



Lattice Propel 2.2

Release Notes

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About Lattice Propel™ 2.2

Welcome to the Lattice Propel 2.2 design environment for Lattice FPGA system design. Lattice Propel is a complete set of graphical and command-line tools to create, analyze, compile, and debug both FPGA-based hardware and software processor systems.

What's New in Lattice Propel 2.2

New Device Family Support

- Lattice LFMX05 (MachXO5™-NX)
- Lattice LIFCL-33 (CrossLink™-NX-33)

Tools and Enhancements

- Supports Ubuntu 20.04 LTS Operating System.
- Supports dual processors.
- Supports displaying the latest IP version in the Propel Builder catalog by default.
- Supports printf through semihosting during On-Chip-Debugging.
- Supports backward compatible templates such as Sentry 1.0 and Sentry 2.1 projects.
- Supports pin connection through auto connect in Propel Builder.
- Supports hierarchical IP in Propel Builder.
- Enhances Meta Data tab GUI to have additional IP description options.
- Supports new interface AMBA4 AXI4, AMBA4 AXI4 Lite, AMBA4 AXI4 Stream.
- Enhances new language in IP Packager *.sv.
- Supports multiple channel for On-Chip-Debugging.
- Supports AHBL & APB passthrough master & slave for user extension.
- Supports AXI4 and AXI4-Lite interface.
- Supports RISC-V RTOS (RX) IP.
- Supports AXI Interconnect IP (AXI4 and AXI4-Lite).
- Supports AXI4 to AHB-Lite Bridge IP.
- Supports AXI4 to APB3 Bridge IP.
- Provides new AXI interface and RISC-V RX IP based SoC template.
- Provides Windows installer with digital signature.

Key Features

Device Family Support

- Lattice LFCPNX (CertusPro™-NX)
- Lattice MachXO2™
- Lattice MachXO3L™
- Lattice MachXO3LF®
- Lattice MachXO3D™
- Lattice LIFCL (CrossLink™-NX)
- Lattice LFD2NX (Certus™-NX)
- Lattice LFMNX (Mach™-NX)
- Lattice LFMXO5 (MachXO5-NX)

Processor Support

- RISC-V Micro Controller (MC)
- RISC-V State Machine (SM)
- RISC-V RTOS (RX)

Operating System Support

- Microsoft Windows 10 (64-bit)
- Red Hat Enterprise Linux 7.7 (64-bit)
- Red Hat Enterprise Linux 8.4 (64-bit)
- Ubuntu 20.04 LTS

Lattice Propel SDK

- Integrate picolibc as the default standard C library to support three levels of printf.
- Built-in industry standard components and tools for embedded software development and debugging.
- Optimized project management flow for Lattice FPGA platform.
- Supports creating both C and C++ software projects based on Lattice SoC platform.
- Supports Lattice Diamond®, Lattice Radiant™, and Propel Builder bridges.
- Integrates GDB and Open On-Chip-Debugging (OCD) with chained JTAG.
- Supports peripherals view with register description during debug session.
- Supports syntax highlighting for various development languages.
- Supports printf through semihosting during On-Chip-Debugging.

Lattice Propel Builder

- Supports added for some Lattice Radiant foundation IP.
- Supports device modification.
- Supports board information display.
- Supports IP management.
- Supports schematic design.
- Supports creating SoC Project and SoC Verification in project wizard GUI.
- Supports Lattice Diamond, Lattice Radiant, ModelSim/QuartaSim, and Propel SDK bridges.
- Supports generating simulation environment, testbench, and script.
- Integrates ModelSim OEM.
- Supports gluelogic.
- Supports IP Packager flow control.
- Supports hierarchical IP.
- Supports displaying the latest IP version in the Propel Builder catalog by default.
- Supports AXI4 and AXI4-Lite interface.
- Supports more flexible AXI based SoC creation.
- Supports new GUI options, new interface, and more Hardware Description Language (HDL).

IP (Bus) Support

- AXI Interconnect IP
 - AMBA4 AXI4 and AXI4-Lite compliant.
 - Heterogenous support of AXI4 and AXI4-Lite master and slave interfaces.
 - Supports AXI4 INCR and FIXED burst.
 - Data bus width support: AXI4 – 8 to 1024, AXI4-Lite – 32, 64.
 - Supports multiple clock domains.
 - Programmable number of memory-mapped masters (1 to 32) and slaves (1 to 32).
 - Programmable arbitration schemes: round robin and fixed priority.
 - Options to enable or disable ID Ordering.
- AXI4 to AHB-Lite Bridge IP
 - AMBA4 AXI4 and AMBA3 AHB-Lite compliant.
 - Data bus width support: 8 to 1024.
 - Supports AXI4 INCR and FIXED burst.
 - Configurable data bus width, AXI ID width, and user AXI width.

- AXI4 to APB3 Bridge IP
 - AMBA 4 AXI4 and AMBA 3 APB3 protocol compliant.
 - Data bus width support: 8 to 32.
 - Supports AXI4 INCR burst.
 - Configurable data bus width, AXI ID width, and user AXI width.
- Provides MachXO2 template design, the *Hello World Project*.
- Provides MachXO3D template design, the *Hello World Project* and *Lattice Sentry RoT Project* (Windows platform only).
- Provides Mach-NX template design, the *Lattice Sentry RoT Project (484)* (Windows platform only) and *Lattice Sentry RoT Project (256)* (Windows platform only).
- Provides CertusPro-NX AXI based template design, the *RISC-V RX Demo Project* and *FreeRTOS Project*.
- Supports functional verification using system-level simulation environment for templates.

Template Design and System Simulation

- Supports simulation for Linux platform.
- Provides CertusPro-NX template design, the *Hello World Project*. Enhanced to support multiple clock domain.
- Provides CrossLink-NX template design, the *Hello World Project*.

Release Contents

- Propel_2.2.exe (Windows 10 64-bit Operating System)
- Propel_2.2_lin.run (Red Hat Enterprise Linux 64-bit & Ubuntu LTS Operating System)

Validation Platforms

- CertusPro-NX Evaluation Board (REV A P/N: LFCPNX-EVN)
- CrossLink-NX Evaluation Board (REV B P/N: LIFCL-40-EVN)
- MachXO2 Breakout Board (REV B P/N: LCMXO2-7000HE-B-EVN)
- MachXO3D Breakout Board (REV A P/N: LCMXO3D-9400HC-B-EVN)
- MachXO3D PFR Demo Board (REV A P/N: LCMXO3D-PFR-EVN)
- Lattice Sentry Demo Board for Mach-NX (REV B P/N: LFMNX-SENTRY-EVN)
- Sentry_Demo_Board_for_Mach-NX_256 (REV A P/N: LFMNX-SENTRY-EVN-256)

System Requirements

The basic system requirements for Propel 2.2 on Microsoft Windows and Linux platforms:

- Intel Pentium or Pentium-compatible PC, or AMD Opteron system
- Windows 10 64-bit Operating System
- Red Hat Enterprise Linux 64-bit Operating System (RHEL7.7 and RHEL 8.4)
- Ubuntu 20.04 LTS Operating System
- Free Disk Space: approximately 10 GB
- Network adapter and network connectivity for IP server access

Release Limitations

This release of Propel 2.2 has the following limitations:

- Verification engine does not support mixed language SoC project.
- Propel 2.2 does not support HW-USBN-2A cable.
- Diamond 3.12 is not supported in Ubuntu 20.04 LTS.
- The Bit/Jed file cannot be downloaded to the board from Linux Radiant/Diamond tool.
- No simulation support for AXI SoC templates.
- AXI Interconnect IP:
 - No wrap burst support.
 - During AXI4 external master request:
AxQOS, AxREGION, AxUSER, AxCACHE, AxLOCK and AxPROT are ignored while passing to external AXI4-Lite slave interface.
AxQOS, AxREGION, AxUSER, AxCACHE, AxLOCK and AxPROT are passed through as such while passing to external AXI4 slave interface
- AXI4 to AHB-Lite Bridge IP:
 - No wrap burst support.
 - AxQOS, AxREGION, AxUSER, AxCACHE and AxLOCK are considered as don't care.
 - AxPROT is a pass through to the AHB Lite interface
- AXI4 to APB3 Bridge IP:
 - No fixed and wrap burst support.
 - AxQOS, AxREGION, AxUSER, AxCACHE, AxLOCK and AxPROT are considered as don't care.

Known Issues

- AXI Interconnect IP does not support AXI4-Lite interface correctly.
- The Large_RAM_DP_True module information cannot be displayed in the Module/IP Block Wizard of the Lattice Propel 2.2 Builder, and it cannot be generated as an instance.

Technical Support

For assistance, submit a technical support case at www.latticesemi.com/techsupport.



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