



Move on up - Shelving the barriers to PCB design migration

W H I T E P A P E R

PCB design engineers have more incentive than ever to move their software up a notch, and fewer reasons to resist replacing outdated tools with an advanced yet cost effective design tool suite.

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Abstract

PCB design engineers have more incentive than ever to move their software up a notch, and fewer reasons to resist replacing outdated tools with an advanced yet cost effective design tool suite.

This article describes how CADSTAR 12.0 not only provides the advanced, additional functionality and features in demand for today's high speed, high density, power and size constrained board designs, but also how it allows legacy designs to be easily imported, supported and modified, facilitating design re-use, and thereby preserving investment in IP, while boosting design productivity and improving time to market.

Shelving the barriers to PCB design migration

It has been probably two decades since PCB designers have had so many compelling reasons to replace their design tools. The board designer is now faced by tough demands coming from the widespread application of high speed, multifunction, mixed signal devices; combined with the drive towards lower power, smaller size and lower cost end products.

Highly complex, high pin count devices, such as FPGAs, multicore processors and application specific chips, are sufficiently low cost and desirable that they have become commonplace. High speed memory and standard interfaces are widely used, and not just at the cutting edge of design. The explosion in wireless and portable products demands mixed signal and RF design in ever-smaller packages, with low power operation now a critical constraint.

Today's PCB designer has to be prepared to handle a rich combination of new technologies, including high density interconnects and microvias, multilayer designs with embedded components, multiple power rails and more.

Design analysis - trying to optimise speed, minimising power consumption and board space, while avoiding thermal hotspots and signal integrity problems – is occupying more designers, more of the time. Board designers are increasingly having to multi-task. Engineers are creating their own layouts. Layout specialists have to know more about electrical and mechanical design as well as manufacturing. Everyone need access to analysis and verification tools.

Spotlight on PCB Design

Traditionally, board design has not normally been considered to be on the critical path. It has been overlooked, neglected even. In the low cost sector especially, engineers have had to ‘make do’ with old or unlicensed software that their company may have chosen not to maintain. Others are finding gaping shortfalls in the capability and/or performance of their software that cannot be solved by a simple upgrade, a third party tool, or their usual work-arounds. In today’s competitive environment, design bottlenecks have to be avoided; that is why the spotlight now is on PCB design.

Despite the clear advances in modern PCB design software, in many quarters, there remains resistance to change. Cost is an often quoted barrier. Yet, comparatively, board design software is significantly lower cost per seat than it used to be, and with far superior performance. Lack of time between projects to install and learn a new package is another perceived barrier. But again, modern EDA and CAD tools are largely intuitive to use, with online help and training available.

But for many companies, by far the most significant barriers to investing in new tools are the need to maintain legacy designs, and the continuing support of design re-use.

IP Legacy

Maintaining two systems is impractical. But migrating existing designs and libraries to new software is regarded as a significant challenge. Many engineering firms have a substantial portfolio of designs, some of which may still be in production and stable, some may be continuing to evolve. Some designs may be shelved, and no longer in production, but they need to be maintained to support the existing customer base, and especially to avoid component obsolescence issues. This is particularly important for the industrial, medical, automotive, aerospace and defence markets that can have product lifetimes of 10, 20 or even 30 years. Maintaining those legacy designs that are on the shelf, especially robust, well proven elements within these designs, is equally important for design re-use. Design re-use can dramatically improve a company’s competitive edge through increased productivity, reduced design verification time and faster time to market.

Design Migration

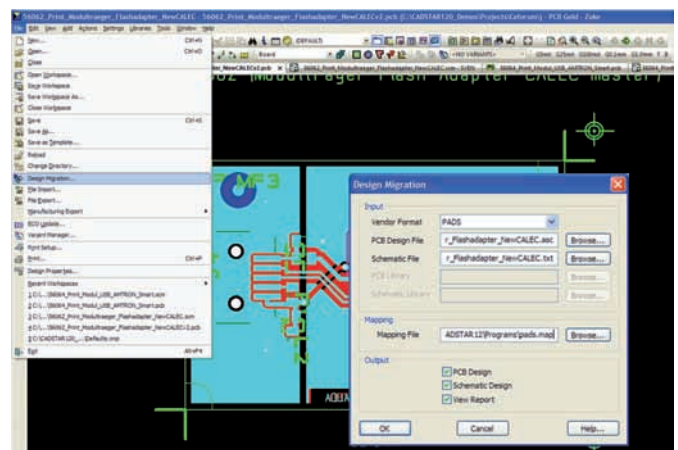
But design migration to a new tool suite need not be difficult, nor overly time-consuming, and new features in the software can bring distinct advantages in protecting and retaining historical IP for design re-use and managing obsolescence.

Version 12.0 of Zuken’s CADSTAR solution is not only a comprehensive PC-based PCB design tool suite, spanning schematic capture, layout, library management and design analysis, it also integrates a Design Migration tool. It also includes additional features to better support and exploit legacy design data.

Dedicated features are provided within the Design Editor for importing schematic, PCB design and library data. The process is straightforward and largely transparent to the user. It is fully quality controlled so that the design connectivity and device information is transferred, with as much detail as possible, including symbols, footprints and other elements.

Currently, designs can be imported from a number of third party packages, including Pads (Mentor Graphics) or OrCAD (Cadence). Migration support from other packages is in progress.

PCB designers and engineers who have had no tools to support design re-use in the past, will be impressed. Whole designs, subsystems or smaller circuit blocks can be defined for re-use by saving them from an existing schematic or PCB design. Thus these proven and verified blocks, created on an older system can be efficiently re-used in new designs, thereby increasing product quality and reducing overall design cycle time. The design re-use features are also useful for partitioning a board or project into subsystems, such as a power supply, RF module or analogue front end, each of which may be undertaken by specialist engineers. These tools are equally as useful for assimilating and re-using designs and IP acquired through company mergers or take-overs.



Migrating legacy designs into the CADSTAR environment

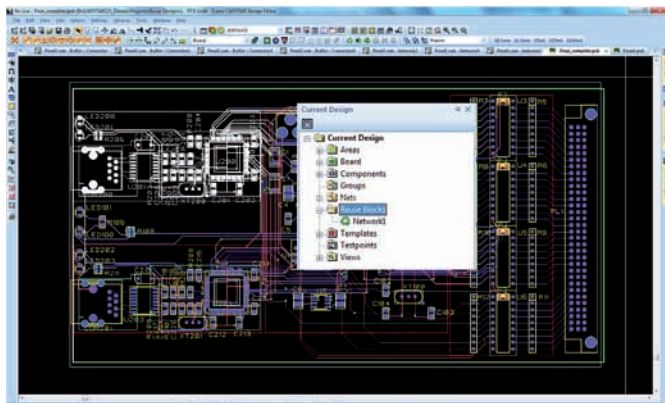
Variant Management

Expanding on this theme, CADSTAR's Variant Management feature provides a simple and effective way of creating and managing the hierarchy of new versions of existing designs, complete with intelligent checking of electrical parts and combined BOM. Once in the CADSTAR environment, new and existing designs can benefit from the advanced features contained in the software. For example, the extensive online component library, contains details on some 230,000 parts, and is regularly expanded and updated.

A Part Acceptance attribute delivers warnings if, when a design is being created, modified, or a relevant block is being re-used, a specified component has become obsolete, or has become difficult to source. Possible alternatives from the library are automatically presented. In this way older designs can be easily and efficiently updated. Further, engineers can easily improve performance, reduce power consumption or reduce cost in existing products by using newer or alternative versions of equivalent devices. An enhanced Attribute Editor in CADSTAR 12.0 allows device characteristics, such as voltage or pin spacing, to be edited. This information is critical for efficient routing and can help optimise the revised board in terms of performance and reliability.

CADSTAR 12.0

These and other CADSTAR features may not have been possible in older and less capable design software. For new and occasional users, Zuken has introduced a Starting Schematic and PCB Wizard to help engineers organise their workflow and get started quickly on new projects. Features include pre-defined templates, and context specific dialogue boxes which show the parameters and fields required initially, positioned at the optimum location to minimise set-up time. Links to online help and training files are also provided. Once underway with CADSTAR 12.0, an improved graphical user interface (gui) allows the user to quickly and easily customise the menus to be displayed. Unnecessary menus can be hidden, frequently used menus or windows can be docked, and windows can be tabbed.



CADSTAR 12.0 adds new features to the graphical interface including the ability to replicate placement to enhance productivity

Signal Integrity

Imported legacy designs can also benefit retrospectively from the analysis tools in CADSTAR 12.0, which include signal integrity analysis (SI Verify) and EMC Advisor. While new projects may take in reusable blocks from legacy designs, engineers have a whole new tool box of integrated and interoperable schematic capture, FPGA design and board design software, with support into the manufacturing environment and links into 3D design.

Conclusion

In conclusion, CADSTAR 12.0 provides the advanced, additional functionality and features in demand for today's high speed, high density, power and size constrained board designs. It also allows legacy designs to be easily imported, supported and modified, and facilitates design re-use - thereby preserving investment in IP, while boosting design productivity and improving time to market.

For more information about CADSTAR and the Design Migration Tool visit www.zuken.com/cadstar-migration