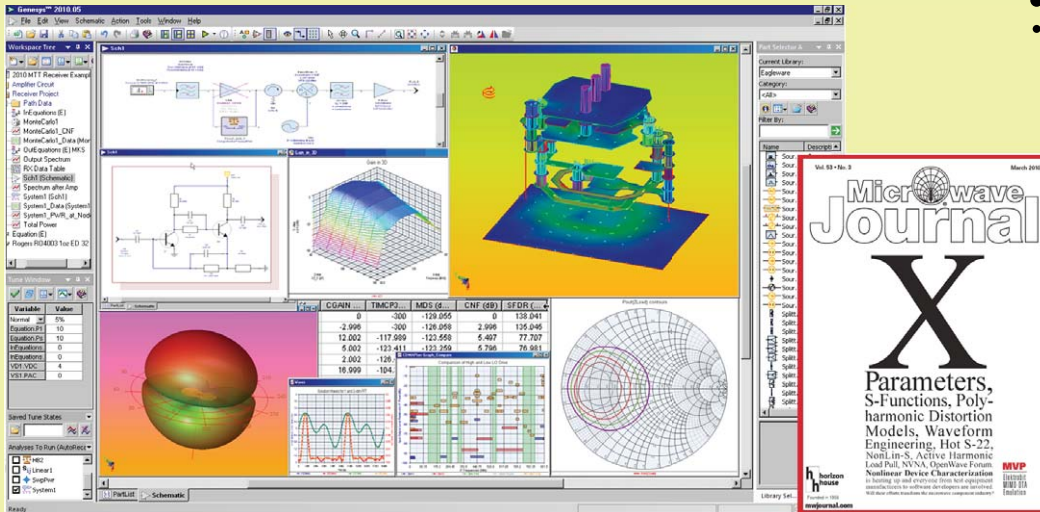
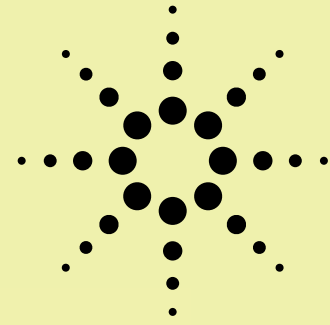


Agilent GENESYS

Brochure and Configuration Guide



An integrated electronic design automation (EDA) environment for RF/microwave circuit board and subsystem designers

Agilent Genesys is an affordable, high-performance RF and microwave tool specifically created for the RF and microwave circuit board and subsystem designer. Providing the optimal balance of design capabilities and ease-of-use, designers can quickly attain the skills necessary to operate the tool while realizing unbeatable engineering productivity in the shortest time possible. Genesys is available in six different languages (English, Japanese, Russian, Korean, Chinese simplified, and Chinese

traditional), further adding to its ease of learning and enabling global collaboration by engineers and technicians alike.

Genesys is endorsed by an installed base of 5,000 satisfied RF and microwave designers worldwide, many of whom have been loyal repeat customers over the past 20 years. Genesys incorporates breakthrough nonlinear X-parameter simulation, backed by Agilent's extensive industry-wide expertise in RF/microwave design, develop-

ment and support. As a proven safe investment, it literally pays for itself through cost savings within its first year of deployment. Further protecting the user's investment, as the designer's needs grow beyond RF board applications, Agilent provides a full trade-in credit that can be applied towards the purchase of Advanced Design System (ADS) for designing MMIC and multi-technology RF system-in-package (SIP) modules.

Affordable • High Performance • Easy to Use



Agilent Technologies

Genesys Configuration Overview

Genesys offers the highest engineering design productivity by providing:

- Industry's widest coverage of RF and microwave circuit synthesis capabilities
- Fastest RF system architecture and frequency planning tools
- Time- and frequency-domain circuit simulation with optimization
- Fast, memory-efficient 3D-planar electromagnetic (EM) simulation
- Accurate and convenient X-parameter nonlinear circuit and system simulation

Genesys Core Environment







All Genesys configurations start with the prerequisite Genesys core environment, which is itself a full-featured design bundle. Additional capabilities can then be added to extend its functionality to include:

- Circuit synthesis
- RF system architecture
- Nonlinear circuit simulation (DC, time- and frequency-domains)
- 3D-planar EM simulation

The core capabilities of Genesys can be extended with additional simulation building blocks into powerful and affordable bundles.

Key building blocks

Genesys bundles are comprised of one or more of these building blocks.

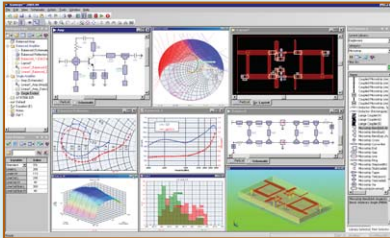
-  **Core** – Core design environment, linear simulator, optimization, layout, 3D view, statistics
-  **Filter and match** – Filter and match synthesis for lumped and distributed networks
-  **Synthesis** – Synthesis for passive and active components, includes filter and match
-  **Circuit** – Circuit DC, time- and frequency-domain nonlinear simulators
-  **System** – System architecture and frequency planning simulators
-  **EM** – EM planar 3D electromagnetic simulator (Momentum GXF)

Genesys

Core Building Block

Capability module

W1320BP/BT
Genesys core



www.agilent.com/find/eesof-genesys-core

Description

Design environment

- Integrated, easy-to-use Windows®-based graphical user environment for hierarchical design creation and management; available in six major languages worldwide
- Scripting from Visual Basic, C++, VBScript or JScript for automation of Genesys to perform custom or repetitive tasks
- LiveReport for creating auto-updating and interactive design documentation
- Export Genesys designs for use in Agilent ADS in design collaboration

Fast linear simulation with robust optimization and statistics

- Iterative tuning of circuit parameters
- Multi-dimensional parameter sweeps
- Statistical analysis including: Monte Carlo, yield, and yield optimization. Linearizes nonlinear components at their DC bias before linear simulation.

NOTE: Full DC analysis requires Harbec/Cayenne.

Data manipulation and display

- Data sets for persistent storage of simulation and measurement data for post-processing and display to eliminate wasteful re-simulation
- Mathlang language for powerful Matlab® custom equations, functions and data processing capabilities
- Flexible data display and analysis with rectangular, polar, Y/Z Smith, histogram, 3D-parametric plots, and instrument-style marker readouts
- Interactive 3D viewer for EM surface currents and antenna far-field patterns

RF/microwave layout and artwork translators

- Create layout from schematic, imported artwork, or direct drawing for EM simulation and board fabrication
- 3D viewer for layout with interactive rotation, zoom, vertical stretching, and cut planes to verify correct geometry before fabrication
- Full library of pad/package layout footprints
- Import /export masks and drill files in popular printed circuit board (PCB) formats (e.g., Gerber, DXF/DWG, and GDSII) for PCB board realization on fast prototyping machines or chemical etching

Libraries of simulation models and parts

- Full libraries of accurate high-frequency physical models with automatic discontinuities
- Over 30,000 linear, nonlinear and system parts libraries

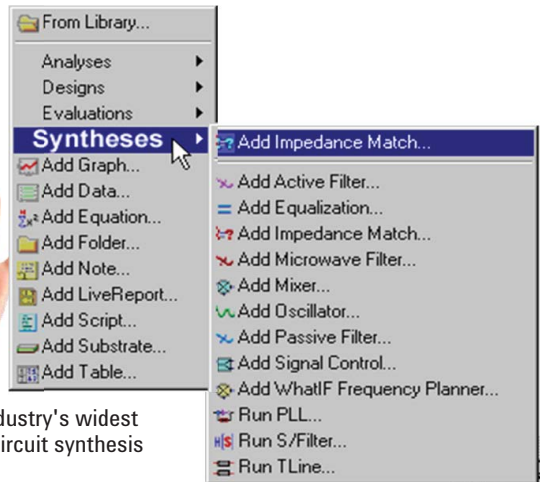
Testlink

- Captures measured data directly into Genesys for simulation and display on network analyzers, impedance analyzers, oscilloscopes, vector/spectrum analyzers, semi-conductor analyzers, and power meters
- Supports over 140 instruments from more than 14 equipment manufacturers

www.agilent.com/find/eesof-genesys-testlink

Genesys Synthesis

Genesys provides the industry's widest coverage of passive and active circuit synthesis capabilities. The synthesis modules create high-performance circuits, accelerate routine design tasks from hours to minutes, and enable fast make-or-buy decisions on RF components. All 11 synthesis modules are included in the Genesys Synthesis building block. An economical subset containing the 4 most popular synthesis modules is the "filter and match" building block.

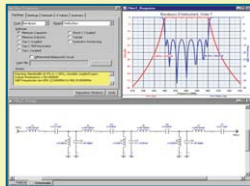


Improve productivity with the industry's widest coverage of RF and microwave circuit synthesis capabilities in Genesys.

Filter and Match Building Block

Capability module

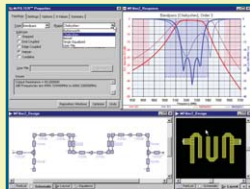
Description



Filter synthesis

Classical lumped filter synthesis for RF applications. This module is the single highest-selling synthesis module from our Genesys product line.

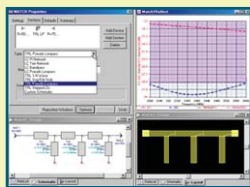
www.agilent.com/find/eesof-genesys-filter



M/filter synthesis

Distributed filter synthesis for microwave applications with over 60 topologies, including automatic layout for subsequent EM analysis. Synthesizes high-performance microwave filters and assists make-versus-buy decisions.

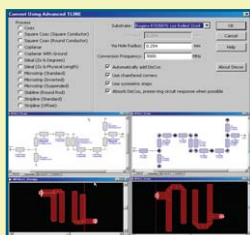
www.agilent.com/find/eesof-genesys-m-filter



Match synthesis

Synthesizes impedance-matching networks over narrow/broad frequency bands with lumped/distributed components and complex frequency-dependent loads.

www.agilent.com/find/eesof-genesys-match



Advanced transmission line synthesis

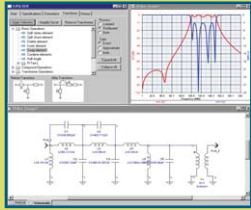
Synthesizes 13 types of transmission lines with lump-distributed circuit conversion and automatic discontinuity insertion. Converts ideal electrical designs to physical implementation such as microstrips and striplines on your choice of substrate.

www.agilent.com/find/eesof-genesys-advanced-t-line

Synthesis – Includes Filter and Match

Capability module

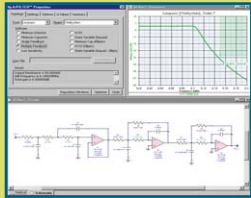
Description



S/filter synthesis

Advanced lumped LC and distributed filter direct synthesis for customized frequency-response shaping by interactive placement of transmission zeros. Comes with over 200 interactive lumped and distributed topological transforms for high-performance filter realization.

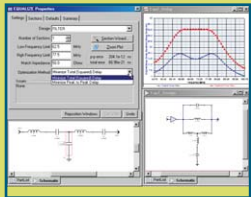
www.agilent.com/find/eesof-genesys-s-filter



A/filter synthesis

Active op-amp filter synthesis with over 30 active topologies. Use for IF, video, base-band frequencies, and control applications such as power control and AGC circuits.

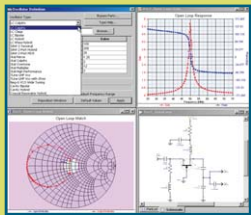
www.agilent.com/find/eesof-genesys-a-filter



Equalize synthesis

Synthesizes equalization networks to compensate for linear phase distortions in the circuit or system that impacts modulation fidelity such as error vector magnitude (EVM), video, and audio fidelity.

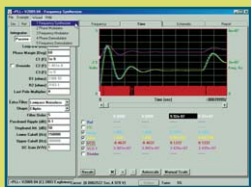
www.agilent.com/find/eesof-genesys-equalize



Oscillator synthesis

Explore 19 RF oscillator topologies from classical L-C, transmission line, SAW, crystal, cavity, and coaxial hybrid. Recommended companion to the Harbec or Cayenne circuit simulators.

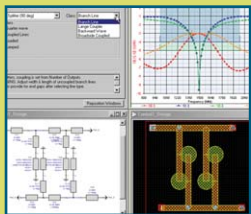
www.agilent.com/find/eesof-genesys-oscillator



PLL synthesis

Phase-locked loop (PLL) synthesis of analog loop filters and 5 setup wizards to design frequency synthesizers and phase/frequency modulators/demodulators.

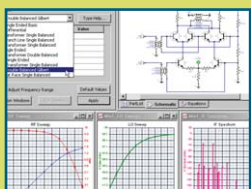
www.agilent.com/find/eesof-genesys-pll



Signal control synthesis

Synthesizes a variety of lumped and distributed couplers (10 types), splitters (10 types), Baluns (5 types), and attenuator (2 types) circuits that control RF signal flow.

www.agilent.com/find/eesof-genesys-signal-control



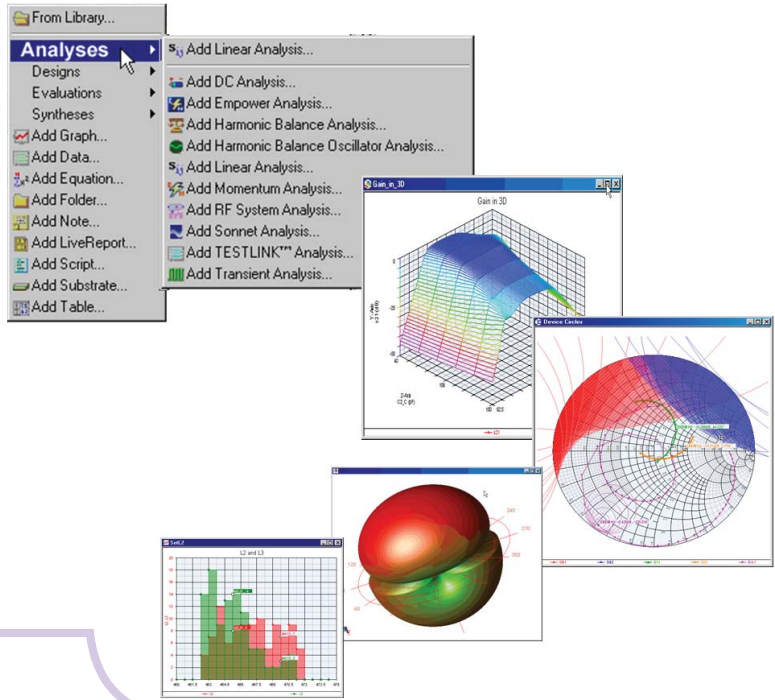
Mixer synthesis

Explore a range of performance trade-offs between 11 RF mixer topologies based on BJTs, FETs and diodes from diode rings to Gilbert cells. Design companion to the Harbec circuit simulator.

www.agilent.com/find/eesof-genesys-mixer

Genesys Simulation

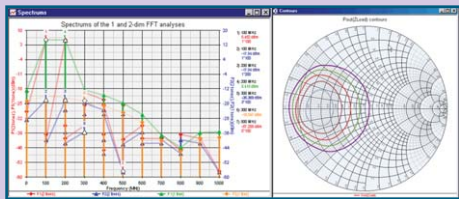
Genesys offers comprehensive circuit, system and electromagnetic simulation capabilities that are provided in the following 3 building blocks which are used to construct powerful and economical Genesys RF and microwave board design bundles.



Circuit Building Block

Capability module

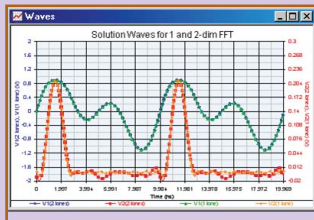
Description



Harbec

Harmonic balance, nonlinear frequency-domain circuit simulation and optimization that calculates harmonic spectrum at any circuit node, IP3, compression, efficiency, conversion gain, phase noise, load pull contour, large-signal oscillator, amplifier, or mixer. Indispensable tool for RF/microwave and DC bias designs with active transistors, diodes, and components. Harbec now incorporates Agilent's breakthrough nonlinear X-parameters simulation technology for convenient and accurate nonlinear circuit designs with X-parameter models of transistors and RFICs.

www.agilent.com/find/eesof-genesys-harbec



Cayenne

Spice simulation for RF circuits that works from the same schematic and RF physical models as Harbec. Includes convolution algorithm to use S-parameters and frequency-domain transmission-line models in accurate time-domain transient simulations of high-speed signal paths. Includes full DC analysis and optimization of DC voltages and currents

www.agilent.com/find/eesof-genesys-cayenne



Advanced modeling kit

Verilog-A modeling allows you to add robust, custom nonlinear models to Genesys Harbec and Cayenne using the industry's most popular analog behavioral-modeling language. Custom nonlinear models are fast transportable and extend Genesys for new applications such as MEMS and electro-optics.

www.agilent.com/find/eesof-genesys-amk

Genesys System Architecture

The Genesys system building block includes Spectrasys, a powerful RF system architecture and diagnostic simulator, and WhatIF, an innovative frequency planning simulator that instantly identifies spurious-free bands when designing frequency conversion systems.

System Building Block

Capability module

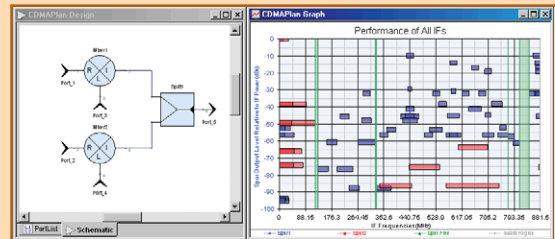


Description

Spectrasys

Interactive RF system architecture tool that diagnoses the source of analog impairments such as spurious frequency mixing and mismatch ignored by spreadsheets, with superior ease-of-use. Integrates with circuit synthesis, circuit simulation, optimization, statistics, and EM simulation. Spectrasys now incorporates breakthrough nonlinear X-parameters simulation technology for convenient and accurate system design with nonlinear X-parameter models of system blocks such as amplifiers, mixers or transceiver RFICs.

www.agilent.com/find/eesof-genesys-spectrasys



WhatIF

Unique, graphical frequency-planning tool that quickly identifies spurious-free bands across a wide bandwidth involving multiband conversions to a common IF, using realistic mixers. Useful for designing multiband down-converters with high- and low-side LO's. A natural companion to Spectrasys.

www.agilent.com/find/eesof-genesys-whatif

Genesys

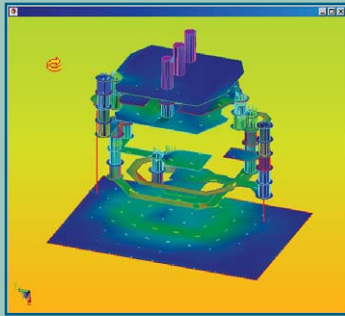
EM Simulation

The Genesys EM block includes Momentum GXF, the most advanced 3D-planar electromagnetic simulator in the industry, along with Momentum GX, EMpower and links to Sonnet.

EM Building Block

Capability module

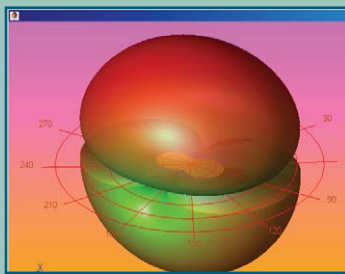
Description



Momentum GXF

Highest-performance, integrated 3D-planar EM simulator with superset capabilities of Momentum GX, including fast multi-threaded simulation on multicore processors and highly memory-efficient NlogN solvers. Offers the highest speed and capacity for 3D-planar EM simulation to analyze complex multilayer layouts or large planar-antenna arrays. It is typically 20x faster than EMpower.

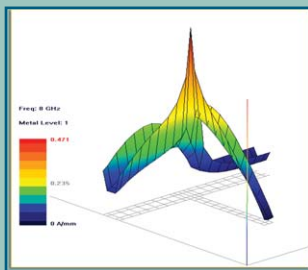
www.agilent.com/find/eesof-genesys-momentum-gxf



Momentum GX

High-performance, integrated 3D-planar EM simulator based on method-of-moments with efficient polygonal meshing of curved and straight geometries. Momentum GX solves a much wider variety of larger problems, faster, using far less memory than traditional rectangular-grid EM solvers. It is typically 5x faster than EMpower. Interactive 3D viewer for surface currents and antenna far-field opens up design insights and is indispensable for troubleshooting.

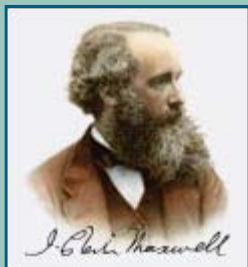
www.agilent.com/find/eesof-genesys-momentum-gx



EMpower

An integrated 3D-planar EM simulator based on method-offlines for analyzing smaller planar layouts that fit on a rectangular grid mesh. Lower performance, capacity, and versatility than Momentum GX.

www.agilent.com/find/eesof-genesys-empower



Sonnet link

Enables users of Sonnet planar EM simulator to take advantage of Genesys circuit/system synthesis and simulation by performing circuit-EM co-simulation.

www.agilent.com/find/eesof-genesys-sonnet

Genesys Co-Simulation

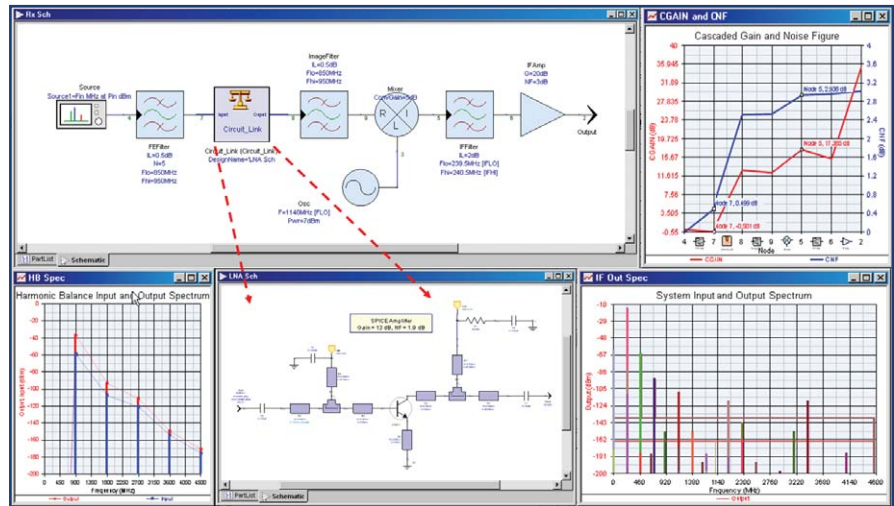
The already powerful system, circuit and electromagnetic simulators can also be used together to analyze, tune and optimize your designs in a single pass. This eliminates tedious and error-prone manual translation of data between simulators.

Circuit-System Co-Simulation

Circuit

System

Enables nonlinear circuit parameters to be tuned and optimized to system specs in one pass. It eliminates tedious, non-interactive and error-prone creation of inaccurate system behavioral models from circuits to perform circuit-system verification.



Circuit-EM Co-Simulation

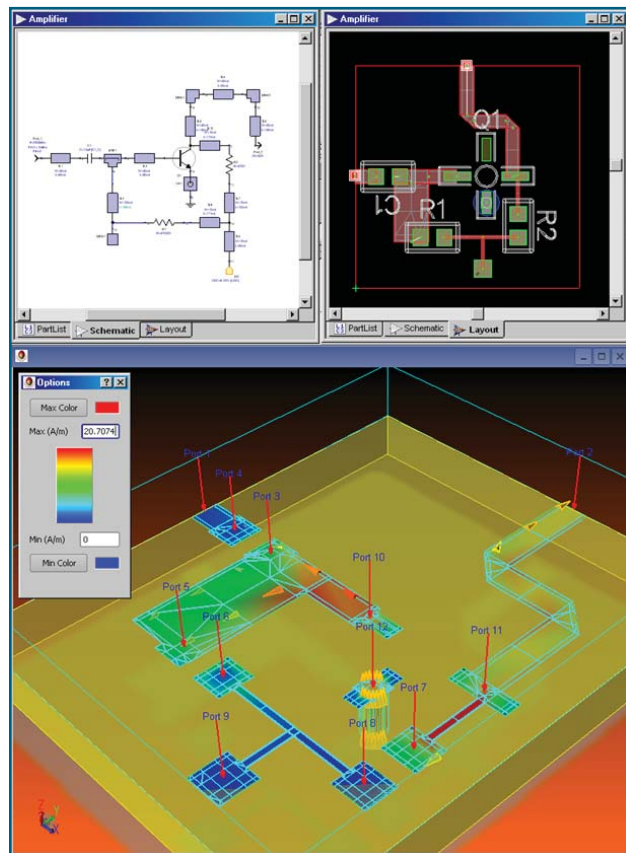
Circuit

EM

Automatically includes the physical effects of board layout in both linear and nonlinear circuit simulations.

It enables you to identify and fix circuit performance degradation caused by undesired proximity coupling, resonance and reflection from your RF board layout.

3D interactive viewing of animated surface current flows help you pinpoint the location of these problems without guesswork.



Getting the Most Value From your Agilent Genesys Software

Agilent has a worldwide network of trained professionals to help you be effective in using and deploying Genesys sooner. An annual software maintenance subscription is an affordable assurance that you will always be up-to-date with the latest software capabilities and bug fixes. It comes with highly-competent Agilent phone and email support, as well as unlimited 24/7 access to the Agilent Knowledge Center for solutions to thousands of engineering questions.

Training is recommended to bring all designers up to a similar skill level and to get the most out of Genesys for productive teamwork and organizational effectiveness.

If you have an old outdated Genesys, you can always upgrade it to the latest version to protect and enhance your original investment at minimum cost.

Support, Training and Upgrade

Genesys software support option



Software maintenance subscription and technical support

- Annual software maintenance subscription keeps your software fresh with the latest enhancements, applications, defect fixes, operating system, and hardware support.
- Provides access to the Agilent technical support network worldwide through email, telephone, and the 24/7 Agilent Knowledge Center.
- Software on current maintenance can be enhanced, upgraded to a floating license, re-hosted, or transitioned to Agilent ADS.
- Typically, there are about two software releases of Genesys per year.

www.agilent.com/find/eesof-support

N3244A



Genesys concepts - training class

Three-day, hands-on Genesys training class, updated for the current release. Can be delivered at Agilent training site (N3244A), or at your site (N3244B).

www.agilent.com/find/eesof-genesys-class

W1401R



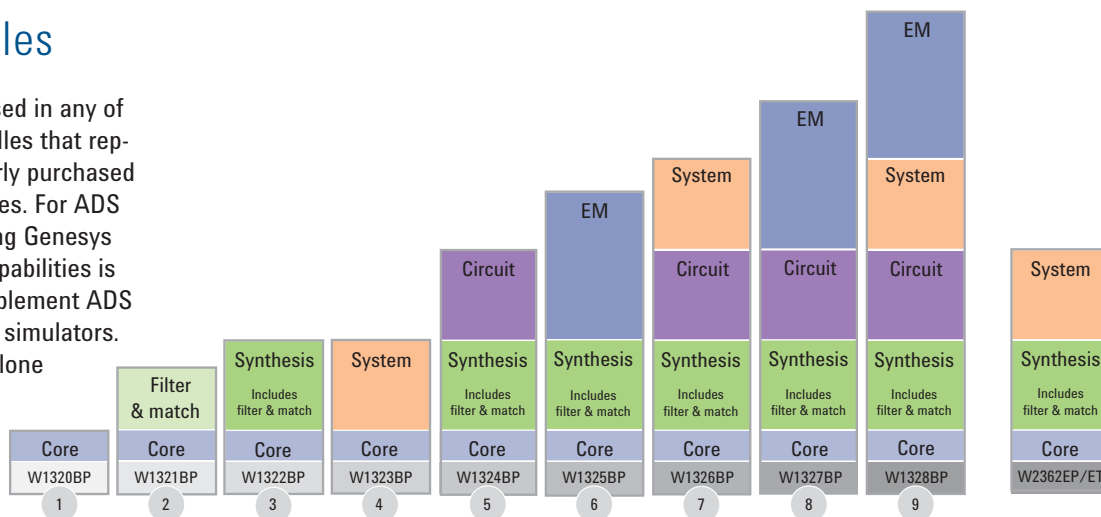
Genesys software upgrade

If your Genesys is outdated, you can upgrade to the latest version at very low cost to preserve your investment in this valuable tool.

Genesys

Genesys Bundles

Genesys may be purchased in any of the 9 preconfigured bundles that represents the most popularly purchased combination of capabilities. For ADS users, a bundle containing Genesys system and synthesis capabilities is specially created to complement ADS nonlinear circuit and EM simulators. It can also run as standalone Genesys software.



Genesys Bundle Name:	Genesys core W1320BP	Genesys core, filter, match W1321BP	Genesys core, synthesis W1322BP	Genesys core, system W1323BP	Genesys core, synthesis, circuit W1324BP	Genesys core, synthesis, EM W1325BP	Genesys core, synthesis, circuit, system W1326BP	Genesys core, synthesis, circuit, EM W1327BP	Genesys core, synthesis, circuit, system, EM W1328BP	ADS RF architect and synthesis element W2362EP/ET
Environment										
Genesys core Environment	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Testlink	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Synthesis										
Filter		Y	Y		Y	Y	Y	Y	Y	Y
M/filter		Y	Y		Y	Y	Y	Y	Y	Y
Match		Y	Y		Y	Y	Y	Y	Y	Y
Advanced Tline		Y	Y		Y	Y	Y	Y	Y	Y
S/filter			Y		Y	Y	Y	Y	Y	Y
A/filter			Y		Y	Y	Y	Y	Y	Y
Equalize			Y		Y	Y	Y	Y	Y	Y
Oscillator			Y		Y	Y	Y	Y	Y	Y
PLL			Y		Y	Y	Y	Y	Y	Y
Signal control			Y		Y	Y	Y	Y	Y	Y
Mixer			Y		Y	Y	Y	Y	Y	Y
Circuit simulation										
Harbec					Y		Y	Y	Y	
Cayenne					Y		Y	Y	Y	
Advanced modeling kit					Y		Y	Y	Y	
System simulation										
Spectrasys				Y			Y		Y	Y
WhatIF				Y			Y		Y	Y
EM simulation										
Momentum GXF						Y		Y	Y	
Momentum GX						Y		Y	Y	
EMpower						Y		Y	Y	
Sonnet Link						Y		Y	Y	
Training & upgrade										
N3244A/B Genesys 3-day hands-on training	Don't forget to sign up for training!									
W1401R Genesys Upgrade	You can always upgrade & refresh your old Genesys to these latest capabilities									

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 5989-7014EN

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<http://www.agilent.com/find/eesof-genesys-latest-downloads>

For more information about Genesys, visit:

<http://www.agilent.com/find/eesof-genesys>



Genesys Licensing Options

Genesys licensing options

License type	Node-locked	Networked
Perpetual license	<ul style="list-style-type: none"> A node-locked perpetual license is locked to a USB key or PC LAN physical address You own the license and this is the most cost-effective option for the long term The node-locked perpetual license is the most popular option 	<ul style="list-style-type: none"> The networked perpetual license enables convenient sharing by users across a network Costs about 30% more than node-locked perpetual license Suitable for larger companies and requires network license server administration
Subscription (time-based) license	<ul style="list-style-type: none"> The node-locked time-based license is locked to a USB key or PC LAN physical address Usage expires after the 12-months time-based license period Costs about 1/3 of a perpetual license including support; suitable for projects with tight cash flows 	<ul style="list-style-type: none"> The networked time-based license enables convenient sharing by users across a network Costs about 30% more than a node-locked time-based license Suitable for larger companies who need to optimize cash flows Requires network license server administration

www.agilent.com/find/eesof-genesys-license-options

Eagleware-Elanix, the originator of Genesys, was acquired by Agilent Technologies in 2005. Agilent EEs of EDA continues to build on and enhance the Genesys platform.



Agilent Technologies