

THE SIX THINGS YOU WANT TO HAVE IN YOUR DESKTOP PCB DESIGN LIBRARY

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L I B R A R Y M A N A G E M E N T

W H I T E P A P E R

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INTRODUCTION

Accurate and up-to-date library data are the foundation for a successful and high-quality PCB design project. Discovering that your prototype can't be manufactured because of an incorrect footprint, or that the prototype does not work because of outdated part definitions in your PCB design, can increase costs and cause unexpected delays.

When choosing PCB design software, libraries are most likely one of the top criteria you consider, as creating and setting up your library for the first time can be extremely time-consuming and error prone.

Before choosing a design tool, you will most likely ask yourself several questions: How do I get started? Can I trust that the library content that comes with my tool is accurate and reliable? Is it easy and quick, or exhausting and time consuming, to create new parts? Can I quickly search component suppliers' websites, and then download the component information directly to my design tool?

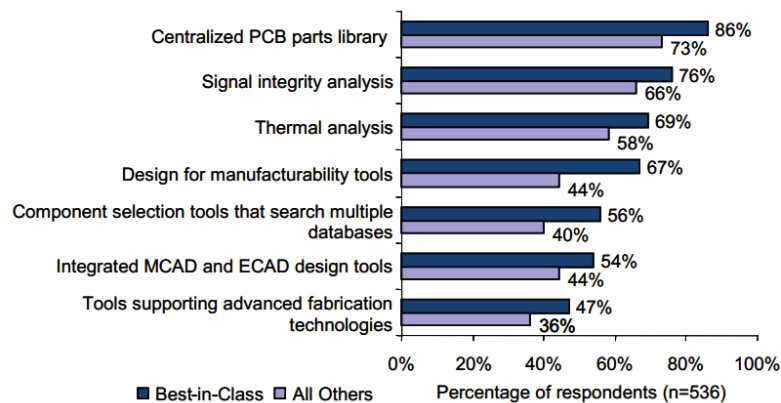
This paper addresses each of these questions, describing the key elements you'll want to have in your PCB design library.

#1 – A SINGLE LIBRARY FOR ALL DESIGN TASKS

Historically, schematic and layout libraries existed as independent entities, as they were describing different aspects of a physical part installed on the PCB. This approach introduced a dependency between schematic symbols and physical decals, creating a complicated design task of making sure the two libraries are constantly kept in-sync. This is why having a centralized location for all library items, a central library, for both schematic and layout parts, throughout the entire design cycle is so helpful.

According to an independent study by the Aberdeen Group, 86% of best-in-class PCB design companies use a centralized PCB parts library to support their PCB design process.

These companies state that using a centralized database helps them improve efficiency, lower product cost, and add features to competitively differentiate their products.



Source: Aberdeen Group, February 2010

To provide an integrated library some design tools require manual compilation of source libraries. This means source libraries need to be manually extracted every time a change is required, and then recompiled with the integrated library. Very few tools provide a central library that automates this process without requiring compilation of source libraries.

#2 – A PROVEN STARTER LIBRARY

One of the most time-consuming tasks for the designer is setting up a library for new PCB design projects. Although many design tools provide a standard, or starter library to their customers, the quality of these libraries is often questionable. Therefore most users do not use these libraries in their designs, and are often forced to build their own libraries in a time-consuming and tedious process. Having a proven starter library that meets industry standards and is ready for use can be a big time-saver and a significant advantage over other PCB design tools.

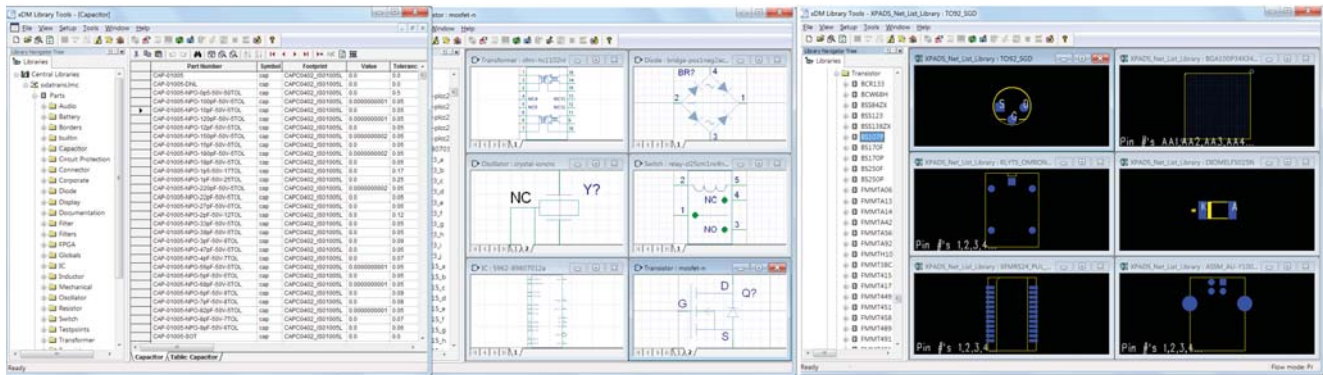


Figure 2: Save time preparing a library for your new project and reduce design costs by choosing a PCB design tool that comes with a high-quality and reliable starter library.

#3 – COMPONENT DATA INTEGRATED FROM THE WEB

With today’s easy access to the Internet, every designer can quickly access large amounts of suppliers’ part data on the web. It only makes sense to use this information for your library, but the problem is that most PCB design tools require that you copy component data from PDF format datasheets into your part creation tool manually. This manual process is not only time consuming, but also error prone. Having a tool that can automate this process for you is a huge advantage.

Part#	Resolution (bits)	# of Channels	FIRVV (typ)	Throughput Rate	US Price 1000 to 4999
AD7656A-1	16	6	4.5 MHz	250 kSPS	\$12.45
AD8993	-	-	-	-	\$148.70
AD9098	14	2	2 GHz	1 GSPS	\$272.00
AD9052	16	2	485 MHz	310 MSPS	\$231.25
AD8928	12	1	2 GHz	2 GSPS	\$625.00
AD7992	16	2	10 MHz	1 MSPS	\$15.00
AD7993	16	1	-	-	\$3.35
AD9056	16	4	650 MHz	125 MSPS	\$258.27
AD7998-5	10	1	10 MHz	500 kSPS	\$11.95
AD7998-1	18	1	10 MHz	100 kSPS	\$8.55
AD7993	16	2	10 MHz	1 MSPS	\$15.00
AD7656A	16	6	12 MHz	250 kSPS	\$12.45
AD7091R-8	12	8	1.5 MHz	1 MSPS	\$3.35
AD7091R-4	12	4	1.5 MHz	1 MSPS	\$2.67

Data Sheet AD7656A-1

OUTLINE DIMENSIONS

VIEW A
NOTATED BY COW

COMPLIANT TO JEDEC STANDARDS MS-028-BCD
Figure 35. 64-Lead Low Profile Quad Flat Package (SOP) (ST-64-2)
Dimensions shown in millimeters

ORDERING GUIDE

Model ¹	Temperature Range	Package Description	Package Option

Figure 3: Being able to make use of supplier part data that are available on-line in an accurate and automated fashion can dramatically reduce part creation time and increase productivity.

#4 – A METHOD FOR MAINTAINING AN UP-TO-DATE PART LIBRARY

One of the greatest challenges in design creation is figuring out a way to maintain an up-to-date library from start to finish. The problem is that library changes often occur after the design process starts, which can make synchronizing designs with the updated library definitions a challenging task. Having a built-in synchronization mechanism alert you whenever there is a database mismatch is tremendously helpful. Having it make the necessary updates is even better and eliminates detection of library issues late in the design cycle.

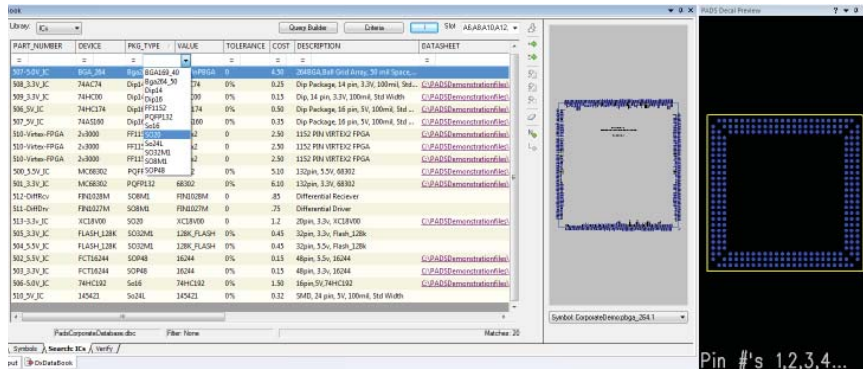


Figure 4: Making sure your library is updated with the correct part properties will help avoid costly redesigns and quality problems.

#5 – EASY LAND PATTERN CREATION

Land Pattern (footprint) creation is not only the most time-consuming library task, it's also among the most critical as errors in footprint geometries can cause costly manufacturability issues. Using an automated tool that follows manufacturing standards can provide a great advantage and dramatically reduce the time spent on creating high-quality footprints.

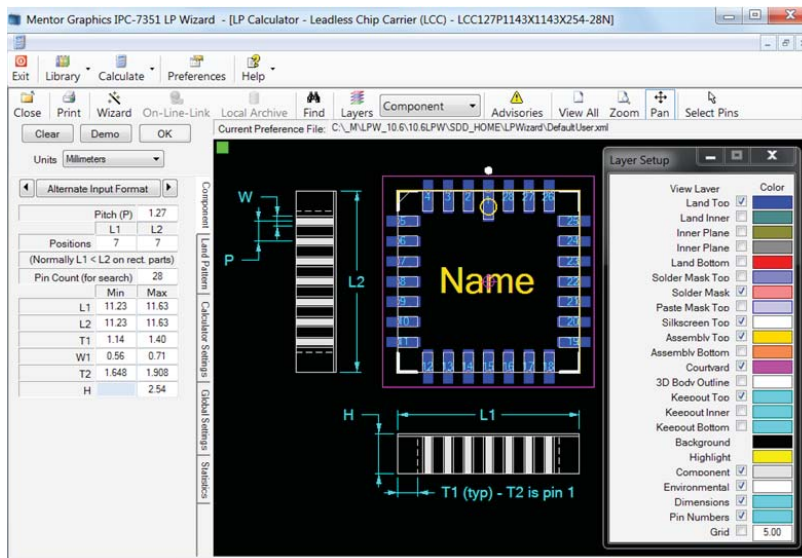


Figure 5 – Footprint errors can cause costly manufacturing issues. Having a high-quality land pattern creator at your fingertips can reduce time dramatically and help you avoid costly errors.

#6- TOOLS FOR THIRD-PARTY MIGRATION

When switching design tools it is important to preserve previous libraries and design IP for use in your new design tool. But just having a translator to import library parts isn't enough, as the import process often results in errors and inconsistencies between schematic parts and layout. A good migration path will make sure imported library data are consistent and accurate.

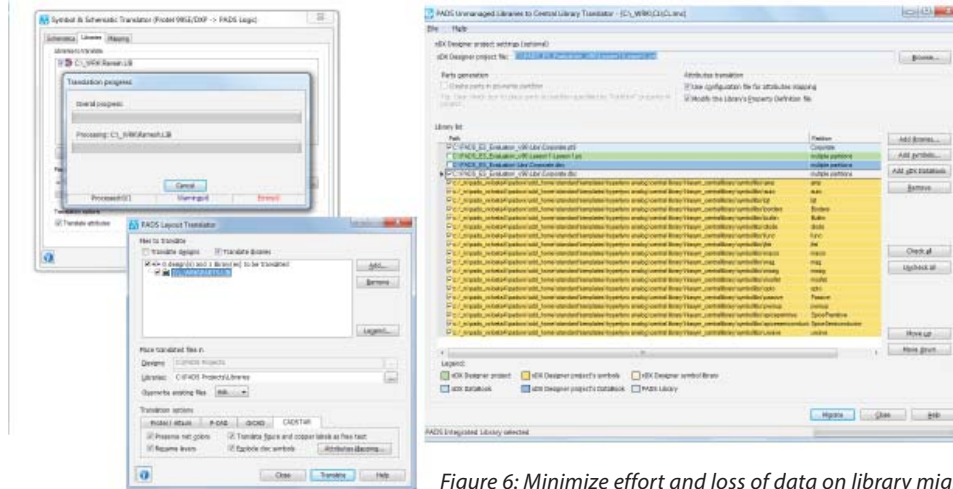


Figure 6: Minimize effort and loss of data on library migration when switching to PADS.

DID YOU KNOW?

PADS®, Mentor Graphics' Personal Automated Design System for desktop PCB design, includes all six of the things you need in your design tool in order to create a good and efficient library. PADS provides a highly integrated library and component management environment that meets designers' and engineers' needs in creating and maintaining PCB design libraries.

PADS library management combines:



- A starter library containing more than 10,000 ready-to-use, IPC-compliant, proven parts provided by Optimum Design Associates for a quick start of new design projects.
- Web access to component supplier data with an ability to load contents into PADS (now in Beta)
- A central library for maintaining up-to-date design data. The central library contains all library elements in the same location, and is available at all design stages. PADS makes it possible to maintain an up-to-date library in real time, without any compilation, and includes all library elements (e.g., symbols, part data, footprints, simulation models, drawing items, and part common property definitions).
- A component management system, integrated with schematic design and library management environments.
- A built-in consistency check of library data to make sure your library is constantly in-sync.
- Live verification of symbols placed in your schematic against the latest component and library data to eliminate costly redesigns and quality problems that might otherwise go undetected until late in the design cycle.
- A land pattern creator for quick creation of IPC-standard footprints.
- A migration path for 3rd-party libraries and component databases.

SUMMARY

Managing your part library is critical, yet challenging. It starts with making sure all designers and engineers are using the most up-to-date library to avoid manufacturability and consistency issues. Then, you set up a library for each of your projects, which could be time-consuming and tedious. And the big challenge is getting your design done on time, with high quality.

To manage all these library tasks with high efficiency you need a PCB design tool that provides a powerful and intuitive library management solution. Look for one that supports the concept of an integrated central library. One that provides you with a proven starter library for quick design starts. One that enables you to pull component data directly from the web. One that reduces design time by reducing inconsistencies between schematic symbol and layout footprint data. One that makes it easy to build land patterns. One that can help you preserve previous libraries and design IP.

PADS can do all that. It includes all six things you want to have in your desktop PCB design library, and much more. For more information about library management and to try PADS for yourself, go to PADS.com.


Research by  TechValidate

Case Study: S&P 500 Electronics Company

Challenges

- Looking for an easy-to-use PCB design tool.

Use Case

- Uses the PADS ES suite for schematic capture and PCB layout.

Results

- Became productive in PADS in 1-2 weeks.
- Consistently releases products on time using PADS.
- Describes PADS routing as being easier to use than competitive tools
- Would recommend PADS to a friend.

Testimonials

"Library structure in PADS is easy to use and doesn't create loads of un-necessary files like Altium and Orcad. I find it easy to switch between units mils to mm without the inaccuracies I have seen with Orcad."

Source: TechValidate Survey of a S&P 500 Electronics Company
www.techvalidate.com/product-research/mentor-graphics-pads TVID: 320-0F4-A05

For the latest product information, call us or visit: www.mentor.com

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