PCB stackup design

Speedstack

Speedstack

Speedstack HDI

Speedstack Flex

Edge-Coupled Coated Microstrip 2B

Professional HDI and flex-rigid stack documentation

Impedance / Insertion Loss control
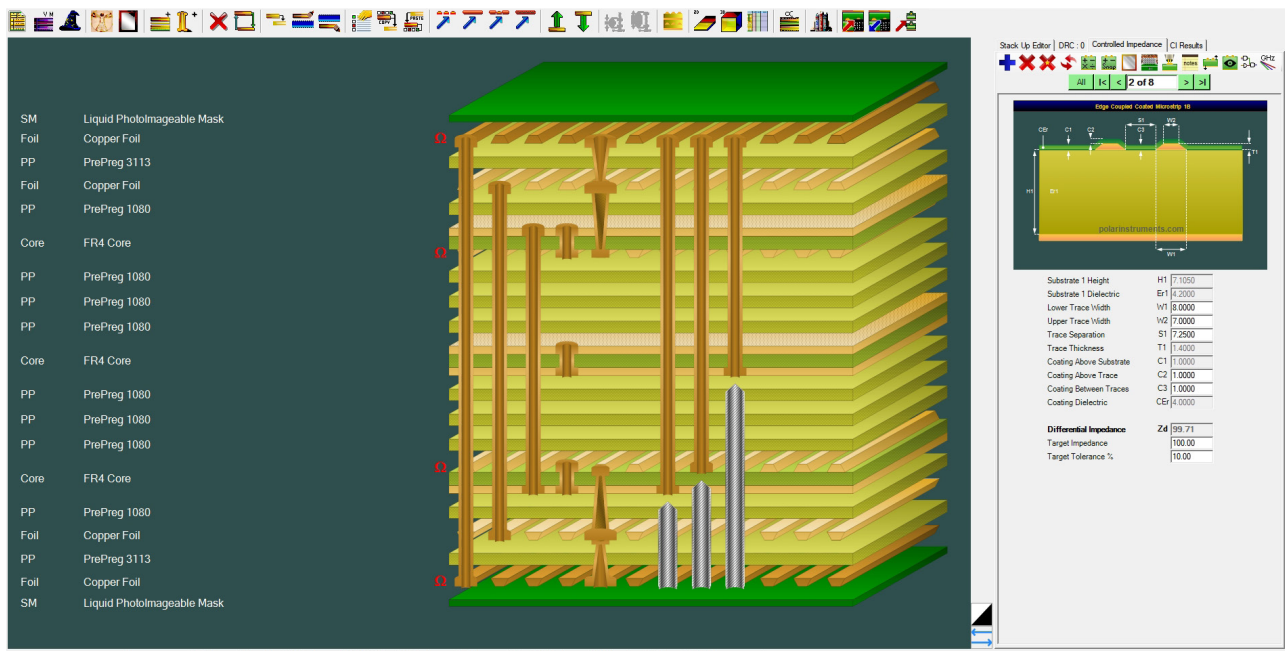
Supply-chain management

Compatibile with industry standard CAD tools

polarinstruments.com

PCB Stackup design & documentation

Stackup design environment

Speedstack is a comprehensive stackup design environment for PCB fabricators, pre-layout engineers and value-add PCB brokers allowing easy collation of libraries of materials, costs and suppliers with design data, such as insertion loss or impedance control requirements. Speedstack lets you produce documents for every stage of the PCB supply chain and reduces the time needed to create PCB layer stackups.

Why use Polar's Speedstack?

Versatile stack creation
Speedstack gives you two key methods for stackup creation: manual layer-by-layer design and a Virtual Material Mode (VMM) to document generic stackups and explore design options before committing to real materials.

What does Speedstack bring you?

Supply chain control
Speedstack combines a generic library of materials of set dielectric thicknesses with the material libraries from PCB basematerial suppliers in the Material Partner Program. You can replace hours of calculations and estimates with accurate data on how different materials will affect your board's final performance.

Cost control
Speedstack helps define the optimum combination of materials to minimise your build costs. OEMs can tightly specify critical parameters, while fabricators can share material recommendations with OEMs to ensure that the most cost-effective materials are used.

Clear & accurate documentation
Your completed stackups are presented in a report and can be exported in a choice of formats, including Gerber, JPEG and PDF. This makes it easier for you and your fabricator to visualise and replicate the stackup design. Speedstack links with most professional CAD and CAM systems.

Speedstack features

- Enhances supplier management and cost control
- Comprehensive stackup editing tools
- Flexible report generator allows you to tailor your printouts
- Easy error-free documentation & communication
- Impedance control & Insertion loss control(Speedstack PCB or Si)
- VMM – Virtual Material Mode – library-freestack specification
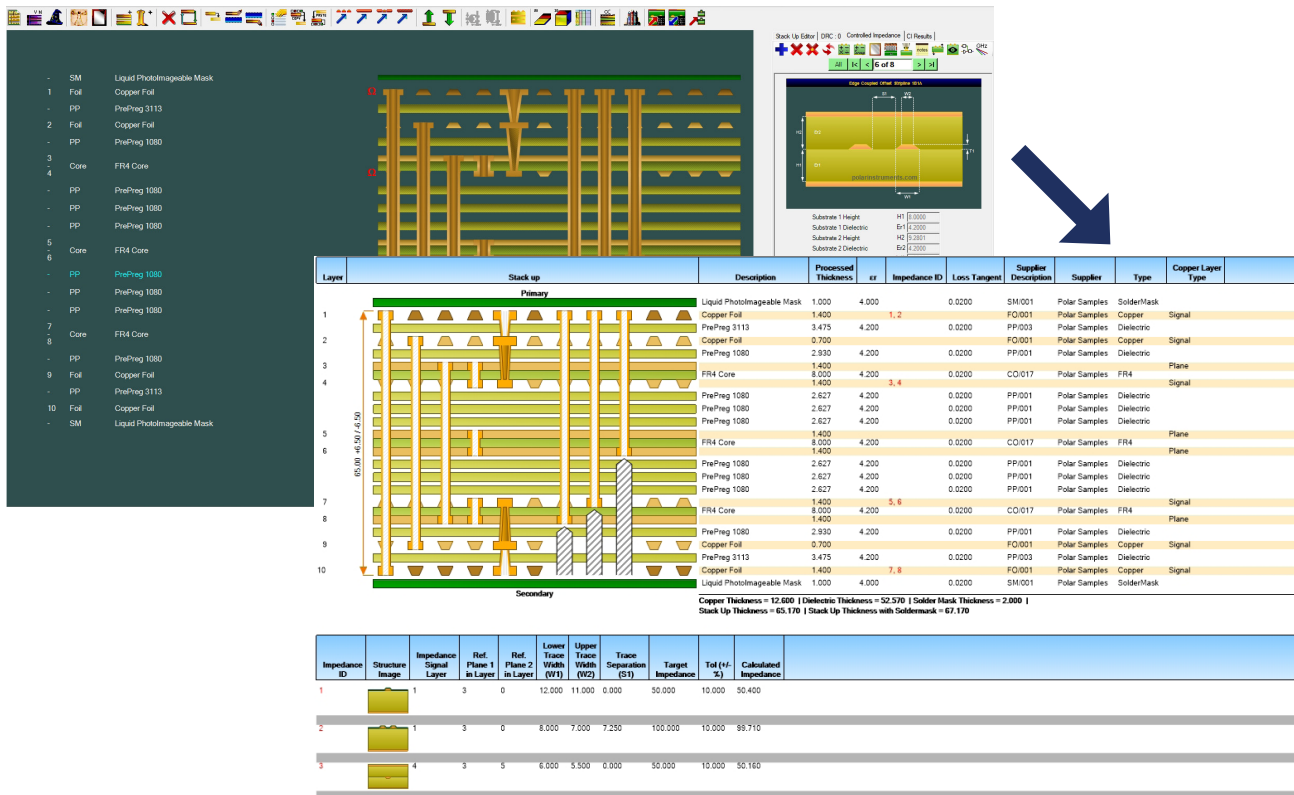
Who should use Speedstack?

Pre-layout designers and supply chain managers
A checklist of design rules for stackup and fabrication helps you ensure each supplier's capabilities are factored into the stackup process. When sourcing PCBs or moving from prototype to volume, you can make the most effective choice of supplier and ensure that build requirements are met. At the pre-layout stage the stack can be imported into your CAD system constraints tool – this is the most cost effective time to lock down the stackup design.

PCB fabricators
Documentation on preferred stackups is fast and easy, this greatly reduces your engineering time. The Speedstack .sci file contains detailed information on the layer stackup, including drills and impedance control. Speedstack presents your customers with easy to read professional reports.

Impedance control on lossless PCBs
With a link into Polar Si8000m controlled impedance field solver, Speedstack makes it easy to add impedance to stackups. You'll experience closer collaboration between fabricators, OEMs and brokers and resolve potential issues early in the process.

Test data for controlled impedance
With Speedstack you can output test files for Polar CITS controlled impedance test systems for each stackup. As an OEM, you can specify impedance tests to suppliers or brokers; fabricators can link the required impedance test to each build.

Speedstack material partner program

AGC · ARLON Materials for Electronics · CIRCUIT FO · DOOSAN Electro-Materials · DU PONT · EMC Elite Material Co., Ltd. · GORE · isola

ITEQ · LG Chem · MGC · MITSUI COPPER FOIL · 南亞塑膠 NAN YA PLASTICS · OAK-MITSUI TECHNOLOGIES · Panasonic · PILLAR

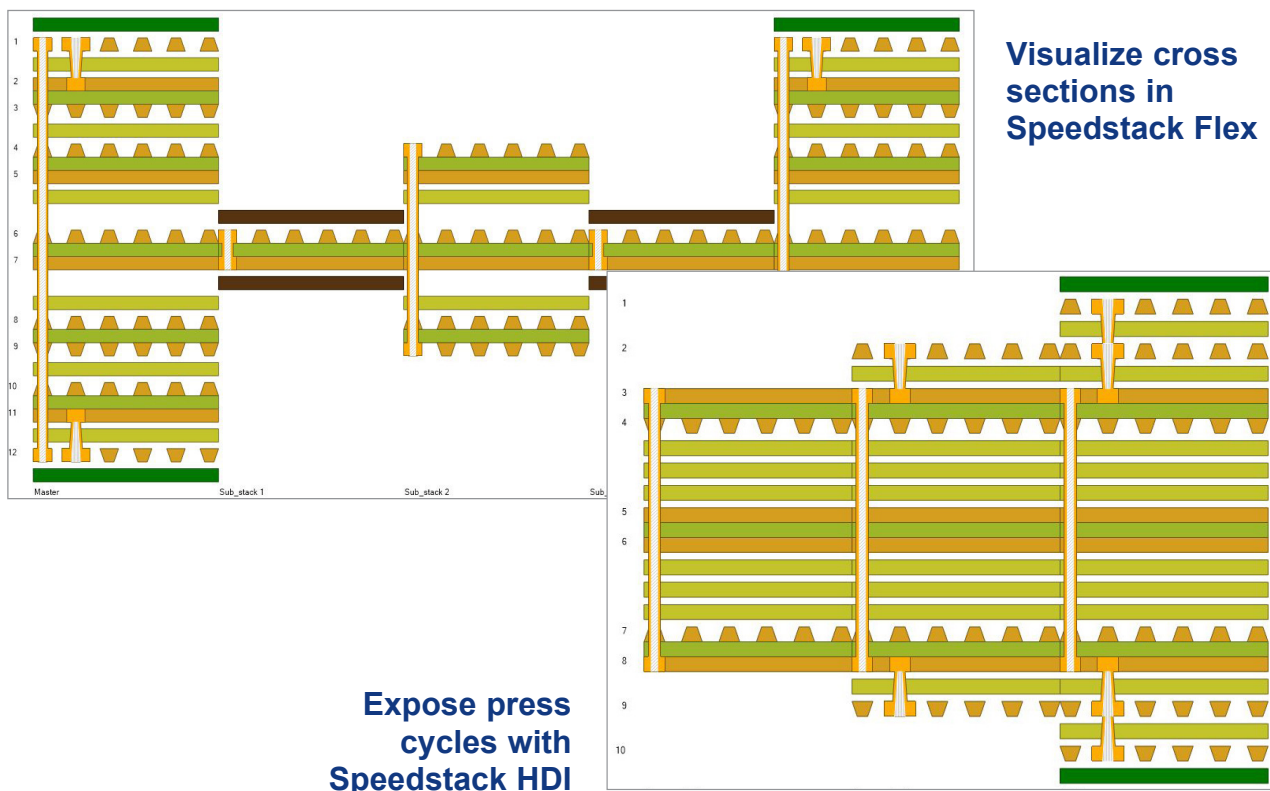RESONAC Chemistry for Change · ROGERS CORPORATION · 生益科技 SYTECH · TACONIC Advanced Dielectric Division · TATSUTA · TECHNOLAM · tuc Taiwan Union Technology Corporation (TUC) · ventec INTERNATIONAL GROUP

Visualize cross sections in Speedstack Flex

Expose press cycles with Speedstack HDI

Speedstack Flex

Flex-rigid stackup documentation with Speedstack Flex

With Speedstack Flex navigator you can link multiple cross sections to fully document your flex-rigid build up. Speedstack Flex supports common flex-rigid constructions, including doublets and bikini builds. The navigator displays each cross section with as many "substacks" and layers as you need. A range of materials including flexible adhesives, bondply and flexi core can be used, impedance can be added to each substack.

Mesh / crosshatch ground planes
Used in conjunction with Si8000m and Si9000e field solvers to model and document mesh / crosshatch ground.

Controlling impedance & transmission line losses
For PCBs with the latest ultra-high-speed chipsets, managing insertion loss is as critical as controlling impedance. Speedstack PCB allows you to manage impedance control and Speedstack Si enables both impedance and insertion loss modeling.
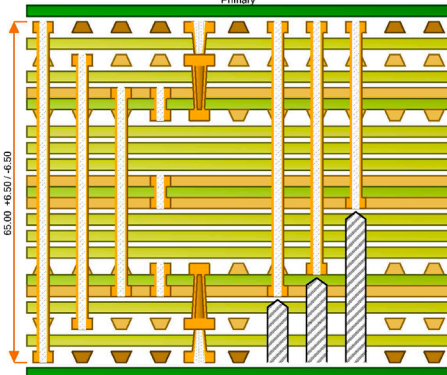
Speedstack HDI

Press cycle documentation with Speedstack HDI

The Speedstack navigator enables you to link and document the multiple stages in HDI buildups stage by stage as well as the final product.

Pre-layout design with Speedstack HDI Si
Speedstack HDI Si quickly guides you through the complex decisions required to create efficient stackups prior to layout. With Speedstack HDI Si's documentation designers can discuss material selections with fabricators prior to production and optimise materials for cost, signal integrity, manufacturability and reliability. Alternatively, you can use generic materials to create your stackup and allow your fabricator to fine tune using different materials to improve manufacturing cost and yield.

Layer	Stack up	Description	Processed Thickness	εr	Impedance ID	Loss Tangent	Supplier Description	Supplier	Type	Copper Layer Type
	Primary									
1		Liquid PhotoImageable Mask	1.000	4.000		0.0200	SM/001	Polar Samples	SolderMask	
		Copper Foil	1.400		1, 2		FO/001	Polar Samples	Copper	Signal
		PrePreg 3113	3.475	4.200		0.0200	PP/003	Polar Samples	Dielectric	
2		Copper Foil	0.700				FO/001	Polar Samples	Copper	Signal
		PrePreg 1080	2.930	4.200		0.0200	PP/001	Polar Samples	Dielectric	
3			1.400							Plane
		FR4 Core	8.000	4.200		0.0200	CO/017	Polar Samples	FR4	
4			1.400		3, 4					Signal
		PrePreg 1080	2.627	4.200		0.0200	PP/001	Polar Samples	Dielectric	
		PrePreg 1080	2.627	4.200		0.0200	PP/001	Polar Samples	Dielectric	
		PrePreg 1080	2.627	4.200		0.0200	PP/001	Polar Samples	Dielectric	
5			1.400							Plane
6		FR4 Core	8.000	4.200		0.0200	CO/017	Polar Samples	FR4	
			1.400							Plane
		PrePreg 1080	2.627	4.200		0.0200	PP/001	Polar Samples	Dielectric	
		PrePreg 1080	2.627	4.200		0.0200	PP/001	Polar Samples	Dielectric	
		PrePreg 1080	2.627	4.200		0.0200	PP/001	Polar Samples	Dielectric	
7			1.400		5, 6					Signal
8		FR4 Core	8.000	4.200		0.0200	CO/017	Polar Samples	FR4	
			1.400							Plane
9		PrePreg 1080	2.930	4.200		0.0200	PP/001	Polar Samples	Dielectric	
		Copper Foil	0.700				FO/001	Polar Samples	Copper	Signal
		PrePreg 3113	3.475	4.200		0.0200	PP/003	Polar Samples	Dielectric	
10		Copper Foil	1.400		7, 8		FO/001	Polar Samples	Copper	Signal
		Liquid PhotoImageable Mask	1.000	4.000		0.0200	SM/001	Polar Samples	SolderMask	
	Secondary									

Copper Thickness = 12.600 | Dielectric Thickness = 52.570 | Solder Mask Thickness = 2.000 |
Stack Up Thickness = 65.170 | Stack Up Thickness with Soldermask = 67.170

Impedance ID	Structure Image	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		1	3	0	12.000	11.000	0.000	50.000	10.000	50.400
2		1	3	0	8.000	7.000	7.250	100.000	10.000	99.710
3		4	3	5	6.000	5.500	0.000	50.000	10.000	50.160

Interconnected tools for impedance & loss

Please refer to the brochures below for Polar's suites of tools for impedance modelling and testing for applications up to 3GHz and tools for modelling and testing insertion loss for applications over 3GHz.

Interconnected impedance tools work seamlessly

✓ Improve communication efficiency

✓ Resolve problems quickly

✓ Support throughout supply chain

Speedstack PCB

Si8000m

CGen PCB impedance coupon generator

CITS controlled impedance test system

Polarcare

polarinstruments.com

LIT 252

Interconnected tools for PCB insertion loss

✓ Improve communication efficiency

✓ Resolve problems quickly

✓ Support throughout supply chain

Speedstack Si

Si9000e

CGen Si insertion loss coupon generator

Atlas Insertion loss test system

polarinstruments.com

LIT 253

Speedstack Product Matrix:

	Editor	HDI Navigator Editor	XFE (Crosshatch)	Signal Integrity
Speedstack PCB	X			Impedance
Speedstack HDI PCB	X	X		Impedance
Speedstack Flex PCB	X	X	X	Impedance
Speedstack Si	X			Insertion loss
Speedstack HDI Si	X	X		Insertion loss
Speedstack Flex Si	X	X	X	Insertion loss

Options:

Export stackup:	Target system
Cadence Design Systems	Allegro
Mentor Graphics	Xpedition, Constraints Manager
Ucamco	Integr8tor, UcamX
Zuken	CR-8000, DFM Center
IPC	IPC-2581-B
Batch Export Impedance:	
Si Projects	Si8000m, Si9000e
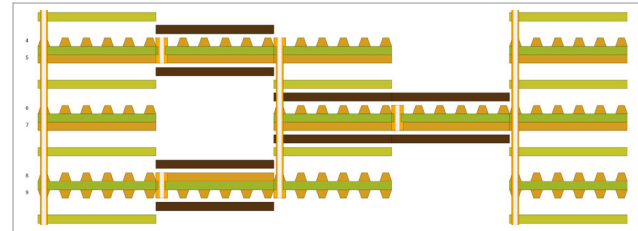
Ordering information:

Speedstack PCB	Rigid controlled impedance PCB stackup design
Speedstack HDI PCB	As above plus HDI & Sequential lamination support
Speedstack Flex PCB	As above plus Flexrigid capability
Speedstack Si	Rigid impedance & insertion loss PCB stackup design
Speedstack HDI Si	As above plus HDI & Sequential lamination support
Speedstack Flex Si	As above plus Flexrigid capability

About Polar Instruments

Polar Instruments is a market leader in designing and manufacturing tools to simplify and enhance the design, fabrication and testing of printed circuit boards (PCBs). Tools include the industry-standard Controlled Impedance Test System (CITS) which provides the global PCB industry with an easy-to-use test system for high-speed digital and RF boards, as well as Speedstack PCB and Si which leads the way in documenting PCB layer stackup across the PCB supply chain. Established in 1976 with operations and channel partners in the US, UK, Europe and Asia Pacific.

USA / CANADA / MEXICO
Polar Instruments Inc
T: (503) 356 5270
E: erik.bateham@polarinstruments.com

ASIA / PACIFIC / SINGAPORE
* Polar Instruments (Asia Pacific) Pte Ltd
T: +65 6873 7470
E: terence.chew@polarinstruments.asia

Polar Instruments Ltd (Head Office)
T: +44 23 9226 9113
E: martyn.gaudion@polarinstruments.com

UK/ EUROPE/ REST OF WORLD
Polar Instruments (Europe) Ltd
T: +44 23 9226 9113
E: neil.chamberlain@polarinstruments.com

GERMANY, AUSTRIA, SWITZERLAND
* Polar Instruments GmbH
T: +43 7666 20041-0
E: hermann.reischer@polarinstruments.eu