# High-Speed Digital SI/PI Simulation Platform

Highlights

1 With the development of emerging technologies, high-speed digital standards are evolving rapidly and bring new design challenges.

2 With channel rates evolving from 28 Gbps NRZ to 112 Gbps PAM4, all impedance discontinuities will cause more signal reflections and distortions, and multi-channels will bring more serious crosstalk noise.

3 DDR5 increases memory density to a potential maximum of 6.4 Gbps and doubles DDR4's frequency, which brings a number of data transmission performance enhancements, as well as new design challenges.

4 ViaExpert can quickly complete 3D model creation and optimization of interconnect structures

5 ChannelExpert can quickly build multi-channel models and evaluate their metrics, like RL, IL, ICN, ILD, COM, etc.

6 All SI/PI analysis for high-speed design can be implemented on this simulation platform, including S-parameters extraction, eye diagram analysis, AC impedance analysis, DC IR-drop analysis, etc.

Overview - High-Speed Serial/Parallel Interfaces

- Xpeedic provides a comprehensive platform supporting high-speed serial/parallel interfaces, including
  1. Channel interconnect modeling and optimization
  2. DDRx bus modeling and analysis
  3. High-speed Serdes bus modeling and analysis
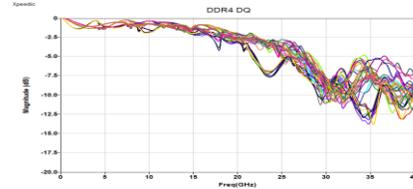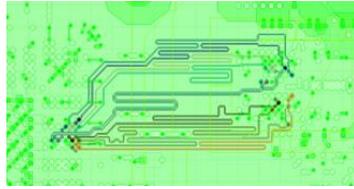 4. PDN system power integrity analysis
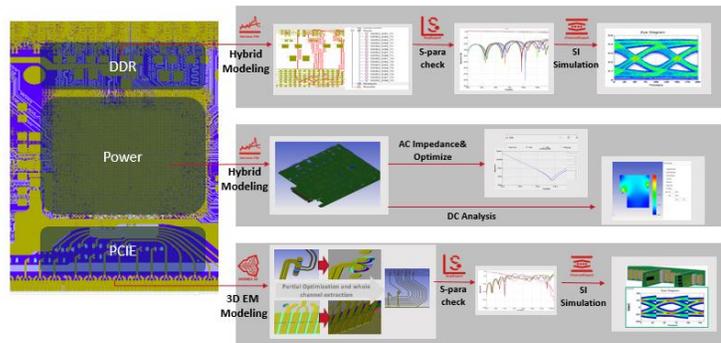
Channel Interconnect Modeling and Optimization

- Channel interconnect such as transmission line, via, BGA fan-out, AC coupling capacitance can be quickly modeled and optimized
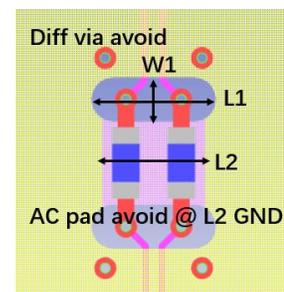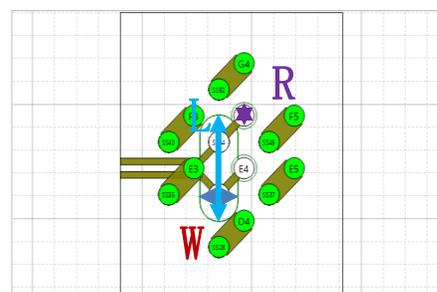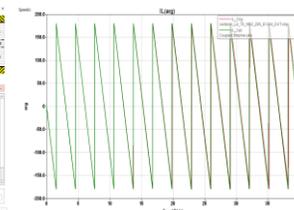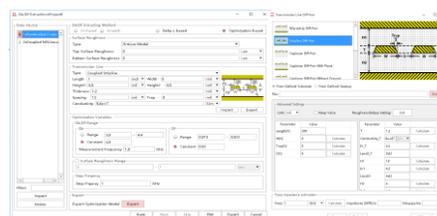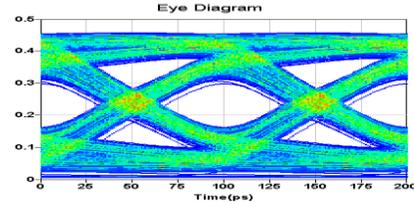
DDRx Bus Modeling and Analysis

- Fast DDRx S-parameter extraction in Hermes PSI
- DDRx bus crosstalk histogram calculation in SnpExpert
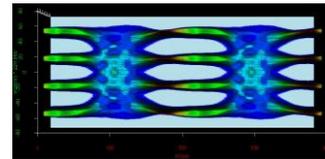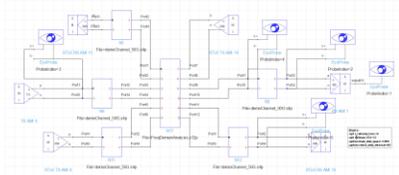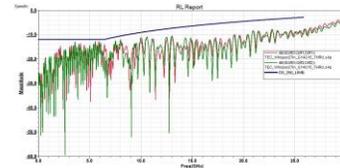- Quick DDRx bus model creation for waveforms and eye diagrams in ChannelExpert

High-Speed Serdes Bus Modeling and Analysis

- Accurate S-parameter extraction for Serdes channel in Hermes 3D
- Compliance check in SnpExpert including IL, RL, ILD, Crosstalk, COM, etc.
- Statistical eye-diagram analysis in ChannelExpert

PDN System Power Integrity Analysis

- Hermes PSI provides both AC impedance and DC IR-drop simulation
- AC impedance simulation can optimize the value, location of decoupling capacitor to stabilize the power fluctuations at the chip pins within the noise tolerance
- DC IR-drop simulation can check the amount of voltage drop on a power system by given DC current consumption.