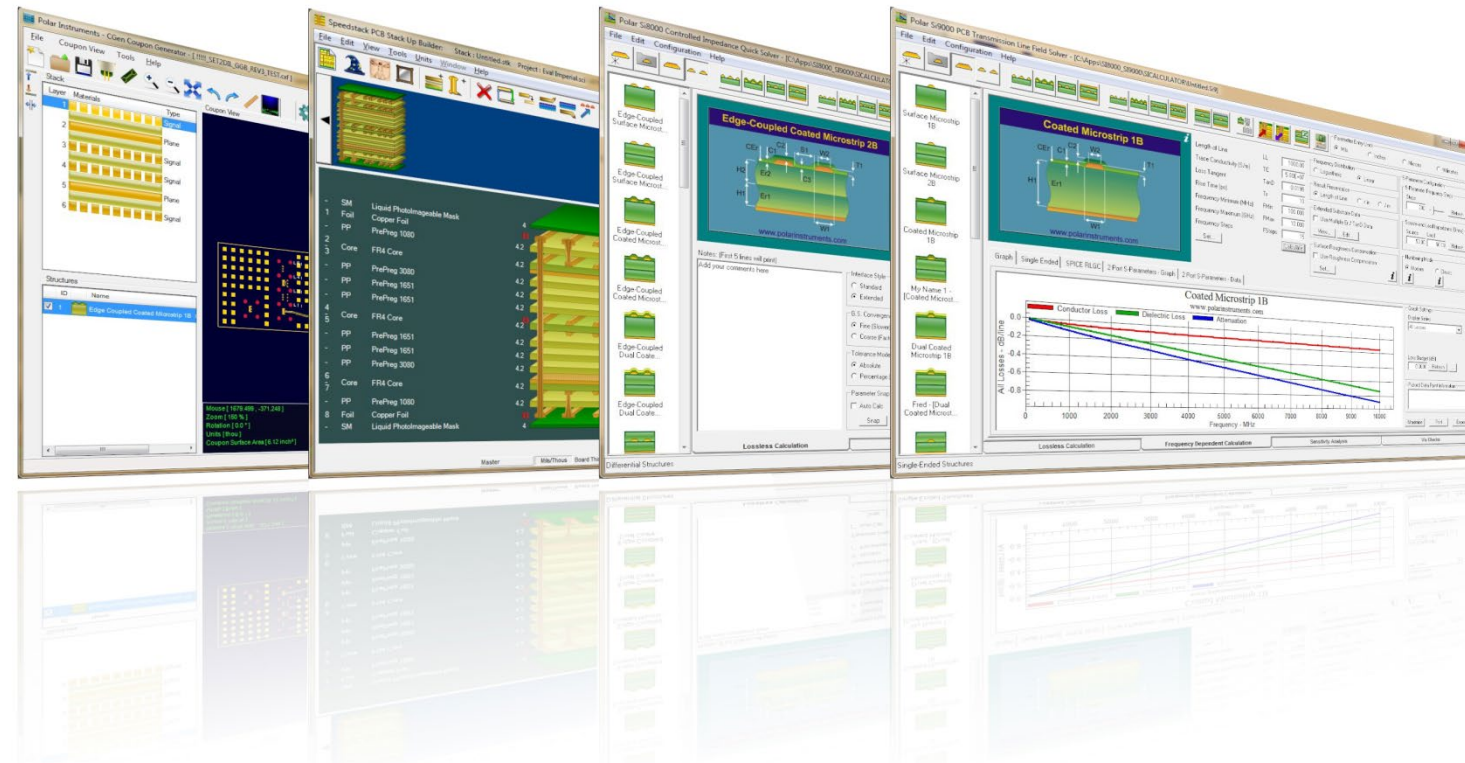
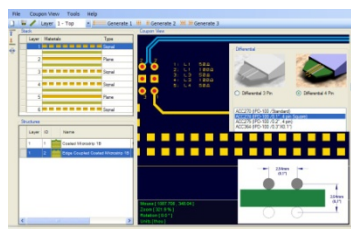
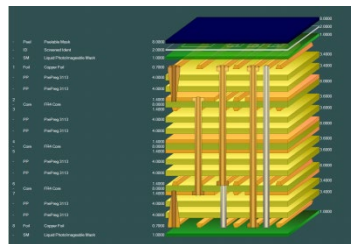
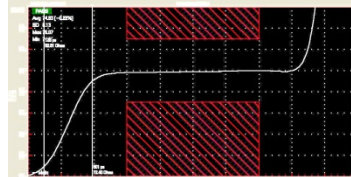
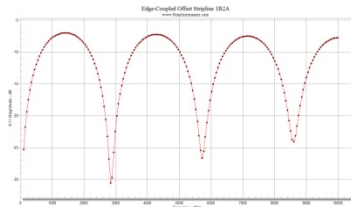
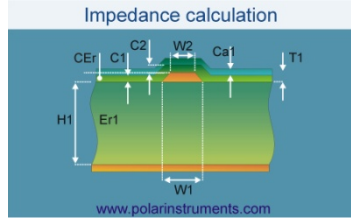


Speedstack 2021 Preview

Richard Attrill – May 2021 (Rev 3)



Introducing Speedstack 2021

Welcome to a preview of Speedstack 2021.

We have introduced a number of new features that have been requested through our Polarcare software maintenance service.

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 Speedstack units have been set to Mils in the following screen grabs

Speedstack v21.05.06 (May 2021)

New Layer Name property for electrical / copper layers

The screenshot shows the Polar Speedstack Stack Up Builder interface. On the left, a table lists the stack layers:

Order	Material	Thickness
-	SM Liquid Photoimageable Mask	4.000/0.0195
1	Foil Copper Foil	4.200/0.0195
-	PP PrePreg 1080	4.200/0.0195
2	Core FR4 Core	4.200/0.0195
3	PP PrePreg 3080	4.200/0.0195
-	PP PrePreg 1651	4.200/0.0195
-	PP PrePreg 1651	4.200/0.0195
4	Core FR4 Core	4.200/0.0195
5	PP PrePreg 1651	4.200/0.0195
-	PP PrePreg 1651	4.200/0.0195
-	PP PrePreg 3080	4.200/0.0195
6	Core FR4 Core	4.200/0.0195
7	PP PrePreg 1080	4.200/0.0195
8	Foil Copper Foil	4.200/0.0195
-	SM Liquid Photoimageable Mask	4.000/0.0195

The 3D model shows layers labeled Top, Inner 2, Inner 3, Inner 4, Inner 5, Inner 6, Inner 7, and Bottom. A red box highlights the inner layers. On the right, a detailed view of an Edge Coupled Coiled Microstrip (ECCM) structure is shown with parameters:

Substrate 1 Height	H1	6.3500
Substrate 1 Dielectric	Er1	4.2000
Lower Trace Width	W1	7.6500
Upper Trace Width	W2	6.6500
Trace Separation	S1	8.1150
Trace Thickness	T1	1.4000
Coating Above Substrate	C1	1.0000

A new Layer Name property has been introduced to the electrical / copper layer element of Foils, Cores, Flex Cores, RCCs and Shields

Speedstack will continue to use the automatic layer numbers but this new text field allows users to key in their own descriptions to match existing layer naming conventions

New Layer Name property for electrical / copper layers

Foil Properties


Main | Notes | Attributes

Apply

General Information

Supplier	Polar Samples	Cost	1.00
Supplier Description	FO/001	Lead Time	0.00
Description	Copper Foil		
Stock Number	100-001		
Type	Copper		

Copper

Base Thickness	0.7000	Copper Coverage %	0.00
Finished Thickness	1.4000	Graphical Colour	
Layer Name	Top		
Data Filename			
Trace Inverted	<input type="checkbox"/>	Remove Copper (disabled if structures or sub-stacks exist)	<input type="checkbox"/>
Finishing Applied	<input type="checkbox"/>		

Foil Properties

The new Layer Name property exists on all materials with an electrical / copper layer. The user can key in any alphanumeric name

New Layer Name property for electrical / copper layers


Core Properties

Main | Notes | Attributes


General Information

Supplier	Polar Samples	Exchange Copper	<input type="checkbox"/>
Supplier Description	CO/005		
Description	FR4 Core	Cost	5.00
Stock Number	400-005	Tolerance	0.00
Type	FR4	Lead Time	0.00


Upper Copper

Base Thickness	1.4000	Copper Coverage %	0.00
Finished Thickness	1.4000	Graphical Colour	
Layer Name	Inner 2		
Data Filename			
Trace Inverted	<input type="checkbox"/>	Remove Copper (disabled if structures or sub-stacks exist)	<input type="checkbox"/>
Finishing Applied	<input type="checkbox"/>		

Dielectric

Base Thickness	3.0000	Td	0.0
Finished Thickness	3.0000	CAF Resistance	0.0
Dielectric Constant	4.2000	Z Axis Expansion	0.0
Loss Tangent	0.0195	Excess Resin	0.0000
Resin Content %	60.00	Isolation Distance	3.0000
Tg	180.0	Graphical Colour	

Lower Copper

Base Thickness	1.4000	Copper Coverage %	0.00
Finished Thickness	1.4000	Graphical Colour	
Layer Name	Inner 3		
Data Filename			
Trace Inverted	<input checked="" type="checkbox"/>	Remove Copper (disabled if structures or sub-stacks exist)	<input type="checkbox"/>
Finishing Applied	<input type="checkbox"/>		

Apply

Close

Core Properties

For core materials, a new Layer Name property has been added for both upper and lower electrical / copper layers

New Layer Name property for electrical / copper layers

The screenshot shows the Polar Speedstack Stack Up Builder interface. The main window displays a stack up editor with a list of materials and their properties. The materials are listed as follows:

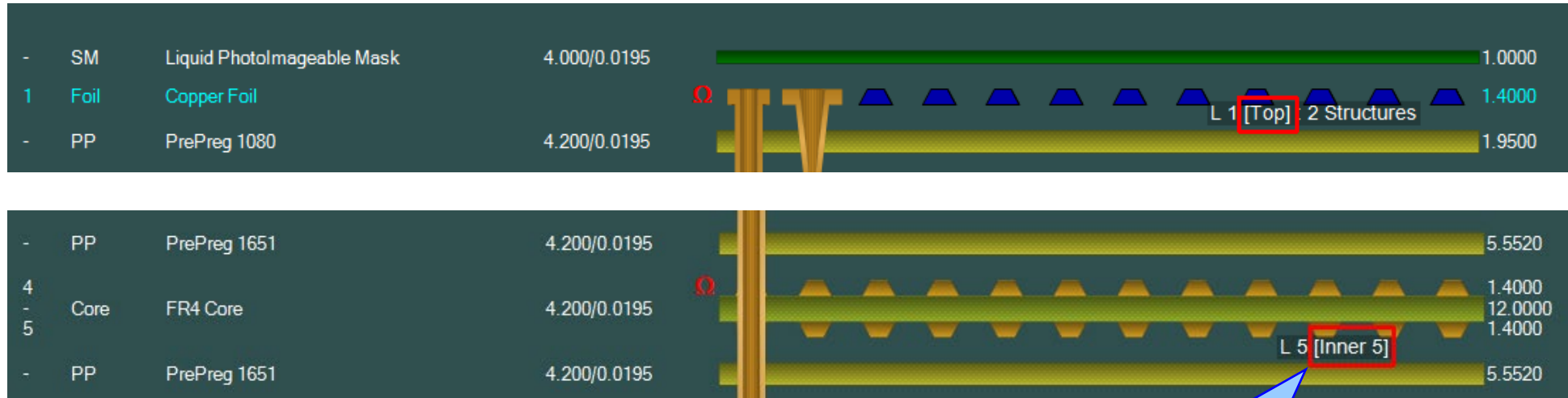
Layer	Material	Thickness (Mils/Thous)	Thickness (Mils)	Thickness (Thous)
-	SM	Liquid Photolmageable Mask	4.000/0.0195	1.0000
1	Foil	Copper Foil	4.200/0.0195	1.4000
-	PP	PrePreg 1080	4.200/0.0195	1.9500
2	Core	FR4 Core	4.200/0.0195	1.4000
3				3.0000
-	PP	PrePreg 3080	4.200/0.0195	2.7760
-	PP	PrePreg 1651	4.200/0.0195	5.5520
-	PP	PrePreg 1651	4.200/0.0195	5.5520
4	Core	FR4 Core	4.200/0.0195	1.4000
5				12.0000
-	PP	PrePreg 1651	4.200/0.0195	5.5520
-	PP	PrePreg 1651	4.200/0.0195	5.5520
-	PP	PrePreg 3080	4.200/0.0195	2.7760
6	Core	FR4 Core	4.200/0.0195	1.4000
7				3.0000
-	PP	PrePreg 1080	4.200/0.0195	1.9500
-	SM	Liquid Photolmageable Mask	4.000/0.0195	1.0000

The right-hand pane shows the 'Stack Up Information' and 'Selected Item Information' for the selected 'Foil' layer. The 'Selected Item Information' table is highlighted with a red box and a blue callout:

Field	Value
Supplier	Polar Samples
Supplier Description	FO.001
Description	Copper Foil
Stock Number	100-001
Type	Copper
Cu Base Thickness	0.7000
Cu Finished Thickness	1.4000
Copper Coverage	0
Layer Name	Top
Data Filenames	
Minimum Trace Width	2.9528
Note 1	
Note 2	
Note 3	
Note 4	
Note 5	
Cost	
Lead Time	
Attributes	

The blue callout box contains the text: "The Selected Item Information auto updates as you click each material, the Layer Name can be confirmed here".

New Layer Name property for electrical / copper layers



Mouse over the electrical layer and the Layer Name will display alongside the layer number and the amount of structures. Very quickly confirm the Layer Name without needing to open the Properties dialog

New Layer Name property for electrical / copper layers

The screenshot displays the Speedstack software interface. On the left, a table lists the stack up layers:

-	SM	Liquid PhotoImageable Mask	4.000/0.0195
1	Fail	Copper Fail	
-	PP	PrePreg 1080	4.200/0.0195
2	Core	FR4 Core	4.200/0.0195
3			
-	PP	PrePreg 30	
-	PP	PrePreg 16	
-	PP	PrePreg 16	
4			

The central part of the image shows a 3D cross-section of the PCB stack up with layers labeled on the right: Top, Inner 2, Inner 3, Inner 4, Inner 5, Inner 6, Inner 7, and Bottom. A red box highlights these labels.

A blue callout box points to the configuration options dialog, containing the text: "Customise the Display Fields to show the layer name next to the stack up graphic".

The "Configuration Options" dialog box is open, showing the "Display Data" tab. It includes the following settings:

- Default Stack Up View: 2D, 3D
- Units: Mils/Thous, Microns, Millimetres, Inches
- Open last used file on application start up:
- Display File Properties Dialog for New Stackups and Projects:

The "Display Data" section contains three dropdown menus for "Display Field 3", "Display Field 4", and "Display Field 5". The "Display Field 5" dropdown is open, showing a list of properties with "Layer Name" selected and highlighted by a red box.

New Layer Name property for electrical / copper layers

Speedstack Report Printer

File Options

C:\Mpsst\Samples\Eval Imperial.sci Units: Mils

Layer	Stack up	Copper Layer Name	Supplier	Description	Type	Processed Thickness	εr	Loss Tangent	Impedance ID
1	Top		Polar Samples	Liquid PhotoImageable Mask	SolderMask	1.000	4.000	0.0195	
			Polar Samples	Copper Foil	Copper	1.400			1, 2
2	Inner 2		Polar Samples	PrePreg 1080	Dielectric	1.950	4.200	0.0195	
3	Inner 3		Polar Samples	FR4 Core	FR4	3.000	4.200	0.0195	
			Polar Samples	PrePreg 3080	Dielectric	1.400			
			Polar Samples	PrePreg 1651	Dielectric	5.552	4.200	0.0195	
			Polar Samples	PrePreg 1651	Dielectric	5.552	4.200	0.0195	
4	Inner 4					1.400			3
			Polar Samples	FR4 Core	FR4	12.000	4.200	0.0195	
						1.400			
			Polar Samples	PrePreg 1651	Dielectric	5.552	4.200	0.0195	
			Polar Samples	PrePreg 1651	Dielectric	5.552	4.200	0.0195	
			Polar Samples	PrePreg 3080	Dielectric	2.776	4.200	0.0195	
6	Inner 6					1.400			
			Polar Samples	FR4 Core	FR4	3.000	4.200	0.0195	
7	Inner 7					1.400			
			Polar Samples	PrePreg 1080	Dielectric	1.950	4.200	0.0195	
8	Bottom		Polar Samples	Copper Foil	Copper	1.400			4
			Polar Samples	Liquid PhotoImageable Mask	SolderMask	1.000	4.000	0.0195	

Copper Thickness = 11.200 | Dielectric Thickness = 49.660 | Solder Mask Thickness = 2.000 | Stack Up Thickness = 60.860 | Stack Up Thickness with Soldermask = 62.860
Stack Up Cost = 54.00

Impedance ID	Structure Image	Structure Name	Impedance Signal Layer	Ref. Plane 1 in Layer	Ref. Plane 2 in Layer	Lower Trace Width (W1)	Upper Trace Width (W2)	Trace Separation (S1)	Target Impedance	Calculated Impedance
1		Edge Coupled Coated Microstrip 1B	1	3	0	7.650	6.650	8.115	100.000	100.290
2		Coated Microstrip 1B	1	3	0	4.000	3.000	0.000	75.000	75.740
3		Edge Coupled Offset Stripline 1B1A	4	3	6	7.250	6.250	8.500	100.000	101.280
4		Coated Microstrip 1B	8	6	0	4.000	3.000	0.000	75.000	75.740

StackName: Master
Date: _____
Author: _____
Department: _____
Site: _____

Version: _____
Associated Documents: _____

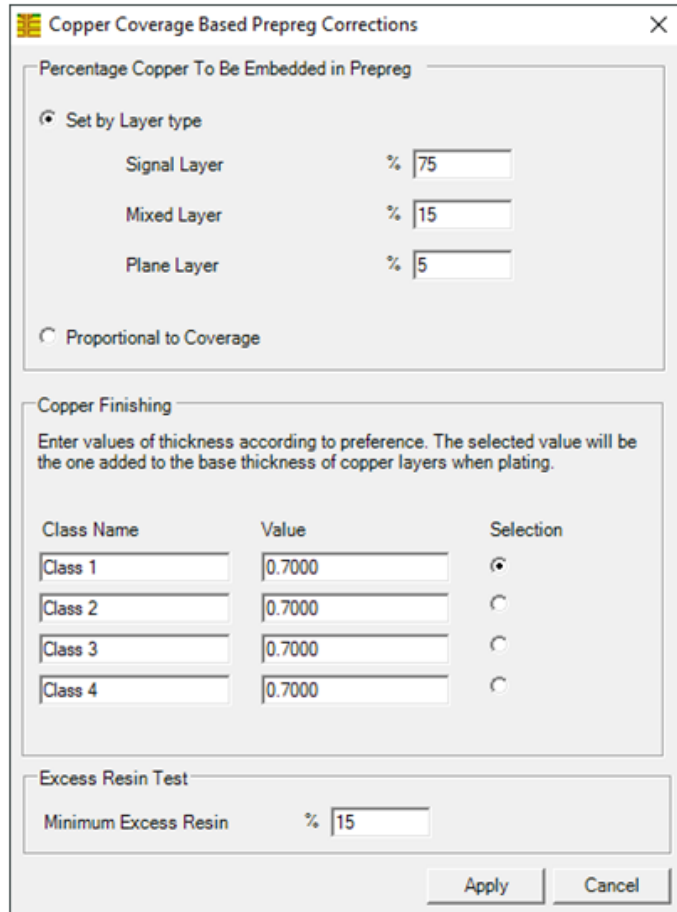
Revision: _____
Modification: _____
Date of Revision: _____
Editor: _____

Page 1/X

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The technical report has also been updated to support layer names

Copper Finishing classes increased



Copper Coverage Based Prepreg Corrections

Percentage Copper To Be Embedded in Prepreg

Set by Layer type

Signal Layer % 75

Mixed Layer % 15

Plane Layer % 5

Proportional to Coverage

Copper Finishing

Enter values of thickness according to preference. The selected value will be the one added to the base thickness of copper layers when plating.

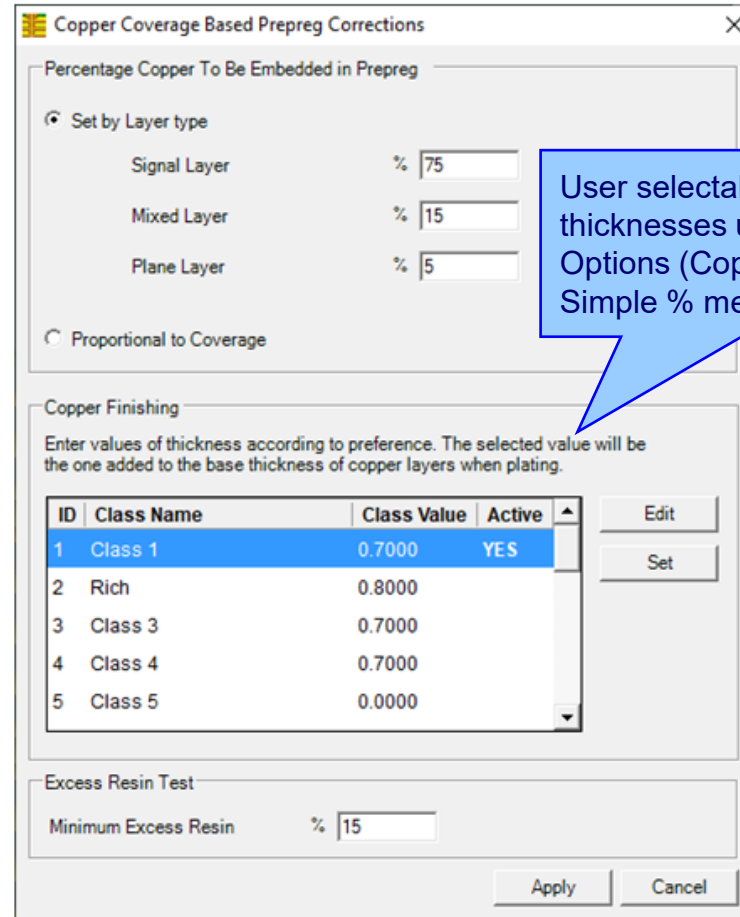
Class Name	Value	Selection
Class 1	0.7000	<input checked="" type="radio"/>
Class 2	0.7000	<input type="radio"/>
Class 3	0.7000	<input type="radio"/>
Class 4	0.7000	<input type="radio"/>

Excess Resin Test

Minimum Excess Resin % 15

Apply Cancel

Speedstack v21.04 and earlier supported 4 classes



Copper Coverage Based Prepreg Corrections

Percentage Copper To Be Embedded in Prepreg

Set by Layer type

Signal Layer % 75

Mixed Layer % 15

Plane Layer % 5

Proportional to Coverage

Copper Finishing

Enter values of thickness according to preference. The selected value will be the one added to the base thickness of copper layers when plating.

ID	Class Name	Class Value	Active
1	Class 1	0.7000	YES
2	Rich	0.8000	
3	Class 3	0.7000	
4	Class 4	0.7000	
5	Class 5	0.0000	

Excess Resin Test

Minimum Excess Resin % 15

Apply Cancel

User selectable plating thicknesses under Finishing Options (Copper Coverage & Simple % methods)

Speedstack v21.05 now supports 20 classes

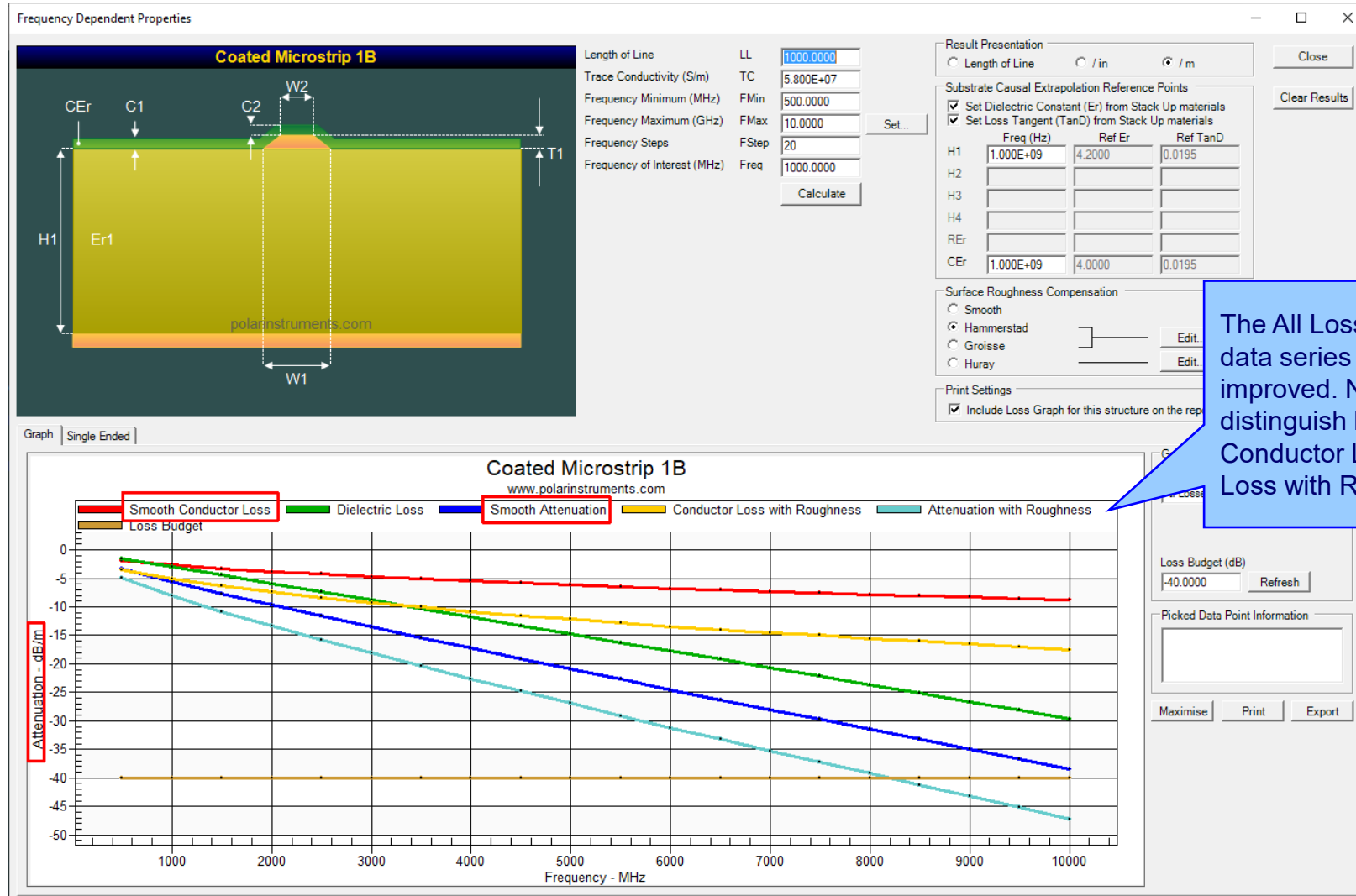
Import / Export enhancements

The following Import / Export options have been updated to support the layer name property introduced with Speedstack v21.05.06:

- XML STKX v21.00 and SSX v11.00 import / export options
- CSV export option
- Gerber / DXF export option

Speedstack v21.04.00 (April 2021)

All Losses plot - clearer labelling



The All Losses plot y-axis and data series labelling has been improved. Now easier to distinguish between Smooth Conductor Loss and Conductor Loss with Roughness

Other enhancements

- The controlled impedance and insertion loss Calculation Engine updated to the latest edition
- Frequency Dependent Calculations graphing library enhancements

Speedstack v21.03.09 (March 2021)

New Apply Plating Colours toolbar option

The screenshot shows the Polar Speedstack Stack Up Builder interface. The main window displays a 3D cross-section of a PCB stack-up with various layers color-coded. A toolbar at the top contains several icons, with the 'Apply Plating Colours' icon (a stack of layers with a red highlight) being the focus. A blue callout box points to this icon, stating: "New Apply Plating Colours toolbar option. Toggle between standard and enhanced colours".

On the right side, the 'Stack Up Information' panel is visible, containing a table with the following data:

Field	Value
Electrical Layer Count	8
Stack Up Cost	54.00
Copper Thickness	11.2000
Dielectric Thickness	49.6600
Solder Mask Thickness	2.0000
=====	
Target Stack Up Thickness	60.0000
Stack Up Thickness	60.8600
Stack Up Thickness with Soldermask	62.8600
=====	

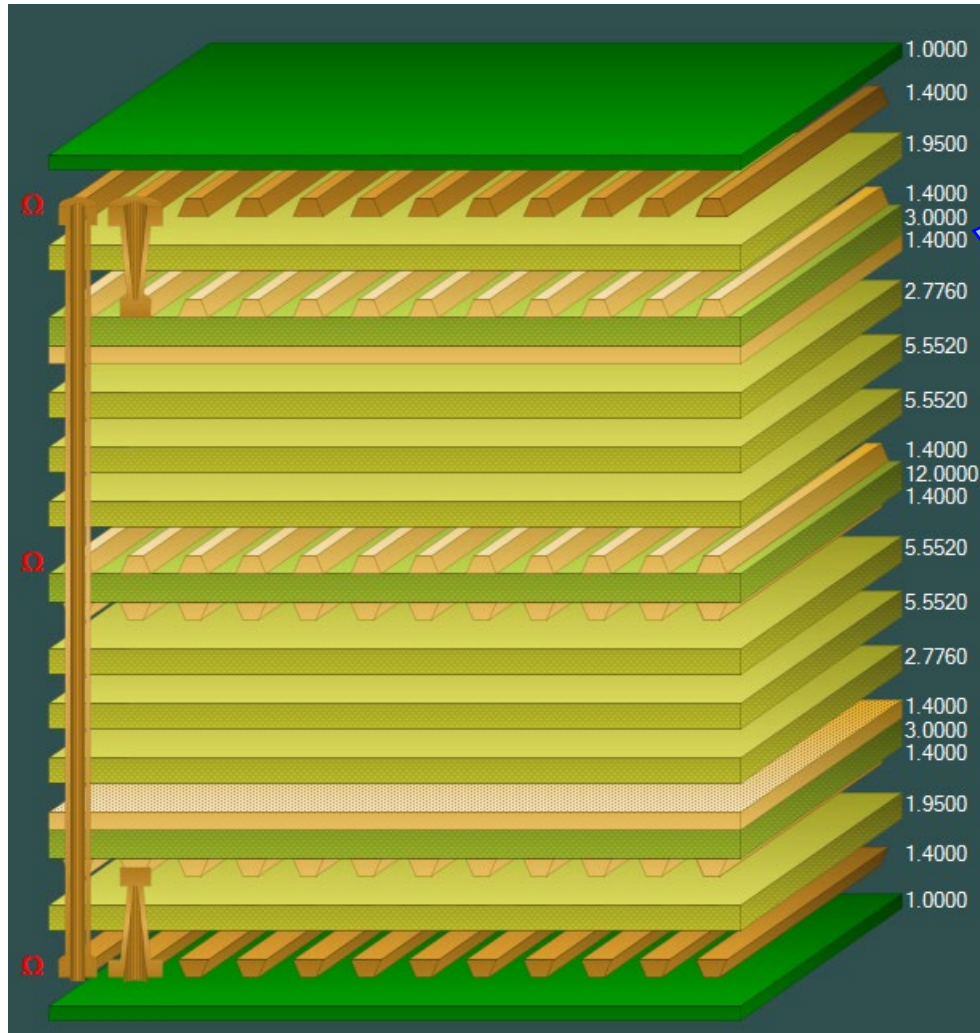
Below this table is the 'Selected Item Information' section, which is currently empty.

At the bottom of the interface, a status bar displays the following information: |Mils/Thous |Target Stack Up Thickness = 60.0000 |Stack Up Thickness = 60.8600 |Stack Up Thickness with Soldermask = 62.8600 |V21.03.09

Automatically assign different colours to plated and un-plated copper layers.

Plated layers are determined by checking the copper base and finished thickness. Plated layers are shown as a darker colour

New Apply Plating Colours toolbar option



Plated Copper Layers

During PCB fabrication drill holes commonly have copper applied to the barrel wall by an electroplating process. This provides an interconnect between copper layers in the stack up.

This electroplating process often results in additional copper also being applied to the exposed copper layers where the mechanical drill starts / ends.

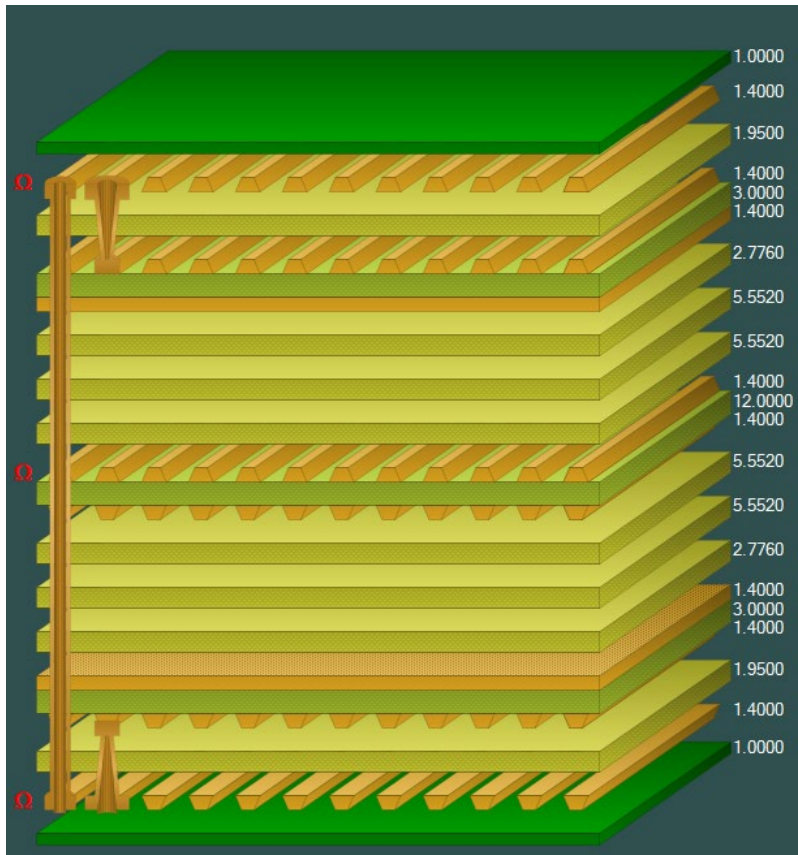
It is important to account for this additional plated copper thickness when calculating the overall stack up thickness and controlled impedance / insertion loss structures.

Speedstack has always allowed this additional plating thickness to be applied to the relevant copper layers. With v21.03 this has been enhanced further with automatic colour assignments to the plated and unplated layers

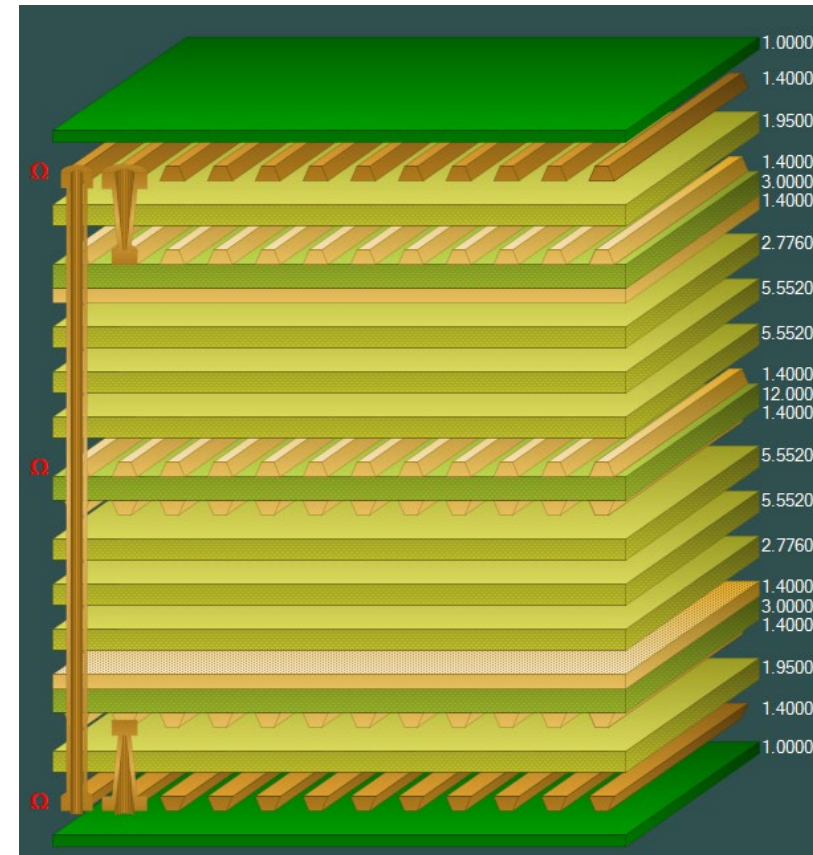
New Apply Plating Colours toolbar option



Standard Colours



Apply Plating Colours



New Apply Plating Colours toolbar option

Speedstack Report Printer

File Options

C:\Appst\Samples\Eval Imperial.sci Units: MILs

Layer	Stack up	Supplier	Description	Type	Processed Thickness	cr	Loss Tangent	Impedance ID	
1		Polar Samples	Liquid Photoimageable Mask	SolderMask	1.000	4.000	0.0195		
		Polar Samples	Copper Foil	Copper	1.400			1, 2	
2		Polar Samples	PreProg 1080	Dielectric	1.950	4.200	0.0195		
3		Polar Samples	FR4 Core	FR4	1.400	3.000	4.200	0.0195	
		Polar Samples	PreProg 3080	Dielectric	2.776	4.200	0.0195		
		Polar Samples	PreProg 1651	Dielectric	5.552	4.200	0.0195		
		Polar Samples	PreProg 1651	Dielectric	5.552	4.200	0.0195		
4		Polar Samples	FR4 Core	FR4	1.400	12.000	4.200	0.0195	3
5		Polar Samples	PreProg 1651	Dielectric	5.552	4.200	0.0195		
		Polar Samples	PreProg 1651	Dielectric	5.552	4.200	0.0195		
		Polar Samples	PreProg 3080	Dielectric	2.776	4.200	0.0195		
6		Polar Samples	FR4 Core	FR4	1.400	3.000	4.200	0.0195	
7		Polar Samples	PreProg 1080	Dielectric	1.950	4.200	0.0195		
		Polar Samples	Copper Foil	Copper	1.400			4	
8		Polar Samples	Liquid Photoimageable Mask	SolderMask	1.000	4.000	0.0195		

Copper Thickness = 11.200 | Dielectric Thickness = 49.660 | Solder Mask Thickness = 2.000 | Stack Up Thickness = 60.860 | Stack Up Thickness with Soldermask = 62.860
Stack Up Cost = 54.00

Notes

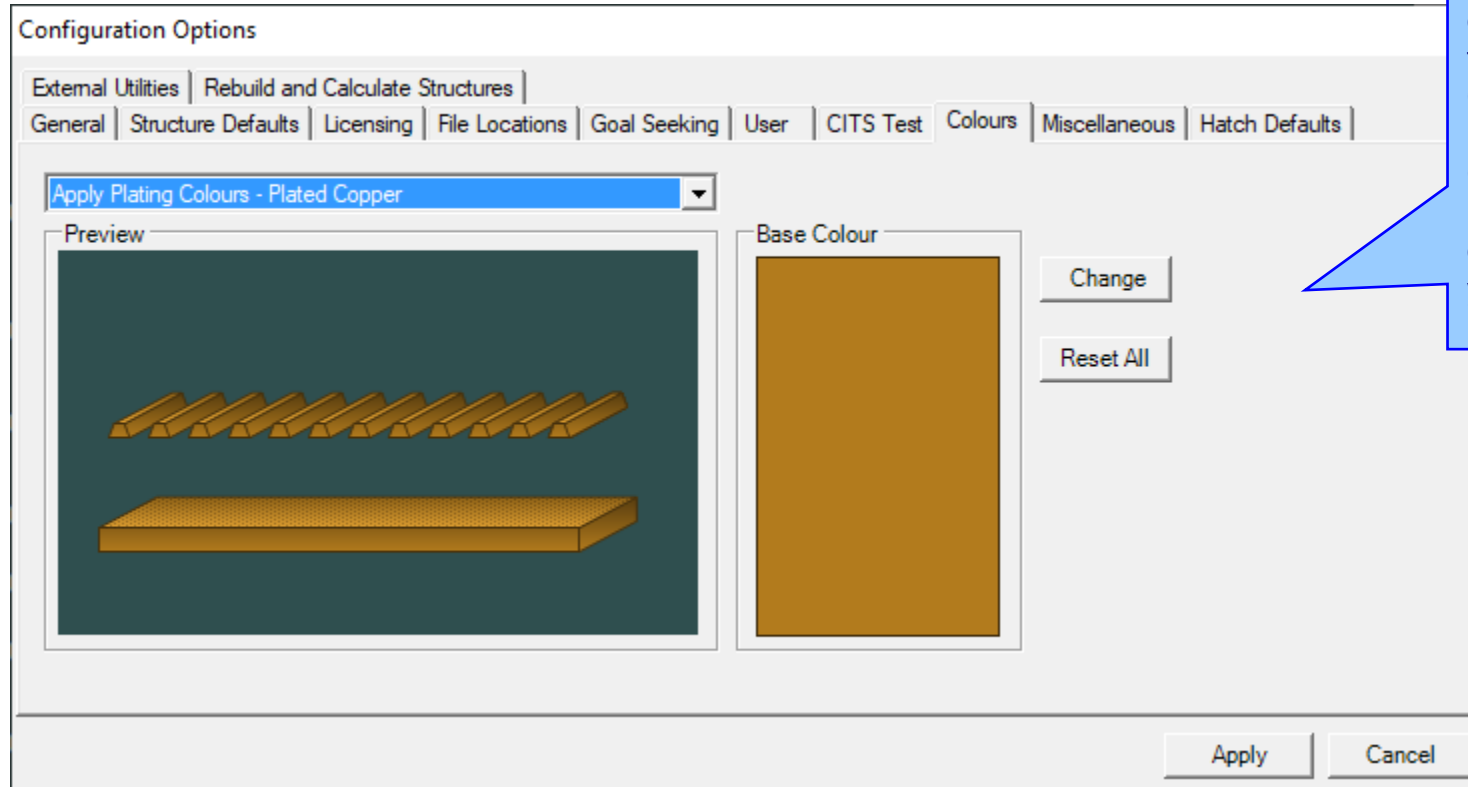
Impedance ID	Structure Image	Structure Name	Impedance Signal Layer	Ref. Plane 1 in Layer	Ref. Plane 2 in Layer	Lower Trace Width (W1)	Upper Trace Width (W2)	Trace Separation (S1)	Target Impedance	Tol (+/- %)	Calculated Impedance
1		Edge Coupled Coated Microstrip 1B	1	3	0	7.650	6.650	8.115	100.000	10.000	100.290
2		Coated Microstrip 1B	1	3	0	4.000	3.000	0.000	75.000	10.000	75.740
3		Edge Coupled Offset Stripline 1B1A	4	3	6	7.250	6.250	8.500	100.000	10.000	101.280

StackName: Master	Version:	Revision:	Modification:	Date of Revision:	Editor:	Page 1/1
Date:	Associated Documents:					
Author:						
Department:						
Site:						

Copyright © Polar Instruments 2021

The technical report will also show the plated and un-plated copper layers.

New Apply Plating Colours toolbar option



Two new user-definable colours have been introduced to the Speedstack Configuration Options.

Customise the Plated and Un-plated colours to suit existing colour schemes adopted by your organisation

Online Library enhancements

The screenshot shows the 'Online Library' application window. It features several sections: 'Filter by Supplier' with logos for Showa Denko, Taconic, and Tatsuta; 'File Type' with a list of material types; 'Filter by Frequency' with radio buttons for various frequency ranges; 'Library Files Available' listing various material files; and 'Existing Data Table' with 'Clear' and 'Append' options. A 'File Access Mode' section at the bottom allows switching between 'Online Polar Library' and 'On-Premise Mode' with a file path input field.

Callout 1: Showa Denko and Tatsuta have recently joined the Polar Material Partner program

Callout 2: Filter downloadable libraries by frequency. The frequency of the dielectric constant (Er) / loss tangent (TanD) material properties

Callout 3: Improvements to On-Premise Mode to help users where, for security reasons, no Internet connection is available

Speedstack v21.02.01 (February 2021)

New Shield material

The screenshot shows the Polar Speedstack Stack Up Builder interface. The main window displays a 3D cross-section of a 4-layer PCB stack up. A red box highlights the top and bottom shield layers. The layer list on the left is as follows:

Layer	Type	Material	Thickness
1	Shield	EMI Shield Film	4.200/0.0195
-	PP	PrePreg 1080	4.200/0.0195
2	Core	FR4 Core	4.200/0.0195
-	PP	PrePreg 1080	4.200/0.0195
4	Shield	EMI Shield Film	4.200/0.0195

The right-hand panel shows 'Stack Up Information' with the following data:

Field	Value
Electrical Layer Count	4
Stack Up Cost	19.00
Copper Thickness	5.6000
Dielectric Thickness	24.0000
Solder Mask Thickness	0.0000

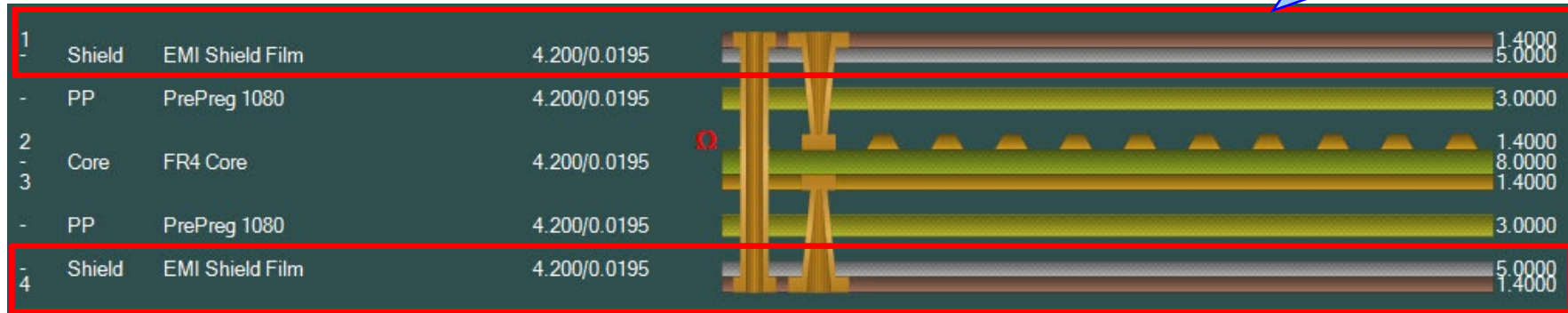
At the bottom of the interface, the status bar indicates: Target Stack Up Thickness = 30.0000, Stack Up Thickness = 29.6000, Stack Up Thickness with Soldermask = 29.6000, Beta V21.02.01.

Speedstack v21.02 introduces support for a new Shield material type.

Shield materials are used to prevent electromagnetic interference (EMI) from being either absorbed or radiated.

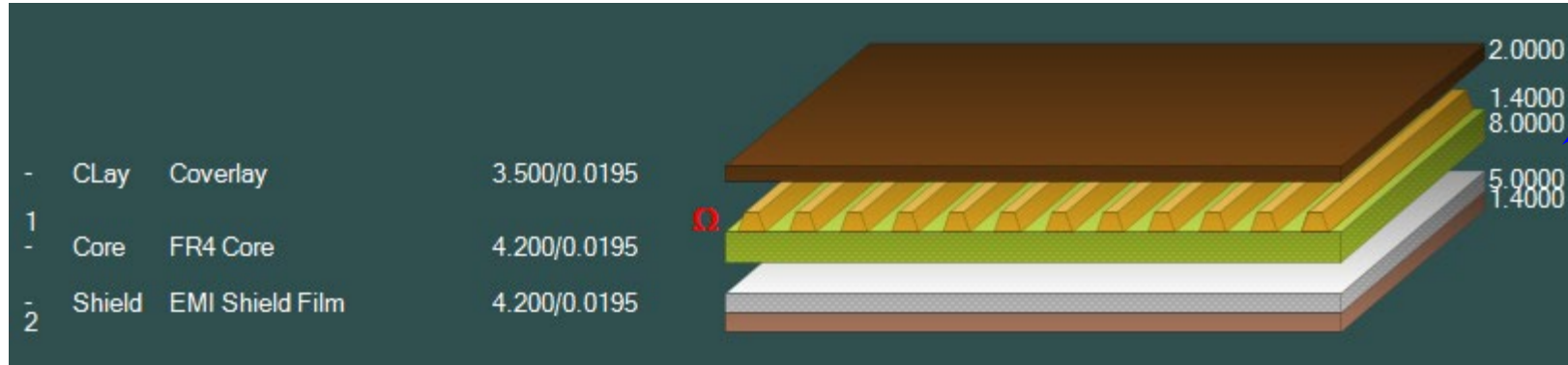
New Shield material

Shields are typically applied to the outer layer(s) of the stack up

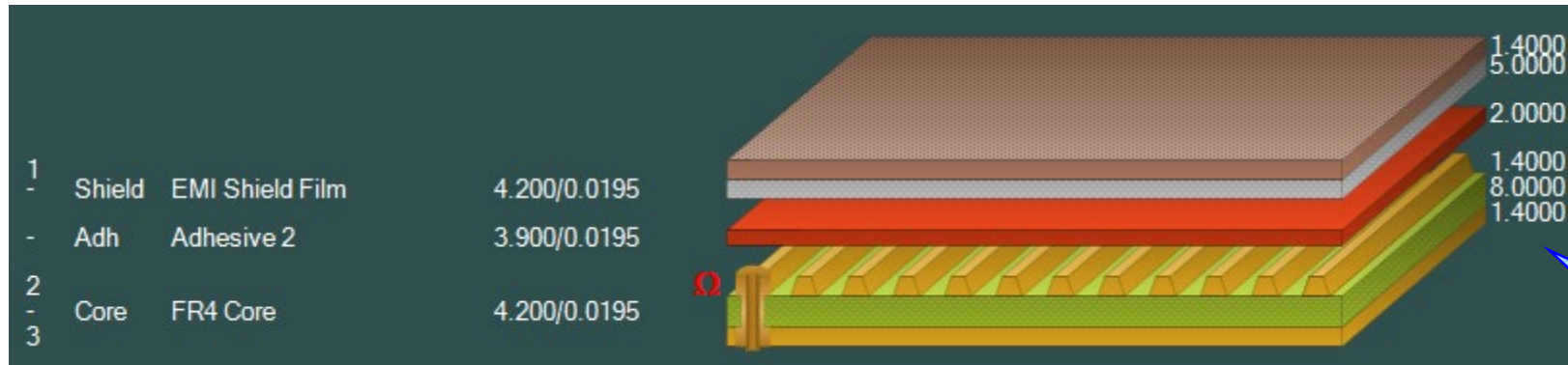


They consist of a shield layer (brown) and dielectric adhesive (silver)

Shield material examples



Example #1
Single-sided core,
coverlay above trace,
shield below



Example #2
Double-sided core,
adhesive and shield
above

Material library enhancements

The screenshot shows the Speedstack software interface with the 'Shields' tab selected in the material library. A blue callout box points to the 'Shields' tab with the text: 'New Shields tab contains Shield material information'. The table below lists the shield materials.

Supplier	Supplier Description	Description	Stock Number	Dielectric Base Thickness	Dielectric Finished Thickne	Shield Cu Thickness	Dielectric
Polar Samples	SH/001	EMI Shield Film	1200-001	5	5	0.7	4.2
Polar Samples	SH/002	EMI Shield Film	1200-002	5	5	1.4	4.2
Polar Samples	SH/003	EMI Shield Film	1200-003	5	5	2.8	4.2
Polar Samples	SH/004	EMI Shield Film	1200-004	10	10	0.7	4.2
Polar Samples	SH/005	EMI Shield Film	1200-005	10	10	1.4	4.2
Polar Samples	SH/006	EMI Shield Film	1200-006	10	10	2.8	4.2

Material library enhancements

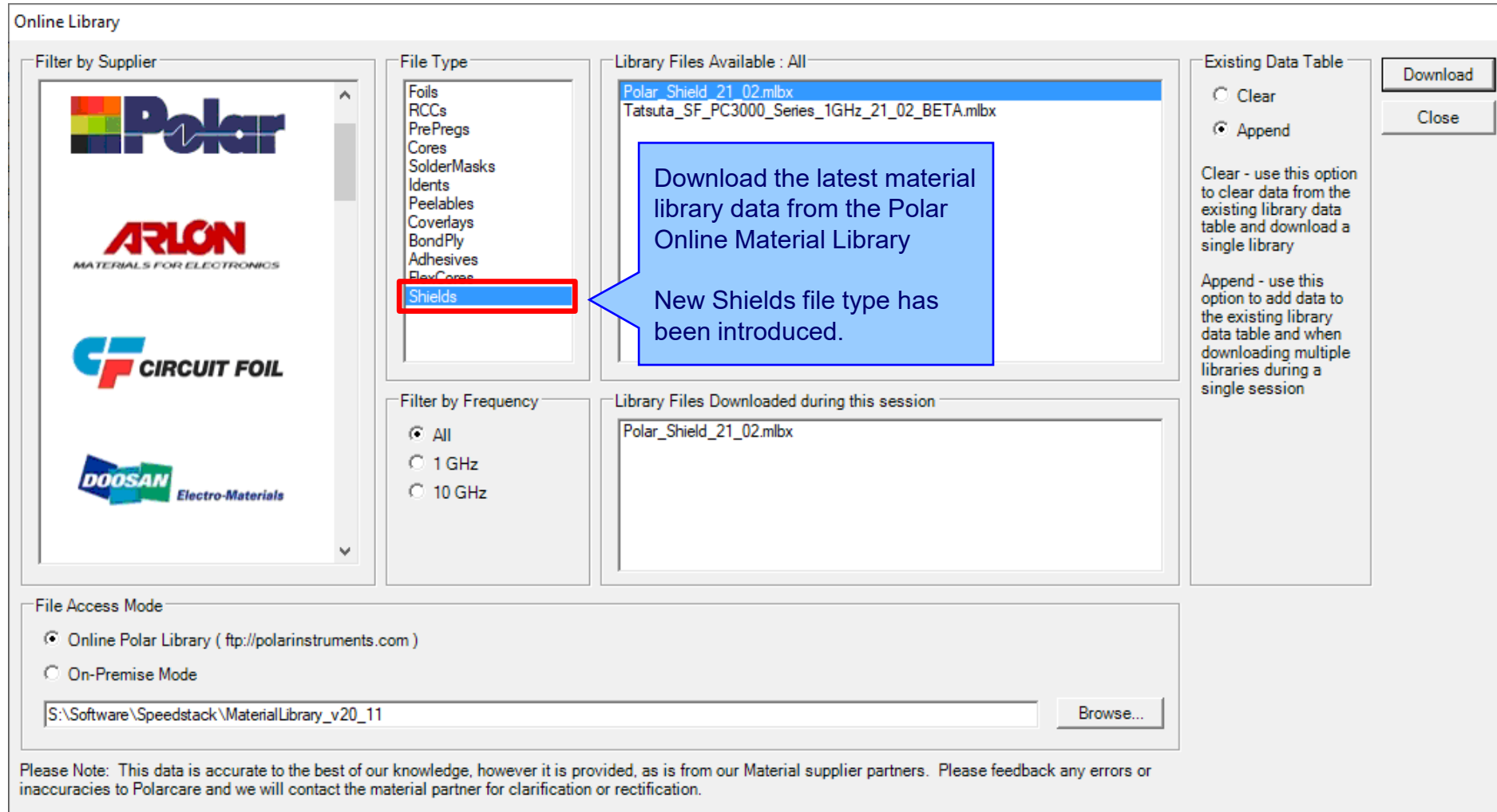
Review/Edit Shield

Supplier	<input type="text" value="Polar Samples"/>	Size	<input type="text" value="*"/>
Supplier Description	<input type="text" value="SH/001"/>	Note 1	<input type="text"/>
Description	<input type="text" value="EMI Shield Film"/>	Note 2	<input type="text"/>
StockNumber	<input type="text" value="1200-001"/>	Note 3	<input type="text"/>
Type	<input type="text" value="Shield"/>	Note 4	<input type="text"/>
Base Thickness	<input type="text" value="5.0000"/>	Note 5	<input type="text"/>
Finished Thickness	<input type="text" value="5.0000"/>		
Dielectric Constant	<input type="text" value="4.2"/>		
Loss Tangent	<input type="text" value="0.0195"/>		
Resin Content	<input type="text" value="0"/>		
Tg	<input type="text" value="0"/>		
Td	<input type="text" value="0"/>		
CAF Resistance	<input type="text" value="0"/>		
Z Axis Expansion	<input type="text" value="0"/>		
Excess Resin	<input type="text" value="0.0000"/>		
Tolerance +/-%	<input type="text" value="10"/>		
Shield Copper Thickness	<input type="text" value="0.7000"/>		
Cost	<input type="text" value="0"/>		
Lead Time	<input type="text" value="0"/>		
Laser Drillable	<input type="checkbox"/>		

1 of 6

Material library Edit Shield dialog

Online Library enhanced to support Shield materials



Online Library

Filter by Supplier

- Polar
- ARLON
MATERIALS FOR ELECTRONICS
- CIRCUIT FOIL
- DOOSAN
Electro-Materials

File Type

- Foils
- RCCs
- PrePregs
- Cores
- SolderMasks
- Idents
- Peelables
- Coverlays
- BondPly
- Adhesives
- FlexCores
- Shields**

Library Files Available : All

- Polar_Shield_21_02.mlbx
- Tatsuta_SF_PC3000_Series_1GHz_21_02_BETA.mlbx

Existing Data Table

Clear

Append

Clear - use this option to clear data from the existing library data table and download a single library

Append - use this option to add data to the existing library data table and when downloading multiple libraries during a single session

Download

Close

Filter by Frequency

All

1 GHz

10 GHz

Library Files Downloaded during this session

- Polar_Shield_21_02.mlbx

File Access Mode

Online Polar Library (ftp://polarinstruments.com)

On-Premise Mode

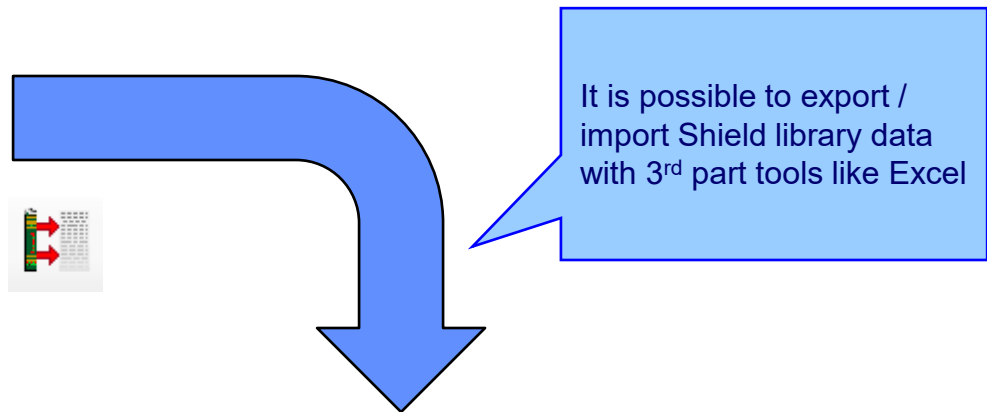
S:\Software\Speedstack\MaterialLibrary_v20_11

Browse...

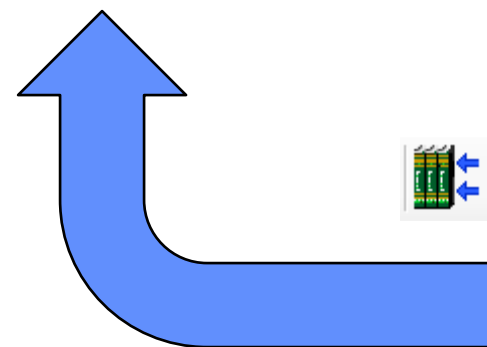
Please Note: This data is accurate to the best of our knowledge, however it is provided, as is from our Material supplier partners. Please feedback any errors or inaccuracies to Polarcare and we will contact the material partner for clarification or rectification.

Export / Import Shield library to Excel

Supplier	Supplier Description	Description	Stock Number	Dielectric Base Thickness	Dielectric Finished Thickness	Shield Cu Thickness	Dielectric
Polar Samples	SH001	EMI Shield Film	1200-001	5	5	0.7	4.2
Polar Samples	SH002	EMI Shield Film	1200-002	5	5	1.4	4.2
Polar Samples	SH003	EMI Shield Film	1200-003	5	5	2.8	4.2
Polar Samples	SH004	EMI Shield Film	1200-004	10	10	0.7	4.2
Polar Samples	SH005	EMI Shield Film	1200-005	10	10	1.4	4.2
Polar Samples	SH006	EMI Shield Film	1200-006	10	10	2.8	4.2

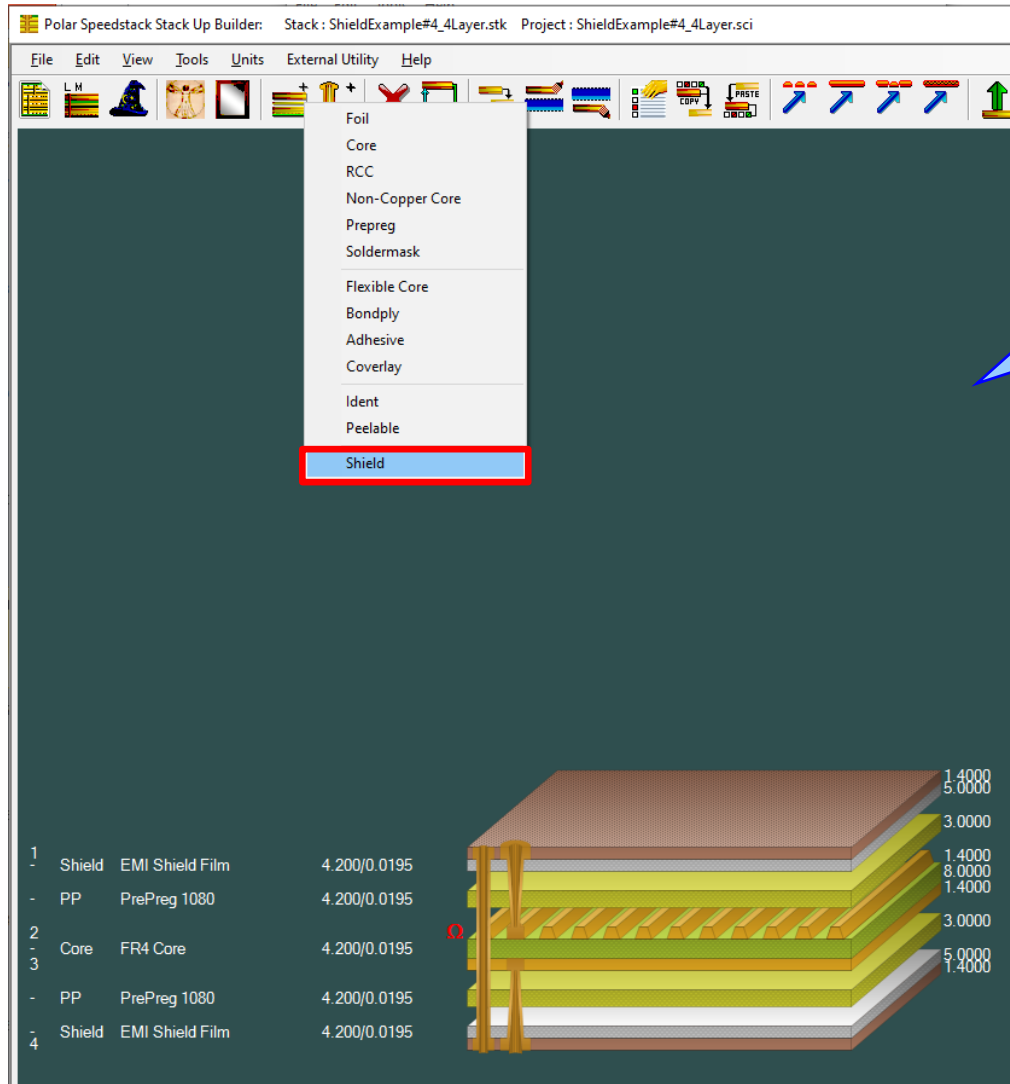


It is possible to export / import Shield library data with 3rd part tools like Excel



Type	Supplier	Supplier Description	Description	Stock Number	Shield Cu Thickness	Dielectric Base Thickness	Dielectric Finished Thickness	Dielectric Constant	Dielectric Loss Tangent	Dielectric Resin Content	Tg	Td	CAF Resistance	ZAxisExpansion	ExcessResin	Tolerance	Dielectric LaserDrillable
Shield	Polar Samples	SH/001	EMI Shield Film	1200-001	0.7	5	5	4.2	0.0195	0	0	0	0	0	0	10	FALSE
Shield	Polar Samples	SH/002	EMI Shield Film	1200-002	1.4	5	5	4.2	0.0195	0	0	0	0	0	0	10	FALSE
Shield	Polar Samples	SH/003	EMI Shield Film	1200-003	2.8	5	5	4.2	0.0195	0	0	0	0	0	0	10	FALSE
Shield	Polar Samples	SH/004	EMI Shield Film	1200-004	0.7	10	10	4.2	0.0195	0	0	0	0	0	0	10	FALSE
Shield	Polar Samples	SH/005	EMI Shield Film	1200-005	1.4	10	10	4.2	0.0195	0	0	0	0	0	0	10	FALSE
Shield	Polar Samples	SH/006	EMI Shield Film	1200-006	2.8	10	10	4.2	0.0195	0	0	0	0	0	0	10	FALSE

Stack up editor enhancements



Stack Up editor enhancements:
Shield material options to add, delete, swap, move up, move down, symmetry and set properties

Shield properties

Shield Properties

Main | Notes | Attributes

General Information

Supplier: Polar Samples

Supplier Description: SH/002

Description: EMI Shield Film

Stock Number: 1200-002

Type: Shield

Shield Copper

Base Thickness: 1.4000

Finished Thickness: 1.4000

Data Filename:

Copper Coverage %: 0.00

Graphical Colour:

Trace Inverted:

Finishing Applied:

Remove Copper (disabled if structures or sub-stacks exist):

Shield Dielectric

Base Thickness: 5.0000

Finished Thickness: 5.0000

Dielectric Constant: 4.2000

Loss Tangent: 0.0195

Resin Content %: 0.00

Tg: 0.0

Td: 0.0

CAF Resistance: 0.0

Z Axis Expansion: 0.0

Excess Resin: 0.0000

Isolation Distance: 5.0000

Graphical Colour:

Data Filenames

Dielectric Base Thickness	5.0000
Dielectric Finished Thickness	5.0000
Dielectric Constant	4.2
Loss Tangent	0.0195
Resin Content	0
Tg	0
Td	0
CAF Resistance	0
Z Axis Expansion	0
Excess Resin	0.0000

Mils/Thous Target Stack Up Thickness = 30.0000 Stack Up Thickness = 29.6000 Stack Up Thickness with Soldermask = 29.6000 Beta V21.02.01

View and customise the Shield properties. Useful in 'what-if' scenarios

Controlled impedance and insertion loss calculations

The screenshot shows the Polar Speedstack Stack Up Builder interface. The main window displays a 3D model of a stack up with a shielded region highlighted in red. The shielded region is a rectangular block on top of the stack up. The stack up consists of several layers: a top shield layer, two prepreg layers, a core layer, another prepreg layer, and a bottom shield layer. The shielded region is a rectangular block on top of the stack up, with dimensions W1 and W2, and height H3. The shielded region is highlighted in red. The software interface includes a menu bar, a toolbar, and a status bar. The status bar shows the target stack up thickness and the current stack up thickness.

Layer	Material	Thickness (Mils/Thous)
1	Shield EMI Shield Film	3.500/0.0180
-	PP PrePreg 1080	4.200/0.0195
2	Core FR4 Core	4.200/0.0195
-	PP PrePreg 1080	4.200/0.0195
4	Shield EMI Shield Film	4.200/0.0195

Shield material in stack up

Impedance and insertion calculations support the new Shield material type.

Shield material region of structure.

Shield adhesive height / thickness dimension and dielectric constant.

Controlled impedance and insertion loss calculations

Shield material region of structure.

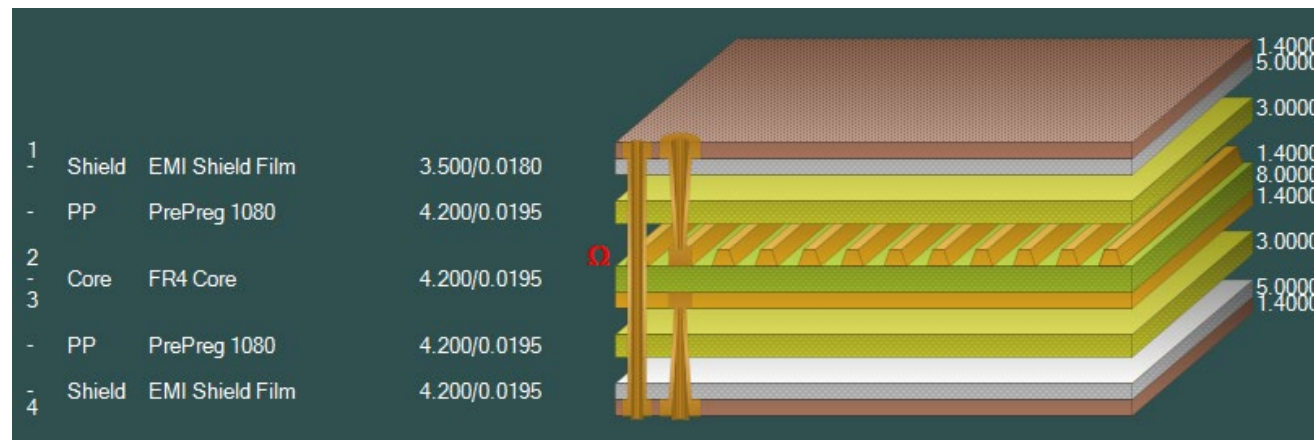
Result Presentation			
Substrate Causal Extrapolation Reference Points			
	Freq (Hz)	Ref Er	Ref TanD
H1	1.000E+09	4.2000	0.0195
H2	1.000E+09	4.2000	0.0195
H3	1.000E+09	3.5000	0.0180
H4			
REr			
CEr			

Shield adhesive dielectric constant / loss tangent.

Conductor loss, dielectric loss, total attenuation

Controlled impedance and insertion loss calculations

Please note: Speedstack is capable of supporting many shield types for stack up design and documentation. However, it is important to use the correct type of shield material for controlled impedance and insertion loss applications. They are often designated by the shield vendor as ‘for high speed signal transmission applications’.



Technical report enhancements

Technical report showing shield materials

Speedstack Report Printer
File Options

C:\Apps\Samples\ShieldExample\F5_4layer.sci Units: Mils

Layer	Stack up	Supplier	Description	Type	Processed Thickness	εr	Loss Tangent	Impedance ID	
1		Polar Samples	EMI Shield Film	Shield	1.400	5.000	3.500	0.0180	
		Polar Samples	PrePreg 1080	Dielectric	3.000	4.200	0.0195		
		Polar Samples	FR4 Core	FR4	1.400	8.000	4.200	0.0195	1,2
		Polar Samples	PrePreg 1080	Dielectric	1.400	3.000	4.200	0.0195	
2		Polar Samples	PrePreg 1080	Dielectric	3.000	4.200	0.0195		
		Polar Samples	EMI Shield Film	Shield	1.400	5.000	4.200	0.0195	

Copper Thickness = 5.600 | Dielectric Thickness = 24.000 | Solder Mask Thickness = 0.000 | Stack Up Thickness = 29.600 | Stack Up Thickness with Soldermask = 29.600
Stack Up Cost = 19.00

Notes

Impedance ID	Structure Image	Structure Name	Impedance Signal Layer	Ref. Plane 1 in Layer	Ref. Plane 2 in Layer	Lower Trace Width (W1)	Upper Trace Width (W2)	Trace Separation (S1)	Target Impedance	Tol (+/- %)	Calculated Impedance
1		Offset Stripline 1B2A	2	1	3	6.400	5.400	0.000	50.000	10.000	50.460
2		Edge Coupled Offset Stripline 1B2A	2	1	3	5.000	4.000	8.800	100.000	10.000	100.010

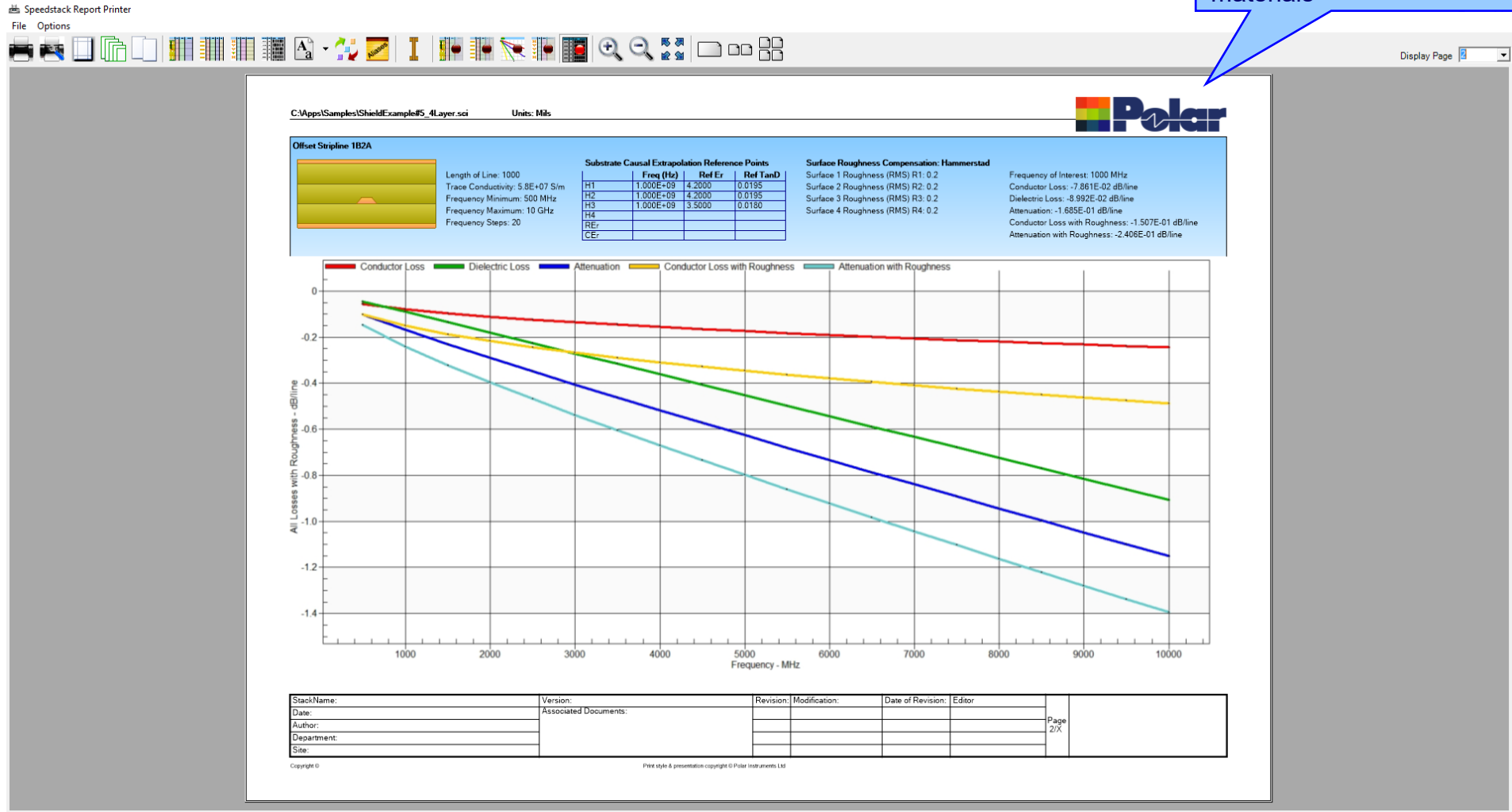
Drill Image	1st Layer	2nd Layer	Column Position	Drill Type
	1	2	2	Laser PTH
	1	4	1	Mechanical PTH
	4	3	2	Laser PTH

StackName: Master	Version:	Revision:	Modification:	Date of Revision:	Editor	Page 1/1
Date:	Associated Documents:					
Author:						
Department:						
Site:						

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Technical report enhancements

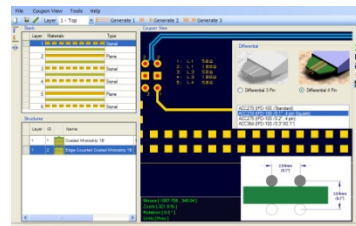
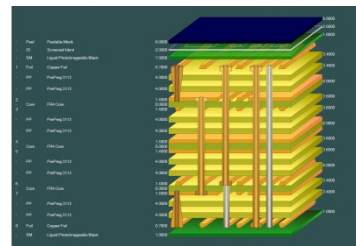
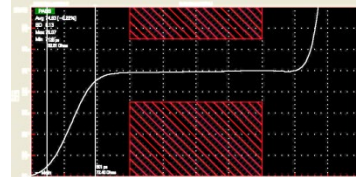
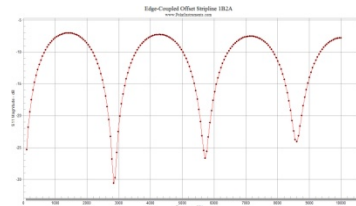
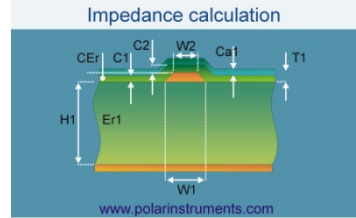
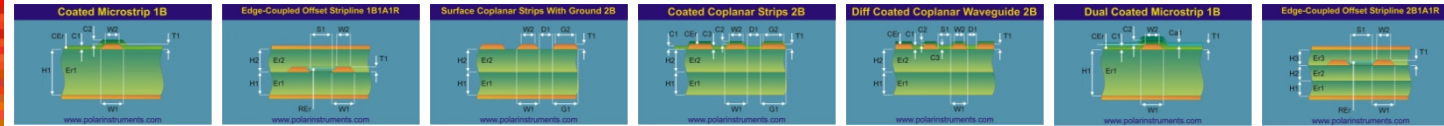
Insertion loss report supporting shield materials



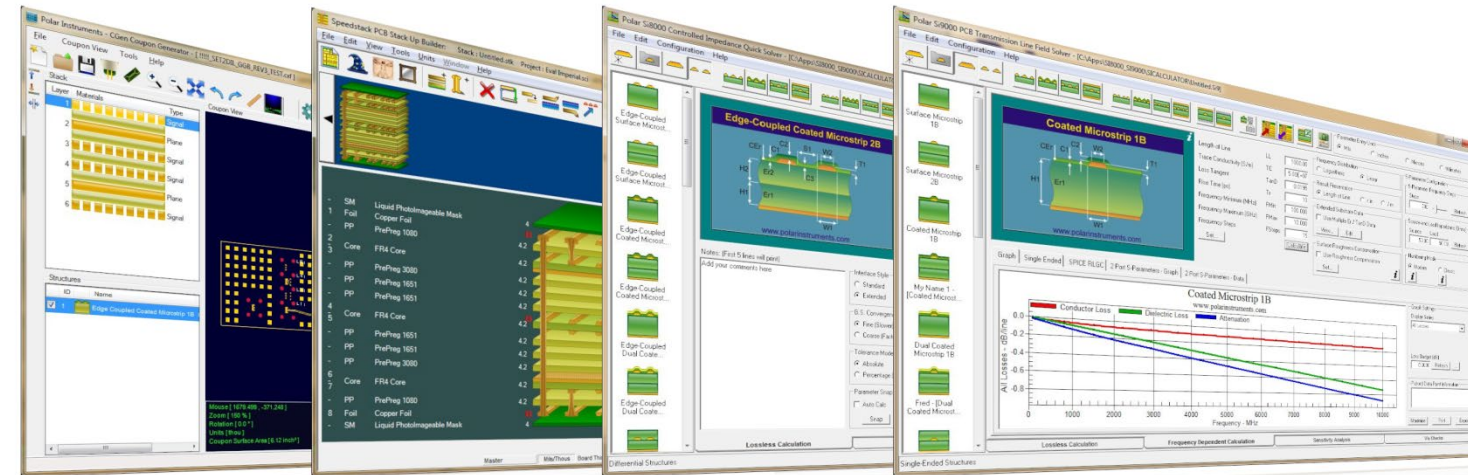
Import / Export enhancements

The following Import / Export options have been updated to support the new shield material introduced with Speedstack 2021:

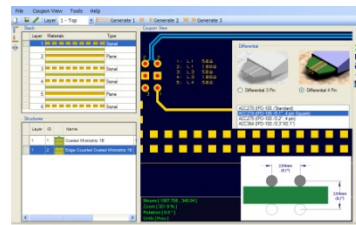
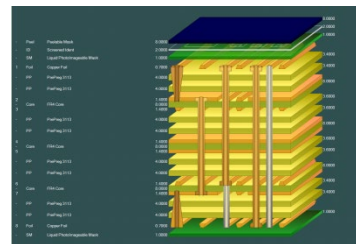
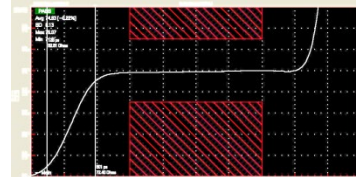
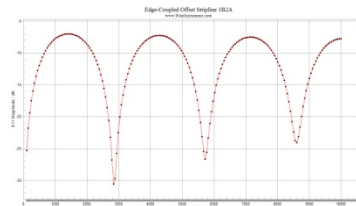
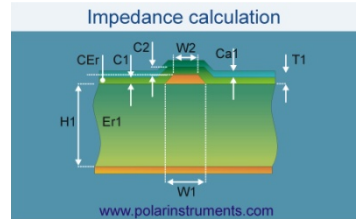
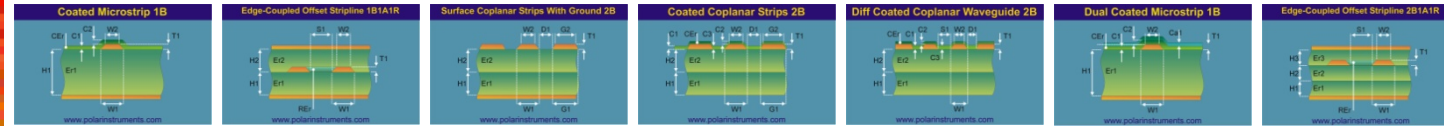
- XML STKX v20.00 and SSX v10.00 import / export options
- CSV export option
- Gerber / DXF export option



Thank you for viewing this Speedstack 2021 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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