

10 NEW WAYS TO MAKE WIRING AND HARNESS DESIGN FASTER AND BETTER



E L E C T R I C A L & W I R E H A R N E S S D E S I G N

W H I T E P A P E R

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INTRODUCTION

Electrical design is getting more complicated—the electronics on even the “simplest” machines are sometimes beyond what the big carmakers were doing 25 years back with big engineering teams and the best CAD tools available. Today’s electrical engineers need more than basic electrical drawing software; they need tools that take the complexity out of the task—helping them work smarter and faster.

A new generation of electrical design tools is now being used by hundreds of OEM and harness manufacturing companies worldwide, from small 10-employee companies to the biggest companies in the industry. With automation facilities that eliminate many of the most labor-intensive and error-prone tasks, these companies often experience payback within less than nine months, with reduced design-cycle times, reduced rework costs and improved margins. Here’s how they do it.

WIRING DESIGN

VIRTUAL DESIGN—TEST BEFORE YOU BUILD

Does your first prototype always work first time with no electrical glitches? New generation tools provide parts and wires that are intelligent objects—they “know” how to interact with each other, providing a virtual simulation and test facility for checking wire and fuse ratings and correct behavior. This can save valuable prototype testing time and eliminate costly errors.

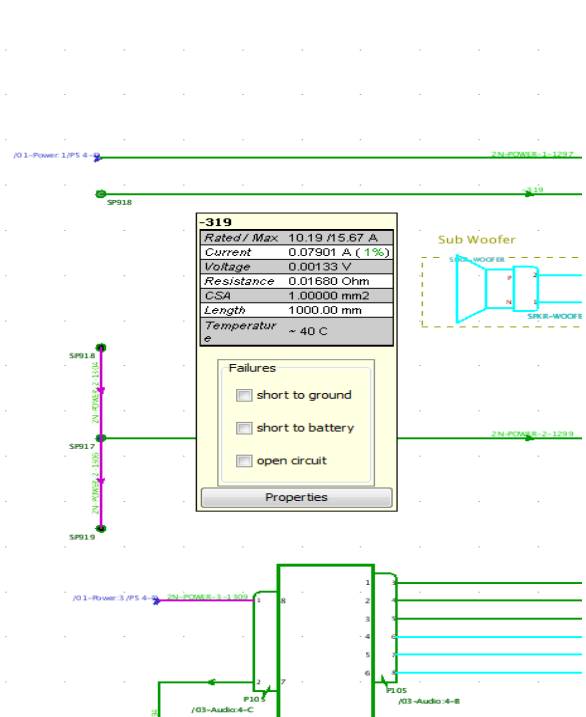
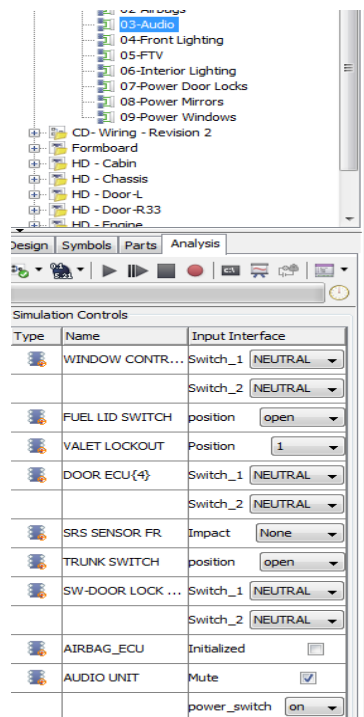
INTEGRATED PARTS LIBRARY—NO MISTAKES ON PART SELECTION

Have you ever made a part number change and discovered your connectors have the wrong number of pins when you get to prototype? New generation tools provide a structured library of intelligent parts that know how to interact with each other, eliminating the need for the designer to repetitively look-up and transcribe the same definitions and parts for each new wiring design. Pin count, pin-names, and electrical

specifications are handled by the system, which means no more bad surprises.

PART NAMING VALIDATION—NO MORE CHECKING FOR ACCIDENTAL DUPLICATES

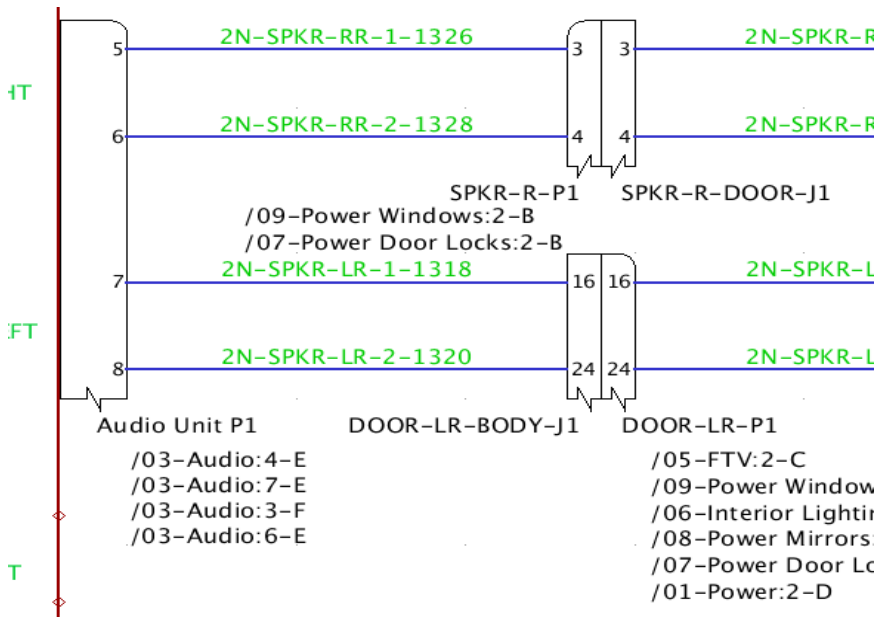
Have you ever created a wiring design with two connectors having the same name? Or wires with the same name? How much time do you spend avoiding these problems?



They don't occur with new generation tools that have auto-numbering/naming facilities and a variety of design checks that prevent problems right from the start.

INTELLIGENT CROSS-REFERENCING—FASTER DESIGN, NO ERRORS

How much time do you spend checking cross-references on multi-sheet wiring designs? Have you ever had a nasty surprise at the prototype build stage? Or worse still, when testing? New generation tools can generate cross-referencing automatically, saving you time. And virtual electrical simulation adds further reassurance because it tests current flow along the wires between each sheet to perform complete system validation.



AUTOMATED DOCUMENT GENERATION—BETTER QUALITY WITH LESS EFFORT

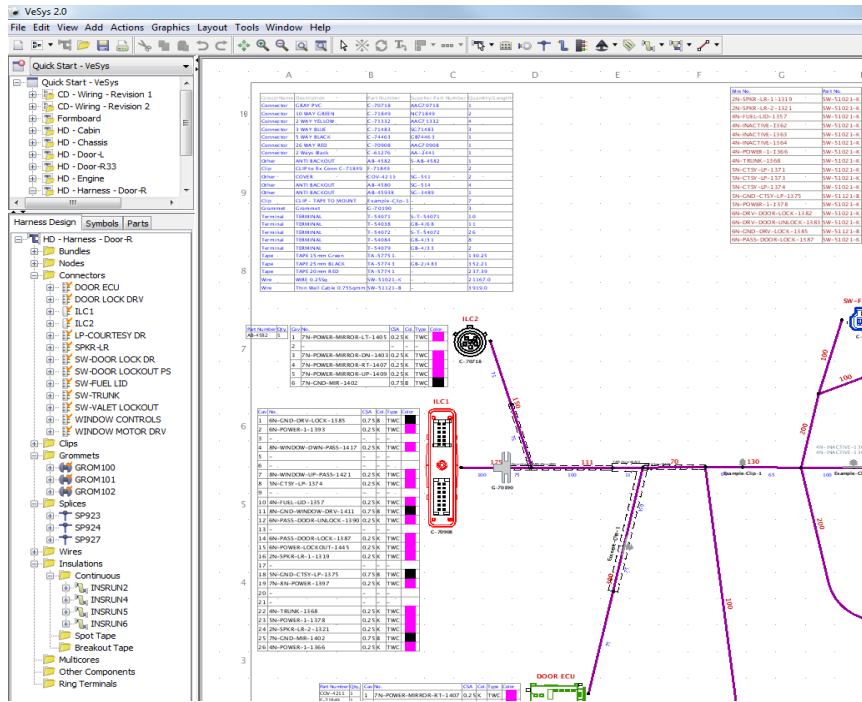
How much time do you spend creating design documents such as BOMs, wire lists, and parts lists? Do you need differnt types of documents but don't have the resources to create them? New generation tools can generate a wide variety of documentation at the touch of a button, providing accurate documentation

Property	Description	Value
_Class	_ Class	W
_Conforming_Spec	_ Conforming Spec	-
_Connector_Thread	_ Connector Thread	M28x1-6g
_Contact_Size	_ Contact Size	22
_Contact_Style	_ The Style Of Contact	Crimp
_EMI_Shielding	_ EMI Shielding	50 dB at 10GHz
_Fixing_Hole_Diam...	_ Fixing Hole Diameter	0.0
_Insert	_ Insert	19-35
_Max_Temperature	_ Max Temperature	200.0
_Min_Temperature	_ Minimum Temperature	-75.0
_No._of_Matings	_ No. of Matings	1500.0
_Nominal_Diameter	_ Nominal Diameter	38.5
_Panel_Thickness	_ Panel Thickness	0.0
_Polarization	_ Polarization	N
_Series	_ The Component Series	D38999
_Shell_Size	_ Shell Size	19
_Shell_Style	_ Shell Style	Straight Plug

specifically optimized for each reader and de-skilling their task of understanding the documentation thus reducing the risk of downstream errors.

HARNESS DESIGN

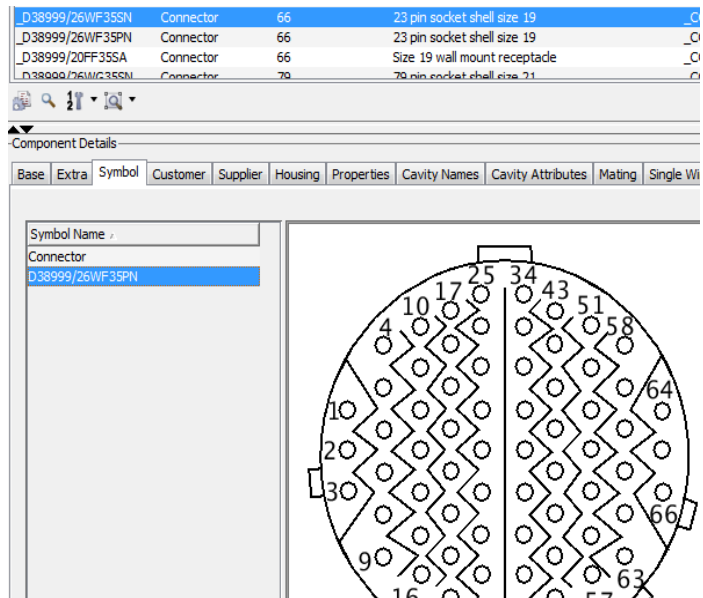
WIRE IMPORT FROM SPREADSHEET—FASTER QUOTATION TURNAROUND AND DESIGN CREATION



What's your quotation turn-around time? Ever make a mistake? Wire import from AutoCAD Electrical, customer-supplied spreadsheet data, or from an existing wiring diagram can reduce quotation time to less than an hour. Simply create the "stick" layout, import the wiring data, add protections, fixings and connectors, and press the "go" button to generate the cost report.

SELF-CONFIGURING CONNECTORS SELECT THEIR TERMINALS, PLUGS, AND SEALS—SPEED THE DESIGN PROCESS AND ELIMINATE MAJOR SOURCE OF ERRORS

Ever quoted and won an unbuildable harness? Customers may specify the connectors and wires, but they are not always compatible when you start to select terminals and sealing components. This is a mind-numbing task, repeated hundreds of times: make a mistake and it won't be the customer who pays. New generation harness tools automate this task—you won't be making avoidable errors, and you can cut your margins yet still be more profitable.



INSTANT GENERATION OF BOMS, NC AND TESTER FILES, AND MANUFACTURING REPORTS PROVIDES BETTER MANUFACTURING PROCESS DOCUMENTATION

Spending too long creating documentation? Are bottlenecks stopping you from doing more business? New generation harness designers can generate a BOM instantly from the diagram; a task that typically takes one or two days is achieved in a few seconds. This is even more valuable when a minor change is made—again the updated BOM is produced in seconds—compare this with the traditional approach that demands another day’s work. For every harness engineer, this capability alone is sufficient to generate a rapid ROI.

Part Number	Description	Item Cost	Quantity	Total Cost
AB-4580	ANTI BACKOUT	2.55	4	10.19
AB-4582	ANTI BACKOUT	2.55	1	2.54
AB-45938	ANTI BACKOUT	2.55	1	2.54
C-61276	2 Ways Black	3.2	1	3.2
C-70718	GRAY PVC	9.5	1	9.5
C-70908	26 WAY RED	14.25	1	14.25
C-71332	2 WAY YELLOW	3.2	4	12.8
C-71483	3 WAY BLUE	3.5	3	10.5
C-71849	10 WAY GREEN	11.0	2	22
C-74463	5 WAY BLACK	5.45	1	5.45
COV-4211	COVER	25.0	2	50
CP-6322	CAVITY PLUG - S	0.01	8	0.08
CS-6320	CAVITY SEAL - Y	0.01	18	0.18
Example-Clip-1	CLIP - TAPE TO MOUNT	4.0	7	28
F-71849	CLIP to fix Conn C-71849	0.25	2	0.5
G-70190	Grommet	0.6	3	1.79
SW-51021-K	WIRE 0.25Sq	0.015	21167	317.5
SW-51121-B	Thin Wall Cable 0.75Sqmm	0.015	3919	58.78
T-54038	TERMINAL	0.01	22	0.22
T-54071	TERMINAL	0.01	20	0.2
T-54072	TERMINAL	0.01	52	0.52
T-54079	TERMINAL	0.01	4	0.04
T-54084	TERMINAL	0.01	16	0.16

EMBEDDED ENGINEERING INTELLIGENCE CALCULATES EXACT WIRE LENGTHS, BUNDLE SIZING, EXACT TAPE LENGTHS

Would you like to manufacture straight from design data without spending time on prototype builds? New generation harness tools can calculate wire length based on many factors, including bundle lengths, connector/terminal dimensioning, connector feed direction (for example, straight, 90-left, 90-right, etc.), desired slack, and more. Bundle diameters are calculated directly from the wire size data allowing exact tape lengths to be calculated for spiral wraps. Precise information gives you a better cost estimate before quotation or build and allows companies to take the guesstimation away from the prototype build phase.

INTEGRATED PARTS LIBRARY SPEEDS DESIGN, REDUCES ERRORS, CUTS INVENTORY

Companies need to manage inventory, and they do this by using the right component when there is a choice and by not selecting a completely new part when there is an equivalent part that has been previously used. New generation harness tools provide a structured library of intelligent parts that know how to interact with each other: wire-terminal-connector-seal. These part definitions also eliminate the need for the designer to repetitively look-up and transcribe the same definitions and parts for each new harness project.

Want to learn more? Contact us via sales-info@mentor.com or visit our website www.mentor.com/electrical

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