IIS2DULPX

Intelligent, energy efficient **accelerometer** that excels in harsh industrial applications

Intelligent sensing in harsh industrial applications

Industrial automation

Anti tampering

Personal healthcare

Asset tracking

IIS2DULPX, a game-changer for battery-operated industrial sensor nodes

Stretched battery life

Ultralow power accelerometer enabling **long-lasting** battery-operated applications

Decision making at the edge

Processing **at the edge** and **self-configurability** for optimized performance and power saving

Suitable for harsh environments

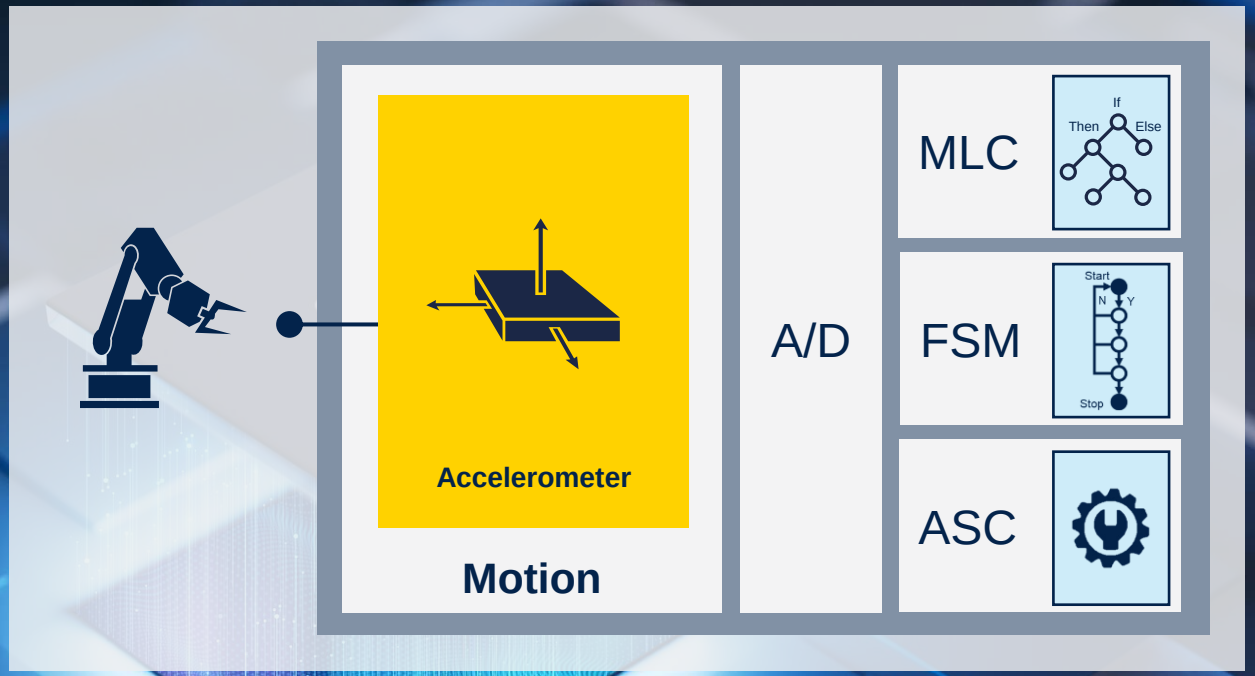
The only **ultralow power smart** accelerometer to operate at high temperatures **up to 105˚C**

Long-term availability

Long-term component **availability**, in line with the industrial product life cycle

What's inside IIS2DULPX?

The **intelligent**, **power-efficient** accelerometer that excels even in harsh industrial applications



An **accurate**, **ultralow power** accelerometer, with **antialiasing** filter, **edge processing** and **self-reconfiguration** capabilities, performing up to **105°C**

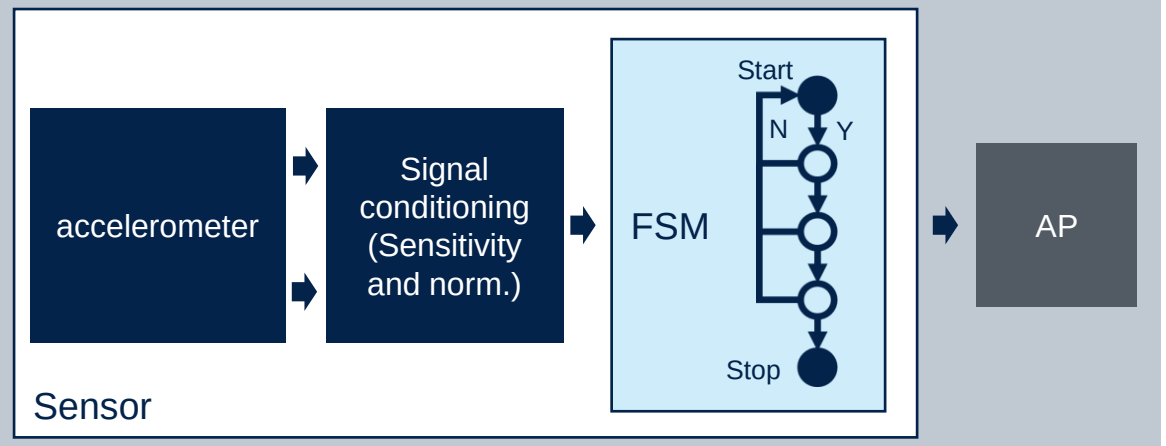
Edge processing with FSM*, MLC*

ASC* to self-configure the sensor in real time without the need of the **host processor**

*FSM = finite state machine
*MLC = machine learning core
*ASC = adaptive self-configuration

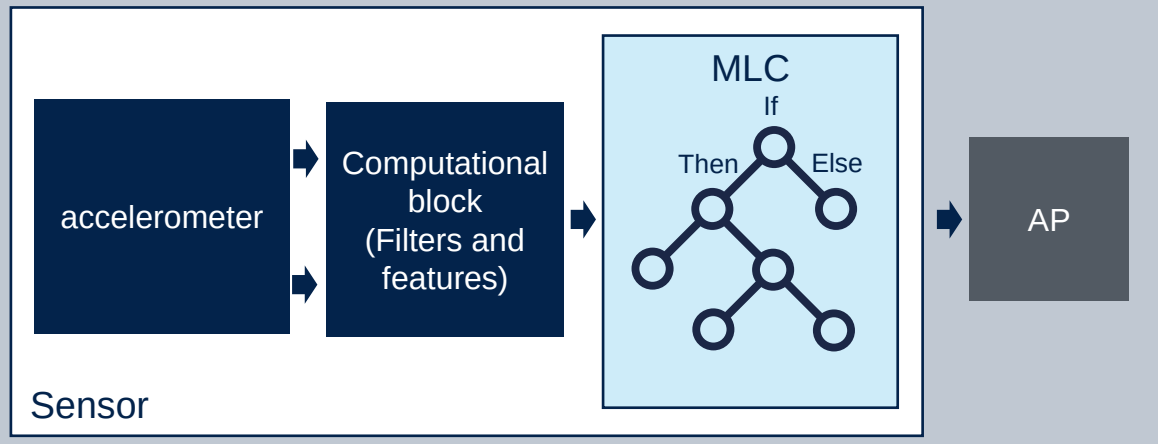
IIS2DULPX
Edge processing with MLC and FSM

Finite state machine



- FSM is composed of a finite number of user-defined states and transitions between them
- FSM can be in just one of the states and move to another one only if the transition condition is met
- Each state can be composed of a command or a next / reset condition

Machine learning core



- The MLC runs predictive models based on a decision tree logic: a series of configurable nodes characterized by an “if-then-else” condition
- The decision tree is “built” offline through analysis of datasets
- It uses sensor data to compute a set of statistical parameters to identify patterns matching with user-defined classes

Adaptive self-configuration (ASC)

Always perfectly fits the context

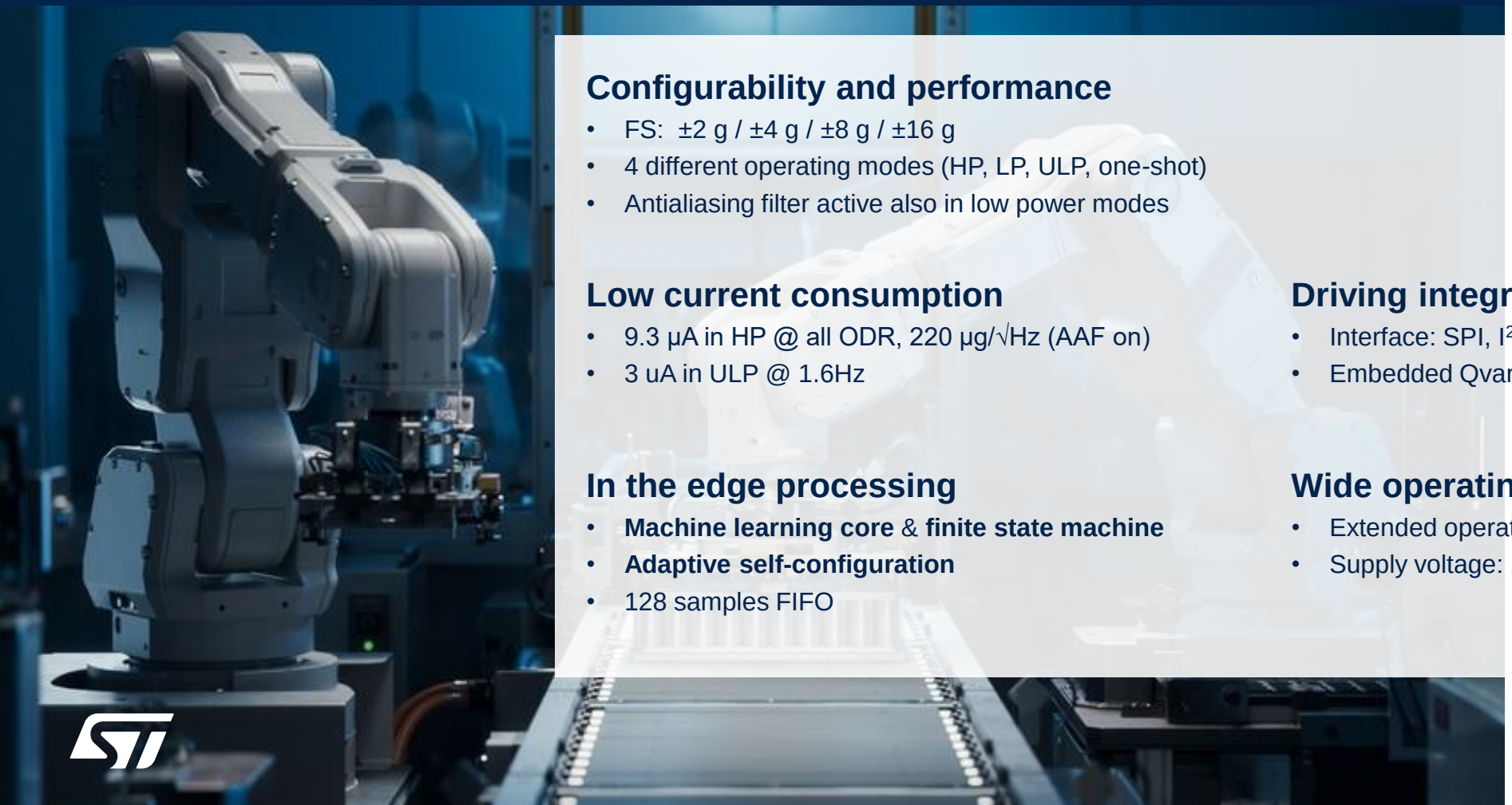
The device automatically **reconfigures itself**, based on the actual context, maximizing the **system efficiency**.

MLC and FSM detect the context without the need of additional data processing

With **ASC** you can make the sensor always fit perfectly with the context

IIS2DULPX overview

Pushing performance and integration of smart features to a whole new level for industrial applications



LGA 12 Lead
2.0 x 2.0 x 0.74 mm

Configurability and performance

- FS: ±2 g / ±4 g / ±8 g / ±16 g
- 4 different operating modes (HP, LP, ULP, one-shot)
- Antialiasing filter active also in low power modes

Low current consumption

- 9.3 µA in HP @ all ODR, 220 µg/√Hz (AAF on)
- 3 uA in ULP @ 1.6Hz

Driving integration

- Interface: SPI, I^2C, I^3C
- Embedded Qvar

In the edge processing

- **Machine learning core** & **finite state machine**
- **Adaptive self-configuration**
- 128 samples FIFO

Wide operating conditions

- Extended operating temperature range: -40 to +105 °C
- Supply voltage: 1.62 to 3.6 V with independent I/O supply

A comprehensive software offering for your application

Use cases

- Factory automation
- Robotics
- Black boxes
- Asset tracking
- Anti-tampering
- Safety Helmets
- Man down
- Portable healthcare
- Earing aids





Available software

- Smart asset tracking
- Car care (Towing, jacking, bump/crash)
- Activity recognition
- Fall / Hard-fall detection

Implemented on MLC / FSM*

- MotionAC (accelerometer calibration)
- MotionAD (airplane detection)
- MotionFT (sliding DFT)
- MotionTL (tilt angles)
- MotionAW (activity recognition for wrist)
- MotionAT (active time)
- MotionFD (fall detection, fall height estimation)
- MotionSD (standing vs sitting at a desk)

Software libraries

(*) MLC: Machine learning core
FSM: Finite state machine

IIS2DULPX is part of ST's longevity program

10 years longevity commitment

ST focuses on markets requiring long-life cycles

Protecting the investments of our customers that need state-of-the-art sensors but have long development, certification or field life cycles

10-year longevity from product introduction date

Design and manufacturing for higher robustness

Calibration & testing for higher accuracy & quality

Higher endurance to shock and vibration

Industrial temperature range

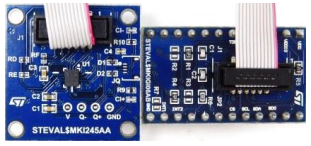
ST's longevity program

Ecosystem for IIS2DULPX

Hardware

Evaluate

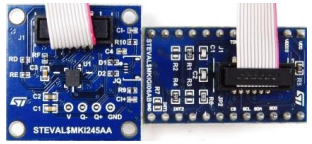
STEVAL-MKI245KA

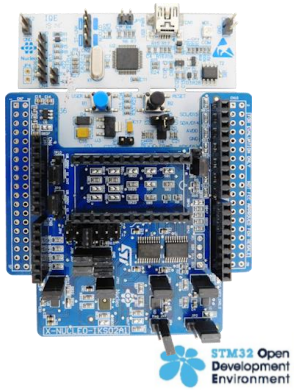


STEVAL-MKI109V3

Develop

STEVAL-MKI245KA

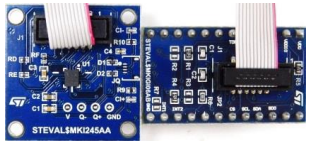




X-NUCLEO-IKS02A1

Prototype

STEVAL-MKI245KA



STEVAL-STWINBX1
STEVAL-MKBOXPRO

Software

Desktop software solution

MEMS Studio

Mobile application

STBLESensor

Ready-to-go application examples

GitHub

X-CUBE-MEMS1
FP-SNS-STBOX1
FP-SNS-DATALOG2

Our technology starts with You

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