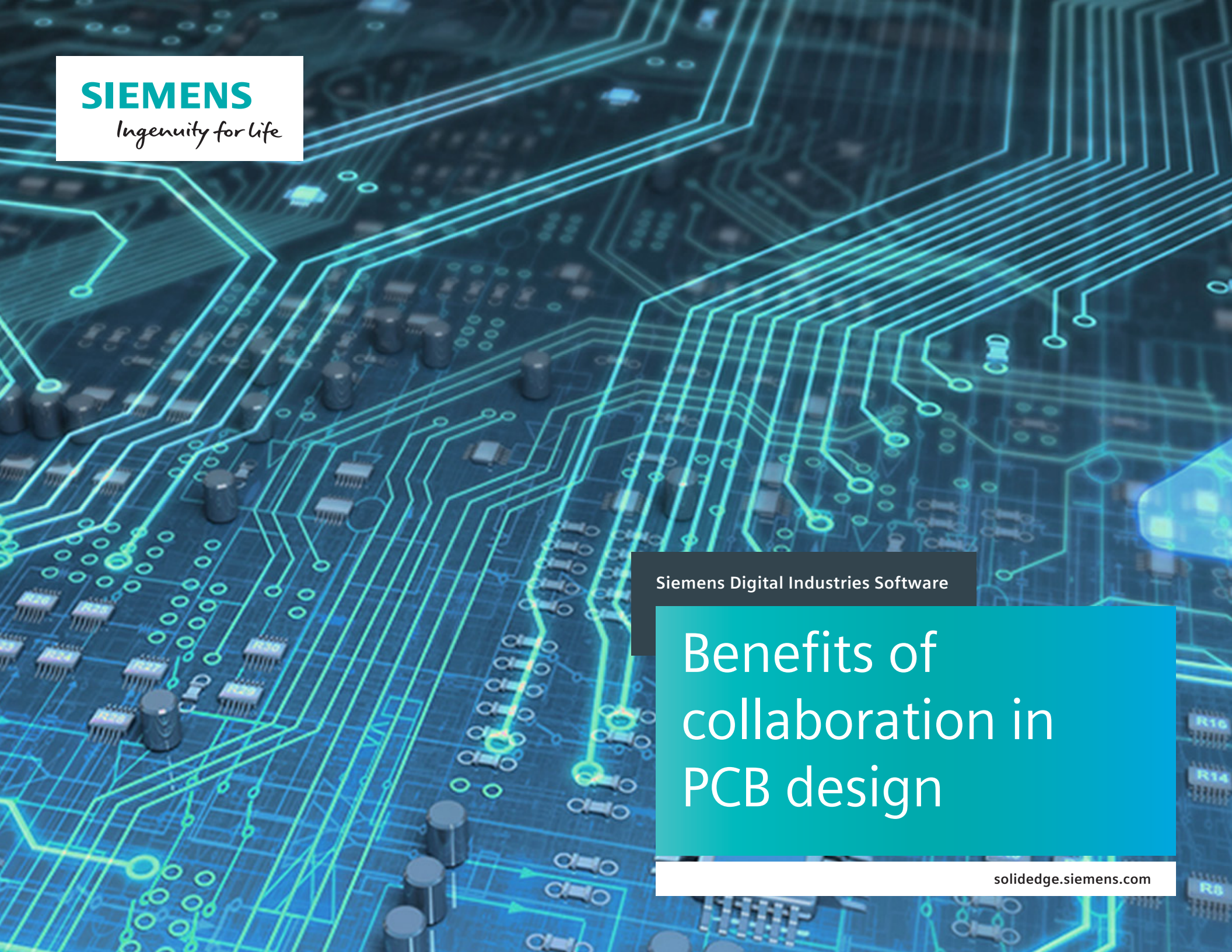

SIEMENS
Ingenuity for life
Siemens Digital Industries Software
Benefits of collaboration in PCB design
solidedge.siemens.com

Designing electromechanical products

This eBook introduces ways to maximize the benefits of collaboration in PCB design.

Across every industry, modern products are increasingly "smart" and connected, designed to improve our productivity and simplify our daily lives. But designing those products is anything but simple. Most of today's products are no longer simple mechanical devices; they contain some type of electronic control system, with at least one printed circuit board (PCB).

Electromechanical complexity is often a barrier to first-pass design success. Design respins due to poor electromechanical integration result in delayed time to market and unplanned costs. Today's complex electromechanical systems, in which electronics and software control mechanical designs, require seamless collaboration across multiple engineering disciplines and across digital and physical workspaces. However, electrical and mechanical engineering disciplines have traditionally been separated. When working in different environments, it can be difficult to communicate. Ineffective communication can introduce significant friction and errors into the design process.

Collaboration has long been recognized as an enabler for increasing productivity by enabling what-if scenarios and allowing engineers to co-design in their native environments. Integration between electrical computer-aided design (ECAD) and mechanical computer-aided design (MCAD) environments plays a major role in designing electromechanical products. Active communication between domains not only reduces development time and the number of change iterations, it also drives concurrent design. Fast and effective communication enables companies to get products to market faster while keeping development costs low.

With modern CAD tools and data-driven software, users are able to synchronize data and collaborate between domains. The increasing need for collaboration between environments requires advanced 3D layout design capabilities to fully address today's challenges. By considering mechanical requirements during layout and ensuring efficient communication between the electrical and mechanical flows, a design can be correctly aligned for manufacturing, avoiding last-minute changes that cost time and money.

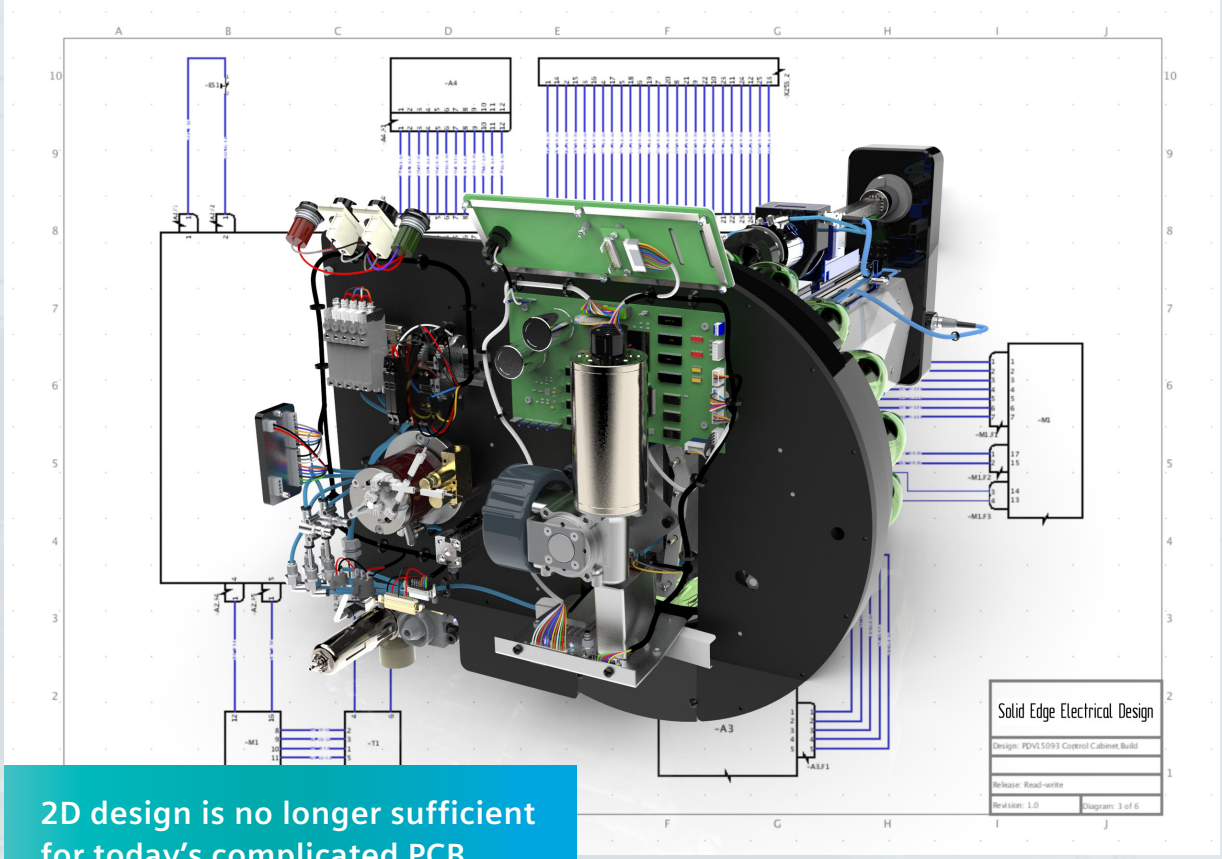
This eBook introduces ways to maximize the benefits of collaboration in PCB design.

Using a digital model in a 3D layout environment

Platforms that enable an integrated product development solution typically leverage 3D models. Also known as “digital twins,” these models are digital representations of a product. Data and intelligence are added to the digital twin throughout the product lifecycle, enabling both the product development process and the product itself to be optimized.

Digital models are especially important in the design of electromechanical products; they ease the collaboration efforts between mechanical and electrical domains that is needed to handle increasing electrical content.

Designing mechanical enclosures alongside PCBs and incorporating the mechanical piece parts for the enclosure, brackets and heat sinks are now accomplished within a unified design environment. A digital model helps engineers visually find electromechanical conflicts that would be difficult to identify in a 2D view. For example, to ensure no physical violations occur when a PCB is placed within an enclosure, both electrical and mechanical environments must consider component and mechanical clearances. There is no better way to do that than by creating a digital model of the end product in an advanced 3D layout environment, one that allows you to consider form and fit issues early in the design process.



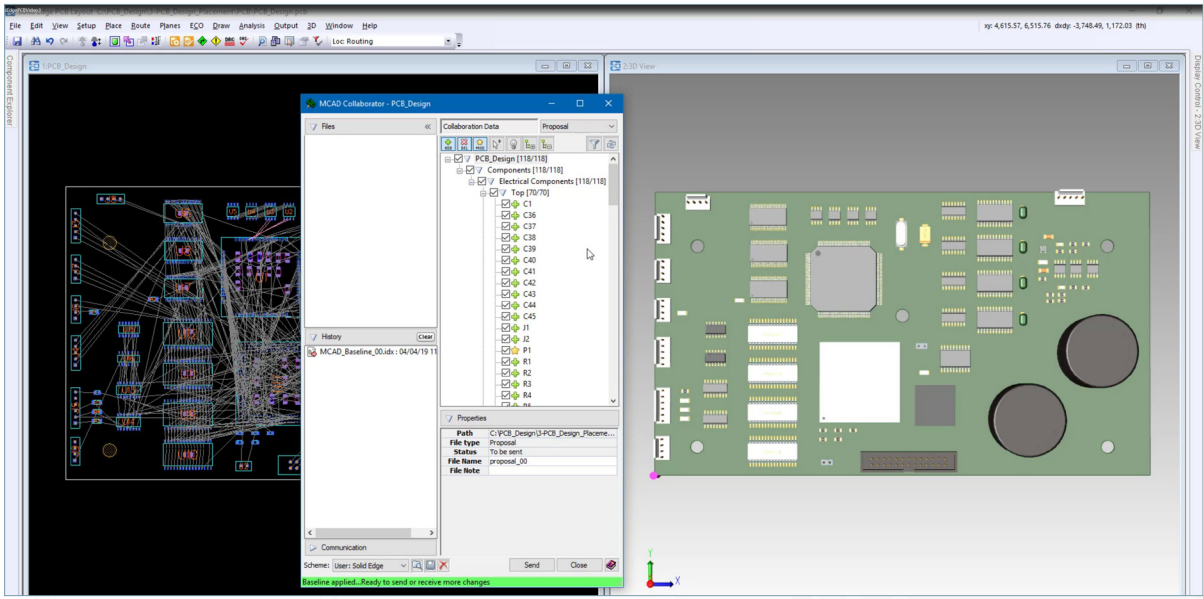
2D design is no longer sufficient for today’s complicated PCB layouts.

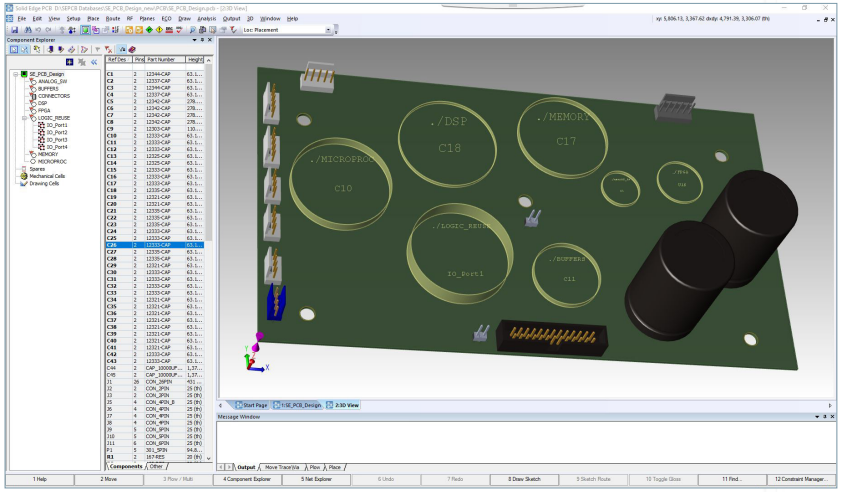
Adhering to mechanical demands as early as possible

3D viewing is more than an interpretation of 2D information; it's a true photorealistic view of how a design will be fabricated, one that provides superior visualization of complicated structures. Being able to view and understand information from the third dimension helps users design better layouts from the start, both electronically and mechanically.

Sharing 3D representations allows visualization of a design and detection of potential problems earlier. This moves validation of manufacturing and electrical data earlier into the design cycle. Fully integrated 3D layout with placement, constraints, design rule checking and photorealistic visualization minimizes iterations.

A robust collaborative design process that uses digital models and provides 3D viewing allows the electrical and mechanical engineers to propose, preview, accept and counter-propose design intent from the earliest stages of PCB design and component placement.





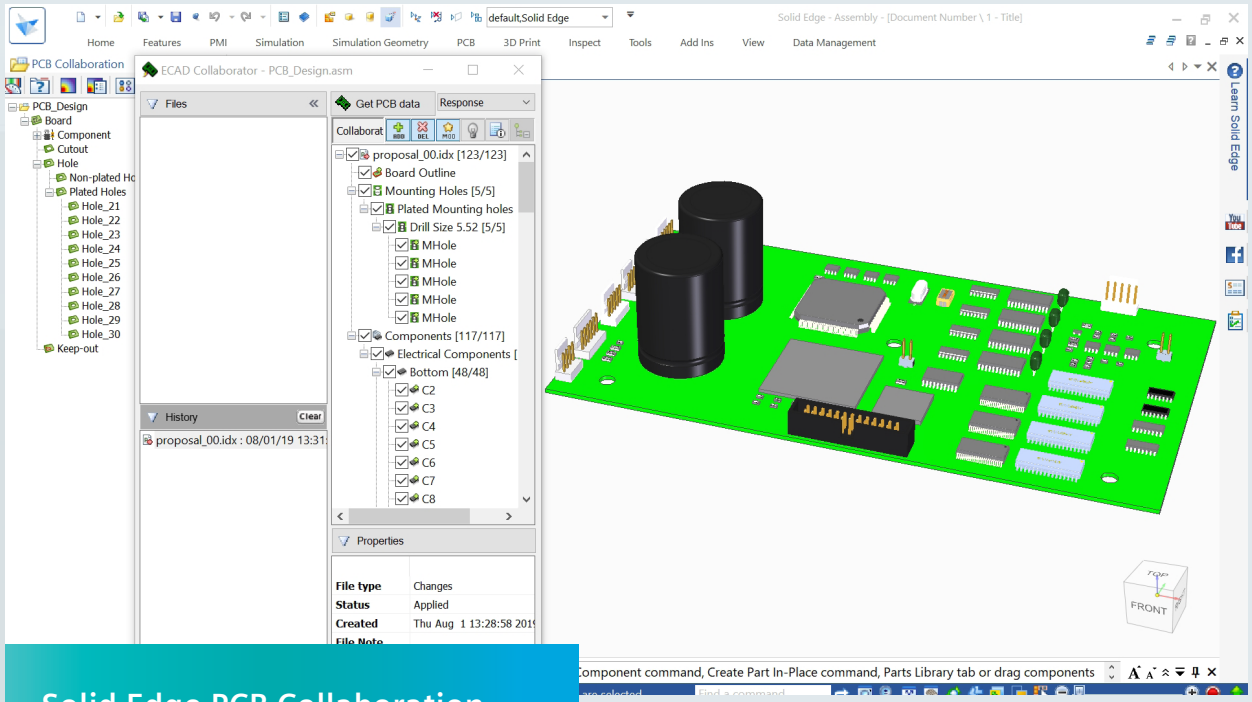
Designing PCBs in 3D is no longer the exception; it is the norm.

Leveraging 3D layout to optimize PCB design

Siemens Digital Industries' Solid Edge® PCB Collaboration software is an integrated ECAD-MCAD collaboration tool that allows electrical and mechanical engineers to be fully synchronized. It removes barriers between ECAD-MCAD environments while allowing engineers to continue working in their individual systems. The software provides an intuitive 3D visualization of both the PCB and its enclosure and displays a complete history of all exchanges that have taken place during collaboration. Design aspects are sent between engineers incrementally, until clearances and electromechanical interferences are checked and modifications are complete.

Solid Edge PCB Collaboration enables users to import precise models, providing a true 3D view of the design, one that can be rotated and visually inspected for interferences. The software enables quick and accurate PCB component placement in the 3D space and easy creation and export of PCB design intent. It can also flag component placement violations. Catching problems early in the design phase eliminates costly, last-minute changes.

The software uses incremental design exchange (IDX) data files to transmit data needed to propose changes. Older formats, such as the intermediate

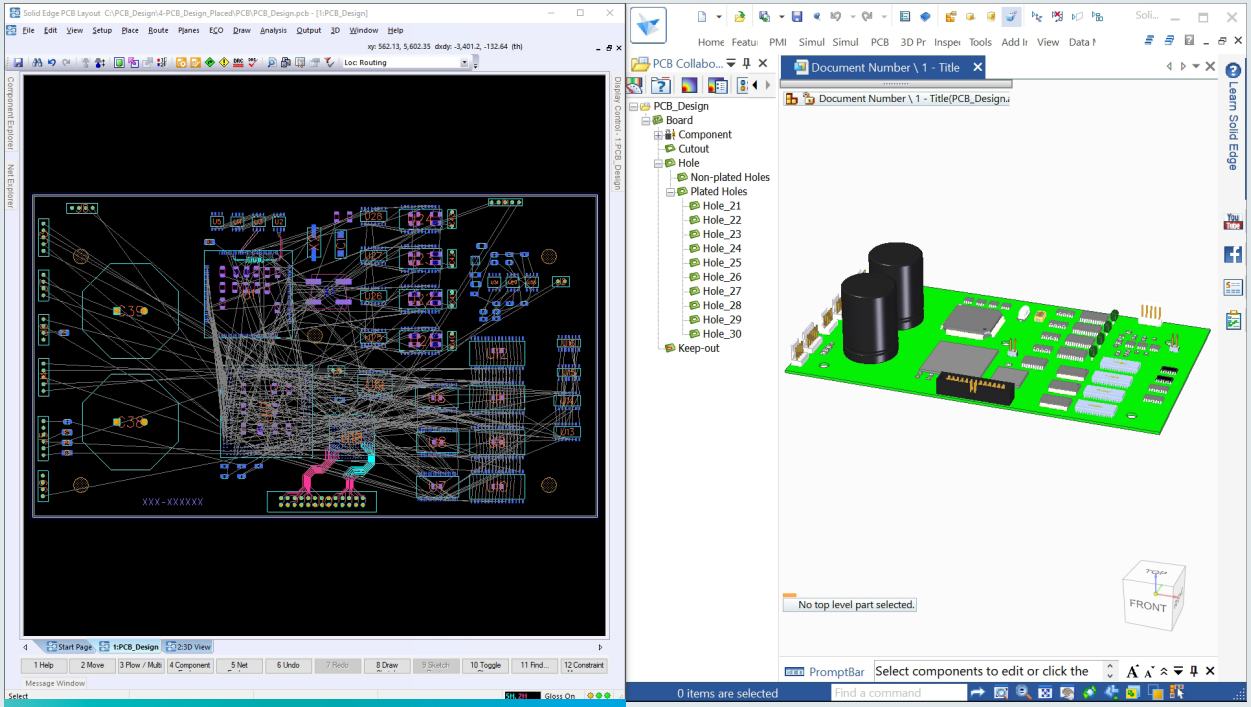


Solid Edge PCB Collaboration enables users to import precise models, providing a true 3D view of the design, one that can be rotated and visually inspected for interferences.

data format (IDF), overload communication by transferring more design data than is necessary. Transmitting only the relevant data for change proposals preserves intellectual property. This is particularly important when the design is spread across different companies.

Solid Edge PCB Collaboration also enables the import of copper trace data, in the form of sketches, from the electrical environment. Copper is an important component in PCB design; it's what makes electrical connections between the PCB components and other parts of the design possible. Knowing information about a design's copper layout assists in better mechanical design and representation.

The benefits of using state-of-the-art technology such as Solid Edge PCB Collaboration are many. Improved collaboration provides design robustness by facilitating the optimization of ever-shrinking form factors. Consistent and iterative collaboration accelerates decision-making and increases efficiency across the entire design process. Solid Edge PCB Collaboration is a powerful solution that aids in ECAD-MCAD collaboration, eliminating costly electromechanical issues during new product development and increasing the probability of achieving first-pass success.

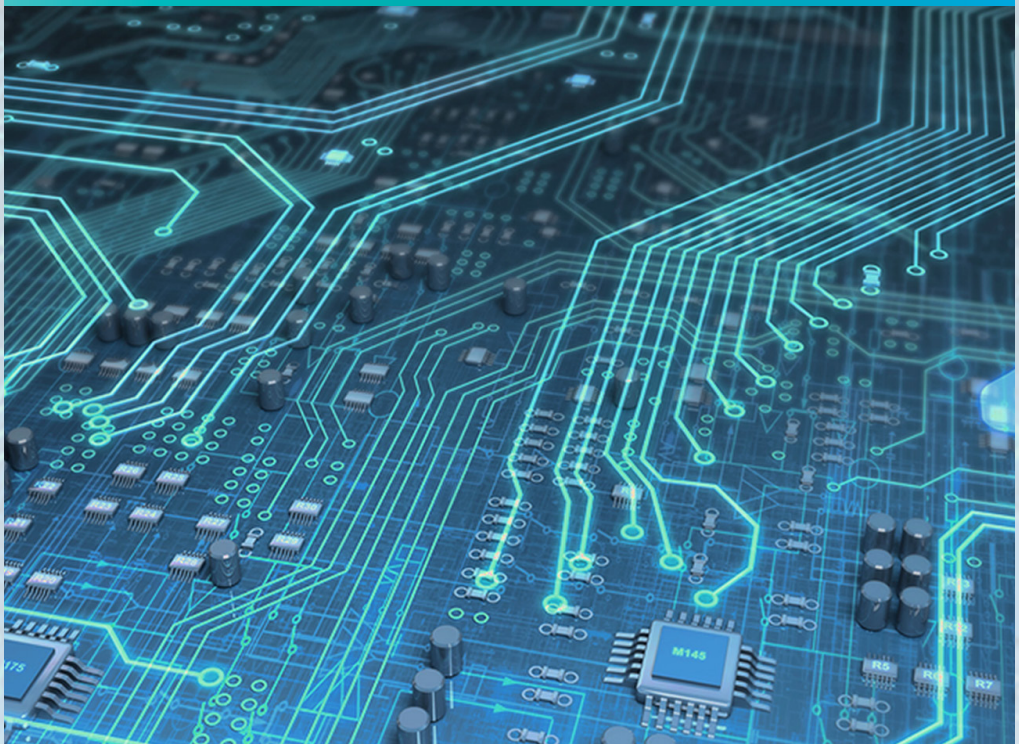


The benefits of using state-of-the-art technology such as Solid Edge PCB Collaboration are many.

Try Solid Edge for yourself

Extending value
Solid Edge is a portfolio of affordable, easy to deploy, maintain and use software tools that advance all aspects of the product development process: mechanical and electrical design, simulation, manufacturing, technical documentation, data management and cloud-based collaboration.

Take the next step
Try Solid Edge for free: www.siemens.com/plm/try-solid-edge



About Siemens Digital Industries Software
Siemens Digital Industries Software is driving transformation to enable a digital enterprise where engineering, manufacturing and electronics design meet tomorrow. Our solutions help companies of all sizes create and leverage digital twins that provide organizations with new insights, opportunities and levels of automation to drive innovation. For more information on Siemens Digital Industries Software products and services, visit siemens.com/software or follow us on LinkedIn, Twitter, Facebook and Instagram. Siemens Digital Industries Software – Where today meets tomorrow.

Headquarters:	+1 972 987 3000
Americas:	+1 314 264 8499
Europe:	+44 (0) 1276 413200
Asia-Pacific:	+852 2230 3333

81134-C2 11/19 A