

# DOLPHIN

## DESIGN

### SMASH 7.4.1 - SCROOGE 4.4.1 - SHAKER 7.4.1

### New Features

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## Preamble

As always for new releases, we would like to thank those customers who take the time to report problems and/or to suggest improvements (please remember that the best way to do so is by sending an email to [support@dolphin.fr](mailto:support@dolphin.fr) with an accurate description of your problem or suggestion, together with the relevant files if any). As you will see in the new features, we do our best to take remarks into account. And even if your suggestion does not appear this time, don't think it was lost or disregarded. Simply, it means that its implementation could not fit into the development plan for this particular release, but be assured that we will try to take it into account in a future release.

## Web Site

Our web site [www.dolphin-design.fr](http://www.dolphin-design.fr) is a source of information on our EDA solutions. Aside from evaluation kits for our products, a number of application notes, courses or upgrades are available for download.

## Supported Platforms

### Microsoft Windows

SMASH is designed to run on Microsoft Windows Vista / 7 / 8 / 10 on x86\_64 platforms.

### Linux on Intel x64 platform

SMASH is designed to run under X-Window on RedHat Enterprise Linux 6 (RHEL6) and supports compatible Linux distributions on x86\_64 platforms.

## Credits & Copyrights

### **wxWidgets: A free C++ framework for cross-platform programming**

<http://www.wxwidgets.org>

wxWindows Library License, Version 3

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This product includes cryptographic software written by Eric Young. This product includes software written by Tim Hudson.

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### **Trio: portable and extendable printf and string functions**

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## **Gear-Brayton Integration Method**

The new formulation of the Gear-Brayton integration method included in SMASH was perfected and implemented at Supélec - Service des Mesures.

## **EKV3 Compact MOSFET Model Documentation**

A. Bazigos, M. Bucher, F. Krummenacher, J.-M. Sallese, A.-S. Roy, C. Enz, "*EKV3 Compact MOSFET Model Documentation, Model Version 301.01*", Technical Report, Technical University of Crete, November 23, 2007.

## **VDA / FAT Open Source Library**

The open source library of VHDL-AMS components created by the VDA / FAT working group is delivered with SMASH.

The VDA / FAT Working Group AK 30 "Simulation of Mixed Systems with VHDL-AMS" is organized within the Association for Research in Automobile Technology (FAT - Forschungsvereinigung Automobiltechnik) of the German Association of the Automotive Industry (VDA - Verband der Automobilindustrie). It promotes the relationship between car manufactures and their suppliers concerning simulation of mixed systems and model exchange.

The working group promotes the development of VHDL-AMS models that are integrated in different libraries.

## **FUNDAMENTALS\_VDA**

Public library with general VHDL-AMS models like time sources, converters between different domains, table-lookup models, relays, switches...

## **SPICE2VHD**

VHDL-AMS models with nearly the same terminal behavior like Spice models of basic electrical elements like resistor, capacitor, inductor, and level1 models of semiconductor devices.

## **AUTOMOTIVE\_VDA**

Library under development with special parameterized models like wires, fuses, bulbs, EMC test signals...

## New Features

### SMASH - API

#### Bug fixing

- Corrected the SMASH\_GetJacobianValue API function with KLU solver (DDIsa13576 - SMASH 7.4.1)

### SMASH - Documentation

#### Enhancements

- Corrected the .LSTB description in the user manual (DDIsa13103 - SMASH 7.4.0)

### SMASH - Kernel

#### Enhancements

- Improved operating-point power-up method to be allowed when the circuit contains logic items (DDIsa13454 - SMASH 7.4.0)
- Improved the .CONNECT directive management to reduce the matrix size and thus improve the overall simulation performance (DDIsa13474 - SMASH 7.4.0)
- Implemented Tian's method to make the '.LSTB' directive insensitive to the direction of the voltage source (DDIsa13478 - SMASH 7.4.0)
- Implemented Zeq method to compute the voltage of each node of the circuit during '.LSTB' analyses (DDIsa13479 - SMASH 7.4.0)
- Modified the default behavior of bang '!' character to not treat it as starting comment line (DDIsa13500 - SMASH 7.4.0)
- Implemented the detection of loop of inductor/voltage source at elaboration time (DDIsa12364 - SMASH 7.4.1)
- Implemented support of TMI (TSMC Model Interface) for circuit reliability simulations (DDIsa13491 - SMASH 7.4.1)
- Improved the displayed information message on convergence problems during transient analysis (DDIsa13575 - SMASH 7.4.1)
- Improved operating-point to not start useop initialisation if operating-point file does not exist (DDIsa13579 - SMASH 7.4.1)

## Bug fixing

- Corrected archive file creation to include Verilog files included by other Verilog files (DDIsa13502 - SMASH 7.4.0)
- Corrected SMASH to work on Linux when the installation directory contains spaces (DDIsa13517 - SMASH 7.4.0)
- Corrected application of .OPTION MIXED\_CASE\_SENSITIVE option to mixed circuits (DDIsa13508 - SMASH 7.4.1)

## SMASH - Licensing

### Enhancements

- Changed the limitations associated with the Discovery options (DDIsa13510 - SMASH 7.4.0)

## SMASH - Models

### Enhancements

- Improved the memory consumption of SPICE compact models when ports can be merged (DDIsa13443 - SMASH 7.4.0)
- Updated SPICE model BSIM-BULK v106.2 with last TMI noise equations (DDIsa13485 - SMASH 7.4.0)
- Implemented TMI noise equations support for BSIM-CMG v106.1 SPICE model (DDIsa13488, DDIsa13314 - SMASH 7.4.0)
- Improved the evaluation of resistors and capacitors SPICE devices (DDIsa13484 - SMASH 7.4.1)

### Bug fixing

- Corrected a crash that occurs when inductance is instantiated with POLY parameter without value (DDIsa13465 - SMASH 7.4.0)
- Corrected IDS output parameter of BSIM-CMG version 106.1 (DDIsa13520 - SMASH 7.4.1)
- Corrected the computation of AC current of CCCS spice sources (DDIsa13543 - SMASH 7.4.1)
- Corrected transient noise analysis divergence caused by resistor value with dynamic negative value (DDIsa13545 - SMASH 7.4.1)
- Corrected transient convergence problem caused by negative flicker noise value computed in SPICE mos model BSIM4 during transient noise analysis (DDIsa13572 - SMASH 7.4.1)
- Corrected SPICE BSIM-IMG mosfet models to avoid transient starting error. (DDIsa13573 - SMASH 7.4.1)

## SMASH - SPICE

### Enhancements

- Improved the .CONNECT directive to display a warning message when a node does not exist (DDIsa12246 - SMASH 7.4.0)
- Implemented the RM\_CMIN option to ignore small capacitors (DDIsa13507 - SMASH 7.4.0)

### Bug fixing

- Corrected the evaluation of .MEASURE extract=DX with input parameters "YL" and "YH" when there are few waveform points (DDIsa13501 - SMASH 7.4.0)
- Corrected transient convergence problem caused by switching of matrix from KLU to SPARSE (DDIsa13504 - SMASH 7.4.0)
- Fixed a crash when a SPICE netlist requires a TMI library but it can not be found (DDIsa13531 - SMASH 7.4.1)
- Corrected displayed warning messages in report file of some .OPTION parameters which do not respect limits values (DDIsa13550 - SMASH 7.4.1)
- Corrected missing message for not finite measures that have "no" value in the PRINT parameter (DDIsa13574 - SMASH 7.4.1)

## SMASH - Verilog-AMS

### Enhancements

- Implemented access to Verilog-Ams grounded nets from SPICE directives (DDIsa13490 - SMASH 7.4.0)

### Bug fixing

- Corrected Verilog-Ams grounded port management to force connected net to be grounded (DDIsa13489 - SMASH 7.4.0)

## SMASH - Viewer

### Enhancements

- Implemented a new preference for displaying complex HTML pages (DDIsa03446 - SMASH 7.4.0)

**Bug fixing**

- Corrected the display of 'CapaMin' field value from the 'Directives' dialog box (DDIsa13503 - SMASH 7.4.0)
- Corrected a wrongly error message displayed under Linux when opening a directory bookmark in the explorer (DDIsa13516 - SMASH 7.4.1)
- Corrected a rare bad random closing of a visualization subprocess (DDIsa13525 - SMASH 7.4.1)
- Corrected the selection of .param from the DC dialog box (DDIsa13536 - SMASH 7.4.1)
- Corrected Imbalance locate box whose parameters were not taken into account if the update simulation control file option was not activated (DDIsa13580 - SMASH 7.4.1)