

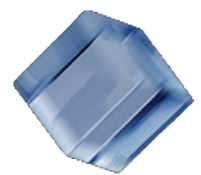
P R O D U C T O V E R V I E W

Z u k e n - T h e P a r t n e r f o r S u c c e s s

CR-8000 – System Level PCB Engineering from Concept to Manufacture



CR-8000™



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CR-8000 is a comprehensive PCB design suite that enables the development of a product from concept to manufacturing. CR-8000's fully integrated design flow ranges from initial system planning, where critical design decisions are made about design partitioning, component selection, form, fit and function of the product or system; through detailed schematic and 2/3D single and multi-board PCB design; to optimized manufacturing output. A modular, object-oriented architecture enables use of consistent data from concept to manufacture.

CR-8000 has been designed from the ground-up to take advantage of the latest advances in hardware and software technologies. This includes 64-bit, multi-thread and multi-CPU hardware support, OpenGL and DirectX graphics. Network environments with standalone client, data server, application server or cloud computing are supported.

By using a mouse in one hand and a touch pad in the other, CR-8000 supports the latest in human interface techniques that mean fewer mouse clicks and movements, and fewer dialogs.

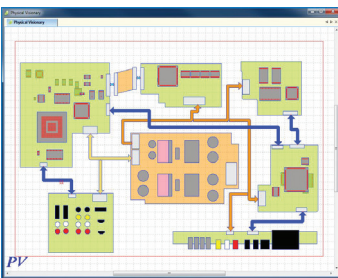
The CR-8000 suite comprises four main modules that can be combined in an end-to-end environment, or used as standalone toolsets.

- **System Planner:** a system-level design environment for up-front planning and partitioning of electronics systems.
- **Design Gateway:** an engineering platform for logical circuit design and verification of single and multi-board system-level electronic designs.
- **Design Force:** a system-level PCB design and analysis toolset combining conventional 2D design with 3D design in real-time.
- **DFM Center:** a comprehensive manufacturing preparation and output solution supporting panelization and common output formats.

These main modules can be extended and complemented through a wide range of fully integrated extensions and add-on toolsets. These will be listed together with the descriptions of the main modules below.

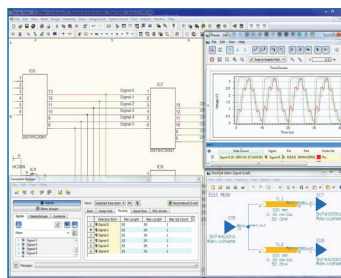
The authoring tools of the CR-8000 suite are complemented by a domain data management environment that provides comprehensive library, material master data and design data management capabilities directly integrated within the authoring environment.

System Planner



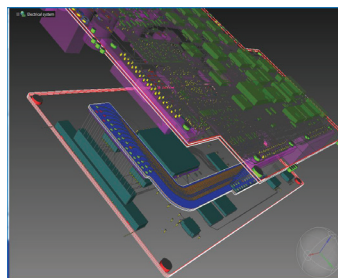
- Architectural planning of electronic systems and products
- Optimization for cost, weight or component supply status

Design Gateway



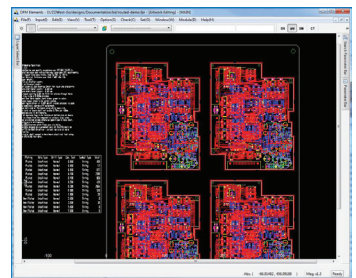
- System level definition, verification of complex systems
- Allocation of constraints for single and multi-board layout

Design Force



- 2D/3D Single and multi-board layout, routing and verification
- Routing by constraints
- Collision checks with STEP model of enclosure

DFM Center



- Panelisation of single or combinations of PCBs
- Real-time manufacturing design rule checks
- Comprehensive post-processing functionality

System Planner – System Level Architecture Optimization & Validation

System Planner is a system-level design environment for the **architectural planning** and optimization of electronics systems and products. It enables engineers to optimize partitioning and performance of multi-board systems, maximizing design reuse and eliminating the need to re-enter up-front planning data into the design tools during detailed design.

System Planner is the starting point for concept development and design creation. It brings steps that were once disconnected into one consolidated view. Engineers and designers can directly transfer planning data into the detailed design process of single and multi-board systems, maximizing design reuse. Design reuse can be employed from an existing library of reuse modules or by cutting and pasting design sections from existing known-good designs for use and/or modification in the current design.

Design architectures defined in System Planner can be seamlessly transferred to detailed engineering (system level engineering and simulation; physical layout; manufacturing output generation), enabling an iterative engineering methodology in which new

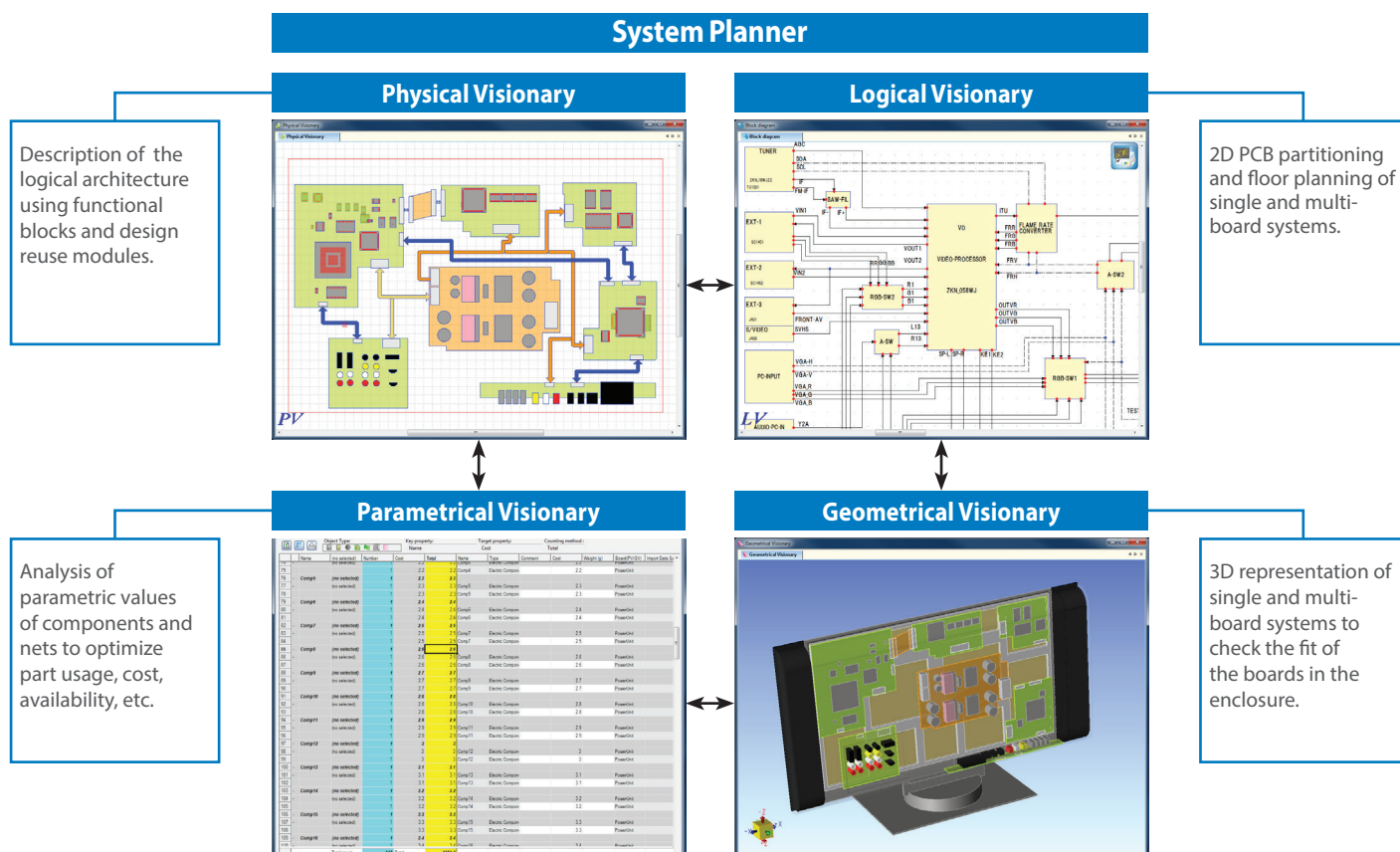
products can be developed based existing know-how, reducing engineering lead times and cost.

System Planner is made up of four components that work together in real-time.

- **Logical Visionary:** Used to describe the logical architecture using functional blocks and design reuse modules.
- **Physical Visionary:** 2D PCB partitioning and floor planning of single and multi-board systems.
- **Geometrical Visionary:** 3D representation of single and multi-board systems to check the fit of the boards in the overall system in the enclosure.
- **Parametrical Visionary:** display and analysis of parametric values of the components, nets, and other elements in the design, allowing the user to optimize part usage, cost, availability, etc.

Available options for System Planner:

- **Scenario EX:** A toolset for topology, routing and termination network planning with automatic and manual simulation model assignment.
- **Design Force SI:** A signal integrity simulator for stand-alone simulation or direct access from System Planner, Design Gateway and Design Force.



Design Gateway – System Level Circuit Design, Simulation & Analysis

Design Gateway is the circuit engineering environment that enables definition and verification of complex systems as well as allocation of constraints for single and multi-board layout in CR-8000 Design Force. Design Gateway can be used on its own, as well as in the CR-8000 design flow.

Functional block diagrams defined in the architectural planning environment of System Planner can be directly imported into Design Gateway for detailed circuit engineering.

An integrated component browser helps identify suitable components by entering constraints and attribute values into a spreadsheet menu.

Design Gateway supports both flat and hierarchical schematics, which can be verified using embedded simulation tools for signal integrity, analog simulation, RF analysis, system level simulation and HDL. By supporting hierarchical schematics, Design Gateway also assists design re-use, allowing engineers to use proven logical circuits from previous projects.

Using Design Gateway's constraint browser, constraints can be defined for any combination of nets, extended nets, differential pairs and busses, using a spreadsheet approach. In the same way additional layout rules can be added for nets, and complex spacing rules can be managed within nets and between net groups. These include:

- Net classes
- Differential pairs

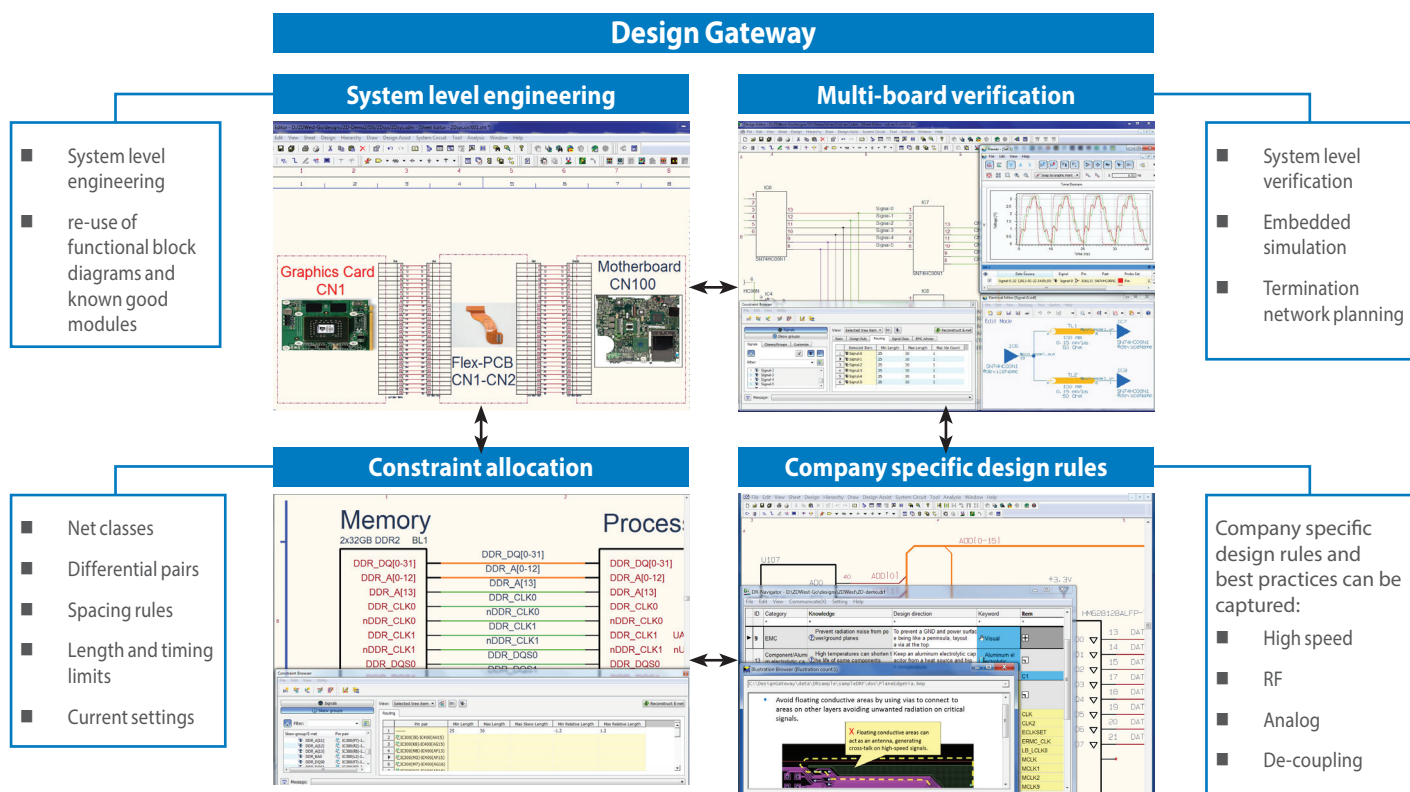
- Spacing rules
- Length and timing limits
- Current settings

All constraints can be verified with bi-directional cross-probing between schematic and PCB layout.

With the full support of variant design in Design Gateway, part assignments and placement status can be managed for multiple assemblies in one utility. Through a direct integration into Zuken's domain data management environment DS-2 designer, users have direct access to approved and released components.

Design Gateway can be complemented through the following options:

- **Analog Simulation Manager:** A simulation cockpit for Spice simulation tools (P-Spice, LT-Spice, H-Spice).
- **Circuit Design Review Navigator:** A tool for capturing and providing company specific design rules and best practice (high speed, RF, analog, de-coupling) within the CAD environment.
- **Graphical Pin Manager:** A powerful PCB-FPGA co-design environment that enables exchange of I/O and constraint information between PCB designs and FPGA designs.
- **Design Gateway Viewer:** A native schematic data viewer with comprehensive analysis capabilities, such as cross-probing, constraint viewing, signal classes and many more.



Design Force – 2D/3D Multi-board PCB Design

Design Force is the **PCB layout** application in the CR-8000 product suite. It supports single board, multi-board and chip, package and board interconnect design and analysis. Combining traditional 2D design with native 3D design and the latest human interface techniques, as well as accelerated graphics for almost instantaneous rendering and refreshing, Design Force is the most advanced PCB design solution available today.

Design Force exchanges information with System Planner and Design Gateway to drive the design process and share changes between the product planning and circuit design disciplines. This allows design teams to create multi-board designs without unnecessary iterations during the design process.

Physical Layout in 2D and 3D

Design Force is fully equipped to manage all of the boards in a system, and bring them together in one view within the boundaries of their mechanical enclosures. These can be loaded as STEP models and displayed together with the PCB design. Design Force can handle any combination of PCBs, packages, and system on chips (SoCs) within one design, completing the layout of the design in one environment. With a multi-board constraint browser, signals can be highlighted across each entity in the system. In the same way, the entire interconnect length can be analyzed across multi-board layouts.

Functional blocks and pre-routed layout-patterns can be imported from libraries of known-good modules, as well as from the architectural planning tool System Planner using drag & drop.

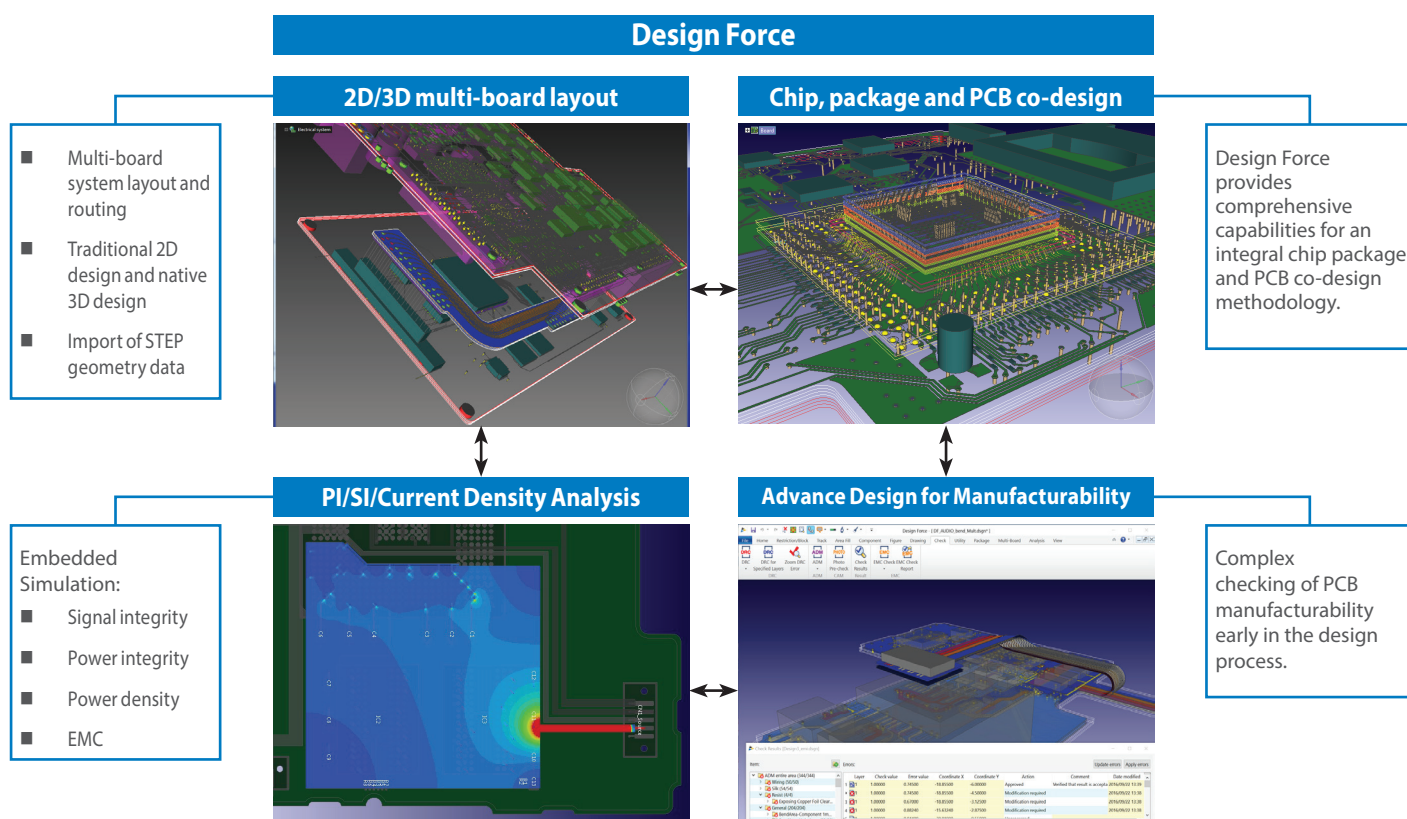
Layout and routing of complex high density multi-layer systems is enhanced by the ability to switch between 2D and 3D views at any given time. 3D views enable improved traceability of signal routes running across several layers as well as inspection and modification of embedded components and layer stacks.

Chip package and PCB co-design

With its ability to switch between 2D and 3D, Design Force provides the ideal environment for the physical layout of 2.5D/3D system-in-package (SiP), package-on-package (PoP) and package-in-package (PiP) components. With these capabilities, Design Force provides comprehensive capabilities for an integral chip package and PCB co-design methodology.

To create SiP and PoP components, Design Force provides dedicated functionality supporting the design of interposer layers and through-silicon-vias (TSV) in all common layer stack types (stacked, interposer, wire-bond, and flip-chip).

To fine-tune the connectivity between the chip, package and board, Design Force includes a multi-board Constraint Manager that supports signal and timing analysis across multiple board and package designs.



Design Force can be extended through a comprehensive choice of verification, analysis and output generation tools:

- **Scenario EX:** Post layout extraction of single and coupled (crosstalk) routed traces; What-if analysis; Cross-section view for traces.
- **Design Force SI:** A simulation environment for post layout signal integrity simulation.
- **PI/EMI Analysis Module:** A simulation environment for Power Integrity (AC impedance and de-coupling impact, DC voltage drop, current analysis) and electro-magnetic interference (EMI full board screening, differential mode, common mode, power bus noise).
- **Current Density Check:** Fast and easy check of the current density of a layout structure towards a given maximum.
- **Advance Design for Manufacturing ADM:** Complex checking of PCB manufacturability early in the design process. ADM facilitates checking that the design has been carried out in conformance with both manufacturing and component mounting specifications.
- **Board Design Viewer Advanced:** A viewing tool for sharing and reviewing Design Force design information including component property viewing (query), cross-probing with schematics; Design Rule Checks and manufacturing rule checks; graphical comparison of boards.
- **DFM Elements:** Creation of panel designs, fabrication and assembly drawings, and CAM outputs.

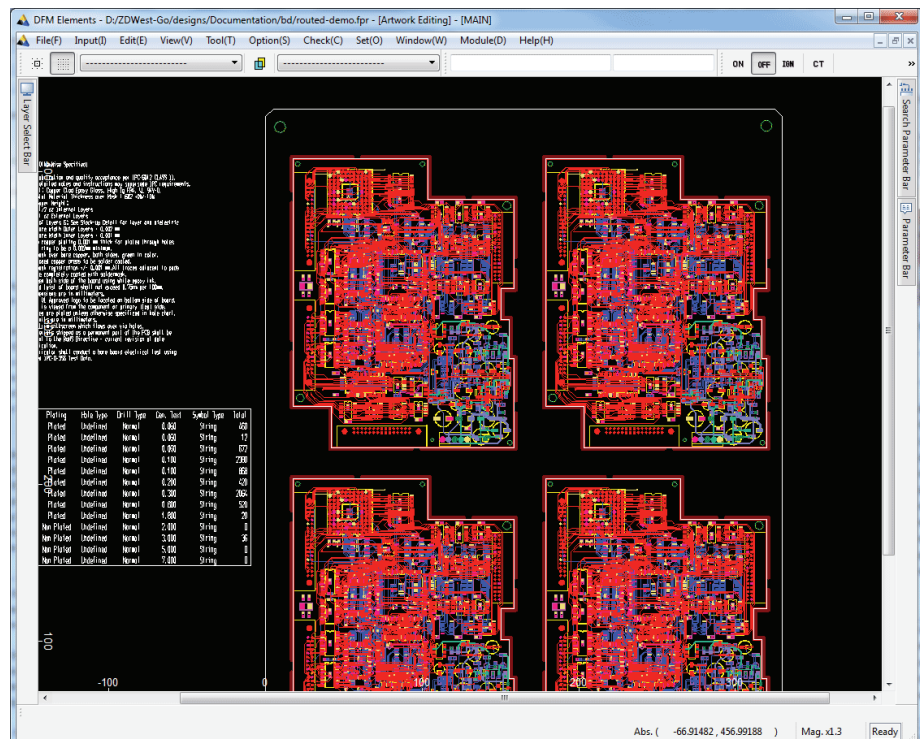
DFM Center – PCB Manufacturing Design & CAM Verification

DFM Center is a comprehensive manufacturing preparation and output solution supporting panelization and common output formats.

DFM Center allows designers to prepare and verify comprehensive manufacturing data by paneling up a single or multiple PCB designs with real-time manufacturing design rule checks (DRCs).

Additional fabrication and assembly checks can be applied dynamically based on any manufacturer's specifications. This makes sure designs can be moved between different manufacturing service providers in a design-anywhere-manufacture-anywhere approach.

With comprehensive post-processing functionality, designs can be analyzed for manufacturability and modifications, such as automatic copper flooding of the complete panel can be applied to the design. For documentation purposes drill tables can be generated automatically and completed with various dimensioning options.



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DS-2 – Library and Design Data Management

Zuken's **engineering data management platform DS-2** combines multi-site library, design data and configuration management into a unified engineering environment. DS-2 has been created for the specific demands of electronic and electrical product design management.

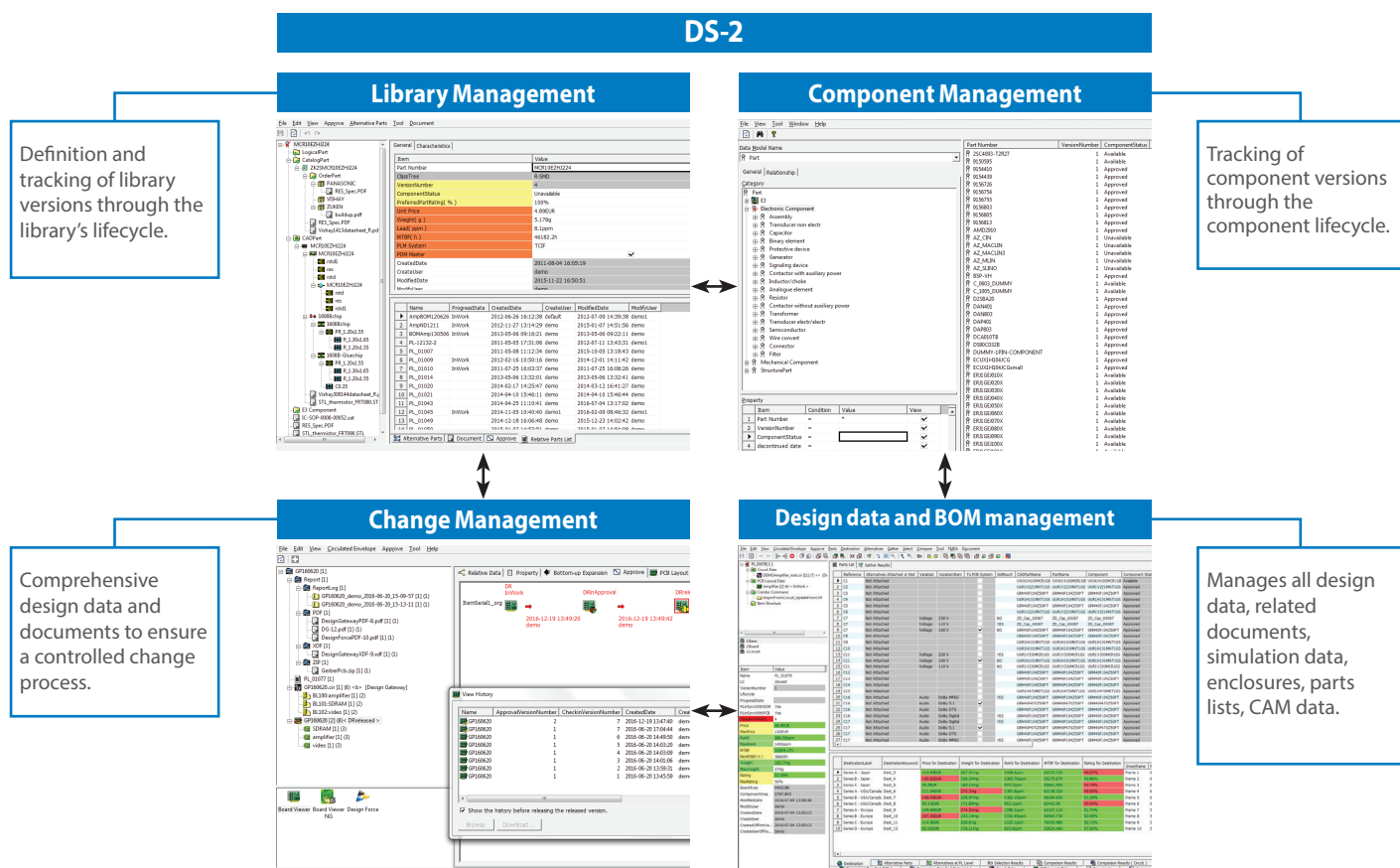
DS-2 supports site-specific components, BOM handling and design data in one global environment that can be integrated into corporate PLM and ERP environments, uniting the design processes with the entire product lifecycle (PLM, ERP, project management).

- **Component information:** single-source environment for all component information within the engineering process.
- **Component version and revision management:** tracking of component versions through the component lifecycle allows concurrent changes to components throughout the product lifecycle, with full tracking and transparency.

■ **Design data and BOM management:** manages all design data, related documents, simulation data, enclosures, parts lists, CAM data, etc.

■ **Change management:** A built-in change management process provides a detailed description of each design data or document change, such as modifications to the specification, customer change, and obsolescence.

■ **Central source supporting multiple locations:** by unifying all engineering data into one environment and controlling synchronization to local or international development teams, DS-2 provides a single source of truth in a global environment.



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About Zuken

Zuken is a global provider of leading-edge software and consulting services for electrical and electronic design and manufacturing. Founded in 1976, Zuken has the longest track record of technological innovation and financial stability in the electronic design automation (EDA) software industry. The company's extensive experience, technological expertise and agility, combine to create world-class software solutions. Zuken's transparent working practices and integrity in all aspects of business produce long-lasting and successful customer partnerships that make Zuken a reliable long-term business partner.

Zuken is focused on being a long-term innovation and growth partner. The security of choosing Zuken is further reinforced by the company's people—the foundation of Zuken's success. Coming from a wide range of industry sectors, specializing in many different disciplines and advanced technologies, Zuken's people relate to and understand each company's unique requirements.

For more information about the company and its products, visit www.zuken.com.

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