Synopsys' New Embedded Vision Processor IP Delivers Industry-Leading 35 TOPS Performance for Artificial Intelligence SoCs

DesignWare ARC EV7x Vision Processors with Deep Neural Network Accelerator Provide More Than 4X Performance Increase for AI-intensive Edge Applications

Disclaimer: GlobalFoundries acquired the Synopsys Processor Solutions business on June 1, 2026. Clickhere to learn more.

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Highlights:

- DesignWare EV7x Vision Processors' heterogeneous architecture integrates vector DSP, vector FPU, and neural network accelerator to provide a scalable solution for a wide range of current and emerging artificial intelligence applications
- Deep neural network accelerator includes up to 14,080 MACs to meet the high-performance needs of intelligent automotive and consumer applications
- Integrated AES encryption option protects valuable data such as training and sensor data from evolving threats without compromising performance
- MetaWare EV Software Development Toolkit enhancements, combined with EV7x processors, accelerate frame-per-second throughput by up to 65% compared to EV6x

Synopsys, Inc. (Nasdaq: SNPS) today introduced its new DesignWare® ARC® EV7x Embedded Vision Processor family with Deep Neural Network (DNN) accelerator for machine learning and artificial intelligence (AI) edge applications. The ARC EV7x Vision Processors integrate up to four enhanced vector processing units (VPUs) and a DNN accelerator with up to 14,080 MACs to deliver up to 35 TOPS performance in 16-nanometer (nm) FinFET process technologies under typical conditions, 4X the performance of the ARC EV6x processors. In addition, the new EV7x design combines clock and power gating technologies with architectural enhancements to reduce power consumption. To speed application software development for ARC EV7x Vision Processors, Synopsys' MetaWare EV Development Toolkit provides a comprehensive software programming environment based on common embedded vision standards, including OpenVX™ and OpenCL™ C. The combination of high-performance vision engine and DNN accelerator with high productivity programming tools make the ARC EV7x Embedded Vision Processors ideal for a broad range of vision applications including advanced driver assist systems (ADAS), video surveillance, smart home, and augmented and virtual reality.

"The new EV7x Vision Processors optimize the execution of linear algebra and matrix math operations to accelerate processing on simultaneous localization and mapping (SLAM) and its related solutions such as real-time tracking for AR/VR and localization for autonomous driving while increasing the accuracy of environmental maps," said Tomo Ohno, chief executive officer and co-founder at Kudan. "Through our collaboration with Synopsys, designers have access to a highly efficient SLAM solution that delivers high performance while consuming significantly less power and memory resources than alternate implementations."

New High-Performance Multicore Architecture with Deep Neural Network Accelerator
The DesignWare ARC EV7x Vision Processors' heterogeneous multicore architecture includes up to four high-performance VPUs. Each EV7x VPU includes a 32-bit scalar unit and a 512-bit-wide vector DSP and can be configured for 8-, 16-, or 32-bit operations to perform simultaneous multiply-accumulates on different streams of data. The optional DNN accelerator scales from 880 to 14,080 MACs and employs a specialized architecture for faster memory access, higher performance, and better power efficiency than alternative neural network IP. In addition to supporting convolutional neural networks (CNNs), the DNN accelerator supports batched LSTMs (long short-term memories) for applications that require time-based results, such as predicting the location of a pedestrian based on their observed path and speed. The vision engine and the DNN accelerator work on tasks in parallel, making the EV7x particularly efficient for autonomous vehicles and ADAS applications where multiple cameras and vision algorithms operate concurrently.

Latest Advancements for Security and Safety
The DesignWare ARC EV7x Vision Processors offer optional AES-XTS encryption engines to protect data passing from on-chip memory to the vision engine and DNN accelerator. The AES-XTS engine prevents high-value data such as training datasets and personal biometric data, including facial recognition and retina scans, from being exploited.

ASIL B and ASIL D compliant versions of the new processors, the ARC EV7xFS portfolio, accelerate ISO 26262 certification of automotive SoCs. The functional safety-enhanced processors offer hardware safety features, safety monitors, and lockstep capabilities that enable designers to achieve stringent levels of functional safety and fault coverage without significant impact

on power or performance. In addition, a new "hybrid" option enables system architects to select required safety levels up to ASIL D in the software, post-silicon.

Enhanced High-Productivity Software Programming Environment
The ARC EV7x Vision Processor family is supported by MetaWare EV Development Toolkit, a comprehensive, high-productivity software development environment based on common embedded vision standards, including OpenVX and OpenCL C. The tool suite enables the development of efficient computer vision applications on the EV7x processor's vision engine as well as automatic mapping and optimization of neural networks graphs on the dedicated DNN accelerator. The mapping tools support Caffe and Tensorflow frameworks, as well as the ONNX neural network interchange format.

"ULSee's facial tracking and computer vision algorithms running on ARC EV7x Vision Processors give our mutual customers high-performance, power-efficient solutions for edge applications, such as automotive ADAS and mobile," said Dr. Yi-Ta Wu, vice president of Engineering (auto team leader) at ULSee. "The extensive EV7x Vision Processor configuration options enable designers to address a wide range of devices within the same programming environment, such as low-power SoCs for drowsiness detection and high-end SoCs for environment monitoring. This versatility saves design teams effort and time-to-market for a tremendous competitive advantage."

"The massive amounts of compute data in intelligent systems across almost every market require chips to execute fast deep learning processing on the edge," said John Koeter, vice president of marketing for IP at Synopsys. "Our new ARC EV7x Embedded Vision Processor IP with DNN accelerator, combined with its comprehensive software environment, enables designers to meet the highest performance and power efficiency requirements for advanced automotive, consumer, and mobile SoC designs."

ARC Processor Summit 2019
Join Synopsys at the ARC Processor Summit to learn more about the EV7x Embedded Vision Processors and entire ARC processor portfolio:

- ARC Processor Summit Silicon Valley: Sept. 19, 2019, Santa Clara
- AIoT Summit Taiwan: Oct. 16, 2019, Hsinchu
- ARC Processor Summit China: Nov. 13, 2019, Beijing
- ARC Processor Summit Japan: Nov. 19, 2019, Tokyo

Availability & Resources
ARC EV7x Embedded Vision Processors, DNN accelerator option up to 14,080 MACs, and MetaWare EV software is expected to be available for lead customers in Q1 2020. The DNN accelerator option with up to 3,520 MACs is available now. For more information on Synopsys ARC EV7x Processor IP:

- Visit ARC EV7x Processor IP web page
- Download ARC EV7x Processor IP datasheet

About Synopsys DesignWare IP
Synopsys is a leading provider of high-quality, silicon-proven IP solutions for SoC designs. The broad Synopsys 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 enables designers to reduce integration risk and accelerate time-to-market. For more information on Synopsys DesignWare IP, visit https://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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