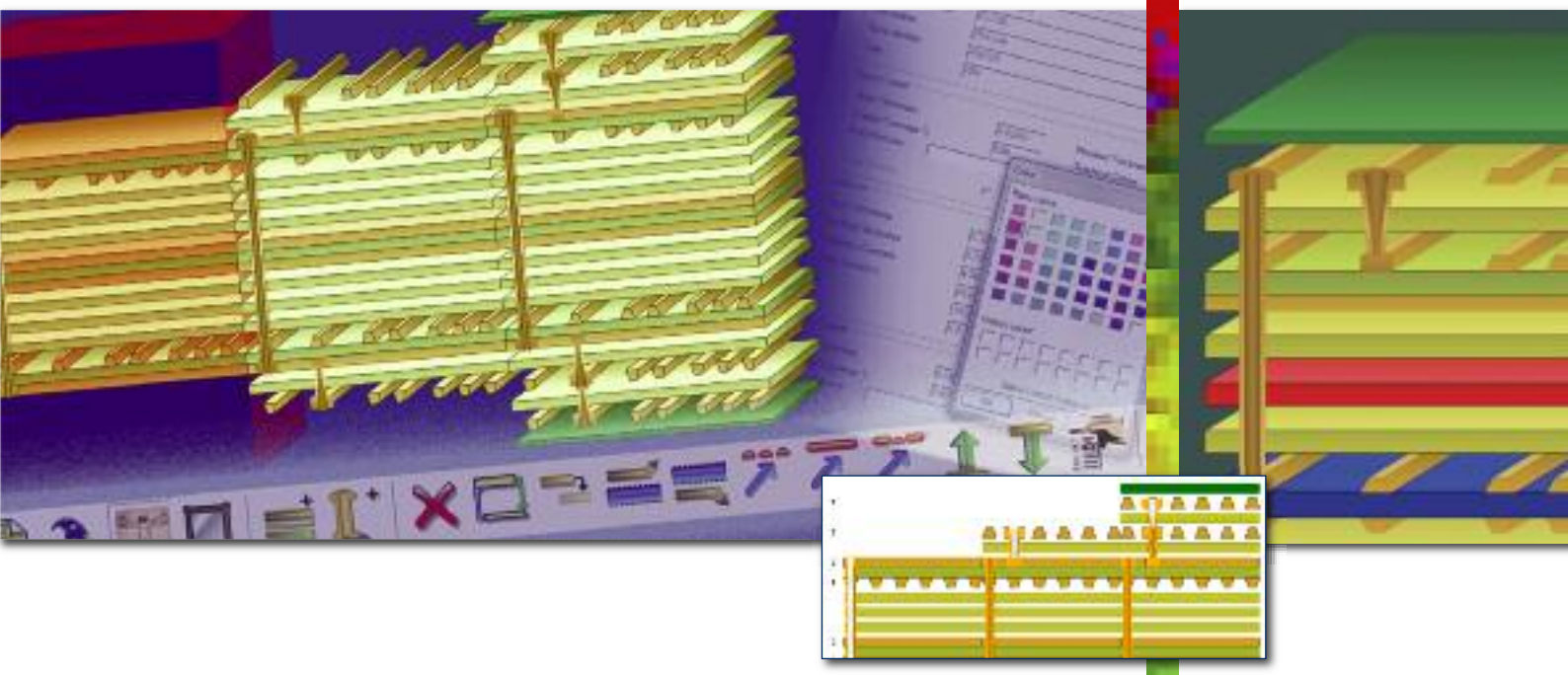
Professional HDI stackup design & documentation: For PCB fabricators & designers



Speedflex HDI
2011/2012

Professional HDI stack documentation

Supply-chain management & cost control

Transmission line modeling

Impedance control

Compatibility with third-party stackup tools.

Polar

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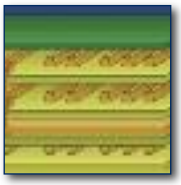
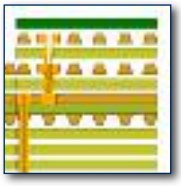
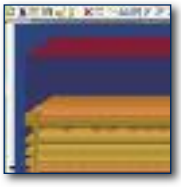
HDI Stackup Design Environment







Speedflex HDI is a comprehensive stackup design environment for PCB fabricators, pre-layout engineers and value-add PCB brokers. By collating libraries of materials, costs and suppliers with critical design data, such as transmission line specifications or impedance control requirements, Speedflex HDI lets you produce error-free build documentation for both conventional and HDI stackups. Speedflex HDI's end-to-end approach to HDI stackup design allows you to create documents that can be shared at every stage of the PCB supply chain and drastically reduces the time you need to create, document and control HDI layer stackups.

Press cycle documentation

The Speedflex HDI navigator enables you to link and document the multiple stages in HDI buildups stage by stage and also the completed final product. There is no limit to the number of layers in the stackup or to the number of press cycles you can document.

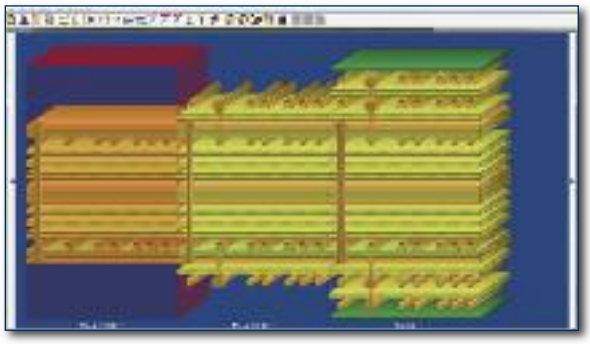
Controlling impedance & transmission line losses

High-speed PCBs, operating at up to 2-3 GHz, typically use simple impedance-controlled traces. However, for PCBs with the latest ultra-high-speed chipsets operating over a broad band of frequencies, managing insertion loss is as critical as controlling impedance. Speedflex HDI's three versions allow you to select the design tools which are right for your PCB performance: Speedflex HDI PCB combines the Speedflex HDI stackup design system with the industry-standard Si8000m impedance field solver; Speedflex HDI Si integrates with the Si9000e PCB transmission line field solver so that you can control impedance and insertion loss in multi-GHz PCBs. Speedflex HDI is also compatible with third-party design-for-manufacture (DFM) tools allowing you to add Speedflex HDI's error-free documentation to your existing Ucamco and Zuken DFM tools.

Speedflex HDI

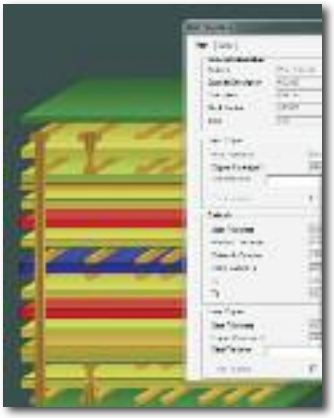
- Integrates critical data into a single stackup design tool
- Enhances supplier management and cost control
- Manual or semi automatic stack-up design
- Stackup reprocessing quickly substitutes different vendor materials
- Easy error-free documentation & communication
- Impedance control data for lossless lines (Speedflex HDI PCB)
- Transmission line field solver & insertion loss modeling (Speedflex HDI Si)
- VMM – Virtual Material Mode – rapid library–free stack specification

Speedflex HDI 2011:	Professional stackup documentation
Speedflex HDI 2011 PCB:	Controlled impedance stackup design for PCBs up to 2-3GHz
Speedflex HDI 2011 Si:	Stackup design with impedance & insertion loss control for multi-GHz PCBs



Flexible stackup creation

Polar's Speedflex HDI gives you three methods for stackup creation: manual layer-by-layer design, a Virtual Material Mode to document generic stackups and explore design options before committing to real materials and stack reprocessing which allows you to rapidly recreate impedance controlled stacks using different vendor materials. All three methods give you the flexibility to manually edit stacks to balance performance, material availability and cost.



Supply-chain control

Speedflex HDI combines a generic library of materials of set dielectric thicknesses with the materials libraries from PCB base-material suppliers in the Polar Speedflex HDI material partner program in addition to your own materials libraries. So you can replace hours of complex calculations and guesswork with accurate data on how different materials or suppliers will affect your board's final performance.

Cost control

By improving collaboration between designers and fabricators Speedflex HDI helps you to define the optimum combination of materials to minimise your build costs. OEMs can tightly specify critical performance parameters, while fabricators can share material recommendations with OEMs to ensure that the most cost-effective materials are used in the build.

Test data for controlled impedance

With Speedflex HDI Si or Speedflex HDI PCB design tools you can output controlled impedance test files directly for each stackup. As an OEM, this means that you can specify clear impedance test criteria to your suppliers or brokers, while fabricators can link the required impedance test characteristics to each build.

Clear & accurate documentation

Your completed stackups are presented in graphical or report formats and can be exported in a choice of file formats, including Gerber, JPEG and PDF. This makes it easier for you and your fabricator to visualize and replicate the stackup design accurately.
Your Speedflex HDI documents will also include clear and accurate information on your PCB materials, drill details and impedance control specifications.

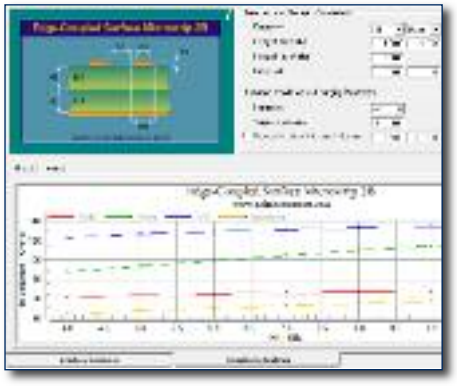
Impedance control on lossless PCBs: Speedflex HDI PCB

With a direct link into Polar's Si8000m controlled-impedance design system, Speedflex HDI PCB is for PCB fabricators, value-add brokers and pre-layout designers who want fast design and documentation of controlled impedance PCB stackups. Speedflex HDI PCB allows you to share accurate stackup documentation with every company and individual in your supply chain, including verification prior to pre-build tests. By sharing accurate stackup data in clear and easy-to-read formats, you get closer collaboration between fabricators, OEMs and brokers allowing you to discuss and resolve potential issues early in the fabrication process.

Who should use Speedflex HDI PCB?

Supply chain managers

A checklist of design rules for stackup and fabrication helps you to ensure that each supplier's specific manufacturing capabilities are factored into the stackup process. When sourcing PCBs from multiple suppliers, or moving from prototype to volume production, this helps you to make the most effective choice of suppliers and ensures that your chosen suppliers can meet your build criteria.



PCB fabricators

Documentation on the preferred stackups can be completed in minutes and shared with customers or other companies within your PCB supply chain. This significantly reduces your engineering time and increases the accuracy of documenting stackups compared to using the conventional Excel, Word or PowerPoint formats.

The Speedflex HDI .sci file contains detailed information on the layer stackup, including drill details and precise impedance control specifications and presents this information to your customers and suppliers in an easy-to-read format. With Speedflex HDI documentation you can eliminate communication errors and minimise the risk of critical information being missed or misinterpreted.

Using Speedflex HDI PCB in Fabrication

Designed for fabricators who need to manage controlled impedance builds, Speedflex HDI PCB uses the proven Polar Si8000m multiple dielectric boundary element field solver to provide the impedance data for the stack. Speedflex HDI PCB also gives you full access to the stand-alone Si8000m Quicksolver.

Controlling impedance with Si8000m in Speedflex HDI PCB

As a stand-alone boundary element field-solving engine or as part of Speedflex HDI PCB the Si8000m allows you to model a wide range of single and multiple dielectric impedance structures. For demanding applications or high-volume fabrication, where the highest production yields are critical, Si8000m lets you model the resin-rich areas between differential traces for maximum accuracy. With the Si8000m Quicksolver you can goal seek and extract impedance at the click of a mouse in addition to calculating minimum and maximum process parameters. This allows you to fully explore 'what if' and worst-case scenarios without having to use Excel spreadsheets.

Insertion loss & impedance control on multi-GHz PCBs: Speedflex HDI Si

Speedflex HDI Si integrates Polar's Si9000e PCB transmission line design system to give you a comprehensive design environment which creates stackups in minutes. Error-free documentation ensures that your stackup specification is communicated accurately throughout the PCB supply chain. Speedflex HDI Si works with Polar's family of insertion loss tools, including the CGen Si coupon generator and Atlas Si GHz PCB test system, to give you end-to-end control of insertion loss.

Who should use Speedflex HDI Si?

Pre-layout designers

Speedflex HDI Si quickly guides you through the complex decisions required to create efficient stackups prior to layout. By using Speedflex HDI Si documentation you can discuss material selections with your fabricator prior to production and optimise your 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 the stack-up using different materials to improve manufacturing cost and yield.

PCB fabricators

Speedflex HDI Si lets PCB fabricators meet the growing need to measure and control insertion losses. As customers move to ultra-high PCB speeds, Speedflex HDI Si gives you all the tools you need to both predict and analyse impedance and insertion loss. Used with Polar's Atlas Si test system, Speedflex HDI Si gives you total control to manage impedance and insertion losses within the fabrication environment.

Base material suppliers

Base material suppliers can explore the effects of different base materials on insertion loss with the Si9000e included in the Speedflex HDI Si package. Analysis of dielectric and copper losses, as well as the affects of copper surface treatments, can be easily understood and shared with fabricators and their customers.

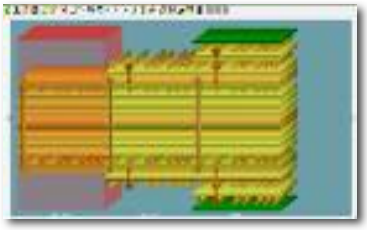
Using Speedflex HDI Si for transmission line design

Speedflex HDI Si takes the impedance-control capabilities integrated into Speedflex HDI PCB and adds insertion-loss control through a direct link to the Polar Si9000e PCB transmission line design system.

Controlling insertion loss with Speedflex HDI Si

With its fast and accurate frequency-dependent transmission line modeling, Si9000e lets you model insertion loss and extract full transmission line parameters from over 100 popular PCB transmission line structures.

Using Si9000e's boundary element method field solver, you can extract RLGC matrices and rapidly plot a range of transmission line information for your design. You can graph dielectric, copper and combined losses and quickly extract, graph or export S-parameters in Touchstone™ format. You can use Si9000e for single or multiple dielectric builds and include solder-mask performance by setting mask coverage to be adjacent, between and above traces. Speedflex HDI Si also lets you create consistent layer stackups and accurate documentation.



Go flex-rigid with Speedflex HDI

Speedflex HDI is also fully compatible with flex-rigid applications - see flex-rigid literature LIT236.

Conventional stackup documentation with Speedstack

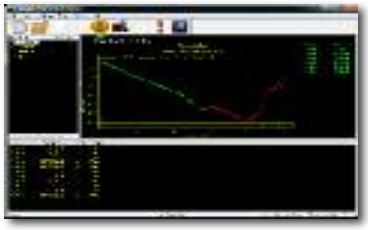
Speedstack PCB and Speedstack Si are cost effective alternatives to Speedflex HDI for documentation of standard PCB stackups – see Speedstack literature LIT218.

Coupon Generation with CGen

Choose the optional CGen PCB for controlled impedance coupons or CGen Si insertion-loss coupon generator to generate test coupons for Speedflex HDI stackups – see CGen literature LIT232

End-to-end insertion-loss control with Speedflex HDI Si

Adding the Atlas Si GHz-PCB test system and CGen Si coupon generator to the Si9000e insertion-loss control tools in Speedflex HDI Si gives you complete control over insertion losses throughout the fabrication process – see Atlas Si literature LIT233 and CGen Si literature LIT232



Speedstack material partner program

USA / CANADA
Polar Instruments Inc
T: +1 (503) 356 5270
E: ken@polarinstruments.com

ASIA / PACIFIC
* **Polar Instruments (Asia Pacific) Pte Ltd**
T: +65 6873 7470
F: +65 6873 7471
E: terence@polarinstruments.asia

UNITED KINGDOM / EUROPE
Polar Instruments (Europe) Ltd
T: +44 23 9226 9113
F: +44 23 9226 9114
E: neil@polarinstruments.com

JAPAN
* **Polar Instruments - Japan Branch**
Tel: +81 45-339-0155
Fax: +81 45-333-0051
E: ttsuji@polarinstruments.asia

KOREA
* **Polar Instruments Korea Corp**
T: +82 2 2644 2493/4
F: +82 2 2644 2495
E: jsbae@polarinstruments.asia

* *GERMANY, AUSTRIA, SWITZERLAND*
Polar Instruments
T: +43 7666 20041-0
F: +43 7666 20041-20
E: reischer@polarinstruments.eu

REST OF WORLD
Polar Instruments Ltd
(Head office)
Garenne Park, Guernsey
GY2 4AF
United Kingdom
T: +44 1481 253081
F: +44 1481 252476
E: martyn@polarinstruments.com

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LIT: 235

Specifications

Speedstack professional stackup design system

	Speedflex HDI PCB	Speedflex HDI Si
Autostackup	Yes	Yes
Max layer count	64+	64+
Materials library	Yes	Yes
Build height Monte Carlo simulation	10 000 builds	10 000 builds
Finished thickness compensation	Yes	Yes
User library	Yes	Yes
CITS Test file generation	Yes	Yes
Impedance support	Yes	Yes
Impedance goal seek	Yes	Yes
Stack documentation	Technical report Gerber .dxf .csv .jpeg	Technical report Gerber .dxf .csv .jpeg
Impedance structures	100+	100+
Single ended impedance	Yes	Yes
Differential	Yes	Yes
Odd mode / even mode	Yes	Yes
Frequency dependent impedance	Yes	Yes
Skin depth	No	Yes
Copper losses	No	Yes
Dielectric losses	No	Yes
S-Parameter plots	No	Yes
Touchstone™ export	No	Yes
Smith chart plots	No	Yes

CGen Coupon Generator – see CGen Coupon Generator literature LIT232

About Polar Instruments

Polar provides innovative and easy to use measurement, test, design tools and utilities for the PCB fabrication industry and related disciplines. Polar is best known for CITS and RITS controlled impedance test systems and professional impedance calculation tools.

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