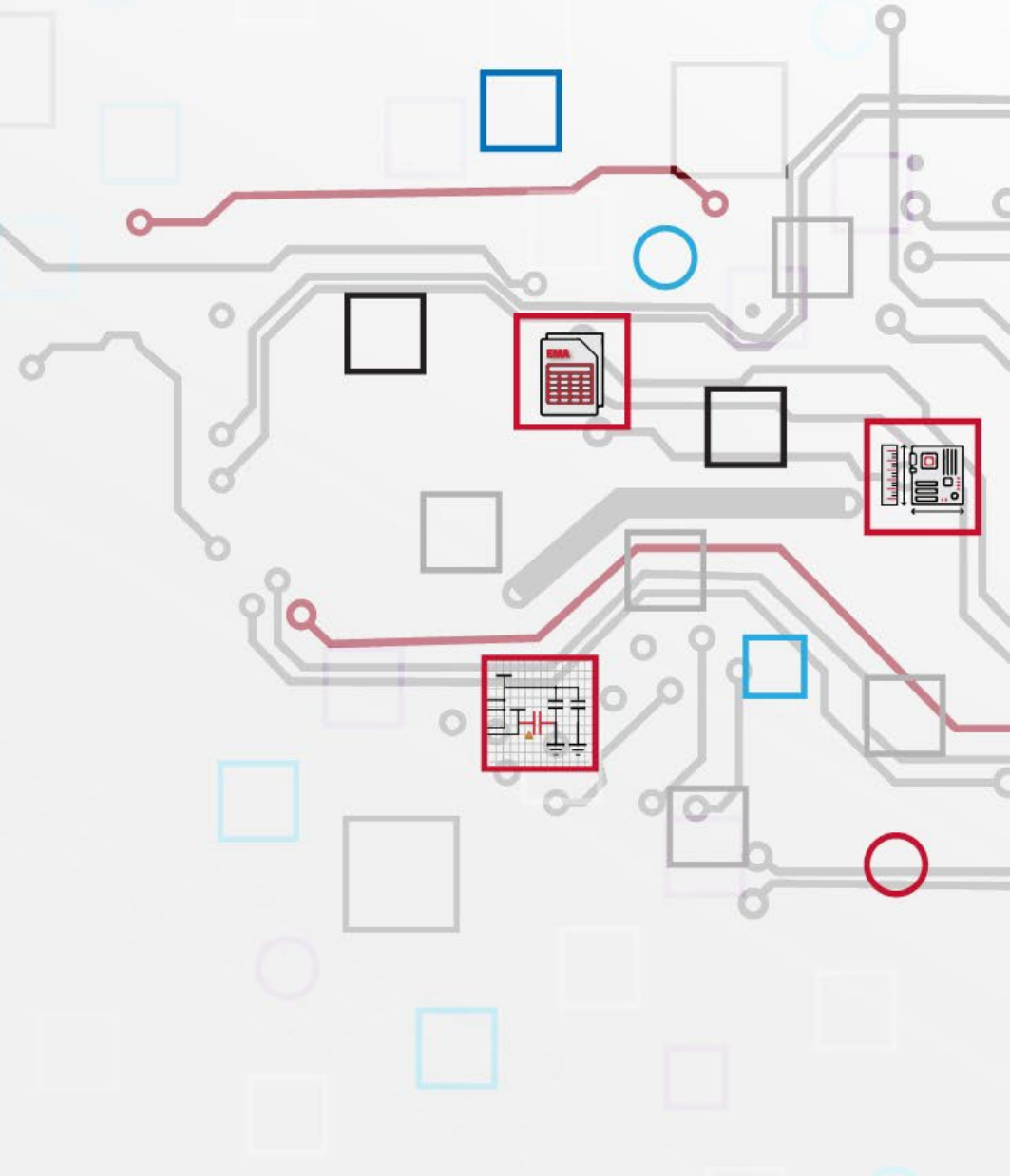


WEBINAR

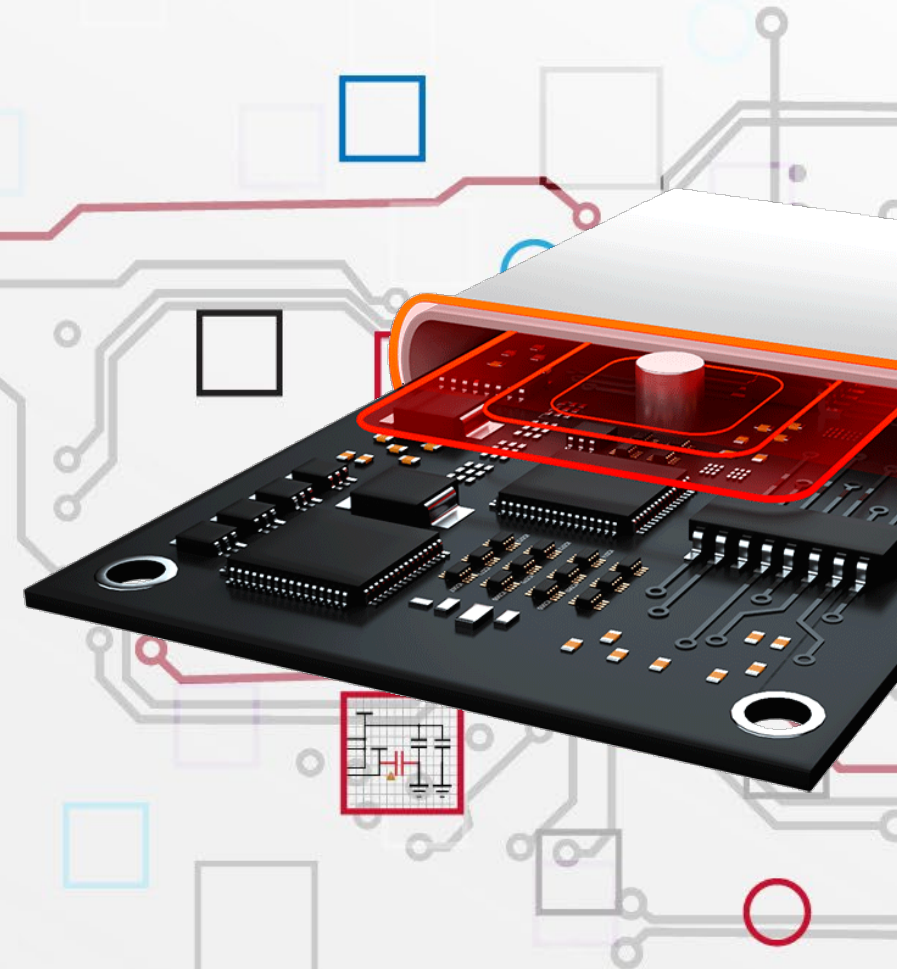
# 6 Common Issues Lurking in Your PCBs

***And How OrCAD X Can  
Solve Them***



# Agenda

- Intro
- OrCAD X Intro
- Cost of Change over Time
- 5 Items
- AI Sneak Peak
- Q&A





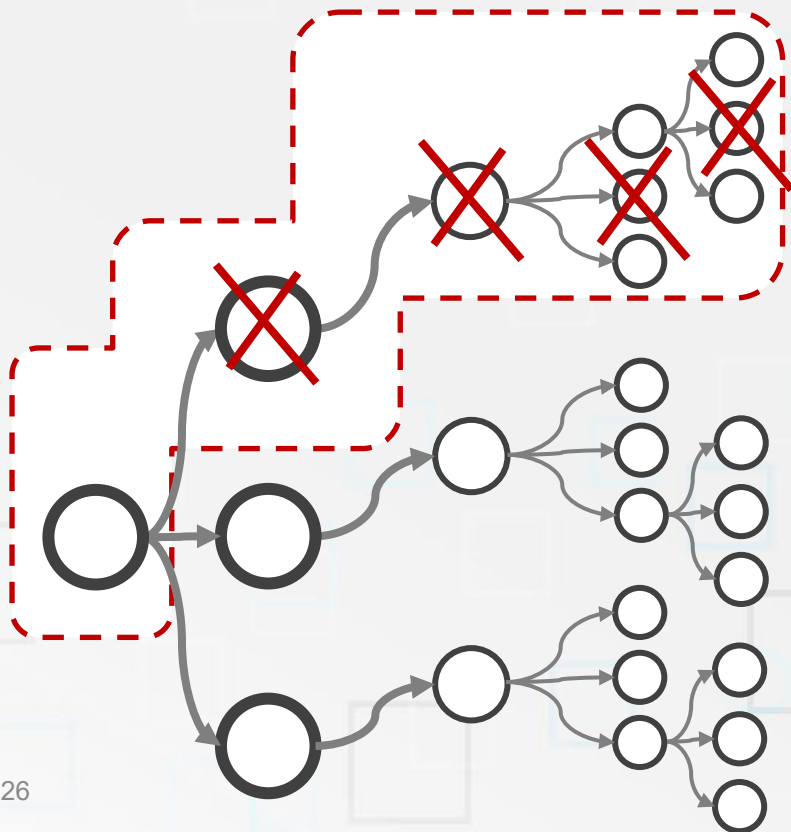
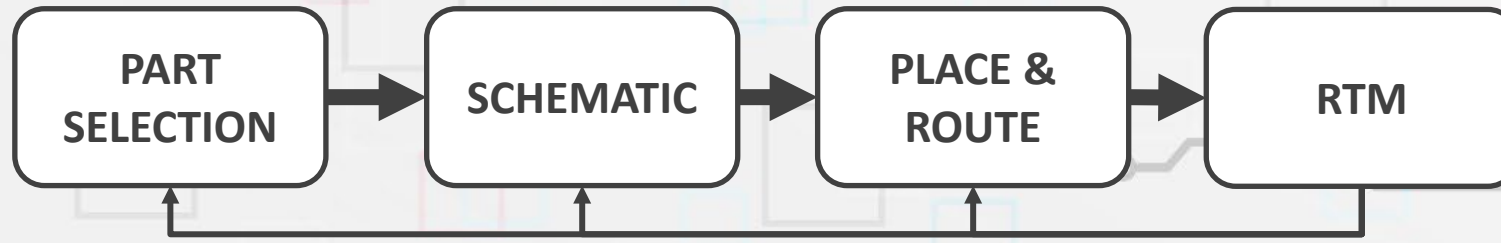
## Your Trusted Design Partner

✓ Support   ✓ Services   ✓ Software   ✓ Training

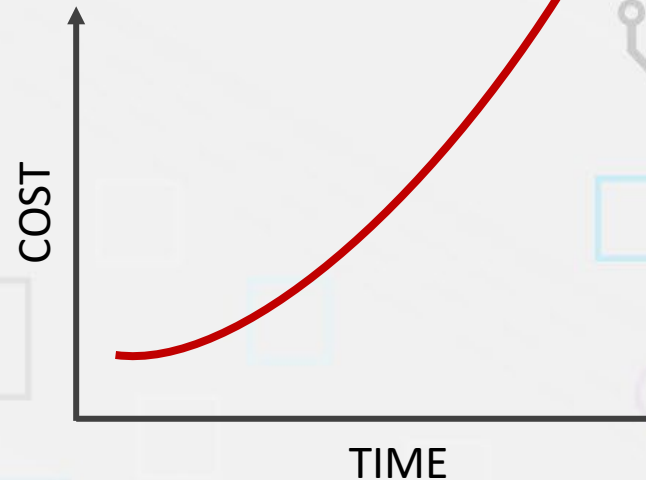
Over 30 years experience helping engineers design, validate, and build hardware successfully

**cādence**<sup>®</sup>  
CHANNEL PARTNER

# PCB Design Flow



Compounding  
Cost of Change



Cost of Change  
Increases as Design  
Progresses

Cumulative Effect of  
Changes (decisions  
stack)

Identify and  
Resolve Early is Key

ISSUE 1/6

# Part Selection

## Problems

- Supply chain issues with selected parts
- Choosing the right parts upfront is key
- Not only electrical / functional compatibility but supply chain / sourcing needs to be considered too
- Late stage charges are typically the most costly

PART ACTIVE?

LEAD TIME?

RECOMMENDED  
FOR NEW DESIGN?

IS IT AVAILABLE?





2ND SOURCE?

ENVIRONMENTAL  
COMPLIANCE?

PRICE?

FFF  
REPLACEMENT?

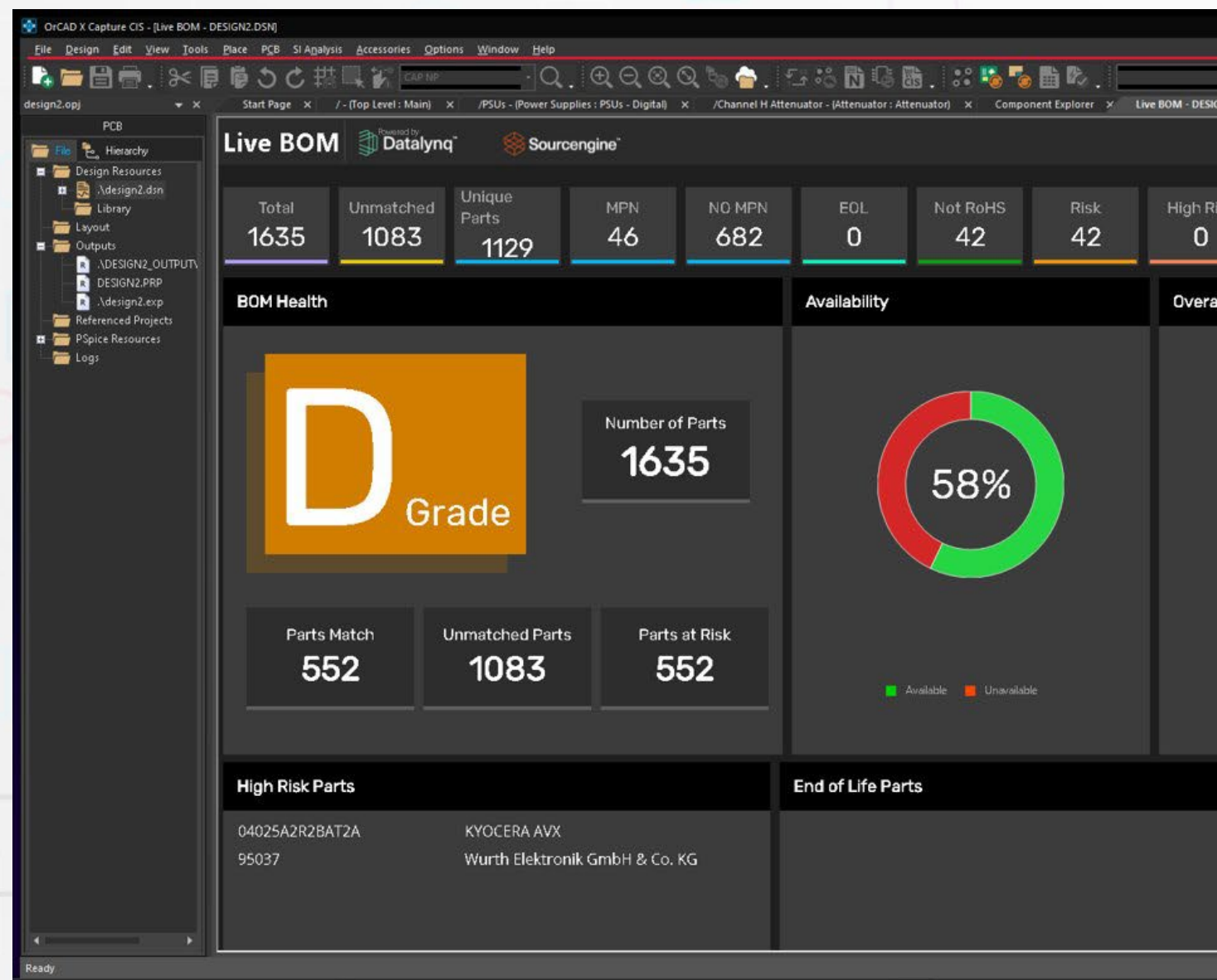
MPN	Supplier	Description	Avg. Price
 C0402C102J5GACTU	KEMET CORPORATION	Cap Ceramic 0.001uF 50V C0G 5% Pad SMD 0402 125°C T/R	<b>\$0.02</b>
 CL05C102JB5NNND	SAMSUNG ELECTRO-MECHANICS	Cap Ceramic 0.001uF 50V C0G 5% Pad SMD 0402 125°C T/R	<b>\$0.02</b>
 GRM1555C1H102JA01B	MURATA MANUFACTURING	Cap Ceramic 0.001uF 50V C0G 5% Pad SMD 0402 125°C Bulk	<b>\$0.01</b>
 C0402C102J5GACAUTO	KEMET CORPORATION	Cap Ceramic 0.001uF 50V C0G 5% Pad SMD 0402 125°C Automotive T/R	<b>\$0.05</b>

MPN	Supplier	Description	Avg. Price	Min. Lead Time [Week(s)]	Max. Lead Time [Week(s)]
 C0402C102J5GACTU	KEMET CORPORATION	Cap Ceramic 0.001uF 50V C0G 5% Pad SMD 0402 125°C T/R	<b>\$0.02</b>	<b>54</b>	<b>54</b>
 CL05C102JB5NNND	SAMSUNG ELECTRO-MECHANICS	Cap Ceramic 0.001uF 50V C0G 5% Pad SMD 0402 125°C T/R	<b>\$0.02</b>	<b>24</b>	<b>24</b>
 GRM1555C1H102JA01B	MURATA MANUFACTURING	Cap Ceramic 0.001uF 50V C0G 5% Pad SMD 0402 125°C Bulk	<b>\$0.01</b>	<b>Obsolete</b>	<b>Obsolete</b>
 C0402C102J5GACAUTO	KEMET CORPORATION	Cap Ceramic 0.001uF 50V C0G 5% Pad SMD 0402 125°C Automotive T/R	<b>\$0.05</b>	<b>33</b>	<b>33</b>

## PART SELECTION

# LiveBOM

- On-demand supply chain intelligence
- Reviews and provides a grade
- Swap and update parts quickly as needed
- Ensure a compliant and orderable BOM
- Available per design or at a library level



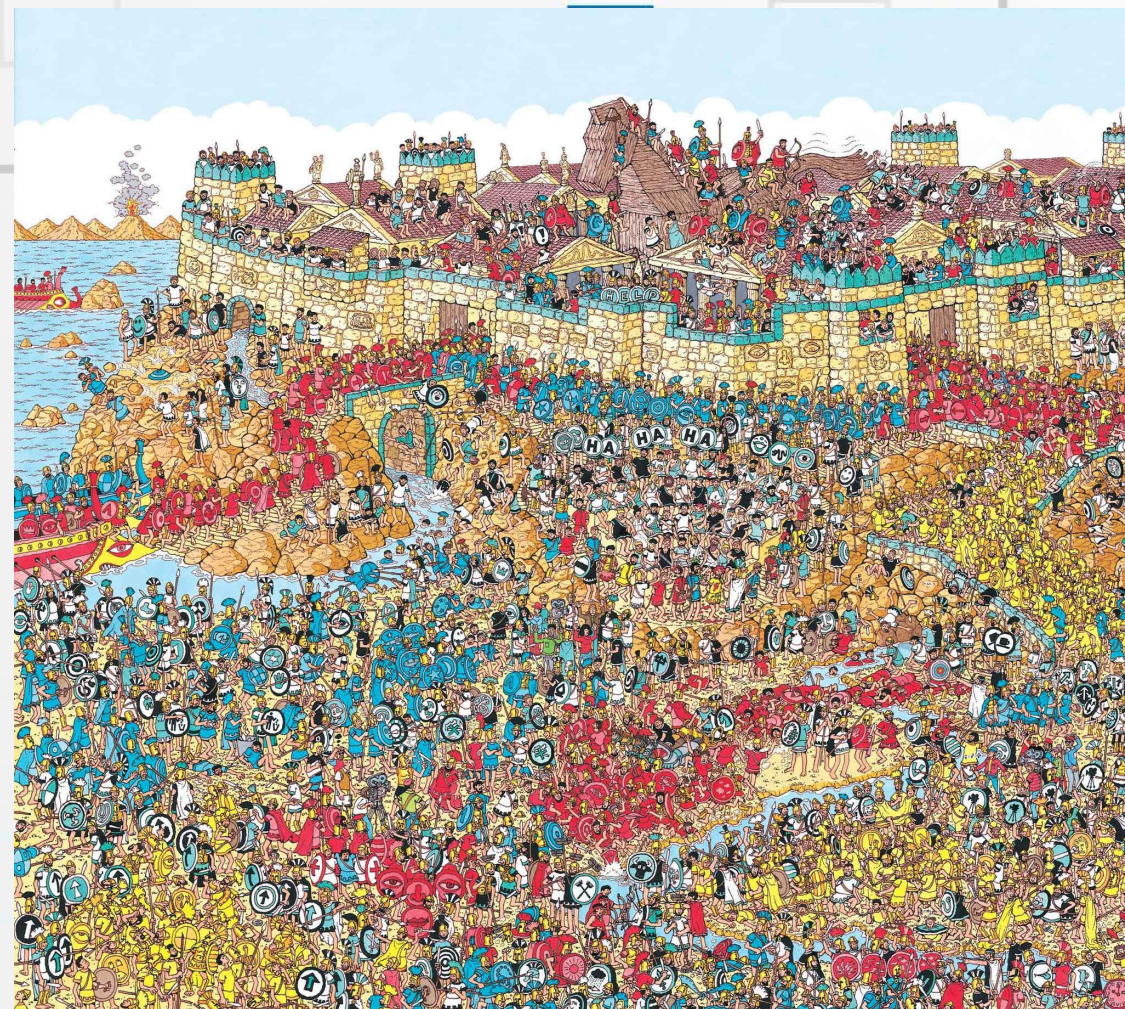
# DEMO 1

ISSUE 2/6

# Hard to Spot / Diagnose Electrical SI/PI Issues

## Problems

- Signal quality issues in your design that are very hard to detect visually
- Can even be challenging to debug in hardware
- How can we identify and prevent / resolve these issues early?

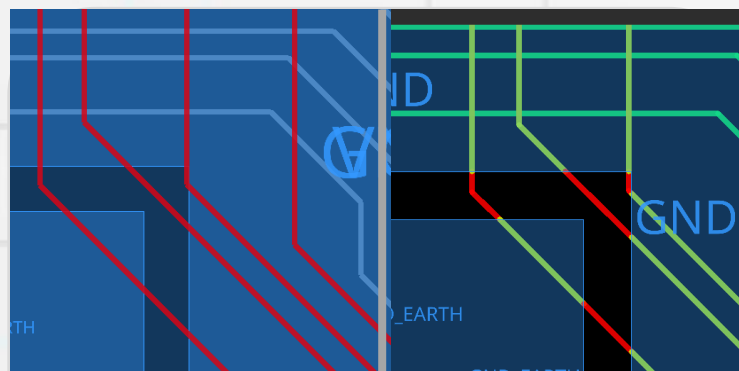


SI/PI Issues

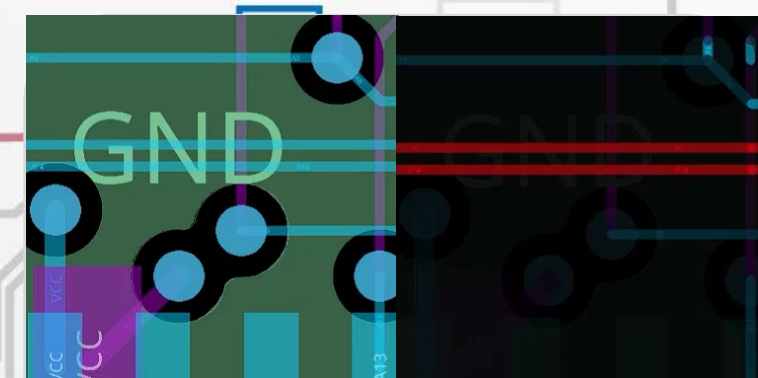
# In-Design Analysis

## Solution

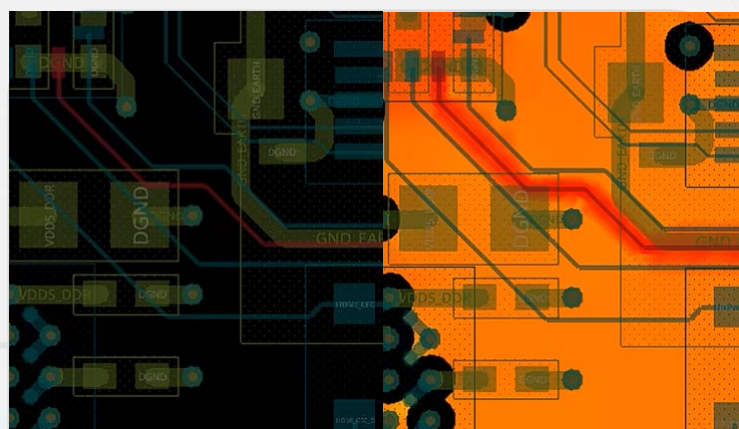
- Leverage Simulation & Real-Time DRC to spot issues as they happen
- Visualize designs contextually
- Do this as you design with minimal setup / configuration



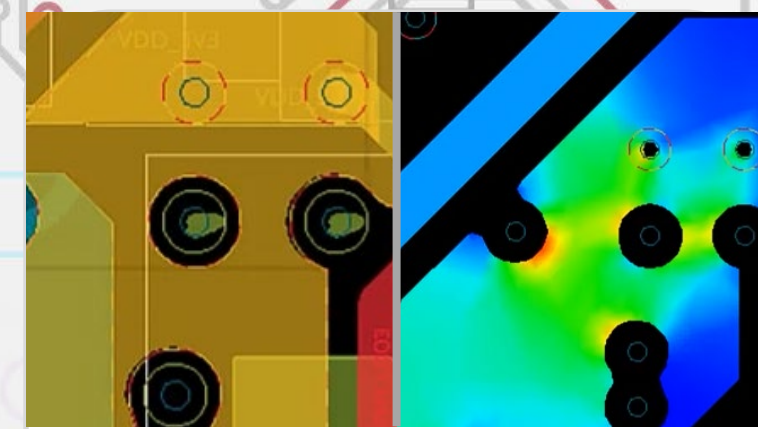
**SPLIT PLANE  
ROUTING**



**COUPLING**



**RETURN PATH**



**CURRENT DENSITY**

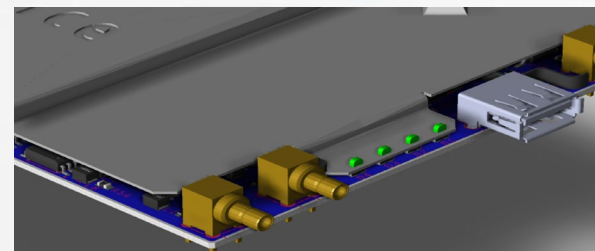
# DEMO 2

ISSUE 3/6

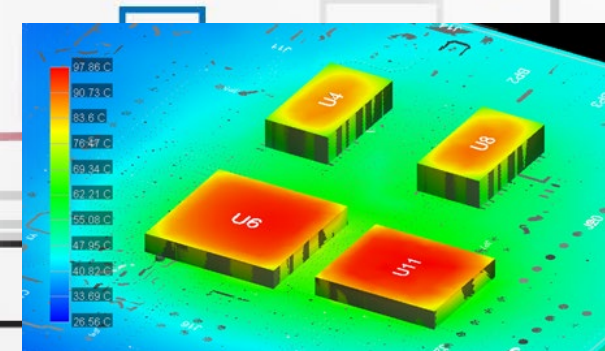
# ECAD/MCAD Discrepancies

## Problems

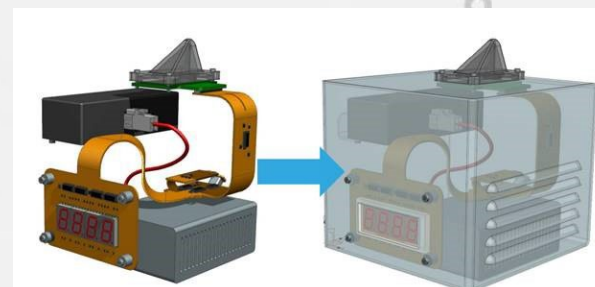
- MCAD / ECAD requirements not aligning or conflicting
- Mutual design elements not synchronized
- Unable to review / visualize electrical and mechanical elements holistically



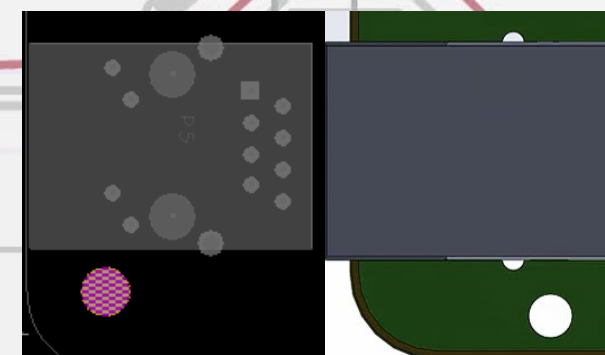
FIT PROBLEMS



Thermal Analysis



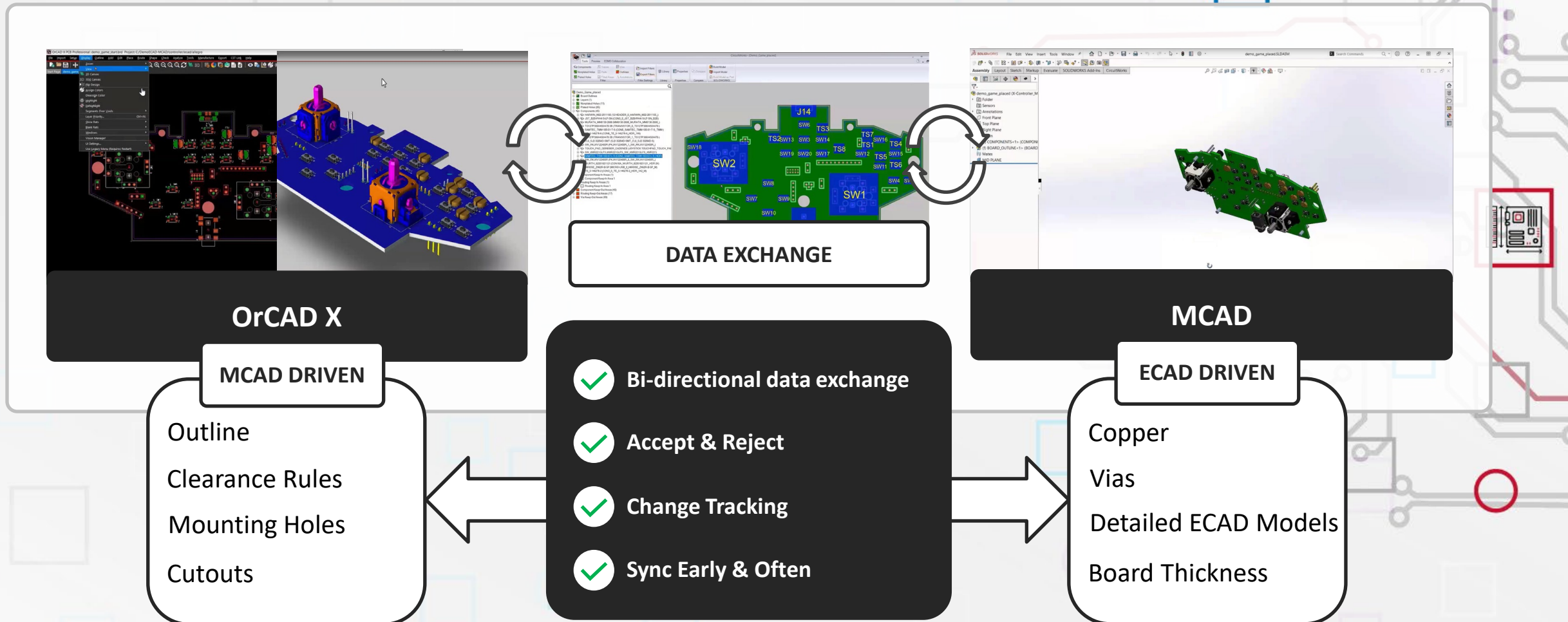
Holistic View



Uncommunicated Changes

ECAD/MCAD

# 3D Design & Data Exchange



# DEMO 3

ISSUE 4/6

# DFM Issues

## Problems

- Don't want to find manufacturability issues late in the design cycle
- DFM issues can be hard to spot (and process dependent)
- DFM related changes are inherently late-stage changes



## DFM ISSUES

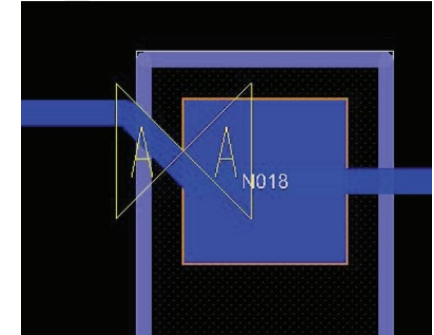
# DesignTrue DFM

## Solution

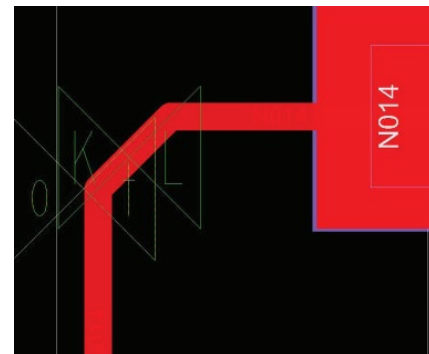
- Perform DFM checking as you design
- Leverage industry standard IPC DFM checking as well as manufacturer specific rules
- Create Documentation as an output of design



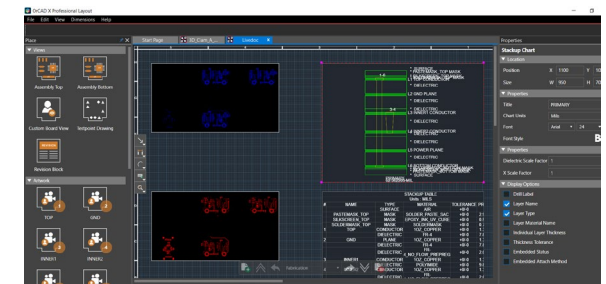
**TOO CLOSE TO  
BOARD EDGE**



**ANNULAR  
RING**



**COPPER PAD TO  
CUTOUT**



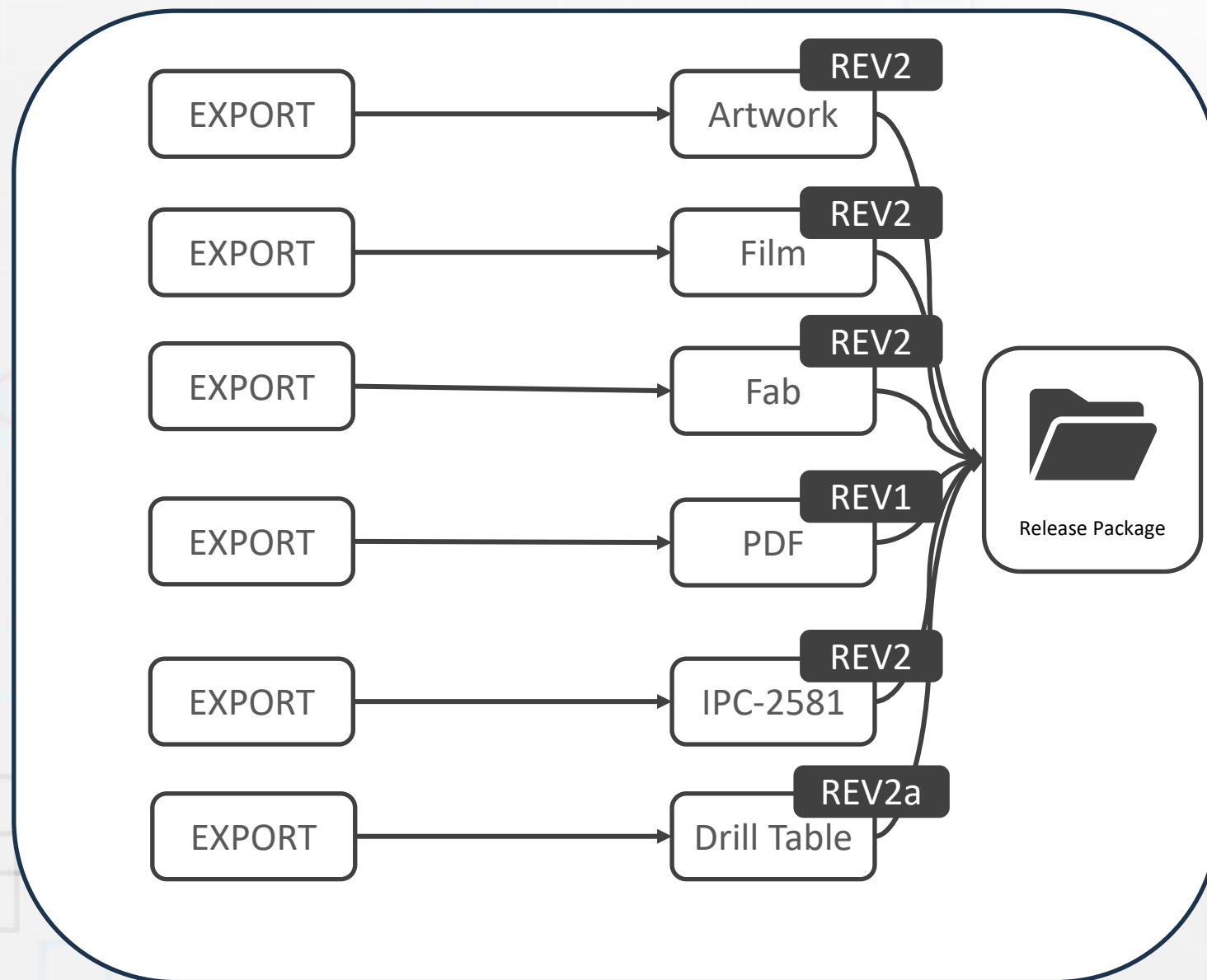
**AUTOMATED  
DOCUMENTATION**

# DEMO 4

ISSUE 5/6

# Release to Manufacturing Problems

- Lots of files needed to provide manufacturing 'instructions'
- Easy to lose synchronization as design iterates (especially at the end)
- Risk manufacturing delays / respins

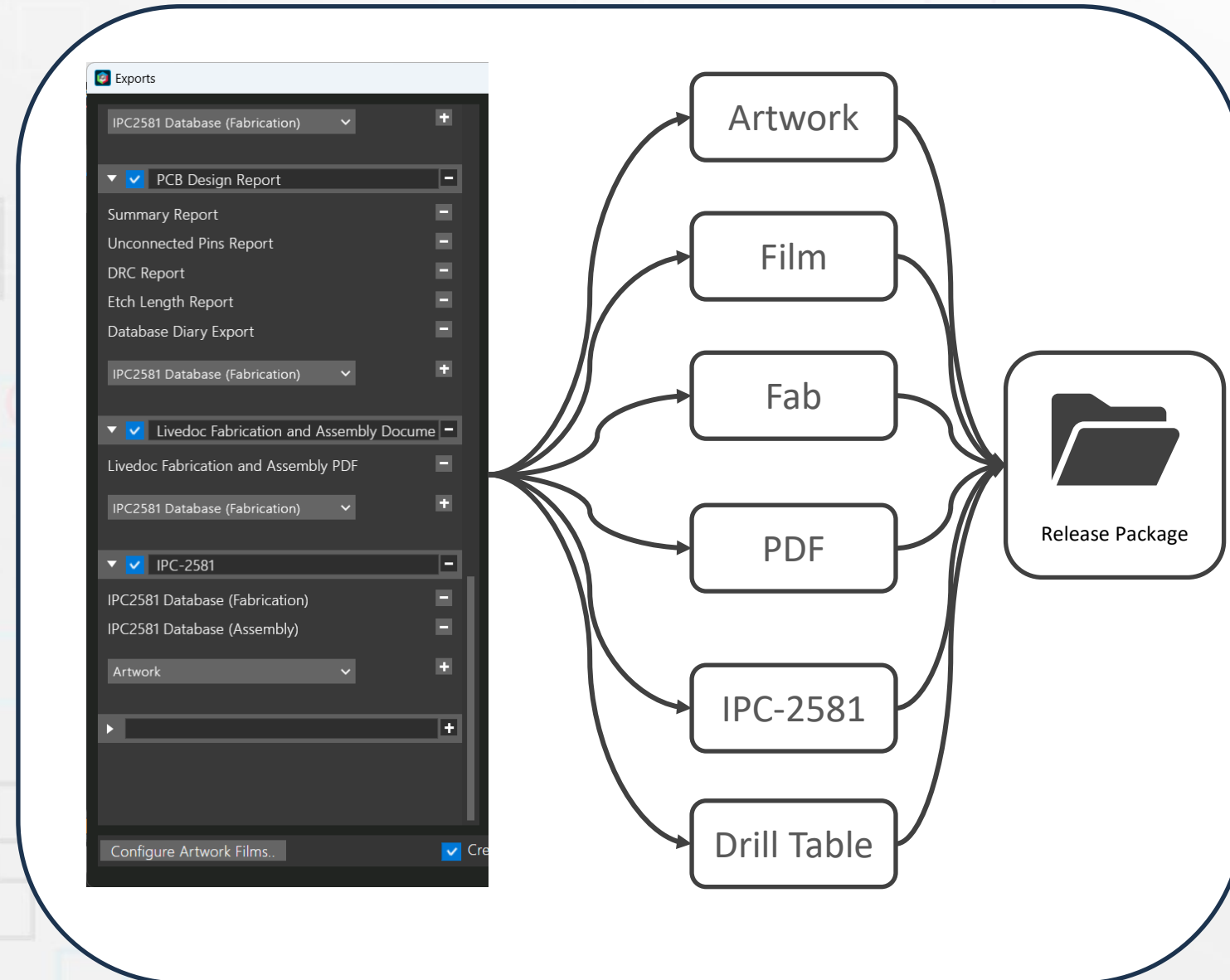


RTM

# MFG Packager

## Solution

- Predefine RTM recipes
- Ensure MFG instructions matches your CAD data
- Customize as needed



# DEMO 5

ISSUE 6/6

# Time....

## Problems

- Don't have enough time to complete designs on schedule
- Designs being released with errors or compromises due to schedule pressure
- No time for design space exploration or optimization



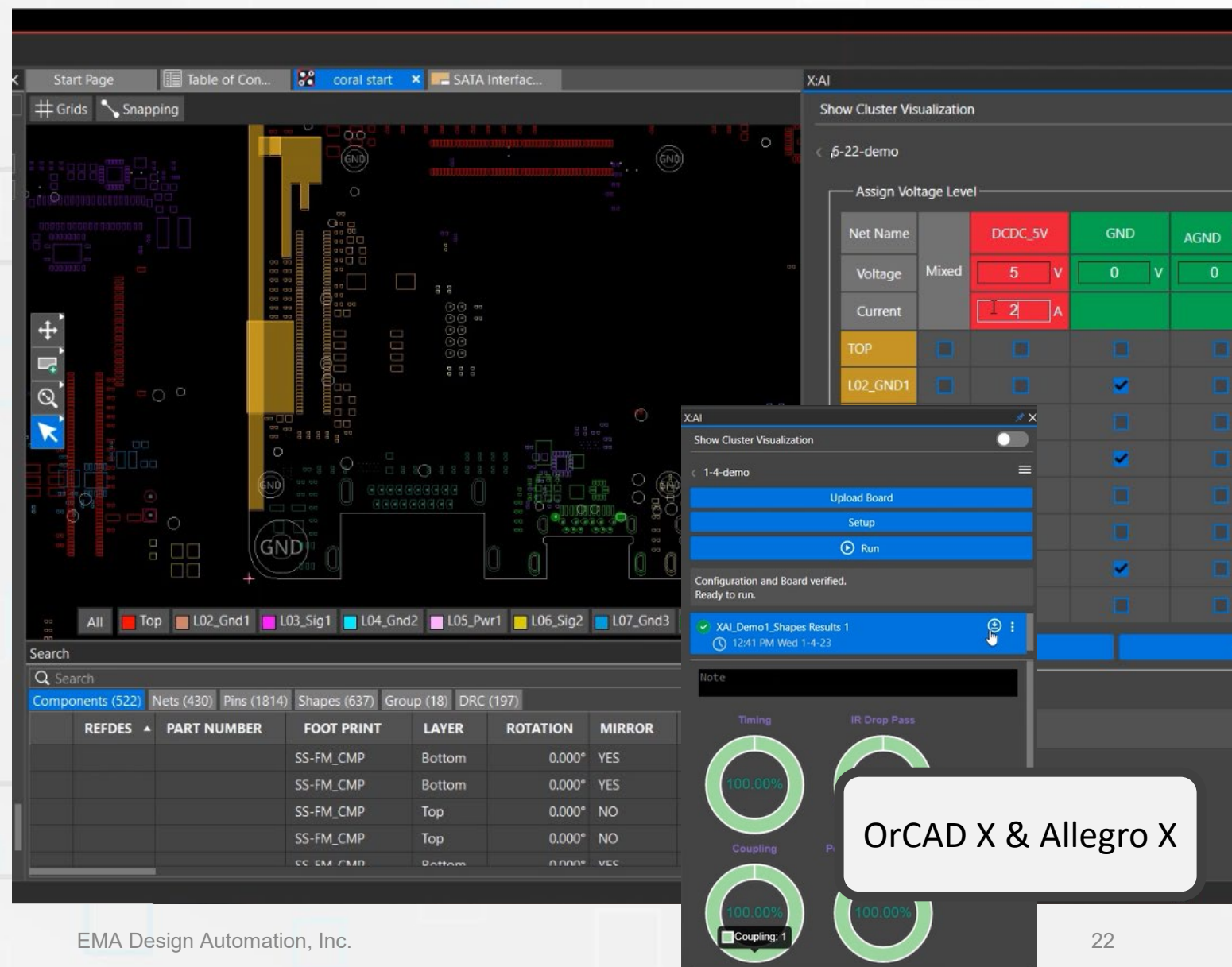
**Each Task Competes for Limited Engineering Time**

## CYCLE REDUCTION

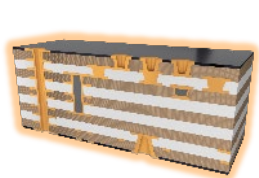
# Allegro X AI

## Solution

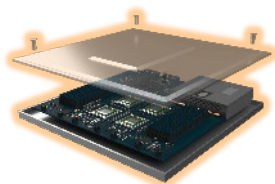
- Dramatically reduce time for initial placement, plane creation, and routing
- Integrated directly inside OrCAD X & Allegro X
- Constraint, Schematic, DFM, and electrically aware



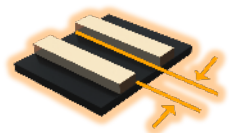
# X AI™ Methodology



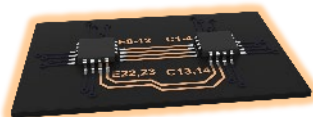
Layer Stack



Board Outline - MCAD +  
fixed component location(s)



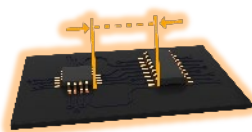
Physical constraints



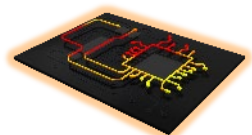
Netlist



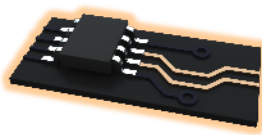
PWR/GND



Assembly rules

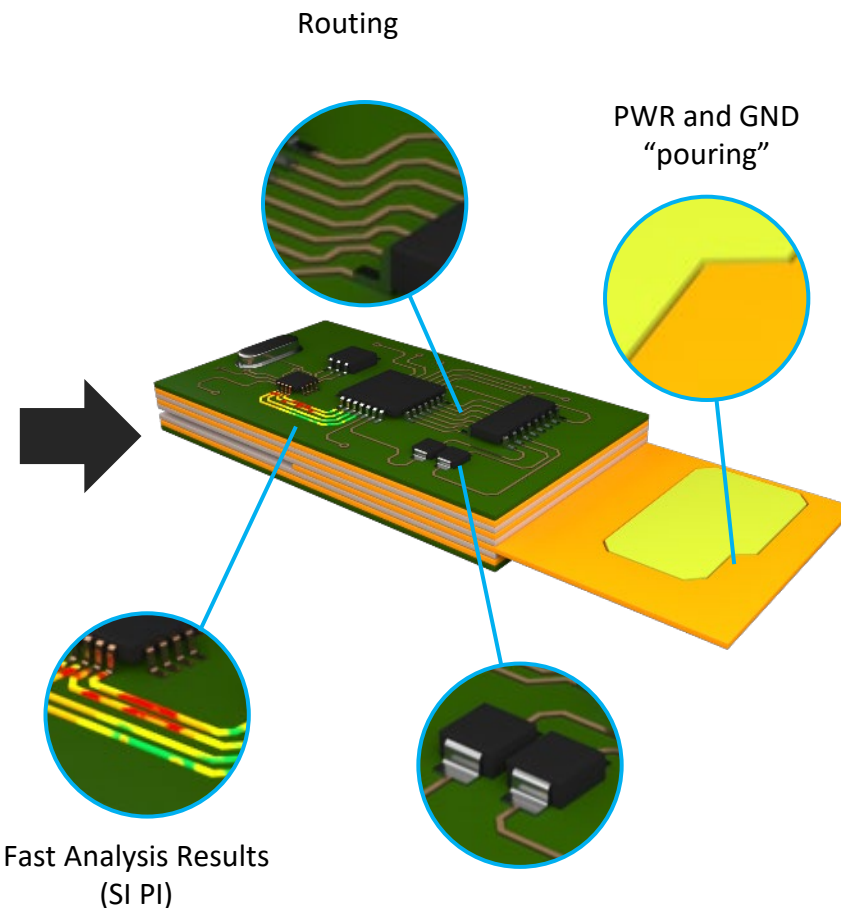
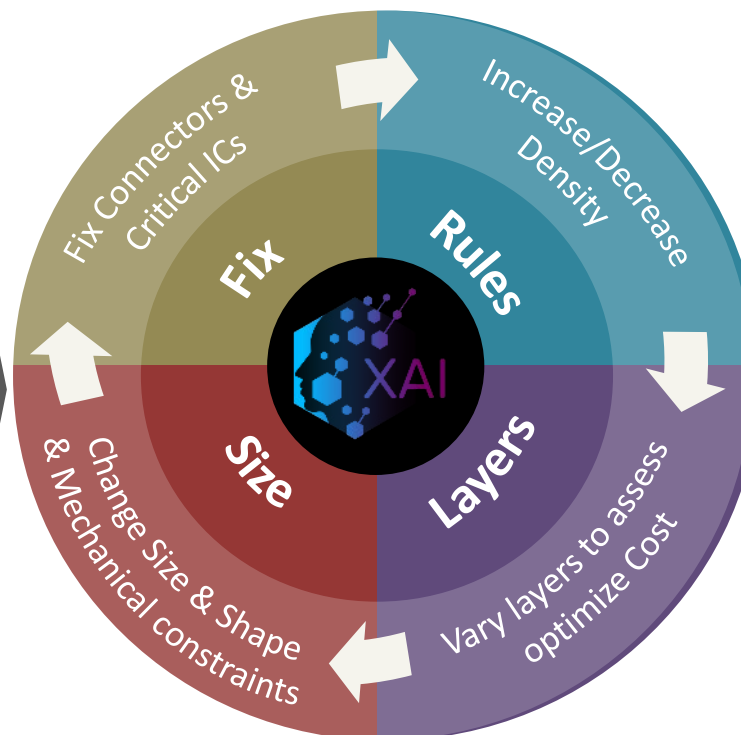


Power Distribution  
Network

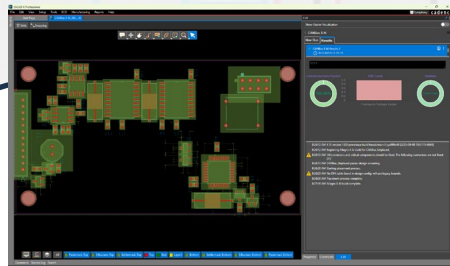


Differential Pairs &  
Critical nets

## Rapid Solution Space Exploration



# 3 Engines



## Placement AI

New Placement Optimization Engine

Constraint and Rule Driven

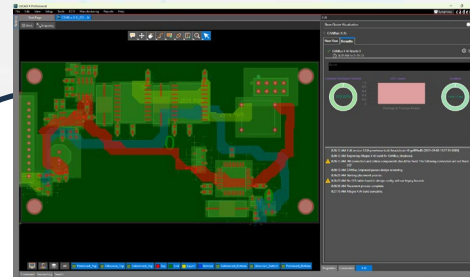
### Example Use Cases:

General Placement Acceleration

Test Placement Alternatives

Route Congestion

Fit Study



## Copper AI

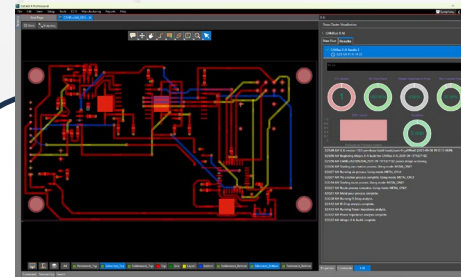
Full Copper Pour Engine

Fast Iterative Approach to Copper & Plane Generation

### Example Use Cases:

Cooper Pour Acceleration

Power Delivery Analysis



## Route AI

New Routing Engine. Built from the Ground Up

Enables any angle routing. Massive capacity (support for MCM / Pckg)

### Example Use Cases:

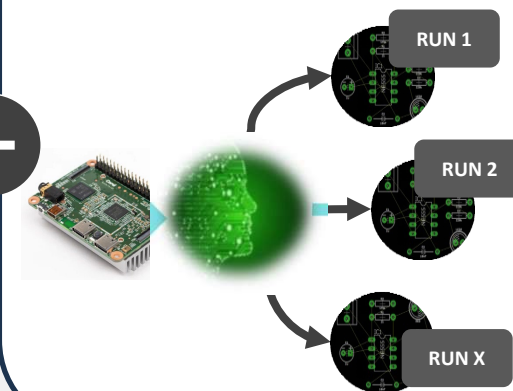
Full Board Routing Closure

Routability Studies

Routing Updates



## Parallel Execution



# X AI Results

PLACEMENT

3 days to  
75 Minutes

WIRELENGTH

12%  
Improved

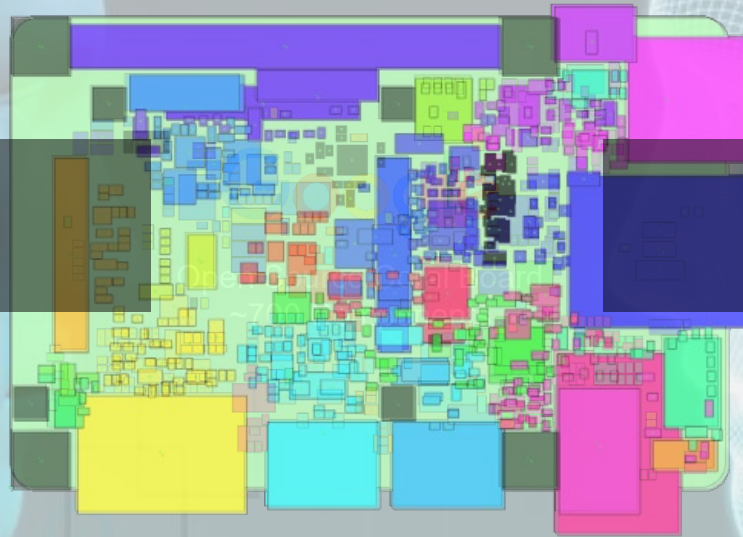
MANUFACTURING

100%  
Compliant

ELECTRICAL  
ANALYSIS

Optimized

Human Alone

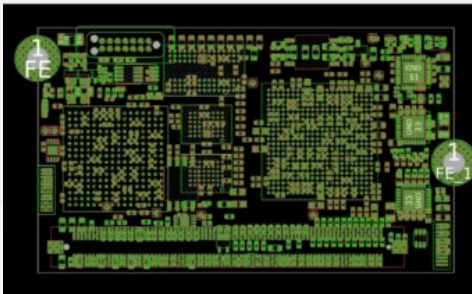


w/ X AI

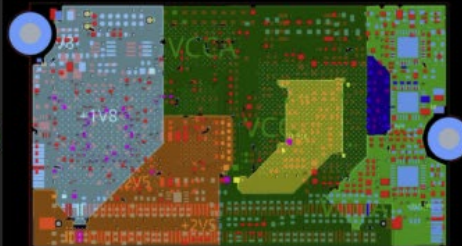
Case Study

# Danfoss Uses Cadence Allegro X AI to Amplify PCB Design for Energy Efficiency

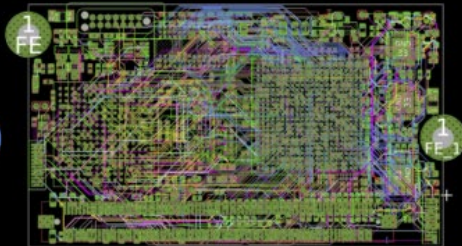
AI Placement



AI Pours



AI Routing



“

I ended up at the first run with a very nice layout for my design. I'll say that not much needed to change.

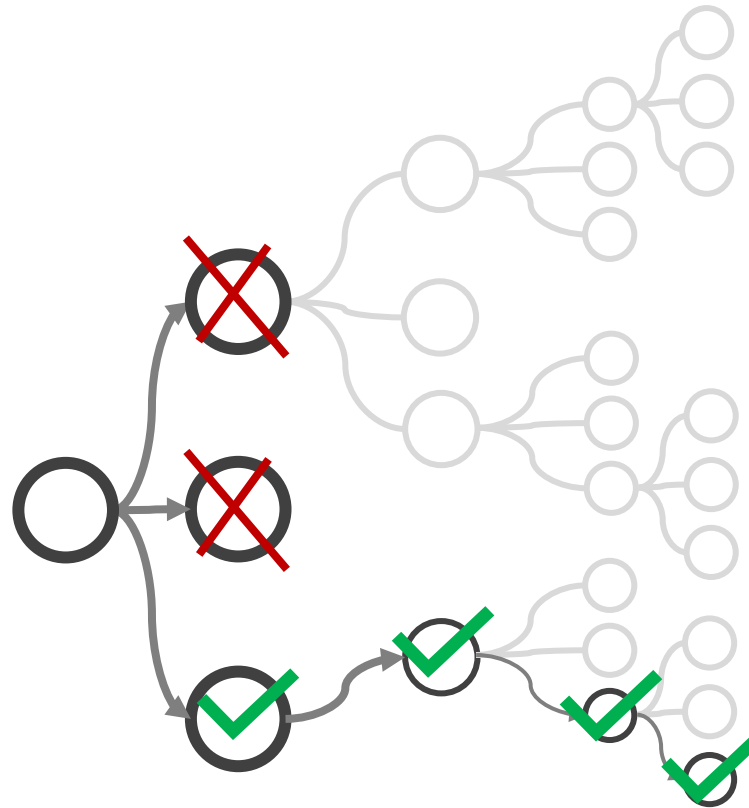
**Bo Kroman, Senior ECAD Engineer, Danfoss**

[Danfoss Uses Cadence Allegro X AI to Amplify PCB Design for Energy Efficiency | EMA Design Automation](#)

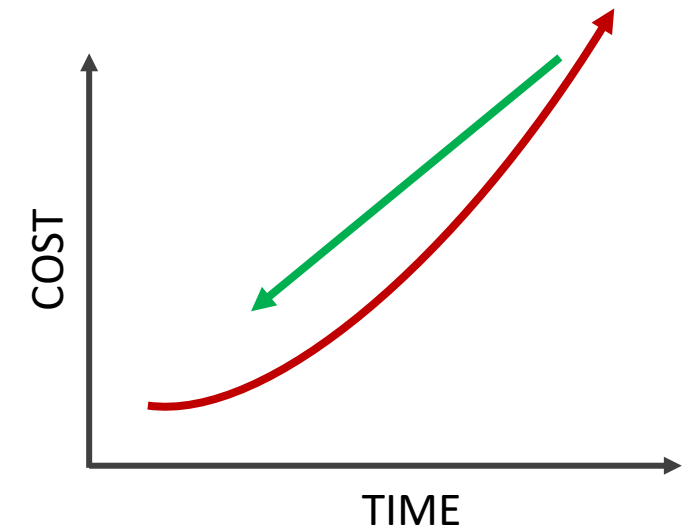
# DEMO 6

# Shift-Left Design

- ✓ Identify and Solve Early
- ✓ Review and Fix in Context
- ✓ Eliminate Late-Stage Design Changes



Compounding  
Cost of Change



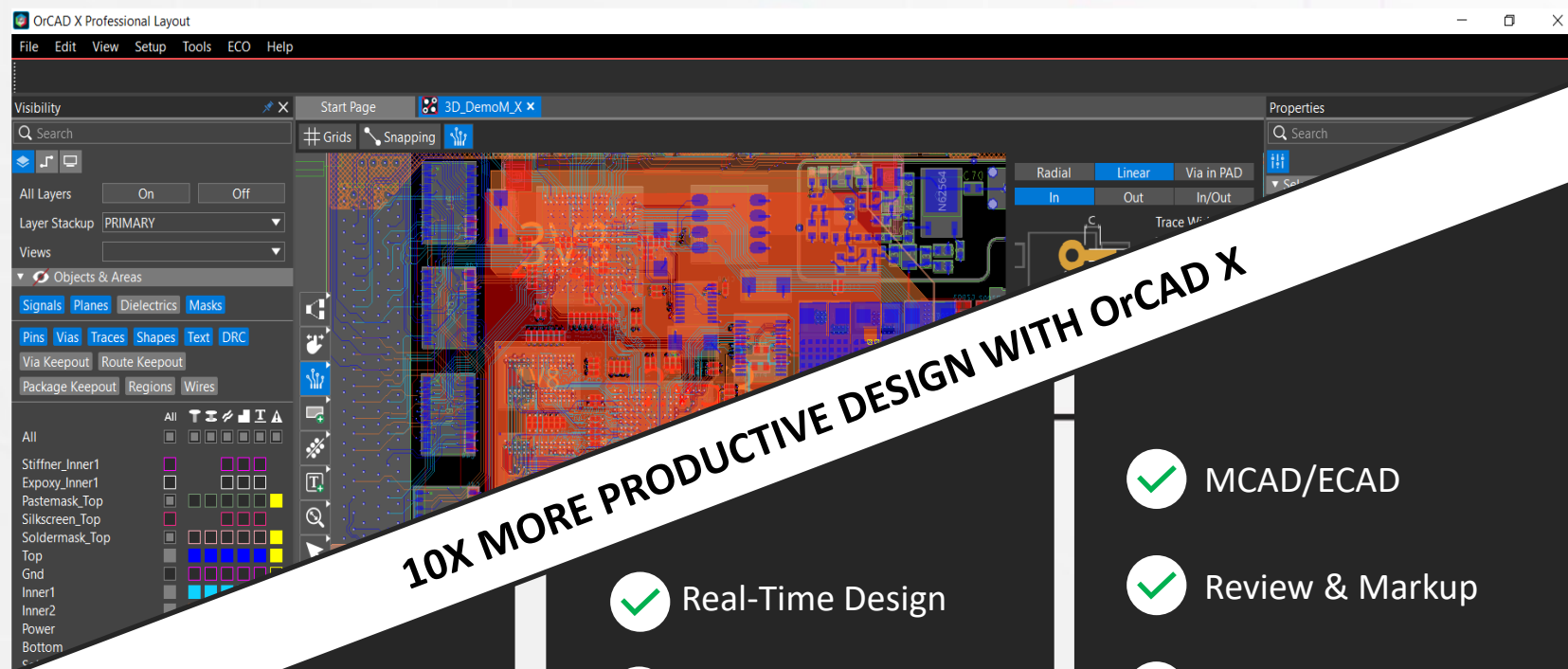
NEXT GEN

# OrCAD X

✓ Real-Time Visibility  
in Context

✓ Connected Platform  
for Holistic Design

✓ Scalable to Grow  
with Design Needs



10X MORE PRODUCTIVE DESIGN WITH OrCAD X

✓ High Performance

✓ AI Enabled

Design Fast

✓ Real-Time Design

✓ Design-True DFM

✓ Supply Chain Insights

✓ In-design Analysis

Design Correct

✓ MCAD/ECAD

✓ Review & Markup

✓ Data & Libraries

✓ Co-Design

Design Connected

# Thank You

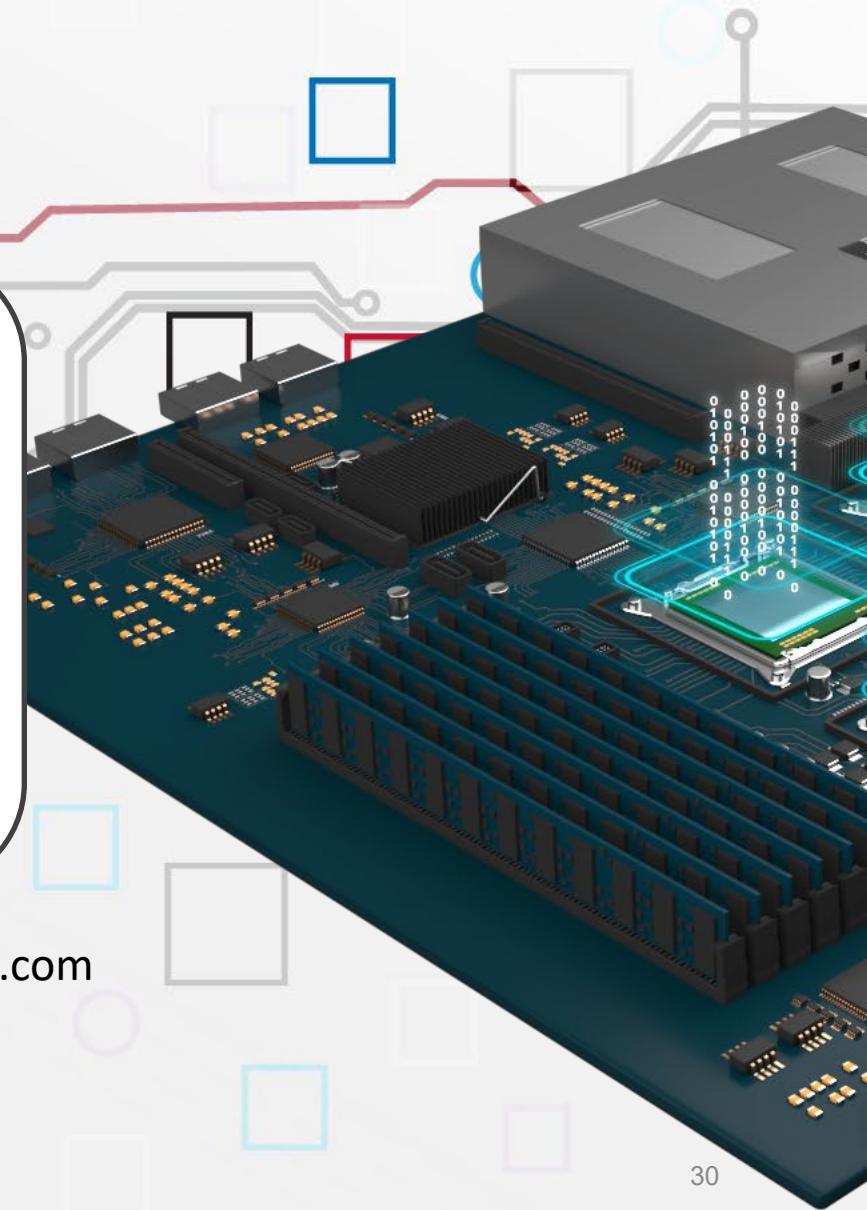


**ECAD Experts**

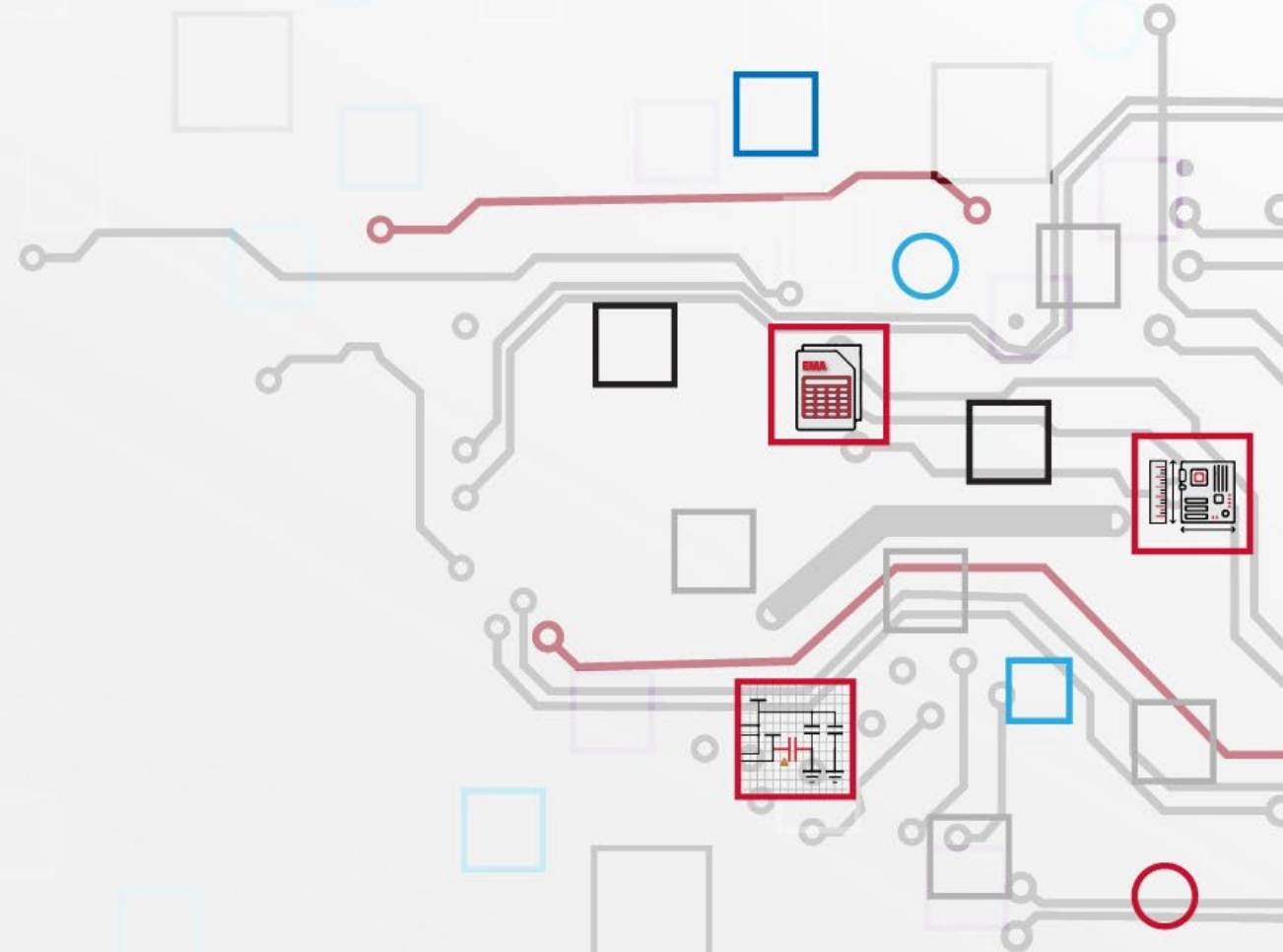
**30+ Years in PCB Design**

**Software – Support - Services**

Questions? Please contact us at [info@ema-eda.com](mailto:info@ema-eda.com) | [www.ema-eda.com](http://www.ema-eda.com)

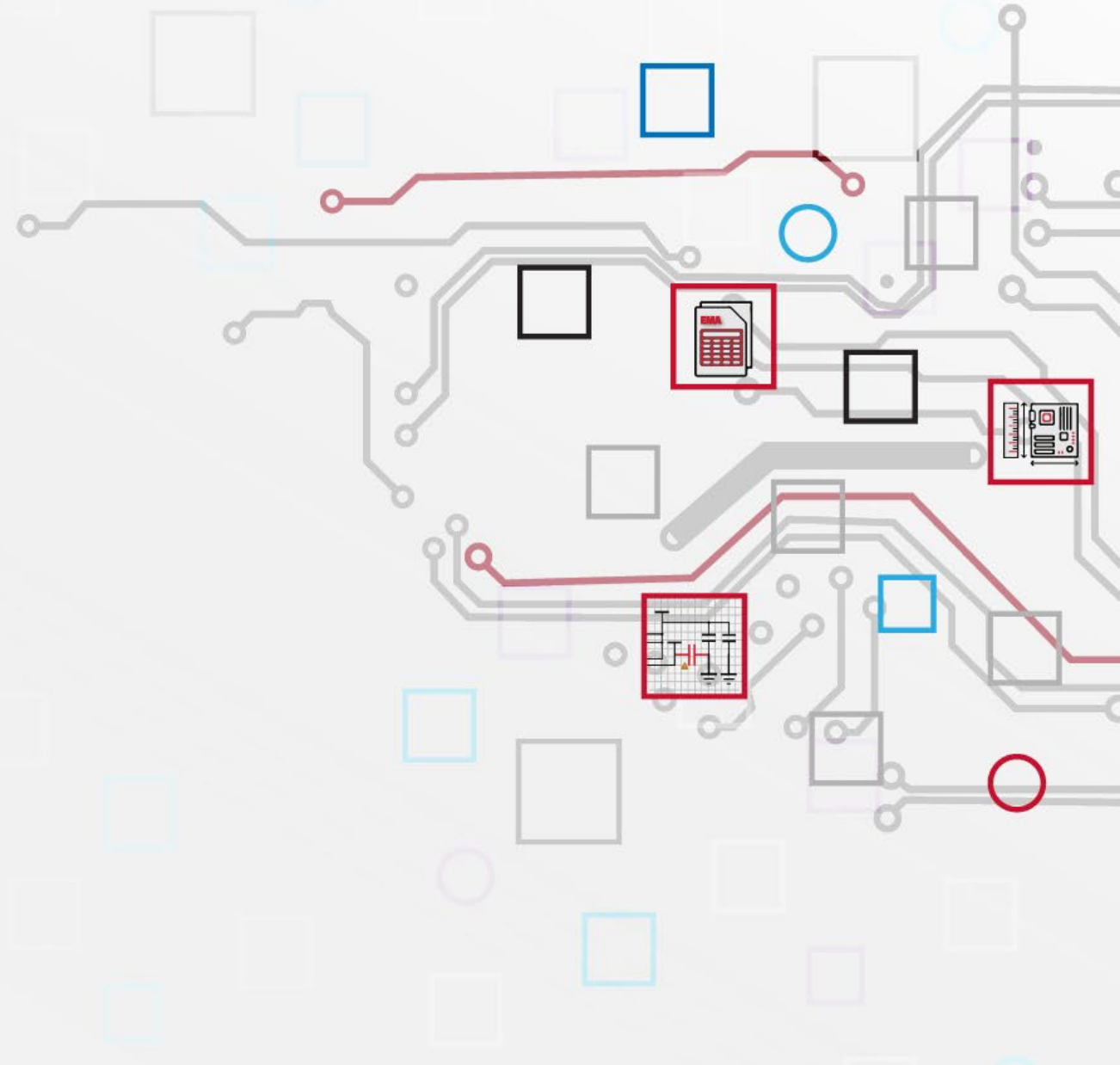


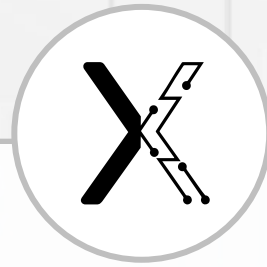
# Backup



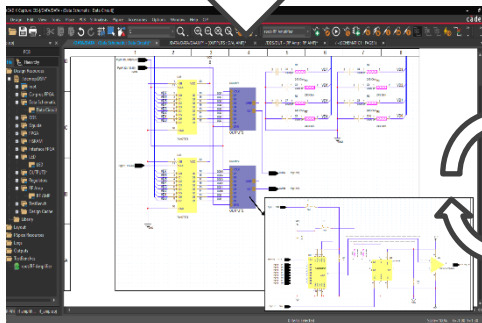
# OrCAD X

Next Generation PCB Design  
Platform

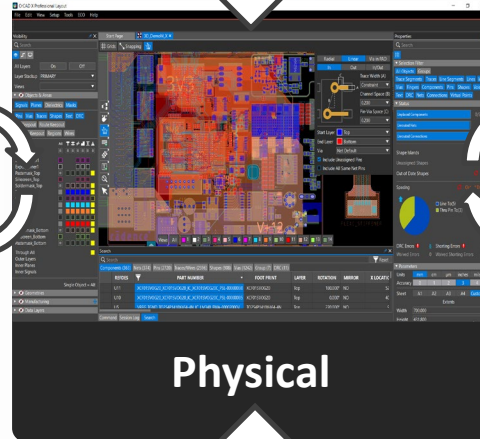




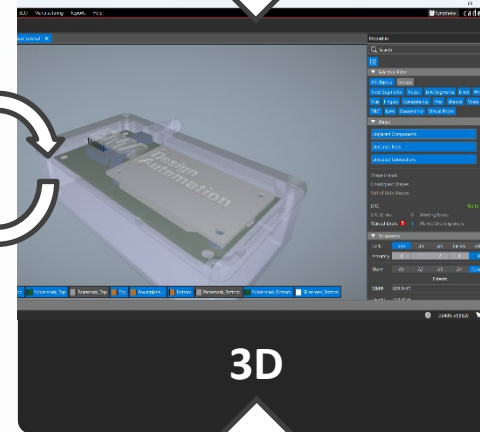
**Simulation & Analysis**  
SI – PI – RF – EM – Thermal - SPICE



**Logical**



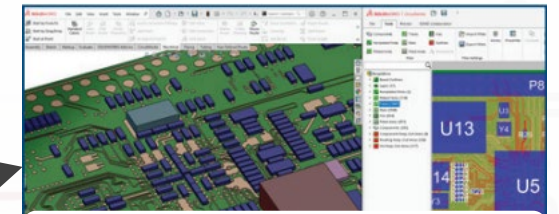
**Physical**



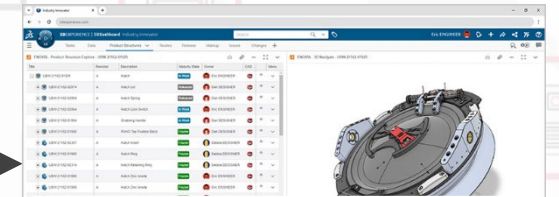
**3D**

**Real-Time Design**  
Constraints – Libraries – Supply Chain – Change Management

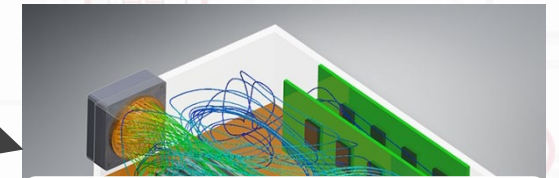
**OrCAD X Design Environment**



**MCAD**



**PLM**

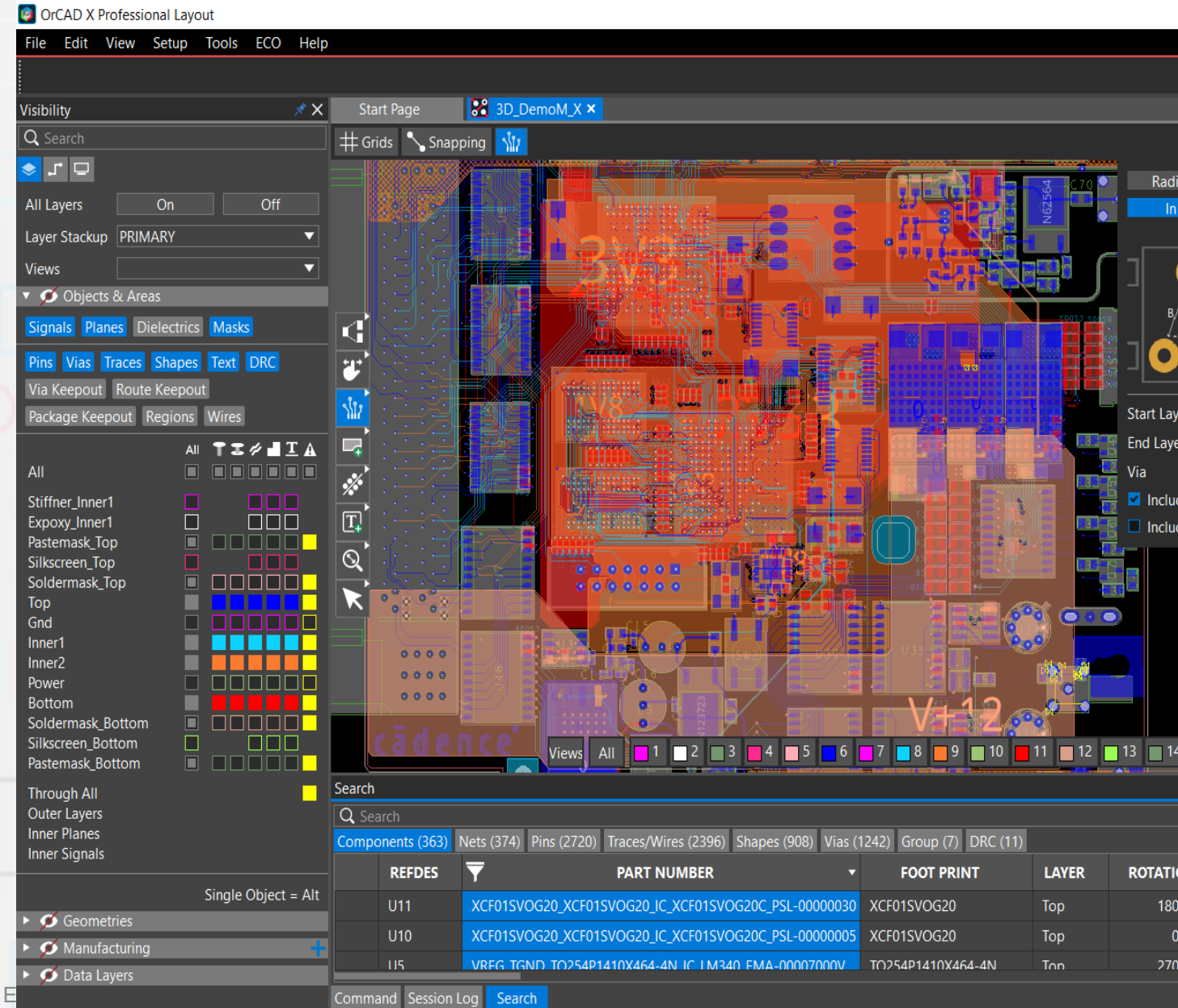


**System  
Simulation**

## LAYOUT & ROUTING

# Presto

- New PCB Layout UX
- Focused on productivity & ease of use combined with powerful layout and routing engines of Allegro
- Fully compatible with OrCAD & Allegro PCB Editor (same .brd)
- Designed for Full-time & Occasional Use



## LAYOUT & ROUTING

# Presto

- Easy to Use
- Designed to make information discoverable, data presentation contextual
- Live links to drill into details where applicable
- Built-in search engine with live editing
- Visual help and guidance

**Search & Modify**

**Graphical Guidance**

**Configurable R2M Packaging**

**Live DRC Panel**

**Contextual Help**

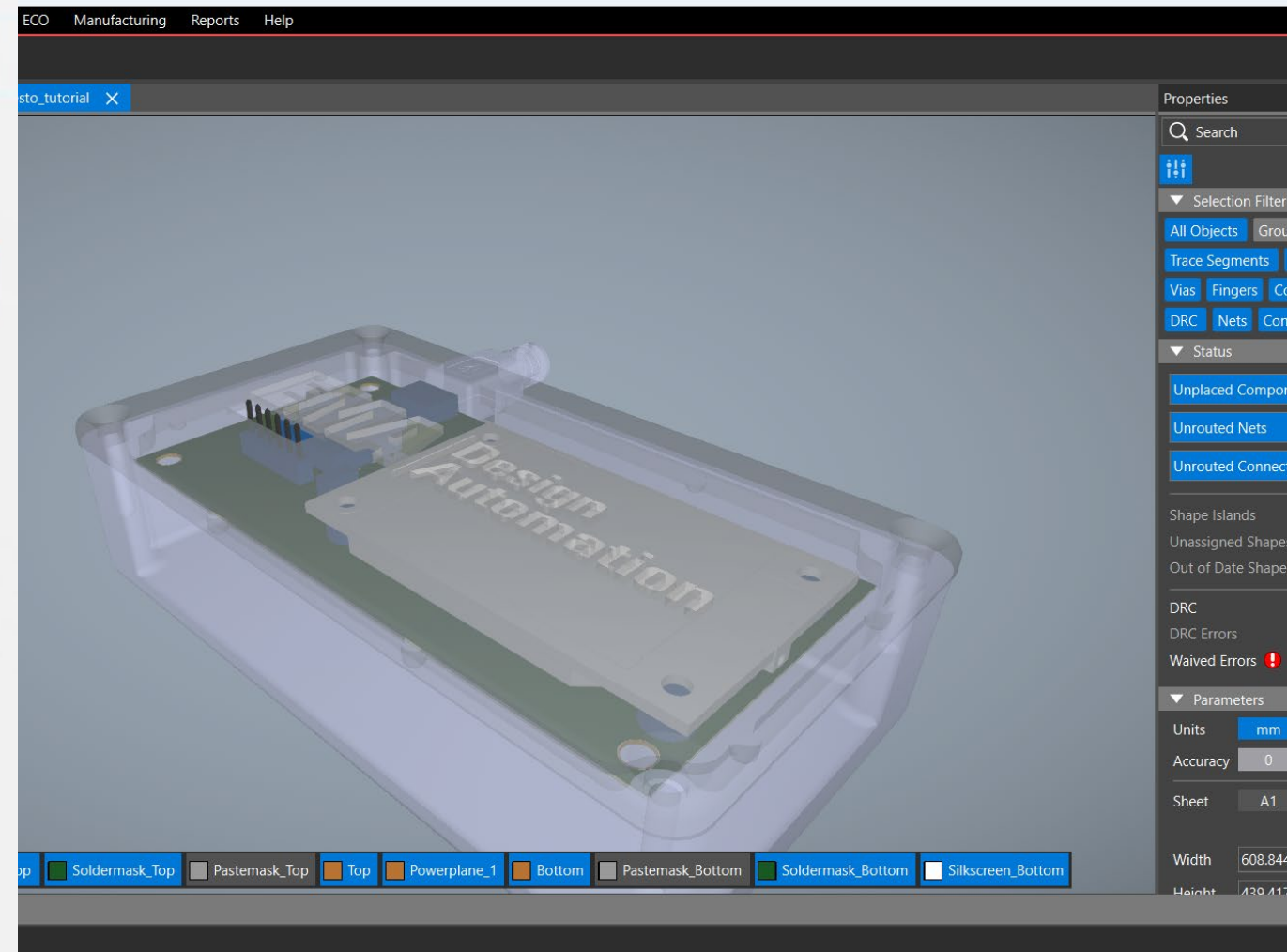
The screenshots show the following features:

- Search & Modify:** A table of unconnected nets with columns for Object, Layer, Net, Width, X Location, Y Location, Group, Associated Refs, Profile, Version, and Diameter.
- Graphical Guidance:** A radial routing tool with options for In, Out, and In/Out, including settings for Trace Width (A), Channel Space (B), Pin-Via Space (C), Start Layer, End Layer, and Via.
- Configurable R2M Packaging:** A panel for configuring R2M packaging, including options for IPC2581 Database (Fabrication) and Livedoc Fabrication and Assembly Docume.
- Live DRC Panel:** A panel showing DRC errors, including a pie chart for Design (13), Electrical (24), Physical (6), and Spacing (21), and a list of errors with counts.
- Contextual Help:** A panel showing a shape utility tool with options for Resize, Boolean, Trim Corners, Merge, Intersect, Subtract, and Exclude, and a warning to Select Reference Shape.

## ELECTROMECHANICAL DESIGN

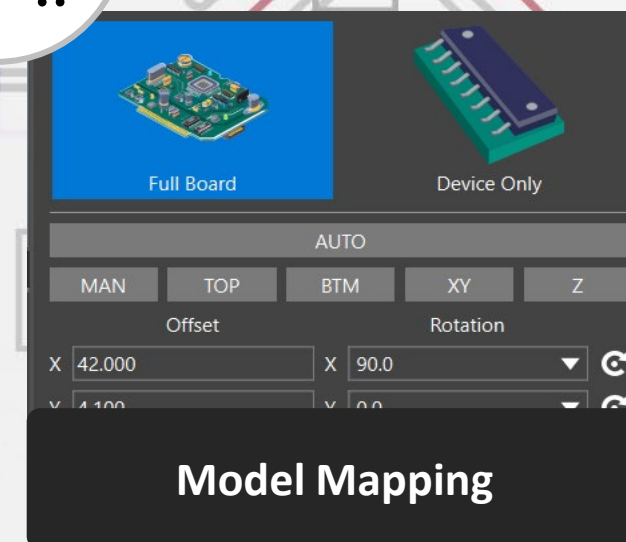
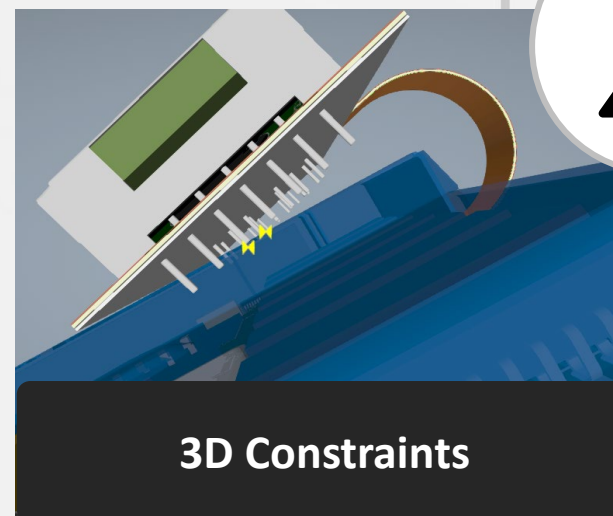
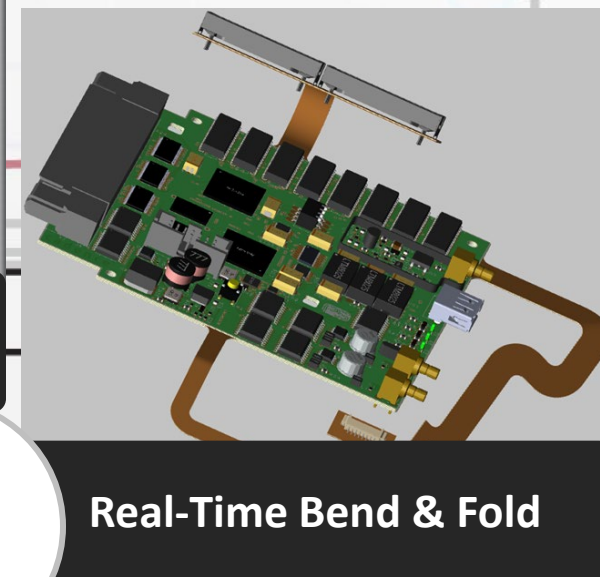
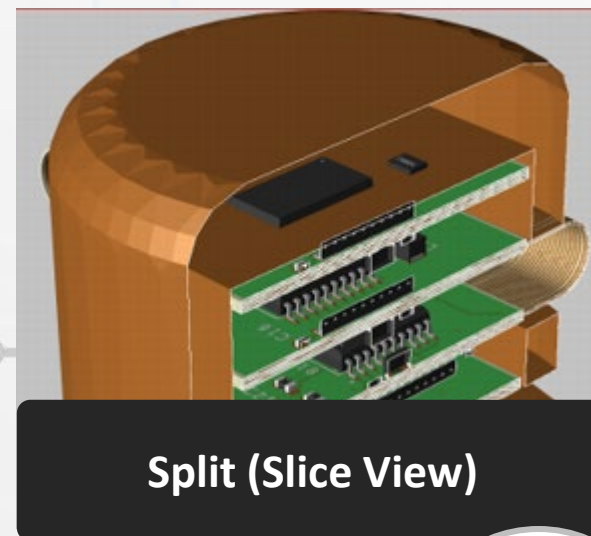
# ECAD/MCAD

- New 3D engine, Built for performance
- Real-time 3D constraints
- Import mechanical elements – export design for mechanical integration



# OrCAD X 3D Engine

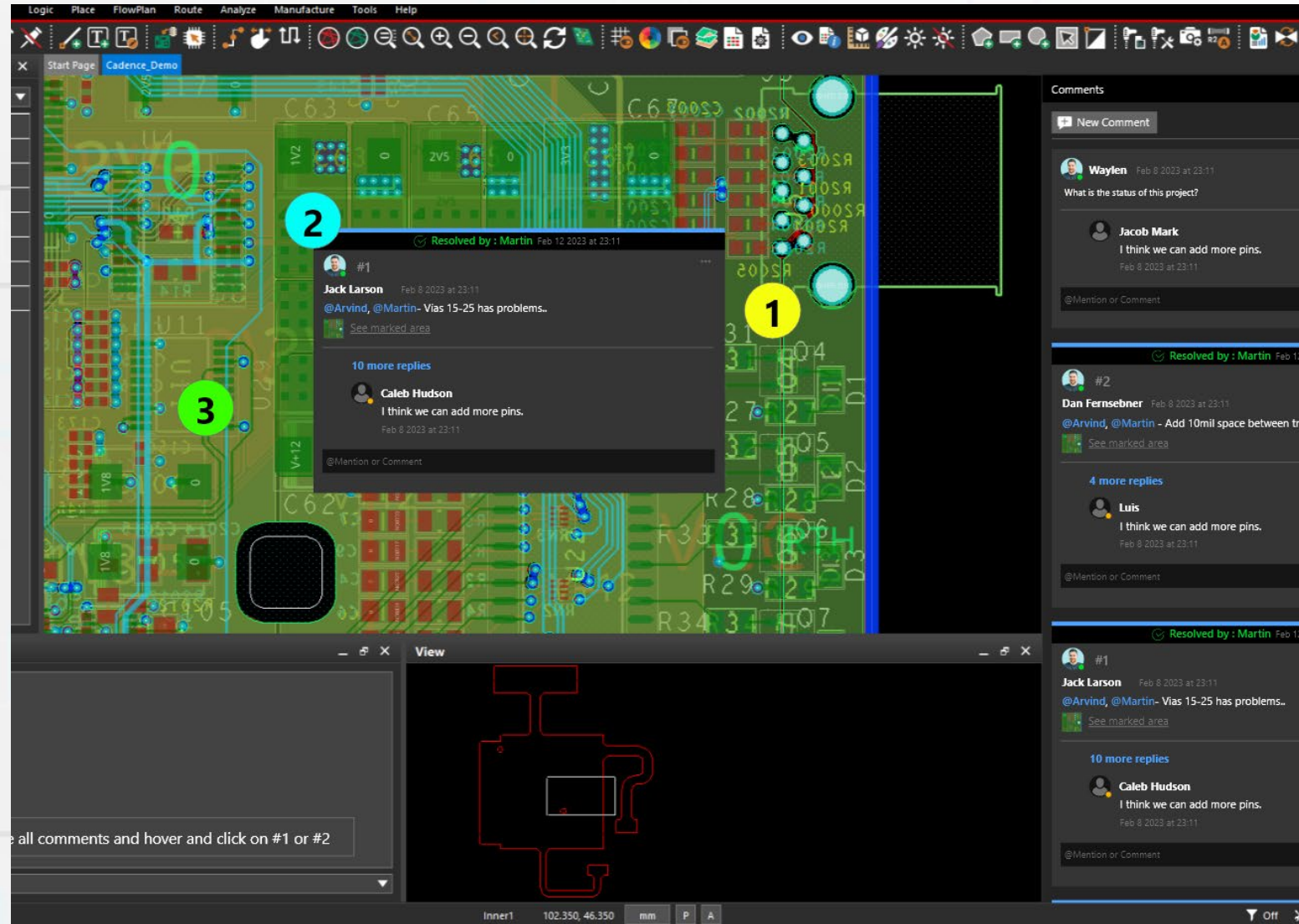
- Full Featured
- Easy to Use
- Cross Probe between 3D & 2D
- Automated 3D model mating and alignment



## COLLABORATION

# Review & Markup

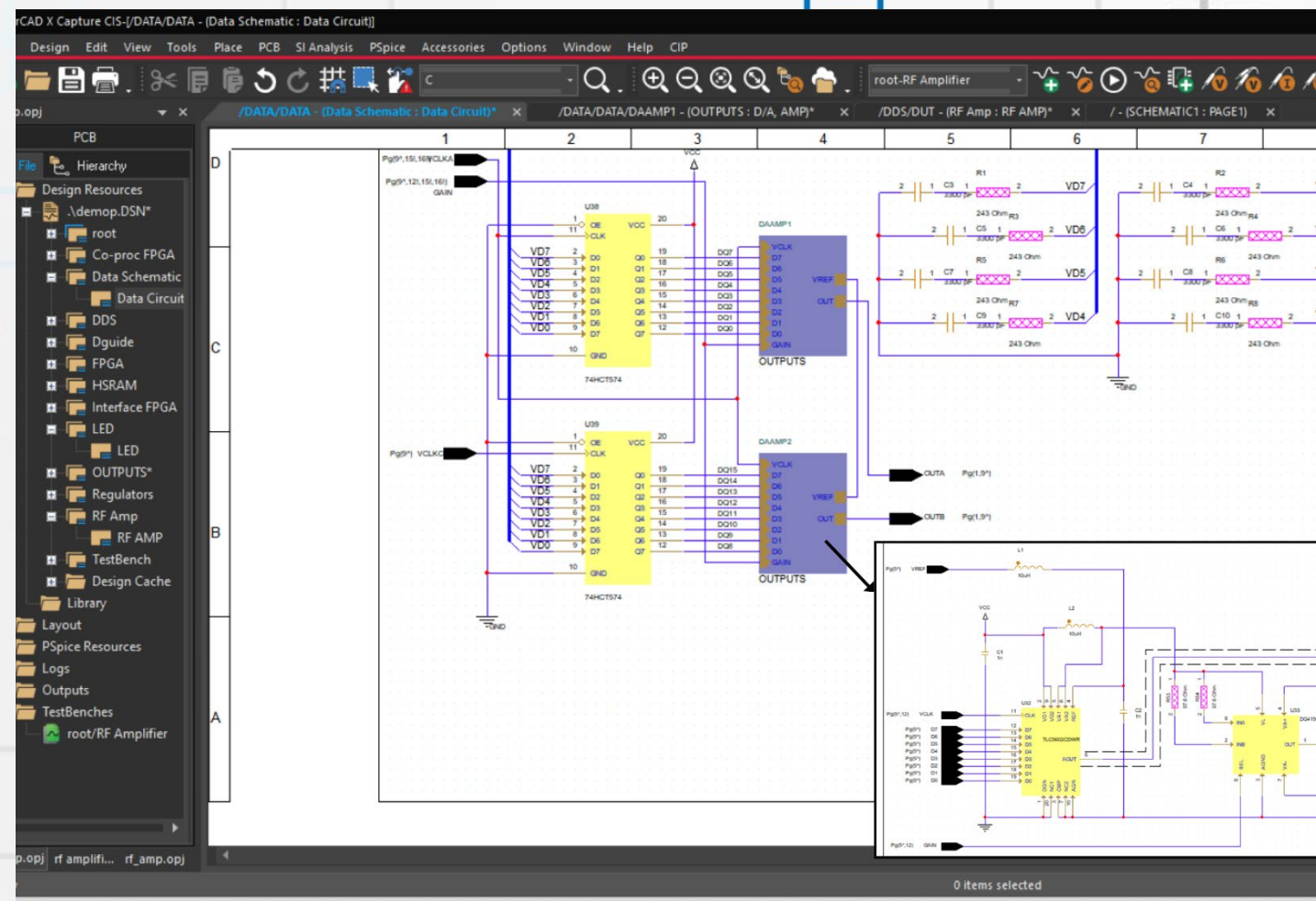
- Embedded Markup Layer
- Like GoogleDocs
- Stored in PCB database
- Commenting, Resolve, history tracking



SCHEMATIC CAPTURE

# Streamlined Design Capture

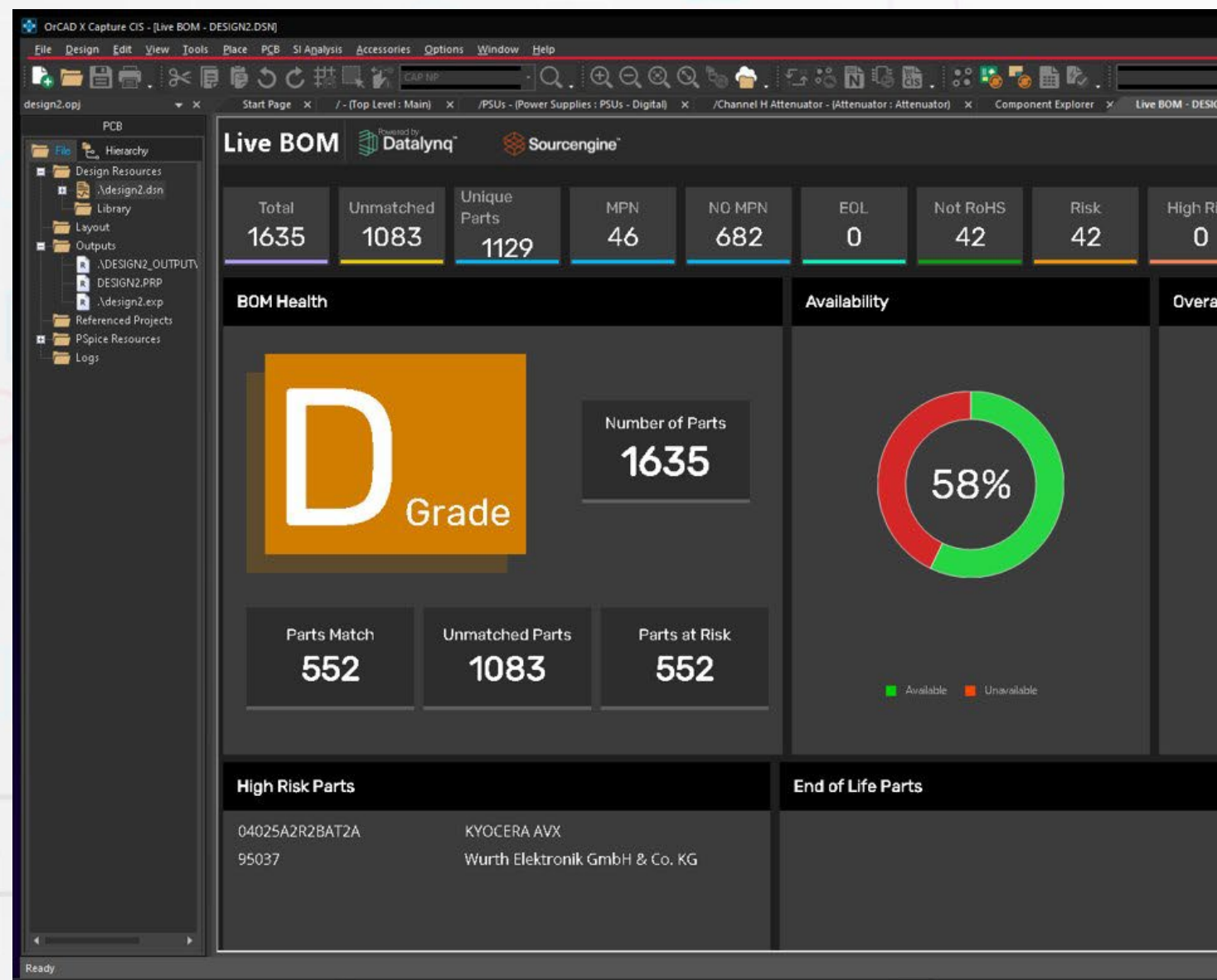
- Hierarchical Design
- Constraint Definition
- Real-Time DRC
- Connected to PCB and Simulation



## SUPPLY CHAIN

# LiveBOM

- On-demand supply chain intelligence
- Reviews and provides a grade
- Swap and update parts quickly as needed
- Ensure a compliant and orderable BOM
- Available via Cloud or On-Prem

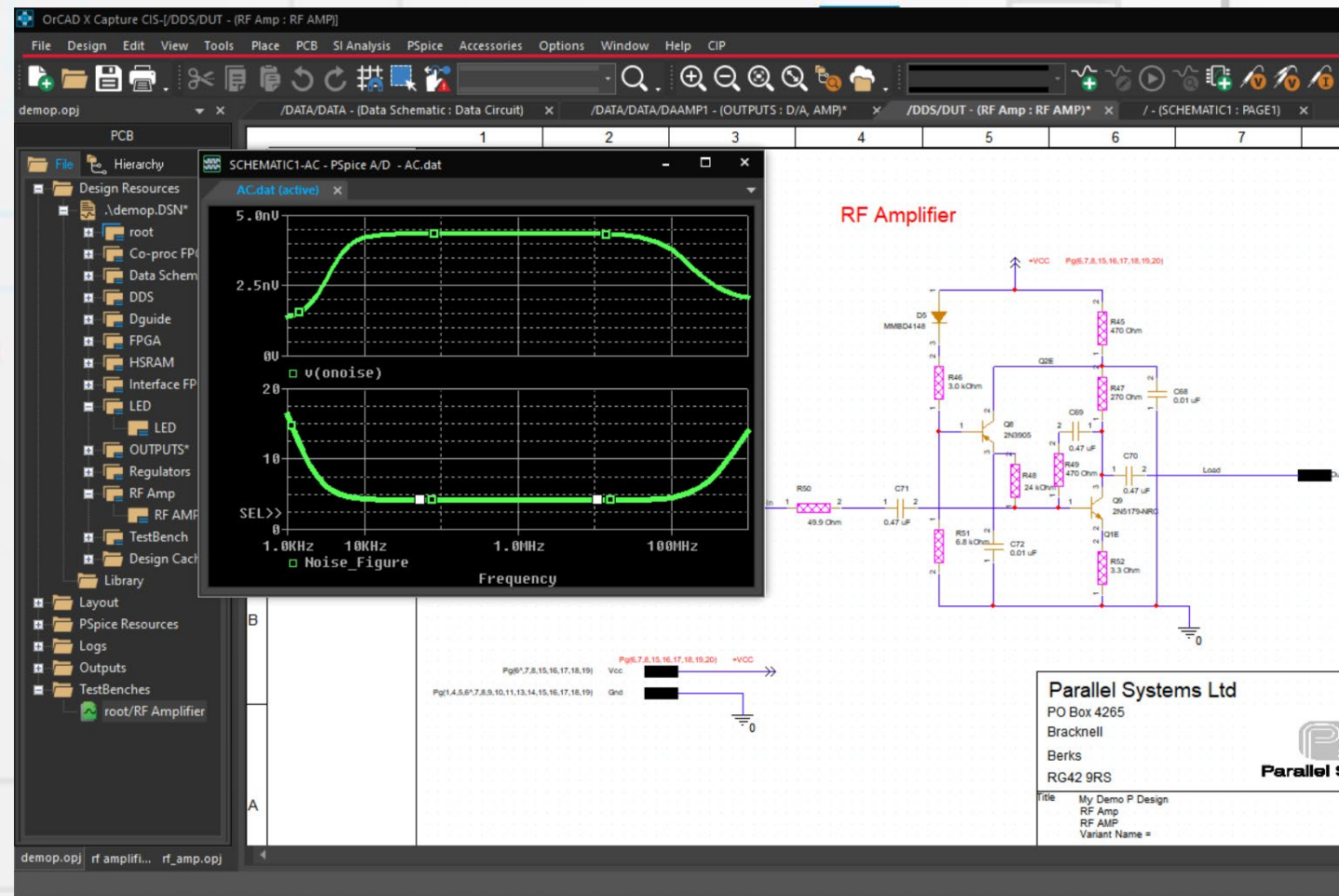




SHIFT LEFT

# Embedded SPICE Analysis

- Run SPICE analysis inside your PCB design environment
- PSpice Testbench functionality to partition design for sim & experimentation
- Perform reliability, yield, stress, and optimization analysis

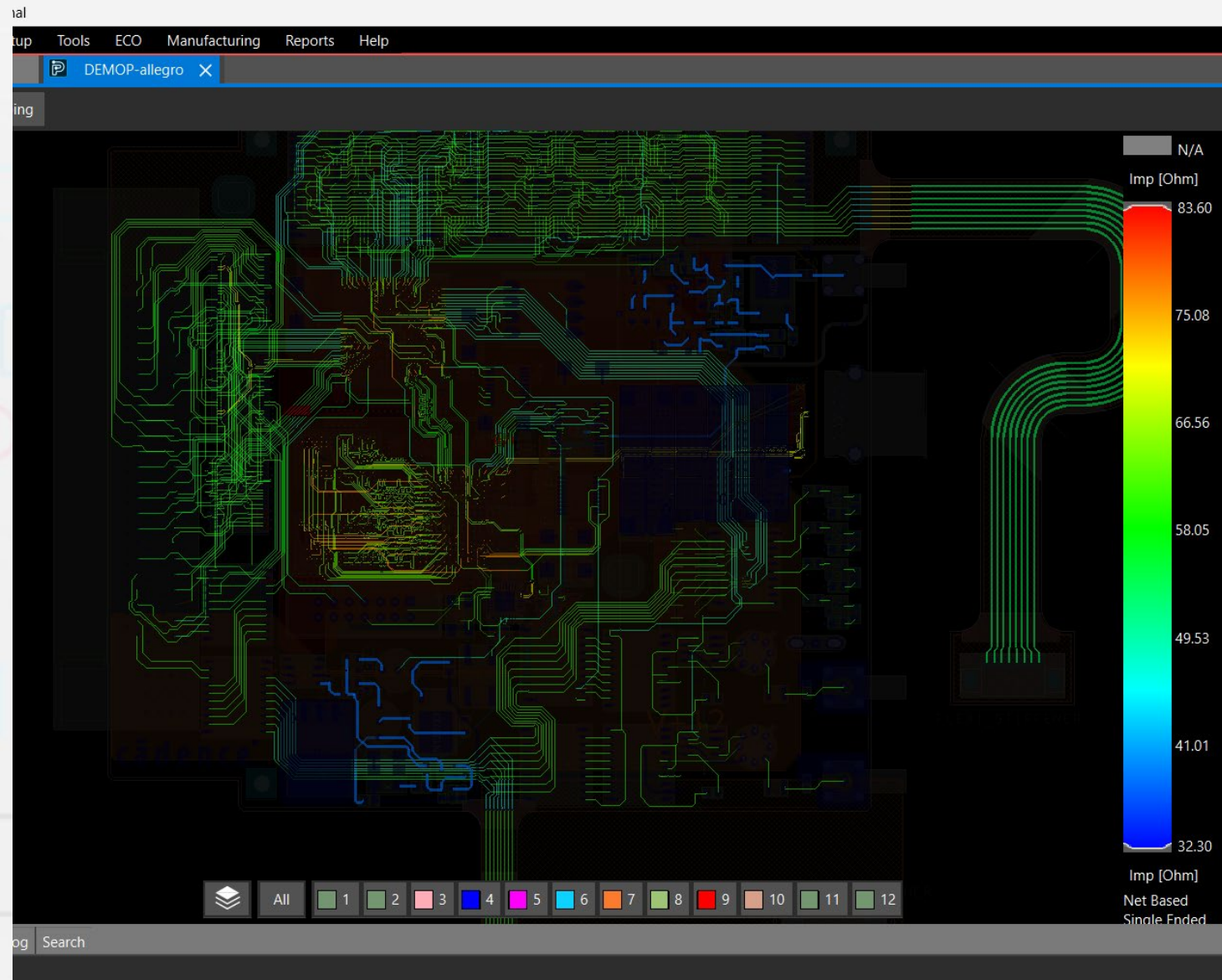


SHIFT LEFT

# In-Design Analysis

- Perform electrical analysis inside the design canvas
- Visual overlays make finding and fixing issues quick & effective
- Analysis to cover:
  - Impedance
  - Coupling
  - IR Drop
  - Crosstalk
  - Return path
  - Thermal (coming soon)

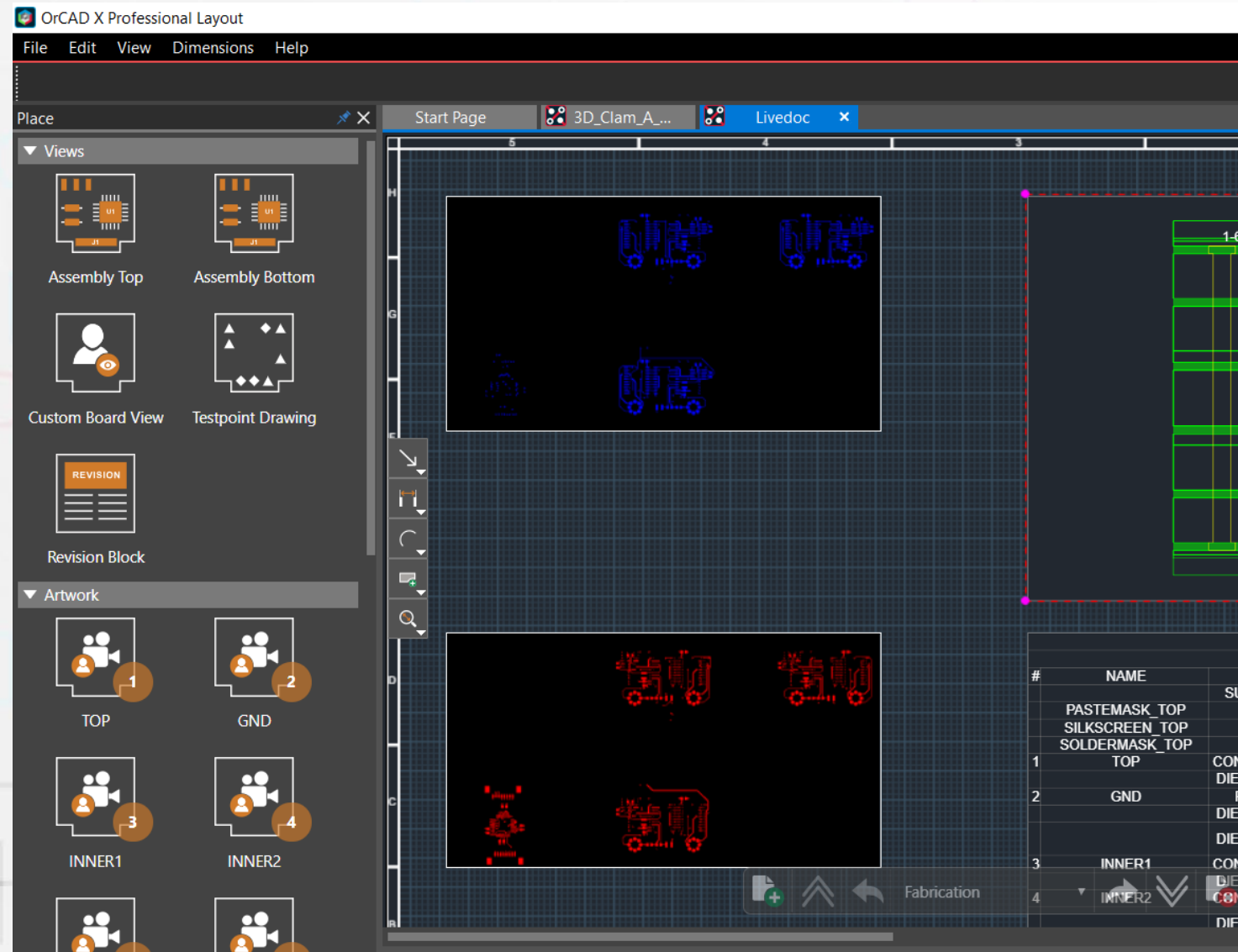
2/2/2026



## DOCUMENT

# LiveDoc

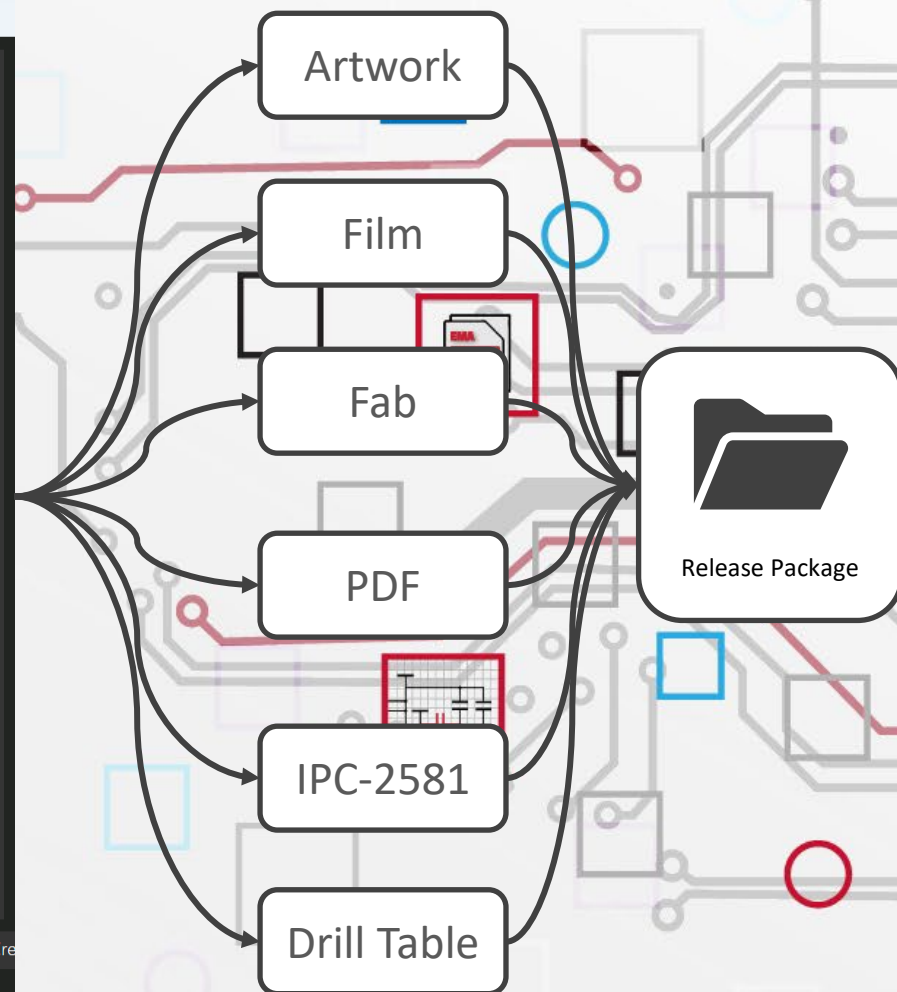
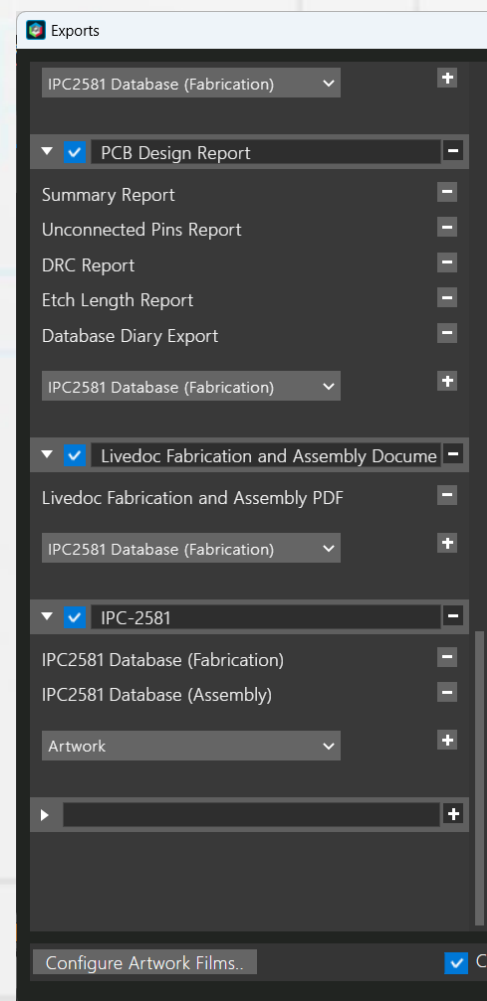
- Automated PCB Documentation
- Live Updates
- Template Driven
- Ensure docs are complete, up to date and ready



RTM PACKAGE

# Release Packager

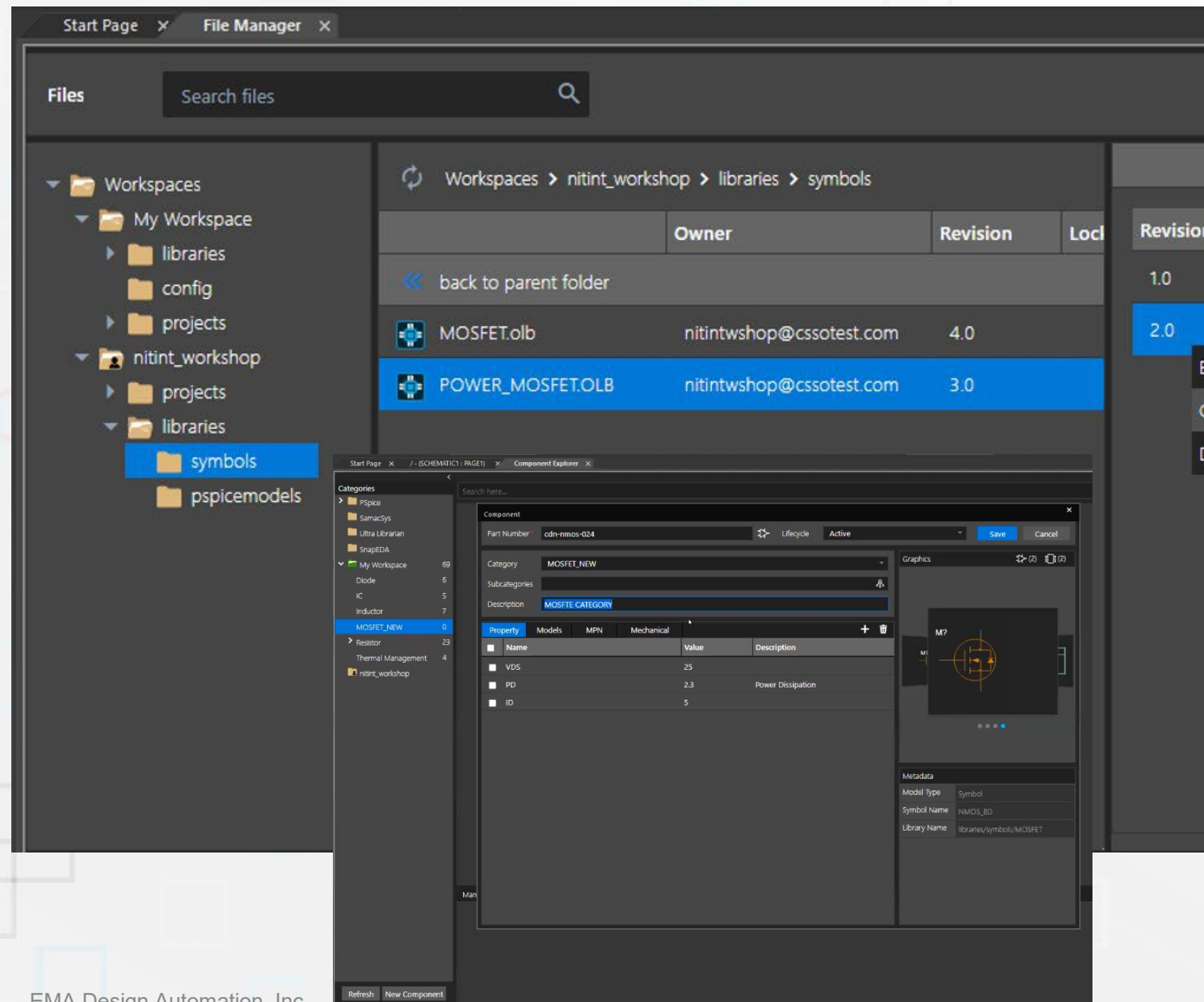
- Define & Customize Release Package
- All files & reports generated and placed in Zip file for delivery
- Template driven, always based on latest design data



CLOUD

# Workspaces

- Cadence Cloud Repository
- Store and share design files and libraries
- No setup and config required



Library & Modeling

# Unified Libraries (CIS)

- Geometries & Parametrics
- Discoverable & shareable
- Track status & updates
- Connect to internal & external data sources
- Cloud & On-prem options

2/2/2026

The screenshot displays the EMA Design Automation software interface, specifically the Component Explorer and Property windows.

**Component Explorer:** Shows a list of components under the 'Atmega328p' category. The 'Ultra Librarian' is selected in the left sidebar. The list includes various ATMEGA328PB models (e.g., ATMEGA328PB-MU, ATMEGA328PB-MN, ATMEGA328PB-MUR, ATMEGA328PB-AU, ATMEGA328PB-MNR, ATMEGA328PB-AN, ATMEGA328PB-AUR, ATMEGA328PB-ANR, ATMEGA328PB-PU, ATMEGA328P-AU, ATMEGA328P-MU, ATMEGA328P-AUR, ATMEGA328P-AUR) and their manufacturers (Microchip).

**Property Window:** Displays the properties for the selected component (ATMEGA328PB-MU). The 'Part Number' is ATMEGA328PB-... and the 'Manufacturer' is Microchip. The 'Part Description' is IC MCU 8BIT 32... The 'DataSheet URL' is Do No. The 'Have Symbol' and 'Have Footprint' are both 1. The 'Symbols and Footprints' section shows a preview of the component symbol and footprint.

**CIS Explorer - Place Database Part:** Shows a table of parts with their status. The table has columns for 'Number', 'Part Status', and 'Part Number'. The parts listed are CF0603FT27K4, 100105, 100105, 100333, and 100333. The status for CF0603FT27K4 is 'Approved: Current' (green dot), and for 100105 and 100333, it is 'Approved: Not Found' (red dot).

**Pricing Window:** Shows pricing information for the selected component. The 'Distributor' is Digi-Key. The 'DistributorPartNumber' is ATMEGA328PB-MU-... The 'ManufacturerLeadW...' is 4 week(s). The 'ManufacturerURL' is <https://www.digkey.com>. The 'Unit Price' is USD 1.52. The 'Quantity in Hand' is 21210. The 'MOQ (1)' is USD 1.52.

CORRECT BY CONSTRUCTION

# Constraint Management

- Shift –Left with Full constraints at all levels
- View and set rules regardless of tier
- Ensure correct by construction design
- Physical, Spacing, Electrical Rules, DFM, 3D Constraints
- Real-Time Feedback

The screenshot displays the EMA Design Automation software interface for PCB constraints management. The main window shows a 'Physical' tab with various constraint categories like Spacing, Same Net Spacing, Manufacturing, 3D, Properties, and DRC. A 'Worksheet Selector' window is open, showing a tree structure for 'Electrical' constraints, including 'Electrical Constraint Set' and 'Routing'. A detailed view of a differential pair constraint set is shown, listing various signals and their properties.

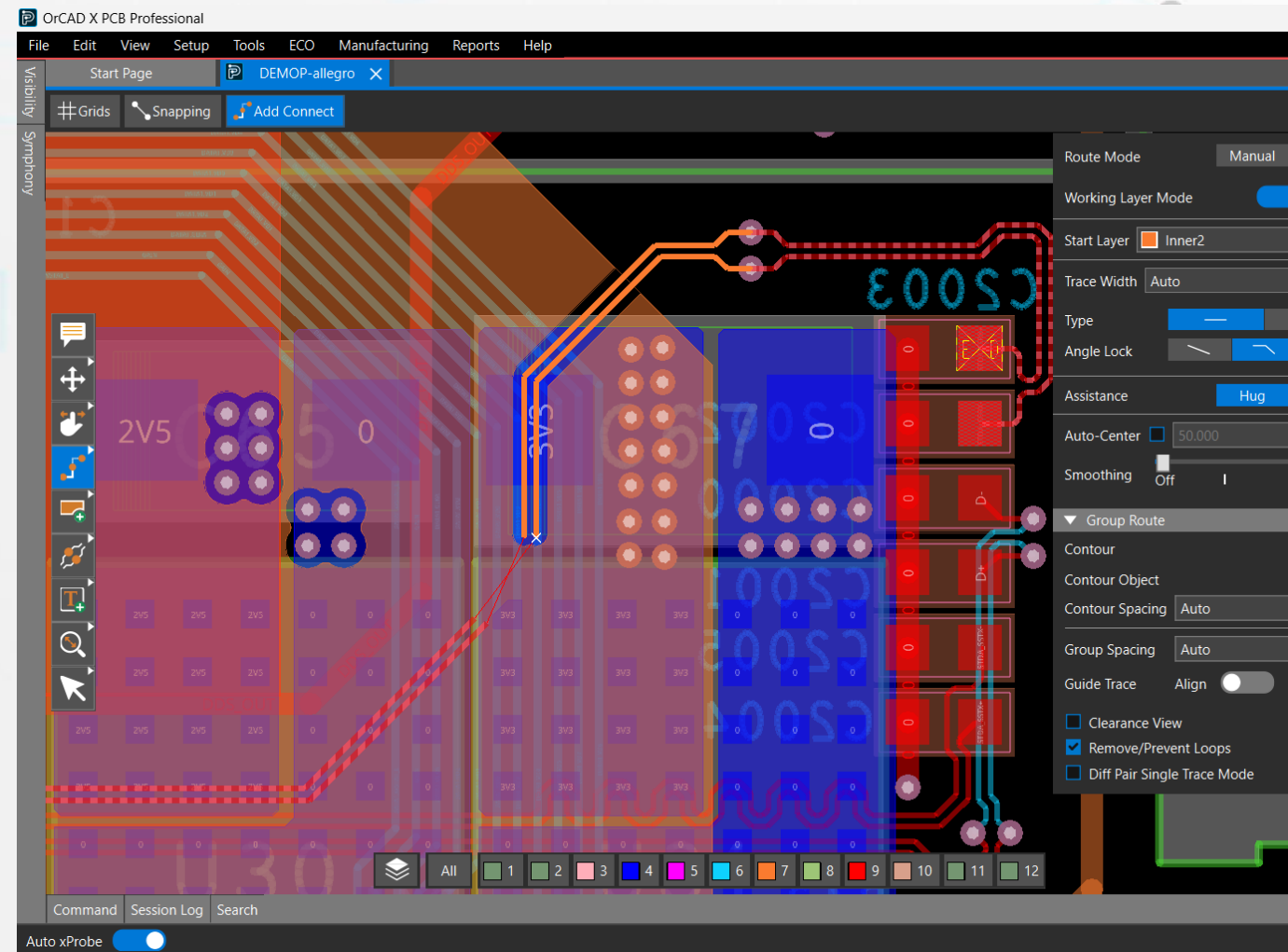
Name	Referenced Electrical CSet	Pin Delay		Gather Control
		Pin 1 mil	Pin 2 mil	
*_CLK_N<0>	DDR4_FLY_BY_B0	*	*	Ignore
*_CLK_P<0>	DDR4_FLY_BY_B0			Ignore
*_DQS_<0>				
*_DQS_N<0>	DDR4_DATA			Include
*_DQS_P<0>	DDR4_DATA			Include
*_DQS_<1>				
*_DQS_N<1>	DDR4_DATA			Include
*_DQS_P<1>	DDR4_DATA			Include
*_DQS_<2>				
*_DQS_N<2>	DDR4_DATA			Include
*_DQS_P<2>	DDR4_DATA			Include
*_DQS_<3>				
*_DQS_N<3>	DDR4_DATA			Include
*_DQS_P<3>	DDR4_DATA			Include
*_DQS_<4>				
*_DQS_N<4>	DDR4_DATA			Include
*_DQS_P<4>	DDR4_DATA			Include

The interface also shows a detailed view of a differential pair constraint set, including a table of signals and their properties, and a 3D visualization of the PCB layout.

## REAL-TIME FEEDBACK

# Dynamic Shapes by Default

- All shapes are dynamic self healing by default
- No need to hide or re-pour
- Know impact of shape adjustments as they happen
- Freeze shapes only for special use cases



CORRECT BY CONSTRUCTION

# DesignTrue DFM

- DFM as you design
- Instantly see issues
- Make RTM a signoff step
- Integrate rules from popular CMs (DesignTrue Portal)

The screenshot displays the Allegro Constraint Manager interface, which is connected to OrCAD X PCB Professional 23.1. The main window shows a 'Worksheet Selector' on the left with categories like Electrical, Physical, Spacing, Same Net Spacing, and Manufacturing. Under Manufacturing, there are sub-categories: Outline, Mask, Annular Ring, Copper Features, Copper Spacing (highlighted), Silkscreen, Design, Design for Assembly, Design for Test, and 3D. The main panel shows a table of constraint set usage with columns for Name and Constraint set usage. The table lists 'SIERRA CIRCUITS\_IN...' and 'SIERRA CIRCUITS' with 'Etch' as the constraint set usage. A 'DesignTrue Certified Vendor List' is overlaid on the right, showing a list of vendors with their details and logos. A 'Design for Fabrication' pie chart is also visible, showing the distribution of shapes: Annular Ring (16) and Copper Spacing (56). At the bottom, there are DRC and Shorting Errors counts: DRC Errors 72, Shorting Errors 0, Waived Errors 0, and Waived Shorting Errors 0. A 'Highlight DRC on Canvas' toggle is also present.

Select	Vendor	Logo	Favorite
<input checked="" type="checkbox"/>	<b>OSH Park</b> 311 B Ave, STE B Lake Oswego-97034, Oregon, USA James Neal 503-616-2484 cadence@oshpark.com http://OSHPark.com	OSH PARK	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<b>Tempo Automation</b> 2460 Alameda St San Francisco-94103, California, USA Lorenzo Ramirez 4153201261 dfm@tempoautomation.com https://www.tempoautomation.com/	TEMPO	<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>	<b>CircuitHub</b> 14 Industrial Drive East South Deerfield-01373, Massachusetts, USA Andrew Seddon 4086009697 andrew@circuithub.com http://circuithub.com	CircuitHub	<input checked="" type="checkbox"/>

**Design for Fabrication** Up to Date

Out of Date Shapes: 0

Design for Fabrication: Up to Date

Annular Ring(16)

Copper Spacing(56)

DRC Errors 72 Shorting Errors 0

Waived Errors 0 Waived Shorting Errors 0

Highlight DRC on Canvas