments

None

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevOpenPlotWindow

```
sevOpenPlotWindow(
    t_session
    )
    => t / nil
```

Description

Opens a plot window.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevOpenPrintWindow

```
sevOpenPrintWindow(
    t_session
    )
    => t / nil
```

Description

Opens a print window.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevOpenJobMonitor

```
sevOpenJobMonitor(
    )
    => t / nil
```

Description

Opens the Job monitor.

Arguments

None

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevIcon

```
sevIcon(
     t_name
     )
     => o_icon / nil
```

Description

Displays the icon object corresponding to the specified name.

Arguments

t_name	The name of the icon for the fixed menu/icon bar. This depends on the created icons. The existing Cadence simulation environment icons are: `'circuit`, `'emitterFollower`, `'ruler`, `'alpha`, `'analyses`, `'acdc`, `'dcTranAc`, `'acTranDc`, `'knobPanel`, `'variables`, `'pin`, `'outputs`, `'pencilEraser`, `'scissors`, `'vcrPlay`, `'trafficGoSmall`, `'trafficGo`, `'trafficYellow`, `'vcrStop`, `'trafficStopSmall`, `'trafficStop`, `'waveform`, `'fx`, or `'sine`.

Value Returned

o_icon	Returns the icon object that can be used in the icon strip.
`nil`	Returns `nil` if the named icon cannot be found.

sevDeleteSelections

```
sevDeleteSelections(
    t_session
    )
    => t / nil
```

Description

Deletes the selected items in any of the simulation environment list boxes.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevWhatsNew

```
sevWhatsNew(
    )
    => t / nil
```

Description

Opens the Whats New window for the simulation environment.

Arguments

None

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevAboutTool

```
sevAboutTool(
    t_toolname
    )
    => t / nil
```

Description

Generates and displays the standard About DFII window for the tool with the tool name in the message.

Arguments

t_toolname	Name of the tool calling `sevAboutTool`.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevStartSession

```
sevStartSession(
     [ ?design g_design ]
     [ ?lib g_lib ]
     [ ?cell g_cell ]
     [ ?view g_view ]
     [ ?schematic g_schematic ]
     )
     => t / nil
```

Description

Starts the Virtuoso Analog Simulation Environment session tied to the specified design. It will try the design first, then lib/cell/view, and finally it will try the schematic. If none of these is specified, it will start a skeleton session that will not be able to do anything until a design has been tied to the session. The lib/cell/view arguments must be specified, otherwise they are ignored.

Arguments

`?design` *`g_design`*	The design object. The default value is `nil`.
`?lib` *`g_lib`*	The library name. The default value is `nil`.
`?cell` *`g_cell`*	The cell name. The default value is `nil`.
`?view` *`g_view`*	The view name. The default value is `nil`.
`?schematic` *`g_schematic`*	The schematic object. The default value is `nil`.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevEditModels

```
sevEditModels(
     t_session
     )
     => t / nil
```

Description

Displays the Model Library Setup form that lets you edit the Spectre direct model libraries.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSetupStimuli

```
sevSetupStimuli(
     t_session
     )
     => t / nil
```

Description

Displays the Setup Analog Stimuli form that lets you specify the circuit stimuli.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSetupSimulationFiles

```
sevSetupSimulationFiles(
    t_session
    )
    => t / nil
```

Description

Displays the Simulation Files Setup form that lets you specify the simulation files and paths for Spectre direct simulation.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNetlistAndRun

```
sevNetlistAndRun(
    t_session
    )
    => t / nil
```

Description

Forces the circuit to netlist and then runs the simulation.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevRun

```
sevRun(
     t_session
     )
     => t / nil
```

Description

Runs a simulation using the current netlist.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevNetlistAndDebug

```
sevNetlistAndDebug(
     t_session
     )
     => t / nil
```

Description

Forces the circuit to netlist and runs the AHDL debugger.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevDebug

```
sevDebug(
     t_session
     )
     => t / nil
```

Description

Runs the AHDL debugger using the current netlist.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevLMGTool

```
sevLMGTool(
     t_session
     )
     => t / nil
```

Description

Opens the Transmission Line Modeler tool.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevPKGTool

```
sevPKGTool(
     t_session
     )
     => t / nil
```

Description

Opens the RFIC Package Modeler tool.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevKmodelTool

```
sevKmodelTool(
     t_session
     )
     => t / nil
```

Description

Opens the RIFC Modeler for Cierto SPW tool.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevPCMTool

```
sevPCMTool(
    t_session
    )
    => t / nil
```

Description

Opens the Spiral Inductor Modeler tool.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevBPMTool

```
sevBPMTool(
     t_session
     )
     => t / nil
```

Description

Opens the Bond Pad Modeler tool.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevBALMTool

```
sevBALMTool(
     t_session
     )
     => t / nil
```

Description

Opens the Transformer Modeler tool.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevActiveSelectedAna

```
sevActiveSelectedAna(
     o_session
     )
     => l_analyses / nil
```

Description

Returns the list of selected analyses that are currently enabled.

Arguments

o_session	The simulation environment session.

Value Returned

l_analyses	List of the selected, enabled analyses.
nil	Returns `nil` if there are no analyses selected in the analysis listbox or all the selected analyses are not enabled.

sevNonActiveSelectedAna

```
sevNonActiveSelectedAna(
    o_session
    )
    => l_analyses / nil
```

Description

Returns the list of selected analyses that are currently not enabled.

Arguments

o_session	The simulation environment session.

Value Returned

l_analyses	The list of selected, non-enabled analyses.
`nil`	Returns `nil` if there are no analyses selected in the analysis listbox or all the selected analyses are enabled.

sevSession

```
sevSession(
     o_entity
     )
     => t_session / nil
```

Description

Displays the session ID of the simulation environment such as the ADE L window, the schematic window associated with ADE L, or a form launched from ADE L.

Arguments

o_entity	The object with which the simulation environment session is associated. For example, form or window.

Value Returned

t_session	Returns the session ID of the current simulation environment window.
nil	Returns `nil` if there is no simulation environment session object currently tied to the entity.

Examples

Example 1

```
sevSession(hiGetCurrentWindow())
=> sevSession2
```

When you specify `hiGetCurrentWindow()` as the object, the function returns the session ID of the current ADE L window.

Example 2

```
sevSession(hiGetCurrentForm())
=> sevSession2
```

When you specify `hiGetCurrentForm()` as the object, the function returns the session ID of the ADE L window associated with the currently opened form.

Example 3

```
sevSession(window(8))
=> sevSession2
```

When you specify the `window(<windowID>)` as the object, the function returns the session ID associated with the *`windowID`*.

sevSetTopSaveDir

```
sevSetTopSaveDir(
     o_session
     )
     => t
```

Description

This function sets the ADE L Save State directory for the simulation environment session.

Arguments

o_session	The simulation environment session.
t_dir	The directory path to be set as the ADE L Save State directory.

Value Returned

`t`	Returns `t` if successful.

sevTopSaveDir

```
sevTopSaveDir(
    o_session
    )
    => t_dir
```

Description

Displays the current ADE L Save State directory path.

Arguments

o_session	The simulation environment session.

Value Returned

t_dir	Returns the ADE L Save State directory path.

sevDisplayViolations

```
sevDisplayViolations(
     t_sevSession
     )
     => o_form
```

Description

Displays the violations form.

Note: This function can be used only with an Analog Design Environment L session.

Arguments

t_sevSession	The simulation environment session.

Value Returned

o_form	Displays the violations form.

Example

```
sevDisplayViolations(session)
```

sevNoViolationsFound

```
sevNoViolationsFound(
     s_sevSession
     )
     => t / nil
```

Description

Determines if any violation file has been found in the results.

Arguments

s_sevSession	The simulation environment session.

Value Returned

`t`	Returns `t` if no violation files are found in the results.
`nil`	Returns `nil` if violations files are found in the results.

Example

```
sevNoViolationsFound(s_sevSession)
=> t
```

sevParasiticsDisplayed

```
sevParasiticsDisplayed(
     t_session
     )
     => t / nil
```

Description

Determines whether the *Show Parasitics* menu will be disabled when the DC Operating Point results are available.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the *Show Parasitics* menu is disabled.
`nil`	Returns `nil` if the *Show Parasitics* menu is not disabled.

Example

```
sevParasiticsDisplayed(session)
```

sevParasiticsNotDisplayed

```
sevParasiticsNotDisplayed(
     t_session
     )
     => t / nil
```

Description

Determines if the *Hide Parasitics* menu will be disabled when the DC Operating Point results are available.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the *Hide Parasitics* menu is disabled.
`nil`	Returns `nil` if the *Hide Parasitics* menu is not disabled.

Example

```
sevParasiticsNotDisplayed(session)
```

sevDevChecking

```
sevDevChecking(
     t_sevSession
     )
     => o_form / nil
```

Description

Displays the Analog Design Environment *Device Checking Setup* form.

Note: This function can be used only with an Analog Design Environment L session.

Arguments

t_sevSession	The simulation environment session.

Value Returned

o_form	Returns the form object and displays the *Device Checking Setup* form if the call is successful.
nil	Returns `nil` if the call is unsuccessful.

Example

```
sevDevChecking(sevSession)
=> formStruct@0x38930e8
```

sevSetSolver

```
sevSetSolver(
    t_session
    )
    => t / nil
```

Description

Displays the *Choose Solver* form, which lets you select a solver.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` and displays the solver form if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevSetConnectModules

```
sevSetConnectModules(
     t_session
     )
     => t / nil
```

Description

Displays the *Connect Rules* form that allows you to select built-in or user-defined connect rules.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevInvokeNCBrowse

```
sevInvokeNCBrowse(
    t_session
    )
    => t / nil
```

Description

Displays the *NCBrowse* window.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevInvokeSimvision

```
sevInvokeSimvision(
     t_session
     )
     => t / nil
```

Description

Displays the *SimVision Waveform* window.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns t if the call is successful.
nil	Returns nil if the call is unsuccessful.

sevInvokeSimvisionDebugger

```
sevInvokeSimvisionDebugger(
    t_session
    )
    => t / nil
```

Description

Displays the *SimVision Debugger* interface with GUI options during an AMS session.

Arguments

t_session	The simulation environment session.

Value Returned

t	Returns `t` if the call is successful.
nil	Returns `nil` if the call is unsuccessful.

sevNoLog

```
sevNoLog(
     t_session
     t_type
     )
     => t / nil
```

Description

Checks if the specified log file exists for the AMS interface.

Arguments

t_session	The simulation environment session.
t_type	The type of log file - compiler, elaborator, or simulator log files. Valid Values: ‘`compiler`’, ‘`elaborator`’, and ‘`simulator`’.

Value Returned

`t`	Returns `t` if the specified log file is not found.
`nil`	Returns `nil` if the specified log file is found.

sevViewNetlisterLog

```
sevViewNetlisterLog(
    t_session
    )
    => t / nil
```

Description

Displays the AMS netlister log file.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevViewCompilerLog

```
sevViewCompilerLog(
     t_session
     )
     => t / nil
```

Description

Displays the AMS simulation compiler log file. The log file can be either `ncvlog.log` or `ncvhdl.log` depending on the contents of the AMS design.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevViewElabLog

```
sevViewElabLog(
    t_session
    )
    => t / nil
```

Description

Displays the AMS simulation elaborator log file.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevViewNcverilogLog

```
sevViewNcverilogLog(
     t_session
     )
     => t / nil
```

Description

Displays the AMS simulation NcVerilog log file.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevViewSimLog

```
sevViewSimLog(
    t_session
    )
    => t / nil
```

Description

Displays the AMS simulator log file.

Arguments

t_session	The simulation environment session.

Value Returned

`t`	Returns `t` if the call is successful.
`nil`	Returns `nil` if the call is unsuccessful.

sevReturnVariablesWithEmptyValues

```
sevReturnVariablesWithEmptyValues(
     o_session
     )
     => t_string / nil
```

Description

Returns the set of variables in a session with empty values.

Arguments

o_session	The simulation environment session.

Value Returned

t_string	Returns a string containing variable names separated by comma. For example, "Var1, Var2".

sevAddExpression

```
sevAddExpression(
     o_session
     t_expressionname
     t_expression
     )
     => t / nil
```

Description

Takes the name and expression as a string and adds a corresponding output in ADE session.

Arguments

o_session	A valid session passed as a string or symbol.
t_expressionname	Name of the expression to be added
t_expression	Expression passed as a string.

Value Returned

`list(nil errorString)`	Returns `list(nil errorString)` if expression adding failed.
`list(t outputStruct)`	Returns `list(t outputStruct)` if expression added successfully.

Example

```
sevAddExpression("sevSession1" "a" "1+1")
```

sevGetExpressions

```
sevGetExpressions(
     o_session
     [ ?axlTestName t_axlTestName ]
     [ ?namedOnly g_namedOnly ]
     )
     => l_list
```

Description

Returns all the expressions in the specified ADE/ADEXL session.

Arguments

o_session — The simulation environment session.

?axlTestName *t_axlTestName*

Name of the test. If passed, method returns expressions to the corresponding test.

?namedOnly *g_namedOnly*

If passed, return only named expressions.

Value Returned

l_list — List of name value pairs.

Example

```
sevGetExpressions("sevSession1" ?axlTestName "aaa" ?namedOnly t)
```

Returns all the named expressions corresponding to the test `aaa` in `sevSession1`.

sevDeleteSelectedSubckts

```
sevDeleteSelectedSubckts(
     t_sevSession
     [ l_instanceList ]
     )
     => t / nil
```

Description

Deletes the subcircuit instances selected in the *Save By Subckt Instances* pane of the simulation window.

Arguments

t_sevSession	The simulation environment session. For more information, see *sevSession*.
l_instanceList	List of subcircuit instances to be deleted from the *Save By Subckts Instances* pane.

Value Returned

t	Returns t if the selected subcircuit instances are deleted.
nil	Returns nil if the specified simulation environment session object is invalid, or no instance is selected in the *Save By Subckt Instances* pane of the simulation window.

Examples

The following example deletes all the selected subcircuit instances in the simulation environment session, sevSession1:

```
sevSession(hiGetCurrentWindow())
=> sevSession1

sevDeleteSelectedSubckts('sevSession1)
=> t
```

sevDeleteSelectedOpPoints

```
sevDeleteSelectedOpPoints(
     t_sevSession
     [ l_instanceList ]
     )
     => t / nil
```

Description

Deletes the operating point instances selected in the *Save Operating Points* pane of the simulation window.

Arguments

t_sevSession	The simulation environment session. For more information, see *sevSession*.
l_instanceList	List of operating point instances to be deleted from the *Save Operating Points* pane.

Value Returned

t	Returns `t` if the selected operating point instances are deleted.
nil	Returns `nil` if the specified simulation environment session object is invalid, or no instance is selected in the *Save Operating Points* pane of the simulation window.

Examples

The following example deletes all the selected operating point instances in the simulation environment session, `sevSession1`:

```
sevSession(hiGetCurrentWindow())
=> sevSession1

sevDeleteSelectedOpPoints('sevSession1)
=> t
```

21

CDF Functions

The Component Description Format (CDF) describes the parameters and the attributes of parameters of individual components and libraries of components. The Virtuoso CDF tools let you create, edit, and delete CDF data of components. For details on using the graphical user interface of these tools, see the *Component Description Format User Guide*.

Using the CDF SKILL functions, you can create routines to perform the operation on many components at once, automating your handling of CDF descriptions. This chapter describes the functions that let you perform these operations.

CDF SKILL Function Elements

CDF SKILL functions use or operate on data IDs, parameters, parameter attributes, expressions, and global variables. This section describes each of these elements in the context of SKILL.

Cell and Library Data IDs

Before working on a CDF description, you must specify the data ID of the cell or library. You can get the data ID for the cell or library you are using with the `ddGetObj`*()* function. With SKILL versions earlier than 4.4, you used the `dmFindLib`*()* and `dmFindCell`*()* functions. You must assign the value returned by these functions to a variable that you create. For example, to operate on the `analogLib` library, you must first create the variable `mylib` with this assignment:

```
mylib = ddGetObj("analogLib")
```

When creating the variable for the object ID of a cell, you must specify both the library name and the cell name:

```
test_cell = ddGetObj("analogLib" "schottky")
```

or

```
test_cell = ddGetObj(mylib -> name "schottky")
```

if you have already defined `mylib`.

You must then use `mylib` when a SKILL function requires a *`d_id`* or *`g_libId`*, and `test_cell` when a SKILL function requires a *`d_id`* or *`g_cellId`*.

You can use this data ID to access information about the description by using the right arrow (-> or ~>) operator. For example

```
test_cell -> name
```

returns the ID

```
"schottky"
```

Data Objects

CDF descriptions are represented by *`g_cdfDataId`* objects, which are SKILL objects that you can manipulate like other SKILL database objects. Just like data IDs, you assign the *`g_cdfDataId`* of a particular CDF description to a variable that you create. The most common variable name is *`g_cdfDataId`*. To create a new CDF data object for a new CDF description, use this type of ID assignment:

```
newCellId = cdfCreateUserCellCDF(test_cell)
cdf:25092160
newCellId->type
"userCellData"
```

To access an existing CDF data object for an existing CDF description, use this type of ID assignment:

```
baseCell = cdfGetBaseCellCDF(test_cell)
baseCell->dataFile->value
"bjt"
```

`newCellId` and `baseCell` are arbitrary names that you create.

Although you can add any information to a *g_cdfDataId*, the object has specific fields to hold the information that it maintains. These fields are described in the following section.

id

The database object (cell ID or library ID) to which the *g_cdfDataId* is attached. This field is not editable.

type

There are seven types of *g_cdfDataId*:

baseLibCDF	base-level library CDF
userLibCDF	user-level library CDF
effLibCDF	effective-level library CDF
baseCellCDF	base-level cell CDF
userCellCDF	user-level cell CDF
effCellCDF	effective-level cell CDF
effInstCDF	effective-level instance CDF

This field is not editable.

parameters

List of parameters attached to this *g_cdfDataId*. This field is not editable.

doneProc

An optional procedure name (a string) that is evaluated after any change to a parameter on a component instance. You can use `doneProc` for post-processing. The procedure must take a single argument: the instance that has been modified.

The `doneProc` callback function can be used to modify the *`cdfgForm`* fields that are editable.

The default value is `nil`. This field is editable.

formInitProc

An optional procedure name. If specified, the procedure is executed when the contents of the CDF are displayed on a form. The default value is *nil*. This field is editable.

This procedure runs when you use the *Add Instance* and *Edit Properties* commands. You can use the procedure for preprocessing CDF data. This procedure must take a single argument, the *`g_cdfDataId`* being added to the form.

Note: When you modify a parameter field value using the `formInitProc`, the Edit Properties Object command for the schematic application is not aware of the modification and does not update the changes made with `formInitProc`. You can avoid this problem by setting the variable *c*`dfgForm->cdfModified` to the value `t`.

Displaying Parameters

The following fields control the display of parameters on a form.

fieldWidth	Width of a field	Default = 350 pixels
fieldHeight	Height of a field	Default = 35 pixels
buttonFieldWidth	Width of a button field	Default = 340 pixels
promptWidth	Width of a prompt	Default = 175 pixels

Parameters

CDF parameters are represented by *`g_cdfParamId`* objects, which are SKILL objects that you can manipulate like other SKILL database objects. You can use a *`g_cdfParamId`* to access information about a parameter by using the right arrow (->) operator. Although you can add any information to a *g_cdfParamId*, the object has fields to hold information that it maintains.

In addition to getting the *g_cdfParamIds* through the parameters field of a *g_cdfDataId*, you can also access a parameter by specifying:

`g_cdfDataId->`*`paramName`*

paramName is the name of the parameter. However, you must not create any user-defined properties on a *g_cdfDataId* that conflict with the name of a parameter on the *g_cdfDataId*.

use

Specifies whether to use this parameter. The *use* attribute is context-specific and is evaluated when necessary. In this field, you can specify parameters that you are not using because of the value of other parameters, or because of the function you are using. The *use* field must be a string.

- If the field evaluates to *non-nil*, the system uses the parameter.
- If a value for the field exists, the system ignores the value.
- If the field evaluates to *nil*, the system does not use the parameter.
- If you do not specify this field, *t* is assumed, so the system always uses the field.

The “Global Variables” section describes several global variables for constructing the *use* expression.

This field is editable.

paramType

Type of the parameter. Valid values for this field are

`"string"`

`"int"`

`"float"`

`"radio"`

`"cyclic"`

`"boolean"`

`"button"`

`"netSet"`

The quotation marks are required. CDF checks that the parameter value matches the type specified. You must specify this field.

This field is not editable.

Note: Use the netSet type to store inherited connections in CDF. Inherited connections allow you to selectively override global signals in designs created in Virtuoso Schematic Editor. The override information is communicated through net expressions and netSet properties. For more information on netSet properties refer to *Inherited Connections Flow Guide* and *Virtuoso Schematic Editor L User Guide*.

defValue

Default value of the parameter. You must specify this field.

This field is editable.

value

Current value of the parameter.

This field is editable.

prompt

Prompt that appears on a form field when an application asks for the value of this parameter. The value for this field must be a string. You must specify this field.

This field is editable.

choices

Possible values (a list of strings) of a *cyclic* or *radio* type parameter. Do not use this field for other types of parameters.

This field is editable.

units

Unit type of the parameter. You often modify parameters that represent resistance, capacitance, length, time, power, and so forth, and expect to see the parameter value scaled to appropriate units (for example, *pF*, *uM*, *dBm*). Valid values for this field include the following strings:

`"resistance"`

`"capacitance"`

`"inductance"`

`"conductance"`

`"time"`

`"frequency"`

`"power"`

`"powerDB"`

`"lengthMetric"`

`"lengthEnglish"`

`"angle"`

`"voltage"`

`"current"`

`"temperature"`

The quotation marks are required. This field determines the unit's suffix and scale factor to use when displaying the parameter value. For example, by setting a parameter's units field to *capacitance,* the parameter value is displayed as *5 pF* instead of *5e-12*.

editable

Specifies whether a parameter is for display only. If set to *nil*, the field specifies a displayed parameter that you cannot change. (Other parameters' callbacks can change the parameter.) Use this field only on *int*, *float*, and *string* type fields.

The *editable* field must be a string. This field is evaluated when necessary.

- If the field evaluates to *non-nil*, the parameter is editable.
- If the field evaluates to *nil*, the parameter is grayed out when displayed as a form field.
- If you do not specify the field, *t* is assumed, meaning that the field is editable.

callback

SKILL code to be executed whenever the value of a parameter changes. Using *callback*, you can cause any parameter's value to affect any other parameter's value. The value of this field must be a string.

This field is optional. If you do not use *callback*, no callback is executed.

The "Global Variables" section describes several global variables you can use in the *callback* field.

parseAsNumber

String type parameter whose value can evaluate to a floating-point number. These types of parameters often occur for circuit-level simulators that allow component parameters to be either numbers or expressions containing variables.

If you specify this field, the system parses the value of the parameter to check if the value is a number.

- If the value is a number, the system converts the string to a floating point number, converts the string to the most efficient notation (taking into account any units field specified), then reconverts the number into a string.
- If the parameter value is not a number, the system does no conversion.

For example, if the parameter value is the string `5.4e-12` and the parameter value has a units field of *capacitance* (that is, the suffix is F), the parameter value is converted to the string `5.4p` before being displayed. However, if the parameter value is `c1`, no conversion takes place.

dontSave

Specifies that the parameter cannot be stored in any instance that corresponds to the component.

The *dontSave* field must be a string. The system evaluates the field as necessary. If the field evaluates to non-*nil*, the parameter is not stored. If you do not specify the field, *nil* is assumed and the parameter value is stored.

parseAsCEL

If set to *yes*, the associated CDF parameter is processed as a CDF Expression Language (CEL) expression. The parameter must be a string. If the expression resolves to a numeric value (the usual case), the `parseAsNumber` flag should also be set to *yes*.

storeDefault

Specifies whether the parameter default value is saved as a property of the instance. All tools based on the Cadence Analog Design Environment software use the CDF to find default values if no property exists on an instance.

If set to *no* (the default) or *don't use*, a property is not saved on the instance when the parameter value is the default. Also, if the default value of the parameter changes, all instances that use the default automatically get the new default value. (To see the change in an open window, you must select *Window – Redraw* from the Cadence menu.)

If set to *yes* and the parameter value is set to the same value as the default, a property is saved on the instance. One disadvantage of this attribute is that if the default value of a parameter changes, the instances that use the default do not automatically change to the new default. If you are a user of the Open Simulation Software (OSS) system, and you used to set this attribute to *yes* because you could only netlist using instance properties, you can now set it to *no* because OSS users now have the option of using CDF.

display

Determines if this parameter is displayed in forms that display CDF parameters, such as the Edit Object Properties form or the Add Instance form. You must enter `t`, `nil`, or a SKILL expression that evaluates to `t` or `nil` in this field to determine if this parameter is to be displayed. If the field evaluates to non-`nil` (the default), the parameter is displayed. If the field evaluates to `nil`, the parameter is not displayed.

Example

You can use the *`g_cdfDataId`* ***baseCell*** from the previous example to examine the parameters in the base-level cell CDF description of the Schottky transistor in the analog library. For example, that cell has a parameter *m*. You can access information about *m* in the following manner:

```
baseCell->m->prompt
"Multiplier"
baseCell->m->editable
```

```
nil
baseCell->m->display
"artParameterInToolDisplay('m)"
baseCell->m->paramType
"string"
```

Expressions

CEL (CDF Expression Language) is another name for the Analog Expression Language (AEL) that works with CDF parameters. For information on AEL, refer to the *Analog Expression Language Reference*. With AEL you can express a value as a mathematical expression instead of a single, fixed value. In such an expression, symbolic names such as *sheetResistivity* can refer to values that are computed and set on one of the following:

- CDF parameter on the same design component
- CDF parameter on the parent design component

Global Variables

CDF parameter values interact with each other, and one parameter's value can affect the existence of another. This feature is implemented primarily through the *use* and *callback* fields of the parameters section. The following global variables, which you can access, are set whenever parameter fields are evaluated.

cdfgData

CDF data for the component in use. You can use this variable in the `doneProc` or `formInitProc` callback functions to either read or write data for a component. Use the *`value`* field to get the current value of any parameter in the CDF description.

- For creating an instance, set the field to the last value you used when you created a component of this type.
- For editing, set the field to the value for the component you are editing.

For example, you might set the *use* field for the *resistance* parameter to

```
"cdfgData->resType->value == \"ideal\""
```

implying that the *resistance* parameter should be used only if the resistor type is set to *ideal*. (== is an equality test, not an assignment.)

When setting the value of a parameter, set

```
cdfgData->paramName->value = paramValue
```

If you use this setting, in the future you should be able to use the property list editor to edit the parameter values directly without going through the form.

cdfgForm

Form on which the CDF data is displayed, if there is one. You can modify data stored in *cdfgData* in the CDF *formInitProc*, or by modifying the *cdfgForm* fields with a callback function. When doing this, set the Boolean variable *cdfgForm -> cdfModified* to *t*.

gLabelsNumNotation

Displays the cdsTerm and cdsParam values in different notations, such as scientific or engineering. The syntax of *`gLabelsNumNotation`* is as follows:

```
gLabelsNumNotation = 'suffix
```

The possible values can be `'suffix`, `'scientific`, `'engineering`, `'simple` or `'default`.

The `default` value displays the labels according to the existing setting. For example, the nmos symbol shows the engineering notation, `300e-3` for `w`, by default.

To set the number of significant digits, use the `aelPushSignifDigits` function as follows:

```
aelPushSignifDigits(10)
```

Creating Descriptions

This section describes the functions that operate on CDF descriptions. You can create base and user CDF descriptions for libraries and cells using the following functions.

cdfCreateBaseLibCDF

```
cdfCreateBaseLibCDF(
     g_libId
     [ ?doneProc t_doneProc ]
     [ ?formInitProc t_formInitProc ]
     [ ?fieldWidth x_fieldWidth ]
     [ ?fieldHeight x_fieldHeight ]
     [ ?buttonFieldWidth x_buttonFieldWidth ]
     [ ?promptWidth x_promptWidth ]
     )
     => g_cdfDataId / nil
```

Description

Creates the Base Library CDF that is applied to all the devices in the library. The CDF description is created with no parameters or *simModels*.

Note the following:

- You must open the library in write mode.
- Before using this function, ensure that the base-level CDF description does not already exist for the library. If the CDF description already exists, this function will not update the existing CDF description.

Arguments

`g_libId` — This is the library ID.

`?doneProc t_doneProc` — Lets you specify an optional SKILL routine that executes after you change any parameter on the instantiation form.

`?formInitProc t_formInitProc`

Lets you specify an optional SKILL language routine that executes automatically when the component is placed on an instantiation form.

`?fieldWidth x_fieldWidth`

Lets you specify the width of a field on the instantiation form. The default width is 350 pixels.

?fieldHeight *x_fieldHeight*

Lets you specify the height of a field on the instantiation form. The default height is 35 pixels.

?buttonFieldWidth *x_buttonFieldWidth*

Lets you specify the width of a button on the instantiation form. The default width is 350 pixels.

?promptWidth *x_promptWidth*

Lets you specify the width of the prompt on the instantiation form. The default width is 175 pixels.

cdfCreateUserLibCDF

```
cdfCreateUserLibCDF(
     g_libId
     [ ?doneProc t_doneProc ]
     [ ?formInitProc t_formInitProc ]
     [ ?fieldWidth x_fieldWidth ]
     [ ?fieldHeight x_fieldHeight ]
     [ ?buttonFieldWidth x_buttonFieldWidth ]
     [ ?promptWidth x_promptWidth ]
     )
     => g_cdfDataId / nil
```

Description

Creates the user-level library CDF that is applied to all the devices in the library. The user-level CDF can override entries in the base-level CDF. Therefore, a combination of the base-level CDF and the user-level CDF becomes the effective CDF.

The CDF description is created with no parameters or simulation models.

Note: Before using this function, ensure that the user-level CDF description does not already exist for the library. If the CDF description already exists, this function will not update the existing CDF description.

Arguments

g_libId This is the library ID.

`?doneProc` *`t_doneProc`*	Lets you specify an optional SKILL routine that executes after you change any parameter on the instantiation form.
`?formInitProc` *`t_formInitProc`*	Lets you specify an optional SKILL language routine that executes automatically when the component is placed on an instantiation form.
`?fieldWidth` *`x_fieldWidth`*	Lets you specify the width of a field on the instantiation form. The default width is 350 pixels.
`?fieldHeight` *`x_fieldHeight`*	Lets you specify the height of a field on the instantiation form. The default height is 35 pixels.
`?buttonFieldWidth` *`x_buttonFieldWidth`*	Lets you specify the width of a button on the instantiation form. The default width is 350 pixels.
`?promptWidth` *`x_promptWidth`*	Lets you specify the width of the prompt on the instantiation form. The default width is 175 pixels.

cdfCreateBaseCellCDF

```
cdfCreateBaseCellCDF(
     g_cellId
     [ ?doneProc t_doneProc ]
     [ ?formInitProc t_formInitProc ]
     [ ?fieldWidth x_fieldWidth ]
     [ ?fieldHeight x_fieldHeight ]
     [ ?buttonFieldWidth x_buttonFieldWidth ]
     [ ?promptWidth x_promptWidth ]
     )
     => g_cdfDataId / nil
```

Description

Creates a base-level CDF description for a cell. The CDF description is created with no parameters or simulation models.

Note the following:

- You must open the cell in write mode.
- Before using this function, ensure that the base-level CDF description does not already exist for the cell. If the CDF description already exists, this function will not update the existing CDF description.

Arguments

`g_cellId` — This is the cell ID.

`?doneProc t_doneProc` — Lets you specify an optional SKILL routine that executes after you change any parameter on the instantiation form.

`?formInitProc t_formInitProc` — Lets you specify an optional SKILL language routine that executes automatically when the component is placed on an instantiation form.

`?fieldWidth x_fieldWidth` — Lets you specify the width of a field on the instantiation form. The default width is 350 pixels.

`?fieldHeight x_fieldHeight` — Lets you specify the height of a field on the instantiation form. The default height is 35 pixels.

`?buttonFieldWidth x_buttonFieldWidth` — Lets you specify the width of a button on the instantiation form. The default width is 350 pixels.

`?promptWidth x_promptWidth` — Lets you specify the width of the prompt on the instantiation form. The default width is 175 pixels.

cdfCreateUserCellCDF

```
cdfCreateUserCellCDF(
     g_cellId
     [ ?doneProc t_doneProc ]
     [ ?formInitProc t_formInitProc ]
     [ ?fieldWidth x_fieldWidth ]
     [ ?fieldHeight x_fieldHeight ]
     [ ?buttonFieldWidth x_buttonFieldWidth ]
```

```
[ ?promptWidth x_promptWidth ]
)
=> g_cdfDataId / nil
```

Description

Creates a user-level CDF description for a cell. The CDF description is created with no parameters or simulation models.

Note: Before using this function, ensure that the user-level CDF description does not already exist for the cell. If the CDF description already exists, this function will not update the existing CDF description.

Arguments

g_cellId	This is the cell ID.
?doneProc *t_doneProc*	Lets you specify an optional SKILL routine that executes after you change any parameter on the instantiation form.
?formInitProc *t_formInitProc*	Lets you specify an optional SKILL language routine that executes automatically when the component is placed on an instantiation form.
?fieldWidth *x_fieldWidth*	Lets you specify the width of a field on the instantiation form. The default width is 350 pixels.
?fieldHeight *x_fieldHeight*	Lets you specify the height of a field on the instantiation form. The default height is 35 pixels.
?buttonFieldWidth *x_buttonFieldWidth*	Lets you specify the width of a button on the instantiation form. The default width is 350 pixels.
?promptWidth *x_promptWidth*	Lets you specify the width of the prompt on the instantiation form. The default width is 175 pixels.

cdfCreateParam

```
cdfCreateParam(
     g_cdfDataId
     [ ?name t_name ]
     [ ?type t_type ]
     [ ?defValue g_defValue ]
     [ ?units t_units ]
     [ ?parseAsNumber t_parseAsNumber ]
     [ ?choices l_choices ]
     [ ?prompt t_prompt ]
     [ ?use t_use ]
     [ ?display t_display ]
     [ ?editable t_editable]
     [ ?dontSave t_dontSave]
     [ ?callback t_callback]
     [ ?storeDefault t_storeDefault ]
     [ ?parseAsCEL t_parseAsCEL ]
     [ ?description t_description ]
     )
     => g_cdfDataId / nil
```

Description

Creates a parameter on the specified *g_cdfDataId* with the specified attributes. The only attributes that are *always* required are the parameter's name and type. If this parameter description is not overriding an existing base-level parameter definition, you must also specify the default value.

Note the following:

- You cannot override a parameter's type. Also, CDF checks that the effective parameter is consistent and valid despite any overrides.
- If the name of a parameter already exists in the CDF description, the CDF description will not be updated.

Note: For more information, see *Component Parameters* in the *Component Description Format User Guide*.

Arguments

g_cdfDataId	The database object that represents the CDF description for the component.
?name *t_name*	The name of the parameter.

`?type` *`t_type`* — The data type of the parameter.

`?defValue` *`g_defValue`* — The default value of the parameter.

`?units` *`t_units`* — The unit suffix and scale factor to use when displaying the parameter value.

`?parseAsNumber` *`t_parseAsNumber`*

Specifies whether the parameter can be evaluated to a floating-point number. Use this attribute only for string type parameters that contain numeric data.

If *`t_parseAsNumber`* is `yes`, string is converted to a floating-point number, which is then converted the most efficient notation for execution, and then reconverts the floating-point number into a string.

If *`t_parseAsNumber`* is `no` (the default value) or `don't use`, the system does no conversion. Use this setting if the parameter to be defined is a literal that contains numeric characters, such as the name of a file or a model.

`t_parseAsNumber` must be used when the value of *`t_parseAsCEL`* is `yes`.

`?choices` *`l_choices`* — The space- or comma-separated list of selections for a *`cyclic`* or *`radio`* data type. This attribute does not apply to other types of parameters.

The choices depend on the following two cases:

- If each choice is a single word, you can separate the choices with spaces.
- If any choice is a group of words, you must separate each choice with a comma (,). (When using commas, do not leave extra spaces between choices because these spaces become part of the choice value.)

A typical entry in the form field can be

```
choice 1,choice 2,choice 3
```

Notice that there is no space between the number 1 and the comma, or between the comma and the *`c`* in *`choice`*.

`?prompt` *`t_prompt`*	The name for the CDF parameter that is displayed on the *Add Instance* or the *Edit Object Properties* form.
`?use` *`t_use`*	Determines if the parameter is to be used. You can enter Cadence SKILL language expression that evaluates to `t` or `nil` in this field to determine if this parameter is applicable. When the field evaluates to nil, the system never displays the parameter. When it evaluates to non-nil (the default), then based on the value of *`t_display`*, the system displays the parameter.
`?display` *`t_display`*	Determines if this parameter is displayed in forms that display CDF parameters, such as the *Edit Object Properties* form or the *Add Instance* form. You must enter `t`, `nil`, or a SKILL expression that evaluates to `t` or `nil` in this field to determine if this parameter is to be displayed. If the field evaluates to non-nil (the default), the parameter is displayed. If the field evaluates to `nil`, the parameter is not displayed.
`?editable` *`t_editable`*	Determines if this parameter can be edited in forms that display CDF parameters, such as the *Edit Object Properties* form or the *Add Instance* form. You can enter a SKILL expression that evaluates to `t` or `nil` in this field to determine if the parameter is editable. If the field evaluates to non-nil (the default), the parameter is editable. If the field evaluates to `nil`, the parameter is not editable. (If not editable, the parameter is grayed so that you can see the value but you cannot edit it.) This field is valid only for `string`, `int`, and `float` data types.
`?dontSave` *`t_dontSave`*	Determines if the parameter value is to be saved on the instance. This attribute is for programming use only. Typically, you should set this field to `nil` and not use it. If the field evaluates to `nil` (the default), the parameter value is saved as a property on the instance. If the field evaluates to non-nil, the parameter value is not saved as a property on the instance. *Caution* ***The*** *`t_dontSave`* ***attribute overrides the t_storeDefault setting. If*** *`t_storeDefault`* ***is*** `yes` ***and*** *`t_dontSave`* ***is*** `yes`***, the default property is not saved.***

`?callback` *`t_callback`*	Specifies a SKILL routine to be executed whenever the value of the parameter changes. The value of this optional field must be a string. The entered value can be an entire function to be executed or a call to a function that is defined elsewhere. If you do not enter anything in this field, the system assumes that there is no callback. The CDF parameter callback is primarily a GUI-based callback. GUI-based callbacks occur when you modify the values in the parameter form fields. A GUI-based callback is active when the CDF parameters are displayed in the *Add Instance* form or the *Edit Object Properties* form if you use the *Create Instance* or *Edit Properties* commands. For more information on callbacks, see *Writing Callbacks* in the *Component Description Format User Guide*.

`?storeDefault t_storeDefault`

Specifies whether to store the default value of a parameter as a parameter attribute on the instance. All tools based on the *Cadence Virtuoso Analog Design* software use the CDF description to find default values if there is no property on an instance.

If set to `no` or `don't use`, the default value that you set for a parameter is not preserved. In this case, if you modify the default value of a parameter, the change is reflected in all the existing instances and new instances of the component.

When the default value of the CDF parameter changes, all the instances including the ones already instantiated are updated with the new default value of the CDF parameter. To see the change in an open window, you must choose *View – Redraw*.

If set to `yes`, a parameter attribute that stores the default value of the parameter is added on the instance. Later if the default value for the parameter is modified, the instances that are already instantiated retain the old default value of the parameter. Only new instantiations have the new default value of the parameter.

One disadvantage of setting this attribute to `yes` is that if the default value of a parameter changes, the existing instances that use the default value do not automatically change to the new default value. That is, they retain the old default value.

Default value: `no`

`?parseAsCEL t_parseAsCEL`

Specifies whether the parameter is processed as a CDF Expression Language (CEL) expression. Use this attribute only for string type parameters.

If *`t_parseAsCEL`* is `yes`, the parameter is processed as a CEL expression. (Expressions such as *`iPar(x)`* or *`pPar(x)`*, indicating inheritance from an instance parameter or a parent parameter, are processed as CEL expressions.)

If *`t_parseAsCEL`* is `no` (the default), the parameter is not processed as a CEL expression.

`?description` *`t_description`*

Allows you to specify a tooltip or description for each parameter. The text specified as description will be displayed on the *Edit Object Properties* and, *Create Instance* form, and the *Property Editor* assistant.

Value Returned

`g_cdfDataId`	Returns the database object that represents the CDF description for the component.
`nil`	Returns `nil` if the parameter with the same name already exists.

Example

```
cdfParamId = cdfCreateParam(g_cdfDataId
?name "resistorType"
?type "radio"
?prompt "Type:"
?defValue "ideal"
?choices list("ideal" "thin film")
?callback "myModelTypeCB()")
```

For more examples of the `cdfCreateParam` function, see *NBSIM Transistor CDF SKILL Description* in the *Component Description Format User Guide*.

Query Descriptions

You can query existing CDF descriptions using the following functions. To use the returned value, you must assign it to a variable that you create.

cdfGetBaseLibCDF

```
cdfGetBaseLibCDF(
     g_libId
     )
     => g_cdfDataId / nil
```

Description

Returns the base-level CDF description attached to a library. If one is not defined, it returns `nil`.

cdfGetUserLibCDF

```
cdfGetUserLibCDF(
     g_libId
     )
     => g_cdfDataId / nil
```

Description

Returns the user-level CDF description attached to a library. If one is not defined, it returns `nil`.

cdfGetLibCDF

```
cdfGetLibCDF(
     g_libId
     )
     => g_cdfDataId / nil
```

Description

Returns the effective CDF description attached to a library. If neither a base- nor user-level CDF description is defined, it returns `nil`. The resulting CDF description represents the overlay of the user-level CDF on the base-level CDF.

cdfGetBaseCellCDF

```
cdfGetBaseCellCDF(
     g_cellId
     )
     => g_cdfDataId / nil
```

Description

Returns the base-level CDF description attached to a cell. If one is not defined, it returns `nil`.

cdfGetUserCellCDF

```
cdfGetUserCellCDF(
     g_cellId
     )
     => g_cdfDataId / nil
```

Description

Returns the user-level CDF description attached to a cell. If one is not defined, it returns `nil`.

cdfGetCellCDF

```
cdfGetCellCDF(
     g_cellId
     )
     => g_cdfDataId / nil
```

Description

Returns the effective CDF description attached to a cell. If neither a base- nor user-level CDF description is defined for the cell or its library, it returns `nil`. The resulting CDF description represents the overlay of the user-level cell CDF on the base-level cell CDF on the user-level library CDF on the base-level library CDF.

cdfGetInstCDF

```
cdfGetInstCDF(
     d_instId
     )
     => g_cdfDataId / nil
```

Description

Returns the effective CDF description associated with an instance.

The difference between the instance's effective CDF description and the cell's effective CDF description is that the values of any CDF parameter takes into account the values of the parameters stored on the instance.

Saving Descriptions

You can save CDF descriptions using the `cdfSaveCDF` function. If this CDF description already exists, the new description is written over the old one.

cdfSaveCDF

```
cdfSaveCDF(
     g_cdfDataId
     )
     => t / nil
```

Description

Saves a CDF description to disk.

The CDF description is then read in every time you open the cell of the library to which the description is attached. You can save only base-level CDF descriptions. You must have write permission on the object to which the CDF description is attached to execute this function.

Dumping and Editing Descriptions

You can save a CDF description to a file and edit it using the following functions. These functions replace `adcDump` and `cdfDumpCellCDF`.

Caution

While editing dump files remember to escape invalid characters while specifying termOrder using symbols. All symbols must be preceded by the backslash (\) to make them valid symbols in SKILL.

cdfDump

```
cdfDump(
     t_libName
     t_fileName
     [ ?cellName t_cellName ]
     [ ?level s_level ]
     [ ?edit g_edit ]
     )
     => t / nil
```

Description

Dumps the CDF description for *t_libName* and *t_cellName* into *t_fileName*. If *t_cellName* is not specified, then only the library CDF description is dumped. *t_fileName* is created in the current working directory or the directory specified with the filename. *s_level* is either `'base` or `'user`, with `'base` as the default value. If *g_edit is* `t`, a text editor window is automatically opened on *t_fileName*. The default is no editor.

Example

```
cdfDump( "nmos" "tr.mod" ?cellName "pnp" ?level 'base
    ?edit t)
```

cdfDumpAll

```
cdfDumpAll(
     t_libName
     t_fileName
     [ ?level s_level ]
     [ ?edit g_edit ]
     )
     => t / nil
```

Description

Dumps the CDF description for *t_libName* and all its cells into *t_fileName*. *s_level* is either `'base` or `'user`, with `'base` as the default value. *t_fileName* is created in the current working directory or the directory specified with the filename. If *g_edit is* `t`, a text editor window is automatically opened on *t_fileName*. The default is no editor.

Example

```
cdfDumpAll("asic" "lib.mod" ?level 'base ?edit t)
```

Deleting Descriptions

You can delete a CDF description or its parameters using the following functions.

cdfDeleteCDF

```
cdfDeleteCDF(
     g_cdfDataId
     )
     => t / nil
```

Description

Deletes a CDF description, including all attached parameters.

If the CDF description has been saved, the saved versions are also deleted. If this is a base-level CDF description, you must have write permission on the object to which the CDF description is attached.

cdfDeleteParam

```
cdfDeleteParam(
     g_cdfParamId
     )
     => t / nil
```

Description

Deletes a CDF parameter.

If the CDF parameter is attached to a base-level CDF description, you must have write permission on the object to which the CDF description is attached.

CDF checks that no invalid parameter descriptions would result from deleting the specified parameter before it is deleted. This would occur if you tried to delete a base-level parameter and a user-level parameter is defined that only partially overrides the base-level description.

Copying, Finding, and Updating Data and Parameters

You can copy, find, and update CDF data and parameters using the following functions.

cdfCopyCDF

```
cdfCopyCDF(
     g_cellId | g_libId
     t_dataType
     g_sourceCdfDataId
     )
     => g_cdfDataId / nil
```

Description

Copies the CDF data of the specified type from specified source to a library or cell by creating a new CDF data ID.

The destination must be specified as the ID of a library or a cell. The destination library or cell must not already have a CDF description of the specified CDF data type.

You can specify one of the following CDF data types:

- Base-level CDF data of the library (`baseLibData`)
- User-level CDF data of the library (`userLibData`)
- Base-level CDF data of the cell (`baseCellData`)
- User-level CDF data of the cell (`userCellData`)

Important Points to Note:

- If you have specified type `baseCellData` or `baseLibData`, ensure that the destination library or cell has the appropriate write permission.
- You cannot copy effective-level CDF data.

Arguments

g_cellId | *g_libId*	Specifies the ID of the library or cell where the CDF data must be copied.
t_dataType	Specifies the type of cdf data to be copied.
g_sourcecdfDataId	Specifies the source of the cdf data to be copied.

Value Returned

g_cdfDataId	ID of the new CDF data returned if the copy operation was successful.
`nil`	`nil` returned if the copy operation failed.

Example

In the following example, base-level CDF description of nbsim in analogLib is copied to nfet in bicmos.

```
source_cell = ddGetObj( "analogLib" "nbsim" )
srcCDF = cdfGetBaseCellCDF( source_cell )
dest_cell = ddGetObj( "bicmos" "nfet" )

if( destCDF = cdfGetBaseCellCDF(dest_cell) then
             cdfDeleteCDF( destCDF)
)
destCDF = cdfCopyCDF( dest_cell "baseCellData" srcCDF )
```

cdfCopyParam

```
cdfCopyParam(
     g_cdfDataId
     g_cdfParamId
     )
     => g_cdfParamId / nil
```

Description

Copies a parameter, adding it to *g_cdfDataId*.

g_cdfDataId must not already have a parameter with the same name. The parameter and the data ID must not be effective objects.

cdfFindParamByName

```
cdfFindParamByName(
     g_cdfDataId
     t_name
     )
     => g_cdfParamId / nil
```

Description

Returns the parameter ID for the specified parameter name on the specified CDF description, if it exists. If not, it returns `nil`.

Use this function to search for parameters by name.

cdfUpdateInstParam

```
cdfUpdateInstParam(
     d_instId
     )
     => t / nil
```

Description

Stores the CDF parameters specified in the effective cell CDF of the instance master onto the specified instance. If a `doneProc` post-processing procedure is specified, the function executes that procedure after updating the instance. When the Id given is not for an instance or the instance master does not have CDF definition, it returns `nil`.

cdfRefreshCDF

```
cdfRefreshCDF(
     g_libId / g_cellId
     )
     => t / nil
```

Description

Updates the CDF structure in the memory for the specified library or cell Id with the contents stored on the hard disk. Returns `nil` if the CDF structures for the specified library and cell Id is not present in memory.

If there are multiple Virtuoso sessions and you modify and save a CDF in one session, then that CDF in other sessions would be outdated. In such a case, use the `cdfRefreshCDF` function to update the CDF in other sessions.

Caution

Use this function with caution. In case multiple users modify the CDF parameters of a common component simultaneously, the saved parameter pointers may become invalid as there is no way of notifying the application after refreshing the CDF parameter values.

Arguments

`g_libId` or *`g_cellId`*	Specify the *`dd_id`* of the library or the cell.

Examples

```
cdfRefreshCDF(ddGetObj("mylib" "npnpar"))
```

aedCopyCDF

```
aedCopyCDF(
     )
     => t / nil
```

Description

Opens the Copy Component CDF form.

aedDeleteCDF

```
aedDeleteCDF(
     )
     => t / nil
```

Description

Opens the Delete Component CDF form.

Setting Scale Factors

Use the following Cadence SKILL language commands to determine the current scale factors or to set scale factors.

cdfGetUnitScaleFactor

```
cdfGetUnitScaleFactor(
     t_unitName
     )
     => t_scaleFactor
```

Description

Displays the current scale factor for the specified unit.

Arguments

t_unitName	The unit name for which you want to display the scale factor.

Value Returned

t_scaleFactor	The current scale factor for the specified unit name.

Example

Following command returns the scale factors for *power*:

```
cdfGetUnitScaleFactor("power")
```

cdfSetUnitScaleFactor

```
cdfSetUnitScaleFactor(
     t_unitName
     t_scaleFactor
     )
     => t / nil
```

Description

Sets the scale factor for the specified unit.

Arguments

t_unitName	The unit name for which you want to set the scale factor.
t_scaleFactor	The scale factor for the specified unit name.

Example

Following command sets the lengthMetric to m (millimeters):

```
cdfSetUnitScaleFactor("lengthMetric" "m")
```

cdfEditScaleFactors

```
cdfEditScaleFactors(
    )
    => t / nil
```

Description

Displays the Units Scaling Factors form which can be used to set scaling factors for displaying CDF parameters.

cdfEnableScaleFactorRetentionForZero

```
cdfEnableScaleFactorRetentionForZero(
    )
    => t
```

Description

If the scale factor for a unit type is set to `auto`, this function lets you retain the unit scale factor for a CDF parameter if its specified default value is `0` followed by the scale factor.

By default, in such cases, the value of the CDF Parameter is converted to `0`.

Value Returned

`t`	Always returns `t`.

Example

```
cdfEnableScaleFactorRetentionForZero()
cdfFormatFloatString("0u" "auto") => "0u"
```

The cdfFormatFloatString function in the example above returns `0u` when called after the `cdfEnableScaleFactorRetentionForZero` funtion.

cdfDisableScaleFactorRetentionForZero

```
cdfDisableScaleFactorRetentionForZero(
     )
     => t
```

Description

Disables the unit scale factor retention for CDF parameters enabled using the cdfEnableScaleFactorRetentionForZero function.

Value Returned

`t`	Always returns `t`.

Other SKILL Functions

cdfParseFloatString

```
cdfParseFloatString(
     t_string
     )
     => nil / d_value / t_string
```

Description

This function uses the standard `strtod` (string to double) function to parse the input string. When the input string contains trailing non-numerical characters, the fragment of the string is compared against a supported set of scale factor designators.

For information on scale factors, see *NFET Examples*.

Value Returned

`nil`	when the input string cannot be parsed as a float value or without a valid scale factor, as shown below: `cdfParseFloatString("1g") => nil`

d_value (a float value)	when the input string can be parsed as a float value with or without a valid scale factor, as shown below:
	`cdfParseFloatString("1.0") => 1.0`
	`cdfParseFloatString("1.0u") => 1e-06`

the given string	when the input string does not contain a valid numerical representation for a float value. For example, the input string starting with a non-digit character as shown below: `cdfParseFloatString("abcd") => "abcd"`

cdfFormatFloatString

```
cdfFormatFloatString(
     t_string
     t_scaleFactor
     )
     => nil / t_val
```

Description

This function formats the input string into a value representation, if possible. It formats the input string using the input scale factor, re-converts the value to a string, and then returns the formatted string value. If the input string cannot be converted, the input string is returned with no change to it.

Arguments

t_string	a string representing a float value
t_scaleFactor	a string representing a scale factor

Value Returned

`nil`	if the `t_scaleFactor` given is invalid
t_val	when the input string can be formatted using the input scale factor. Else, the input string is returned without any change to it.

Example

```
cdfFormatFloatString("123.4" "m") => "123400.0m"
cdfFormatFloatString("10000" "M") => "0.01M"
```

cdfSyncInstParamValue

```
cdfSyncInstParamValue(
     d_instId1
     d_instId2
     )
     => t / nil
```

Description

This function generates all the CDF parameters for the first instance (`d_instId1`) and updates the second instance (`d_instId2`) with the same values. Both the instances must share the same cell.

cdfUpdateInstSingleParam

```
cdfUpdateInstSingleParam(
     d_instId
     t_paramName
     )
     => t / nil
```

Description

This function copies the specified parameter's (`t_paramName`) effective value to the specified instance (*d_instId*).

Invoking the Edit CDF Form

You have the option of modifying how the Edit CDF form opens. You can use `aedEditCDF` to specify initial library, cell, and type values.

aedEditCDF

```
aedEditCDF(
     [ ?libName t_libraryName ]
     [ ?cellName t_cellName ]
     [ ?cdfType t_cdfType ]
     )
     => t
```

Description

Opens the Edit CDF form to the library, cell, and CDF type specified by *libraryName*, *cellName*, and *cdfType*.

libraryName and *cellName* must be strings referring to an existing library or cell, and *cdfType* must be `'effective'`, `'base'`, or `'user'`.

cdfGetCustomViaCDF

```
cdfGetCustomViaCDF(
     d_customViaId
     )
     => g_cdfDataId / nil
```

Description

Returns the effective CDF description associated with a customVia or returns nil. When the customVia's cell or library has a base or user-level CDF defined, it returns the *g_cdfDataId*, otherwise returns `nil`.

cdfUpdateCustomViaParam

```
cdfUpdateCustomViaParam(
    d_customViaId
    )
    => t / nil
```

Description

Stores the parameters specified in the effective cell CDF of the customVia in the specified customVia instance. When the specified ID is not for a customVia instance or the instance master does not have CDF definition, it returns `nil`.

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Reliability Functions

This chapter describes the reliability functions that you can use to integrate the third party simulators into ADE. With the help of these SKILL functions, you can integrate your reliability flow into ADE and also modify the Reliability user-interface.

- relxAddReliabilityInStateComponent
- relxAddReliabilityOption
- relxCreateRunObjectFile
- relxDisplayReliabilityForm
- relxDisplayResult
- relxFormatRXControlFile
- relxGetModifyNetlistVal
- relxGetMosAgingTimeUnitVal
- relxGetMosAgingTimeVal
- relxGetReliabilityOptionChoices
- relxGetReliabilityOptionVal
- relxGetRelxStage
- relxGetStressFileDir
- relxGetRXControlFileName
- relxGetSimulationRunCommand
- relxGetSpecifiedReliabilityStateFileName
- relxGetUserCmdLine
- relxHighLightDevices
- relxInitAdapterReliabilityOption

- relxInitReliabilityOption
- relxIsAgingOn
- relxIsReliabilityEnabled
- relxIsStressOn
- relxPostSimulation
- relxRunSimulation
- relxSetAgingVal
- relxSetReliabilityOptionFormProperties
- relxSetReliabilityOptionVal
- relxSetReliabilityVal

relxAddReliabilityInStateComponent

```
relxAddReliabilityInStateComponent (
     t_sessionName
     )
     => t / nil
```

Description

Adds the Reliability Setup option in the save and load state forms of the specified session. To reuse the save and load state flow of ADE in your simulator, you can rewrite this function and ensure that the function returns `t`.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

`t`	Returns `t` when the function is rewritten for other sessions.
`nil`	Returns `nil` when the function is run in the specified session.

Example

In this example, the function adds the Reliability Setup option to the save and load state flow in the current session.

```
session = asiGetCurrentSession()
relxAddReliabilityInStateComponent(session)
```

relxAddReliabilityOption

```
relxAddReliabilityOption (
     t_toolName
     [ ?name t_name ]
     [ ?value t_value ]
     [ ?type t_type ]
     [ ?mode t_mode ]
     [ ?enabled g_enabled ]
     [ ?prompt t_prompt ]
     [ ?display g_display ]
     [ ?choices l_choices ]
     [ ?callback g_callback ]
     [ ?formApplyCB g_formApplyCB ]
     [ ?page t_page ]
     [ ?coordinates l_coordinates ]
     [ ?private g_private ]
     )
     => t_relVar / nil
```

Description

Adds a variable to the specified Reliability tool.

Arguments

`t_toolName`	Name of the Reliability tool to which you want to add the variable.
`?name t_name`	Name of the variable to be added.
`?value t_value`	Value of the variable according to the type of the variable.
`?type t_type`	Type of the variable to be added. Default value: `string`. Possible values: `radio`, `boolean`, `separator`, `label`, `cyclic`, `string`, `toggle`, or `button`.
`?mode t_mode`	Specifies the file in which the specified variable is to be added. Possible values: `existingFile` or `anyFile`.
`?enabled g_enabled`	Enables or disables the variable. When set to `t`, the variable is enabled, When set to `nil`, the variable is disabled and becomes inactive in the form.
`?prompt t_prompt`	Description to be displayed on the form.
`?display g_display`	Controls the display of variable on the form. If this argument is set to `nil`, the variable is not displayed on the form.
`?choices t_choices`	List of choices, if the variable has multiple choices of values.
`?callback g_callback`	Calls the `callback` function when the value of the variable is changed.
`?formApplyCB g_formApplyCB`	
	Calls the `formApplyCB` function set when a button, such as *OK*, *Apply*, and so on, is clicked.
`?page t_page`	If the form includes multiple pages, specify the page where the variable is to be added.
`?coordinates l_coordinates`	
	Specifies the coordinates on the Reliability form where the variable is to be added. The coordinates are specified as: `list(x:y width:height labelWidth)`.

`?private` *`g_private`*	Boolean that indicates whether the variable is private and not to be included in netlist. If set to `t`, the variable is not included in the netlist. The default value of this argument is `nil`, which means that the variable is netlisted by default.

Value Returned

`t_relVar`	For the specified analog tool, the function returns the variable object.
`nil`	For any other tool, return value is `nil`.

Example

In the example given below, the function adds a variable, *test2*, of type `radio` on the Reliability form with the following argument values:

```
relxAddReliabilityOption (
tool
?name 'test2
?type 'radio
?prompt "Test2 Mode"
?display 'FuncGetDisplay(hiGetCurrentForm())
?choices list( "mode1" "mode2" )
?enabled     'FuncEnable( hiGetCurrentForm() )
?callback "TestModeCB()"
?formApplyCB 'TestModeAppCB
?value "mode1"
?page"Basic"
?coordinates list( xOrig:yCoor+delta fieldWidth:delta labelWidth )
?private nil
)
```

relxCreateRunObjectFile

```
relxCreateRunObjectFile(
     t_sessionName
     )
     => t / nil
```

Description

Creates the `runObject` file for the specified session.

You need to rewrite this function if you have a different results directory as compared to the results directory for analyses in Spectre.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

`t`	If the session is created using Spectre, returns `t` if there is no error.
`nil`	Returns `nil` and displays an error message in CIW if there is an error. Also, for any other session, returns `nil`.

Example

Consider the following example in which the ADE L session is created using Spectre. Now, if you run the `relxCreateRunObjectFile` function, it returns `t` when the `runObject` file is successfully created.

```
session = asiGetCurrentSession()
relxCreateRunObjectFile(session)
=> t
```

relxDisplayReliabilityForm

```
relxDisplayReliabilityForm(
     s_sevSession
     )
     => t / nil
```

Description

Displays the Reliability form for the specified session.

Arguments

s_sevSession	The simulation environment session.

Value Returned

`t`	For the specified session, the return value is `t` when the function runs successfully and reliability form is displayed.
`nil`	For any others session, returns `nil`. Also, returns `nil` if there is an error.

Example

In this example, the function displays the Reliability form for the specified `sev` session and returns `t`.

```
relxDisplayReliabilityForm(sevSession)
=> t
```

relxDisplayResult

```
relxDisplayResult (
     t_sessionName
     t_file
     )
     => t / nil
```

Description

Displays the specified result log file.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.
t_file	Name or path of the results log file. **Note:** If the value of this argument is a filename, the function searches for the specified filename in the netlist directory and displays when found.

Value Returned

`t`	For the specified session, returns `t` if function runs successfully.
`nil`	For any other session, returns `nil`. Also, returns `nil` if there is an error.

Example

In the example given below, the function searches for `relXpert` log file in the netlist directory and opens the file when it is found. When the file is found, returns `t`, else displays a warning message.

```
session = asiGetCurrentSession()
relxDisplayResult(session "relxpert.log")
```

In the example given below, the function searches for `relXpert` log file at the specified path and opens the file when it is found. When the file is found, returns `t`, else displays a warning message.

```
relxDisplayResult(session “/dir/relxpert.log”)
```

relxFormatRXControlFile

```
relxFormatRXControlFile(
     t_sessionName
     )
     => t / nil
```

Description

When the session is created using Spectre, this function creates a file that includes all the possible options for Relxpert Reliability simulator mode. This function does not work for other sessions. If Lynx's netlist flow is based on the result of this function, you need to rewrite the `relxGetRXControlFileName` function.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

`t`	For the specified Spectre session, returns `t` when the function runs successfully. Also, for any other session, returns `t`.
`nil`	Returns `nil` if there is an error.

Example

Consider the following example in which the ADE L session is created using Spectre. Now, if you run this function, it returns `t` when the file containing the Relxpert Reliability simulator options is successfully created.

```
session = asiGetCurrentSession()
relxFormatRXControlFile(session)
=> t
```

relxGetModifyNetlistVal

```
relxGetModifyNetlistVal(
     t_sessionName
     )
     => t / nil
```

Description

Checks whether to modify the netlist before aging starts. You can rewrite this function as per your requirements.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

`t`	When the session is created using Spectre, returns `t` if the netlist is to be modified.
`nil`	Returns `nil` if the netlist is not to be modified or if there is an error. Also, for any other session, returns `nil`.

Example

Consider the following example in which you create an ADE L session using Spectre. Now, if you run the `relxGetModifyNetlistVal` function, the function returns `t` if the netlist is to be modified. Otherwise, returns `nil`.

```
session = asiGetCurrentSession()
relxGetModifyNetlistVal(session)
=> t / nil
```

relxGetMosAgingTimeUnitVal

```
relxGetMosAgingTimeUnitVal(
     t_sessionName
     )
     => t_agingTimeUnit / nil
```

Description

Returns the unit of aging time, which can be represented in years, days, hours, minutes or seconds. Only one unit of time is supported for a given simulation run.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

t_agingTimeUnit	When the session is created using Spectre, returns the aging time unit.
`nil`	For any other session, returns `nil`. Also, returns `nil` if there is an error.

Example

Consider the following example in which you create a session using Spectre simulator. Now, if you run the `relxGetMosAgingTimeUnitVal` function, it returns the aging time unit in years.

```
session = asiGetCurrentSession()
relxGetMosAgingTimeUnitVal(session)
```

relxGetMosAgingTimeVal

```
relxGetMosAgingTimeVal (
     t_sessionName
     )
     => t_agingTimeValue / nil
```

Description

Returns the aging time value of the simulation in the specified session. The aging time can be in years, days, hours, minutes or seconds. Only one unit of time is supported for a given simulation run.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

t_agingTimeValue	When the session is created using Spectre, returns the aging time value of the simulation in the specified session.
`nil`	For any other session, returns `nil`. Also, returns `nil` if there is an error.

Example

In the example given below, suppose the simulation aging time value in the current Spectre session is `10`. In this case, the `relxGetMosAgingTimeVal` function returns the value `10`.

```
session = asiGetCurrentSession()
relxGetMosAgingTimeVal(session)
=> 10
```

relxGetReliabilityOptionChoices

```
relxGetReliabilityOptionChoices(
    t_sessionName
    s_optionName
    )
    =>  t_optionValues / nil
```

Description

Returns the possible values for the specified Reliability option in the given analog session. This function works for fields that are of type radio, cyclic, and toggle.

Note: It is a unit function used for netlist and control flow. It is recommended not to rewrite this function.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.
s_optionName	Name of the option whose possible values you want to return. Ensure that you specify the same option name as defined in your session. The name should be in symbol format.

Value Returned

t_optionValues	Returns possible values for the specified Reliability option in the given session.
`nil`	For any other session, returns `nil`. Also, returns `nil` if there is an error.

Examples

Consider the example given below, in which you create an ADE L session using Spectre. The current session name is returned as shown:

```
session = asiGetCurrentSession()
```

Now, if you run the `relxGetReliabilityOptionChoices` function for the current session and variable name is `AnalysisType`, the function returns the all possible types for analysis, such as tran, AC, DC.

```
relxGetReliabilityOptionChoices(session ‘AnalysisType)
)
```

relxGetReliabilityOptionVal

```
relxGetReliabilityOptionVal(
     t_sessionName
     s_optionName
     )
     => t_reliabilityOptionValue/ nil
```

Description

Returns the value of the specified Reliability option variable in the given session.

Note: It is a unit function for netlist and control flow. It is recommended not to rewrite this function.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.
s_optionName	Name of the variable whose value you want to return. The value should be in symbol format.

Value Returned

t_ReliabilityOptionValue	
	For Spectre session, returns the value of the specified Reliability option.
`nil`	For any other session, returns `nil`. Also, returns `nil` if there is an error.

Example

In this example, the function returns the value of Reliability option `xyz`.

```
session = asiGetCurrentSession()
relxGetReliabilityOptionVal(session 'xyz')
```

relxGetRelxStage

```
relxGetRelxStage(
     o_session
     )
     => t_relxStage / nil
```

Description

Returns the current stage of the reliability simulation in the given session.

Arguments

o_session	Session object of the current session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

t_relxStage	
	Returns one of the following values:
	`stress`: Stress simulation stage
	`aging`: Aging simulation stage
	`all`: Stress and aging simulations are running on a single netlist.
`nil`	Returns an empty string if reliability analysis is not enabled in the test setup or if there is an error.

Example

In this example, the function returns "`aging`", which indicates that the current stage of reliability simulation is `aging`.

```
session = asiGetCurrentSession()
relxGetRelxStage(session)
"aging"
```

relxGetStressFileDir

```
relxGetStressFileDir(
     o_session
     )
     => t_stressFileDir / nil
```

Description

Returns the directory of the stress file.

Arguments

o_session	Session object of the current session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

t_stressFileDir	Directory where the stress file, `input.bs0`, is saved.
`nil`	Returns `nil` if reliability analysis is not enabled in the test setup or if there is an error.

Example

In this example, the function returns the directory of the stress file.

```
session = asiGetCurrentSession()
relxGetStressFileDir(session)
```

relxGetRXControlFileName

```
relxGetRXControlFileName(
    t_sessionName
    )
    => ""/ t_RXControlFilename / nil
```

Description

Returns the name of the `RXControl` file.

If you want to format your `RXControl` file, you need to rewrite this function.Then, the function returns the name of the formatted `RXControl` file.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

""	Returns an empty string as the filename in the specified Spectre session because by default netlist does not perform any operation.
t_RXControlFilename	Returns the `RXControl` filename when the function is rewritten.
`nil`	Returns `nil` if there is an error.

Example

Consider the following example in which the ADE L session is created using Spectre. If you run this function, it returns an empty string.

```
session = asiGetCurrentSession()
relxGetRXControlFileName(session)
=> ""
```

relxGetSimulationRunCommand

```
relxGetSimulationRunCommand (
     t_sessionName
     )
     => t_runSimulationFileName / nil
```

Description

Formats the content of the simulation run file present in the netlist directory. This file is required to run simulation flow.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

t_runSimulationFileName	For the specified Spectre session, returns the name of the simulation run file.
`nil`	Returns `nil` for any other sessions or if there is an error.

Example

In this example, the function returns the name of the simulation run file for the current session.

```
session = asiGetCurrentSession()
relxGetSimulationRunCommand( session )
```

relxGetSpecifiedReliabilityStateFileName

```
relxGetSpecifiedReliabilityStateFileName (
     t_sessionName
     )
     => t_filename/ nil
```

Description

Returns the name of the state file used the Reliability form. By default, the name of the state file is `relxOptions`. However, you can rewrite this function to define another name for the state file for your simulator.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

t_filename	If the session is created using Spectre, returns the name of the state file.
nil	For any other sessions, returns `nil`. Also, returns `nil` if there is an error.

Example

Consider the below example in which you define the name of the state file for your simulator. The `asiGetSpecifiedReliabilityStateFileName` function returns the specified name of the state file.

```
(defmethod asiGetSpecifiedReliabilityStateFileName((session
asiAnalogAdapter_session))
    "LynxOptions"
)
session = asiGetCurrentSession()
asiGetSpecifiedReliabilityStateFileName(session)
=> LynxOptions
```

relxGetUserCmdLine

```
relxGetUserCmdLine (
     t_sessionName
     )
     => t_UserCmdLine / nil
```

Description

Returns the value of the `userCmdLine` option in the specified session.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

t_UserCmdLine	When the session is created using Spectre, returns the value of `userCmdLine` option(s) for Spectre.
`nil`	For any others sessions, returns `nil`. Also, returns `nil` if there is an error.

Example

Consider the example given below, in which you create an ADE L session using Spectre and specify `+aps` command-line option for Spectre. In this case, this function returns `+aps`.

```
session = asiGetCurrentSession()
relxGetUserCmdLine (session)
=> aps
```

relxHighLightDevices

```
relxHighLightDevices(
     t_sessionName
     l_instList
     l_tagList
     )
     => t / nil
```

Description

Highlights the specified device and instance list on schematic, and also displays information for the selected devices and instances in the form of tags.

Note: It is recommended not to rewrite this function.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.
l_instList	List of instances that you want to highlight on schematic.
l_tagList	List of tags used to highlight the specified instances.

Value Returned

`t`	For the specified Spectre session, returns `t` when the function runs successfully.
`nil`	Returns `nil` if there is an error. Also, for any other session, returns `nil`.

Example

Consider the example given below, in which you create an ADE L session using Spectre. You can use the `relxHighLightDevices` function to highlight the following instances with special tags.

```
session = asiGetCurrentSession()
instList = '((nil nbti 0.1232 hci_nbti 0.1237
    agetime "10.00yrs" instname "I0.I0.M#2310#" maxIb
    1.686e-09 avgIb 6.572e-11 maxIg 1.265e-12
    avgIg 6.387e-14 Degrad 0.1237
```

```
    )
    (nil nbti 0.1229 hci_nbti 0.1234
    agetime "10.00yrs" instname "I0.I1.M#2310#" maxIb
    1.781e-09 avgIb 7.977e-11 maxIg 1.311e-12
    avgIg 7.737e-14 Degrad 0.1234
    )
    (nil nbti 0.1258 hci_nbti 0.1264
    agetime "10.00yrs" instname "I0.I2.M#2310#" maxIb
    1.687e-09 avgIb 6.534e-11 maxIg 1.265e-12
    avgIg 6.354e-14 Degrad 0.1264
    )
)
taglist = '(hci nbti)
relxHighLightDevices(session instList taglist)
```

relxInitAdapterReliabilityOption

```
relxInitAdapterReliabilityOption(
     t_toolName
     )
```

Description

Rewrites the `asiInitialize` function when called in the initialization flow for the specified tool. This function internally calls the `relxInitReliabilityOption` function and also adds some private variables to this function.

Note: It is recommended not to rewrite this function.

Arguments

t_toolName	Name of the tool for which you want to rewrite the `asiInitialize` function.

Value Returned

None

Example

```
relxInitAdapterReliability(tool)
```

relxInitReliabilityOption

```
relxInitReliabilityOption (
     t_toolName
     )
     => nil
```

Description

Initializes the Reliability Option form in the specified tool. You can rewrite this function by using unit functions `relxAddReliabilityOption` and `relxSetReliabilityOptionFormProperties`.

Arguments

t_toolName	Name of the tool in which the Reliability Option form is to be initialized.

Value Returned

`nil`	Returns `nil` by default. **Note:** This function can be rewriten to return any user specified value.

Example

In this example, the function initializes the Reliability Option form in the specified tool.

```
relxInitReliabilityOption(tool)
```

The example below shows the function code used to rewrite the `relxInitReliabilityOption` function:

```
(defmethod relxInitReliabilityOption ((tool asiAnalogAdapter))
    (let ((xOrig 5) (yOrig 10) (delta 35) (fieldWidth 600) (labelWidth 260)
        (yCoor 10))

    pageList =  list(list("Basic" 'custom) list("Advanced" 'custom))

        relxSetReliabilityOptionFormProperties( tool
            ?title          "Reliability"
            ?width          xOrig*2+fieldWidth
            ?height         yOrig+delta*30
            ?type           'multiPage
            ?groupType      'tabs
            ?pageList       pageList
```

```
            )
) )
```

relxIsAgingOn

```
relxIsAgingOn (
     t_sessionName
     )
     => t / nil
```

Description

Checks whether aging is ON or OFF in the specified session.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

`t`	Returns `t` when the aging is ON in the specified Spectre session.
`nil`	Returns `nil` when aging is OFF in the specified Spectre session or if there is an error. Also, returns `nil` for any other sessions.

Example

In this example, the function returns `t` if aging is ON in the current session.

```
session = asiGetCurrentSession()
relxIsAgingOn (session)
=> t
```

relxIsReliabilityEnabled

```
relxIsReliabilityEnabled(
     t_sessionName
     )
     => t / nil
```

Description

Checks whether the Reliability analysis is enabled or disabled in the specified session.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

`t`	Returns `t` when the Reliability analysis is enabled in the specified Spectre session.
`nil`	Returns `nil` when the Reliability analysis is disabled in the specified Spectre session or if there is an error. For other sessions, return value is always `nil`.

Example

Consider the following example in which the ADE L session is created using Spectre. Now, when you run the `relxIsReliabilityEnabled` function, it returns `t` if the Reliability analysis is enabled.

```
session = asiGetCurrentSession()
relxIsReliabilityEnabled(session)
=> t
```

relxIsStressOn

```
relxIsStressOn(
     t_sessionName
     )
     => t / nil
```

Description

Checks whether the stress is ON or OFF in the specified session.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

`t`	Returns `t` when the stress is ON in the specified session.
`nil`	Returns `nil` when the stress is OFF or if there is an error. Also, returns `nil` when you are using other sessions.

Example

In this example, the function returns `t` if the stress is ON in the current session.

```
session = asiGetCurrentSession()
relxIsStressOn (session)
=> t
```

relxPostSimulation

```
relxPostSimulation (
     t_sessionName
     )
```

Description

Used to post process the simulation result.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

`t`	Returns `t` when the function runs successfully.
`nil`	Returns `nil` if there is an error.

Example

In this example, the function posts the simulation results in the current session.

```
session = asiGetCurrentSession()
relxPostSimulation(session)
```

relxRunSimulation

```
relxRunSimulation(
     t_sessionName
     )
     => t_processId / nil
```

Description

Runs the Relxpert simulation.

Note: It is recommended not to rewrite this function.This function can be added to the `asiRunSimulation` function when you rewrite it.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.

Value Returned

t_processId	Returns a string that displays the process ID, which can be pending, error, complete, and so on.
nil	Returns `nil` for other sessions or if there is an error.

Example

In this example, the function runs the simulation for Relxpert in the current session.

```
session = asiGetCurrentSession()
relxRunSimulation(session)
```

relxSetAgingVal

```
relxSetAgingVal (
     t_sessionName
     g_value
     )
     => t / nil
```

Description

Enables or disables aging for simulation in the specified session. Also sets the specified simulation aging value, while enabling aging.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.
g_value	Aging value that you want to set. The format of value depends on the definition of aging variable.

Value Returned

`t`	When the session is created using Spectre, this function returns `t`, when the aging value is successfully set.
`nil`	Returns `nil` when there is an error. Also, returns `nil` for any other sessions.

Example

In the example given below, the function sets the aging value as `10` in the current session.

```
session = asiGetCurrentSession()
relxSetAgingVal(session ‘10’)
=> t
```

relxSetReliabilityOptionFormProperties

```
relxSetReliabilityOptionFormProperties(
     t_toolName
     [ ?title t_title ]
     [ ?width d_width ]
     [ ?height d_height ]
     [ ?columns d_columns ]
     [ ?help   s_help ]
     [ ?type t_type ]
     [ ?groupType t_groupType ]
     [ ?pageList l_pageList ]
     )
     => o_formObj / nil
```

Description

Sets the various properties of the Reliability form.

Arguments

t_toolName	Name of the tool.
?title *t_title*	Title of the form.
?width *d_width*	Width of the form (in pixels).
?height *d_height*	Height of the form (in pixels).
?column *d_columns*	Number of columns.
?help *s_helpSymbol*	Help symbol of the form.
?type *t_Type*	Type of the form. Indicates if the form covers one page or multiple pages. Possible values: `oneD` or `multiPage`.
?groupType *t_groupType*	Group type to be used in a multiple page form. Possible values: `tabs` or `trees`.
?pageList *t_title*	List of pages and their types.

Value Returned

o_formObj	Returns the Reliability form object.
nil	For any other tools, returns `nil`. Also returns `nil` if there is an error.

Example

Consider the example given below, in which you create an ADE L session using Spectre and run this function using the following argument values:

```
relxSetReliabilityOptionFormProperties (
tool
?title "Reliability"
?width 600
?height 80
?type 'multiPage
?groupType 'tabs
?pageList list(list("Page1" 'custom) list("Page2" 'custom))
)
```

relxSetReliabilityOptionVal

```
relxSetReliabilityOptionVal(
     t_sessionName
     s_optionName
     t_value
     )
     => g_value / nil
```

Description

Sets the value of the specified Reliability option variable in the given session.

Note: It is a unit function for netlist and control flow. It is recommended not to rewrite this function.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.
s_optionName	Name of the Reliability option whose value you want to set. Ensure that you use the same option name as defined in your analog session. The option name should be in symbol format.
t_value	The value that you want to assign to the specified Reliability option. The value depends on the variable type.

Value Returned

g_value	For Spectre session, returns the value of the Reliability option variable.
`nil`	For any other sessions, returns `nil.Also, returns nil` if there is an error.

Example

Consider the example given below, in which the ADE L session is created using Spectre. You can use the following function to set the value of the specified reliability option variable as `STRESS`.

```
session = asiGetCurrentSession()
relxSetReliabilityOptionVal(session 'variable_name "STRESS")
```

Now, return the specified value using the following function:

```
relxGetReliabilityOptionVal(session 'variable_name)
=> STRESS
```

relxSetReliabilityVal

```
relxSetReliabilityVal(
     t_sessionName
     g_value
     )
     => t / nil
```

Description

Enables or disables the Reliability analysis in the specified session.

Arguments

t_sessionName	Name of the Spectre session. You can also use the `asiGetCurrentSession` function to specify the current session.
g_value	Boolean indicating whether you want to enable or disable reliability analysis in the specified session. When set to `t`, reliability analysis is enabled. When set to `nil`, it is disabled.

Value Returned

`t`	Returns `t` if reliability analysis is enabled in the specified Spectre session.
`nil`	Returns `nil` if reliability analysis is disabled or if there is an error.

Example

In this example, the function returns `t` because you enable the reliability analysis in the current session.

```
session = asiGetCurrentSession()
relxSetReliabilityVal (session t)
=> t
```

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Simulator Integration Functions

This chapter describes the functions used to generate the waveform data required to preview stimuli created using the Stimuli Assignment form in ADE Explorer and ADE Assembler.

asiStmSupportWaveformGeneration

```
asiStmSupportWaveformGeneration(
     o_session
     )
     => t / nil
```

Description

Determines whether the Stimuli Assignment form supports waveform preview functionality or not.

Arguments

o_session	The OASIS session object.

Value Returned

`t`	Returns `t` if the integrated simulator supports waveform preview functionality in the *Stimuli Assignment form.*
`nil`	Returns `nil` if the integrated simulator does not support the waveform preview functionality in the *Stimuli Assignment form.*

asiStmGenerateNetlist

```
asiStmGenerateNetlist(
     o_session
     wavepath
     nodeDesc
     [?o_simOptions]
     )
     => l_netlistStatus
```

Description

Generates netlist, as part of preview waveform generation for a stimuli and saves it at the specified psf directory path.

Arguments

o_session	The Simulator OASIS session object.
wavepath	The path of the directory to create netlist.
nodeDesc	Stimuli input description from the OASIS stimulus session
?o_simOptions	Optional argument that specifies the simulator options such as stopTime.

Value Returned

l_netlistStatus	Returns an association list of the following key/value pairs: `list(list('success t/nil)` `list('waveName <waveform name>)`

asiStmRunSimulation

```
asiStmRunSimulation(
    o_session
    wavepath
    nodeDesc
    [?o_simOptions]
    [?o_varDefinitions]
    )
    => l_simStatus
```

Description

Runs a simulation by using the netlist generated by SKILL function asiStmGenerateNetlist, and writes the psf waveform data at the specified path.

Arguments

o_session	The Simulator OASIS session object.
wavepath	The psf directory path.
nodeDesc	Stimuli input description from the OASIS stimulus session
?o_simOptions	Optional argument that specifies the simulator options such as stopTime
?o_varDefinitions	Optional argument that specifies the list of variable values.

Value Returned

l_simStatus

Returns an association list of the following key/value pairs:

```
list(list('success t/nil)
list('waveName <name to plot>)
list('shortMsg "")
list('logFile' <path relative to
wavePath of simulation log file>)
list('netlist <path relative to
wavePath for netlist file>)
)
```

asiStmGenerateWaveform

```
asiStmGenerateWaveform(
     o_session
     session_wavepath
     directory_stimuliDesc
     [?o_simOptions]
     [?o_varDefinitions]
     )
     => l_waveStatus
```

Description

Generates preview waveforms for the specified stimuli under the given directory path.

Arguments

o_session	The Simulator OASIS session object.
wavepath	The psf directory path.
nodeDesc	Stimuli input description from the OASIS stimulus session
?o_simOptions	Optional argument that specifies the simulator options such as stopTime.
?o_varDefinitions	Optional argument that specifies the list of variable values.

Value Returned

l_waveStatus Returns an association list of the following key/value pairs:

```
list( list('success t/nil)
list('waveName <name to plot>)
list('shortMsg "")
list('logFile' <path relative to
wavePath of simulation log file>)
list('netlist <path relative to
wavePath for netlist file>)
)
```