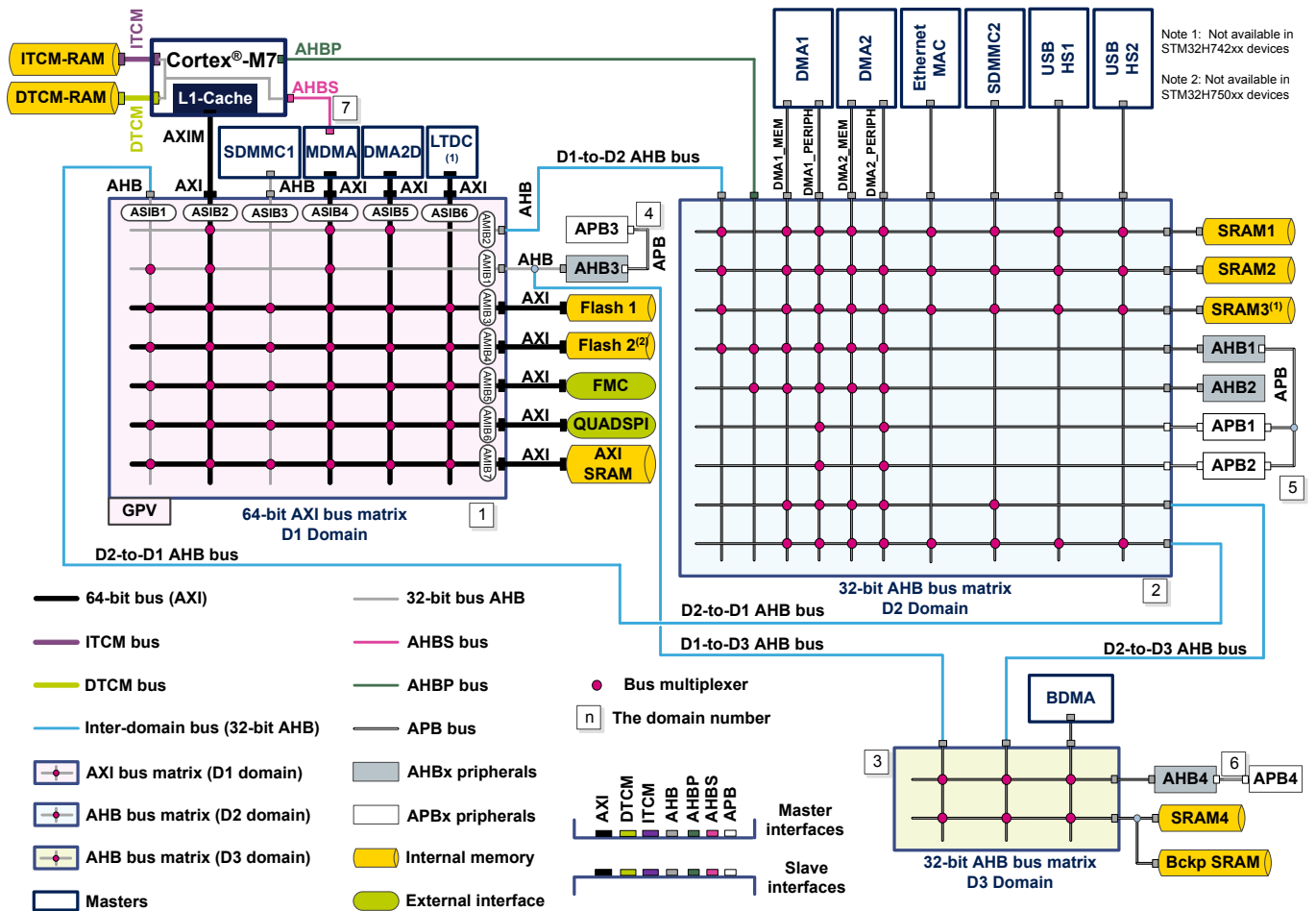


## STM32H74x and STM32H75x performance software expansion for STM32Cube



MSv44011V15

Product status link

[X-CUBE-PERF-H7](#)



## Features

- STM32H74x and STM32H75x performance demonstrator
- Code execution and data storage in different memory locations
- Arm® Cortex®-M7
- Instruction cache (ICACHE)
- Data cache (DCACHE)
- D1, D2, and D3 power domains
- AXI and AHB bus matrices

## Description

The X-CUBE-PERF-H7 Expansion Package aims to demonstrate the performance of the STM32H74x and STM32H75x architecture with its Arm® Cortex®-M7 single core able to run at up to 480 MHz. The core instruction and data caches unleash its performance with 0-wait-state-like execution from different memories. The memories can be either internal or external, scattered across different domains (D1, D2, and D3), and accessed by the core through the TCM buses or the AXIM bus.

The Expansion Package is provided with several project configurations for the [STM32H743I-EVAL](#) Evaluation board. Each project allows the execution of application code and data storage in different memory locations such as internal memories as well as external memories located in different domains (D1, D2, and D3). Firmware results demonstrate that performance is similar when the code execution or data storage uses internal or external memories located in different domains. An FFT use case (provided by the CMSIS library) is proposed as an example with several toolchains: Keil® (MDK-ARM), IAR Systems® (EWARM), and STMicroelectronics System Workbench ([SW4STM32](#)). It can be ported easily to any other toolchain and any [STM32H7 Series](#) single-core device.

The generic microcontroller names STM32H74x and STM32H75x represent the STM32H7 Series single-core devices in the following product lines: STM32H742, STM32H743/753, and STM32H750 Value line.

# 1 General information

The X-CUBE-PERF-H7 Expansion Package runs on STM32 microcontrollers based on Arm® cores.

*Note:* Arm is a registered trademark of Arm Limited (or its subsidiaries) in the US and/or elsewhere.



## 1.1 Ordering information

X-CUBE-PERF-H7 is available for free download from the [www.st.com](http://www.st.com) website.

## 1.2 What is STM32Cube?

STM32Cube is an STMicroelectronics original initiative to improve designer productivity significantly by reducing development effort, time, and cost. STM32Cube covers the whole STM32 portfolio.

STM32Cube includes:

- A set of user-friendly software development tools to cover project development from conception to realization, among which are:
  - STM32CubeMX, a graphical software configuration tool that allows the automatic generation of C initialization code using graphical wizards
  - STM32CubeIDE, an all-in-one development tool with peripheral configuration, code generation, code compilation, and debug features
  - STM32CubeProgrammer (STM32CubeProg), a programming tool available in graphical and command-line versions
  - STM32CubeMonitor (STM32CubeMonitor, STM32CubeMonPwr, STM32CubeMonRF, STM32CubeMonUCPD), powerful monitoring tools to fine-tune the behavior and performance of STM32 applications in real time
- STM32Cube MCU and MPU Packages, comprehensive embedded-software platforms specific to each microcontroller and microprocessor series (such as STM32CubeH7 for the STM32H7 Series), which include:
  - STM32Cube hardware abstraction layer (HAL), ensuring maximized portability across the STM32 portfolio
  - STM32Cube low-layer APIs, ensuring the best performance and footprints with a high degree of user control over hardware
  - A consistent set of middleware components such as RTOS, USB Host and Device, TCP/IP, mbedTLS, FAT file system, audio, and graphics
  - All embedded software utilities with full sets of peripheral and applicative examples
- STM32Cube Expansion Packages, which contain embedded software components that complement the functionalities of the STM32Cube MCU and MPU Packages with:
  - Middleware extensions and applicative layers
  - Examples running on some specific STMicroelectronics development boards

## 2 License

X-CUBE-PERF-H7 is delivered under the *Mix Ultimate Liberty+OSS+3rd-party V1* software license agreement (SLA0048).

The software components provided in this package come with different license schemes as shown in [Table 1](#).

**Table 1. Software component license agreements**

Software component	Copyright	License
Cortex <sup>®</sup> -M CMSIS	Arm Limited	<a href="#">Apache License 2.0</a>
STM32H7xx CMSIS	STMicroelectronics	<a href="#">BSD-3-Clause</a>
STM32H7xx HAL	STMicroelectronics	<a href="#">BSD-3-Clause</a>
Project example	STMicroelectronics	Proprietary

## Revision history

**Table 2. Document revision history**

Date	Revision	Changes
16-Jun-2017	1	Initial release.
13-Jun-2019	2	Adapted the data brief to the STM32H74x and STM32H75x products, and extended its content with additional information: <ul style="list-style-type: none"> <li>• Updated title, cover picture, <i>Features</i>, and <i>Description</i></li> <li>• Added <i>What is STM32Cube?</i> and <i>License</i></li> </ul>
10-May-2022	3	Updated the AHB bus multiplexers of the domain D2 in the cover picture: <ul style="list-style-type: none"> <li>• Removed the Ethernet MAC connection with the domain D1</li> <li>• Added the SDMMC2 connection with the domain D3</li> </ul> Updated <i>License</i> and <i>What is STM32Cube?</i>
1-Sep-2022	4	Restored the Ethernet MAC connection between the domains D1 and D2 in the cover picture.

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