LATTICE SEMICONDUCTOR®

Leading-edge design and implementation tools optimized for Lattice FPGA architectures

Lattice Diamond® design software offers leading-edge design and implementation tools optimized for small form-factor, low-power Lattice FPGA architectures. Diamond features design exploration, ease of use, improved design flow, and numerous other enhancements. These enhanced features allows users to complete designs faster, easier and with better results.

Diamond software is available as a download from the Lattice website for both Windows and Linux. Once downloaded and installed, it can be used with either a free license or a subscription license.

Diamond Software Free License

A free license can be downloaded from the Lattice website. This license provides immediate access to many popular Lattice devices such as CrossLink™, CrosslinkPlus™, ECP5U, Mach™-NX, MachXO3D™, MachXO3L™, MachXO2™, MachXO™, and Platform Manager 2 at no cost. It includes Synopsys® Synplify Pro™ for Lattice synthesis and Mentor ModelSim™ Lattice Edition mixed language simulator.

Diamond Software Subscription License

A subscription license provides support for all Lattice FPGAs including ECP5UM and LatticeECP3 devices. It also includes Synopsys® Synplify Pro™ for Lattice synthesis and Mentor ModelSim mixed language simulator.

Key Features and Benefits

- **Easy-to-Use Design Entry, Planning, & Implementation**
  - Intuitive HDL text editor supporting VHDL, Verilog, EDIF, and Lattice Preference Language keywords.
  - Spreadsheet, Floorplan, and Package views for easy design constraint (pin assignments, clock constraints, global preferences, timing preferences, placement constraints, etc.) entry.
  - Simulation Wizard for easy simulation setup.
  - Full Tcl Scripting Support.

- **Powerful Optimization**
  - Lattice Synthesis Engine (LSE): integrated logic-synthesis tool designed specifically optimized for Lattice FPGAs.
  - Easy design exploration with multiple implementations in a single project.
  - Multiple built-in implementation strategies for easy timing closure.

- **IP Re-Use**
  - Clarity Design and IPexpress offer an integrated interface to the Lattice catalog of functional modules, reference designs, and intellectual property (IP).

- **Accurate Analysis**
  - Drag-and-Drop support for setting constraints.
  - Graphical Timing Analysis environment.
  - Integrated Graphical Netlist and Physical Analysis tools to cross-probe between logic results (pre- and post-synthesis) and physical results (placement and routing).
  - ECO Editor provides quick access to adjust IO settings, PLL parameters, and memory initialization without having to recompile.
  - Graphical Power Calculator.
  - Reveal Inserter for easy insertion of embedded logic analyzer debug hardware to perform real-time analysis.
  - Reveal Analyzer allows multi-event triggering which can be controlled dynamically at run-time with an integrated waveform for displaying captured events from the target FPGA.

- **Third Party Tools**
  - Synthesis: Synopsys Synplify Pro
  - Simulation: Mentor ModelSim Lattice Edition

- **Additional Software Included with Diamond**
  - LatticeMico™ system integration for embedded microprocessor applications
  - EPIC full-featured physical netlist-level editor

Feature	Description
Power Calculator	• Accurate data models and data-driven power models • Graphical power estimation displays and reports • Stand-alone Power Estimator tool
Spreadsheet View	• Spreadsheet design constraints entry (pin assignments, clock resource usage, global preferences, timing preferences, and more) • Verify pin assignments real-time or on-demand
Package View	• Easy graphical assignment of signals to pins • Graphical representation of SSO noise analysis
Floorplanning Tasks	• Floorplan View – view design placement and edit placement constraints • Physical View – detailed view of physical routing of paths to understand timing issues • Netlist View – browse design ports, instances, and nets. Drag and drop into other views to set constraints. • NCD View – detailed usage information of physical components • Device View – view device resources and edit placement constraints
Lattice Synthesis Engine (LSE)	• Supports CrossLink, CrossLinkPlus, ECP5, LatticeECP3, LatticeECP2/M, Mach-NX, MachXO3D, MachX03L/LF, MachXO2, MachXO, and LatticeXP2 device families • Supports Verilog, VHDL, and mixed HDL designs • Uses Synopsys Design Compiler (SDC) format for constraints
Reveal Hardware Debugger	• Easy insertion of embedded logic analyzer debug hardware for real-time analysis • Reveal Analyzer module with multiple cursors and rubber banding for measuring events in the waveform display
IPexpress / Clarity	• Catalog of modules and intellectual property (IP) optimized for Lattice devices
Programmer	• Device programming manager
Deployment Tool	• Creates various device programming file formats for testers, embedded systems or external memories
Synopsys Synplify Pro for Lattice Synthesis	• Mixed VHDL, Verilog, and SystemVerilog synthesis support • Automatic re-timing (balancing registers across combinatorial logic)
Mentor ModelSim Lattice Edition Simulation	• Mixed language simulation of VHDL, Verilog, and SystemVerilog • Language Assistant • Advanced Breakpoint Management

Diamond Software Configuration Summary

	Lattice Diamond Free License	Lattice Diamond Subscription License
Lattice Device Support		
ECP5UM, LatticeECP3, LatticeECP2M/S, LatticeECP2/S, LatticeSC™, LatticeSCM™		X
CrossLink, CrossLinkPlus, ECP5U, LatticeECP2, LatticeECTM , Mach-NX, MachXO3D, MachXO3L/LF, MachXO2, MachXO, LatticeXP2, LatticeXPTM, Platform Manager 2, Platform Manager	X	X
Key Software Features		
Complete Diamond Software Environment	X	X
Third-Party Software		
Synopsys Synplify Pro	X	X
Mentor ModelSim Lattice Edition	X	X
Operating Systems		
Windows 10 (64-bit)	X	X
Linux – RHEL 6 and 7	X	X
Licensing and Ordering		
License Terms	1 Year, Nodelocked or Floating, Renewable	1 Year Subscription, Nodelocked or Floating
Ordering Part Number	N/A	LSC-SW-NL (Nodelocked) LSC-SW-NL-R (Nodelocked Renewal) LSC-SW-FL (Floating) LSC-SW-FL-R (Floating Renewal)

Diamond Software Configuration Summary
Related Products

Product	Description	Ordering Part Number
Download Cable (1.2 V to 3.3 V USB Programming Cable)	USB programming cable	HW-USBN-2B
Download Cable (1.2 V to 5 V USB Programming Cable)	USB programming cable	HW-USBN-2A
Download Cable (1.8 V to 5 V Parallel Port Programming Cable)	Parallel port programming cable	HW-DLN-3C