

RELEASE NOTES

NI Multisim Analog Devices Edition

Version 10.0.1

These release notes contain system requirements, installation instructions, and information about the edition's features.

They also contain information about product tiers and new features for the full versions of NI Multisim and NI Ultiboard found in NI Circuit Design Suite 10.0.1.

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Installing NI Multisim Analog Devices Edition

This section describes the system requirements and installation procedures for NI Multisim Analog Devices Edition.

Minimum System Requirements

To run NI Multisim Analog Devices Edition, National Instruments recommends that your system meet the following requirements:

- Windows 2000 Service Pack 3 or later, Windows XP, Vista, or 64-bit Vista
- Pentium 4 class microprocessor or equivalent (Pentium III class minimum)
- 512 MB of memory (256 MB minimum)
- 1.5 GB of free hard disk space (1 GB minimum)
- Open GL® capable 3D graphics card recommended (SVGA resolution video adapter with 800×600 video resolution minimum, 1024×768 or higher preferred)
- To develop custom LabVIEW based instruments for use in Multisim, LabVIEW 8.2.x or higher is required

Installation Instructions

National Instruments recommends that you close all open applications before you install NI Multisim Analog Devices Edition.

Unless you specify another location during installation, the installation program copies files to <Program Files>\National Instruments\Multisim Analog Devices Edition 10.0 after you complete the following steps:

1. Download the self-extracting software file from the Analog Devices website.
2. Double-click on the self-extracting file to unzip and launch the installer.
3. Follow the instructions in the dialog boxes.



Note If desired, you can install NI Multisim Analog Devices Edition on the same machine as NI Circuit Design Suite.

Product Activation

There is no need to activate this product.

NI Multisim Analog Devices Edition 10.0.1 Feature Set

NI Multisim Analog Devices Edition has the following distinctions from the NI Multisim Power Pro Edition:

- The installation process installs only NI Multisim Analog Devices Edition, which runs perpetually with no license activation required.
- Design Limitations:
 - 25 components per schematic. Fixed power sources (V_{CC} , V_{DD} , and so on) and grounds do not count toward the total number of components.
 - Circuits that exceed this limit will open and simulate but will not be editable.
 - Single-sheet designs only—no multi-page circuits, hierarchical blocks or sub-circuits.
- The component database contains only Analog Devices components, virtual components, and a selection of other commonly-used components.
- You cannot create your own components or copy components into the database. There are no **User** or **Corporate** databases.
- You cannot edit components.

- You cannot transfer designs to NI Ultiboard or other EDA tools.
- Additional menu items:
 - A link to the National Instruments website, where you can purchase an upgrade to a full edition of Multisim, found at **Help»Buy Multisim Now**.
 - Tools menu items that link to Analog Devices design sites, found at **Tools»Online Design Resources»Analog Devices**.
- Software is English only.
- The Support and Upgrade Utility (SUU) is not installed or used.
- This software launches from **Start»All Programs»National Instruments»Multisim Analog Devices Edition 10.0»Multisim Analog Devices Edition**.

NI Multisim Analog Devices Edition Documentation

NI Multisim Analog Devices Edition includes a complete documentation set for your reference.

The following resources are available in PDF files:

- Getting Started with NI Multisim Analog Devices Edition
- Multisim User Guide
- Multisim Component Reference Guide



Note The Multisim User Guide, and the Multisim Component Reference Guide include descriptions of functionality not available in the NI Multisim Analog Devices Edition.

To access the user guides, select **Start»All Programs»National Instruments»Multisim Analog Devices Edition 10.0»Documentation** and then select the file of interest.

The following online help files are available from the installed software Help menu and from the Start Menu:

- Multisim Professional Edition Help File

To access the help files, select **Start»All Programs»National Instruments»Multisim Analog Devices Edition 10.0»Documentation** and then select the file of interest.

The following online help files are available from the installed software Help menu:

- Component Reference Professional Edition Help File
- Multisim Title Block Editor Help File



Note The help files include descriptions of functionality not available in the NI Multisim Analog Devices Edition.

Documentation Notes

The following is not reflected in the NI Multisim Analog Devices Edition documentation set:

- NI Multisim Analog Devices Edition supports LabVIEW instruments created in LabVIEW 8.2.x or later only. If you have instruments created with LabVIEW 8.0.x or 8.1.x, you must rebuild them using LabVIEW 8.2.x or later.

Changes in Functionality for NI Circuit Design Suite 10.0.1

LabVIEW Instruments Support

NI Multisim 10.0.1 supports LabVIEW instruments created in LabVIEW 8.2.x or later only. If you have instruments created with LabVIEW 8.0.x or 8.1.x, you must rebuild them using LabVIEW 8.2.x or later.



Note The above also applies to NI Multisim Analog Devices Edition.

What's New in NI Circuit Design Suite 10.0.1

Localization

NI Circuit Design Suite 10.0.1 is localized for English, German, and Japanese. The language that the software uses by default depends on your system locale settings.

To change the language the software uses, select **Options»Global Preferences**, click on the **General** tab (Multisim) or **General Settings** tab (Ultiboard), select the desired locale from the **Language** combination box, and restart the application.

The Support and Upgrade Utility (SUU) is localized for English and German.

To change the language that SUU uses, select **Help»Check for Updates** from either Multisim or Ultiboard to launch SUU, click on the **Settings** button, select either English or German from the **Language** combination box, and restart SUU.

The following items are not localized, and remain in English:

- SPICE error messages
- LabVIEW instruments
- Layer names in both NI Ultiboard and the NI Multisim Spreadsheet View
- Agilent and Tektronix simulated instruments
- Sample files
- NI Multisim MCU Module: source file names, code/comments within source files, and compiler/linker messages

The following documentation is localized for English, German, and Japanese:

- Release Notes
- Getting Started with NI Circuit Design Suite



Note Does not apply to NI Multisim Analog Devices Edition.

What's New in NI Circuit Design Suite 10.0

The following sections describe features new to NI Circuit Design Suite 10.0. In most cases, these features are also found in NI Multisim Analog Devices Edition.

Exceptions include those features that relate to NI Ultiboard, and those that relate to the NI Multisim MCU Module.

Mouse-Click Support for Interactive Components

NI Multisim 10.0 lets you use your mouse to control interactive components during simulation. You can click on switches to toggle them, push keypad buttons with the mouse, and adjust the value of the variable components, such as potentiometers, with a slider bar. You may also continue to use keyboard controls for these devices.

Convergence Assistant

The Convergence Assistant adjusts simulation settings when a “Time Step Too Small” error occurs during interactive simulation. The assistant adjusts the minimum number of parameters required in order to allow convergence of the simulation. The assistant adjusts the following parameters:

1. Initial Condition
2. TMAX
3. RELTOL

4. RSHUNT
5. ITL1
6. Integration method
7. GMIN

Increased Quality and Breadth of the Component Database

NI Multisim 10.0 has a number of new additions and improvements to the component database. These include: around 1,000 new components from leading manufacturers, generic power simulation parts, new bipolar sources, a Graphical LCD, single symbol representations of standard logic components, and improvements to passive components.



Note Some of the above do not apply to NI Multisim Analog Devices Edition.

New Components from Leading Manufacturers

NI Multisim 10.0 has approximately 1,000 new components with models from leading manufacturers. These additions include symbols, models, and IPC-standard landpatterns. Components include operational-amplifier, comparator, and voltage reference models.



Note Does not apply to NI Multisim Analog Devices Edition.

Generic Power Simulation Parts

NI Multisim 10.0 includes models for all power simulation parts found in the “Switch-Mode Power Supply SPICE Cookbook” by Christophe Basso. These components include Buck, Boost, Buck-Boost, and PWM controllers. Their models include voltage and current mode controlled devices, and models for average and detailed transient operation.



Note Does not apply to NI Multisim Analog Devices Edition.

Bipolar Sources

New bipolar pulse sources include both current and voltage sources.

Graphical LCD

A Graphical LCD is available for users who purchase the MCU Module in conjunction with NI Multisim. The command system for the Graphical LCD follows the Toshiba T6963C. The graphical LCD is a two-color device with 256×256 pixel display resolution. This device supports three modes of operation: text-only, graphics-only, and mixed text and graphics.



Note Does not apply to NI Multisim Analog Devices Edition.

Single Symbol Representations of Standard Logic Components

In addition to the multi-section component representation of standard logic components such as logic gates and flip-flops, the component database now includes single symbol representations of common components. These single-symbol representations show the power and ground pins of these devices.

Enhancements to Passive Components

You can now change the value of any resistor, capacitor, or inductor placed on the schematic without replacing it. You can also assign a landpattern to any passive component. You can assign information about the type of component, for instance metal-oxide, and this information propagates to the Bill of Materials. The tolerance of the components is automatically available for Monte-Carlo and Worst Case analyses, and you can edit the tolerances in the spreadsheet.

An advanced non-linear inductor model lets you define the inductor characteristics based on datasheet values.

Extended SPICE Modeling Capabilities

NI Multisim 10.0 introduces enhancements to its SPICE modeling capabilities, including parameters in SPICE subcircuit models, improved support of behavioral sources, and support for BSIM 4 parameters.

Parameterized SPICE models

You may now define parameters in the .subcircuit line of SPICE macro-models in NI Multisim. The definition of parameters is as follows.

```
.subckt <subckt_name> <node_list> PARAMS: param_name = value, ...
```

You may then use the parameter name in place of a value in the macro-model. The value of the parameter is editable in the component dialog on the schematic.

Improved Support of Behavioral Sources

Behavioral sources now support nested instances of IF statements.

Support for BSIM 4 Parameters

NI Multisim 10.0 supports the standard BSIM 4 parameters for MOSFET models. BSIM 4 supports up to 400 parameters. More information about BSIM 4 is available at <http://www-device.eecs.berkeley.edu/~bsim3/bsim4.html>.

Enhanced Data Visualization

NI Multisim 10.0 includes a number of improvements to the way you configure and view results. These include: advanced functionality of the static probes, the ability to add traces to the Grapher after running a simulation, the ability to display the initial conditions of components on the schematic, and a current probe instrument.

Advanced Functionality of Static Probes

Placed (static) probes now include a reference designator, which allows you to select another probe as a reference net. In previous versions of NI Multisim, all probes referenced ground. You can also use probe reference designators to select which traces to view in analyses.

Add Traces to Grapher after Running Analyses

You can add traces to the Grapher view after running an analysis and select what type of data you want NI Multisim to store.

Display Initial Conditions on the Schematic

You can choose to display the initial conditions of capacitors and inductors on the schematic.

Current Probe Instrument

The current probe instrument is a virtual representation of a real current probe that connects to an oscilloscope. You connect one end of the probe to a net on the schematic and the other to the input to an oscilloscope. You can set the ratio of amps to volts displayed on the instrument. Note that the units remain in volts on the oscilloscope.

Enhanced Analysis Capabilities

NI Multisim 10.0 allows you to evaluate more expressions before and after running analyses. The definitions of the expressions are:

1. $\text{avg}(\mathbf{X})$ —Running average of the vector \mathbf{X}
2. $\text{avg}(\mathbf{X}, d)$ —Running average of the vector \mathbf{X} over d
3. $\text{envmax}(\mathbf{X}, n)$ —Upper envelope of the vector \mathbf{X} where n is the number of points on either side of a peak that must be less than the value for a peak to be identified
4. $\text{envmin}(\mathbf{X}, n)$ —Lower envelope of the vector \mathbf{X} where n is the number of points on either side of a peak that must be less than the value for a peak to be identified
5. $\text{grpdelay}(\mathbf{X})$ —Group delay of \mathbf{X} with results in seconds

6. `rms(X)`—Running RMS average of vector **X**
7. `integral(X)`—Running integral of vector **X**
8. `sgn(X)`—The sign or signum of a real number. It is -1 for a negative number, 0 for the number zero, and 1 for a positive number.

Extended Language Support and File Management in the MCU Module

The MCU Module, formerly MultiMCU, is now available to the professional market. This module supports C-code in addition to Assembly language. It has a code manager that lets you use multiple files to define the operation of the microcontrollers in the design. You can have header files and use libraries. You can also load in externally assembled binary files and view them in disassembled format.



Note Does not apply to NI Multisim Analog Devices Edition.

Improved Export to Mentor Graphics PADS®

You can export NI Multisim schematics to Mentor Graphics PADS®. The exported netlist file follows the Mentor Graphics specification. Every NI Multisim component includes generic landpatterns, which means you can transfer without dropping any nets and then select the appropriate landpattern once in PADS. You can also map your existing PADS landpatterns to the components in NI Multisim.



Note Does not apply to NI Multisim Analog Devices Edition.

Improvements to Speed and Quality of NI Ultiboard

NI Ultiboard 10.0 contains enhancements to the quality of the product that include improvements to the speed of trace-placement and the ability to select whether or not to plate through-holes. Exported Gerber files do not contain mosaics in the polygons. Quality improvements in the landpatterns include: pin mappings from symbols to IC pin-outs and landpattern shapes and sizes in the database. All new landpatterns now follow IPC standards.



Note Does not apply to NI Multisim Analog Devices Edition.

Advanced Options for Exported Data Interpolation

When exporting simulation data from NI Multisim to other NI data formats such as LVM or TDM files, you can choose the interpolation technique that best suits the signal. You can also control the interpolation method used when sending simulation data to NI LabVIEW based instruments running inside of NI Multisim. The interpolation methods include:

- Coerce

- Linear Interpolation
- Spline Interpolation

Miscellaneous Features

Some of the other features added to the new suite include Unicode character support and NI installation and license management.

Unicode Characters

All products in NI Circuit Design Suite 10.0 now support Unicode characters. This feature allows you to use Cyrillic and Asian fonts inside the products.

NI Installation and License Management

All products in NI Circuit Design Suite adhere to the standard method used to install and activate National Instruments software. You can activate the software automatically via the internet, or manually via a web browser, phone call, or email.



Note Does not apply to NI Multisim Analog Devices Edition.

NI Circuit Design Suite 10.0 Product Tier Details



Note Some of the functionality listed in the following tables is not available in the NI Multisim Analog Devices Edition.

The following lists the schematic capture functionality available in NI Multisim Base, Full, and Power Pro editions:

| Functionality | Base | Full | Power Pro |
|------------------------------------|------|------|-----------|
| Customizable GUI | X | X | X |
| Modeless part placement and wiring | X | X | X |
| Fast retrieval parts bins | X | X | X |
| User defined fields | X | X | X |
| Advanced symbol editor | X | X | X |
| Auto and manual wiring | X | X | X |

| Functionality | Base | Full | Power Pro |
|-------------------------------------|-------------|-------------|------------------|
| Virtual wiring by node name | X | X | X |
| Fast auto-connect passives | X | X | X |
| Rubber banding on part move | X | X | X |
| Replace multiple components at once | X | X | X |
| Bus-Vector connect | X | X | X |
| Project manager | X | X | X |
| Hierarchical design | X | X | X |
| Multisheet design | X | X | X |
| Circuit annotations | X | X | X |
| Comments on schematic | X | X | X |
| Electrical rules check | X | X | X |
| Title block editor | X | X | X |
| Forward/Back annotation | X | X | X |
| Export to Mentor PADS layout | X | X | X |
| Advanced search | X | X | X |
| Variant support | | | X |
| Spreadsheet view | | | X |
| Design constraints | | | X |
| Zoom to selected part | | | X |
| Pin and gate swap | | | X |
| Customizable BOM | | | X |
| Advanced reports | | | X |
| Cross-probing with Ultiboard | | | X |
| ERC scope setting | | | X |
| Mark no-connect pins | | | X |

| Functionality | Base | Full | Power Pro |
|------------------------|-------------|-------------|------------------|
| Database import/export | | | X |
| Component database | Partial | Partial | Complete |

The following lists the simulation functionality available in NI Multisim Base, Full, and Power Pro editions:

| Functionality | Base | Full | Power Pro |
|---|-------------|-------------|------------------|
| Interactive simulator | X | X | X |
| Fully mixed-mode A/D simulation | X | X | X |
| Standard SPICE 3X5/XSPICE | X | X | X |
| Enhanced model support | X | X | X |
| PSPICE model simulation* | X | X | X |
| Speed/Accuracy tradeoffs | X | X | X |
| Simulation Advisor | X | X | X |
| Convergence Assistant | X | X | X |
| Virtual, interactive, animated parts | X | X | X |
| Mouse click support for interactive parts | X | X | X |
| Measurement Probes | X | X | X |
| Component Wizard | X | X | X |
| NI measurement data file sources | X | X | X |
| NI measurement data file export | X | X | X |
| NI LabVIEW VIs as instruments and sources | | X | X |
| Simulation Profiles | | X | X |
| Postprocessor | | X | X |

| Functionality | Base | Full | Power Pro |
|--------------------------------------|-------------|-------------|------------------|
| Expressions in analyses | | X | X |
| Add traces to Grapher post analyses | | X | X |
| Rated components | | X | X |
| Insert faults into components | | X | X |
| Op-Amp Wizard | | | X |
| 555 Timer Wizard | | | X |
| Filter Wizard | | | X |
| CE Amplifier Wizard | | | X |
| Model makers | | | X |
| Switch mode power supply generics | | | X |
| RF Design Module | | | X |
| Nested sweeps | | | X |
| C-Code modeling | | | X |
| Virtual Instruments | 4 | 15 | 22 |
| Analyses | 0 | 15 | 19 |
| Simulated Agilent instruments | 0 | 1 | 3 |
| Simulated Tektronix instrument | 0 | 0 | 1 |
| Multisim MCU module | Add On | Add On | Add On |
| * Does not support all PSpice syntax | | | |

The following lists the layout functionality available in NI Ultiboard Full and Power Pro editions:

| Functionality | Full | Power Pro |
|--------------------------------|-------------|------------------|
| Gridless Follow-me placement | X | X |
| Push and Shove part placement | X | X |
| Push and Shove trace placement | X | X |

| Functionality | Full | Power Pro |
|---------------------------------------|-------------|------------------|
| Real-time & from copper ratsnest | X | X |
| Auto-alignment | X | X |
| Real-time polygon update with voiding | X | X |
| Keep-in/Keep-out areas | X | X |
| Forward/Backward annotation | X | X |
| Real-time DRC | X | X |
| Jump to Error | X | X |
| 64 layers and 1 nanometer resolution | X | X |
| Polar Grids | X | X |
| Customizable layer viewing | X | X |
| Split power-planes | X | X |
| Comprehensive Footprint Wizard | X | X |
| Enhanced 3D visualization with print | X | X |
| Full screen mode | X | X |
| Gerber, DXF, IPC-D-356A, SVG output | X | X |
| Dimensions on PCB and Landpatterns | X | X |
| Dimensions in Database Manager | X | X |
| User annotations | X | X |
| Net bridges | X | X |
| 3D visualization inside circuit board | | X |
| Turn off ratsnest for selected nets | | X |
| Load and save technology files | | X |
| Cross-probing with Multisim | | X |
| Variant Support | | X |
| Component Placement Sequencer | | X |

| Functionality | Full | Power Pro |
|--|-------------|------------------|
| Place components in array | | X |
| Unplace all components | | X |
| Ruler bar alignments and measurements | | X |
| Save PCB Design as a component | | X |
| Permanent grouping | | X |
| Pin & gate swapping | | X |
| Gridless Connection Machine | | X |
| High-speed constraint driven layout | | X |
| Multiple clearances | | X |
| Net topology choices | | X |
| Equispace trace support | | X |
| Differential Impedance Calculator | | X |
| Transmission Line Calculator | | X |
| Microvias | | X |
| Test point insertion | | X |
| Automatic tear-dropping | | X |
| Pin necked trace support | | X |
| Automatic jumper insertion | | X |
| Copy Route & Replica Place functions | | X |
| In-place footprint editor | | X |
| Mechanical CAD | | X |
| Export 3D info in 3D IGES, DXF formats | | X |
| Copper amount report | | X |
| Test point report | | X |
| Number of pins supported | 1,400 | Unlimited |
| Spreadsheet view | Limited | Complete |

The following lists the autorouting functionality available in NI Ultiboard Full and Power Pro editions:

| Functionality | Full | Power Pro |
|---|-------------|------------------|
| Autoplacement | X | X |
| Pin & gate swapping | X | X |
| Fully customizable cost factors | X | X |
| Progressive Routing | X | X |
| Interactive autorouting | X | X |
| Constraint driven routing | X | X |
| Follows keep-in/keep-out criteria | X | X |
| Manual pre-placement: components, vias, traces | X | X |
| Auto Block Capacitor recognition | X | X |
| SMD mirroring | X | X |
| Net shielding | X | X |
| Automatic testpoint insertion | X | X |
| Trace rubberbanding | X | X |
| Advanced BGA fan-out | | X |
| Topology: shortest, daisy chain, star | | X |
| Prioritize routing order | | X |
| Route an individual net | | X |
| Automatic bus routing | | X |
| Differential Pair routing | | X |
| Group autoplace | | X |
| Group autoroute | | X |
| Optimization | | X |
| Pin number limit | 1,400 | Unlimited |
| Maximum number of layers | 4 | 64 |

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