Applications

“I’ve been doing PCB design since long before a PC could lay out a design or create library parts for you,” says David Ricketts of MMI Designs (mmi-designs.com). With the complexity of designs, the volume of different types of parts, and new innovative parts coming out all the time, David finds a company’s parts library doesn’t always have every part he needs for a new design.

Background

“I always verify every part in a parts library I’m given, because a small dimensional error can result in thousands of dollars of rework and correction for my client. So, any tool that helps me verify and quickly build an accurate library is incredibly valuable. That’s where PADS LP Creator comes in.”

PADS LP Creator includes thousands of IPC-compliant parts and their land patterns. David says he can use these land patterns in PADS® directly, quickly modify the part and pad dimensions, and even customize the library parameters for a particular customer’s library. “Today, since the computer does so much of the work, tools like PADS and PADS LP Creator really speed up parts creation. And, if the part isn’t in the PADS LP Creator library, I can easily create it manually with the PADS decal editor.”

Results

Instantly Creating Parts with PADS LP Creator

PADS LP Creator has saved David countless hours in part creation. “With PADS LP Creator, you pick a part from the IPC-compliant database, enter the dimensions from the manufacturer’s data sheet, and press a button. It’s an expert wizard."

“I can set up all my favorite parameters of how I want the library to work – line widths, layers I use, and all the variables specific to my customers. I can set all those parameters and then just press the Create button, and it makes a part and footprint.”

David remembers the days of spending 15 to 30 minutes or more on land pattern generation for a single basic part. “Now I can do it literally in a couple minutes. If the result is exactly what I want, I make another click and the part is put in my library and is ready to place. It’s an incredible time-saver.”

Manually Creating Parts Easily with PADS Decal Editor

According to David, as good and effective as any wizard is, it can’t create every part. Some have to be built the old-fashioned way – by hand with the CAD tool – to ensure the part is exactly correct. “That’s where the moveable origin of PADS decal editor, a separate tool from PADS LP Creator, really shines.”

“The most problematic parts for any wizard are connectors,” says David. “They are more complicated. Connectors come in a variety of odd shapes and sizes. They can have through-hole pins, surface-mount pins, plated pins, and other mechanical characteristics. “It’s not easy for a wizard to keep track of all that,” he says. “But PADS, with its decal editor, makes it efficient to manually create these types of parts.”

The part manufacturer provides a drawing and dimensions of the connector footprint in the data sheet. Dimensioning is often different from the typical IPC-compliant part pattern. David manually builds parts from the data sheet.

“When it comes to PCB design, a good designer never trusts the library he or she is given.”

– DAVID RICKETTS, DESIGNER/OWNER MMI DESIGNS
image and dimensions using the PADS decal editor. “Entering that data into a CAD system without a tool like the PADS decal editor would be very difficult,” says David.

With a surface-mount, IPC-compliant part, everything is dimensioned from the center of the part and PCB pads. With a connector, the dimensions are often specified differently. They might be given as spacing between the pads plus the pads themselves, referenced from a particular point the mechanical engineer chooses, or any number of other possibilities. “There can be a lot of variability from part to part,” he says. For example, with a through-hole ribbon connector, David needs to set the origin to pin 1 for assembly purposes, while the mechanical engineer sets the origin to a mounting hole.

“I’ve seen part data sheets where the dimensions for each side are referenced from a point on that side’s edge,” David says. “That means two different origins instead of one, like with an IC pattern.” Also, connectors are often dimensioned in imperial units, while layout grids for parts, like BGAs, are in metric values.

“Switching origins and unit variability make extra work when creating the part by hand, because now I have to do manual calculations to verify everything matches the data sheet and aligns correctly. With PADS decal editor, the whole process is simpler.”

David likes the ability in PADS to quickly and easily move the origin around by point and click. “I don’t have to make those extra calculations. And that saves me a lot of time.” David says he is able to simply follow the data sheet and set the origin of the part in PADS to the origin on the data sheet. “Then I can line everything up according to their dimensions, and when I’m done, move the origin for assembly purposes back to the center of the part if it’s a surface-mount part, or to pin 1 if it’s a through-hole part.”

David has found that sometimes a manufacturer will show the land pattern and pattern dimensions as well as the physical part and its dimensions on the data sheet. But the data sheet doesn’t show how they line up to each other. “So you have to find some common feature between the two patterns,” he says. “Once you find that feature, you move the origin to that point so you can line the two patterns up. In PADS I can do this with a simple point and click. I don’t need to enter coordinates.”

The moveable origin also helps when creating the PCB outline, which David says is particularly useful in creating the different layers for layout, silkscreen, and assembly. According to David, a moveable origin isn’t necessarily unique to PADS. “But nobody does it as well as PADS,” he says. “It’s so much easier to manually make a part in the PADS decal editor by pointing and clicking to move the origin to match the data sheet. It makes it possible for me to work more effectively by avoiding errors. Otherwise, I have to constantly go back to the calculator and figure out the right dimension. PADS cuts my time in half compared to manually making a part the old fashioned way.”

“But, when I can simply enter dimensions in PADS LP Creator, push a button, and automatically get the detail I need – well, I love that part.”

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