Electrical Design for Wiring, Harnesses, Cable Assemblies and Control Panels
Overview

E³.WireWorks is a Windows-based, modular, scalable and easy-to-learn system for electrical design of wiring, harnesses, cable assemblies, and control panels. Its modules include Schematic (for circuit diagrams), Cable (for advanced electrical design), Panel (for cabinet and panel design), and Formboard (for wiring harness layout drawings). Together with SolidWorks® Routing tools, E³.WireWorks is a complete solution for the electrical engineer from design concept through physical realization and manufacturing output. E³.WireWorks is designed to work out-of-the-box, either standalone or with SolidWorks Routing tools and SolidWorks PDM Enterprise.

A central feature of E³.WireWorks is its multi-view project database. This object-oriented architecture stores all views of the design (schematic, cable, panel, and formboard) in one electrically-aware database. When you make a change in one view, the change is reflected in all views. So, if you add or delete a component or wire in one module (such as Schematic), that change is reflected in all of the other views, including the BOM. This automatically keeps all design documents in sync and eliminates the need to manually update and annotate the corresponding views. This feature also means you can start the design in any module or view (including the BOM). Because the BOM is always up to date, it can be reviewed at any stage of the design (for example, by component engineering or procurement).

E³.WireWorks’ flexibility allows you to work with many other file formats including the import and export of DXF/DWG, TIFF, GIF, JPG, PDF, DGN, CGM, VRML, and STEP AP-214. Supporting 10 languages and all Windows fonts, E³.WireWorks can readily be used for design projects spanning multiple geographies.
Core Features and Benefits

• **Multi-View Project File with Full Associativity**
  Schematic, cable, harness, and panel are associative views on one project file. When you make a change in one view (e.g. Schematic), it automatically changes in the other views (e.g. Cable, Panel, Formboard, BOM).

• **Online physical and electrical design rule checks (DRC)**
  Prevents errors in the design, reducing rework.

• **Design Reuse**
  Modular design using predefined sub-circuits which are stored in a library for easy access by the engineering community.

• **Electrically-Aware Component Library**
  Library parts contain the physical and electrical attributes that drive the DRC (e.g. AWG, predefined signals on pins, etc.). Library parts include symbols/elements for all views of the project.

• **SolidWorks Integration (Premium Routing, PDM Enterprise)**
  Routing netlist (from/to connectivity), library information for wires, cables, and components with associativity. Cross-highlight between electrical and physical domains.

• **Built from Zuken E³.series**
  Advanced ECAD engine inherently designed for electrical schematic, harness and P&ID applications. Stable, proven technology with thousands of users worldwide.
E³.WireWorks Schematic

E³.WireWorks Schematic design tool provides electrical engineers with an easy-to-use solution for designing and documenting electrical wiring designs from circuit diagrams to terminal plans and bills of material. Its integrated core database and online DRC provide a consistent design approach to help eliminate errors, improve quality and reduce design time.

Features:
- **Autoselect** – automatic selection of mating and fitting parts (e.g. plug and socket) with automatic part updates in all views (including the BOM)
- **Terminal Plan** – on-line dynamic terminal plan, changes in the schematic update the plan, and changes in the plan update the schematic
- **Jump To** – select a part in one section and jump to other locations to see its usage, from simple to complex parts including PLC’s, cross-reference symbols, connector symbols, etc.
- **Design Reuse** – modular design using predefined sub-circuits which are stored in a library for easy access by the engineering community.
- **Design Rule Checks** – multiple online DRC for physical and electrical rules prevents such errors as short-circuits, multiple device designations, overloaded components, etc.
- **Extensive Component Library** – includes ANSI and IEC standard symbols.
- **SolidWorks Integration** – Bidirectional cross-highlighting with SolidWorks Routing

E³.WireWorks Cable

E³.WireWorks Cable design tool includes all functionality of E³.WireWorks Schematic plus advanced design methods such as hierarchical circuit design and cable assembly generation. It provides engineers with the ability to design, develop and document electrical cable and harness systems to be used in any manufacturing segment – especially special vehicles, machinery, heavy equipment, and transportation. Users can generate specific views of the data for design, production and service.

Features:
- **Hierarchical Design** – enables design from top-down or bottom up and promotes design reuse.
- **Black Boxes** – circuit blocks enable quick definition of complex devices or sub-systems.
- **Dynamic Cables** – dynamic definition of cables and harnesses (including shielded, twisted pairs, and bundled).
- **Alternate Views** – generation of alternate views of connectors, cables, and pins allows for the creation of cable assemblies and documentation drawings.
- **Verification** – electrical circuit verification and calculations for typical circuit design requirements such as volt drop
E³.WireWorks Panel

E³.WireWorks Panel design tool enables engineers to design cabinets and panels with all associated parts and wiring. It automatically calculates wire details and connection routes, enabling pre-assembly of wires and cables. All necessary data is generated for production, labeling, manufacturing cables, drilling, milling and producing reports.

Features:
• Placement – interactive component placement with online DRC.
• Calculations – cable duct fill calculations with graphical display.
• 2D and 3D Views – 2D and 3D graphical view of the cabinet or panel.
• Reports – generate standard reports such as bill of materials and wiring schedule.

Autoroute (optional add-on)

Autoroute is an optional add-on that enables automatic wire routing in the cabinet or panel.

Features:
• Autoroute – automatic routing of wires.
• Design Rules – observes rules such as signal segregation, minimum and maximum wire size within terminals, and maximum duct fill capacity.
• Calculations – wire length calculations

E³.WireWorks Formboard

E³.WireWorks Formboard design tool provides engineers with the ability to design harnesses in two dimensions and create true working 1:1 scale nail board drawings (layups) ready for manufacturing. The Formboard drawing is a view of the cables and harnesses defined in the circuit diagram including connector placement, wire segments, coverings, cable protection, clips, pin and wire charts, etc.

Features:
• Length Definition – manufacturing length definition on any wire segment. Also, automatic segment adjustment with the ability to predefined the adjustment direction.
• Bend Radius – easy rotation of branches represented by B-splines to allow for realistic bend radius.
• Connector Tables – dynamically generated wire-to connector tables.
• Manufacturing Data – add cable protection (e.g. shrinking tubes), fasteners, nail points, and branch attributes.
**E³.WireWorks View**

E³.WireWorks View tool is a free-of-charge database viewer which permits users to view E³.WireWorks data without tying up a full design license. Users can view complete documentation, perform quick searches, print, and exchange data inside and outside of your organization.

**Features:**
- **Project Structure** – shows the project structure and different sheets or the same sheet in multiple zoomed and panned states.
- **Navigation** – abilities include zoom in / zoom out, jump to other sheets and symbols via part references and by searching text strings.
- **Jump To** – select a part in one view and jump to other views to see its usage, from simple to complex parts including PLC’s, cross-reference symbols, connector symbols, etc.
- **Display** – display grids and rulers.
- **Preview** – preview of components and circuit diagrams.
- **Properties** – display of component, symbol and connection properties.
- **Print** – ability to print and plot designs to Windows-supported devices.

**E³.WireWorks Redliner**

E³.WireWorks Redliner tool can be used in the design, implementation, and production phases. It includes the functionality of E³.WireWorks View plus the ability to redline the design, adding comments and marks-up to propose changes to the design. These comments and mark-ups can be reviewed by the design owner and appropriate changes made in the design.

**Features:**
- **View** – supports all functions of E³.WireWorks View.
- **Highlight** – highlight nets, signals, components, symbols, texts, attributes, cable and conductor routes.
- **Redline** – review and mark-up the design with graphics and text for later review by the design owner.
- **Export** – export redline information and transfer to E³.WireWorks for design review.

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View, Search, Print, and Exchange Data

View and Mark-Up A Design

www.zuken.com/e3wireworks
SolidWorks Premium Routing Integration

E³.WireWorks integrates with SolidWorks Premium Routing by transferring the necessary data to route wires, harnesses and cables throughout the system. Once routed, this information along with segments and wire lengths are passed back into E³.WireWorks for use in Formboard. The integration improves collaboration between electrical and mechanical engineers by sharing part and harness information allowing them to see multiple views of cables, verify mating connectors and connector pin terminals, determine bend radius, clash detection, etc. The integration also includes bidirectional highlighting between SolidWorks Routing and E³.WireWorks circuit diagrams.

Features:
- **Export** – transfer from/to, wire, cable, and part information to SolidWorks for routing.
- **Import** – after routing, transfer updated from/to, wire, cable, and part information with segments and wire lengths into E³.WireWorks Formboard for nail board layout.
- **Cross-highlight** – bidirectional cross-highlighting between SolidWorks Routing and E³.WireWorks circuit diagrams.

SolidWorks Enterprise PDM Integration

E³.WireWorks integrates with SolidWorks Enterprise PDM allowing you to manage your entire project within the SolidWorks data vault. E³.WireWorks projects can be checked-in and checked-out of the SolidWorks project area, permitting work-in-progress (WIP) data management. Users can update attributes from either a checked-out E³.WireWorks document or from the Enterprise PDM data card; this can be immediate or part of the check-in process. Standard methods of versioning and release within Enterprise PDM are used, as set by the PDM Enterprise system administrator.

Features:
- **Check-in / check-out** – E³.WireWorks files can be managed in the data vault, giving secure, up-to-date access to authorized users.
- **WIP Data Management** – E³.WireWorks files can be stored in the same project area as the SolidWorks files, but independently check-in and checked-out as needed.
- **Workflow** – supports automation of workflows, such as engineering change notice (ECN)/engineering change order (ECO) processes, and integration and connectivity to MRP/ERP systems.
- **Lifecycle Control** – E³.WireWorks files are managed with the same lifecycle controls as SolidWorks data, including design reviews and electronic sign-offs.
- **Production Release** – when the project is ready for manufacturing, the E³.WireWorks and SolidWorks files can be released to manufacturing together ensuring no mismatch of versions or data.
About Zuken and SolidWorks

Dassault Systèmes SolidWorks Corp. is the leader in 3D CAD technology providing engineers, designers and other creative professionals with the tools they need to design the world’s greatest products.

Zuken works globally with leading companies to optimize their electrical and electronic engineering design and related manufacturing processes through the provision of leading edge software and consulting services. Zuken has partnered with SolidWorks to provide the unique E³.WireWorks solution.

Partner Network

You can rely on a worldwide network of Zuken and SolidWorks trained E³.WireWorks distributors and application engineers. They offer you the best 1st line support and training.

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