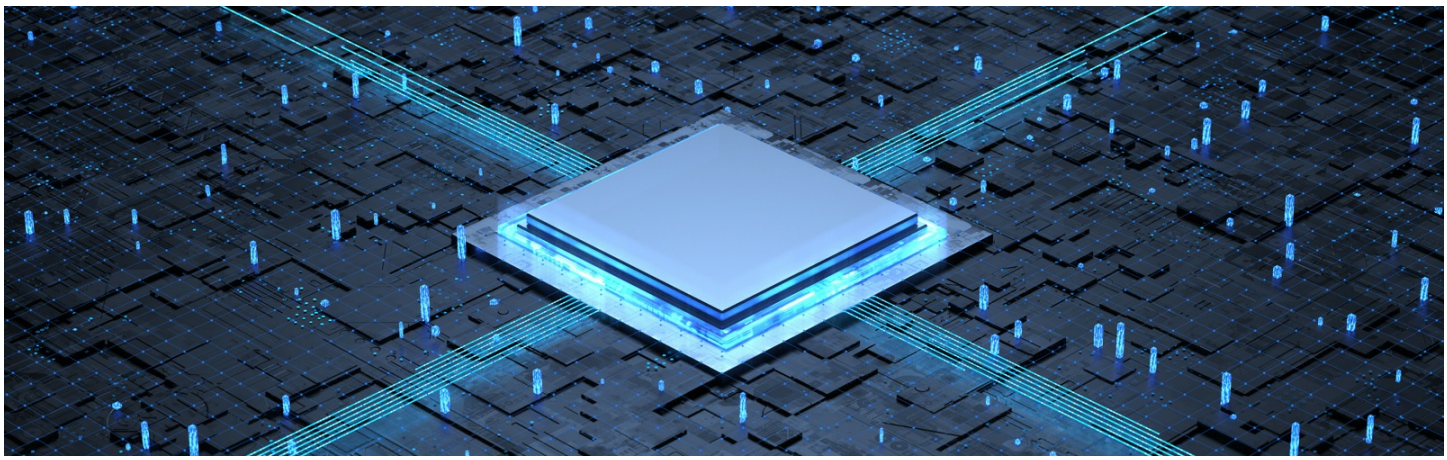
Synopsys Introduces Industry's Highest Performance Neural Processor IP



New DesignWare ARC NPX6 NPU IP Delivers Up to 3,500 TOPS Performance for Automotive, Consumer and Data Center Chip Designs

Highlights of this Announcement:

- DesignWare ARC NPX6 NPU IP delivers industry-leading performance and power efficiency of 30 TOPS/Watt, featuring up to 96K MACs with enhanced utilization, new sparsity features and new interconnect for scalability
- New MetaWare MX Development Toolkit automatically compiles and optimizes models for neural networks such as CNNs and RNNs/LSTMs, as well as emerging deep learning networks such as transformers and recommenders
- New ARC NPX6FS NPU IP and MetaWare MX Toolkit for Safety simplify safety-critical automotive SoC development and accelerate ISO 26262 qualification

MOUNTAIN VIEW, Calif., April 19, 2022 /PRNewswire/ -- Addressing increasing performance requirements for artificial intelligence (AI) systems on chip (SoCs), Synopsys, Inc. (Nasdaq: SNPS) today announced its new neural processing unit (NPU) IP and toolchain that delivers the industry's highest performance and support for the latest, most complex neural network models. Synopsys DesignWare® ARC® NPX6 and NPX6FS NPU IP address the demands of real-time compute with ultra-low power consumption for AI applications. To accelerate application software development for the ARC NPX6 NPU IP, the new DesignWare ARC MetaWare MX Development Toolkit provides a comprehensive compilation environment with automatic neural network algorithm partitioning to maximize resource utilization.

"Based on our seamless experience integrating the Synopsys DesignWare ARC EV Processor IP into our successful NU4000 multi-core SoC, we have selected the new ARC NPX6 NPU IP to further strengthen the AI processing capabilities and efficiency of our products when executing the latest neural network models," said Dor Zepeniuk, CTO at Inuitive, a designer of powerful 3D and vision processors for advanced robotics, drones, augmented reality/virtual reality (AR/VR) devices and other edge AI and embedded vision applications. "In addition, the easy-to-use ARC MetaWare tools help us take maximum advantage of the processor hardware resources, ultimately helping us to meet our performance and time-to-market targets."

Real-Time Responses with Scalable Neural Processors

Advanced driver assistance systems (ADAS), surveillance, digital TVs and cameras and other emerging AI applications that implement complex neural network models are putting greater demands on compute and memory resources, often for safety-critical functions. To address the range of application requirements, the ARC NPX6 NPU IP:

- Scales from 4K to 96K MACs
- Delivers, in a single instance, up to 250 tera operations per second (TOPS) at 1.3 GHz on 5nm processes in worst-case conditions, or up to 440 TOPS by using new sparsity features, which can increase the performance and decrease energy demands of executing a neural network
- Integrates hardware and software connectivity features that enable implementation of multiple NPU instances to achieve up to 3,500 TOPS of performance on a single SoC

- Provides more than 50x the performance of the maximum configuration of the ARC EV7x Processor IP
- Offers optional 16-bit floating point support inside the neural processing hardware, maximizing layer performance and simplifying the transition from GPUs used for AI prototyping to high-volume power- and area-optimized SoCs

DesignWare ARC NPX6FS NPU IP meets stringent random hardware fault detection and systematic functional safety development flow requirements to achieve up to ISO 26262 ASIL D compliance. The processors, with comprehensive safety documentation included, feature dedicated safety mechanisms for ISO 26262 compliance and address the mixed-criticality and virtualization requirements of next-generation zonal architectures.

Comprehensive Software Environment

The ARC MetaWare MX Development Toolkit includes compilers and debugger, neural network software development kit (SDK), virtual platforms SDK, runtimes and libraries, and advanced simulation models. MetaWare MX offers a single toolchain to accelerate application development and automatically partitions algorithms across the MAC resources for highly efficient processing. For safety-critical automotive applications, the MetaWare MX Development Toolkit for Safety includes a safety manual and a safety guide to help developers meet the ISO 26262 requirements and prepare for ISO 26262 compliance testing.

"Higher resolution images, more cameras in systems, and more complex algorithms are driving AI processing requirements to high TOPS performance," said John Koeter, Sr. VP, marketing and strategy in the Synopsys Solutions Group. "With the new DesignWare ARC NPX6 and NPX6FS NPU IP, as well as MetaWare MX Development Toolkits, designers can take advantage of the latest neural network models, meet growing performance demands and accelerate time-to-market for their next intelligent SoCs."

Synopsys' broad DesignWare IP portfolio includes logic libraries, embedded memories, IOs, PVT monitors, embedded test, analog IP, 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. Our extensive investment in IP quality and comprehensive technical support enable designers to reduce integration risk and accelerate time-to-market. For more information, please visit https://www.synopsys.com/designware.

Availability & Resources

- DesignWare ARC NPX6 NPU IP, NPX6FS NPU IP and MetaWare MX Development toolkit are available to lead customers today.
- Join Synopsys at the Linley Fall Processor Conference on April 20 to hear more about the new ARC NPX6NPU IP in the session, "Bigger, Faster, and Better AI Using Synopsys NPUs."
- Attend the Synopsys Deep Dive session at the Embedded Vision Summit on May 19 to learn how to "Optimize AI Performance and Power for Tomorrow's Neural Network Applications."
- For more information, visit the ARC NPX6 NPU IP and ARC MetaWare MX Development Toolkit web pages.

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 an S&P 500 company, Synopsys has a long history of being a global leader in electronic design automation (EDA) and semiconductor IP and offers the industry's broadest portfolio of application security testing tools and services. Whether you're a system-on-chip (SoC) designer creating advanced semiconductors, or a software developer writing more secure, high-quality code, Synopsys has the solutions needed to deliver innovative products. Learn more at www.synopsys.com.

Editorial Contact:
Simone Souza
Synopsys, Inc.
650-584-6454
simone@synopsys.com

SOURCE Synopsys, Inc.