LP Wizard
(Land Pattern Wizard)

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SH Lee
SDD
Application Engineer.

What is a Land Pattern?

- The conductive pattern on a PC board used for the attachment and electrical connection of a compatible surface-mount or through-hole device

- Also known as a footprint, decal, cell, model, CAD library part, etc.
  - ‘Land Pattern’ is the IPC standards term

- Used for attaching electronic component assemblies
  - More than 500,000 different component packages exist
  - Every unique component package requires a unique land pattern
Creating Land Patterns: How Hard Could it Be?

QFN Component Package

- Silkscreen Pin 1 Polarity
- Assembly Pin 1 Polarity
- Post Assembly Dot Located by Pin 1 Visible After Assembly
- 80% Paste Mask Reduction on all Lands
- Center of Gravity Origin
- 75um Solder Mask Swell on all Lands
- 40% Paste Reduction on Thermal Pad Broken Into Squares
- 3D Model Outline Maximum Body Size
- Thermal Pad
- 0.25mm Silk to Land Gap Automatic DRC Checked
- 2mm Thermal to Land Gap DRC Checked
- 2mm Land to Land Gap DRC Checked
- Perfect IPC Land Sizes
- 2 Ref Des – Silkscreen and Assembly Drawing
- Silkscreen Outline Line Width 0.2mm
- IPC Placement Courtyard 0.25mm External Boundary
- Assembly Outline Nom or Max Body w/0.1mm Line Width
How Hard Could it Be?

Very hard, if you’re creating them by hand!

Creating land patterns by hand is time-consuming and error-prone.

It can take hours to create a single pattern!
LP Wizard: Perfect Land Patterns in 5 Minutes!

- PCB layout is not complete until CAD library parts are built
- Most PCB designers and EE engineers dread building CAD library parts
- With LP Wizard, building CAD library parts is as easy as 1, 2, 3 -

1. Enter Component Dimensions in Template and Auto-generate Land Pattern
2. Select LP Wizard Create Button
3. Import New Part Into CAD Tool
With LP Wizard, land patterns (footprints) are ready to use, with no post-creation clean up needed.

With LP Wizard, you can build 80-100 high-quality, “perfect” land patterns … in a single day!
CAD Library Challenges: Compelling Reasons to Use LP Wizard

- Current process takes too long
  - Use of current tools is labor intensive & prone to error
  - New designs are delayed due to library-creation backlog

- Libraries can’t keep up with industry standards
  - IPC standards demand new land patterns for RoHS compliance
  - Legacy libraries built in Imperial units need to be converted to Metric
  - Fewer manufacturers provide recommended land patterns
CAD Library Challenges: Compelling Reasons to Use LP Wizard

- Library creation is inefficient
  - An old library needs an overhaul but is too big to handle
  - A process change causes massive rework to re-generate the CAD library
  - Component manufacturers continually create unique component packages, adding to the library-generation burden

- Duplicate work needed to support all design uses
  - Components used in multiple environments (e.g., cell phone, computer, automotive) require unique land patterns for each use
  - Duplicate effort needed to support multiple CAD systems
The Benefits of LP Wizard

- Saves time & is more accurate
  - Template-based part creation is 89% faster than manual part creation
  - Includes a starter library of 10,000+ components
  - Output requires no clean up or additional data entry
  - Builds the Part Library (PLB) database simultaneously

- Guarantees that land patterns meet industry standards
  - LP Wizard is the only CAD library-generation tool approved by IPC
  - Ensures conformance to all IPC rules, including RoHS
The Benefits of LP Wizard

- **Improves efficiency**
  - Eliminates content duplication
  - Powerful search by component dimensions or mfr part number

- **Creates clean libraries & layout, with user-controlled results**
  - Land-pattern constraint rules provide exactly what users want
  - Improves design aesthetics: better part placement, easier routing, higher-quality designs
  - Aids assembly: CAD library includes post-processing data
If You Answer Yes to Any of These Questions, You Need LP Wizard!

- Are you tired of manually building CAD libraries?
- Are you in the process of switching CAD tools?
- Do you use multiple CAD tools?
- Is RoHS compliance a concern?
- Do you have multiple R&D locations that need to standardize on a single library format?
- Are you a service bureau that requires different CAD library rules?
If You Answer Yes to Any of These Questions, You Need LP Wizard!

- Do you have a CAD library that was built by multiple people using different construction techniques? Is your CAD library a mess?
- Are you an EE doing PCB layout?
- Are you transitioning from Imperial units to Metric units?
- Do you have a high volume of new PCB design layouts?
- Do you want to meet IPC Land Pattern standards?
- Are you a new Start-up?
What’s Included in the LP Wizard?

- **LP Viewer**
  - Provides access to a company’s CAD library documentation

- **LP Calculator**
  - Auto-generates accurate land patterns from component dimensions on manufacturers’ datasheets

- **LP Librarian**
  - Creates CAD library documentation by saving component dimensions, design rules, & manufacturer attributes in a part library (PLB) file
  - Saves user-definable attributes in the PLB, enabling users to search for parts using manufacturer datasheet text

- **Single-Part CAD Export Wizard**
  - Outputs a calculated land pattern to virtually any CAD tool
  - Each part is ready to use; no post-clean-up necessary

- **OPTIONAL: Multi-Part CAD Export Wizard**
  - Mass-produce an entire library of unlimited parts in a PLB file
  - Set custom rules and build entire library in minutes
LP Viewer

Features

- Free download
- Complete library documentation tool
- Open PLB files created by LP Librarian
- Quick search-and-locate capabilities
  - Find parts using component dimensions
  - Find parts by Mfr. Package Description
  - Find parts by Mfr. Case Code or Name
  - Find LP names for schematic symbols
- Superimpose physical component with LP for visual accuracy and QC
- Turn layers on/off to see library details
- View dimensions & padstack information
- View design rules and statistical data
- Web link to manufacturers’ datasheets
- Print a datasheet in B&W or color
LP Calculator

Features

- Build IPC-7351B compliant CAD library parts
- Create customized parts from personal rule files
- Use inch, mil, mm, or micron units
- Pin controls:
  - Relocate pin 1 to any pin
  - Pin order clockwise or counter-clockwise
  - Delete or hide pins
- Customize line widths & Ref Des sizes
- Unlimited solder & paste-mask controls
- Multiple pad shapes & rounded rectangle
- Toe, heel, & side solder-joint statistics
- Local fiducials for fine-pitch components
- Auto-generate LP & padstack names
- Min/Max or Nominal component dimensions
Features

- Saves component dimensions, design rules, and attributes in a library (PLB) file
- The Free LP Viewer provides access to PLB data
- Unlimited, user-definable attribute fields. Easily sort data for any attribute.
- Full spreadsheet editor with find/replace, undo/redo, add/delete rows & columns
Single-Part CAD Export Wizard

Features

- Exports land patterns, one at a time, to all versions of the following CAD tools:
  - Expedition
  - PADS Layout
  - Board Station
  - Cadence Allegro & PCB Editor
  - CADSTAR & CR-5000
  - Altium Designer (via PADS import)
  - Pulsonix (via PADS import)
  - P-CAD
  - McCAD
  - Pantheon
  - NI Ultiboard
  - Eagle
  - OrCAD Layout
  - Additional CAD exports coming!
Multi-Part CAD Export Wizard

Features

- LP Wizard includes 10,000+ component packages in multiple PLB files for SMT & PTH technology
- By adding the Multi-Part Wizard (MPW), you can:
  - Define custom rules
  - Create a library by mass-building all 10,000 parts
  - Update rules files and regenerate new libraries as needed
  - Switch CAD tools and regenerate a new library instantly, without translating
Multi-Part CAD Export Wizard
Create Libraries for Different Applications

- Mass-create libraries to meet different needs
  - Flex circuits
  - High density
  - High shock
  - Various solder techniques (wave solder, lead solder, lead-free)
- Change environment settings for different applications
  - Least (cell phones)
  - Nominal (desktop standard)
  - Most (medical, mil/aero)
  - User-customized
- Create unique rule sets for each application
  - In minutes, translate a normal (standard) library to any rule set
  - Service Bureaus can set up rules for each customer
- Easily maintain 100 land-pattern libraries using the same component dimensions
Unique Print Capability

Print Features

- Dimensions for:
  - Land patterns
  - Pin & padstack data
  - Silkscreen data
  - Assembly data
  - Courtyard data
- Padstack names
- Environment setting used
- Land pattern name
- Solder joint goals
- Construction units used
- Advisories on rule violations
- No other tool can do this

Component (Fig. 1)

Quad Flat Pack (QFP)

Pitch: 0.51
Pins A: 28
Pins B: 28
Pin Count: 150
Lmin: 18.70
Lmin: 16.50
Lmax: 16.70
Lmax: 16.90
Tmin: 9.90
Tmax: 9.90
Wmin: 0.15
Wmax: 0.30
Tab Xmin: 12.00
Tab Xmax: 13.00
Amin: 13.00
Amax: 14.10
Emin: 13.50
Emax: 14.10
Mmin: 1.70
Mmax: 0.00

Solder Joint Goals (Fig. 2)

Environment is B - NOMINAL

Tref (Outside) Goal: 0.35
Tref Min: 0.29
Tref Max: 0.60
H@I (Inside) Goal: 0.35
H@I Min: 0.24
H@I Max: 0.76
Side Goal: -0.02
Side Min: -0.02
Side Max: -0.19

Land Pattern (Fig. 3)

C1: 15.40
C2: 2.59
C3: 0.10
C5: 18.40
Y1: 12.90
**Return On Investment**
Reduce the time needed to build CAD libraries by up to 91%!

**Standard CAD Tool vs. LP Suite**

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<th>Design Time</th>
<th>Time Saved</th>
<th>Design Tool</th>
<th>LP Suite</th>
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<tr>
<td>1 h, 36 min</td>
<td>91.7%</td>
<td>Citrus Logic Inc CS5012A-BL7Z</td>
<td>LP3852EMP-1.8v</td>
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<tr>
<td>32 min, 34 s</td>
<td>84.8%</td>
<td>National Semiconductor</td>
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<tr>
<td>40 min, 35 s</td>
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<td>Zetex Inc ZXT951KTC</td>
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<tr>
<td>1 h, 3 min</td>
<td>88.9%</td>
<td>Intersil ISL43143IR</td>
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<tr>
<td>1 h, 3 min</td>
<td>90.5%</td>
<td>Analog Devices AD9929BCZ</td>
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</tr>
</tbody>
</table>

Time Saved:
- 91.7%
- 84.8%
- 87.8%
- 88.9%
- 90.5%

Full-featured, 30-day evaluation copy available online
*(Evaluation does not include Multi-Part CAD Export)*

* Data source: Benchmark by a large computer company, comparing the library-creation times of their current Allegro process with those of LP Wizard.
LP Viewer & LP Wizard by Mentor Graphics