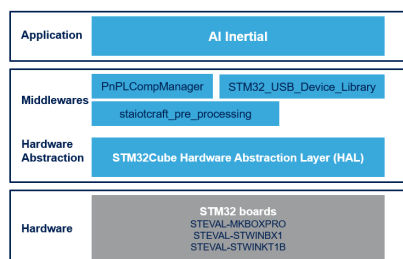




STM32Cube function pack for ST AIoT craft application using IoT systems



Features

- AI inference capabilities: it supports AI inference directly on the MCU, MLC, and ISPU, enabling applications such as vibration monitoring and smart asset tracking
- Seamless integration: it is compatible with STM32CubeMX for easy project configuration and code generation, supporting STEVAL-MKBOXPRO, STEVAL-STWINBX1, and STEVAL-STWINKT1B boards
- Comprehensive sensor support: it utilizes sensors such as ISM330DHCX and LSM6DSV16X for inertial data gathering and processing
- Multifunctional application: it offers ready-to-use projects with functionalities like AI inference, USB connectivity, and PnPL commands for switching between applications
- Robust software pack selection: it requires X-CUBE-AI, X-CUBE-ISPU, and X-CUBE-MEMS1 for AI, sensor interfacing, and preprocessing support

Description

The FP-SNS-STAIOTCFT function pack for STM32CubeMX enables AI-based inertial applications on STM32 microcontrollers. It supports the STEVAL-MKBOXPRO, STEVAL-STWINBX1, and STEVAL-STWINKT1B development boards, offering three main functionalities: AI inference on the MCU, machine learning core (MLC), and intelligent sensor processing unit (ISPU). The pack includes sample applications for vibration monitoring and smart asset tracking, utilizing sensors like the ISM330DHCX and LSM6DSV16X. It seamlessly integrates with STM32CubeMX, allowing easy configuration and code generation. Key software packs required include X-CUBE-AI, X-CUBE-ISPU, and X-CUBE-MEMS1, ensuring comprehensive support for AI, sensor interfacing, and preprocessing.

Product summary	
STM32Cube function pack for ST AIoT Craft application using IoT Systems	FP-SNS-STAIOTCFT
STM32Cube initialization code generator	STM32CubeMX
SensorTile.box PRO with multi-sensors and wireless connectivity for any intelligent IoT node	STEVAL-MKBOXPRO
STWIN.box SensorTile Wireless Industrial Node Development Kit	STEVAL-STWINBX1
STWIN SensorTile Wireless Industrial Node development kit and reference design for industrial IoT applications	STEVAL-STWINKT1B
iNEMO inertial module with Machine Learning Core, Finite State Machine with digital output for industrial applications	ISM330DHCXTR
6-axis inertial measurement unit (IMU) with embedded AI and sensor fusion,	LSM6DSV16XTR

Product summary	
Qvar for high-end applications	
AI expansion pack for STM32CubeMX	X-CUBE-AI
Sensor software expansion for STM32Cube	X-CUBE-ISPU
Sensor and motion algorithm software expansion for STM32Cube	X-CUBE-MEMS1

1 Detailed description

1.1 What can you do with the STM32Cube function packs?

The **STM32Cube** function packs leverage the modularity and interoperability of STM32 Nucleo, Discovery and X-NUCLEO boards, as well as STM32Cube and X-CUBE software, to create function examples, embodying some of the most common use cases for each application area.

These software function packs are designed to exploit the underlying STM32 ODE hardware and software components as much as possible, to best fit the requirements of final users' applications.

Moreover, function packs may include additional libraries and frameworks not present in the original X-CUBE packages, thus enabling new functionalities and creating a real and usable system for developers.

1.2 What is STM32Cube?

STMCube™ represents an original initiative by STMicroelectronics to ease developers' life by reducing development effort, time, and cost. **STM32Cube** covers the STM32 portfolio. Version 1.x of STM32Cube includes:

- **STM32CubeMX**, a graphical software configuration tool that generates C initialization code from graphical wizards.
- A comprehensive embedded software platform, delivered per series (such as the **STM32CubeF4** for the STM32F4 series):
 - STM32Cube HAL, an embedded STM32 abstraction software layer, ensuring maximized portability across the STM32 portfolio.
 - A consistent set of middleware components, such as RTOS, audio add-ons, acoustic beamforming, motion, low-power manager and graphics.
 - All embedded software utilities, including a full set of examples.

1.3 How does this function pack complement STM32Cube?

The proposed software leverages several key components, including **X-CUBE-MEMS1**, **X-CUBE-ISPU**, and **X-CUBE-AI**. It incorporates an application layer that interacts with middleware libraries, such as the PnPL library, the USB serial stack (bare metal), and the pre-processing library.

PnPL technology is employed to define a device model, essentially creating a detailed blueprint of the firmware. The USB serial stack facilitates communication with the firmware, allowing for command transmission, property retrieval, and telemetry monitoring. The pre-processing library works with X-CUBE-AI to handle data from inertial sensors, enabling the generation of network files necessary for neural network inference on the MCU.

This integration ensures efficient data processing and robust interaction between the software components, enhancing the overall functionality and performance of the system.

Revision history

Table 1. Document revision history

Date	Revision	Changes
03-Jun-2025	1	Initial release.

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