STM32U5 SERIES

The flagship of ultra-low power MCUs with advanced performance and security

Discover the secure, high-performance, and ultra-low power STM32 microcontrollers that will revolutionize your design.

The STM32U5 microcontrollers combine the Arm® Cortex®-M33 core with power-saving features and advanced security to meet the most demanding power/performance requirements for smart applications, including wearables, personal medical devices, home automation, and industrial sensors.

Offering up to 2 Mbytes of Flash (dual bank) memory and 786 Kbytes of SRAM, the STM32U5 microcontrollers take performance to the next level. The STM32U5 offers 8 packages (from 48 to 169 pins) and supports up to 125°C ambient temperature.

BEST-IN-CLASS POWER CONSUMPTION

- Energy benchmark:
  - 535 ULPMark-CP
  - 149 ULPMark-PP
  - 58 ULPMark-CM
  - 133,000 SecureMark-TLS
- LPBAM (Low Power Background Autonomous Mode), an innovative autonomous power mode, with peripherals and DMA working in stop mode
- Key performance indicators include:
  - 110 nA in shutdown mode
  - 300 nA in standby mode
  - 1.7 µA in stop mode 3 with 16 Kbytes of SRAM
  - 6.6 µA in stop mode 2 with 786 Kbytes of SRAM
  - Down to 19 µA/MHz in active mode

ENHANCED SECURITY

- Arm’s TrustZone® technology
- AES encryption and Public Key Accelerator (PKA) side-channel hardware-resistant
- Secure data storage with a Hardware Unique Key (HUK)
- Active tamper detection
- Targeting PSA and SESIP assurance level 3

ENHANCED PERFORMANCE

- Arm Cortex-M33 running at 160 MHz
- 240 DMIPS and 651 CoreMark scores
- Mathematic accelerators FMAC and Cordic

www.st.com/stm32u5
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STM32U585 block diagram

- **Parallel interface**
  - FSMC 8-/16-bit (TFT-LCD, SRAM, NOR, NAND)

- **Arm® Cortex®-M33 CPU**
  - 160 MHz
  - TrustZone®
  - FPU
  - MPU
  - ETM

- **Connectivity**
  - USB2.0 OTG_FS, UCPD,
  - 2 x SD/SDIO/MMC, 3 x SPI,
  - 4 x I²C, 1x CAN FD,
  - 2 x Octo-SPI,
  - 5 x USART + 1 x LPUART

- **Timers**
  - 19 timers including:
    - 2 x 16-bit advanced motor control timers
    - 4 x ULP timers
    - 5 x 16-bit-timers
    - 4 x 32-bit timers

- **I/Os**
  - Touch-sensing controller
  - Camera Interface

- **Up to 2-Mbyte Flash memory**
- **Dual Bank**
- **786-Kbyte RAM**

- **Analog**
  - 1x 14-bit ADC 2 MSPS,
  - 1x 12-bit ADC 2 MSPS,
  - 2 x DAC, 2 x comparators,
  - 2 x op amps
  - 1 x temperature sensor

- **Digital**
  - AES (256-bit),
  - SHA-1, SHA-256, TRNG,
  - PKA, HUK, 2 x SAI,
  - MDF, ADF

- **Art Accelerator™**
- **CORDIC**
- **FMAC**
- **Chrom-ART Accelerator™**
- **LPDMA**

STM32Cube ecosystem

The STM32Cube ecosystem is a complete software solution for STM32 MCUs and MPUs, including STM32CubeMX to configure, generate code, calculate power consumption; STM32CubeIDE to configure, develop, compile and debug; STM32CubeProgrammer to program internal or external memories through JTAG or bootloader interfaces; and STM32CubeMonitor-Power to display power consumption.

A one-stop-shop solution, STM32Cube embedded software package includes MCU drivers, middleware (USB, TLS, Crypto, touch sensing, file system, TF-M and RTOS), as well as project examples for IAR, Keil and STM32CubeIDE. TF-M is an open-source reference code to implement a Trusted Execution Environment (TEE) as specified in Arm PSA.

STM32U5 Portfolio

**Flash memory size / RAM size (bytes)**

<table>
<thead>
<tr>
<th>Flash memory size</th>
<th>RAM size (bytes)</th>
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<tr>
<td>2 M / 786 K</td>
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**Pin count**

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<th>Pin count</th>
<th>48-pin LQFP/QFN</th>
<th>64-pin LQFP</th>
<th>90-pin WLCSP</th>
<th>100-pin LQFP</th>
<th>132-pin UFBGA</th>
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**Legend:**
- [ ] without HW crypto
- [ ] with HW crypto
- [ ] Available in Q3-2021

Hardware tools

**Evaluation board**
Full-featured development platform

**Discovery kit**
Flexible prototyping with wireless connectivity

**STM32 Nucleo boards**
An affordable and flexible way to try out new concepts

The STM32Trust framework combines ST’s knowledge, design tools, and ready-to-use software to build strong cyber-protection into new IoT devices, leveraging industry best practices.

www.st.com/stm32trust

STM32 COMMUNITY
community.st.com/stm32

Order code: FLSTM32U50321

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