

Spiking Neural Processor

Energy-efficient
ambient intelligence

The Spiking Neural Processor (SNP) revolutionizes the way devices perceive, process, and interact with the physical world. Innatera's neuromorphic signal processing technology enables ambient intelligence with unprecedented energy efficiency, enabling smarter, faster, and more efficient sensing applications.

Integrated solution for edge applications

A seamless combination of high-performance hardware and intuitive software helps create a complete solution for energy-efficient and innovative edge applications, all in a single chip.

Powerful event-driven compute

The Spiking Neural Processor has a blazingly fast, event-driven Spiking Neural Network (SNN) fabric that supports diverse network topologies, with immense programming flexibility, and trainable parameters for both neurons and synapses. The fabric excels at temporal and spatio-temporal data processing common to many sensing applications.

Game-changing power efficiency

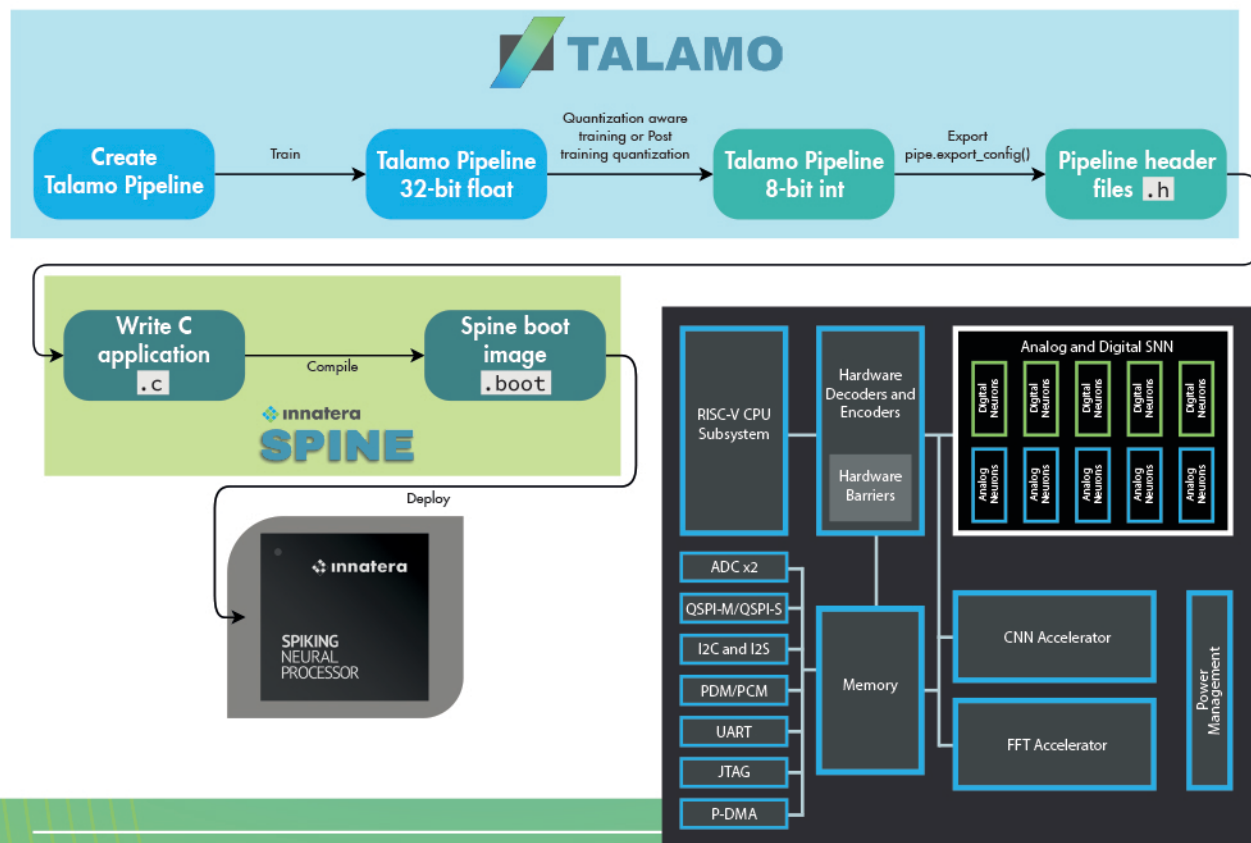
With the Spiking Neural Processor, edge applications are revolutionized with low-latency AI computing, all within a milliwatt power envelope. The SNP offers a versatile architecture, tailored for low-power applications by combining extended RISC-V ISA with asynchronous accelerators and optimized memory architecture with minimal data transfer. The proprietary on-chip PLL frequency control, fine-grained clock, on-chip LDOs, separation of power domains, and reset management deliver efficient power control.

Heterogeneous AI for performant applications

The SNP architecture brings together Spiking and Convolutional Neural Networks (CNN), alongside event-based algorithms, to enable real-time, low-power, low-latency applications. Combining two paradigms, in-memory compute and near-memory compute, The SNP offers a high degree of application flexibility, and is sensor agnostic, making it an ideal choice for a wide range of use-cases involving sensor data processing and sensor fusion.

Complete application development toolchain

The Spiking Neural Processor's Talamo SDK offers a PyTorch integrated environment for building and deploying models, a familiar workflow for neural network developers. An integrated compiler maps trained models to the processor's heterogeneous computing fabric, while an architecture simulator enables rapid hardware emulation for quick validation and iteration.



Transform your application with ambient intelligence

The Spiking Neural Processor enables seamless processing of data from diverse sensors such as microphones, radars, IMUs, IR, as well as sensor fusion applications. The SNP unlocks application use cases such as touch-free interfaces in industries such as consumer electronics, IoT, industrial automation, and applications like touch-free interfaces, presence detection, keyword spotting, environmental monitoring, predictive maintenance, and adaptive control.



Radar



Microphone



IMU



Image sensors



ECG/PPG



Ultrasonic sensors

Heterogeneous compute

- Low-power Spiking Neural Network accelerators
- 32-bit RISC-V CPU with floating point support and improved hardware utilization
- 32 MAC CNN Accelerator
- FFT/iFFT accelerator*

Low-power

- Event-driven and sparse signal processing and AI
- Internal low-power PLL
- Efficient clock management
- Separate (software controllable) power domains*
- Improved power management with several sleep modes*

Standard peripheral interfaces

- QSPI-M, QSPI-S*, JTAG, I2C, UART, GPIO, ADC, I2S, PDM2PCM*, CIF*
- DMA for peripherals and between memory
- Scatter-Gather DMAs for improved spike data handling*

Real-time features

- Interrupt and Event Manager
- Software events
- Hardware semaphores
- WatchDog timer
- Advanced Timers
- Hardware barriers and event barrier bridges*
- Event triggering through GPIO

Memory

- 384 KB of central embedded SRAM
- 128 KB CNN designated memory
- 32 KB retention SRAM*

Operating parameters

- Supply voltage 1.8V
- System frequency up to 160 MHz
- 2.8mm x 2.6mm, 36-pin WLCSP
- Operating temperature range -40 to 125°C (-40 to 257°F)*

Application development toolchain

- Pytorch-based machine learning framework
- TensorBoard-based network performance visualizations
- Network compilers for easy deployment to hardware directly from Python
- GCC-based Embedded Software Development Kit for RISC-V

*Not available with the T1 Evaluation Kit

Get your Evaluation kit today!

T1 Evaluation Kit provides all necessary components for rapid prototyping. Included in the kit are the T1 Spiking Neural Processor board, a sensor shield with microphone, IMU, and other sensors, a breadboard for custom designs, a comprehensive SDK, and application examples.



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