

Speedstack 2021 Preview

Richard Attrill – January 2021 (Rev 1)



Introducing Speedstack 2021

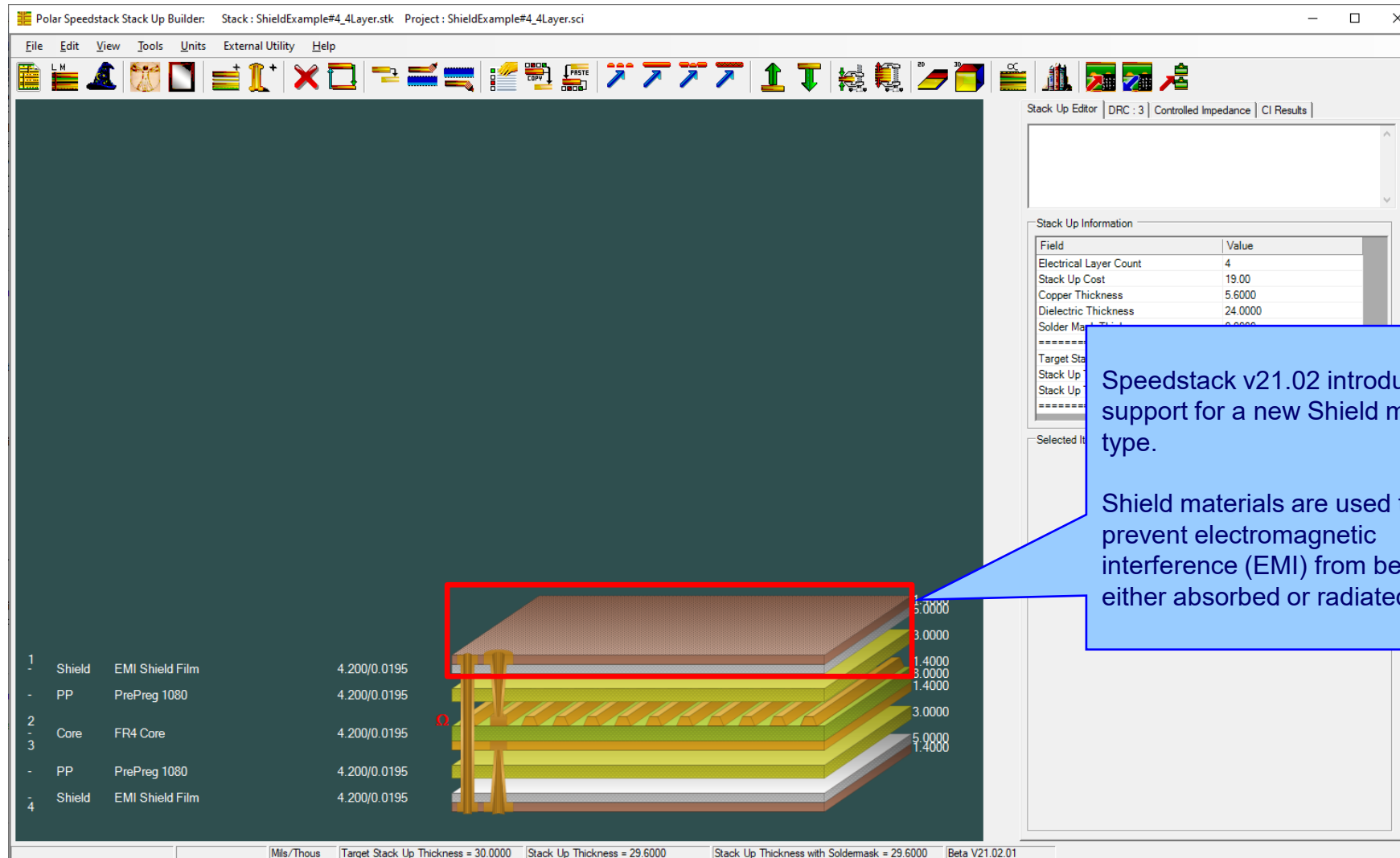
Welcome to a preview of Speedstack 2021.

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

New Shield material



Stack Up Editor | DRC : 3 | Controlled Impedance | CI Results

Stack Up Information

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

Target Stack Up Thickness = 30.0000
Stack Up Thickness = 29.6000
Stack Up Thickness with Soldermask = 29.6000

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

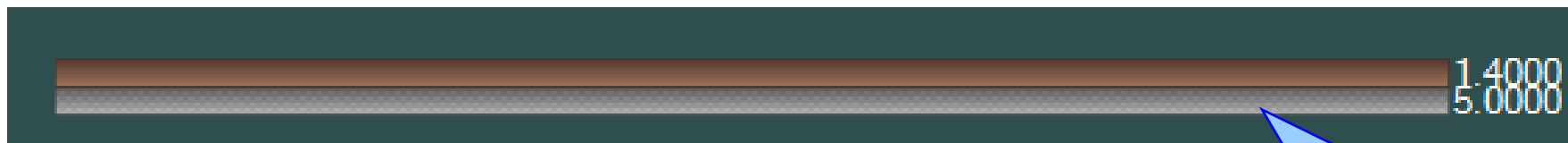
Speedstack v21.02 introduces support for a new Shield material type.

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

New Shield material

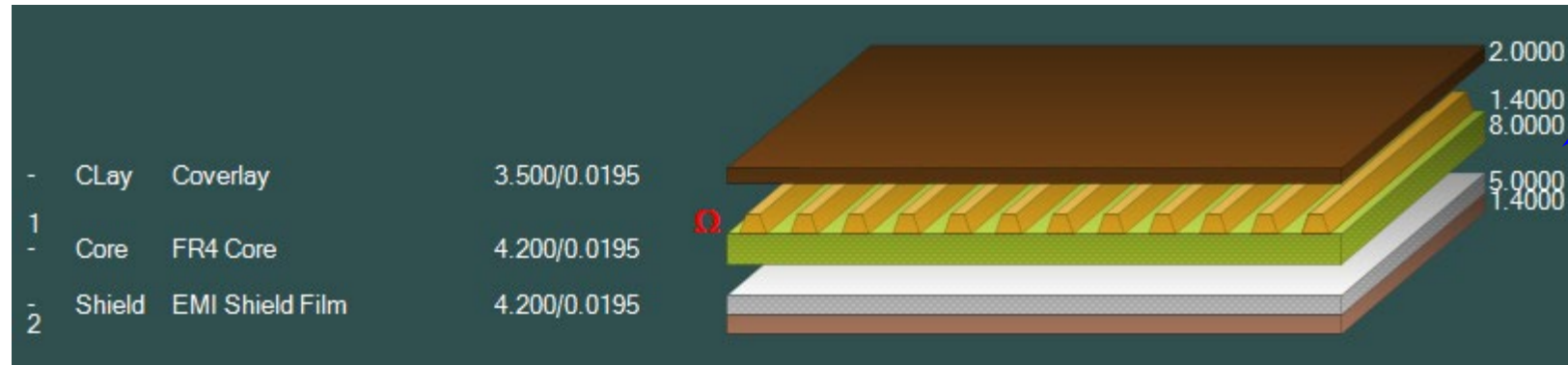
Shields are typically applied to the outer layer(s) of the stack up

1	Shield	EMI Shield Film	4.200/0.0195	1.4000	5.0000
-	PP	PrePreg 1080	4.200/0.0195	3.0000	
2	Core	FR4 Core	4.200/0.0195	1.4000	8.0000
3				1.4000	
-	PP	PrePreg 1080	4.200/0.0195	3.0000	
-	Shield	EMI Shield Film	4.200/0.0195	5.0000	1.4000

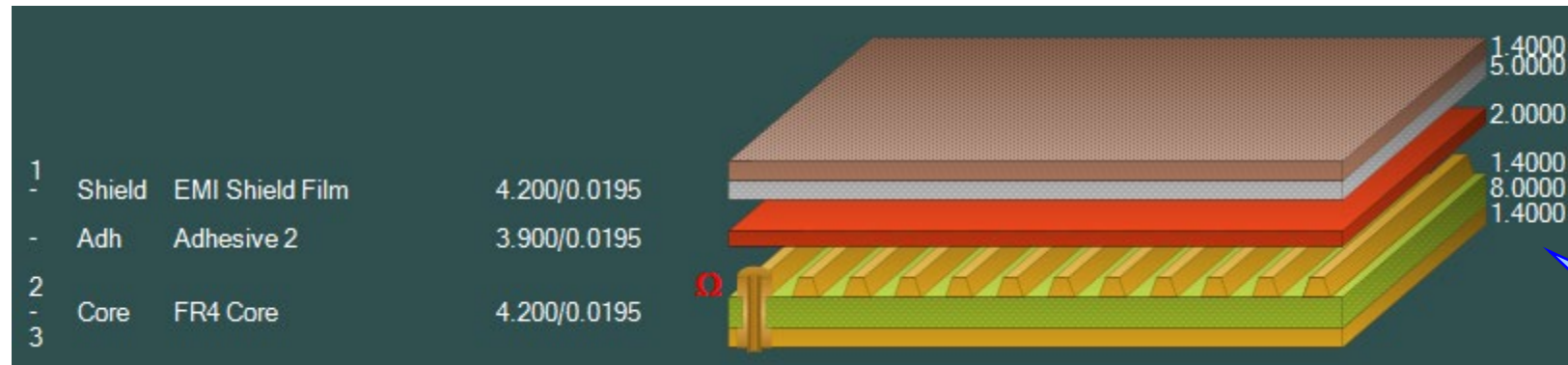


They consist of a shield layer (brown) and dielectric adhesive (silver)

Shield material examples

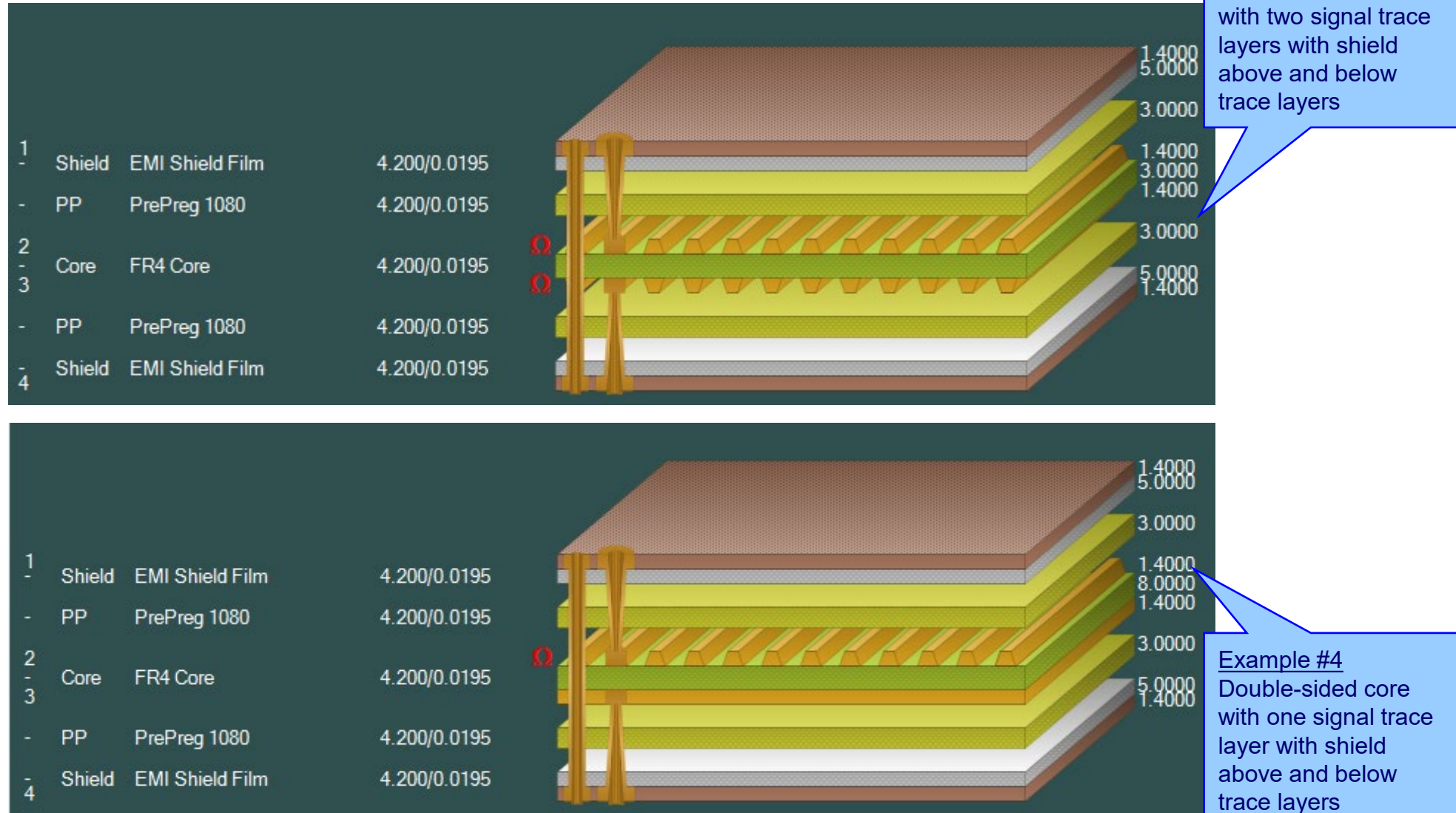


Example #1
Single-sided core,
coverlay above trace,
shield below



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

Shield material examples



Material library enhancements

C:\Apps\Samples\Speedstack Imperial.mlbx

EXIT [Icons]

Foils | Prepregs | RCCs | Cores | Solder Masks | Ident Inks | Peelable Masks | Coverlays | Bond Ply | Adhesive | Flexible Cores | **Shields**

New Shields tab contains Shield material information

	Supplier	Supplier Description	Description	Stock Number	Dielectric Base Thickness	Dielectric Finished Thickne	Shield Cu Thickness	Dielectric
▶	PolarSamples	SH/001	EMI Shield Film	1200-001	5	5	0.7	4.2
	PolarSamples	SH/002	EMI Shield Film	1200-002	5	5	1.4	4.2
	PolarSamples	SH/003	EMI Shield Film	1200-003	5	5	2.8	4.2
	PolarSamples	SH/004	EMI Shield Film	1200-004	10	10	0.7	4.2
	PolarSamples	SH/005	EMI Shield Film	1200-005	10	10	1.4	4.2
	PolarSamples	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" value=""/>
Description	<input type="text" value="EMI Shield Film"/>	Note 2	<input type="text" value=""/>
StockNumber	<input type="text" value="1200-001"/>	Note 3	<input type="text" value=""/>
Type	<input type="text" value="Shield"/>	Note 4	<input type="text" value=""/>
Base Thickness	<input type="text" value="5.0000"/>	Note 5	<input type="text" value=""/>
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"/>		

Material library Edit Shield dialog

Online Library enhanced to support Shield materials

Online Library

Filter by Supplier

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

Download the latest material library data from the Polar Online Material Library

New Shields file type has been introduced.

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

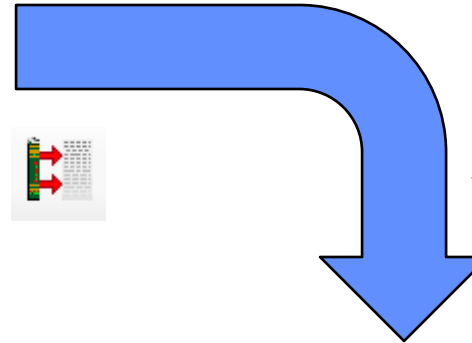
Browse...

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.

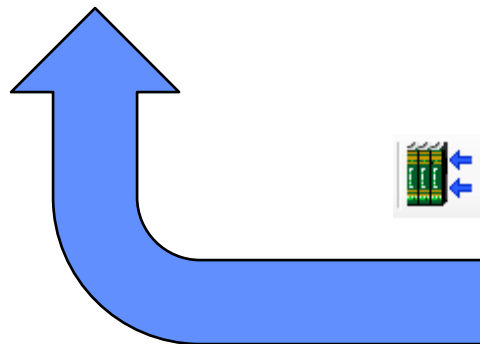
Export / Import Shield library to Excel

C:\Apps\Sample\Speedstack Imperial.mlbx

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 party tools like Excel



FileHomeInsertPage LayoutFormulasDataReviewViewDeveloperTeam

CutCopyFormat PainterClipboardFont

Calibri11A²

Wrap TextGeneralConditional Formatting as Table

NormalBadGoodNeutralCalculation

Check CellExplanatory...InputLinked CellNote

Styles

AutoSumFillSort & Find & Filter > Select >Editing

InsertDeleteFormatCells

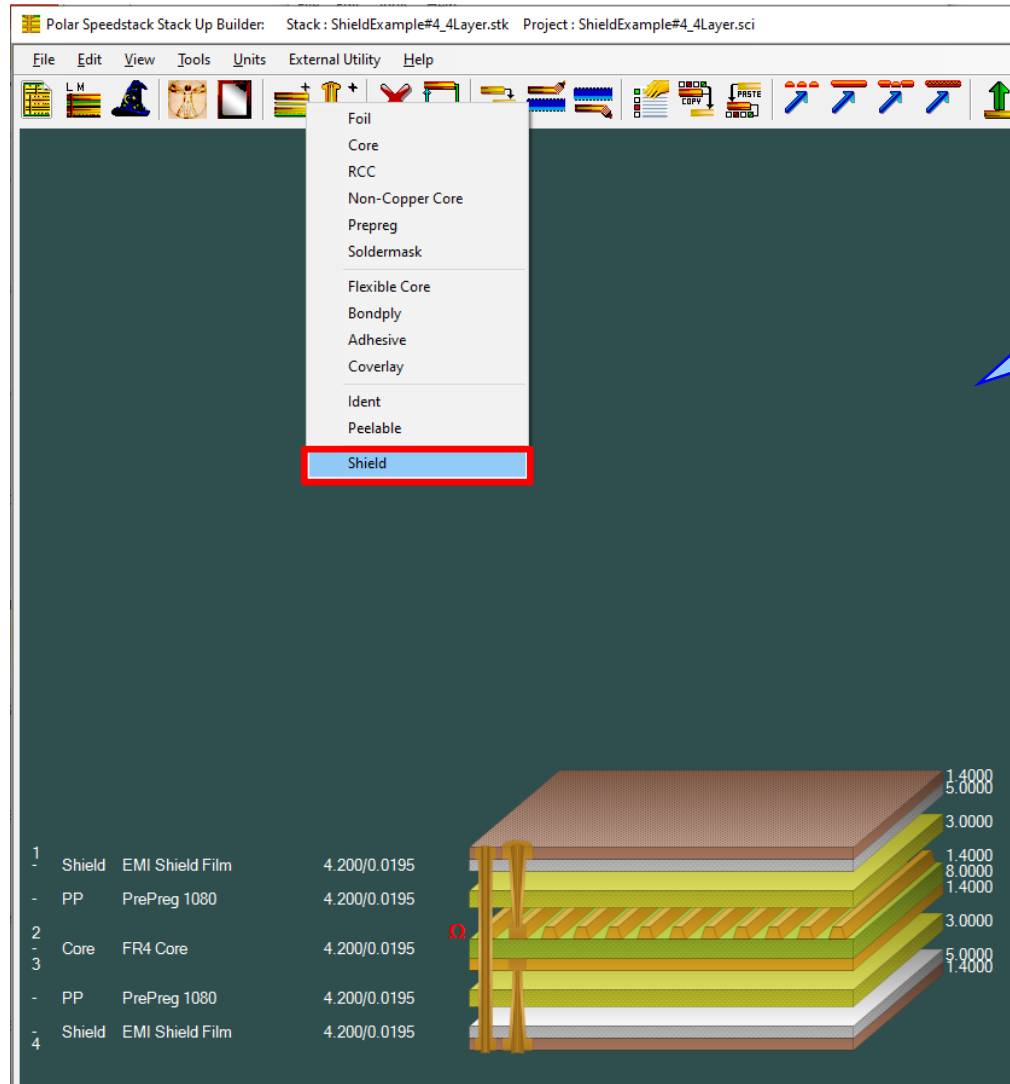
A4Shield

Speedstack_Shield_Export.csv

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	
1																			
2																			
3	*	Type	Supplier	Supplier Description	Description	Stock Number	Shield Cu Thickness	Dielectric Base Thickness	Dielectric Finished Thickness	Dielectric Dielectric Constant	Dielectric Loss Tangent	Dielectric Resin Content	Dielectric Tg	Dielectric Td	Dielectric CAF Resistance	Dielectric ZAxisExpansion	Dielectric ExcessResin	Dielectric Tolerance	Dielectric LaserDrillable
4	Shield	Polar Samples	SH/001	EMI Shield Film	1200-001	0.7	5	5	5	4.2	0.0195	0	0	0	0	0	0	10	FALSE
5	Shield	Polar Samples	SH/002	EMI Shield Film	1200-002	1.4	5	5	5	4.2	0.0195	0	0	0	0	0	0	10	FALSE
6	Shield	Polar Samples	SH/003	EMI Shield Film	1200-003	2.8	5	5	5	4.2	0.0195	0	0	0	0	0	0	10	FALSE
7	Shield	Polar Samples	SH/004	EMI Shield Film	1200-004	0.7	10	10	10	4.2	0.0195	0	0	0	0	0	0	10	FALSE
8	Shield	Polar Samples	SH/005	EMI Shield Film	1200-005	1.4	10	10	10	4.2	0.0195	0	0	0	0	0	0	10	FALSE
9	Shield	Polar Samples	SH/006	EMI Shield Film	1200-006	2.8	10	10	10	4.2	0.0195	0	0	0	0	0	0	10	FALSE
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Speedstack_Shield_Export

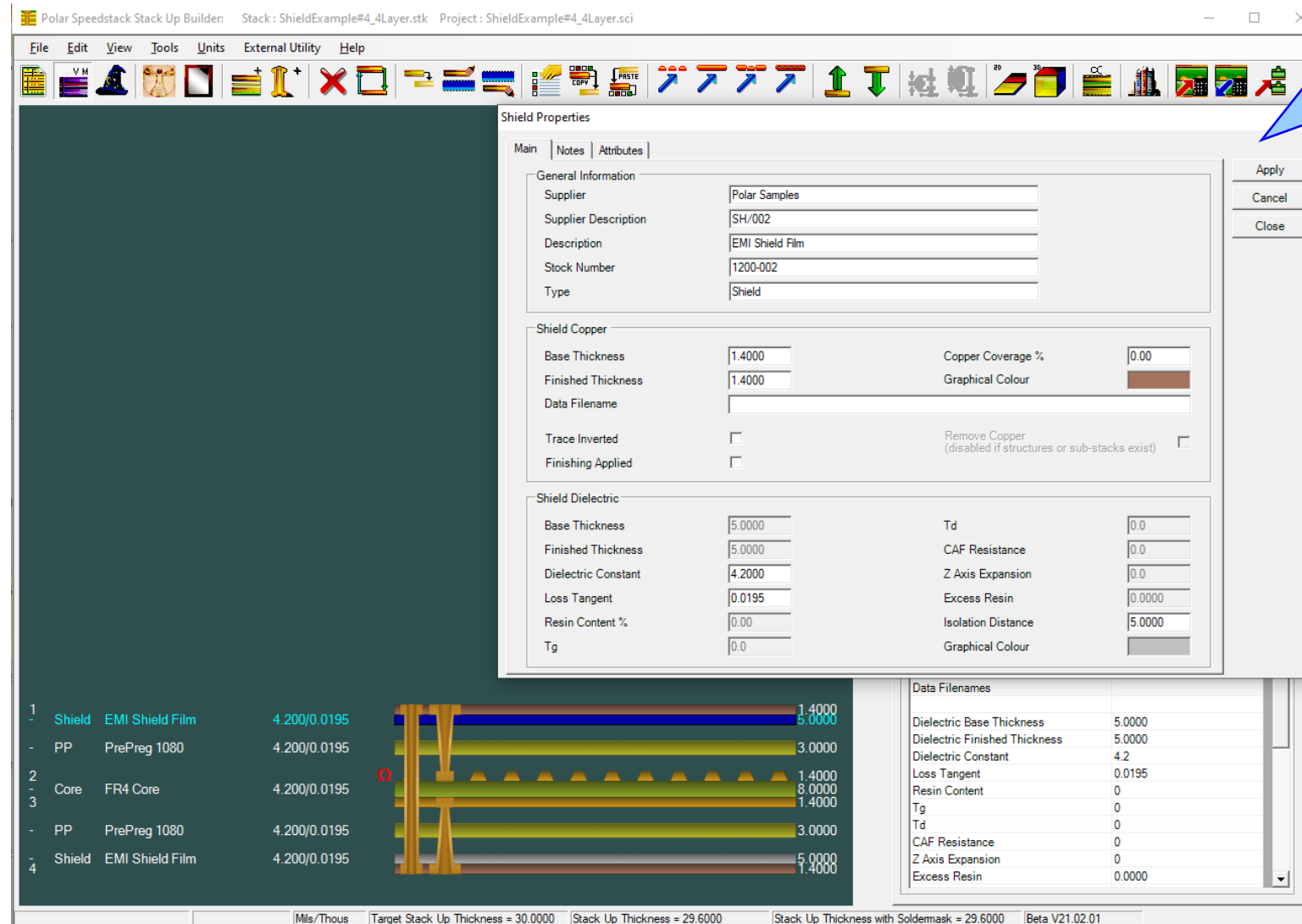
Stack up editor enhancements



Stack Up editor enhancements:

Shield material options to add, delete, swap, move up, move down, symmetry and set properties

Shield properties



Polar Speedstack Stack Up Builder: Stack: ShieldExample#4_4Layer.stk Project: ShieldExample#4_4Layer.sci

File Edit View Tools Units External Utility Help

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:

Apply

Cancel

Close

1 Shield EMI Shield Film 4.200/0.0195 1.4000 5.0000

2 PP PrePreg 1080 4.200/0.0195 3.0000

3 Core FR4 Core 4.200/0.0195 1.4000 8.0000 1.4000

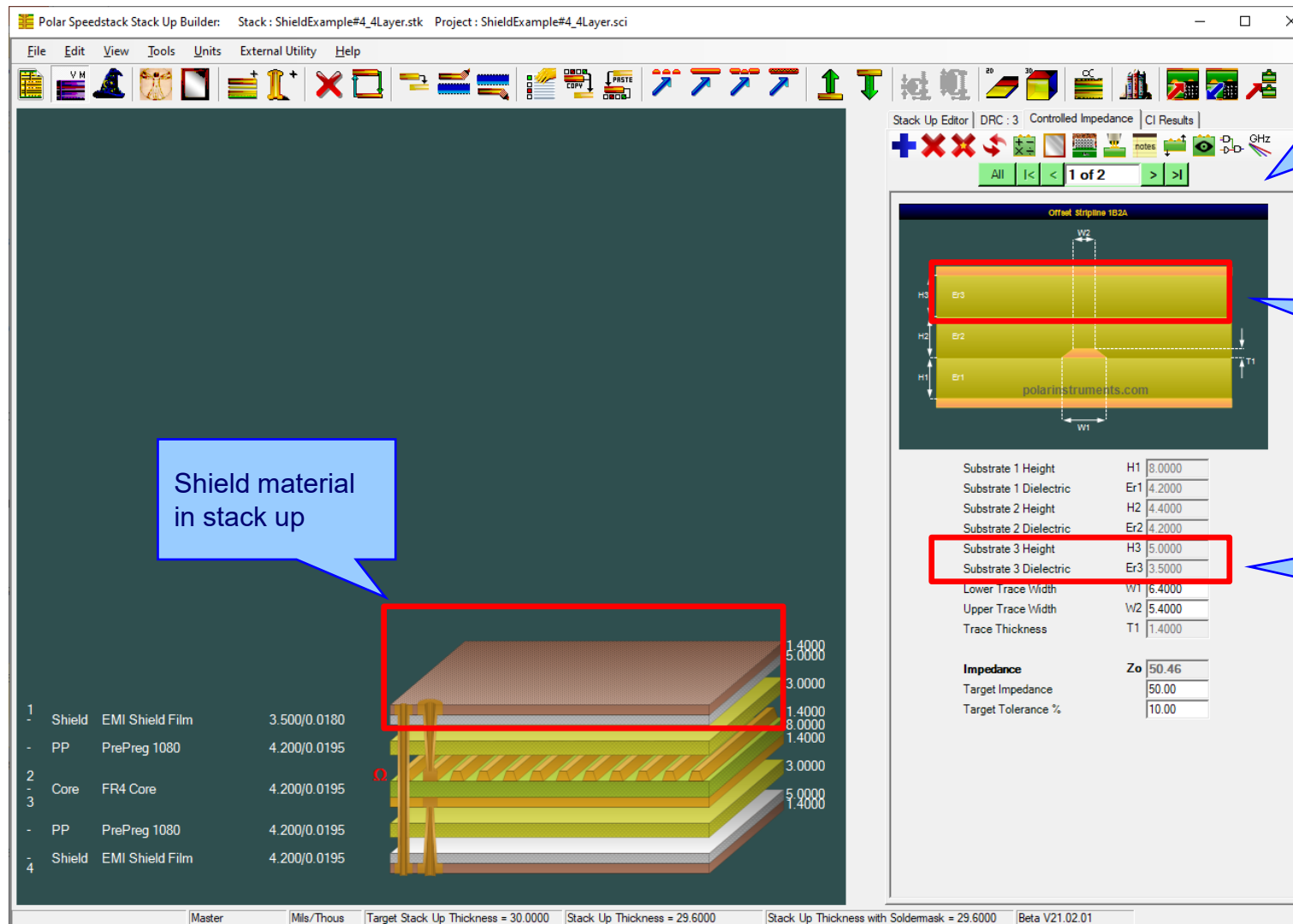
4 PP PrePreg 1080 4.200/0.0195 3.0000

5 Shield EMI Shield Film 4.200/0.0195 5.0000 1.4000

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



Shield material
in stack up

Impedance and insertion
calculations support the
new Shield material type.

Shield material region of
structure.

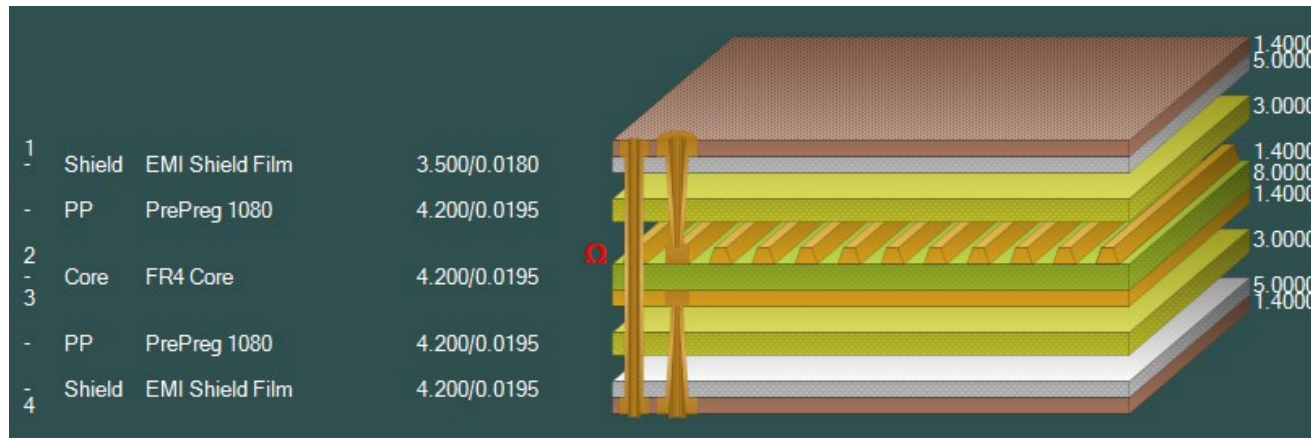
Shield adhesive height /
thickness dimension and
dielectric constant.

Controlled impedance and insertion loss calculations



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’.

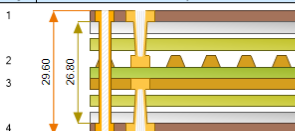


Technical report enhancements

Technical report showing shield materials

Speedstack Report Printer
File Options



C:\Apps\Samples\ShieldExample\5_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	3.500	0.0180	
		Polar Samples	PrePreg 1080	Dielectric	3.000	4.200	0.0195	
2		Polar Samples	FR4 Core	FR4	1.400	4.200	0.0195	1, 2
3		Polar Samples	PrePreg 1080	Dielectric	3.000	4.200	0.0195	
4		Polar Samples	EMI Shield Film	Shield	1.400	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

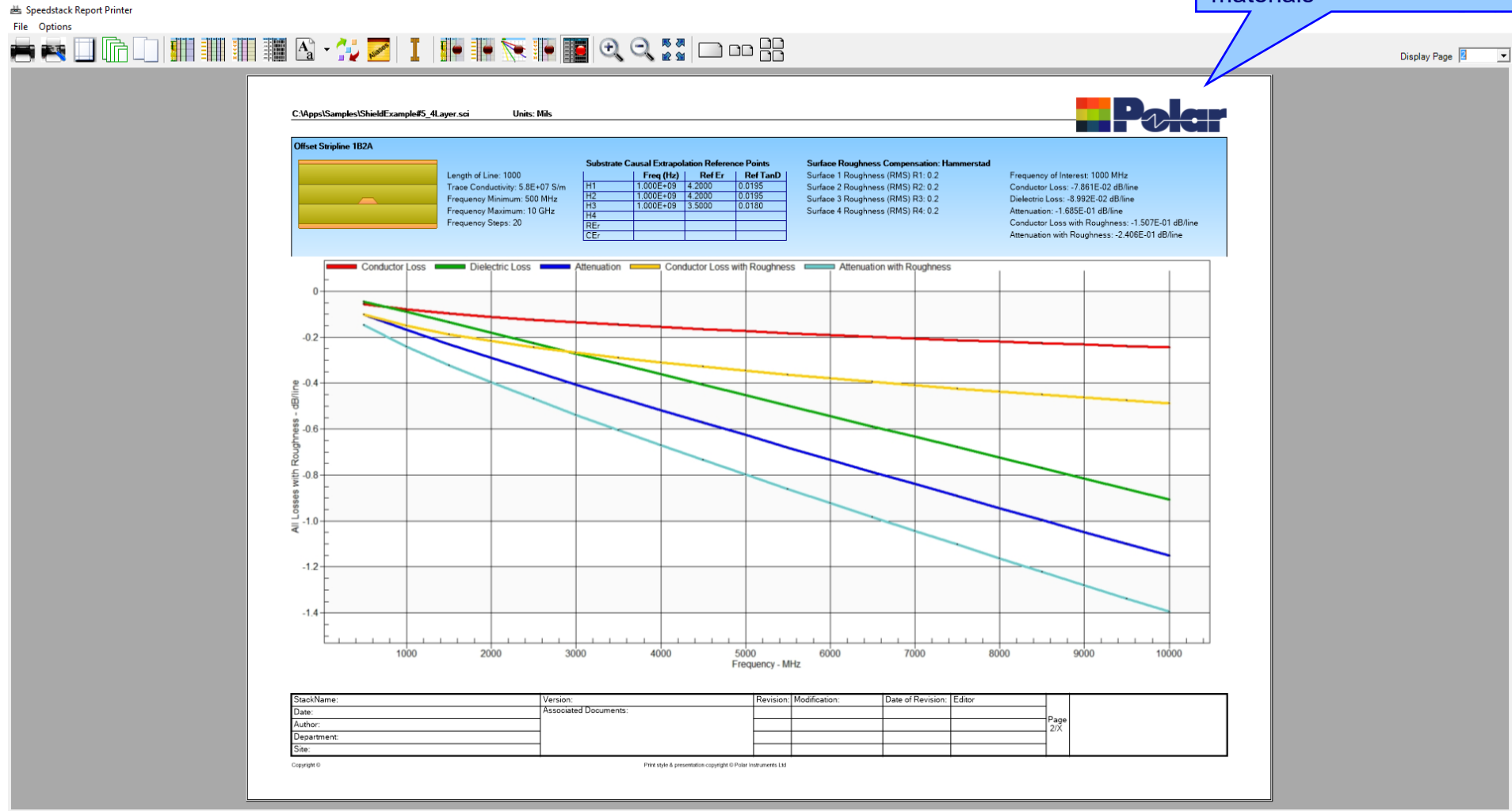
Drill Image	1st Layer	2nd Layer	Column Position	Drill Type
	1	2	2	Laser PTH
	1	4	1	Mechanical PTH
	4	3	2	Laser PTH

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

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Technical report enhancements

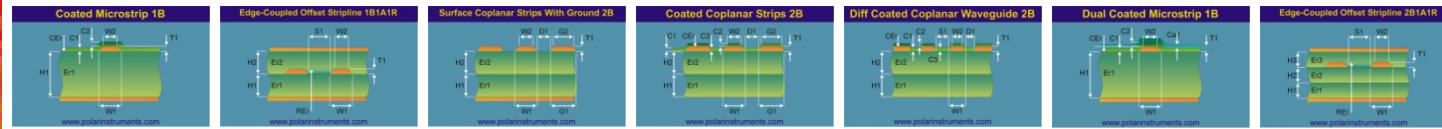
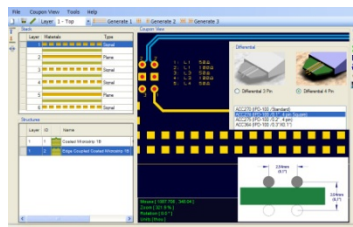
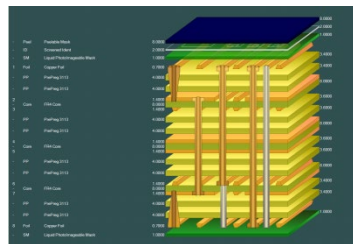
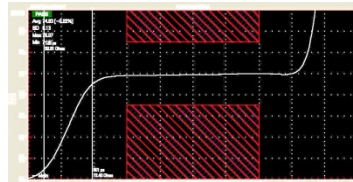
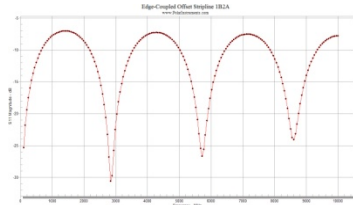
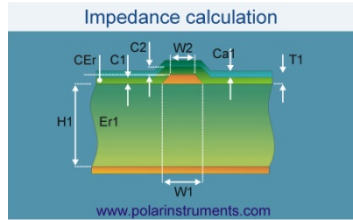
Insertion loss report
supporting shield
materials



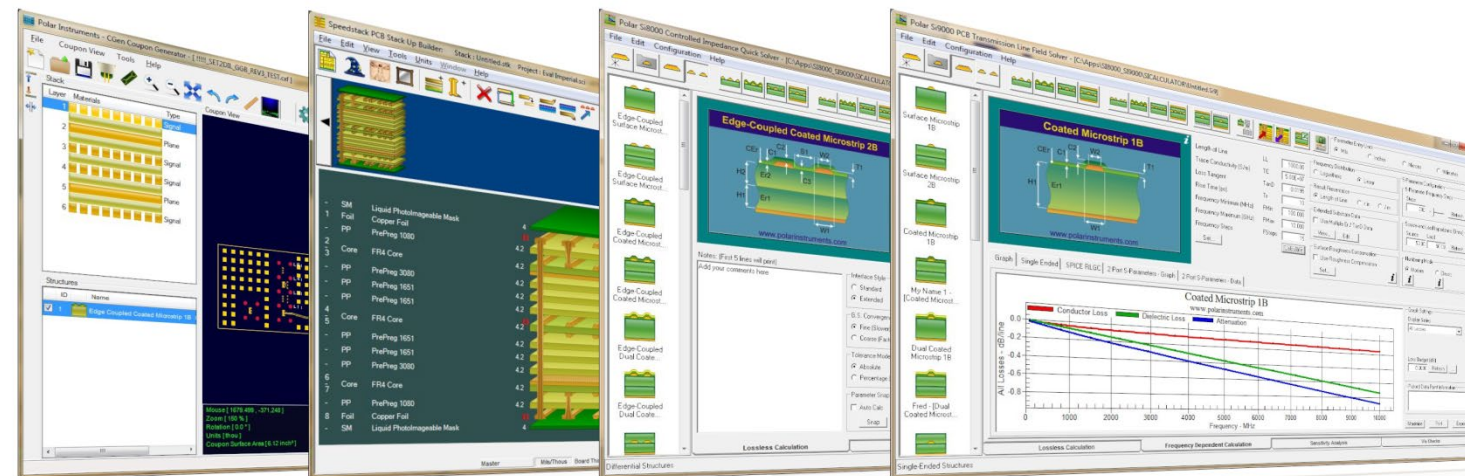
Import / Export enhancements

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

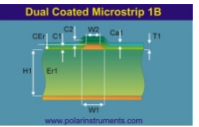
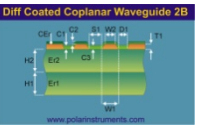
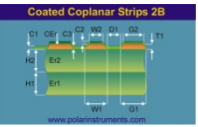
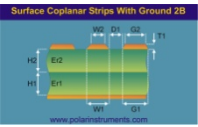
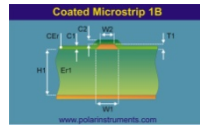
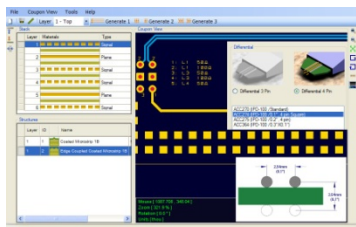
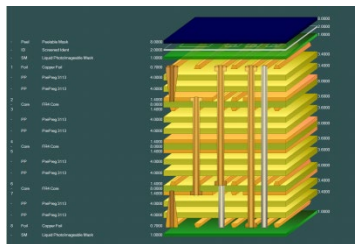
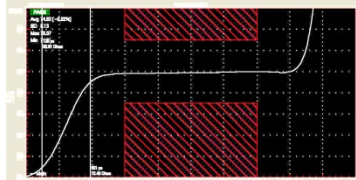
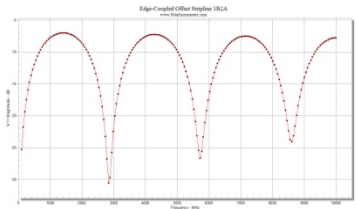
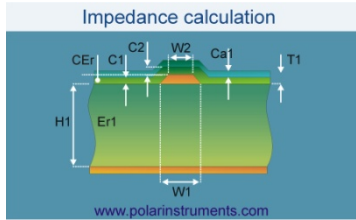


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