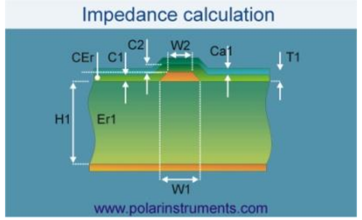
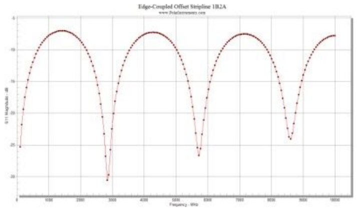
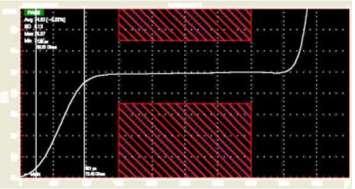
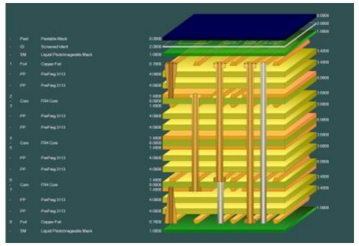
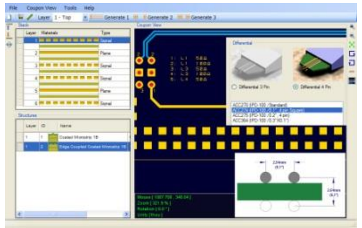










Si8000m 2021 - 2022 Preview

Richard Attrill – September 2022 (Rev 3)

Introducing the latest features of Si8000m

Welcome to a preview of Si8000m.

Since January 2021 we have released seven versions of Si8000m, each introducing a number of new features that have been requested through our Polarcare software maintenance service.

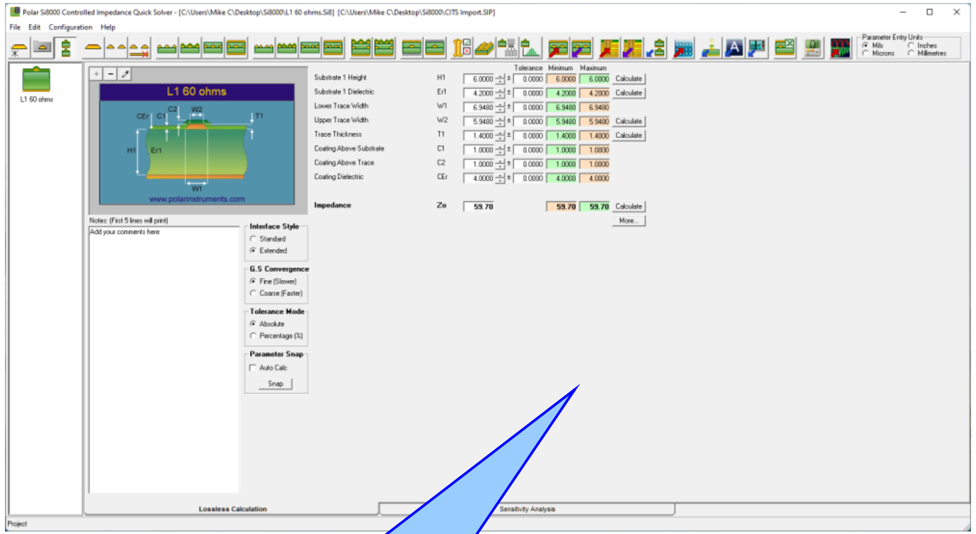
These slides are arranged in a “newest first” format. A slide containing the version number and release date precedes information detailing the new features contained in each release.

If you would like to have a web-based demonstration please contact your local Polar office, details are shown on the last slide of this presentation

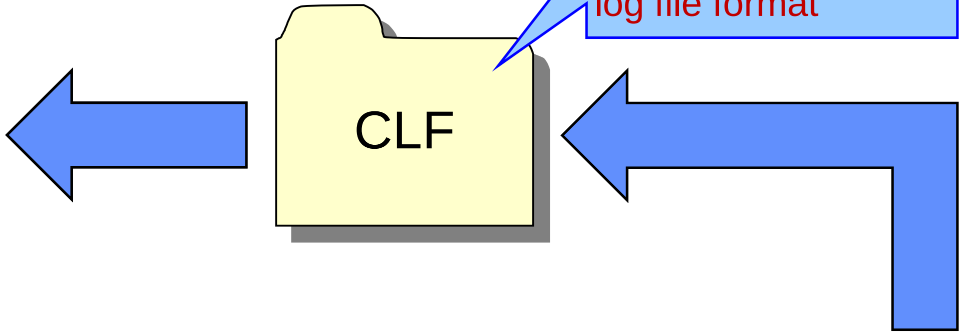
Please note: the Si8000m units have been set to Mils in the following screen grabs

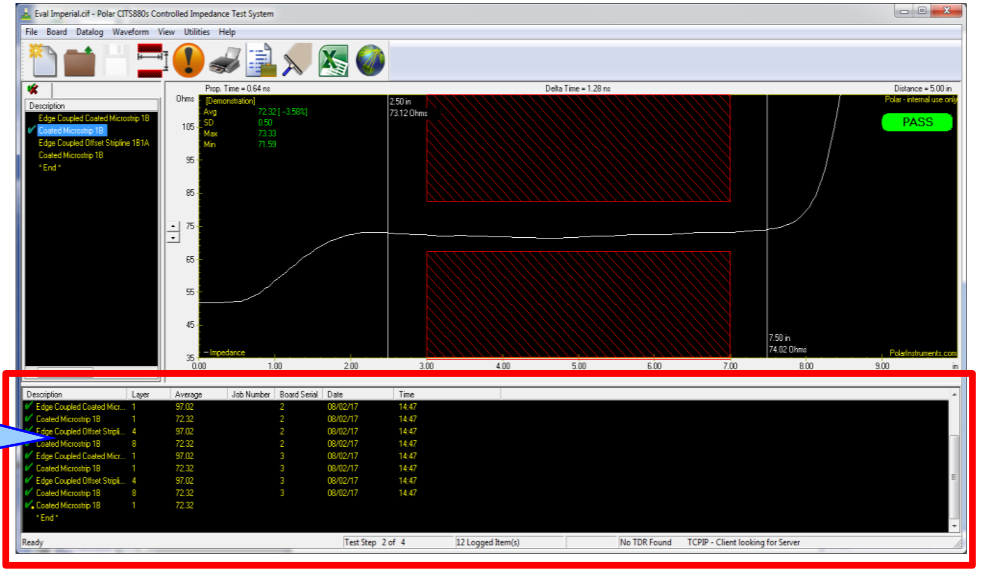
Si8000m v22.09.01 (September 2022)

Enhancements to the Import Polar CITS Datalog File option



New for v22.09.01
Now supports the latest CITS880s data log file format





Overview
The Polar Si8000m / Si8000m field solver products have the capability to read a Polar CITS Data Log File (.CLF). This file contains comprehensive impedance measurement data and, along with existing modelled structure information, offers graphing capabilities and statistical analysis where the modelled and measured data can be presented together.

The Data Log of the CITS software is stored in a CLF file

Import CITS Datalog File option – feature recap

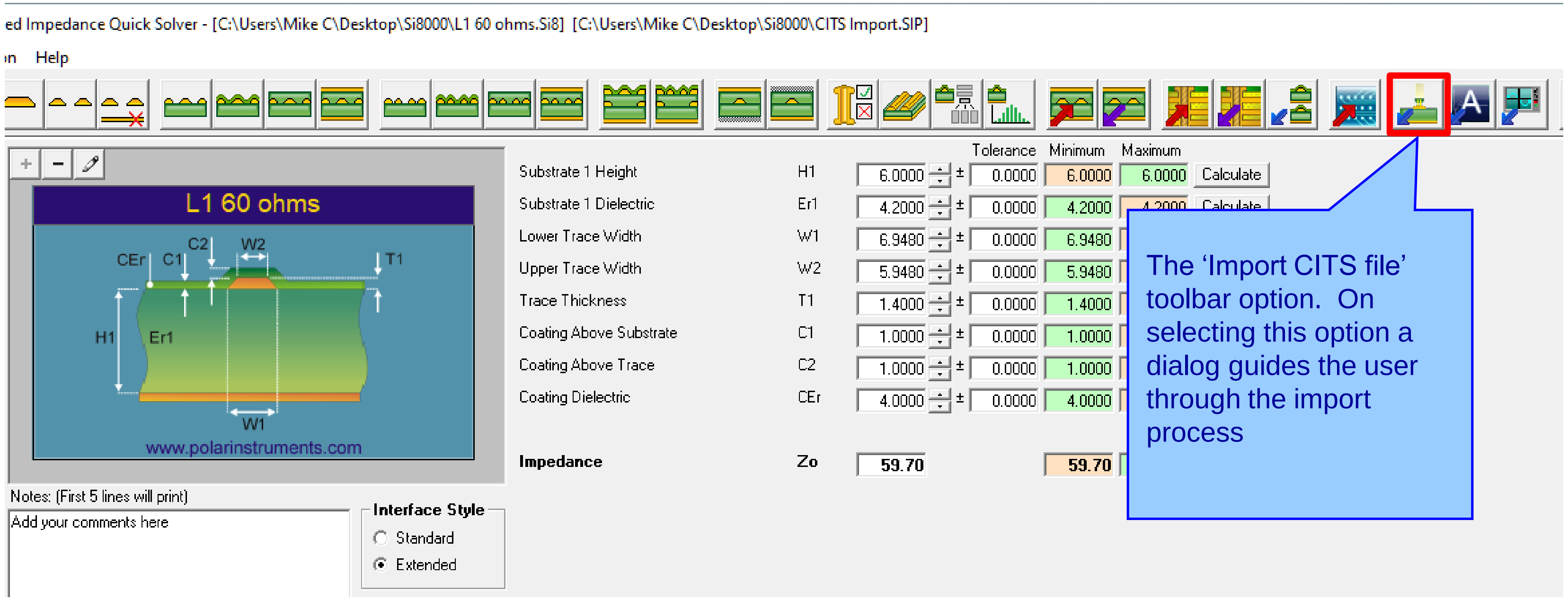
Whilst working with controlled impedance designs it is often desirable to compare the reality of the measurement data against the modelled structure.

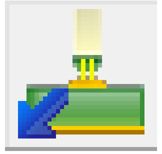
‘Closing the loop’ between the predicted and actual measured results has a number of benefits for both the design and fabrication environments. It allows for fine tuning of the structure parameters in future manufacturing batches, statistical analysis and improved overall process control.

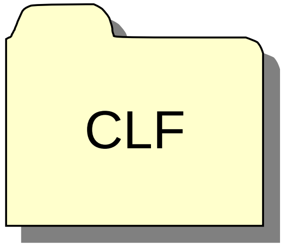
This capability within the Polar’s Si8000m / Si8000m field solver products allows the user to quickly import measurement data directly from the industry-standard Polar Controlled Impedance Test System (CITS).

If you are a design customer using the Si8000m / Si8000m and would like to use this feature, please request the Polar CITS Datalog File from your fabricator.

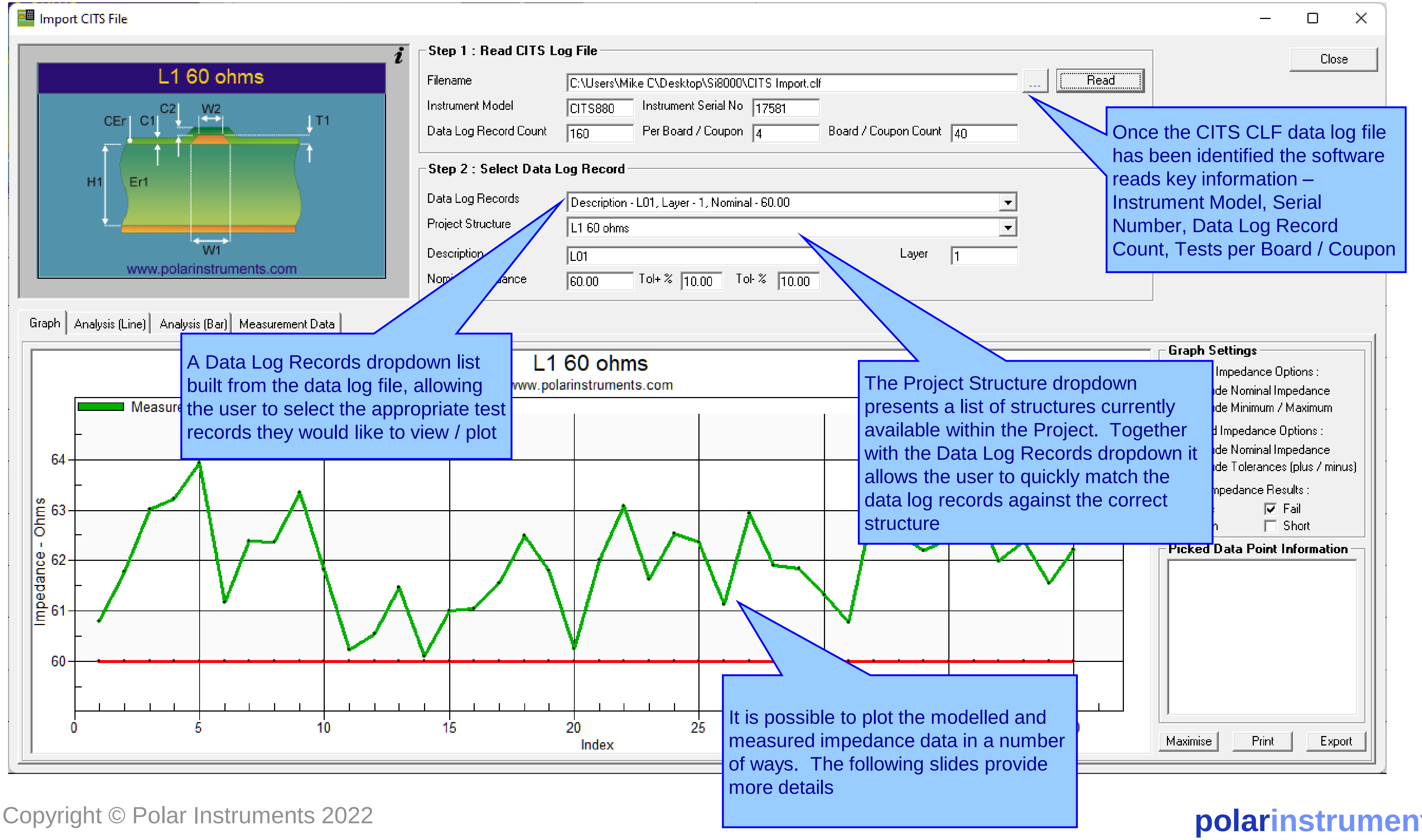
Import CITS Datalog File option – feature recap



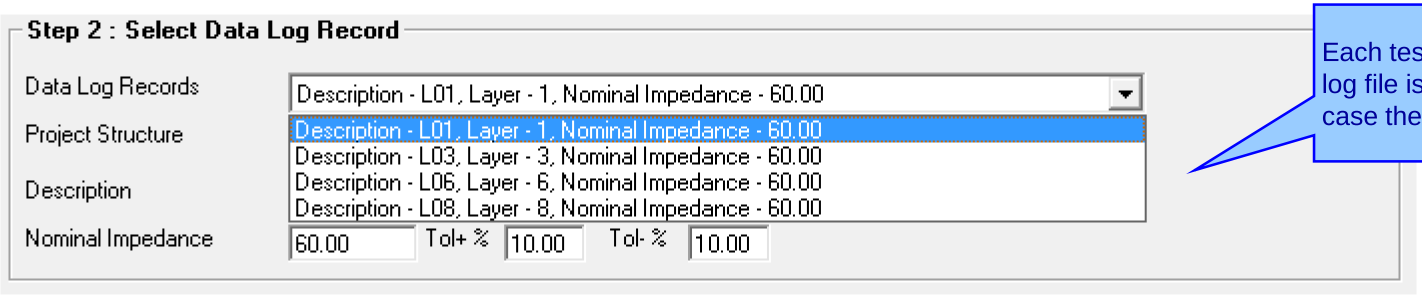




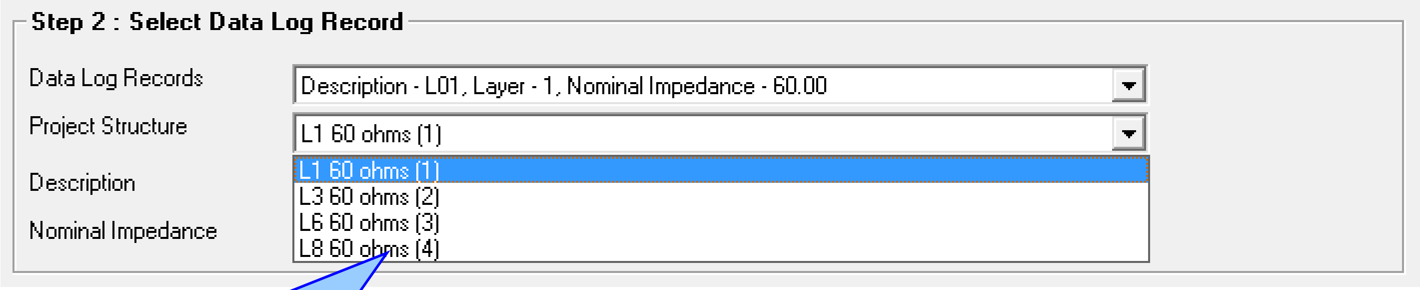
Import CITS Datalog File option – feature recap

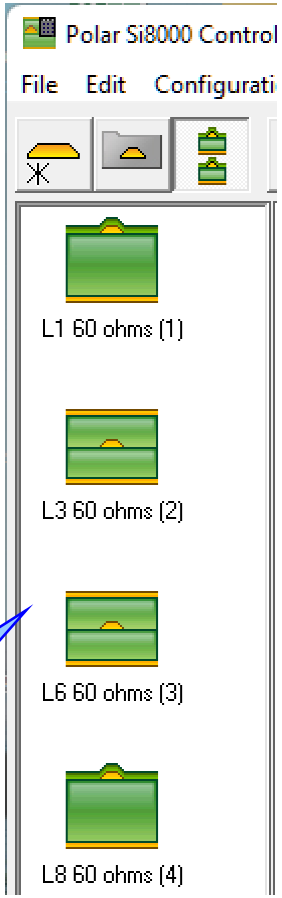


Import CITS Datalog File option – feature recap



Each test record type found in the data log file is listed in the drop down. In this case there are four tests.





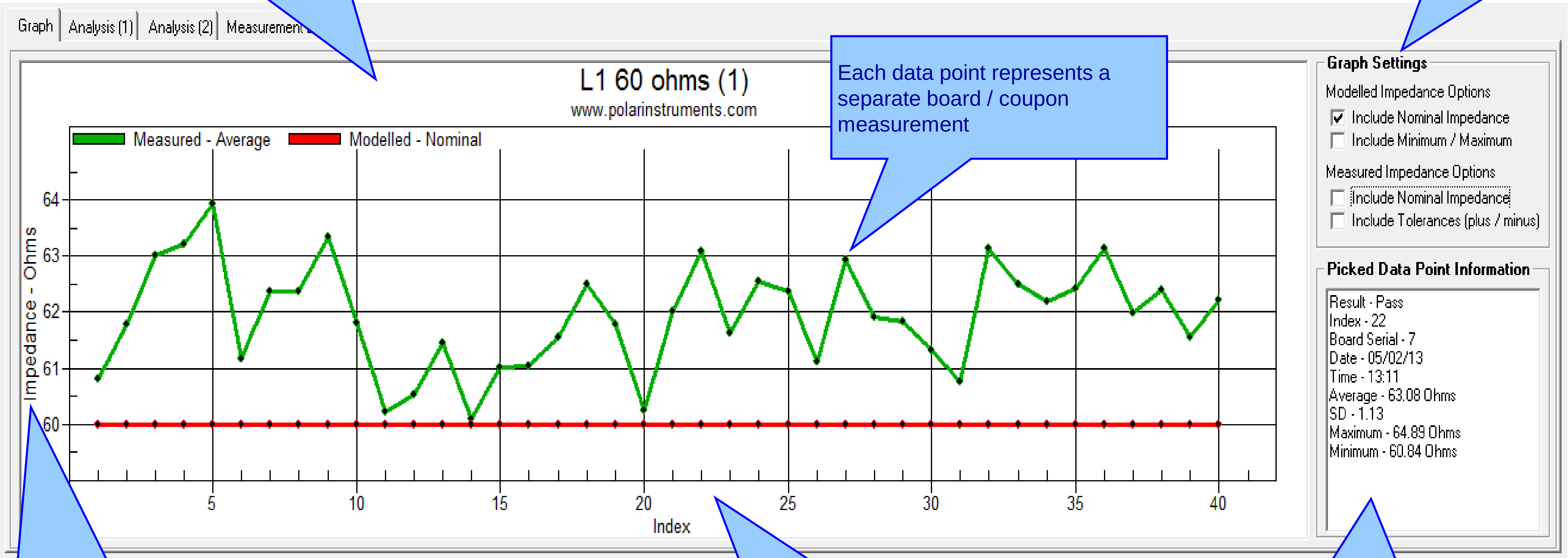
To match one of the four modelled structures from the Project group against a data log test record simply select the structure from the Project Structure dropdown

Four structures loaded into the Project group

Import CITS Datalog File option – feature recap

The Graph tab provides a number of plot options. In this case the measured data is shown in Green, the modelled data in Red

Graph Settings allow the selection of modelled / measured data to be plotted



Each data point represents a separate board / coupon measurement

The y-axis is the measured impedance for each board / coupon

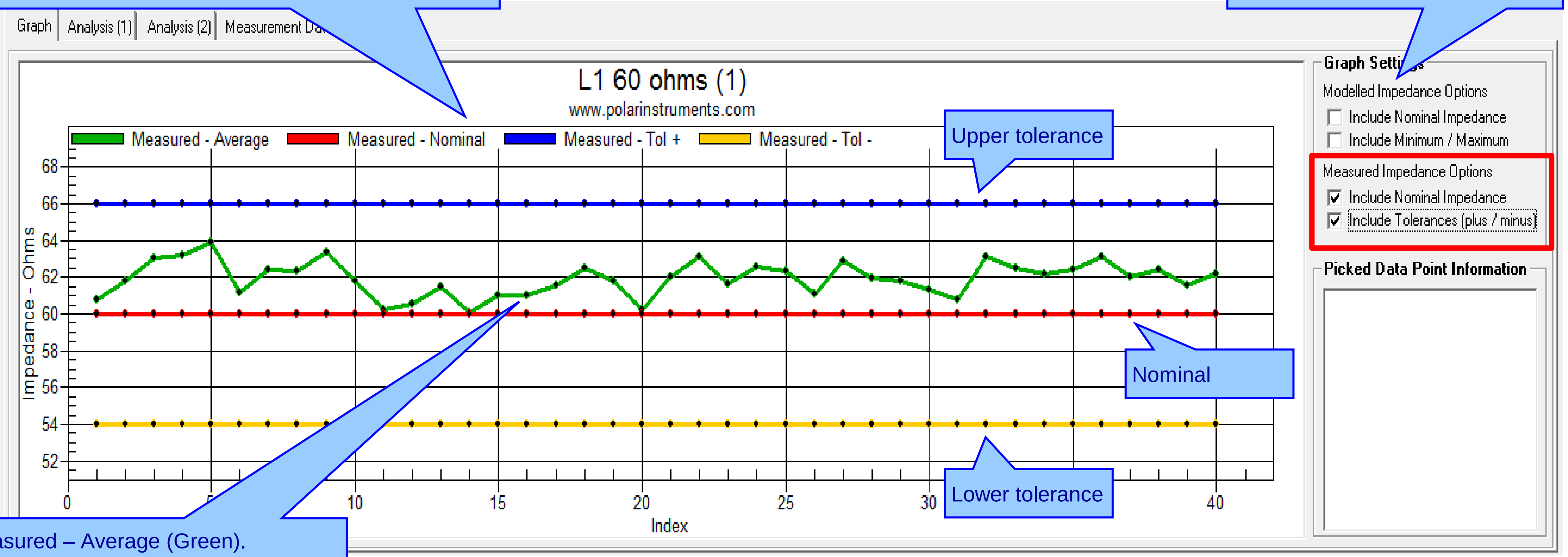
The x-axis is the identifying Index of the board / coupon read from the data log file

It is possible to pick a measured data point, key information is displayed here

Import CITS Datalog File option – feature recap

In this case the Graph contains:
Measured – Average (Green)
Nominal (Red)
Upper Tolerance (Blue)
Lower Tolerance (Yellow)

Graph Settings allow the selection of modelled / measured data to be plotted

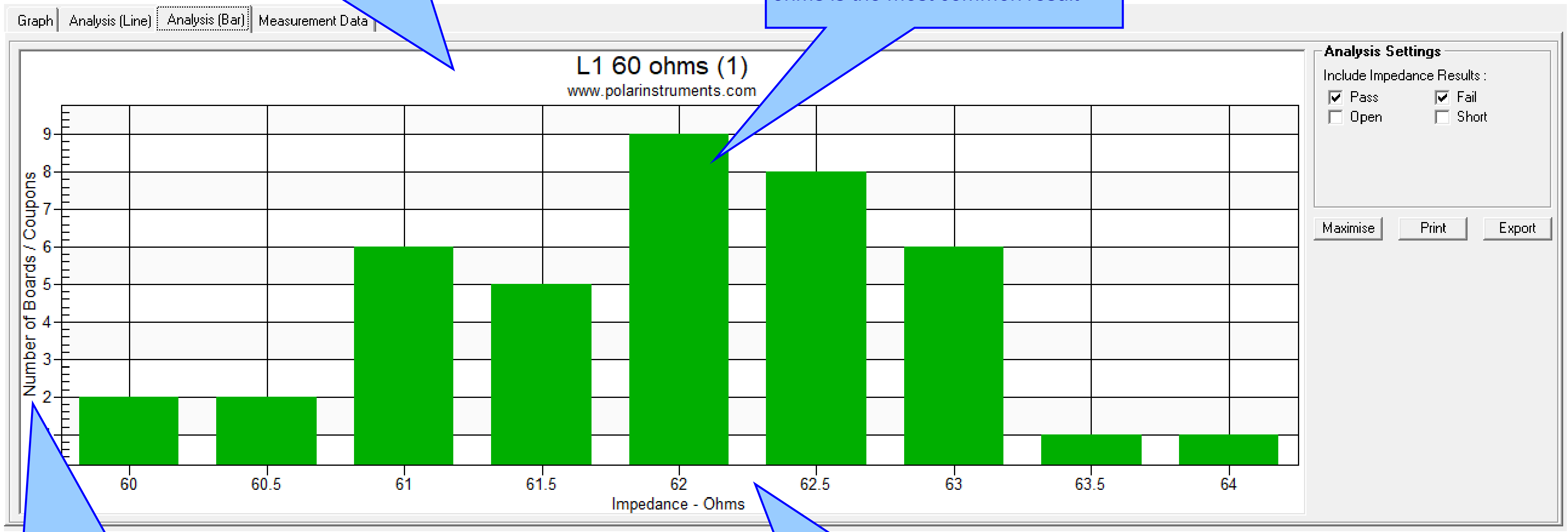


Measured – Average (Green).
Whilst reading slightly higher than the Nominal (60 ohms) all measured data points are within the upper and lower tolerance bands

Import CITS Datalog File option – feature recap

Analysis options:
This bar chart shows the distribution of measurement results over an impedance range

From this batch of 40 board / coupon measurements, 62 +/- 0.25 ohms is the most common result



The y-axis is the number of boards / coupons that fall within a given impedance as detailed on the x-axis

The x-axis is the measured impedance in 0.5 ohm increments

Import CITS Datalog File option – feature recap

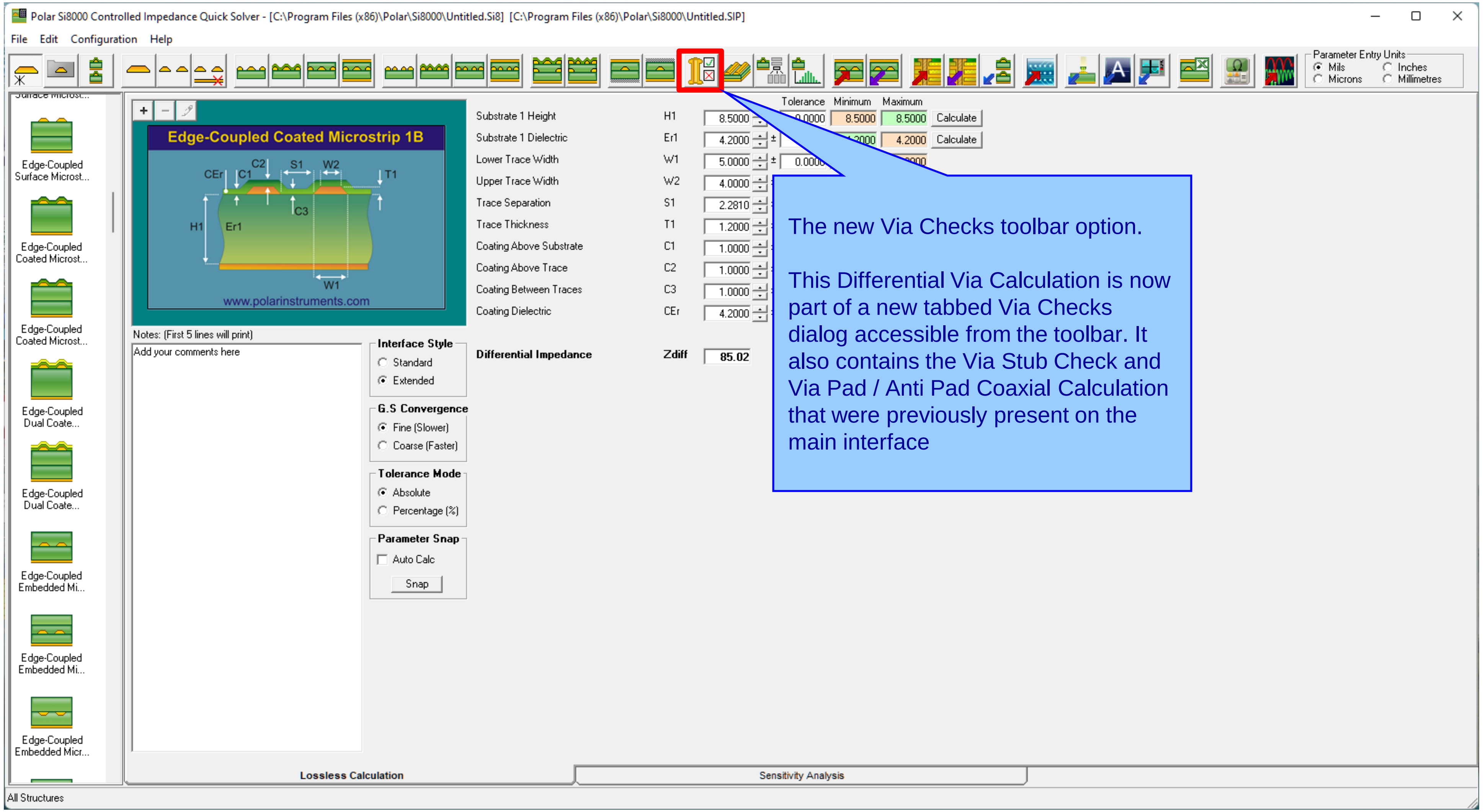
Measurement Data:
The CITS Data Log data may also be viewed in a data grid layout. This is especially useful for viewing the Result data (Pass / Fail)

Graph | Analysis (Line) | Analysis (Bar) | Measurement Data

Result	Index	Board Serial	Date	Time	Average	SD	Maximum	Minimum	Station	Description	Layer	Nominal	Tol+ %	Tol- %	Instrument	Serial No
Passed	1	24	05/02/13	12:48	60.8	0.8	61.9	59.56	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	2	29	05/02/13	12:50	61.77	0.95	63.21	59.93	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	3	17	05/02/13	12:51	63.01	0.94	64.48	61.68	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	4	39	05/02/13	12:52	63.22	1.07	64.62	61.29	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	5	8	05/02/13	12:59	63.93	0.95	65.32	62.2	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	6	10	05/02/13	13:00	61.17	0.89	62.69	59.63	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	7	32	05/02/13	13:01	62.38	0.88	63.58	60.72	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	8	21	05/02/13	13:01	62.37	0.82	63.88	60.98	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	9	4	05/02/13	13:02	63.35	0.68	64.41	61.75	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	10	33	05/02/13	13:03	61.81	0.78	62.95	60.09	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	11	18	05/02/13	13:03	60.22	0.62	61.48	59.09	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	12	3	05/02/13	13:04	60.54	0.75	62.1	59.19	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	13	15	05/02/13	13:05	61.46	0.73	62.83	60.12	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	14	2	05/02/13	13:05	60.09	0.67	61.24	58.57	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	15	23	05/02/13	13:06	61.01	0.78	62.4	59.69	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	16	5	05/02/13	13:07	61.05	0.63	62.14	59.49	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	17	6	05/02/13	13:07	61.54	0.8	62.98	60.11	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	18	76	05/02/13	13:08	62.49	0.92	63.44	60.32	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	19	11	05/02/13	13:09	61.79	0.83	63.08	60.37	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	20	31	05/02/13	13:09	60.25	0.65	61.37	58.85	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	21	12	05/02/13	13:10	62.01	0.69	63.24	60.65	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	22	7	05/02/13	13:11	63.08	1.13	64.89	60.84	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581
Passed	23	19	05/02/13	13:11	61.63	0.72	62.81	60.19	_TEST STATION 1_	L01	1	60	10	10	CITS880	17581

Si8000m v22.04 (April 2022)

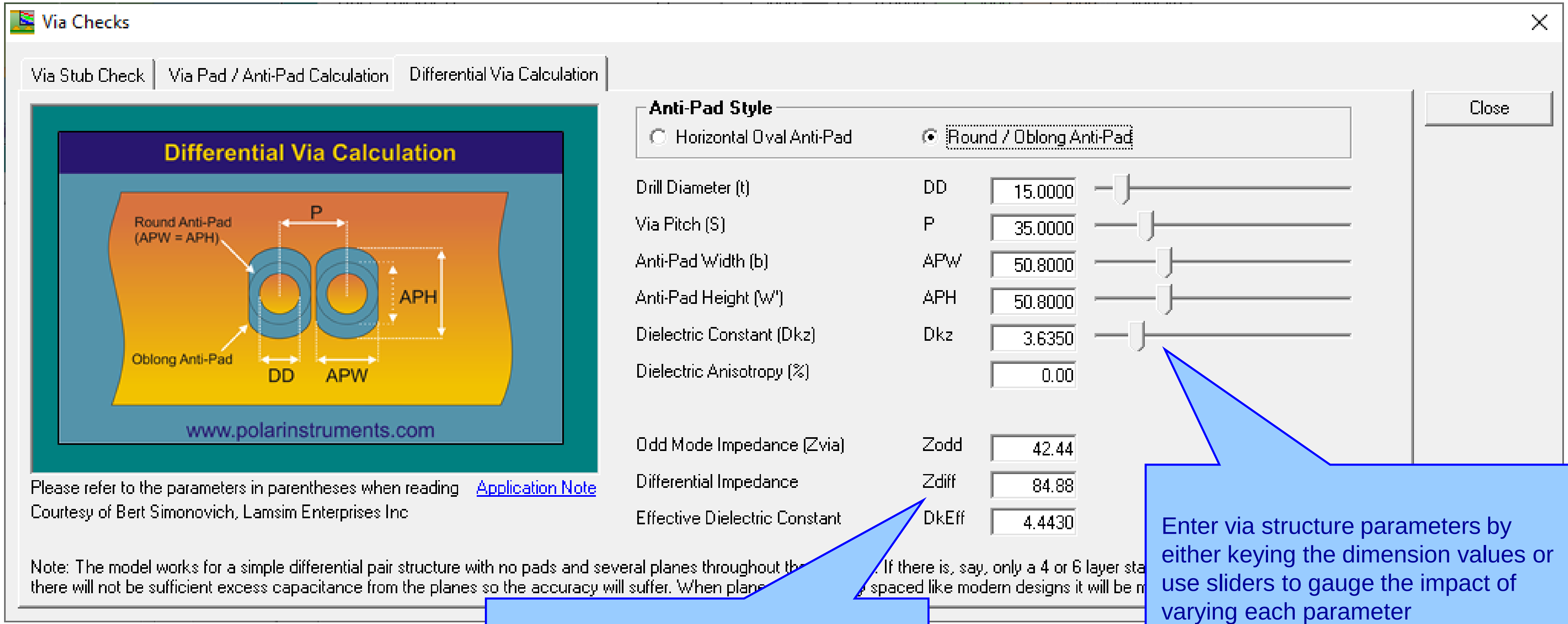
New Differential Via Calculation capability



The new Via Checks toolbar option.

This Differential Via Calculation is now part of a new tabbed Via Checks dialog accessible from the toolbar. It also contains the Via Stub Check and Via Pad / Anti Pad Coaxial Calculation that were previously present on the main interface

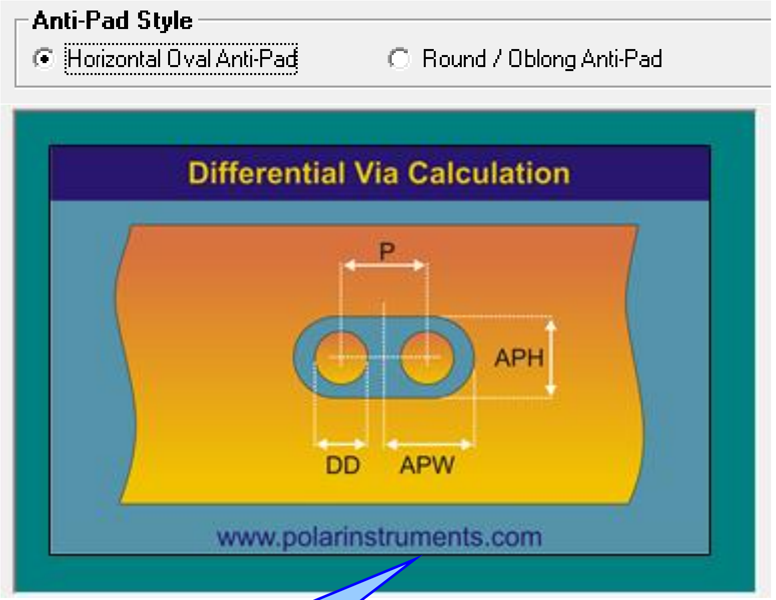
New Differential Via Calculation

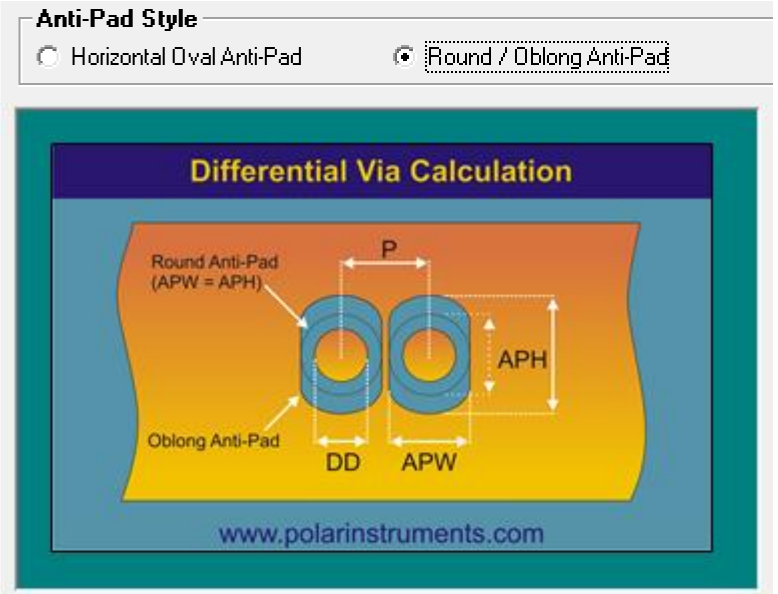


Calculation results are presented here

Enter via structure parameters by either keying the dimension values or use sliders to gauge the impact of varying each parameter

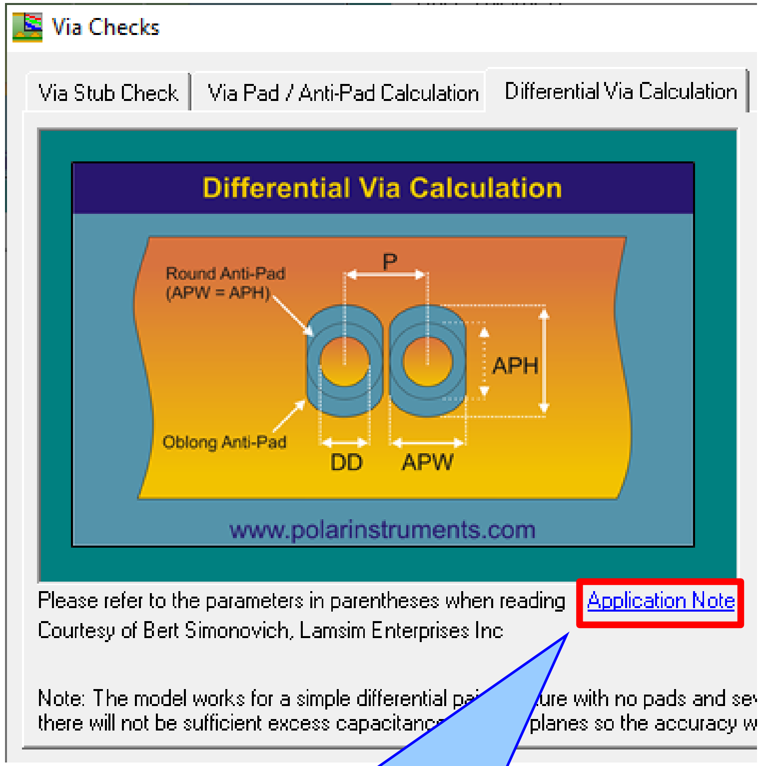
New Differential Via Calculation



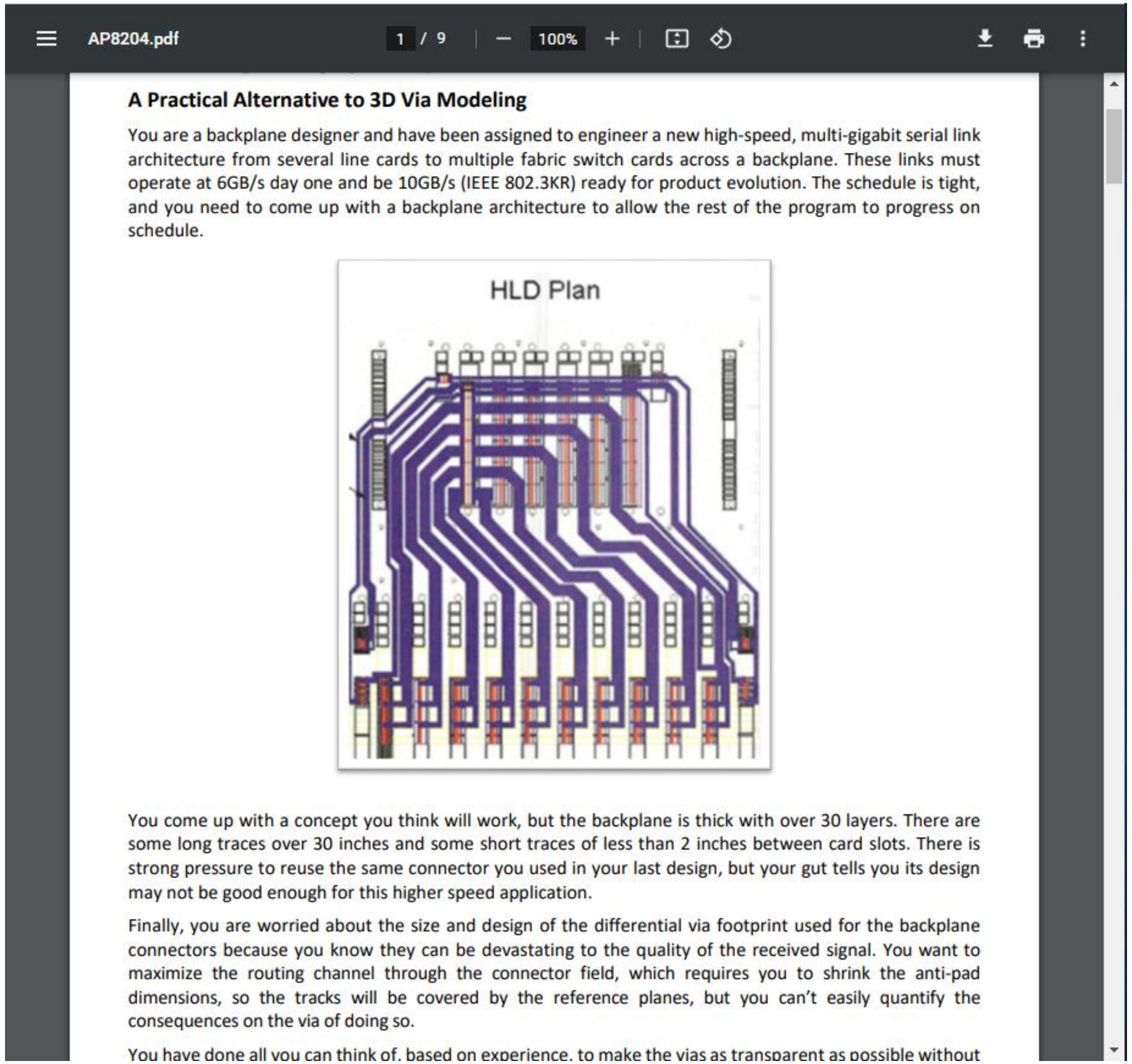


Two different selectable Anti-Pad Styles available

New Differential Via Calculation



The Application Note link provides further details of how the model works



A Practical Alternative to 3D Via Modeling

You are a backplane designer and have been assigned to engineer a new high-speed, multi-gigabit serial link architecture from several line cards to multiple fabric switch cards across a backplane. These links must operate at 6GB/s day one and be 10GB/s (IEEE 802.3KR) ready for product evolution. The schedule is tight, and you need to come up with a backplane architecture to allow the rest of the program to progress on schedule.

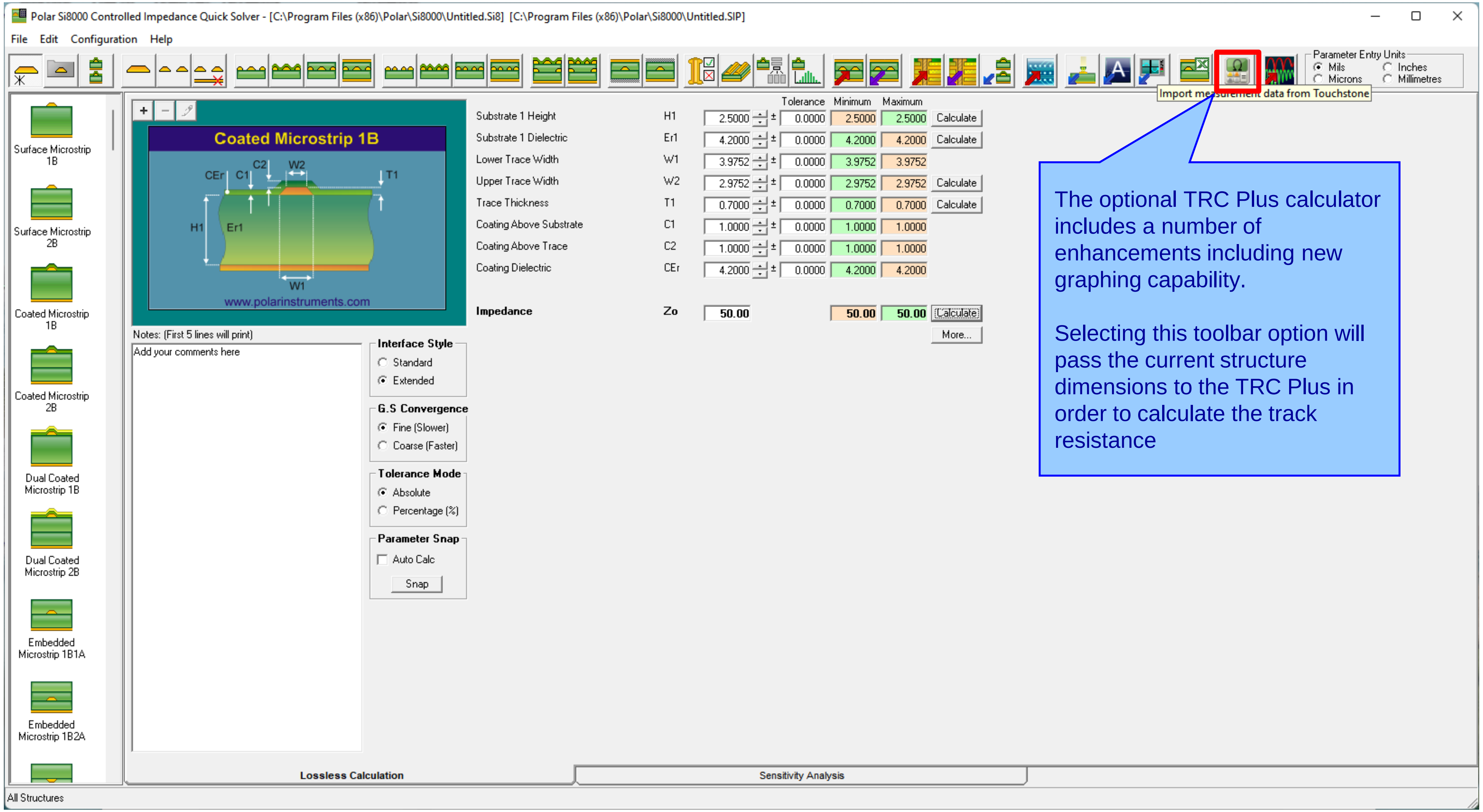
You come up with a concept you think will work, but the backplane is thick with over 30 layers. There are some long traces over 30 inches and some short traces of less than 2 inches between card slots. There is strong pressure to reuse the same connector you used in your last design, but your gut tells you its design may not be good enough for this higher speed application.

Finally, you are worried about the size and design of the differential via footprint used for the backplane connectors because you know they can be devastating to the quality of the received signal. You want to maximize the routing channel through the connector field, which requires you to shrink the anti-pad dimensions, so the tracks will be covered by the reference planes, but you can't easily quantify the consequences on the via of doing so.

You have done all you can think of, based on experience, to make the vias as transparent as possible without

Si8000m v22.02 (February 2022)

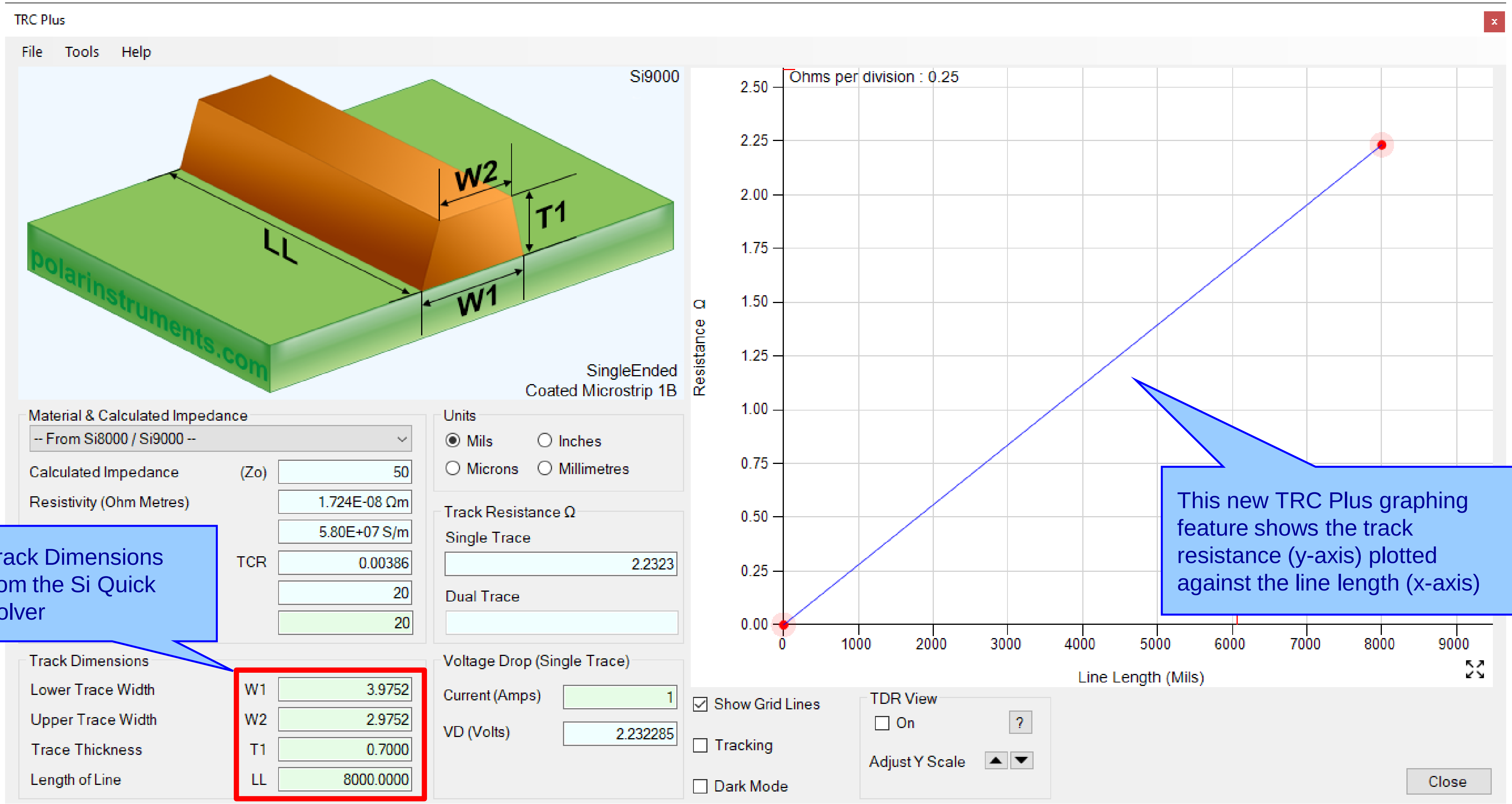
Track Resistance Calculator (TRC Plus) enhancements



The optional TRC Plus calculator includes a number of enhancements including new graphing capability.

Selecting this toolbar option will pass the current structure dimensions to the TRC Plus in order to calculate the track resistance

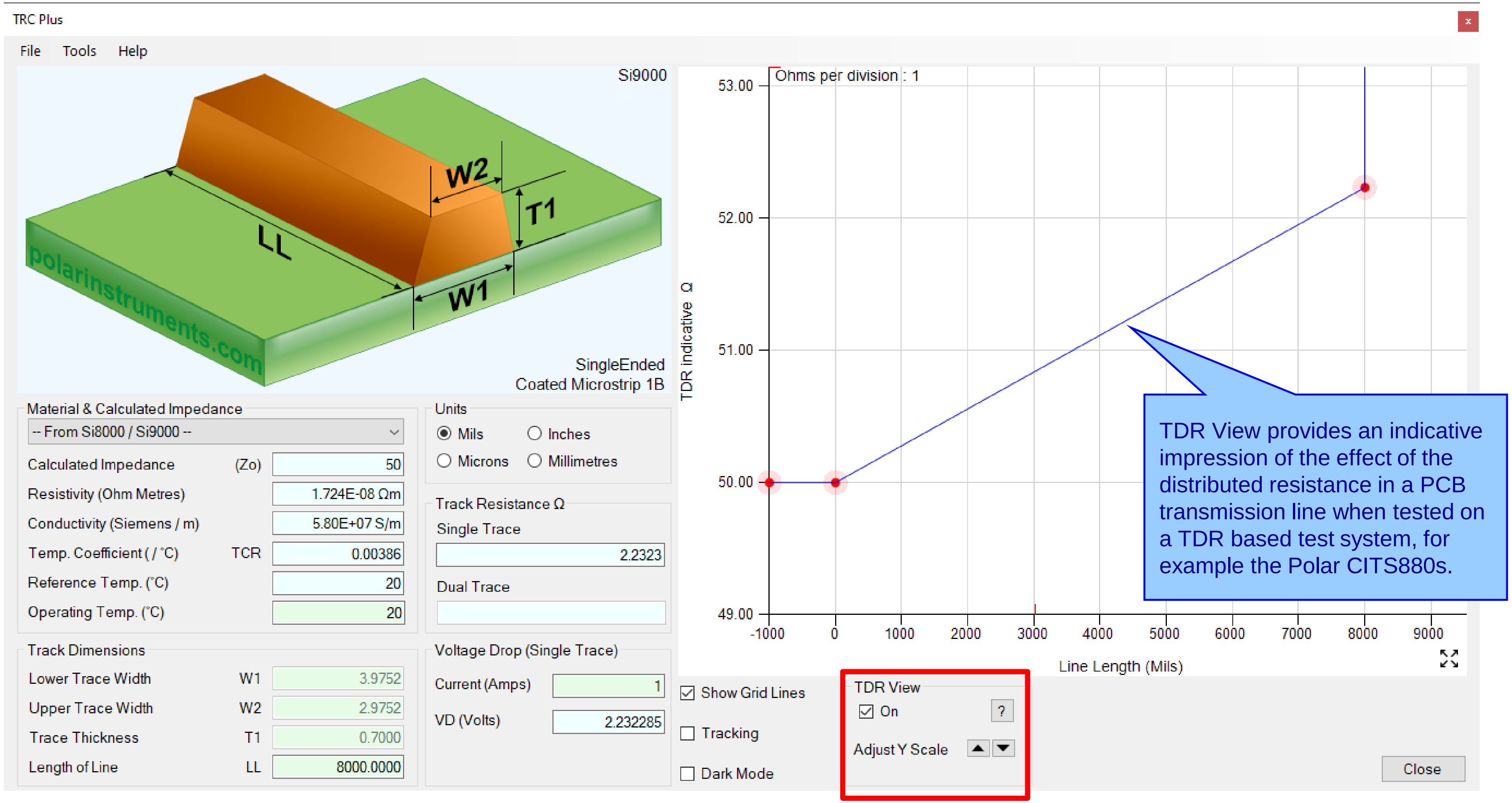
Track Resistance Calculator (TRC Plus) enhancements



Track Dimensions from the Si Quick Solver

This new TRC Plus graphing feature shows the track resistance (y-axis) plotted against the line length (x-axis)

Track Resistance Calculator (TRC Plus) enhancements



Si8000m v21.09 (Sept 2021)

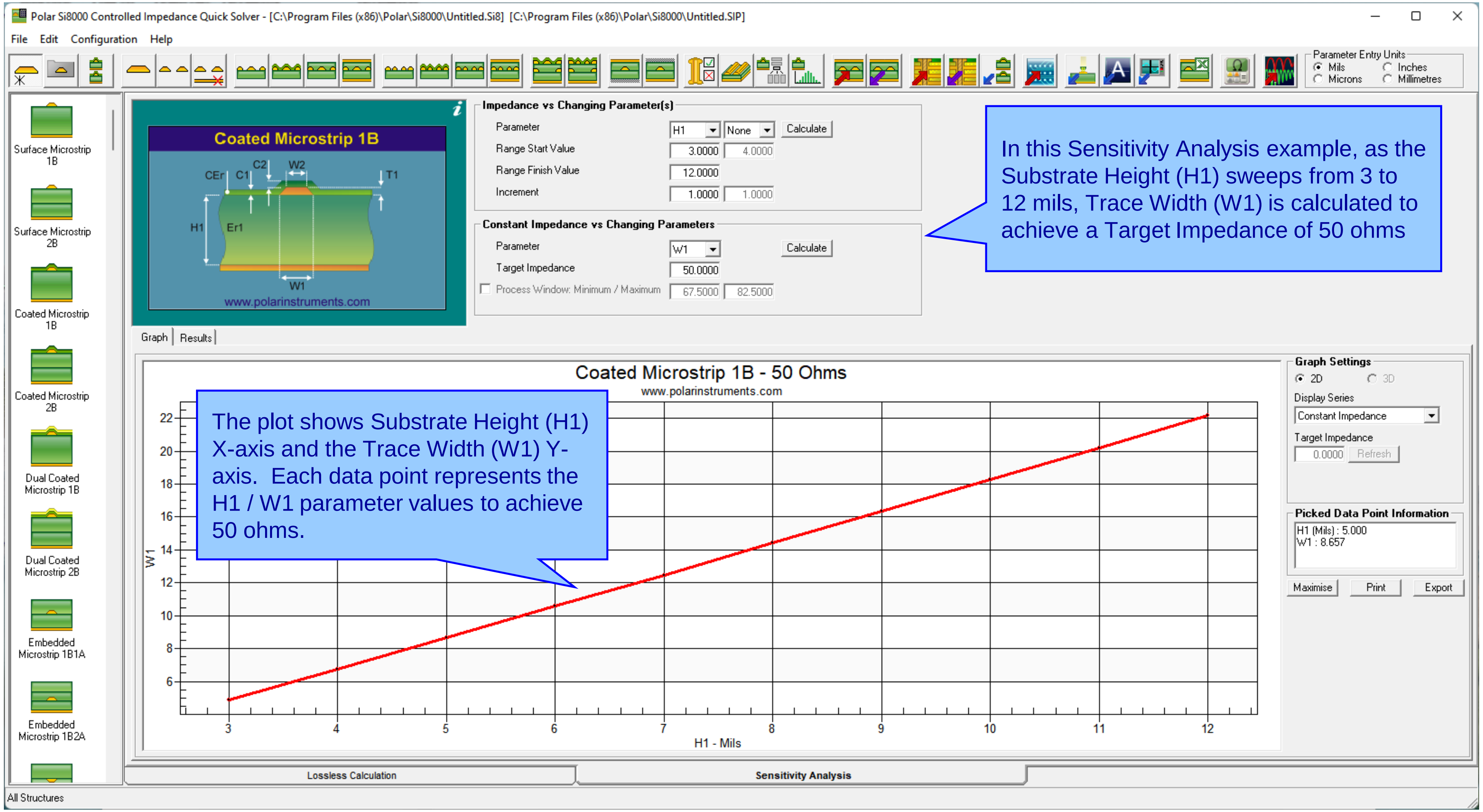
Populate a Project from Sensitivity Analysis Results

(requires the Si Projects feature)

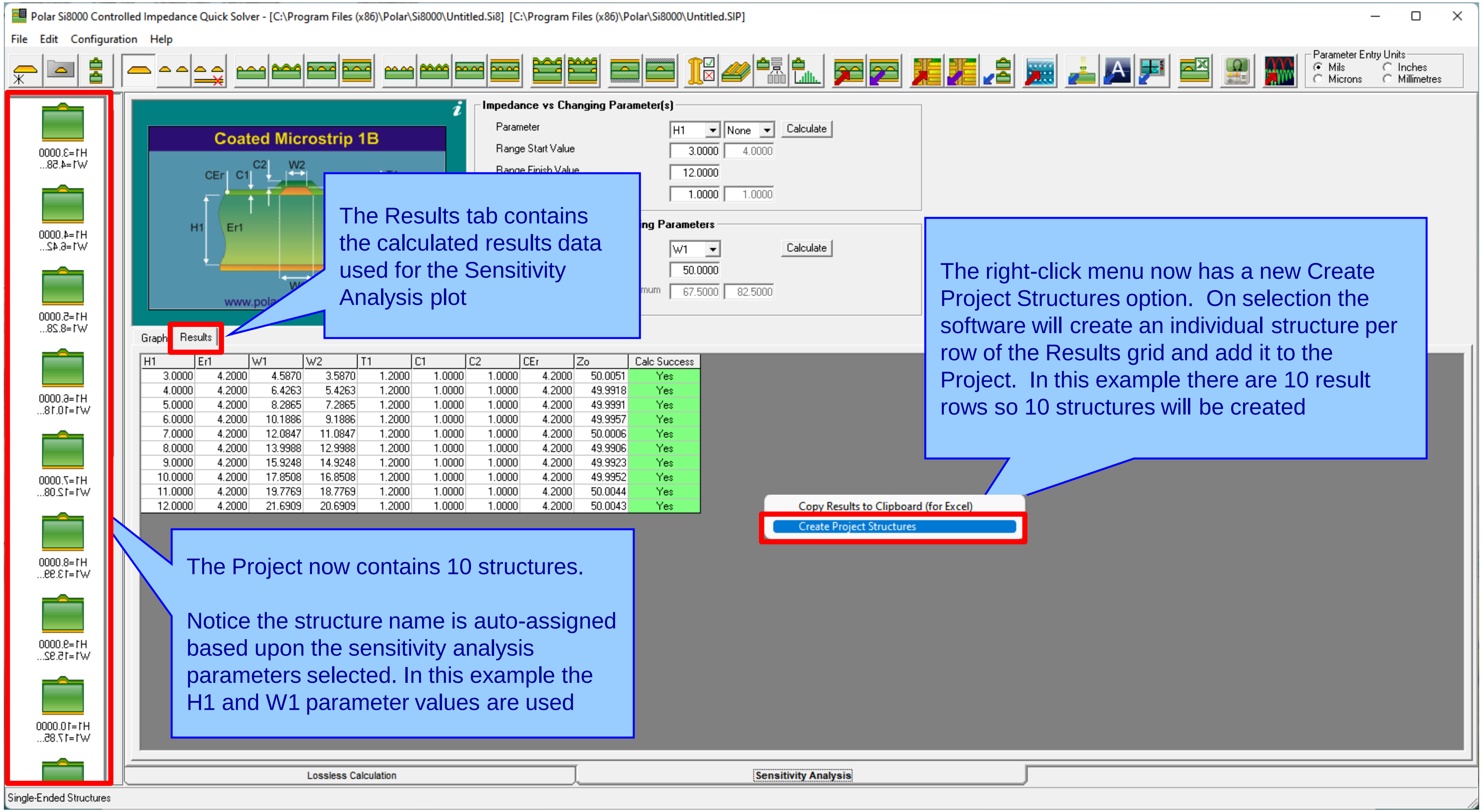
When using the Sensitivity Analysis option it is often useful to examine the calculated results in more details. It is now possible to auto-create a Project containing structures based upon the Sensitivity Analysis results data.

The following slides provide further details:

Populate a Project from Sensitivity Analysis Results



Populate a Project from Sensitivity Analysis Results



H1	Er1	W1	W2	T1	C1	C2	CEr	Zo	Calc Success
3.0000	4.2000	4.5870	3.5870	1.2000	1.0000	1.0000	4.2000	50.0051	Yes
4.0000	4.2000	6.4263	5.4263	1.2000	1.0000	1.0000	4.2000	49.9918	Yes
5.0000	4.2000	8.2865	7.2865	1.2000	1.0000	1.0000	4.2000	49.9991	Yes
6.0000	4.2000	10.1886	9.1886	1.2000	1.0000	1.0000	4.2000	49.9957	Yes
7.0000	4.2000	12.0847	11.0847	1.2000	1.0000	1.0000	4.2000	50.0006	Yes
8.0000	4.2000	13.9988	12.9988	1.2000	1.0000	1.0000	4.2000	49.9906	Yes
9.0000	4.2000	15.9248	14.9248	1.2000	1.0000	1.0000	4.2000	49.9923	Yes
10.0000	4.2000	17.8508	16.8508	1.2000	1.0000	1.0000	4.2000	49.9952	Yes
11.0000	4.2000	19.7769	18.7769	1.2000	1.0000	1.0000	4.2000	50.0044	Yes
12.0000	4.2000	21.6909	20.6909	1.2000	1.0000	1.0000	4.2000	50.0043	Yes

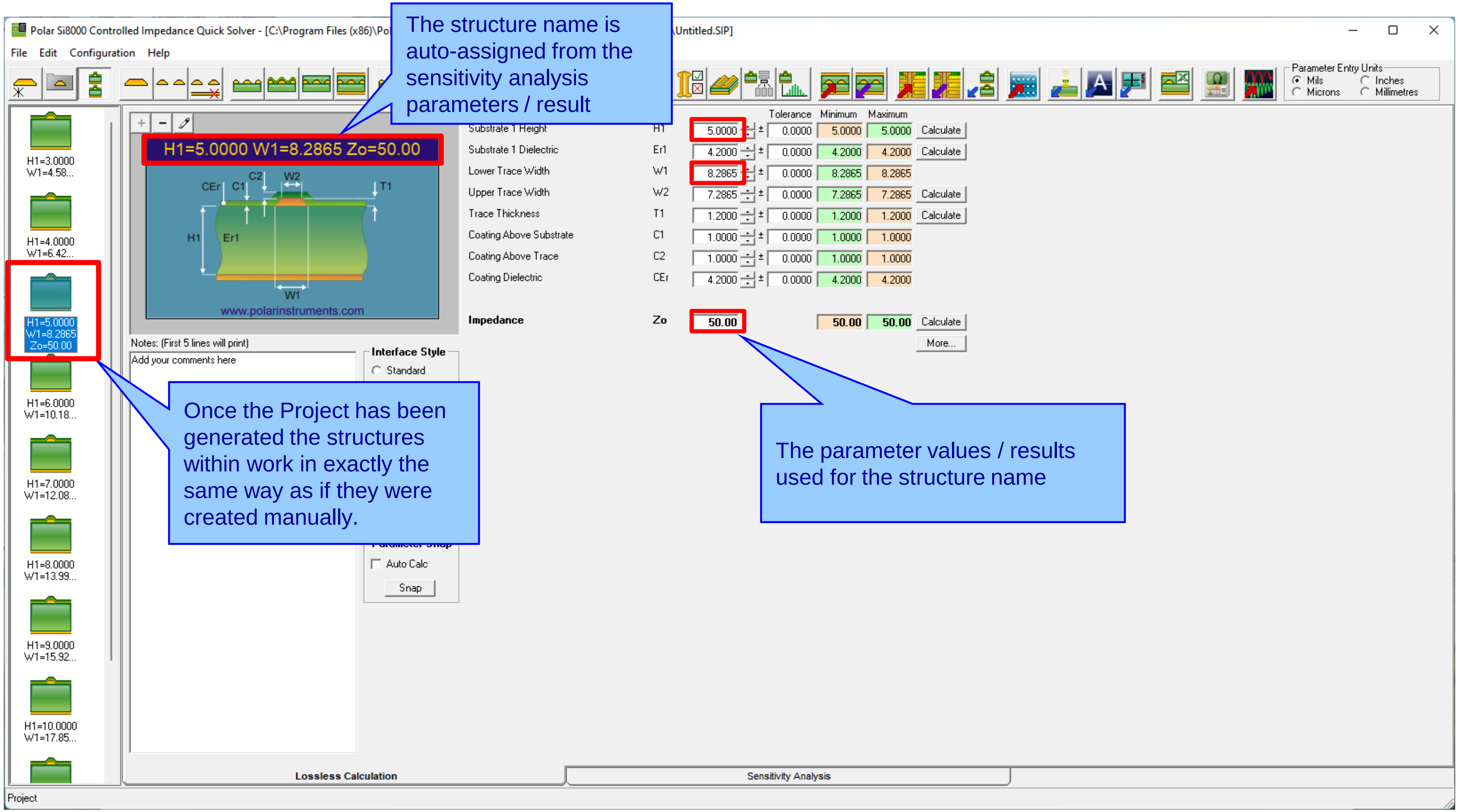
The Results tab contains the calculated results data used for the Sensitivity Analysis plot

The right-click menu now has a new Create Project Structures option. On selection the software will create an individual structure per row of the Results grid and add it to the Project. In this example there are 10 result rows so 10 structures will be created

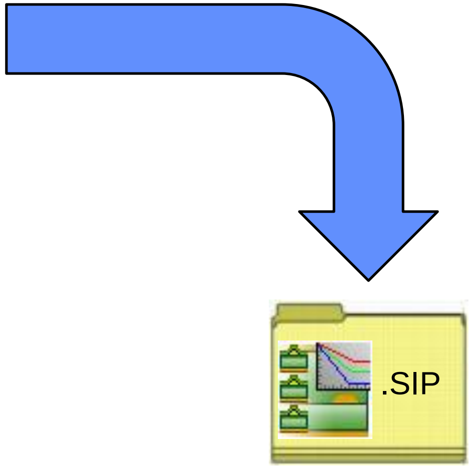
The Project now contains 10 structures.

Notice the structure name is auto-assigned based upon the sensitivity analysis parameters selected. In this example the H1 and W1 parameter values are used

Populate a Project from Sensitivity Analysis Results



Populate a Project from Sensitivity Analysis Results

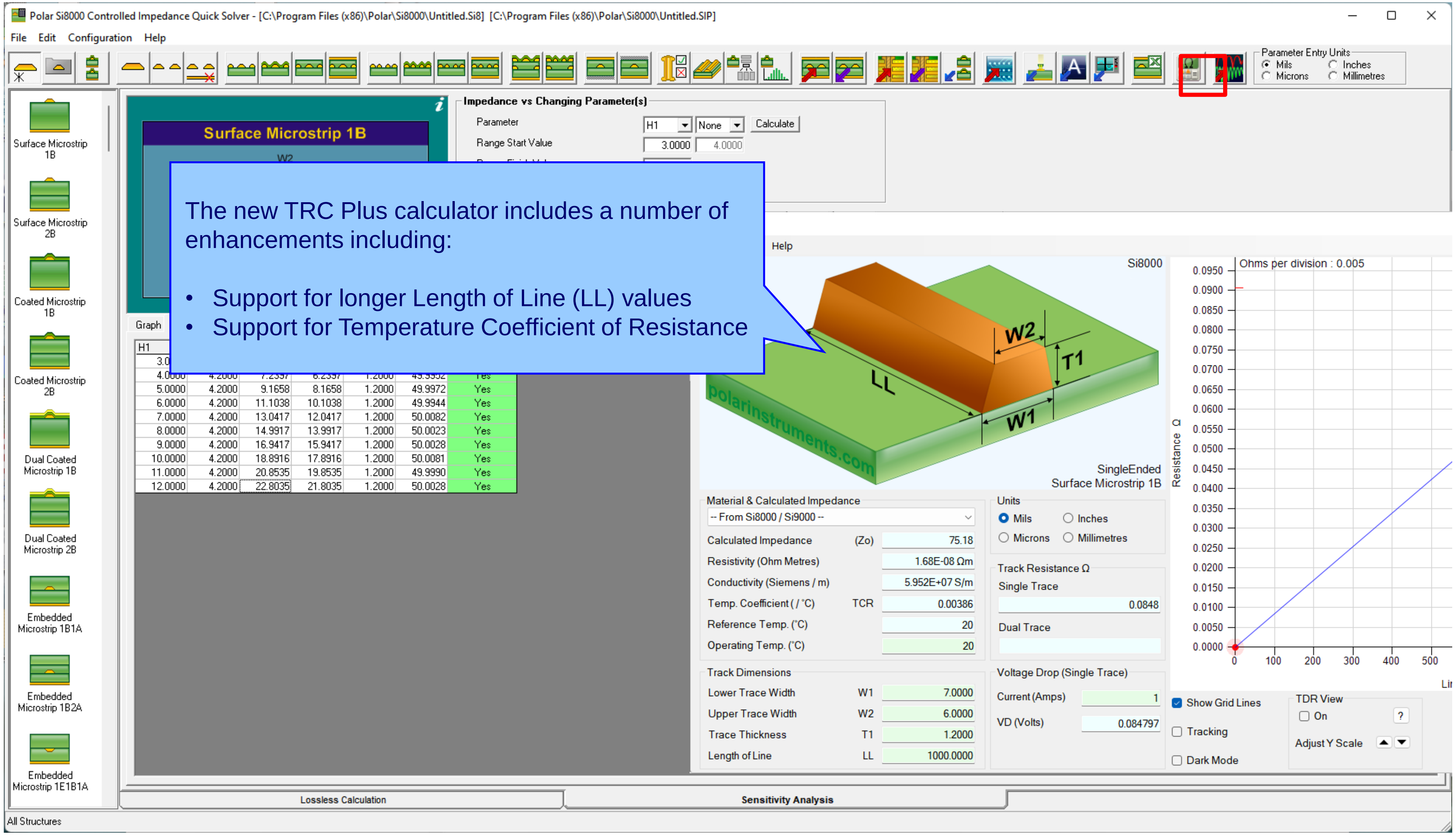


Save the newly created project to the Si Project file format (.SIP) so that it can be recalled at a later date.

Populate a Project from Sensitivity Analysis Results - Summary

- As separate structure in a Project it is now possible to examine the results in a lot more detail than when in sensitivity analysis
- As a Project the structure data can be stored as a .SIP file and recalled later
- Useful to both fabricators and design companies

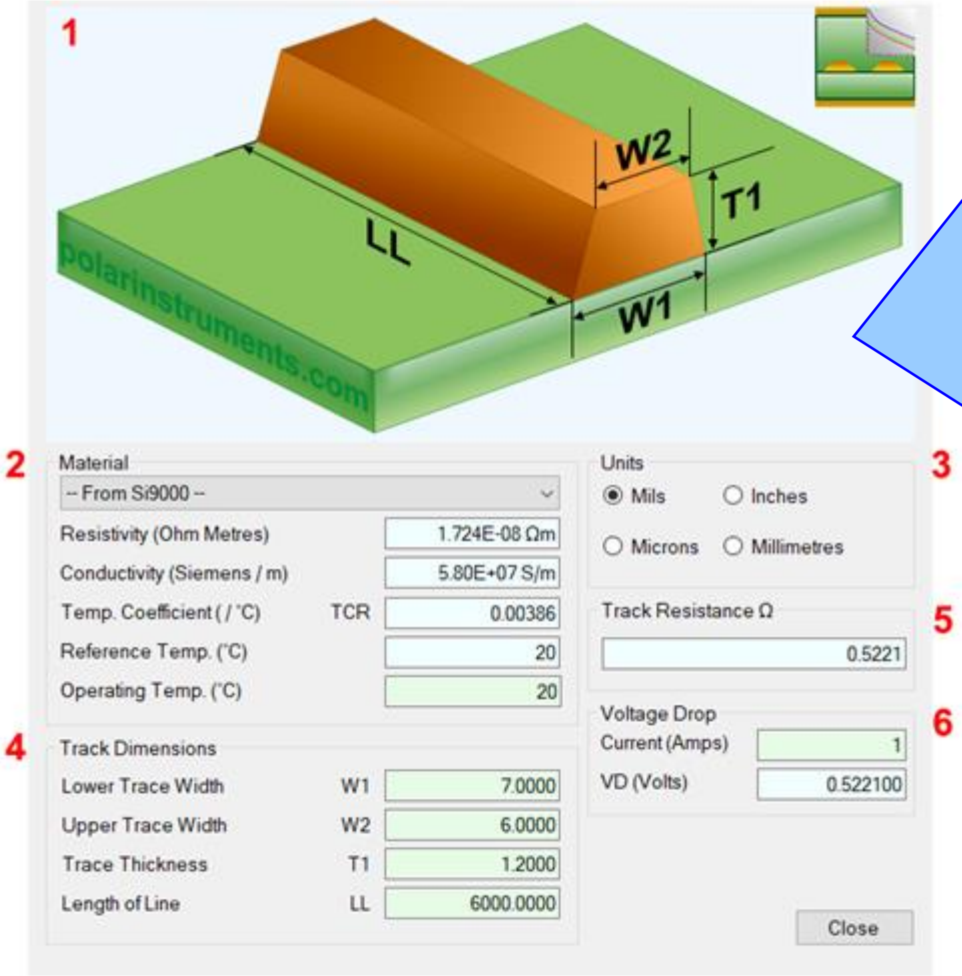
Track Resistance Calculator (TRC Plus)



The new TRC Plus calculator includes a number of enhancements including:

- Support for longer Length of Line (LL) values
- Support for Temperature Coefficient of Resistance

Track Resistance Calculator (TRC Plus)



1. Interactive track material image.
Clicking on a track parameter label will highlight the associated Track Dimension field (text box). Enter data into the active field.

Double-clicking anywhere on the image will bring up the Materials Editor.

2. Material selection and properties
Select the material via the drop-down list.

Fields coloured in light-blue are not directly editable but the field values can be in the Materials Editor.

Fields coloured in light-green are editable by the user. For example, Operating Temperature will determine a material's resistivity at that temperature, which in turn will be applied in calculating the track resistance.

3. Units
Switch to your preferred units by clicking the associated option button – imperial units include Mils (Thou) and Inches; for metric units choose Microns (Micrometres) or Millimetres.

4. Track or trace dimensions
Enter or change track dimensions in the Track Dimensions in the chosen units.

5. Resistance result
Calculation of the track resistance. The result should update immediately upon any changes to the editable (light-green) fields.

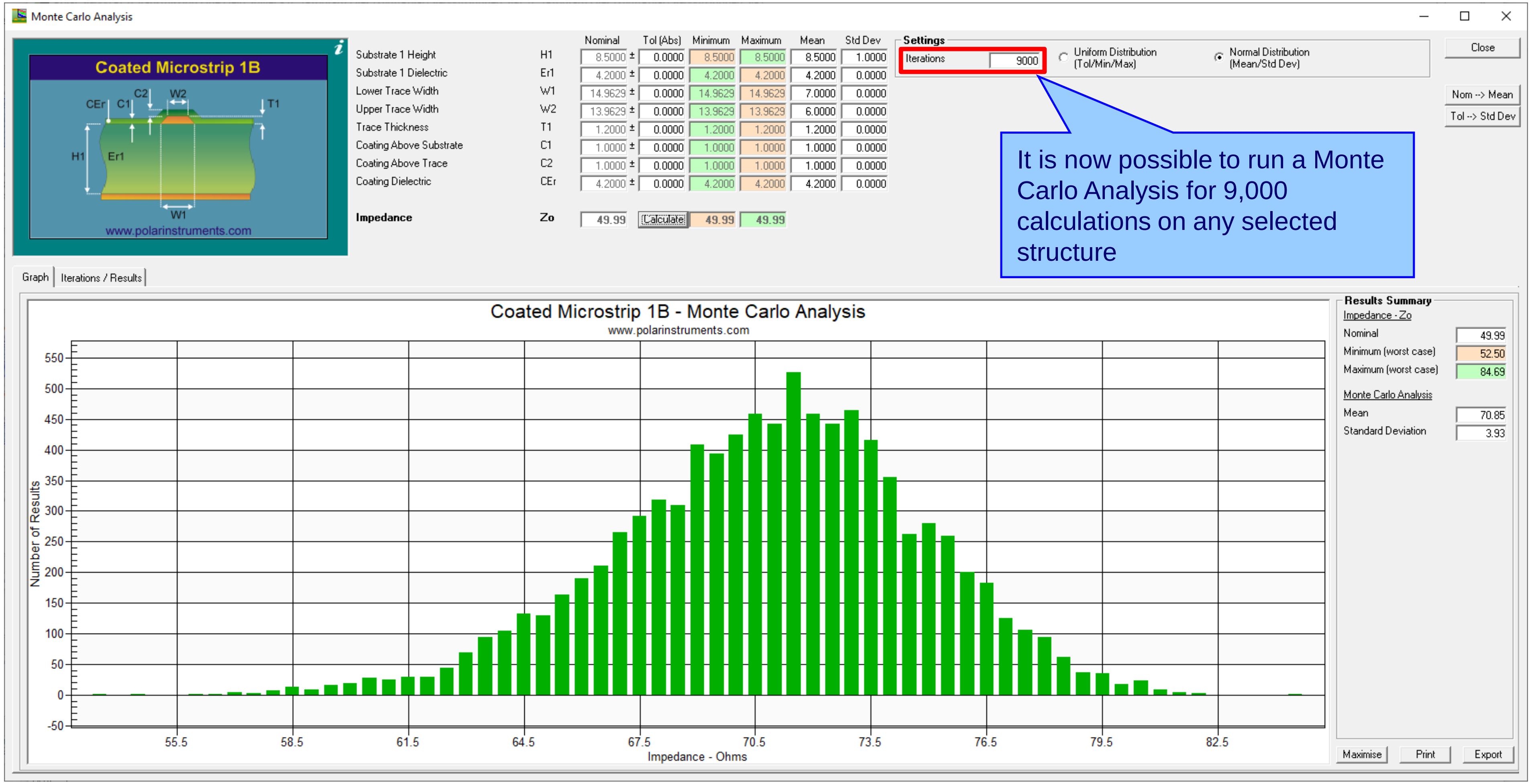
6. Voltage Drop calculation result
The calculated Voltage Drop is displayed in the VD (Volts) text box

Other enhancements

- Monte Carlo Analysis. New option added to export the Iterations / Results to Clipboard (for Excel), accessible from the right-click menu

Si8000m v21.04 (April 2021)

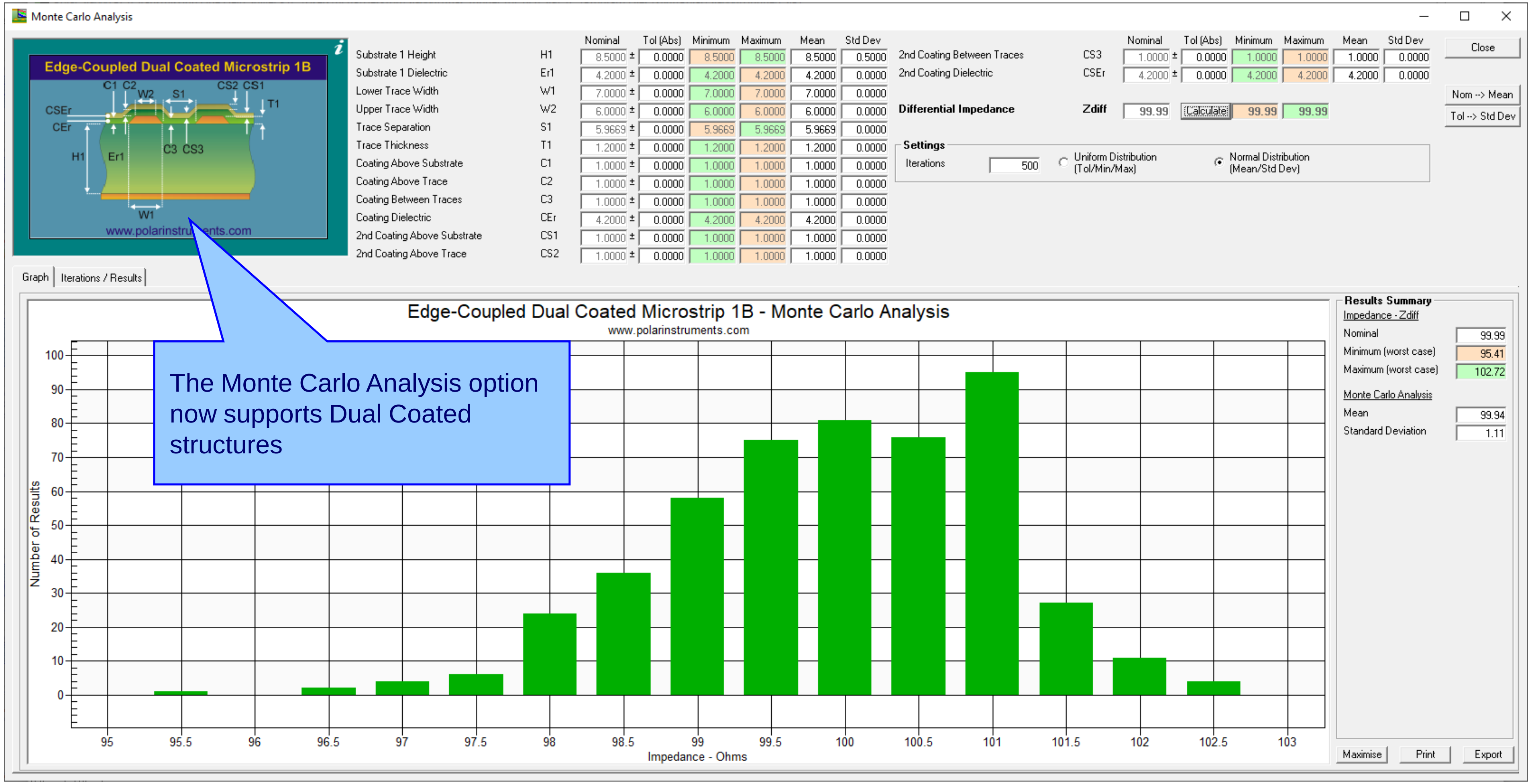
Monte Carlo Analysis maximum iteration increased to 9000



It is now possible to run a Monte Carlo Analysis for 9,000 calculations on any selected structure

Si8000m v21.01 (January 2021)

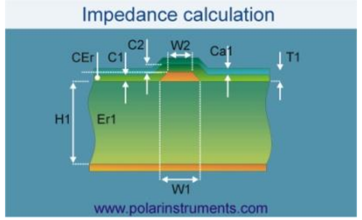
Monte Carlo support added for Dual Coated structures

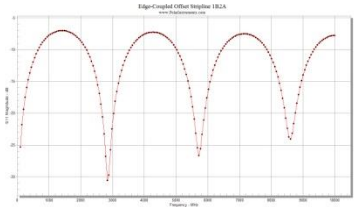


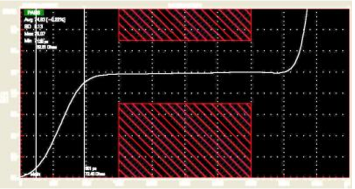
The Monte Carlo Analysis option now supports Dual Coated structures

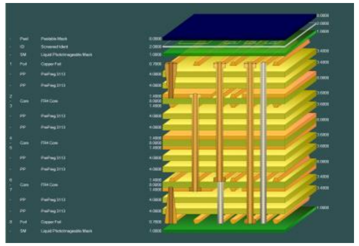
Other enhancements

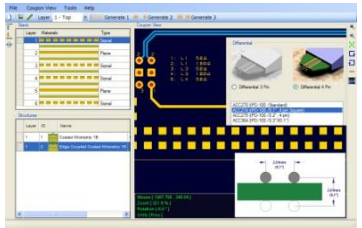
- FlexNet Publisher / FLEXlm v11.17.2.0 supported



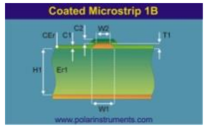


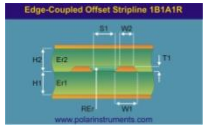


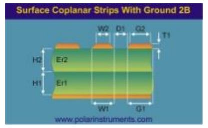


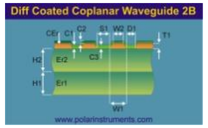


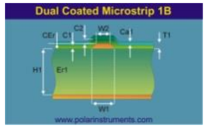
Thank you for viewing this Si8000m 2021 – 2022 preview. If you have questions we would be delighted to help you.
Your local contact information is contained on the following slide

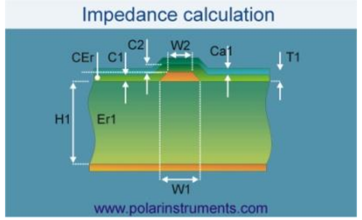


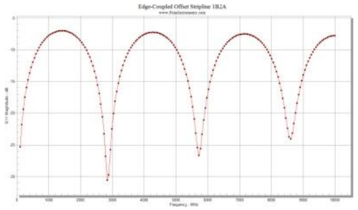
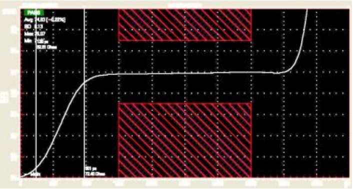
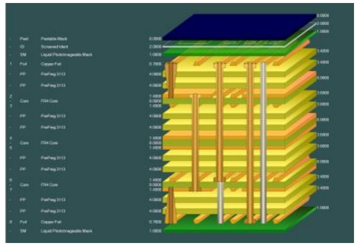
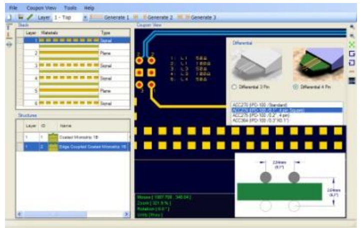










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