CEVA®

CEVA X1

Streamlining the design of cellular-enabled low data rate IoT devices

CEVA-X1 is a Lightweight Multi-purpose, Multi-mode single-core processor that addresses the severe size, power and cost limitations demanded for deploying the latest LTE Cat-M1 and Cat-NB1 IoT standards
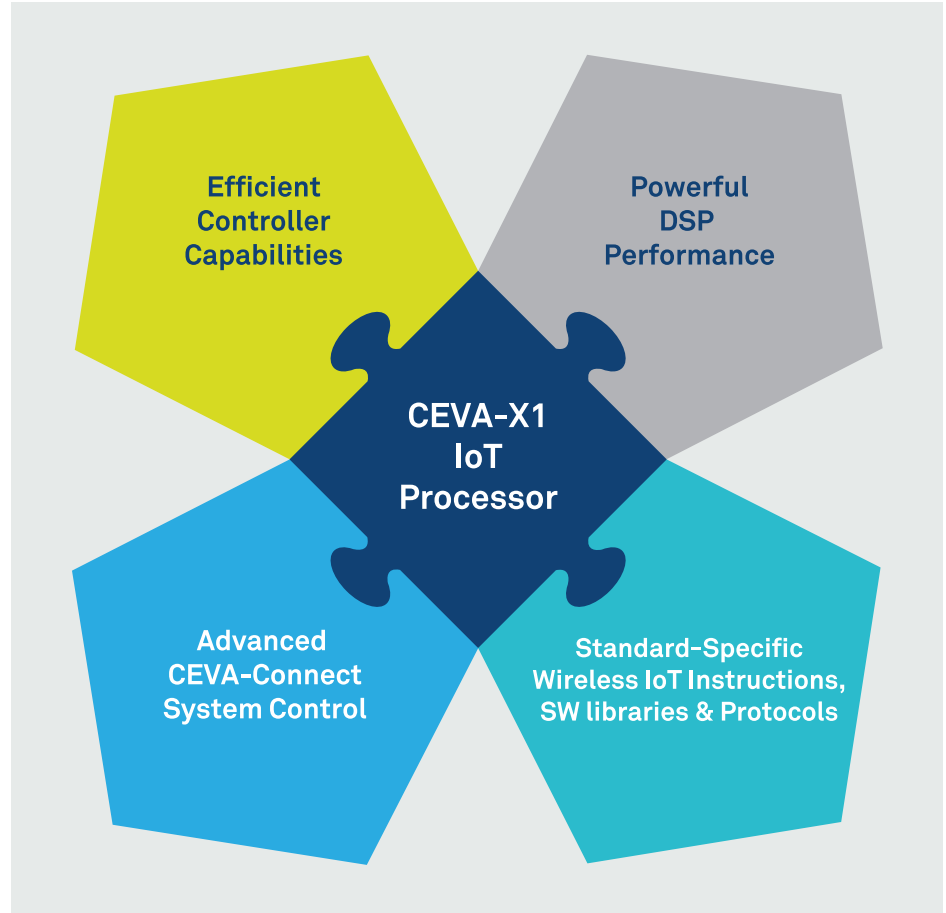
Key Benefits

› **Reduces total system cost** with single processor solution for baseband, protocol and application
› **Reduces power** for >10 years operation on a single AA battery using dedicated standard-specific instructions, such as LTE Cat-NB1 and Cat-M1
› **Software flexibility** enables multi-mode applications such as Cat-NB1 T and GNSS to run concurrently on the same processor
› **Software based modems** ease development cycle, accelerate time-to-market, enable product differentiation and ensure >10 years of future-proofing with in-field over the air upgrades
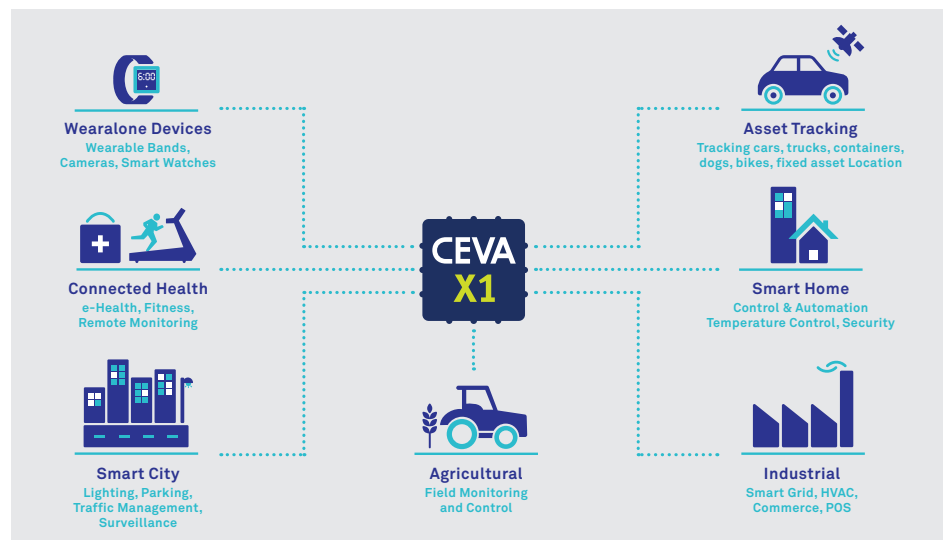
Multi-mode Use Cases

› Asset or person tracking (children, dogs, cars, bikes)
› Geo-fencing when asset/person leaves virtual area
› Identification of fixed devices (smart meters, city sensors)
› Smart home hub (WiFi, BLE, Zigbee/Thread, Cat-NB1/M1)
› Sensor fusion for activity trackers in wearables
› Cat-M1 and speech codec for wear-alone smart-watch

A True Multi-purpose, Multi-mode IoT Processor

Efficient Controller Capabilities

Powerful DSP Performance

CEVA-X1 IoT Processor

Advanced CEVA-Connect System Control

Standard-Specific Wireless IoT Instructions, SW libraries & Protocols

Target Markets

Wearalone Devices
Wearable Bands, Cameras, Smart Watches

Connected Health
e-Health, Fitness, Remote Monitoring

Smart City
Lighting, Parking, Traffic Management, Surveillance

CEVA X1

Agricultural
Field Monitoring and Control

Asset Tracking
Tracking cars, trucks, containers, dogs, bikes, fixed asset Location

Smart Home
Control & Automation Temperature Control, Security

Industrial
Smart Grid, HVAC, Commerce, POS
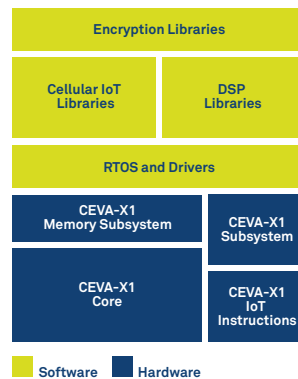
CEVA Wireless IoT Processor

Designing a multi-mode connected IoT end node has never been faster, easier or lower-risk, thanks to the comprehensive CEVA-X1 Processor. The processor includes standard specific instruction extensions, PHY hardware accelerators, software libraries and MAC protocols, as well as RTOS, drivers and a hardware IoT subsystem.

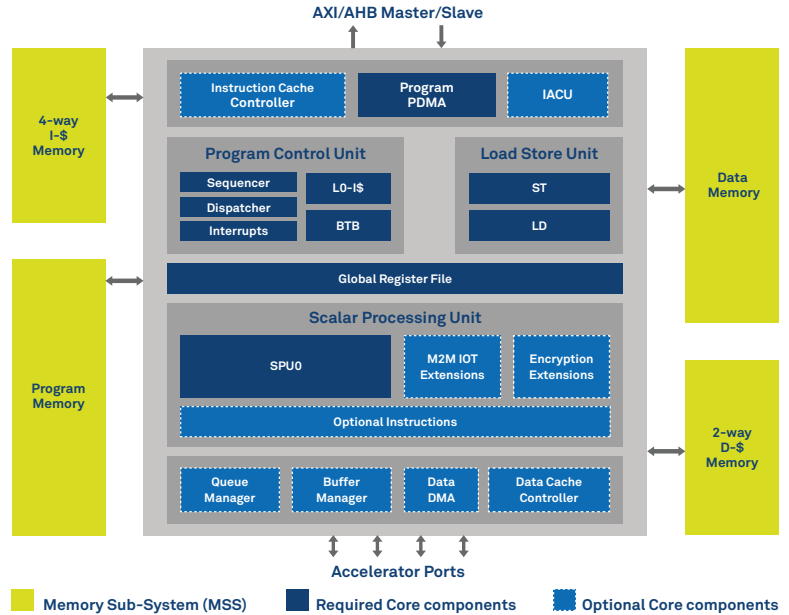GNSS · 5G · Lte Cat-NB1 · THREAD · Lte Cat-M1 · LoRa · CEVA X1 · Bluetooth SMART · ZigBee · Bluetooth · WiFi · SIGFOX

Multi-purpose Processing Hub

- ❯ Cat-NB1 (NB-IoT), LTE Cat-M1
- ❯ WiFi 802.11n/ah, Zigbee/Thread, BT, BLE
- ❯ GNSS: GPS, Beidou, GLONASS, Galileo
- ❯ Sensor fusion for indoor positioning
- ❯ Voice activation and vocoder

CEVA-X1 complete offerings

Encryption Libraries	
Cellular IoT Libraries	DSP Libraries
RTOS and Drivers	
CEVA-X1 Memory Subsystem	CEVA-X1 Subsystem
CEVA-X1 Core	CEVA-X1 IoT Instructions

■ Software ■ Hardware

Architectural Highlights

- ❯ **High performance controller**
  - Coremark/MHz: 3.3
  - Dynamic branch prediction
  - Full RTOS support
  - Ultra fast context switch
  - Compact code size
- ❯ **Powerful DSP performance**
  - MAC: dual 16x16, single 32x32
  - 4-way VLIW - 32-bit SIMD
  - IEEE SP floating point
  - Dedicated instructions for Cellular IOT
- ❯ **Advanced system control**
  - CEVA Connect
  - Automatic buffer management
  - High QoS with queue managers
  - Dedicated HW accelerator ports

AXI/AHB Master/Slave

4-way I-$ Memory

Instruction Cache Controller | Program PDMA | IACU

Program Control Unit — Sequencer, Dispatcher, Interrupts, L0-I$, BTB

Load Store Unit — ST, LD

Data Memory

Global Register File

Scalar Processing Unit — SPU0, M2M IOT Extensions, Encryption Extensions

Optional Instructions

Program Memory

Queue Manager | Buffer Manager | Data DMA | Data Cache Controller

2-way D-$ Memory

Accelerator Ports

■ Memory Sub-System (MSS) ■ Required Core components ■ Optional Core components

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