# Tenstorrent Achieves First-Pass Silicon Success for High-Performance AI Processor SoC Using Synopsys' Broad DesignWare IP Portfolio

High-Quality DesignWare Interface and Processor IP for Efficient Real-Time Connectivity and Machine Learning Processing Accelerate Design Schedule and Lower Risk

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**Highlights:**

- Tenstorrent achieved first-pass silicon success for its Grayskull AI processor SoC using DesignWare PCI Express 4.0, ARC HS48 Processor, and LPDDR4 IP
- PCI Express 4.0 controller and PHY IP with up to x16 link widths handling more than 36dB channel loss provides low-latency and high throughput connectivity
- Quad-core ARC HS48 Processor IP with superscalar architecture delivers outstanding power-efficient performance and scalability
- Low-latency LPDDR4 controller IP offers automated memory power state optimization for power-efficiency and advanced RAS features for high reliability

Synopsys, Inc. (Nasdaq: SNPS) today announced that Tenstorrent has achieved first-pass silicon success for its Grayskull AI processor system-on-chip (SoC) using Synopsys' DesignWare® PCI Express (PCIe) 4.0 Controller and PHY, ARC® HS48 Processor, and LPDDR4 Controller IP. The silicon-proven DesignWare IP portfolio enabled Tenstorrent to quickly meet the critical real-time connectivity and specialized processing requirements of their dynamic artificial intelligence (AI) processor SoC for high-performance computing applications. Tenstorrent also leveraged Synopsys' expert technical support team to ease IP integration and significantly accelerate their design schedule.

Grayskull offers differentiated capabilities, including fine-grained conditional computation, an area- and power-efficient matrix compute engine, a custom network-on-chip (NoC), and dynamic data compression. Due to the success of the Grayskull SoC, Tenstorrent intends to engage with Synopsys on their next-generation AI processor SoCs for markets such as data centers, public/private cloud servers, on-premises servers, edge servers, and automotive.

"Tenstorrent's Grayskull AI processor SoC required a range of high-performance IP that met the aggressive compute demands of training and inferencing models," said Drago Ignjatovic, vice president of engineering at Tenstorrent. "Synopsys' established track record in the IP industry gave us confidence that we could quickly integrate the DesignWare PCIe 4.0 Controller and PHY, ARC HS48 Processor, and LPDDR4 IP into our AI processor SoC. In addition, Synopsys' technical support team along with the maturity and quality of the DesignWare IP allowed our designers to focus on their core competencies and quickly achieve first-pass silicon success."

The PCI Express 4.0 controller and PHY IP provide the required 16GT/s data rate and x16 link width while allowing more than 36dB channel loss across process, voltage, and temperature (PVT) variations for high-throughput and low-latency connectivity. A quad-core configuration of the DesignWare ARC HS48 Processor delivers high processing performance within constrained area and power budgets. To achieve power-efficiency Synopsys' LPDDR4 Controller IP, operating at 4267 Mbps, provides automated low-power state entry and exit. The Advanced Reliability, Serviceability, and Availability (RAS) features including inline error correcting code (ECC) with address protection reduce system downtime.

"Innovations in machine learning algorithms and neural network processing for high-performance computing applications are driving new technology requirements for AI SoCs," said John Koeter, senior vice president of marketing and strategy for IP at Synopsys. "Synopsys provides companies such as Tenstorrent with a comprehensive IP portfolio that addresses the performance, latency, memory and connectivity requirements of AI chips for cloud, IoT, mobile, and automotive designs, while accelerating their development time."

**Availability and Additional Resources**

DesignWare PCI Express 4.0 Controller and PHY, ARC HS48 Processor, and LPDDR4 Controller IP are available now.

Visit the following web pages to learn more about:

- DesignWare IP for PCI Express
- DesignWare ARC Processor IP

- DesignWare LPDDR IP
- DesignWare IP or AI

## About DesignWare IP

Synopsys is a leading provider of high-quality, silicon-proven IP solutions for SoC designs. The broad DesignWare IP portfolio includes logic libraries, embedded memories, embedded test, analog IP, wired and wireless interface IP, security IP, embedded processors and subsystems. To accelerate prototyping, software development and integration of IP into SoCs, Synopsys' IP Accelerated initiative offers IP prototyping kits, IP software development kits and IP subsystems. Synopsys' extensive investment in IP quality, comprehensive technical support and robust IP development methodology enable designers to reduce integration risk and accelerate time-to-market. For more information on DesignWare IP, visit http://www.synopsys.com/designware.

## About Synopsys

Synopsys, Inc. (Nasdaq: SNPS) is the Silicon to Software™ partner for innovative companies developing the electronic products and software applications we rely on every day. As the world's 15th largest software company, Synopsys has a long history of being a global leader in electronic design automation (EDA) and semiconductor IP and is also growing its leadership in software security and quality solutions. Whether you're a system-on-chip (SoC) designer creating advanced semiconductors, or a software developer writing applications that require the highest security and quality, Synopsys has the solutions needed to deliver innovative, high-quality, secure products. Learn more at www.synopsys.com.

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