
RELEASE NOTES

VERSION 6.1

OVERVIEW

This document describes SIMetrix and SIMetrix/SIMPLIS version 6.1

DESIGN VERIFICATION MODULE

SUPPORT FOR SIMETRIX

Previous versions supported SIMPLIS only. Now DVM has been enhanced to allow design verification using the SIMetrix simulator.

NEW ADVANCED FEATURES

1. Test selection GUI
2. Support for multiple sources and loads
3. Support for user testplans

DVM TEST DEFINITION SYNTAX SUPPORTS

1. Simulation engine selection (SIMPLIS/SIMetrix)
2. Dynamic source/load configuration
3. Analysis selection/configuration
4. .INCLUDE directives
5. .VAR/.PARAM/.GLOBALVAR definitions
6. On-the-fly setting of property values
7. .TEMP directives (if supported by the simulator)
8. Hierarchical test naming (for output report generation)

SCHEMATIC ENHANCEMENTS

COPY HIERARCHY

A new menu is provided which will copy all the files making up a schematic hierarchy to a new location. Currently this has some limitations as follows:

1. All child components must be referenced using relative paths
2. All child components must be either in the same directory as the root or in a directory that is a direct descendant of the root.

VIEW/EDIT MODELS

It is now possible using a right click context menu to view or edit the model used for a schematic instance. This currently only works for models obtained from the global library,

The feature shows the text of the model and allows per-instance local modifications to be made

ZOOM USING SCROLL WHEEL

The schematic can now be zoomed in and out using the scroll wheel with the control key held down

IMPROVEMENTS TO ARBITRARY SOURCE

Enhancements to schematic support for non-linear transfer function device (arbitrary source). Can specify to build using Verilog-A (if license available) for improved performance and wider range of functions. Can also use any pinname not just pre-defined N1, N2 etc.

USER INTERFACE FOR ACTABLE DEVICE

See menu Place | Passives | S-Parameter Table Lookup Device

WAVEFORM VIEWER

GRAPH ZOOM

Previously with a multi-grid graph, the zoomed area was defined by the selected grid axis. Many users found this counter-intuitive. The default behaviour has now changed so that the reference y-axis is defined by the grid that holds the first mouse click. This is the new default behaviour but the old behaviour may be restored using the command line option setting , “Set GraphZoomMode=SelectedGrid”

Further, if you drag a horizontal line in an inactive area, the x-axis alone will be zoomed.

FIXED PROBE IMPROVEMENTS

Fixed probe changes. Fixed probes in earlier versions tended to plot on same graph but this was not always desired. Now different schematics will use a different graph. Also if an empty graph sheet is selected, any probe using a default graph will be plotted in it.

PER-CYCLE PLOT FUNCTIONS

A set of new probe functions for plotting various per-cycle measurements had been added to SIMetrix/SIMPLIS 6.10. For example, it might be desirable to plot the per-cycle duty cycle of the ON-time of a power MOSFET during a load transient simulation.

This set of new probe functions can be accessed by clicking the following sequence in the schematic editor: Probe | More Probe Functions...

and these new probe functions are grouped under two categories:

Selected Curves Per Cycle Measurement
Single Ended Voltage Per Cycle Measurement

SINGLE ENDED VOLTAGE PER CYCLE MEASUREMENT

From the category of "Single Ended Voltage Per Cycle Measurement," you can plot

Per Cycle Frequency, or
Per Cycle Period

of the waveform associated with a node voltage in the schematic.

Once you have selected "Per Cycle Frequency" or "Per Cycle Period" and click OK, the "probe" symbol will appear in the schematic editor for you to select the node to measure the frequency or the period. Once you have clicked the appropriate node, a curve plotting the per-cycle frequency or per-cycle period of the associated node voltage will be displayed in the graph window. If the associated node voltage is running at a fixed frequency, the plotted per-cycle frequency or per-cycle period should be a flat curve. On the other hand, if the associated node voltage is running at a variable frequency, the plotted per-cycle frequency or per-cycle period should show such a variation in the frequency or period over time.

The probe function determines period by attempting to detect rising and falling edges. So the per-cycle measurement will be more accurate if it is working on a node voltage that has very sharp rising and falling edges.

If the node voltage is made up of a train of well-defined pulses, the probe function is smart enough to figure out whether the rising edges or the falling edges should be used to define the per-cycle period. Hence, this new probe function can be used to measure the per-cycle frequency or per-cycle period of a periodic but pulse-width modulated waveform as well.

SELECTED CURVES PER CYCLE MEASUREMENT

From the category of "Selected Curves Per Cycle Measurement," you can plot

Per Cycle Duty Cycle of Selected Curves, or
Per Cycle Maximum of Selected Curves, or
Per Cycle Mean of Selected Curves, or
Per Cycle Minimum of Selected Curves, or
Per Cycle ON Time of Selected Curves, or
Per Cycle RMS of Selected Curves

As their names implied, these measurements are applied to curves that have been displayed in the graph window. They require 1) a single-ended node voltage to define the reference frequency or period, and 2) at least one of the curves in the graph window selected. By allowing the user to select a single-ended node voltage to define the reference frequency, it allows for the possibility of using a signal that has shaper rising and falling edges to define the per-cycle frequency or per-cycle period.

To perform one of these per-cycle measurements of selected curves, the user should first click and select one or more curves in the graph window. Then the user can go to the schematic editor and click Probe | More Probe Functions..., select the appropriate per-cycle measurement, and then click OK. The probe "symbol" will appear in the schematic editor for you to select the node voltage to define the reference period. Once you have clicked the appropriate node, appropriate curve(s) plotting the per-cycle measurement of selected curve(s) will be displayed in the graph window.

SIMPLIS IMPROVEMENTS

DISCRETE IIR FILTERS

A set of new discrete filter components is now available for use with the SIMPLIS simulator. These components can be accessed through the drop-down menu sequence of Place | Digital | Advanced Digital (with ground ref) in the schematic editor when the schematic is set to use SIMPLIS as the simulator.

Currently, there are five components available:

1. Sampling Clock Generator for Discrete Filters
2. 1-pole Discrete Filter
3. 2-pole Discrete Filter
4. PID Discrete Filter
5. Track and Hold for Discrete Filter

An example directory named "Discrete IIR Filters" containing example schematics for the discrete filters is now placed alongside the "Boost_Converter," "Digital_PWM," and "UC3854" example directories

.POST_PROCESS AND .FILE/.ENDF

The SIMPLIS simulator now supports the `.post_process` statement. This has been available in SIMetrix since version 5.4

The syntax of the `.POST_PROCESS` command when used with the SIMPLIS simulator is exactly the same as the syntax of the `.POST_PROCESS` command when used with the SIMetrix simulator. If the following is defined in the F11 window,

```
.POST_PROCESS scriptname [arguments]
```

the SIMetrix script `scriptname` is invoked at the end of a successful analysis. If present, arguments will be passed to the script as a single string. `scriptname` may be the name of a SIMetrix command, the name of a script file, or the name of an embedded file defined using `.FILE` and `.ENDF`.

`.POST_PROCESS` may be used to perform measurements on simulation results for display in the command shell or written to a file. The "Freq_Response.sxsch" schematic in the "Boost Converter" example in SIMPLIS has been updated to show how the `.POST_PROCESS` command can be used with the SIMPLIS simulator. Users can open up the F11 text window in that schematic to see how the `.POST_PROCESS` command can be used. For information about the SIMetrix script language, please refer to the SIMetrix script reference manual.

In SIMetrix/SIMPLIS 6.10, the SIMPLIS simulator will support the `.FILE / .ENDF` file construct to define an embedded temporary script file to be used by the `.POST_PROCESS` command. As explained in the section on the `.POST_PROCESS` command, the `scriptname` in the `.POST_PROCESS` command may be the name of an embedded file defined using the `.FILE` and `.ENDF` construct.

The `.FILE / .ENDF` construct, when used with the SIMPLIS simulator to define an embedded temporary script file, has the following syntax:

```
.File filename SIMPLIS_PASS_THRU  
File_contents  
.endf
```

The `SIMPLIS_PASS_THRU` in the `.FILE` statement is a required keyword. It allows the SIMPLIS simulator to understand that the embedded temporary file is required to be passed back to the SIMetrix/SIMPLIS environment and it is not to be used by the SIMPLIS simulator.

For example, if the following is defined in the F11 window of a schematic supporting the SIMPLIS simulator,

```
.post_process ON_COMPLETE
```

```
.File ON_COMPLETE SIMPLIS_PASS_THRU
if :SIMPLISanalysis='POP' then
    echo Finished POP Analysis
elseif :SIMPLISanalysis='AC' then
    echo Finished AC Analysis
elseif :SIMPLISanalysis='transient' then
    echo Finished Transient Analysis
endif
.endf
```

then the appropriate text will be displayed in the command shell window when the corresponding analysis is completed. The :SIMPLISanalysis variable is extracted from the simulation data set of the current data group. As a result, it is only available if there is data generated from the corresponding analysis. For instance, if the user has elected to run in one single simulation run the POP analysis, the AC analysis, and the transient analysis, then the example above will not yield the message of "Finished POP Analysis" at the completion of the POP analysis since data is usually not generated for the POP analysis when it is also followed by a subsequent transient analysis.

SIMETRIX SIMULATOR

SCRIPT BASED MULTI-STEP RUNS

This is currently a netlist based feature and is not supported by the GUI. It allows a multi-step run to be defined whereby a script is called at each step allowing customised multi-step analyses to be defined.

The analysis type may be used with .TRAN, .DC, .AC, .TF and .NOISE. Refer to the sections in the simulator reference manual for these statements for full details of this feature.

PSP VERSION 1.02

Version 1.02 of the PSP MOS model has been added. This is in addition to version 1.01

PSP OPERATING POINT VALUES

Operating point values are now output to the list file for PSP devices, both versions 1.01 and 1.02

DCAP ADDED TO DIODE LEVEL 3

OTHER FEATURES

VERILOG-A LIBRARY

1. Voltage controlled delay
2. Fixed delay
3. Sine wave VCO
4. Pulse width modulator

See menu Place | Analog Functions | Verilog-A Library

NETWORK LICENSES SUPPORTED ON LINUX FOR ALL PRODUCTS

The Flexnet publisher license manager may now be hosted on Linux systems for both SIMetrix and SIMetrix/SIMPLIS licenses. Any Linux distribution complying with Linux standard base (LSB) version 3.0 or later is supported.

For earlier versions only SIMetrix licenses could be hosted on Linux systems.

FLEXID-10 DONGLES

New dongle type overcomes limitation on 64 bit systems. The older style only support one dongle plugged in at a time on such systems. Currently this is supported by SIMetrix products only, but we expect SIMPLIS to support this type of dongle in the near future.