



# TinyML & EDGE AI TINY RAPTOR

IP PLATFORM BRIEF

DOLPHIN  
DESIGN

## Speed up your algorithms at a fraction of the energy spent by your CPU

### USE-CASES

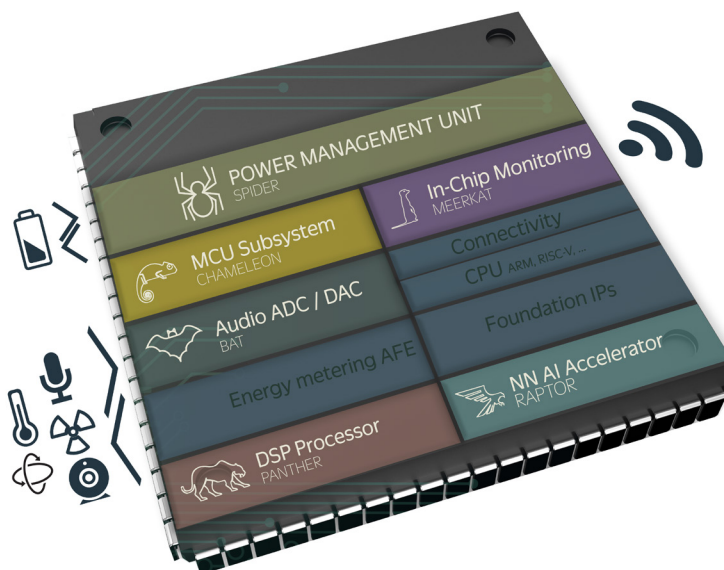
- Speech recognition
- Noise cancellation
- Sound recognition
- Face identification
- Object detection
- Image classification

Tiny RAPTOR is a Power efficient Neural Processing IP Platform specialized in sound and vision. Tiny RAPTOR's near-memory computing architecture is composed of a DMA, local memory and up to 128 processing elements in its most powerful version.

Tiny RAPTOR is a fully programmable accelerator designed to execute deep neural networks (DNN) in an energy-efficient way. It reduces the inference time needed to run Machine Learning (ML) Neural Networks (NN). Tiny RAPTOR fits particularly well within any MCU subsystem, in particular Dolphin Design's solution (CHAMELEON).

### APPLICATIONS

- Doorlock
- Smart camera
- Wearable
- TWS
- Smart speaker
- IoT sensor fusion



### KEY FIGURES

- 3x higher power efficiency compared to state-of-the-art NPU (KWS-TinyML)
- 30mW power @ mobilenet v2 image classification (224x224-60FPS-500MHz)
- Up to 256GOPS peak at 1GHz
- 2.2TOPS/W computing efficiency
- Small footprint (0.045mm<sup>2</sup> in 22nm for 32 GOPS)

### TECHNOLOGY FOR BETTER FUTURE

The solution to deal with data deluge, while preventing the increase of power consumed by data centers, is known as Edge AI. This solution consists in transferring most of the processing intelligence from the cloud to the sensor. It translates into an unprecedented need to increase performances of «smart devices» by a factor of 1,000 at constant energy consumption.

With its SPEED IP platform, Dolphin Design is positioned as THE provider of solutions for Edge AI System-on-Chip designers. We enable our customers to do much more with less energy resulting in major benefits on environment.

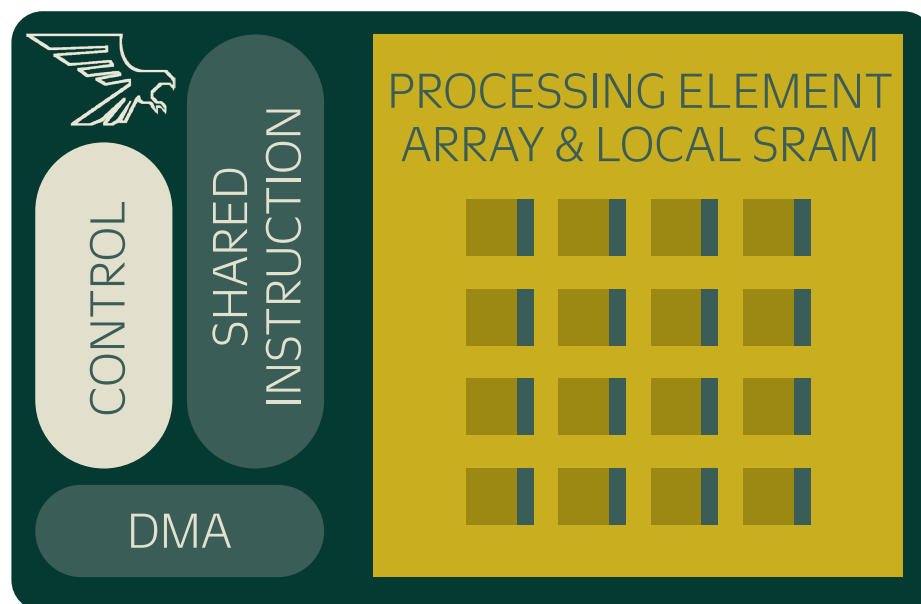
Dolphin Design's SPEED IP platform is labelled by the Solar Impulse Foundation among 1,000 solutions for tomorrow.





## KEY BENEFITS

- Minimize iteration from data science to deployment into tiny-constrained devices
- Unlock extended battery life and gain a quicker market adoption by delivering differentiated features
- Scale your AI-enabled use cases performances thanks to Raptor programmability & flexibility



Tiny RAPTOR is effectively tweaked to allow powerful Machine Learning algorithms.

Tiny RAPTOR not only brings a unique near-memory to compute approach but also avoids unnecessary data movement by optimizing data reuse.

The co-design of Tiny RAPTOR hardware together with its toolchain creates an extremely power-efficient environment delivering energy-efficient computing previously unheard-of.

## KEY FEATURES

- Scalable from 32 to 128 MAC/ cycle
- 8-bits data type
- 32k to 512k internal SRAM
- Pre-verified and highly Flexible TCDM for near memory processing
- Lossless weight compression
- Neural framework: TensorFlow, PyTorch, ONNX
- Comprehensive toolchain from Quantization Aware Training (QAT) to binaries
- Early prototyping via virtual platform and ISS

