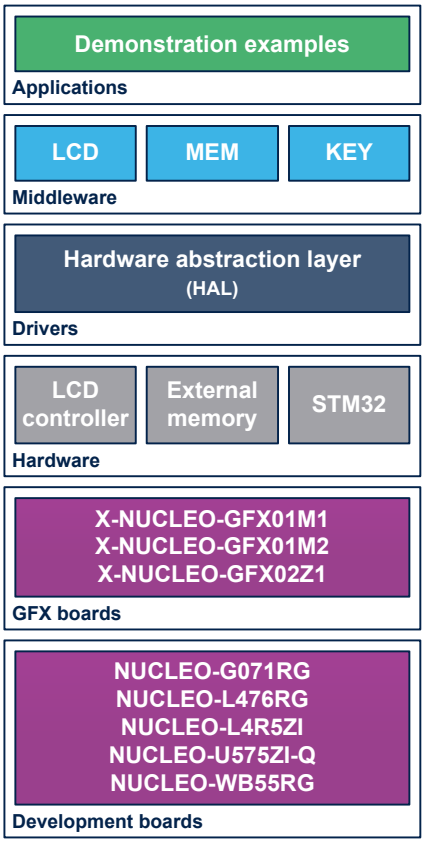
X-CUBE-DISPLAY

Data brief

Display expansion board software expansion for STM32Cube



Product status link
X-CUBE-DISPLAY

Features

- Software building block supporting the addition of display expansion boards to Nucleo-64 and Nucleo-144 boards, including
  - drivers for the supported LCD controllers
  - drivers for the supported external flash memories
- Simple "hello world" example available on
  - the X-NUCLEO-GFX01M1 expansion board connected to the NUCLEO-G071RB or NUCLEO-L476RG Nucleo-64 development board
  - the X-NUCLEO-GFX01M2 expansion board connected to the NUCLEO-G071RB or NUCLEO-WB55RG Nucleo-64 development board
  - the X-NUCLEO-GFX02Z1 expansion board connected to the NUCLEO-L4R5ZI or NUCLEO-U575ZI-Q Nucleo-144 development board
- FreeRTOS™ examples available on
  - the X-NUCLEO-GFX01M1 expansion board connected to the NUCLEO-L476RG Nucleo-64 development board
  - the X-NUCLEO-GFX02Z1 expansion board connected to the NUCLEO-L4R5ZI Nucleo-144 development board
- Azure® RTOS ThreadX examples available on
  - the X-NUCLEO-GFX02Z1 expansion board connected to the NUCLEO-U575ZI-Q Nucleo-144 development board
- Easy portability across STM32 microcontrollers with STM32CubeMX in the STM32Cube ecosystem
- Free and user-friendly license terms

Description

The X-CUBE-DISPLAY STM32Cube Expansion Package runs on the STM32 microcontroller. It offers a complete project example enabling easy and simple use of the STM32 display expansion boards for STM32 Nucleo boards. It includes an STM32CubeMX configuration project, as well as embedded software extending Nucleo boards with graphical user interface (GUI) capability, including display, joystick control, and external memory management.

Additionally, demonstration binaries are provided as joint resources while more advanced examples are available with the TouchGFX Designer tool, part of the X-CUBE-TOUCHGFX Expansion Package.

1 General information

The X-CUBE-DISPLAY 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-DISPLAY is available for free download from the *www.st.com* website.

1.2 Product summary

- X-CUBE-DISPLAY: STM32Cube Expansion Package for display expansion boards on STM32 Nucleo development boards
- X-NUCLEO-GFX01M1 and X-NUCLEO-GFX01M2: display expansion boards for STM32 Nucleo-64 boards
- X-NUCLEO-GFX02Z1: display expansion board for STM32 Nucleo-144 boards
- NUCLEO-G071RB, NUCLEO-L476RG, and NUCLEO-WB55RG: STM32 Nucleo-64 development boards
- NUCLEO-L4R5ZI and NUCLEO-U575ZI-Q: STM32 Nucleo-144 development boards

X-CUBE-DISPLAY offers project examples for the board associations summarized in Table 1.

Table 1. Board associations demonstrated in X-CUBE-DISPLAY

STM32 Nucleo boards		Expansion boards		
		X-NUCLEO-GFX01M1	X-NUCLEO-GFX01M2	X-NUCLEO-GFX02Z1
Nucleo-64	NUCLEO-G071RB	Yes	Yes	-
	NUCLEO-L476RG	Yes	-	-
	NUCLEO-WB55RG	-	Yes	-
Nucleo-144	NUCLEO-L4R5ZI	-	-	Yes
	NUCLEO-U575ZI-Q	-	-	Yes

1.3 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 STM32CubeG0 for the STM32G0 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, UCPD library, graphics, and FAT file system
  - 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

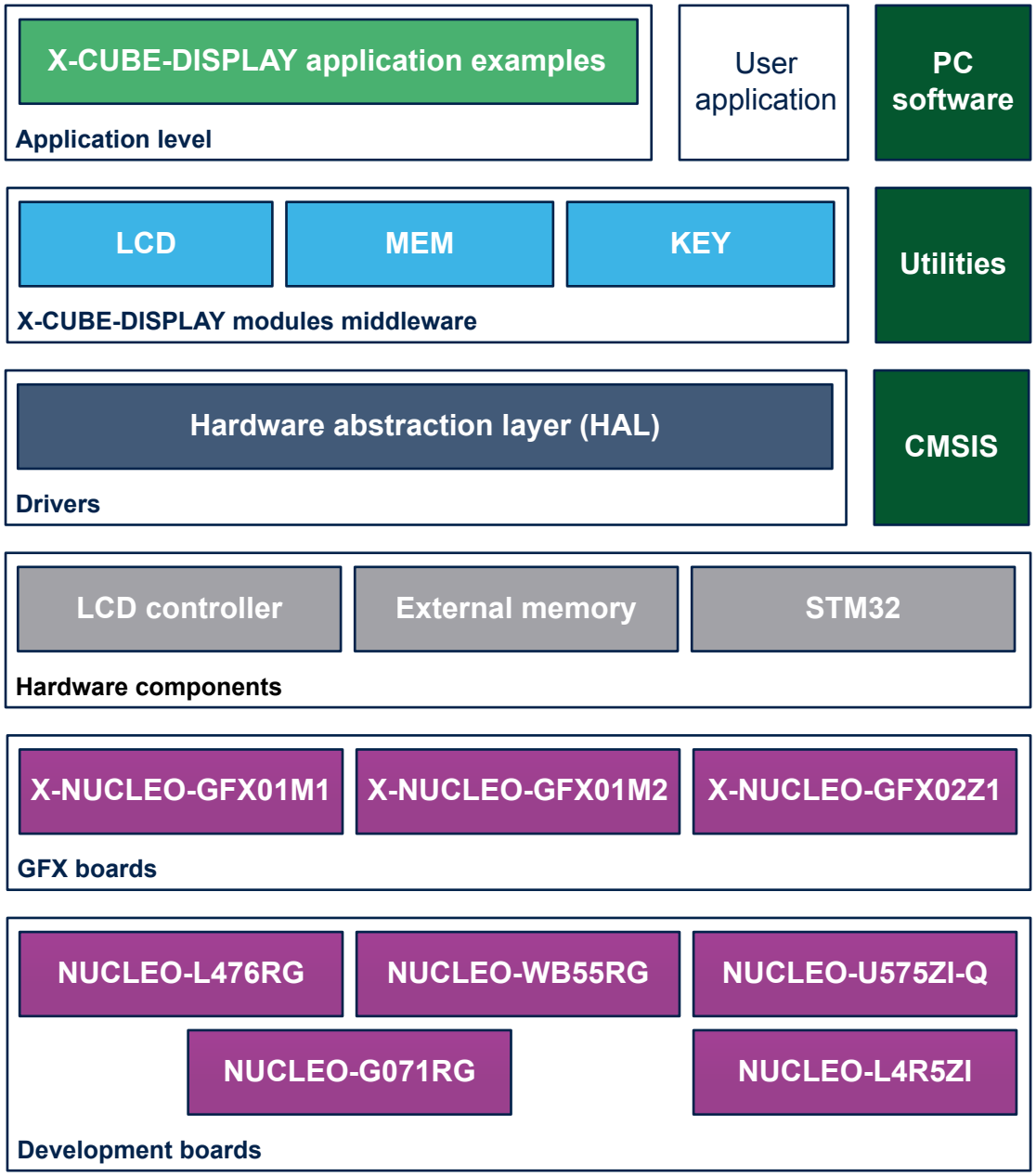
1.4 How does this package complement STM32Cube?

The X-CUBE-DISPLAY Expansion Package supports the addition of display expansion boards on top of selected STM32 Nucleo development boards. This Expansion Package is based on the STM32Cube HAL, the hardware abstraction layer for the STM32 microcontroller. It extends STM32Cube by providing a board support package (BSP) for the X-NUCLEO-GFX01M1, X-NUCLEO-GFX01M2, and X-NUCLEO-GFX02Z1 STM32 Nucleo expansion boards. The Expansion Package includes a “hello world” example that fetches images from the external memory and displays them on the display screen. Entry GUI demonstration is also provided as a related resource and more advanced TouchGFX-based examples are available with the TouchGFX Designer tool in the X-CUBE-TOUCHGFX Expansion Package.

2 Software architecture

The top-level architecture of the X-CUBE-DISPLAY Expansion Package is shown in Figure 1.

Figure 1. X-CUBE-DISPLAY architecture



3 License

X-CUBE-DISPLAY is delivered under the SLA0048 software license agreement and its Additional License Terms.

Revision history

Table 2. Document revision history

Date	Revision	Changes
8-Oct-2020	1	Initial release.
20-Oct-2021	2	Extended the document scope to the support of the X-NUCLEO-GFX01M2 and X-NUCLEO-GFX02Z1 display expansion boards: • Updated the document title and the cover image • Updated *Features* and *Description* • Updated *Product summary* and *How does this package complement STM32Cube?* Updated *License* with the Additional License Terms.
2-Sep-2022	3	Added FreeRTOS™ and Azure® RTOS ThreadX examples in Features. Added Software architecture and updated the cover picture.