Sonnet Software, Inc.
100 Elwood Davis Road • North Syracuse, NY • 13212 • USA

Nine Good Reasons to Upgrade Your Sonnet Suites to Release 11

We're pleased to announce the Sonnet Suites Release 11 for high frequency planar electromagnetic (EM) analysis. Among the significant new features in the software are nine good reasons to consider upgrading your Sonnet Suites installation to Release 11:

1. 64-Bit EM Analysis Engine (Sonnet Professional Suites)

In Release 11, Sonnet introduces full 64-bit support for our EM analysis engine for Windows and Linux Platforms. That means that your analysis job size is limited only by the available RAM on your computer. In previous releases, Sonnet EM analysis job sizes were limited to less than 4 GB, depending on your operating system. The new 64-bit analysis engine paves the way to analysis of very large circuits and structures.

2. Improved Analysis Engine Provides Faster Analysis (All Sonnet Suites)

The new EM Analysis Engine for Release 11 includes significant performance improvements, yielding up to 40% faster analysis over Release 10 on the newer Intel and AMD processor platforms (Linux and Windows).

3. Co-calibrated™ Internal Ports (Sonnet Professional Suites)

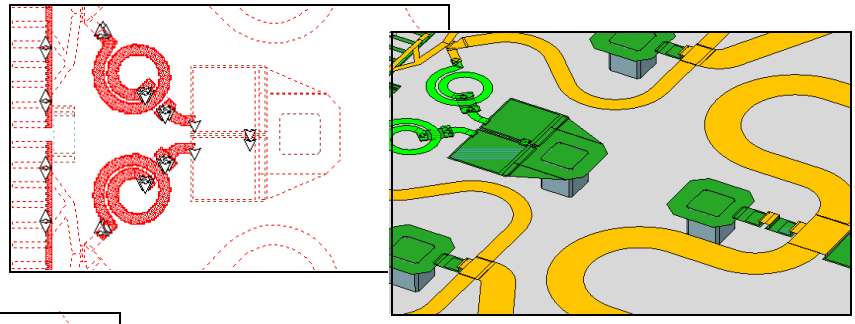
With Co-calibrated Ports, we're proud to usher in a new era of EM-based design. Co-calibrated Internal Ports are based on a ground breaking new EM analysis port calibration technique known as General Local Ground de-embedding[1] to bring you the industry's first and only perfectly calibrated internal ports. Co-calibrated ports enable you to partition your high frequency designs for EM analysis in ways that were previously impossible.

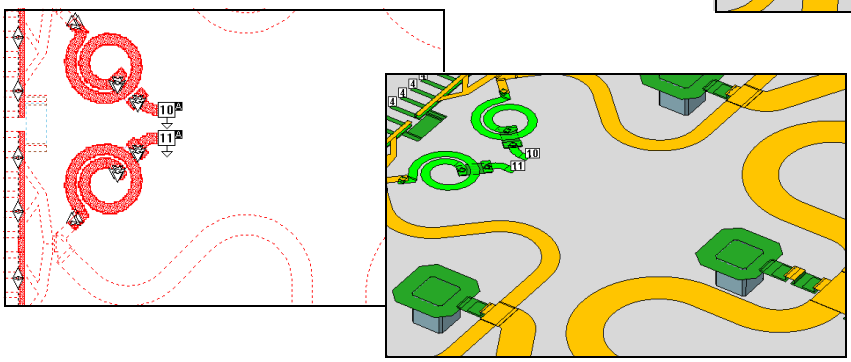
Imagine having the ability to perform EM analysis on any section of your high frequency circuit or interconnect with any number of perfectly calibrated ports anywhere on the interior of your layout. You could segment your design to leverage the accuracy of EM analysis to account for interstage or interconnect cross-

1. James C. Rautio, Deembedding the Effect of a Local Ground Plane in Electromagnetic Analysis, IEEE Transactions on Microwave Theory and Techniques, Vol. 53, No. 2, February 2005, pp. 770 - 776.

coupling, and accurately attach (or optimize) models for targeted components in the middle of the layout, like capacitors, inductor elements or even active devices. Co-calibrated Ports ensure that the connections between EM models and other system models are accurately and properly calibrated.

TOP: MMIC circuit with MIM capacitor termination which may be replaced by Co-calibrated ports for EM simulation



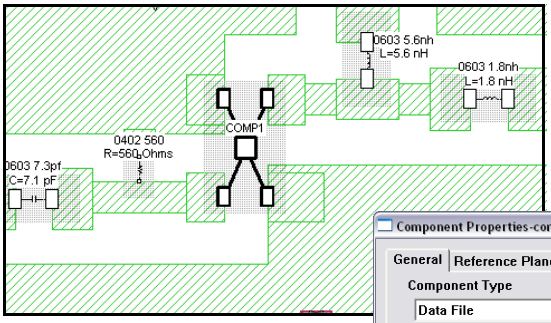


BOTTOM: MIM capacitor termination is removed and replaced with Co-Calibrated Ports so the model may be attached in later schematic or Sonnet Component simulation.

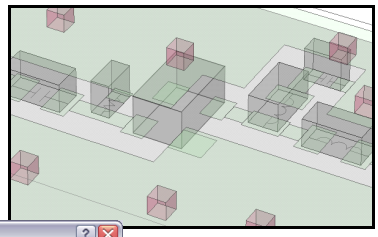
Calibration Groups made up of Co-calibrated ports provide calibration and de-embedding for multiple ports spaced close together. Closely-spaced internal ports exhibit cross-coupling—especially if they are within a substrate thickness of one another. Calibration Groups calibrate all co-calibrated ports within the group at the same time—effectively removing all cross-coupling between the ports in the group. Any number of calibration groups may exist within a given EM analysis. Calibration groups of Co-calibrated Ports may be used to replace elements as small as a MIM capacitor or individual transistor device. Later attachment of the device model can be accommodated either in Sonnet (using our Component feature) or in the high frequency design framework of your choice.

4. Components (All Sonnet Suites)

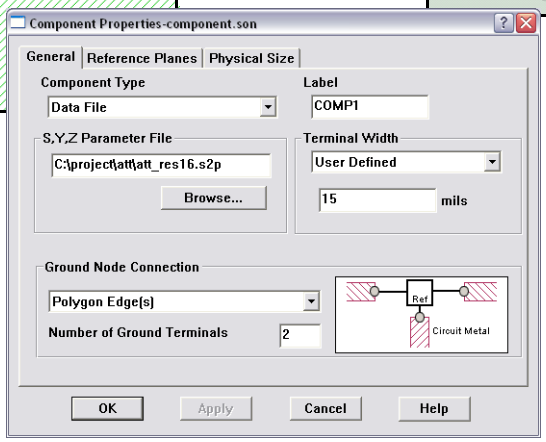
Sonnet Components are electrical model objects that can be embedded into your EM projects. They combine electrical models with internal Co-calibrated Ports to provide EM co-simulation of electrical models with your EM analysis.



Top Left: Surface mount technology (SMT) power amplifier using a vendor data model Component for the transistor. Surface mount passive Components are also shown.



Top Right: 3D View of circuit including SMD package outlines.



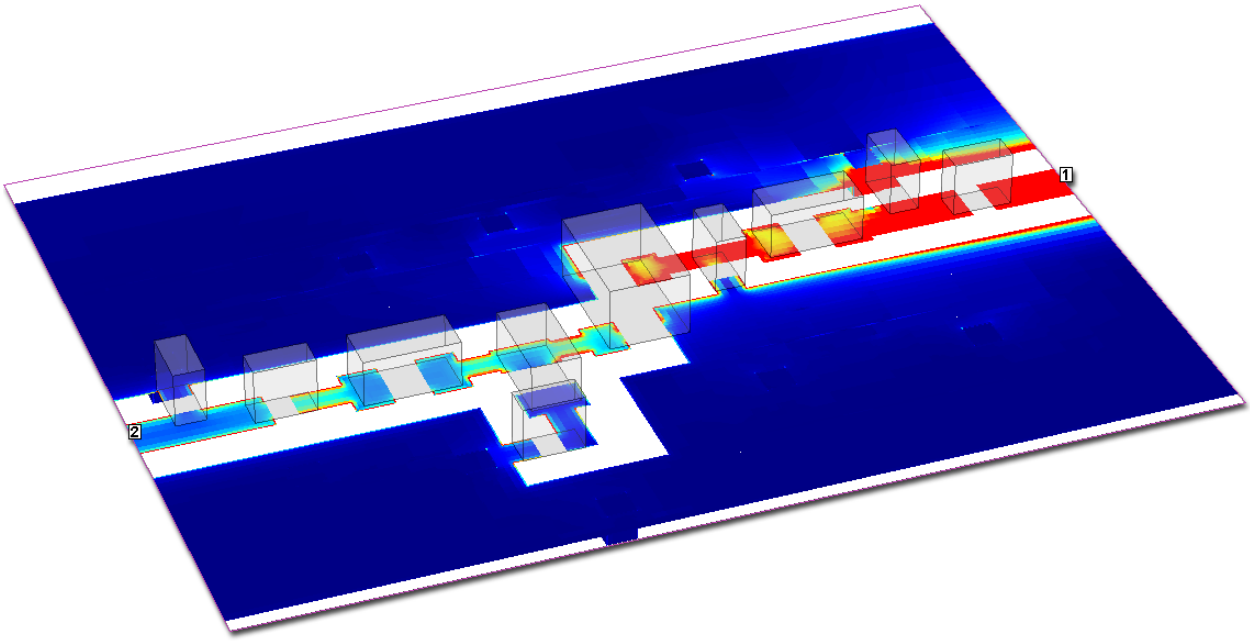
Bottom: Sonnet Component definition window for the Data File component that represents the transistor package.

Sonnet Components enable surface mount device (SMD) models in EM analysis.

Examples of Components are:

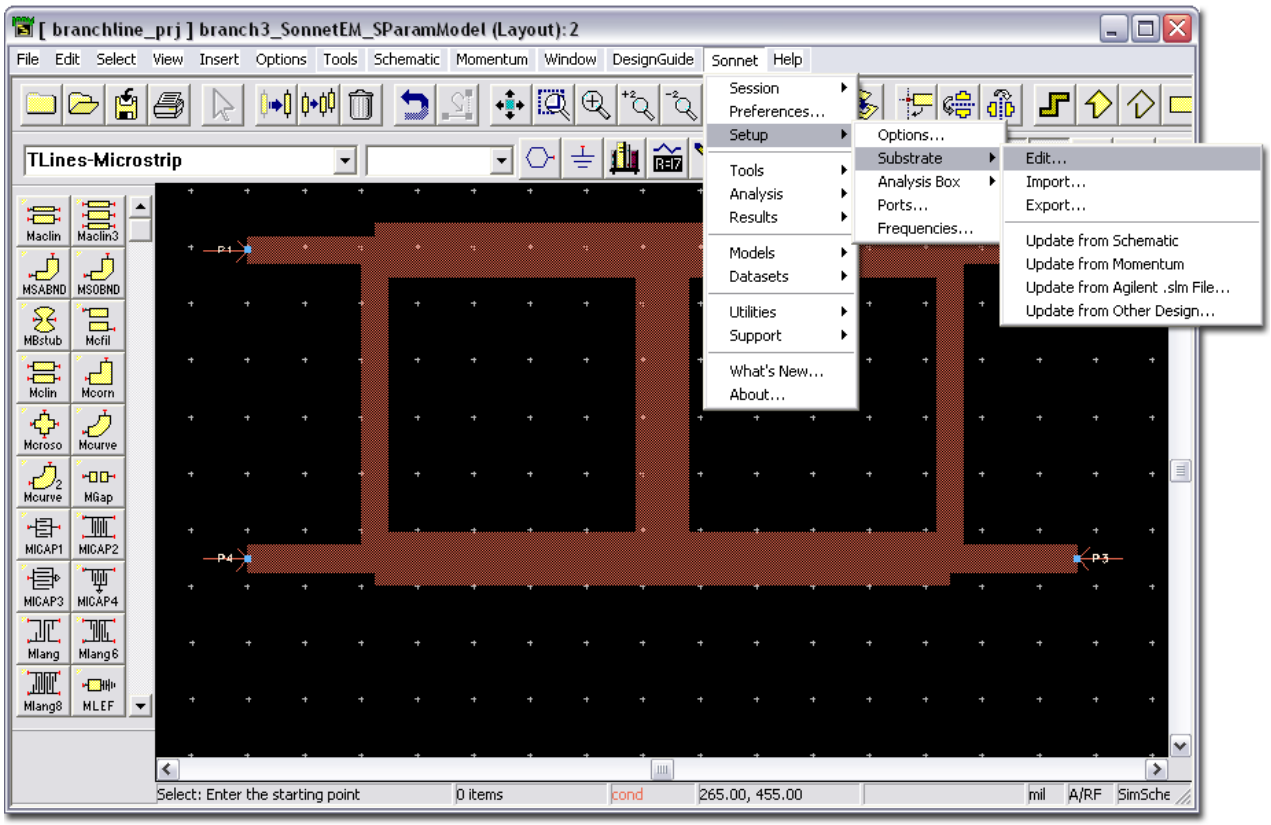
- Ideal capacitors, inductors and resistors with physical terminal widths to properly model the electrical discontinuity in their connection
- S-parameter data models for transistors, surface mount amplifiers, or vendor models for any surface mount device or package
- Device or subcircuit models based on measurement
- Device placeholders for EM port data, enabling later model attachment in any high frequency circuit simulation framework

Accurate current density is computed by the solver to display the effects of any included Components on the circuit behavior. For instance, if you use components to form a resonant circuit, the current density will show the resonance effects on the circuit metal and interconnections.



5. Redesigned Agilent ADS Interface (All Sonnet Suites)

Sonnet is fully committed to tight, seamless integration with high frequency design frameworks. In Release 11, we have completely redesigned our Agilent® ADS® interface to provide tight, error-free access to Sonnet's EM analysis engine and EM design environment from within the ADS environment.



New interface makes Sonnet fully accessible from within ADS

Sonnet's new ADS Interface is installed as a Design Kit in ADS, making it possible for EM models and their accompanying layouts to be available for other projects, or even to other users. Design Kit installation can be done instantly and automatically from the Sonnet Task Bar—no editing of ADS initialization files is needed.

The ADS Interface provides:

- Instant creation and simulation of Sonnet EM projects derived from ADS layouts using any ADS drawing layer
- Instant creation and simulation of existing ADS Momentum projects
- One-step EM co-simulation for ADS, including these tasks:
  - Create Sonnet EM Project and call for Sonnet EM simulation
  - Enable remote simulation or simulation on a Sonnet ***emCluster***, if desired
  - Import Sonnet EM data model (usually S-parameters) to ADS, and create an ADS dataset model
  - Create an ADS Layout-look alike model for ADS schematic to ease the use of the Sonnet model in future schematic designs
  - Create an accompanying ADS Layout for the EM model

- The creation of interface "states," which instantly recall material definitions, layer mappings, analysis plans, and other interface and simulation settings previously created for a particular process technology or previous ADS design.

The interface is an automatic upgrade to customers who already own previous versions of the ADS interface (feature name ***ebridge***). For details on supported versions of ADS, please visit the Sonnet Suites Release 11 System Requirements page on the Sonnet Software web site:

http://www.sonnetsoftware.com/requirements.

6. Enhanced AWR™ Microwave Office™ Interface (All Sonnet Suites)

Continuing our commitment to superior high frequency design frameworks, Sonnet is pleased to provide a number of significant enhancements to our AWR Microwave Office Interface, ***mwoint***:

- Sonnet Co-calibrated Ports may be referenced and used in AWR EM Projects, but must be set in the Sonnet native editor
- Sonnet thick metal types may be set in AWR for automatic thick-metal simulation in Sonnet
- The EMSocket interface can drive Sonnet Remote EM Processing and ***emCluster*** computing for processing on high-end network computing servers
- AWR X-models and EM-driven Extract Blocks may use Sonnet as the EM simulation client

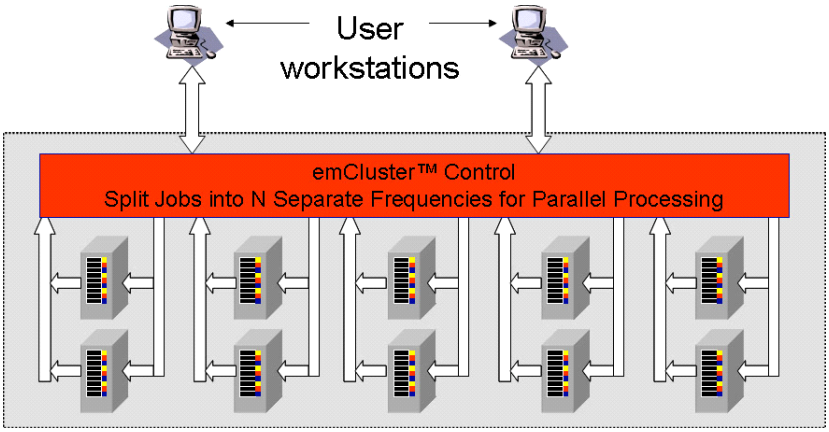
For details on supported versions of Microwave Office, please visit the Sonnet Suites Release 11 System Requirements page on the Sonnet Software web site:

http://www.sonnetsoftware.com/requirements.

7. Simplified Distributed Computing using Sonnet Cluster (Sonnet Professional Suites)

In Release 10, we introduced the capability to distribute Sonnet EM analysis job computing across multiple workstations. In order to implement this "shared computing" capability, you needed to install and configure Load Sharing Facility (LSF) from Platform Computing. An industry standard, Platform LSF is a very flexible and comprehensive 3rd party software tool for computing cluster administration, control, health monitoring and job scheduling.

Many customers have computing clusters that are relatively small (5-20 workstations) and prefer a simpler solution. For the benefit of those customers, we are pleased to announce the release of ***emCluster***® **Using Sonnet Networking (Sonnet Cluster)**.



Sonnet *emCluster* computing leverages networking computing resources for faster simulation

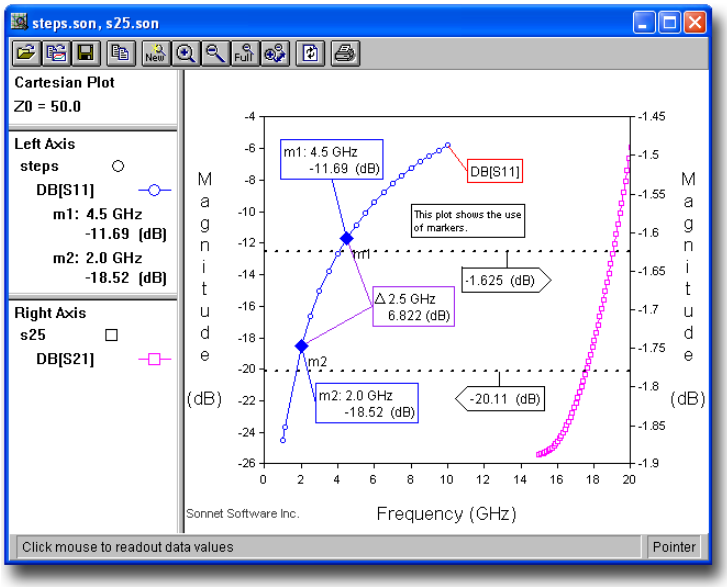
Sonnet Cluster provides a cluster computing capability for Sonnet that is based on the existing TCP/IP socket communication system already used in our Remote EM Processing capability. Although not as flexible as Platform LSF (which we continue to support), the new networking system has the following features:

- The cluster computing queue may be shared by all users on your network, ensuring that your solver licenses are utilized as efficiently as possible
- Sonnet EM analysis jobs may be submitted so that different frequency points of the same job are computed in parallel or the complete analysis may be performed on only one node
- The status of each ***emCluster*** node may be monitored at any time by any network user
- All computing and hard disk utilization is local to each computing node; there are no shared file systems required for the ***emCluster*** computing nodes
- Minimal network bandwidth is required, enabling low-cost cluster networking solutions

Sonnet Cluster is supported for clusters using Linux and Windows computers with AMD and Intel CPUs. Mixed operating systems are supported within the same cluster.

8. Response Viewer Enhancements (All Sonnet Suites)

In Release 11, we introduce Markers, a new feature in the response viewer. Markers allow you to annotate a plot in the response viewer to make it easier to interpret your data and present it to others. Markers are available under the Graph Menu in the response viewer main menu. There are six types of markers: Data, Curve, Vertical Line, Horizontal Line, Delta and Note.



Sonnet Response Viewer now includes markers and value lines

9. Larger Circuits Can Be Analyzed in the Same RAM Space (Sonnet Lite, Sonnet LitePlus, Level2 and Level3 Suites Only)

Sonnet Lite, Sonnet LitePlus, Level2 Basic, Level2 Silver and Level3 Gold Suites have been upgraded to use available RAM memory more efficiently by changing the matrix solver to a symmetric matrix solver. This change enables Sonnet Lite, Sonnet LitePlus, Level2 and Level3 users to solve jobs that have on the order of 40% more subsections (unknowns) than in the previous release.