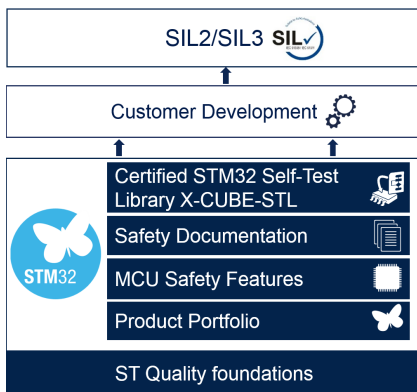


Functional safety package for STM32 microcontrollers in systems implementing safety functions up to IEC 61508 safety integrity level SIL2/SIL3



Features

- MCU safety manual
 - Detailed list of safety requirements (conditions of use) and examples to guide STM32 users to achieve safety integrity level certification in compliance with IEC 61508
 - SIL2 safety functions can be implemented with a single STM32 MCU; SIL3 safety functions implementation requires two STM32 MCUs in 1oo2 scheme
 - Available for the STM32F0, STM32F1, STM32F3, STM32F4, STM32F7, STM32G0, STM32G4, STM32H7, STM32L0, STM32L4, and STM32L4+ Series
- MCU FMEA
 - Detailed list of MCU failure modes and related mitigation measures adopted (qualitative analysis)
 - Available for the STM32F0, STM32F1, STM32F3, STM32F4, STM32F7, STM32G0, STM32G4, STM32H7, STM32L0, STM32L4, and STM32L4+ Series
- MCU FMEDA snapshot
 - Static snapshot reporting failure rates compliant to IEC 61508, computed at both MCU and basic function levels of detail
 - Available for the STM32F0, STM32F1, STM32F3, STM32F4, STM32F7, STM32G0, STM32G4, STM32H7, STM32L0, STM32L4, and STM32L4+ Series
- X-CUBE-STL library
 - Software-based diagnostic suite designed to detect random hardware failures in STM32 safety-critical core components (CPU + SRAM + Flash memory)
 - Compliant to IEC61508 SC3 (SIL3) development process
 - Diagnostic coverage verified by state-of-the-art ST proprietary fault injection methodology
 - Application independent: can be used in potentially any end-user application
 - Compiler independent: delivered as object code
 - Certified by TÜV Rheinland
 - Includes the X-CUBE-STL user guide, a functional-only document related to STL functions (such as API details and performance figures)
 - Includes the X-CUBE-STL safety manual, the instructions/conditions of use for end user related to the use of X-CUBE-STL in a safety application
 - Available for the STM32F0, STM32F1, STM32F3, STM32F4, STM32F7, STM32G0, STM32G4, STM32H7, STM32L0, STM32L4, and STM32L4+ Series



1 Description

On the basis of the ST Quality foundations, the STM32 microcontrollers portfolio and the STM32 embedded safety features, the STM32 SIL functional safety design package helps users to market STM32-based safety critical applications quickly, targeting the industry safety standard IEC 61508 safety integrity level (SIL2/SIL3) in domains such as industrial, motor control, factory automation, or power generation/conversion.

The package helps end-users to target safety applications according to various safety standards such as ISO 13849, IEC 62061 and IEC 61800.

2 General information

The X-CUBE-STL functional safety 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.



2.1 Ordering information

The MCU safety manual is available on www.st.com for download.

Contact STMicroelectronics local representative to request the X-CUBE-STL software, MCU FMEA and FMEDA documentation (NDA agreement required).

2.2 Certification information

The original certificate and the updated list of certificated software versions can be downloaded from TÜV Rheinland websites fs-products.tuvasi.com and www.certipedia.com.

2.3 What is STM32Cube?

STM32Cube is an STMicroelectronics original initiative to significantly improve designer's productivity 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 the conception to the realization, among which:
 - 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 & MPU Packages, comprehensive embedded-software platforms specific to each microcontroller and microprocessor series (such as STM32CubeG4 for the STM32G4 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 the HW
 - A consistent set of middleware components such as FAT file system, RTOS, USB Device, and USB Power Delivery
 - 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 & MPU Packages with:
 - Middleware extensions and applicative layers
 - Examples running on some specific STMicroelectronics development boards

Revision history

Table 1. Document revision history

Date	Version	Changes
23-Apr-2018	1	Initial release.
01-Jun-2018	2	Updated product status link on cover page.
17-Jul-2019	3	Updated functional safety documentation framework. Updated <i>Features</i> . Updated <i>Description</i> . Added <i>Section 1 General information</i> .
28-Apr-2020	4	Extended the availability of all package components to the STM32F1 Series, STM32F7 Series, STM32L0 Series, STM32G4 Series, and STM32H7 Series. Updated the document title. Updated Features and Description . Added Ordering information , Certification information and What is STM32Cube?

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