STM32C5 microcontroller series

Upgrade your entry-level design without raising your budget


STM32C5


BREAKING
THE
MOLD
WITHOUT
BREAKING
THE
BANK
STM32C5

What the STM32C5 series offers

Enhanced performance for developers and end device users

Without impacting end-product cost

Building on the foundation of the STM32 offering

The STM32 portfolio

Five product categories

Wireless MCU

Short- and long-range connectivity

Ultra-low-power MCU

Mainstream MCU

High-performance MCU

32-bit general-purpose microcontrollers: from 75 to 5,072 CoreMark score

Embedded MPU

32- and 64-bit microprocessors





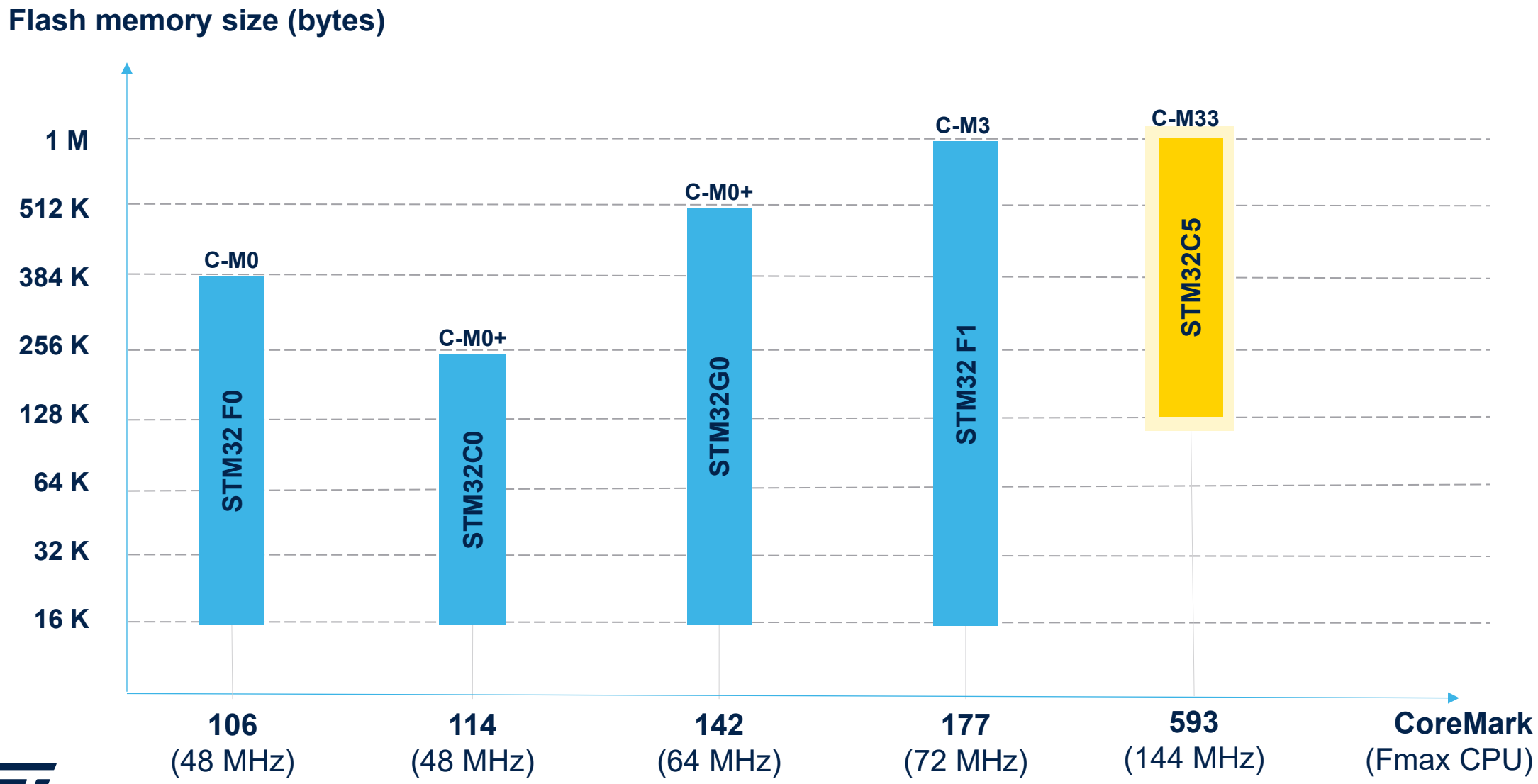
Enabling edge AI solutions

Scalable security

MPU portfolio

MCU portfolio

New STM32C5 series



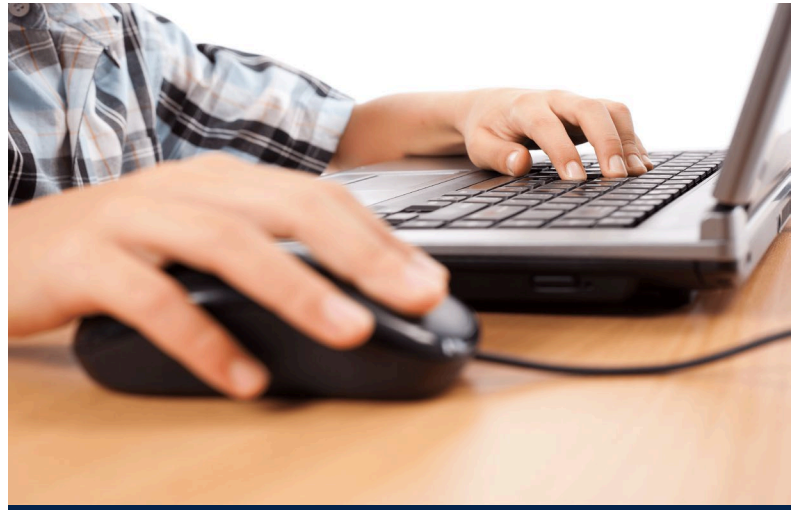
Expanding the potential of entry-level applications

Smart homes & appliances

Home appliances, thermostats, smoke detectors, door locks, sensors

Factory automation

Sensors, controllers, robotics, PLCs



Entertainment

Gaming accessories, keyboards

A modern platform

Built on Arm® Cortex® -M33 core

Powered by ST's 40nm process

Enabling a smooth design journey

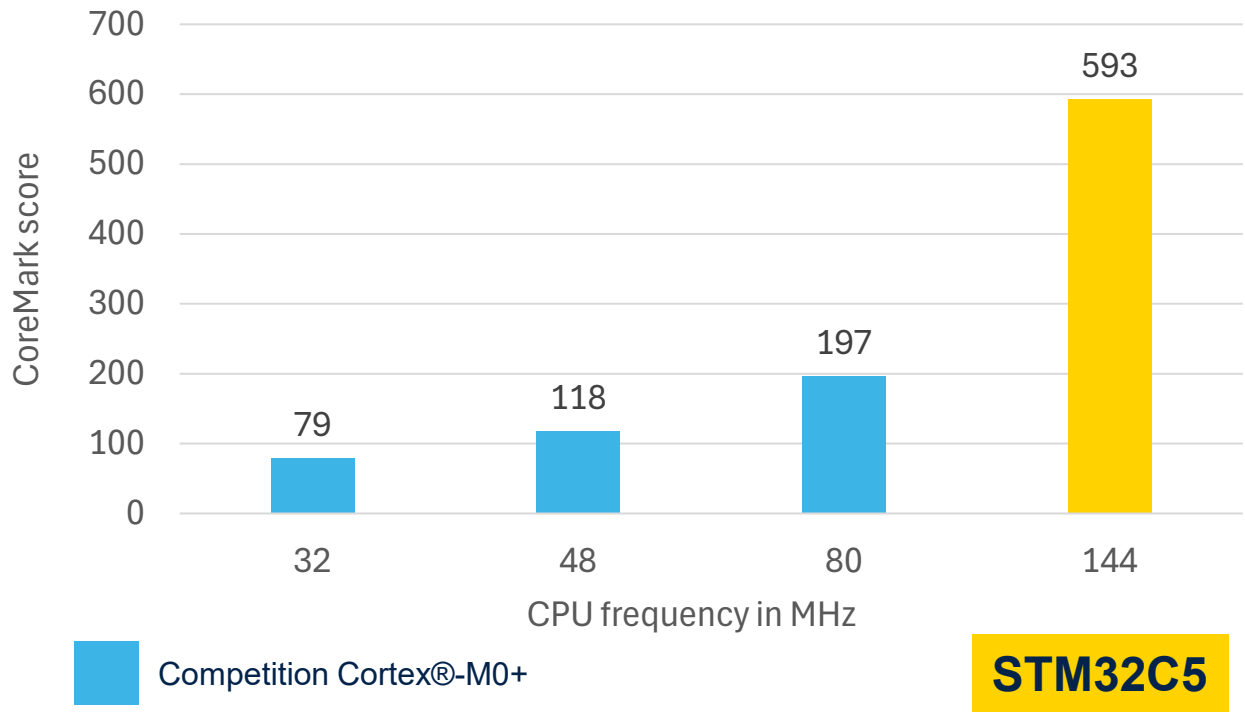
- **No external accelerators required**
  - Integrated floating-point unit simplifies software development & hardware division
  - Enhanced native DSP and math instructions
- Easier peripheral separation and software management thanks to **more flexible** interrupt vectors
- **Easier debugging** with improved trace features
- Boosted edge AI algorithms
- Cortex® -M33 is **supported by all major compilers**

512 Kbytes of flash, **128 Kbytes** of SRAM,
64 pins, starts at **$0.87** for **10k** units

A modern core providing a performance leap for the entry range

	Cortex®-M0+	Cortex®-M33
Instruction set	Arm V6	Arm V8
FPU	-	Yes
Hardware divide	-	Yes
CoreMark/MHz	2.46	4.12
FIR filter (float32) perf	Reference	40x more performance
FIR filter (int32) perf	Reference	20x more performance
Flexible interrupt vectors	Up to 32 inputs	Up to 480 inputs

STM32C5 provides **three times more performance** than the competition Cortex®-M0+ in the market



Reliable performance in industrial environments

A robust platform and precise clock system

- Arm Cortex®-M33 core up to **144 MHz** with FPU, MPU, and flexible NVIC
- Up to **125°C** ambient temperature without performance penalty
- **1%** factory-calibrated internal oscillator between wide ambient temperature range from **-20** to **105°C**
- Multiple external clock sources including high-speed (HSE), low-speed (LSE), and internal oscillators for flexibility and redundancy
- Versatile analog features available (op amp, DAC, 12-bit ADC, comparator)

Industrial interfaces and flexible memory

- More RAM available compared to typical Cortex-M0 +-based applications
- **OctoSPI** for external memory expansion
- Industrial-grade communication interfaces: **Ethernet**, **FDCAN**, **I3C**

Security & safety

- Hardware security with side channel attack resistant crypto
- PSA Certified Level 3 & SESIP3 target certifications
- Ready for functional safety requirements

Certified functional safety packages for STM32C5

www.st.com/x-cube-stl

Robust performance and reliability in harsh conditions

- ECC on RAM and flash
- Brown-Out Reset
- Dual Watchdog

SIL functional safety

- Ready for IEC 61508 systems up to SIL3
- FMEDA & FMEA, safety manual
- Certified STM32 Self-Test library

Class B functional safety

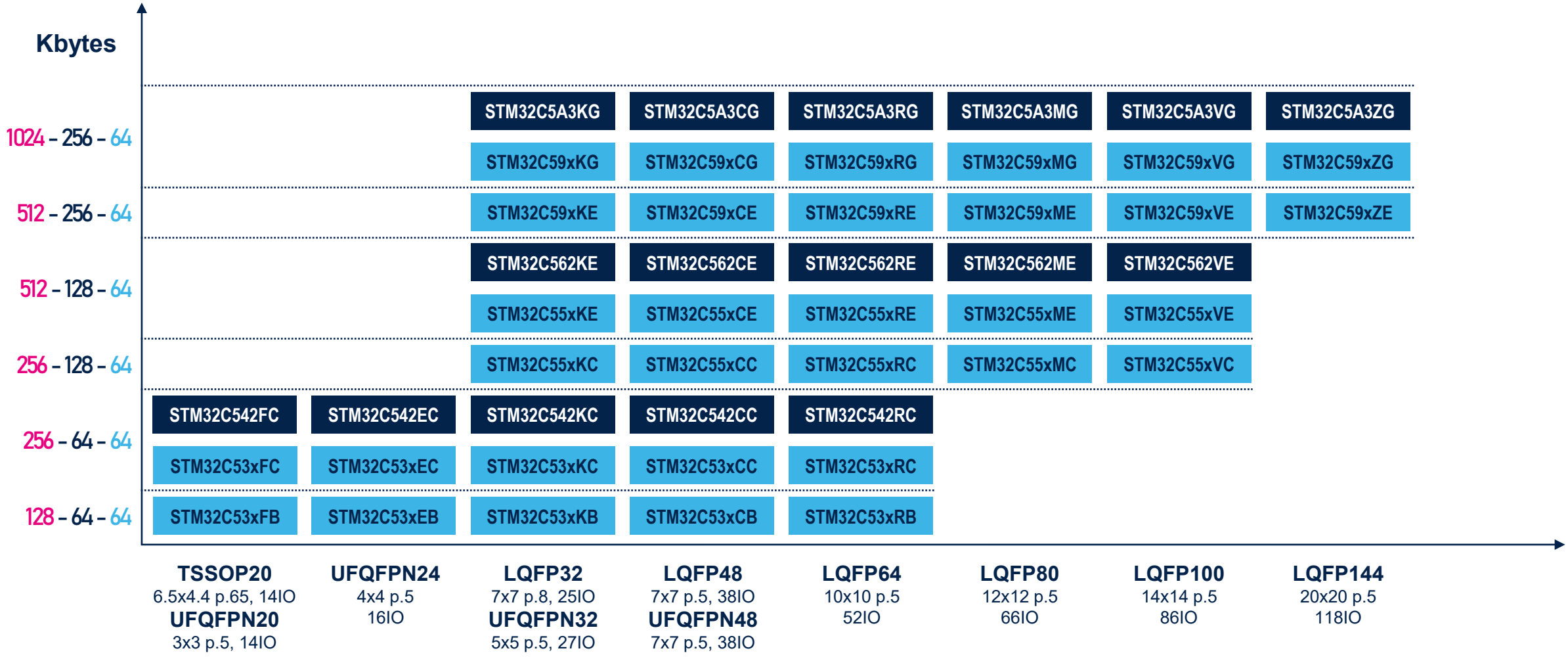
- IEC 60335-1/60730-1 Class-B
- Household electrical appliances
- Certified STM32 Self-Test library

Find the right fit for your design thanks to a scalable portfolio

	STM32C531	STM32C532	STM32C542	STM32C551	STM32C552	STM32C562	STM32C591	STM32C593	STM32C5A3
Flash size with ECC	128 to 256 KB	128 to 256 KB	256 KB	256 to 512 KB	256 to 512 KB	512 KB	512 KB to 1 MB	512 KB to 1 MB	1 MB
RAM size with ECC	64 KB	64 KB	64 KB	128 KB	128 KB	128 KB	256 KB	256 KB	256 KB
12-bit ADC	1	1	1	2	2	2	3	3	3
DAC/COMP	2/2	2/2	2/2	1/1	1/1	1/1	1/1	1/1	1/1
OPAMP	1	1	1						
Memory IF							1x OctoSPI	1x OctoSPI	1x OctoSPI
FDCAN		2	2		1	1		2	2
Ethernet 10/100Mbit								Yes	Yes
AES			Yes			Yes			Yes
HASH	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
SAES/SPKA, HUK, SCA, CCB							SPKA verify	SPKA verify	Full config

One new STM32 series. Multiple lines.

Flash – RAM – Flash area for software EEPROM emulation



Commercial part number availability in $T_{ambient}$ = -40 to 85/125°C

Crypto line | Non-crypto

STM32C53x/42 block diagram

Arm® Cortex®-M33
144 MHz
593 CoreMark

FPU, MPU, ETM
SW debug

8 KB - ICACHE

Memory

256 KB flash
Dual Bank w/ ECC

64 KB SRAM w/ ECC

64 KB flash area for software emulated EEPROM

4.5 KB OTP	128B bkp RAM

System

VDD 2.7-3.6V

32kHz LSE, LSI, HSE
144MHz HSI with internal 1% accuracy Ta=-20-105°C

RTC

Connectivity

2x USART, 2x UART
1x LPUART

2x SPI

2x I2C, 1x I3C

1x USB FS

2x FDCAN (2)

Security

AES 128/256 (1)

TRNG

HASH, OTP

96-bits unique ID

Accelerators

DMA (4+4)

CORDIC, CRC

Analog

1x 12-bit ADC
2.25MSPS

2x DAC12
w/ Buffer

2x COMP

1x OPAMP

Timers

1x 32-bit GPTIM

2x 16-bit 7ch MCTIM

2x 16-bit GPTIM

2x 16-bit basic TIM

1x 16-bit LPTIM

IWDG, WWDG
Systick

Operation modes

Run, Sleep, STOP,
Standby

Bootloader

UART, SPI, FDCAN, USB

Operating temperature

$T_{ambient}$ -40 to 125°C

$T_{junction}$ 140°C

Packages

QFP (0.5p) 32, 48, 64
QFN (0.5p) 20, 24, 32, 48
TSSOP20

Cortex-M33 for all entry products

Extensive memory

(1) Available on STM32C542 lines
(2) Available on STM32C532 and STM32C542 lines

STM32C55x/62 block diagram

Arm® Cortex®-M33
144 MHz
593 CoreMark

FPU, MPU, ETM
SW debug

8KB - ICACHE

Memory
512 KB flash Dual Bank w/ ECC
128 KB SRAM w/ ECC
64 KB flash area for software emulated EEPROM
4.5 KB OTP / 128B bkp RAM

System
VDD 2.7-3.6V
32kHz LSE, LSI, HSE 144MHz HSI with internal 1% accuracy Ta=-20-105°C
RTC

Connectivity
3x USART, 2x UART 1x LPUART
3x SPI
2x I2C, 1x I3C
1x USB FS
1x FDCAN (2)

Security
AES 128/256 (1)
TRNG
HASH, OTP
96-bits unique ID

Accelerators
2x DMA (8+4)
CORDIC, CRC

Analog
2x 12-bit ADC 2.25MSPS
1x DAC12 w/ Buffer
1x COMP

Timers
2x 32-bit GPTIM
2x 16-bit 7ch MCTIM
4x 16-bit GPTIM
2x 16-bit basic TIM
1x 16-bit LPTIM
IWDG, WWDG Systick

Operation modes
Run, Sleep, STOP, Standby

Bootloader
UART, SPI, FDCAN, USB

Operating temperature
$T_{ambient}$ -40 to 125°C
$T_{junction}$ 140°C

Packages
QFP (0.5p) 32, 48, 64, 80, 100 QFN (0.5p) 32, 48

Cortex-M33 for all entry products

Extensive memory

(1) Available on STM32C562 lines
(2) Available on STM32C552 and STM32C562 lines

STM32C59x/A3 block diagram

Arm® Cortex®-M33
144 MHz
593 CoreMark

FPU, MPU, ETM
SW debug

8KB - ICACHE

Memory

1 MB flash
Dual Bank w/ ECC

256 KB SRAM w/ ECC

64 KB flash area for software emulated EEPROM

4.5 KB OTP	128B bkp RAM

System

VDD 2.7-3.6V

32kHz LSE, LSI, HSE
144MHz HSI with internal 1% accuracy Ta=-20-105°C

RTC

Connectivity

4x USART, 3x UART
1x LPUART

3x SPI

2x I2C, 1x I3C

1x USB FS

2x FDCAN (2)

1x OCTOSPI

ETH 10-100Mb (2)

Security

SAES, AES 128/256 (1)

TRNG

HASH, OTP, HUK
SPKA, CCB

96-bits unique ID

Accelerators

2x DMA (8+8)

CORDIC, CRC

Analog

3x 12-bit ADC
2.25MSPS

1x DAC12
w/ Buffer

1x COMP

Timers

4x 32-bit GPTIM

2x 16-bit 7ch MCTIM

4x 16-bit GPTIM

2x 16-bit basic TIM

1x 16-bit LPTIM

IWDG, WWDG
Systick

Operation modes

Run, Sleep, STOP,
Standby

Bootloader

UART, SPI, FDCAN, USB

Operating temperature

$T_{ambient}$ -40 to 125°C

$T_{junction}$ 140°C

Packages

QFP (0.5p) 48, 64, 80, 100, 144
QFN (0.5p) 32, 48

Cortex-M33 for all entry products

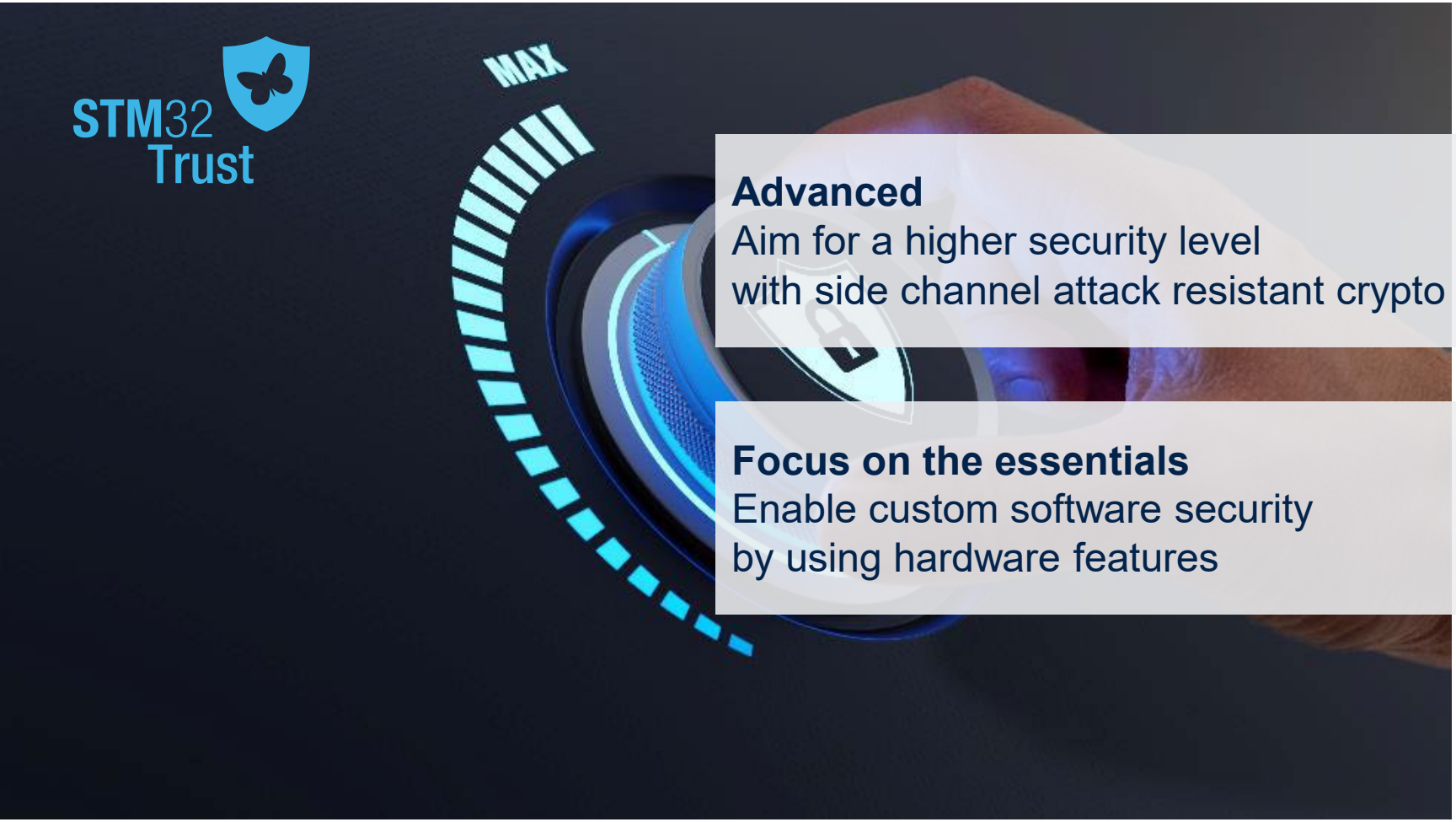
Extensive memory

More connectivity

(1) Available on STM32C5A3 lines
(2) Available on STM32C593 and STM32C5A3 lines

Security on STM32C5

Choose your STM32C5 based on your security strategy



Advanced
Aim for a higher security level
with side channel attack resistant crypto

STM32**C59x/5A3**

Focus on the essentials
Enable custom software security
by using hardware features

STM32**C55x/562**
STM32**C53x/542**

STM32C5 security overview

Increasing security with digital identities

Memory protections
against illegal access control

OTP, HDP, WRP, RDP, MPU
Passive tamper

Cryptography
for hardware robustness

(*) Side channel SAES, SPKA
SHA, SHA1, SHA224/256
TRNG
Hardware unique key (HUK)

Platform protection
during product lifecycle

RDP: 2 protection level states
Password based regression

Code isolation
for runtime protection

Temporal isolation – HDP

Security services

Secure boot & secure updates

Secure KeyStore with CCB*

NIST - CAVP certified X-CUBE-CRYPTOLIB
(**) Flexible Crypto Framework

State-of-the-art security assurance level

target certifications

*Available only on STM32C5-1M
Available Q2'2026

** X-CUBE-CRYPTOLIB V5 supports Classic + PQC
Available Q2'2026

Robust security to safeguard sensitive and mission-critical applications

More locked doors to ensure device security on STM32C59x/5A3

Enhanced device authentication and anticloning capabilities at a reduced cost

#1

The coupling and chaining bridge (CCB) HAL

- Isolated Secure crypto engines with private key bus to chain crypto operations without involving CPU.
- Keeps keys hidden even from the CPU and securely stored.

#2

Secure key storage

- Key wrapping with hardware unique key and CCB.
- Key isolation during life cycle with HiDeProtect.

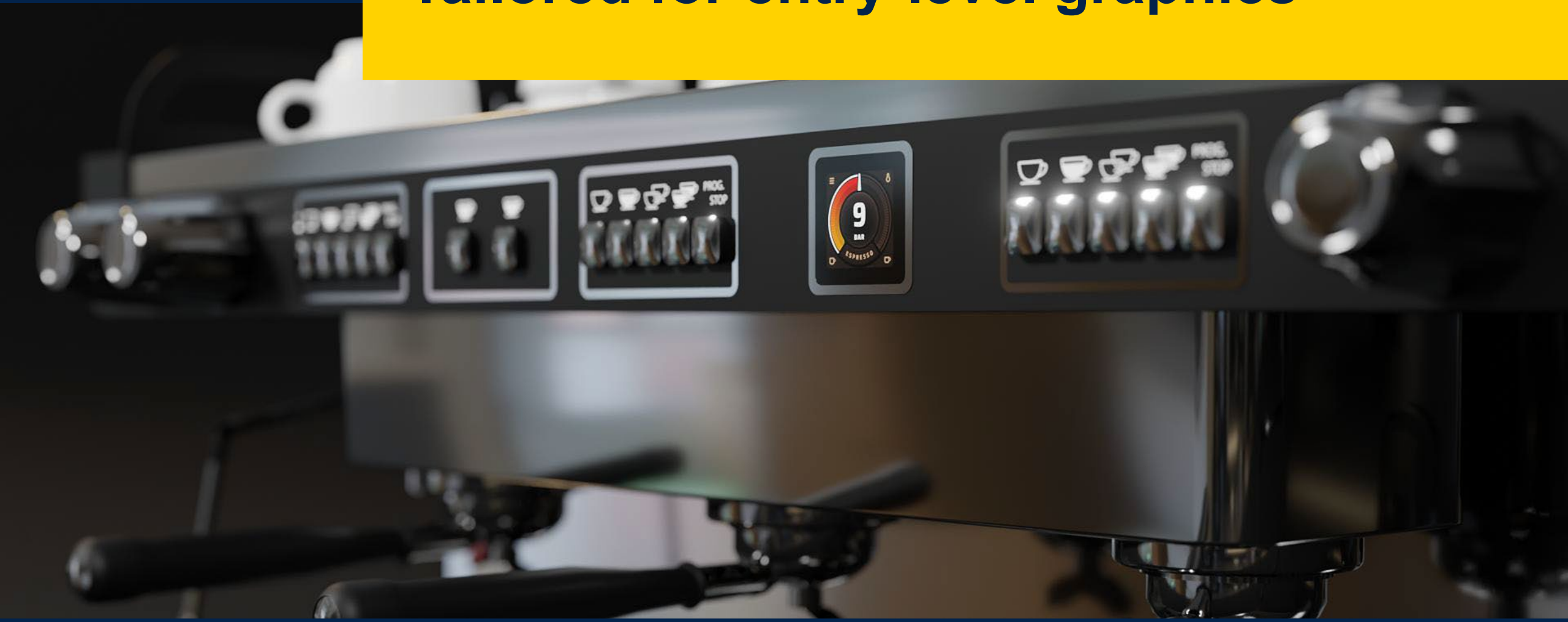
+

Side-channel resistant hardware protection

Strong security for regulatory compliance, including CRA

SESIP3 and PSA Certified Level 3 Certification targets

Tailored for entry-level graphics



STM32 hardware for entry-level graphics

Graphic performance	ENTRY LEVEL							
Display	SPI/Quad/OctoSPI and parallel display IF, G-RAM, touch, and no-touch							
STM32 MCU	**STM32U0**	**STM32U3**	**STM32C0**	**STM32G0**	**STM32H503**	**STM32C5**	**STM32WBA**	**STM32WB**
Development kits-TouchGFX supported	**Nucleo-U083RC** + X-NUCLEO-GFX01M2	**Nucleo-U385RG-Q** + RVA15MD*	**Nucleo-C092RC** + RVA15MD*/ X-NUCLEO-GFX01M2	**Nucleo-G071RB** + X-NUCLEO-GFX01M2	**Nucleo-H503RB** + X-NUCLEO-GFX01M2	**NUCLEO-C5A3ZG** + RVA15MD	**Nucleo-WBA65RI** + RVA15MD*	**Nucleo-WB55RG** + X-NUCLEO-GFX01M2
Main features *Max memory listed*	CM0+, 56 MHz 40 KB RAM 256 KB flash	CM33, 96 MHz 256 KB RAM 1000 KB flash	CM0+, 48 MHz 36 KB RAM 256 KB flash	CM0+, 64 MHz 144 KB RAM 512 KB flash	CM33, 250 MHz 32 KB RAM 128 KB flash	CM33, 144 MHz 64-256 KB RAM 128-1024 KB flash	CM33, 100 MHz 512 KB RAM 1000 KB flash	CM4, 64 MHz 256 KB RAM 1000 KB flash
Framebuffer details	Partial in internal RAM, starting from 6 KB					Full or partial in internal RAM		
Asset storage (flash memory)	Internal or External SPI	Internal or Externa(Q)SPI	Internal or External SPI	Internal or External SPI	Internal or Externa(Q)SPI	Internal or External (O)SPI	Internal or External SPI	Internal or Externa(Q)SPI

**Riverdi add-on kit: RVA15MD, order from Riverdi sales channels: [1.54" STM32 Nucleo-64 display kit - Riverdi]*

STM32C5 tailored for entry-level GUIs

STM32 hardware

All STM32C5 Nucleo kits

+

Extension display from Riverdi

One-chip module from TSD

STM32 software

TouchGFX + STM32 Cube

A complete STM32 software offer, free of charge

Achieve STM32C5 design success with STM32Cube ecosystem

Helping developers release their creativity

Develop faster
With STM32 code generation tools, IDE, and production-ready examples

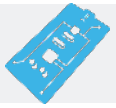
Stand out more
With optimized drivers leveraging all STM32 smart features

Save costs
With free and permissive production licenses

STM32 Cube

STM32Cube ecosystem

Tools and software supporting you during all your design steps

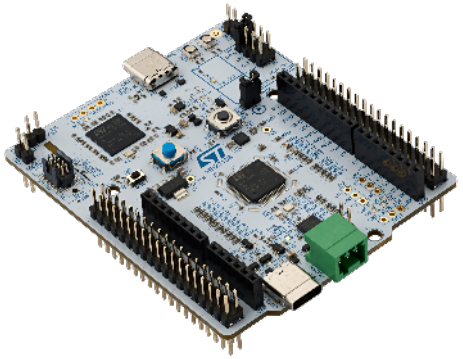
Evaluate		Large and affordable selection of evaluation kits
Configure	STM32 CubeMX	Efficient and intuitive MCU configuration with automatic code generation
Develop and debug	STM32 CubeMCU Packages	Optimized drivers and ported middleware, full access to hardware features
	STM32 CubeExpansion	Extended selection of optimized middleware and part drivers
	STM32 CubeIDE	Eclipse & VS Code options , C/C++ code editing, GCC & LLVM build, advanced debugging features, integrated code programming
Program	STM32 CubeProgrammer	Efficient and secure code and hardware option bytes programming
Monitor	STM32 CubeMonitor	Graphical and non-intrusive code monitoring

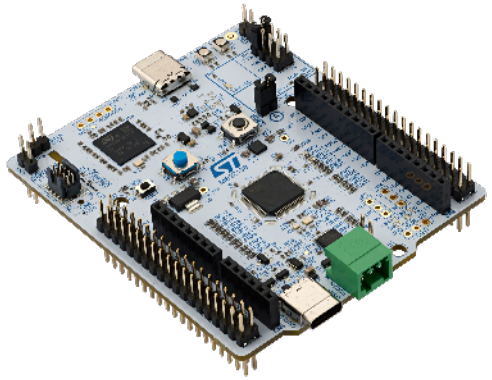
Get started with STM32C5

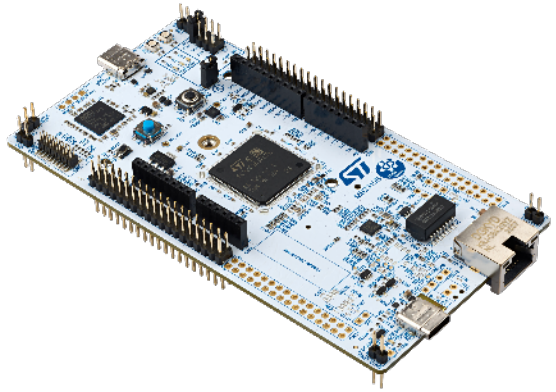
STM32C5 evaluation kits

Swiftly transform your ideas into prototypes

- **Evaluate**
- Configure
- Develop and debug
- Program
- Monitor







NUCLEO-C542RC	NUCLEO-C562RE	NUCLEO-C5A3ZG
USB-C FS and FDCAN	USB-C FS and FDCAN	USB-C FS and Ethernet 10/100(RMII)
64-pin MCU	64-pin MCU	144-pin MCU
Arduino and ST-Morpho64 IFs	Arduino and ST-Morpho64 IFs	Arduino and ST-Morpho144 Ifs
		M.2 serial memory IF

Get started with STM32C5

STM32CubeMX2

Accelerate STM32C5 configuration and allocate more time to application development

- Evaluate
- **Configure**
- Develop and debug
- Program
- Monitor

Intuitive Pinout configuration, now offering a new table view

Seamless Clock configuration, now with more convenient frequency view at each peripheral level

Peripherals full feature configuration, saving the time to read detailed MCU documentation

New Code preview: Live view of configuration code for fast code snippets copies

Full project generation with support of Keil, IAR, STM32CubeIDE, Make files or CMake formats

Enhanced CLI with full access to functionalities through command line

Get started with STM32C5

STM32CubeC5 embedded software

Get the full benefits of STM32C5 features and accelerate your development

- Evaluate
- Configure
- **Develop and debug**
- Program
- Monitor

HAL2 and LL MCU abstraction layers, offering access to all STM32C5 features

Size Optimized and quality enhanced HAL2, saving memory and time for application development

Optimized porting of a selection of Middleware for faster development

Large set of production ready examples to accelerate development and leverage STM32C5 rich features

Rich documentation including porting guides for faster transition from other STM32 MCUs

Get started with STM32C5

STM32CubeIDE

Accelerate your code editing and debug

- Evaluate
- Configure
- **Develop and debug**
- Program
- Monitor

	STM32CubeIDE	STM32CubeIDE for VS Code
STM32 device support	Full MCU and MPU portfolio	Full MCU portfolio
Target Audience	Developers preferring an integrated GUI	Developers preferring modularity / flexibility
Development Style	GUI-rich, all-in-one IDE	Lightweight, code-centric environment
Host OS Support	Windows®, Linux®, macOS®	Windows®, Linux®, macOS®
Base Framework	Eclipse®/CDT™	Microsoft® Visual Studio Code®
Project Creation	STM32CubeMX, Empty, CMake, Make	STM32CubeMX, Empty, CMake
Editor	Eclipse/CDT	IntelliSense LSP-driven + clangd
Build System	Integrated build system	CMake-based with Ninja support
debugging	Advanced debugging with SWV, RTOS-aware	Basic debugging with RTOS-aware
Customization	Eclipse® add-ons	VS Code® marketplace

Get started with STM32C5

STM32CubeIDE

Accelerate your code editing and debug

- Evaluate
- Configure
- **Develop and debug**
- Program
- Monitor

STM32 CubeIDE

- ✓ Integrated all-in-one environment
- ✓ Advanced debugging capabilities
- ✓ Extensive device support

STM32 CubeIDE for VS Code

- ✓ Modularity and flexibility
- ✓ Familiar framework
- ✓ Efficient build system

Partners IDEs

IAR SYSTEMS

arm KEIL

Get started with STM32C5

ST-LINK and STM32CubeProgrammer

Leverage simple and efficient programming tools for your development

- Evaluate
- Configure
- Develop and debug
- **Program**
- Monitor

STLINK portfolio

debugging & programming

STLINK-V3MINIE

STLINK-V3PWR

ST-LINK/V2

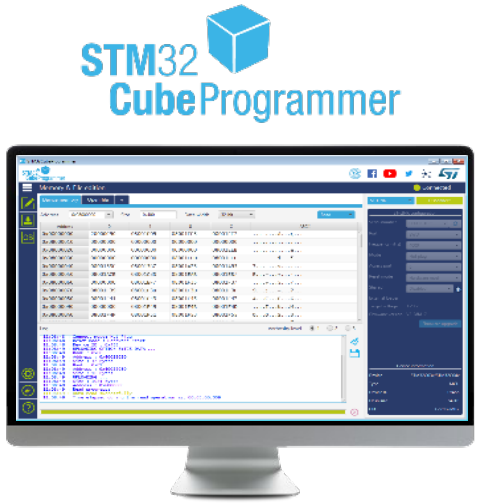
STLINK-V3SET

STLINK-V3MODS

and expansion boards

STM32CubeProgrammer software tool

Code & hardware programming



Partners programming systems

From prototyping to mass production

ACROVIEW
Data I/O
Algocraft
DediProg
eps
BPM
HI-LO SYSTEMS
DATAMAN
Phyton
PE micro
SECURE THINGZ
RK-SYSTEM
SMH Technologies
SEGGER It simply works!
XELTEK

Get started with STM32C5

STM32CubeMonitor

Enjoy simple and fast runtime monitoring

- Evaluate
- Configure
- Develop and debug
- Program
- **Monitor**

STM32 CubeMonitor

STM32CubeMonitor

Non-intrusive monitoring at runtime

STM32CubeMonitor-UCPD

Monitor USB Type-C® and power delivery apps

STM32CubeMonitor-Power

Visualize dynamic energy consumption

Third-party tracing / monitoring systems

From application diagnosis to code profiling

ARM KEIL Microcontroller Tools

iar

LAUTERBACH DEVELOPMENT TOOLS

percepio SENSING SOFTWARE

SEGGER It simply works!

TR


Check our recommended development journeys with STM32C5 MCUs
Get started with STM32C5

Our technology starts with You

Find out more at www.st.com/stm32c5