DATASHEET

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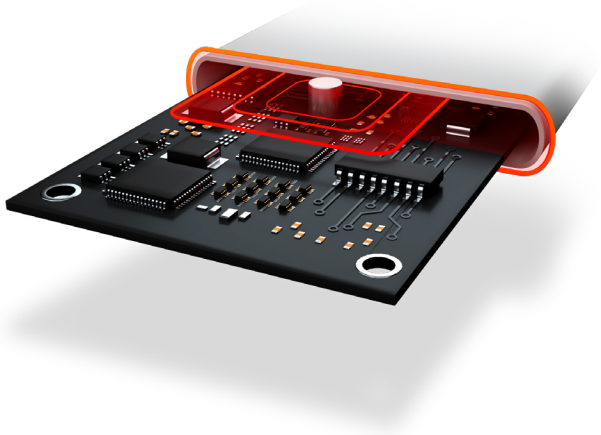
ECAD and MCAD Co-Design for Success

Seamless Integration Between the Electrical and Mechanical Worlds

Electrical and mechanical engineers have traditionally worked in silos due to the disjointed workflow of how CAD data has been managed and stored between ECAD and MCAD tools. This process has often led to poor communication and coordination between the two domains, resulting in inefficiencies, errors, and delays in the design process. With stricter requirements for today's electronics and the need for 3D product visualization, it's important that both electrical and mechanical engineers are aligned in terms of the product requirements to ensure manufacturability as well as proper form and fit. These requirements can range from form factor constraints to electrical and mechanical component alignment.

Cadence® has partnered with all the major MCAD providers to support a seamless integration between the two design spaces, helping facilitate proper communication for data exchange. Engineers can now concurrently work on mechanical and electrical aspects of the design to accurately model, track and synchronize changes, and ensure that printed circuit boards (PCBs) fit in their enclosure without any interference. The integrated co-design solutions with our MCAD partners enable close collaboration between teams and real-time data transfer to help avoid design respins and an extended time-to-market.



The following key requirements highlight the critical aspects necessary for effective collaboration between mechanical and electrical teams to design a high-quality product.

MCAD Key Requirements

- **Accurate Geometry Representation** – Ensure proper fitting and alignment of PCB enclosure, housing, and mechanical components
- **Form Factor Constraints** – Critical design constraints are defined as the board outline, thickness, mounting holes, keep-in/keep-out areas, connectors and clearance requirements
- **Thermal Management Consideration** – Implement mechanical design features such as heat sinks, ventilation, and thermal pads to ensure adequate distribution for heat dissipation
- **Mechanical Stress Analysis** – Evaluate the reliability and durability of the final product, and its impact on environmental factors and structural integrity of the PCB assembly

ECAD Key Requirements

- **Electrical Component Consideration** – Ensure accurate placement and minimum clearance requirements are met between electrical components and mechanical constraints such as mounting holes, connectors, and keep-in/keep-out areas
- **Signal Integrity Consideration** – Optimize signal integrity with proper component placement and layout techniques to minimize electromagnetic interference (EMI), crosstalk, and impedance mismatches
- **Power Distribution Planning** – Minimize voltage drops and optimize power delivery by proper planning of power distribution traces and shapes while simultaneously reducing joule heating
- **EMI/EMC Compliance** – Collaborate with the MCAD team to implement shielding, grounding and more to ensure compliance with EMI and EMC standards

Benefits

The core benefits of ECAD and MCAD co-design between Cadence and leading MCAD tools are:

Effortless Synchronization – Push and pull changes with a single-click with either platform-to-platform or file-based data synchronization

Bi-Directional Collaboration – Send object changes from either domain to optimize electrical and mechanical integrity

Change History – Accept, reject, and revert change capability with IDX

3D Visualization – Visualize and optimize PCB integration with enclosures early, using advanced 3D capabilities of Allegro X and OrCAD X

Platform Connectivity – Supports desktop data exchange and direct connection to Autodesk Fusion and Dassault **3D**EXPERIENCE cloud platform

Integration Availability – Capability is included in all Allegro X and OrCAD X tiers

Partner Solutions

Available in both Allegro X and OrCAD X PCB Editor

MCAD Solution	File Format	Platform	Plugin	Support for objects passed between the two interfaces[1]
Autodesk Fusion	IDF	Autodesk 360, Library.io	Not Required	• Board Outline • Board Thickness[2] • Component Placement • Component Name and Reference Designator • Copper Traces and Shapes[2] • Cutouts • Keep-in/Keep-out Areas • Plated and Unplated Holes
Dassault Systèmes CATIA	IDX	**3D**EXPERIENCE	Not Required	
Dassault Systèmes SOLIDWORKS	IDX	**3D**EXPERIENCE	CircuitWorks	
PTC Creo	IDX	None – File Based	Creo Parametric	
Siemens NX	IDX	None – File Based	PCB Exchange	

1 Supported objects may vary for some of the MCAD solutions listed.
2 Single direction transfer from ECAD to MCAD. All other objects listed without a superscript are bi-directional transfers.

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