



ROUTED SYSTEMS



DIGITAL TRANSFORMS PHYSICAL

WHAT IS ROUTED SYSTEMS DESIGN?

Routed systems is a series of tools used to **automate, design and analyze** cable, wire harnesses, and piping & instrumentation systems. Routed systems design uses a set of solutions to define 2D schematic logic, route 3D cabling and piping systems and speed the creation of manufacturing documentation.

WITH ROUTED SYSTEMS DESIGN YOU CAN...



Reduce Operational Costs

Design and visualize complex 3D cable and pipe routings to determine the optimum path for manufacturing, cost, and serviceability.



Improve Product Quality

Eliminate errors and validate 3D routings referencing 2D schematic logics to provide electronic verification and rule checking.



Speed Time-to-Market

Create schematic designs quickly and easily. Automate the 3D routing of cable and piping systems and simplify the creation of harness manufacturing documentation.

HOW DO THESE TOOLS **WORK TOGETHER?**

The use of integral solutions supports design associativity and automatic change propagation. The logic from Creo Schematics automates the 3D routing of cable and piping systems in Creo PCX. Once the 3D routings are defined in PCX, HMX helps you easily create harness manufacturing documentation. CCX helps you analyze and optimize your designs for electrical product safety.

>> **Creo Schematics**

is a standalone multi-disciplinary diagramming solution that speeds and automates the routing of 3D cable and piping systems. Tightly integrated with Creo and Windchill, Creo Schematics streamlines and automates the 3D routing of cable and piping systems.

>> **Creo Piping and Cabling Extension (PCX)**

is a 3D routing solution that speeds the 3D routing of cable and piping systems. Cable and pipe routings can be defined manually or semi-automated referencing a 2D schematic logic or spec-driven data.

>> **Creo Harness Manufacturing Extension (HMX)**

provides specialized capabilities to automate the creation of harness manufacturing documentation including connectivity tables, wire list and BOMs.

>> **Creo Clearance and Creepage Extension (CCX)**

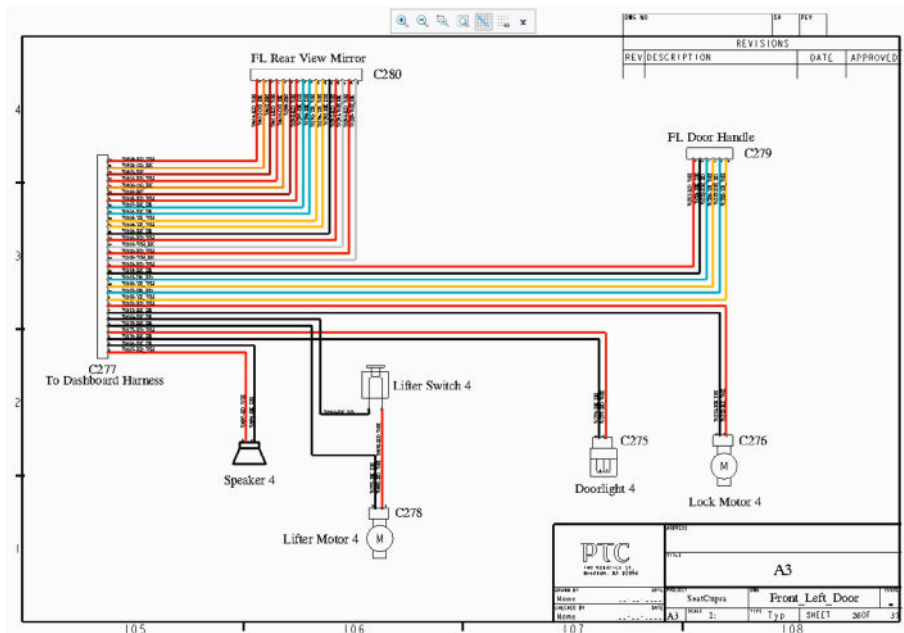
can be used to analyze and optimize models for electrical product safety.

WHAT DO THESE TOOLS LOOK LIKE?

01. Creo Schematics

[See More...](#)

A comprehensive, standalone 2D diagramming solution for creating 2D schematic diagrams of routed systems. The software **automates** the creation of detailed 3D routed system designs from existing 2D schematics within **Creo Parametric** and **Creo Elements/Direct**. Creo Schematics Lite is included with the purchase of Creo Piping and Cabling Extension (PCX) and any package containing Creo PCX.



Creo Schematics speeds the capture of design logic and connectivity information. The solution provides a multi-disciplinary support for:

- Block, Circuit and Wiring Interconnect Diagrams
- Piping & Instrumentation Diagrams (P&ID)
- Process Flow Diagrams (PFD)
- Heating Ventilation & Air Conditioning (HVAC)

You Need This If You Want To:

- Define and optimize cable and pipe routings for manufacturing, cost, and serviceability
- Minimize errors and manual effort using automated tools to capture system information and produce manufacturing deliverables
- Enforce best practices referencing design rules, schematic logic, and specifications
- Increase design speed through the reuse of standard symbols, connectors, and fittings
- Reduce manufacturing cost referencing accurate documentation, such as isometric drawings, bend tables, and BOMs
- Reduce cost and enable cost-effective manufacturing by providing accurate documentation and manufacturing deliverables

Creo Schematics

Functionality:

- >> Designs with more than 10 sheets
- >> Central Catalog
- >> Draft Groups
- >> Share design information using design properties files
- >> Reorder members of two variable groups simultaneously
- >> Export or import CGM files
- >> The JAVA API
- >> Alpha numeric naming
- >> BID WID verification
- >> Export to DWG, DXF, MEDUSA, PDF, or EDA
- >> Import PCB data
- >> Extend label functionality
- >> Apply pin parameters from a .csv file
- >> Create custom cable decorations
- >> The Find Tool
- >> CID to WID designs
- >> Use eSimulate Lite

Work Group Manager for Creo Schematics (by Virtual Interconnect)

Work Group Manager enables fast, accurate access to Windchill, delivering version control and professional document management. With an extensive array of functions, Work Group Manager makes the management of documents and designs as easy as possible. An essential for Schematics data management. Work Group Manager can be purchased from www.virtual-interconnect.co.uk.

You Need This If You Want To:

- Conduct parameter mapping
- Full Server, workspace and cache management
- Streamlined check-in and checkout of schematics (including offline mode)
- Auto-associate related parts in Windchill
- Automate PDF generation

Creo View

Creo View is a simple but powerful enterprise visualization technology that enables effortless collaboration across local and global design teams. Access multiple forms of engineering data including schematics and printed circuit boards both interactively at the desktop or through augmented reality (AR). As a result, design authors, project managers and downstream suppliers can quickly and easily access and share information between themselves and other stakeholders.

Creo Illustrate

Create rich 3D technical illustrations, 2D drawings and interactive animated sequences that accurately reflect current product configurations and support formats from hard copy to augmented reality. Creo Illustrate reads diagrams from Creo Schematics and synchronizes itself with the 3D model, leveraging itself for documentation.

02. Creo Piping and Cabling Extension (PCX)

[See More...](#)

Accelerate your piping and cabling design process using manual and semi-automated methods to define 3D cable and pipe routings. To reduce product development cost, 3D routings are designed, visualized and analyzed early in the design process allowing engineers to identify errors, resolve design flaws and optimize the placement of routings. Virtual interference checking and the ability to verify 2D schematic logic eliminates reliance on physical prototypes and testing to further reduce development cost.

You Need This If You Want To:

- Create 3D cabling or piping systems
- Capture and document schematic information and manufacturing documents
- Minimize errors and reduce time consuming tasks by automating the capture of all relevant system information
- Automate routing to quickly determine the optimum path for manufacturing, cost, and service
- Ensure design rules and schematic logic rules are enforced through specification driven design for P&ID
- Increase design speed through reuse of standard symbols with an established logic behind them
- Reduce cost and design time by eliminating physical prototypes because of virtual interference checking and automated manufacturability verification
- Enable cost effective manufacturing through accurate documentation like isometric bend BOMs
- Optimize physical and 3rd party routings
- Save on time and budget to support rework
- Produce service and manufacturing documentations
- Minimize errors and reduce time consuming tasks by automating the capture of all relevant system information

02.a - Piping Design

Automated pipe routing referencing 2D schematic logic

- >> Identify and place standard pipes and fittings based on schematic information

Visually inspect and optimize routings for cost, manufacturing, and serviceability

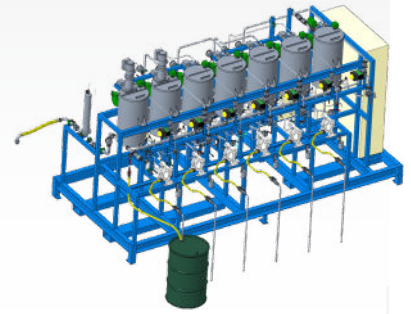
- >> Easily optimize pipe routes using shortcut menus and dynamic dragging
- >> Associative updates to pipe routes when placement references are modified

Automatic verification of pipe routing referencing schematic logic and design

- >> Define rules and automatically detect violations (max/min bend radii, branch separation and angle, placement, etc.)

Automated creation of manufacturing documentation and deliverables

- >> Piping system layouts, isometric, installation, and spool drawings
- >> Extract BOMs, CNC bend information, cut lists, and fitting reports
- >> Use information to drive CNC bend machines



02.b - Cabling Design

Automated cable routing referencing 2D schematic logic

- >> Designate components, determine cable connections and auto-route cables

Visually inspect and optimize routings for cost, manufacturing, and serviceability

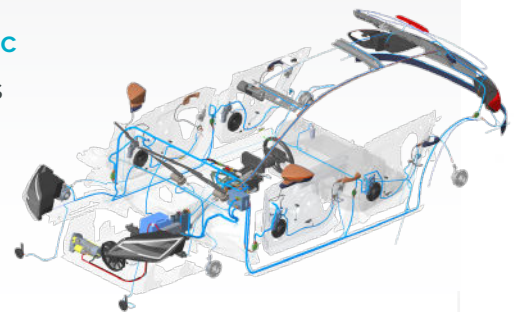
- >> Easily optimize cable routes using shortcut menus and dynamic dragging
- >> Associative updates to cable routes when placement references are modified

Automatic verification of cable routing referencing schematic logic

- >> Verify wires and from-to pin connections referencing 2D logic

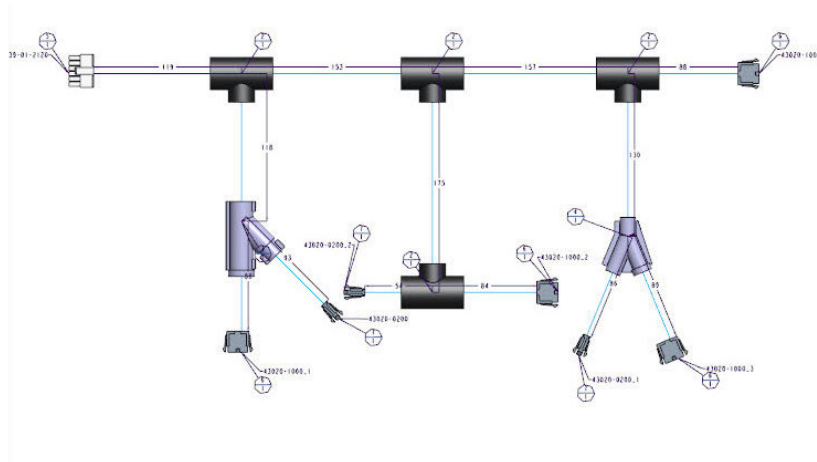
Create accurate harness manufacturing documentation

- >> Manual creation using harness manufacturing capabilities included with Creo PCX
- >> Automatic creation using Creo HMX



03. Creo Harness Manufacturing Extension (HMX)

Create and **automate** standardized harness manufacturing documentation quickly and accurately.



HMX dramatically reduces the time spent generating manufacturing documentation from hours to minutes..."

You Need This If You Want To:

- Easily create manufacturing documentation to a pre-defined standard using an intuitive user interface
- Easily accommodate late design changes with an optimized documentation process
- Standardize documentation of manufacturing deliverables
- Accelerate time-to-market
- Improve consistency and quality of documentation
- Allocate time and budget to pursue harness optimization
- Rapidly respond to quotes and accurate manufacturing estimates

03.a - Creo HMX Lite

Included with the purchase of Creo PCX and Creo packages containing Creo PCX (Creo 3.0 and later)

Limitations: 5 connectors, 20 Wires

Features: Auto Dimensioning

Reporting:

>> Bill of Materials (BOM)

>> Wire From/To List

03.b - Creo HMX Standard

Limitations: 20 Connectors, 50 Wires

Features: Auto Dimensioning

Reporting:

>> Bill of Materials (BOM)

>> Cutting List

>> BOM including spools usage

>> Connector Cavity Table including strip length

>> Wire From/To List

03.c - Creo HMX Advanced

Unlimited Connectors and Wires
No Feature or Reporting limitations

Features: Auto Dimensioning
Automatic Design Rule Checking
Back annotation to Creo Schematics

Reporting:

>> Bill of Materials (BOM)

>> Cutting List

>> BOM including spool usage

>> Connector Cavity Table including strip length

>> BOM including wedges, cavity, seals, etc.

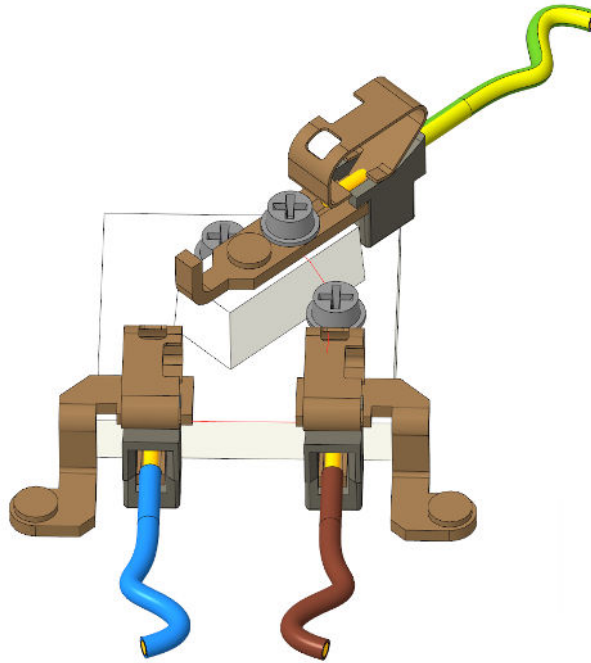
>> Connector Cavity Table including location view

>> Wire From/To List

04. Creo Clearance and Creepage (CCX)

[See More...](#)

Optimize designs for electrical product safety. **Automate** your electrical clearance and creepage analysis. Avoid product failures.



You Need This If You Want To:

- Streamline product development activities and speed time-to-market
- Reduce product development cost (i.e., prototypes, rework, scrap)
- Optimize designs for electrical product safety and improved design quality
- Protect/build company reputation by reducing product failures and recalls
- Reduce after-market cost (i.e., service, warranty, repair)



THE CREO ADVANTAGE

Creo is the 3D CAD solution that helps you accelerate product innovation so you can build better products faster. Easy-to-learn Creo seamlessly takes you from the earliest phases of product design to manufacturing and beyond. You can combine powerful, proven functionality with new technologies such as generative design, augmented reality, real-time simulation, additive manufacturing and the IIoT, to iterate faster, reduce costs and improve product quality. The world of product development moves quickly, and only Creo delivers the transformative tools you need to build competitive advantage and gain market share.

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