

Quantic EMC Inc.



The Power of Quantic Signal Integrity
and EMC simulation on PC and
UNIX workstations

*Accurate and robust algorithms from the inventors of
Signal Integrity simulation. Fuelled by Quantic's
proprietary Boundary Element Method technology.*

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overview

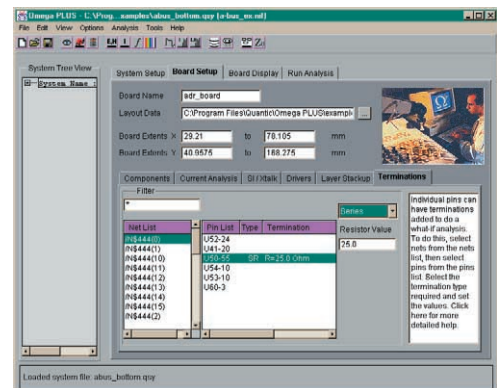
Quantic EMC has been providing engineers and printed circuit board designers with signal integrity and EMC simulation tools since 1985. Our innovative products and solutions allow engineers to get their electronic products to the market on schedule and on budget. The emphasis is to address electronic performance interference before committing the design to the manufacturer.

Omega PLUS Platform

available on both Windows and Unix workstations

Omega PLUS is Quantic's latest comprehensive signal integrity and EMC simulation tool for high-speed design verification and analysis. Using a convenient graphical user interface, Omega PLUS accurately screens all popular layout formats for SI and EMC violations. PCB designers and engineers can quickly and easily find and solve problems with a minimum of design iterations.

Generally, signal integrity and EMC issues are dealt with separately by different departmental engineers using various and often complicated analysis tools. However, today's high-speed designs require that these issues be dealt with collectively as changes made to the design by the Signal Integrity Department may inadvertently affect the level of radiated emissions. Such design changes, without assessing the overall impact, could inevitably add weeks to the design cycle. Omega PLUS promotes departmental cooperation by acting as a powerful communication medium between designers and engineers. Comprehensive user-configurable reports are produced allowing engineers to address design problems cooperatively via our results viewer e-mailer. Changes to the design can be made quickly and effectively without having to sit down for lengthy design reviews.



Omega PLUS

BoardScan-Signal Integrity and Crosstalk Module

Screens PCB layouts for nets with crosstalk, ringing, time delays, overshoot, undershoot, settling time and noise margin violations. Once the violation criteria are provided, looking at a graphical view of the board, the engineer can screen one net, a group of nets or entire circuit boards. Because the technique of using this tool is no more than a button-pushing operation, the PCB designer is able to concentrate on the task at hand. For instance, nets can be listed in descending order of crosstalk or the user may restrict the maximum number of nets to be reported. Signal overshoot violations may also be requested.



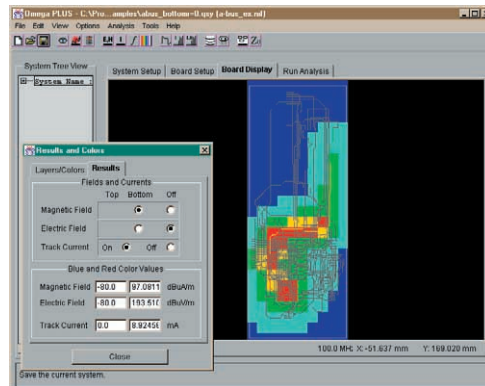
To screen on the basis of signal integrity (i.e. pulse shape) and crosstalk it is necessary that BoardScan do the field analysis associated with the cross-sections of all multiconductor line systems in order to obtain the parasitics. With this data, BoardScan forms the required transmission-line models. To economize on field analysis, BoardScan builds a permanent library of models for each cross-sectional configuration it uncovers. In short, this constructs a permanently held lookup table with very infrequent occasion for subsequent field analysis.



Omega PLUS Emissions Module

Simulates the electromagnetic emissions immediately above or below a PCB allowing for the identification of problem nets. The simulation can be done during routing or at the post-layout stage. Users can analyze both individual and multiple nets to enable first pass EMC verification by locating the highly radiating "hot spots" and the nets that are the cause.

This module, when calculating emissions from a board, accurately deals with emissions from pins and vias as well as from tracks. Even if a board is encapsulated with copper planes as striplines, emissions still occur from component pins and vias protruding above the ground planes. The Omega PLUS Emissions module will show these emissions.

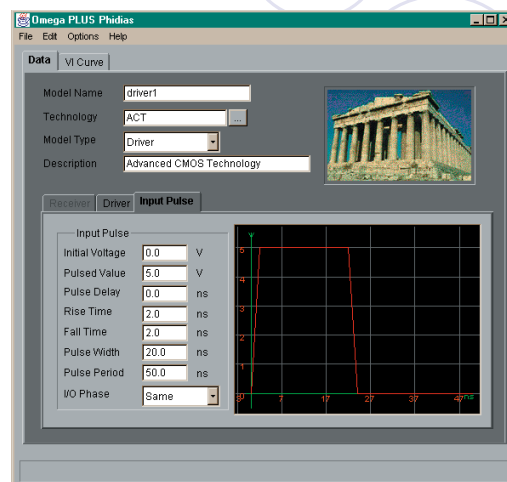


Omega PLUS Ground Plane Modeller

With this module, Omega PLUS simulates two-sided boards and multi-layer boards with partial power and ground planes. The Ground Plane Modeller automatically includes the influence of copper areas and power nets on the tracks in the simulation of the signals on the PCB.

Omega PLUS Phidias Module

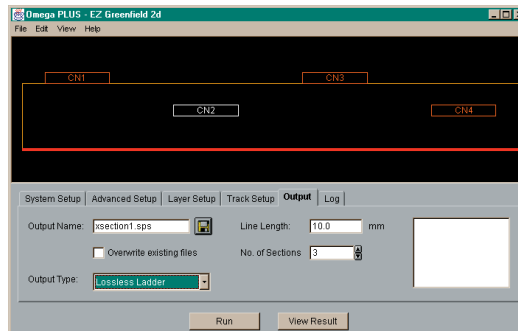
Quantic's IBIS-compliant behavioural modelling tool, is an easy to use software package that allows behavioural component models for use in simulations, e.g. V-I curve-based signal integrity simulation models for use in BoardScan's signal integrity, crosstalk and emissions modules. Phidias allows behavioural models to be developed conveniently from IC manufacturers' data sheet information, from the output of Omega PLUS, or from SPICE simulations of more complex models. The models created are then placed within components that may easily be managed under Quantic's Database Manager. The models created with Phidias offer high accuracy combined with fast simulations. For convenience, Quantic provides a library of generic models for use in simulations.





Omega PLUS EZ Greenfield 2d

A transmission-line modeller. Uses Quantic's boundary element method (BEM) field solver to produce equivalent circuit models of general microstrip and stripline transmission-line structures. It outputs matrices of derived parasitics (e.g. inductance, capacitance and resistance matrices), and voltage/current mode shapes and velocities, impedances and a variety of transmission-line models that are readable by SPICE products. Using these transmission-line models (e.g. lossy, lossless, continuous and discrete ladder), which include controlled sources, it couples the otherwise uncoupled SPICE transmission lines together to allow correct simulation of crosstalk using SPICE-provided component models. A very convenient tool for pre-layout simulation and rules generation.



Omega PLUS Impedance Calculator

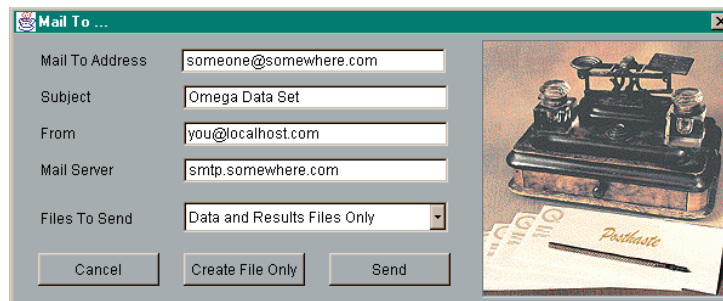
A special case of EZ Greenfield 2d. It very conveniently and rapidly calculates the impedance of single tracks in microstrip and stripline configurations within the homogeneous dielectric medium. Since all dimensions of the system are adjustable, non-standard models such as embedded microstrip and asymmetric stripline can be quickly analyzed.

Omega PLUS Database Manager

The Database Manager allows engineers, designers and model library managers to quickly and easily, display, add and delete models in the component, translation and sub-circuit databases. Users can map user-part codes to existing components, attach sub-circuits to pins and use IBIS/Phidias selected behavioural or SPICE models.

Omega PLUS The Mailer

In addition to SI and EMC analysis, Omega PLUS acts as a powerful communications medium – a white board, if you will - between PCB designers and engineers. Because of its quantitative reports, designers and engineers can forward the simulated data via our results viewer e-mailer without having to sit together for lengthy periods in design reviews. By providing an unlicensed copy of the software, it can also perform this function between departments, divisions and external customers.



Quantum EMC Inc.

Unix Workstations

PCB Greenfield

└ System level pre- and post-layout signal integrity and crosstalk simulation on Unix workstations

Allows users to examine signal integrity (ringing, time delays, overshoot and undershoot) and crosstalk on problem nets prior to prototyping. PCB Greenfield provides designers with pre- and post-layout simulation capabilities on critical nets to verify design rules. It handles multi-board systems with connector models. Because it was designed to be an optimal multi-conductor transmission line simulation tool, users are able to analyze the most complex nets quickly and extremely accurately.

Also included is the capability to analyze non-uniform traces that may be included as subnetworks. TrLine provides SPICE models of special transmission lines for example discretely-coupled lossy, lossless and no-ground models, lossy and lossless ladder-line models, non-uniform lossy and lossless ladder-line models, RC ladder-line models, and infinitely-long transmission-line models.

Greenfield 2d

└ Two-dimensional solver for complex geometries

Greenfield 2d, is a parasitics extractor for complex two-dimensional geometries, such as non-planar photo resists and trace undercuttings caused by etching. Once modelled and solved, users are provided with extremely accurate parasitics results, including conductor losses, inductances, capacitances, impedances and time delays. Other models include cables, connectors, and atypical microstrip and stripline geometries. The software also calculates per-unit length self and mutual inductances, mutual capacitances and capacitances to ground for multi-conductor transmission line systems, and calculates resistances for eddy-current losses. Greenfield 2d, employs Green's functions and the highly accurate Boundary Element Method (BEM) for field solving.

Greenfield 3d

└ A powerful parasitics solver for three-dimensional structures

Greenfield 3d is a powerful SPICE modeller for three-dimensional structures. For vias, connectors, complex PCB structures, cables, and IC packages. Generates SPICE models and sub-networks for PCB Greenfield. Greenfield 3d is available with an integrated library of common PCB structures including straight and right-angled connectors. Interface to an external three-dimensional solids modeller and mesh generator to support analysis of user-defined three-dimensional structures.

Compliance

└ Predicts emitted field patterns for systems of PCBs including cables and enclosures

Presents the effects upon radiated fields due to changes in single nets, groups of nets, entire printed circuit boards, complete systems combining boards, cabling and slotted enclosures. It mimics anechoic chamber testing facilities and open-area test sites. Compliance gives results relative to changes. It does not yield absolute field values for comparison to actual laboratory measurements at this time.

Compliance displays the vertical, horizontal and radial electric and magnetic fields. Common-mode effects are included. Compliance displays maximum field vs. frequency, as well as the fields at the observation points in a three-dimensional graph resembling the measurement positions used in a testing facility. The direct-field contributions from the individual nets can be displayed as well as the coupled-field contributions from the induced currents on the enclosure, cabling, ground planes and substrates. Induced current distribution on the enclosure is displayed as a colour surface plot. Current spectra and waveforms at each component pin are provided.

AutoTools

└ Rules control for the SPECCTRA autorouter

Produces layout rules and DO files for SPECCTRA. This product contains: a) AutoTalk – automatic generator of crosstalk rules for SPECCTRA; and b) AutoTime – automatic generator of time delay rules for SPECCTRA. AutoTalk and AutoTime are designed specifically to drive the SPECCTRA Fast Circuits Option. They produce complete noise coupling and time delay DO files based on a thorough field analysis of your board before routing.



Customer Testimonials

Marcus Lankford et al, Auburn University

“The results of the simulations and measured crosstalk are shown... for a line length of 15 inches... the simulation and measured crosstalk are nearly identical.”

Urs von Kanel, Siemens, Switzerland

“Our EMC Testing Laboratory does all EMC testing necessary for our products to meet the requirements of specified countries... assuring the customer a “Swiss” quality standard... For the support and improvement of the layout process in the field of EMC and signal integrity we use Omega PLUS as a support tool for our EMC engineers. Omega PLUS is easy to use and the results are accurate. Training and support is quickly accessible and professional... I highly recommend Omega PLUS.”

Steve Bird, Sanmina Corporation

“Because of the accuracy of their algorithms and the reliability of their results of their simulations, we made the decision to include Quantic software in our tool kit... We believe Omega PLUS is the only software that contains the functionality that we need for a variety of applications and customer demands. For example, the software’s ability to identify offending traces, simulate current waveforms, and model split power and ground planes is particularly appealing to us.”

Andrew Rybak, IBM Corporation

“We wanted a product that would help us streamline the design process prior to prototyping. What we found particularly appealing about Omega PLUS was the program’s ability to pinpoint the radiating “hot spots” and the nets that are the cause. Omega PLUS will help our engineers develop high quality, first pass designs.”

Company Headquarters

Quantic EMC Inc.
1103-191 Lombard Avenue
Winnipeg, Manitoba
R3B 0X1, Canada
phone: (204) 942-4000
fax: (204) 957-1158
www.quantiac-emc.com
info@quantiac-emc.com

Research & Development Centres

Quantic EMC Inc.
Croft House, Chilcompton
Somerset
BA3 4JA, UK
phone: 44(0) 1761 232191
fax: 44(0) 7974 141685

Quantic EMC Inc.
1103-191 Lombard Avenue
Winnipeg, Manitoba
R3B 0X1, Canada
phone: (204) 942-4000
fax: (204) 957-1158