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STM32G0 MCU series efficiency at its best



Key messages of STM32G0 series

1

Efficient

- Arm® Cortex®-M0+ at 64 MHz
- Compact cost: maximum I/Os count
- Best RAM/Flash Ratio
- Smallest possible package down to 8-pin
- Very low power consumption (3 µA in stop, <100 µA/MHz in Run)
- Accurate internal high-speed clock 1% RC
- Best optimization, down to each and every detail
- Offers the best value for money

2

Robust

- Low electromagnetic susceptibility, EMC
- Clock Monitoring and 2 Watchdogs
- Error correction on Flash
- IoT ready with embedded security
- Hardware AES-256 encryption or the new Securable Memory Area.
- Safe Firmware upgrade / Install

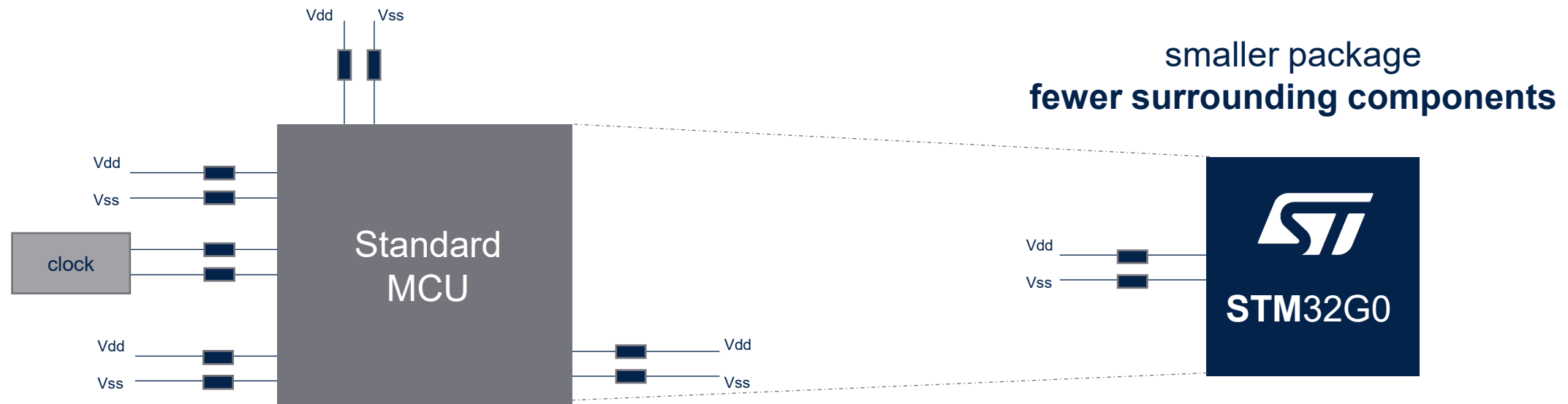
3

Simple

- Easy to configure thanks to the intuitive and graphic STM32CubeMX configuration tool.
- Easy to develop based on the Hardware Abstraction Layer library (HAL) or the low-layer library (LL) allowing maximum re-use and faster time-to-market.

Reducing BOM cost

New platform optimized with 1 power supply pair only
up to 64-pin packages



Innovations for your benefit

- **No external clock** **-10cts**
Accurate internal high-speed clock +/-1% for 0 / 90°C
- **No decoupling capacitances** **-4cts**
Remove up to 6 decoupling capacitors for supply and clocks
- **Smaller PCB** **-1cts**
Smaller package, less components: save on PCB area

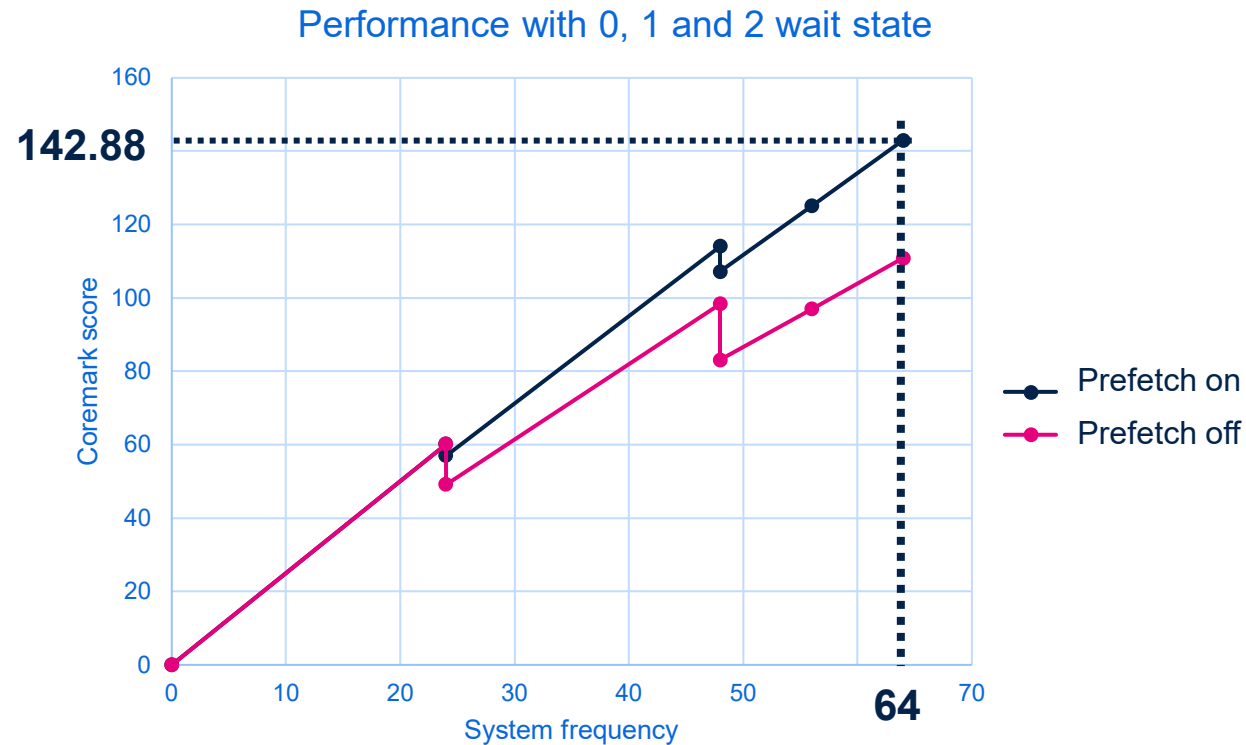
Additional benefits for your convenience:

- **USB-C power delivery** **-15cts**
Integrated transceivers, pull-up/down resistors and digital
- **Secure programming** **-25cts**
In house or at 3rd parties



Providing more performance

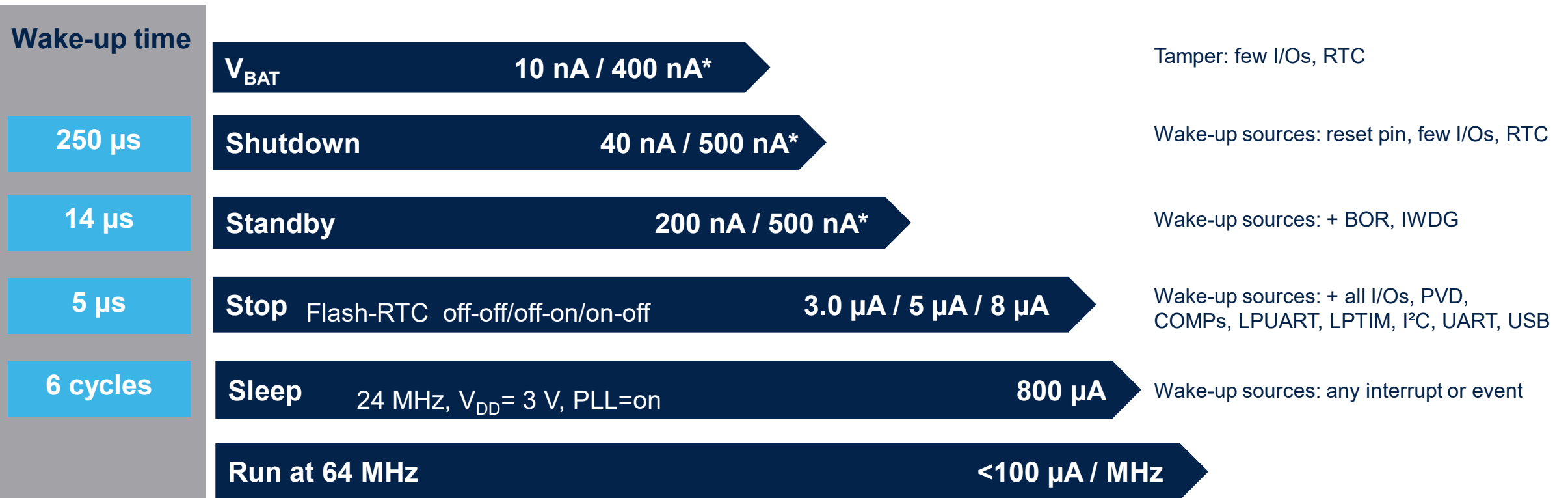
Do not compromise on performance with STM32G0



- Up to 64 MHz/ 59 DMIPS
- Up to >142 CoreMark Result
- Arm Cortex-M0+ with Memory Protection Unit (MPU)
- Flexible **DMA** up to 12 channels

Low-power modes efficiency

When Mainstream MCU Series meets low-power requirements



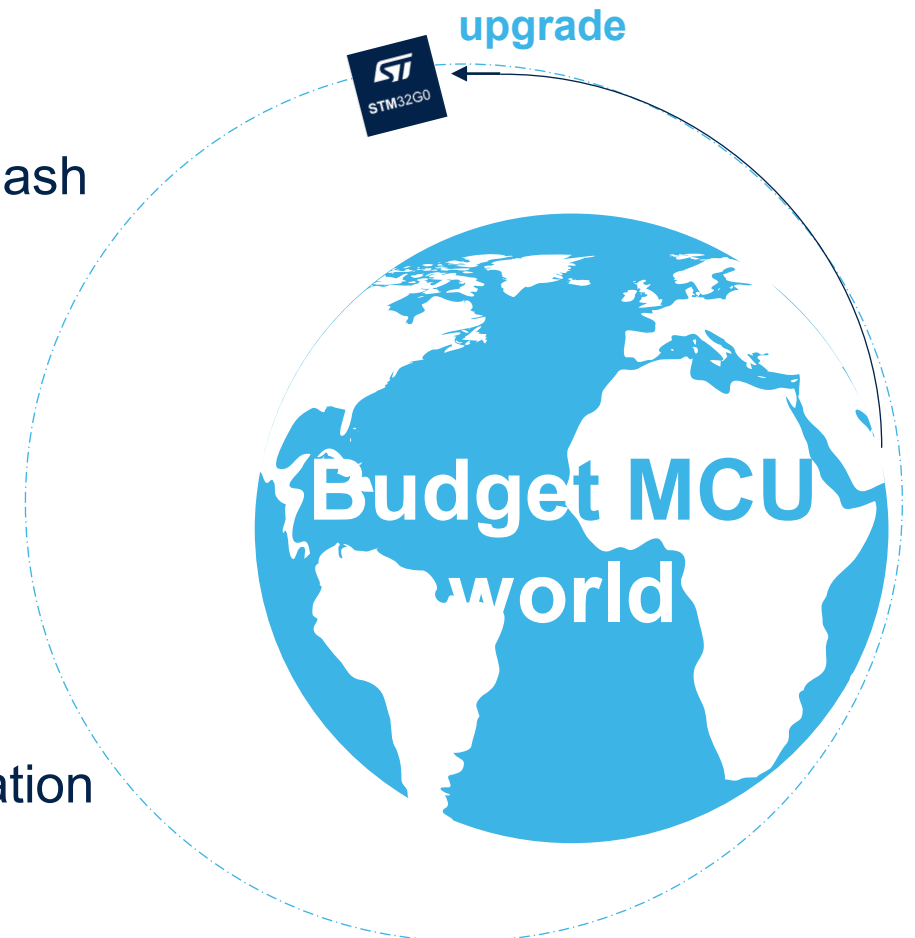
Conditions: 25°C, V_{DD} = 3V

Note : * without RTC / with RTC

Ready for tomorrow

Faster, more accurate analog and digital functions

- More **RAM** for Flash
 - Up to 144 KB SRAM for 512 KB and 256 KB Flash memory, Up to 36 KB SRAM for 128 KB and 64 KB Flash memory
- **Timers'** frequency up to **128 MHz** resolution (**< 8 ns**)
 - **Advanced control** capabilities
- **12-bit ADC** up to **2.5 MSPS** (0.4 μ s) conversion time
 - **16-bit** oversampling by hardware
- **32 Mbit/s SPI**, 7 Mbaud USART, 1 Mbit/s I²C communication



Smart peripherals



Smart integration

Save on battery life



Low consumption process and design

Low-Power UART: wake-up on frame

Low-Power Timer: counts and generate signals

I²C wake-up on address

Save on BOM cost



+/-1% high speed clock internal from 0 to 90 °C

+/-2% high speed clock internal from -40 to 125 °C

IO maximization: smaller package footprint

More flexibility



More RAM or **more safety** with parity enable/disable

Dynamic DMA assignment on **DMAMUX**

All IOs with external interrupt capability

STM32G0



Always keep control Diagnose, react

Main Clock monitoring

Backup clock and interrupts

Voltage monitoring: programmable interrupts and reset

Window watchdog on CPU clock

Independent watchdog on independent clock

Checksum by hardware

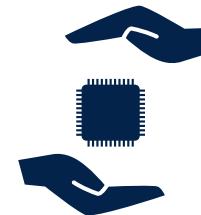
ECC on Flash, **Parity** on RAM



High temperature

from -40 °C

up to +125 °C



High robustness

Highly immune to fast-transients

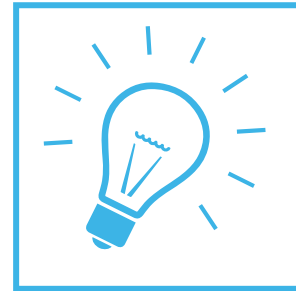
Robust IOs against negative injections



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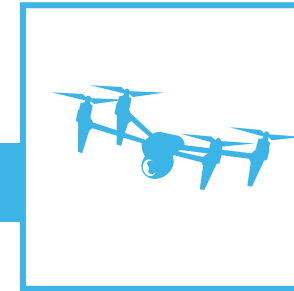
Smart applications

- High temperature 125 °C
 - Fast CPU 64 MHz
 - Advanced timers with high-resolution 7.8 ns
- Fast comparators
 - ADC-12-bit, DAC-12-bit
 - Low-thickness packages
- AES & security for secure upgrades



Lighting

STM32G0



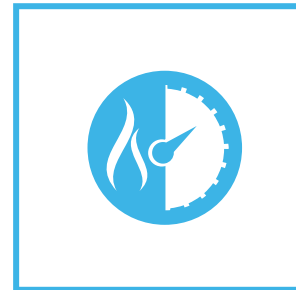
Consumer objects

Smartphones, IoT devices, rechargeable connected devices, drones, toys

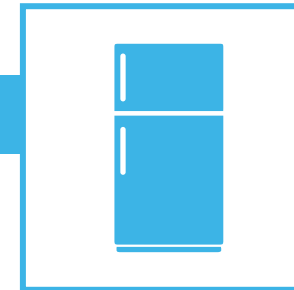
- Low-thickness, small form-factor
- 64MHz CPU with DMA
- Low consumption in run and low-power, fast wake-up
- USB Type-C Power Delivery 3.0
- USB FS 2.0 dev/host crystal-less

Air conditioning, e-bikes, industrial equipment

- High temperature 125 °C
 - CANFD support
 - SPI, USART, I²C
 - Advanced timers with high-resolution 7.8 ns
- RTC with backup registers
- AES & security for secure upgrades



Industrial devices
Motor control
Advanced control

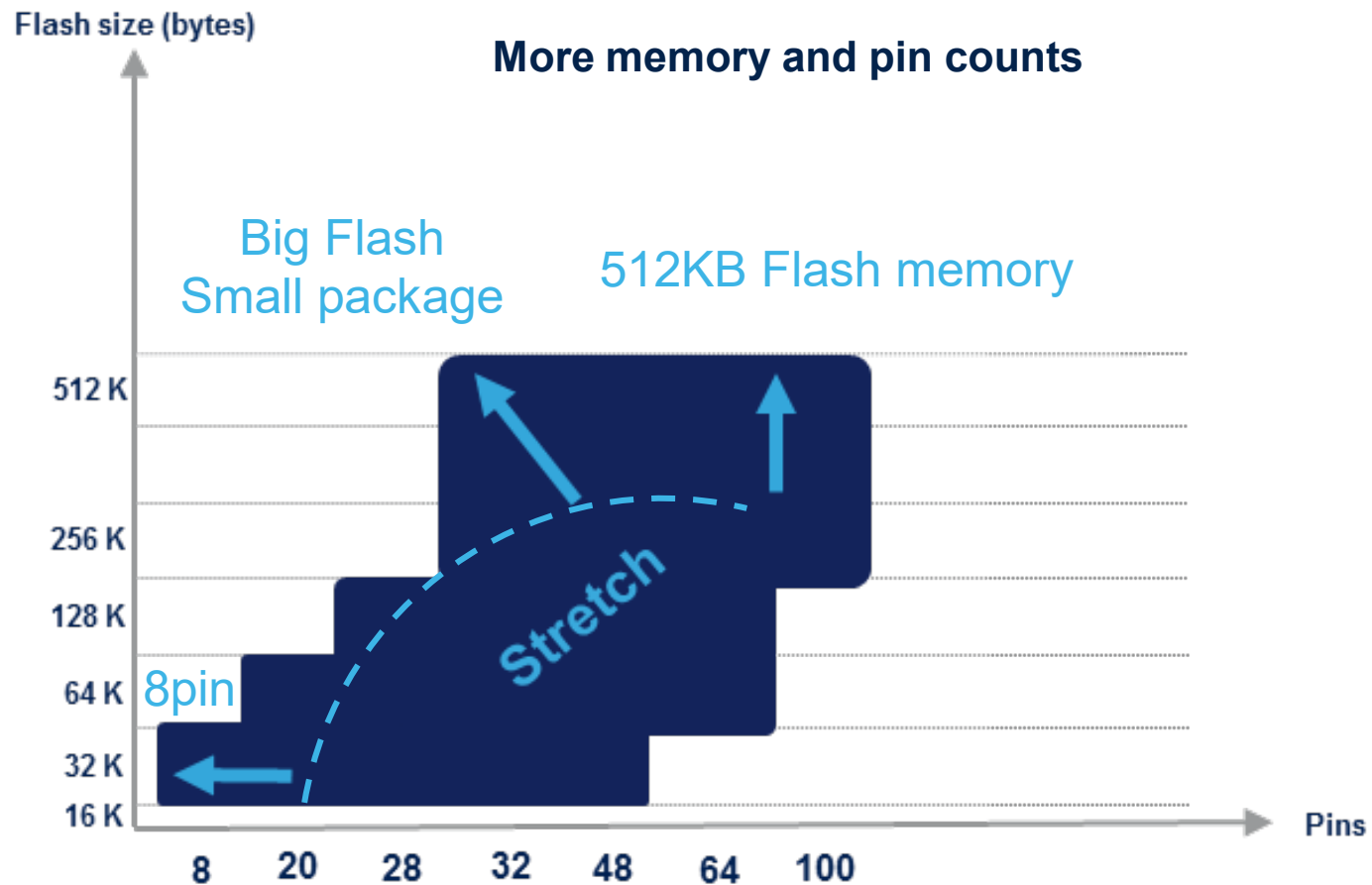


Smart Home

Home appliances, alarms and safety, advanced user interfaces

- High temperature 125 °C
- Safety monitoring features
- More RAM for flash
- Low consumption <100µA/MHz in run

Portfolio stretched for efficient budget applications

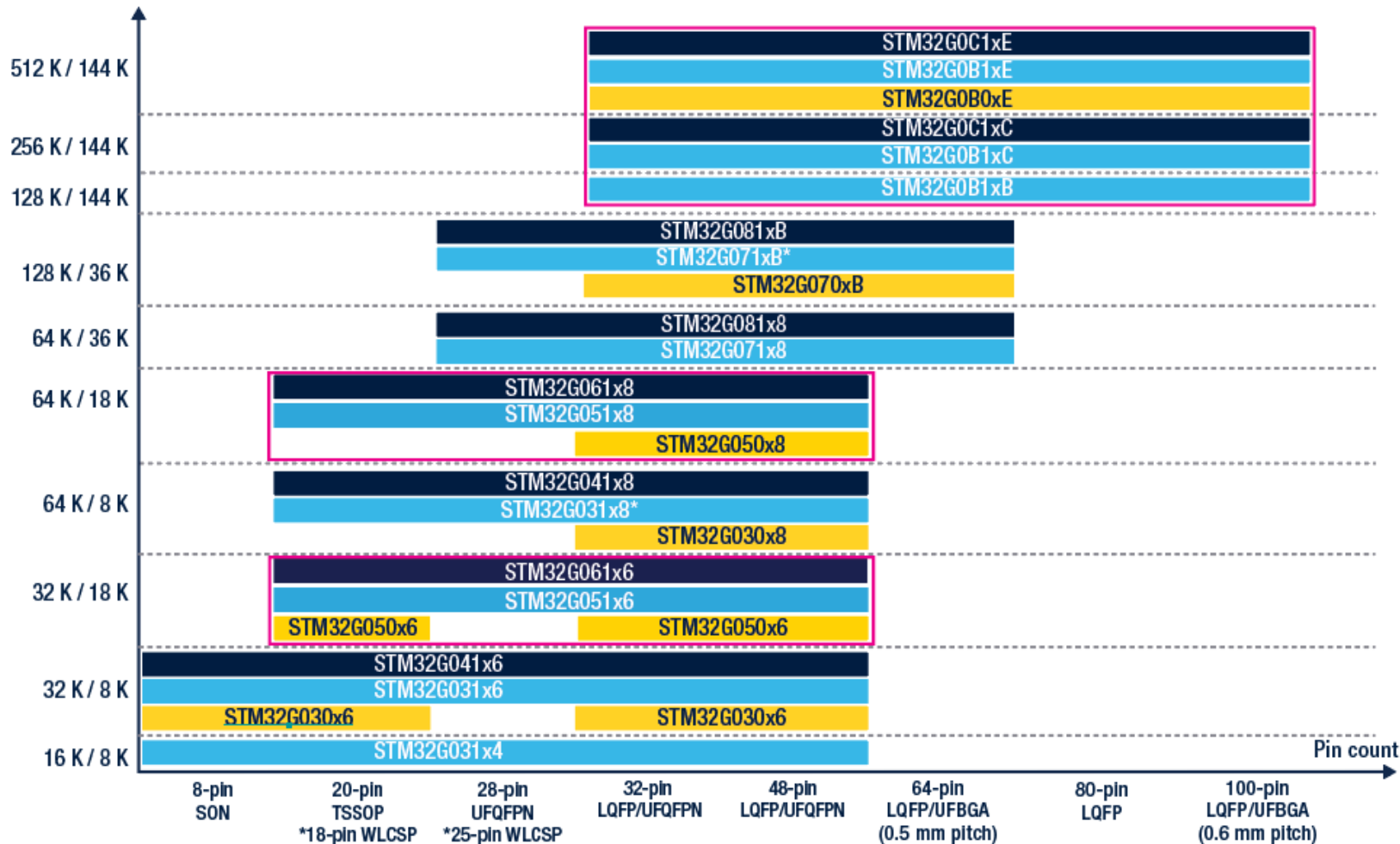


More packages



STM32G0 portfolio

Flash memory size / RAM size (bytes)



Legend :

- STM32G0x1 Access line
With 128-/256-bit AES Hardware Encryption
- STM32G0x1 Access line
Without 128-/256-bit AES Hardware Encryption
- STM32G0x0 Value line
- New product introduction





STM32G0 series, continuity of the STM32F0



MPU

STM32MP1

4158 CoreMark
650 MHz Cortex –A7
209 MHz Cortex –M4



High Perf
MCUs

STM32F2

Up to 398 CoreMark
120 MHz Cortex-M3

STM32F4

Up to 608 CoreMark
180 MHz Cortex-M4

STM32F7

1082 CoreMark
216 MHz Cortex-M7

STM32H7

Up to 3224 CoreMark
Up to 550 MHz Cortex -M7
240 MHz Cortex -M4



Mainstream
MCUs

STM32F0

106 CoreMark
48 MHz Cortex-M0

STM32G0

142 CoreMark
64 MHz Cortex-M0+

STM32F1

177 CoreMark
72 MHz Cortex-M3

STM32F3

245 CoreMark
72 MHz Cortex-M4

STM32G4

550 CoreMark
170 MHz Cortex-M4

Optimized for mixed-signal Applications



Ultra-low Power
MCUs

STM32L0

75 CoreMark
32 MHz Cortex-M0+

STM32L1

93 CoreMark
32 MHz Cortex-M3

STM32L4

273 CoreMark
80 MHz Cortex-M4

STM32L4+

409 CoreMark
120 MHz Cortex-M4

STM32L5

443 CoreMark
110 MHz Cortex-M33

STM32U5

651 CoreMark
160 MHz Cortex-M33



Wireless
MCUs

STM32WL

162 CoreMark
48 MHz Cortex-M4
48 MHz Cortex-M0+

STM32WB

216 CoreMark
64 MHz Cortex-M4
32 MHz Cortex-M0+



● Optimized for mixed-signal applications

● Cortex-M0+ Radio co-processor

Advanced features and solutions

- 32-bit Arm Cortex-M0+ core
- 1.7 to 3.6V power supply
- RAM maximization
- 1% internal clock
- Direct Memory Access (DMA)
- Communication peripherals
- FDCAN peripherals
- USB-C Power Delivery
- USB FS 2.0 Device (crystal-less) and Host

System		Connectivity
Power supply POR/PDR/PVD/BOR	Arm® Cortex®-M0+ CPU Up to 64 MHz	3x SPI (I²S)
Xtal oscillator 32 kHz + 4 to 48 MHz	Nested vector interrupt Controller (NVIC)	6x USART (3x with LIN, smartcard, IrDA, modem control)
Internal RC oscillators 32 kHz (±5%) + 16 MHz (±1%)	SW debug	2x LPUART
Internal RC oscillator 48 MHz (auto trimming on ext. synchro)	Memory Protection Unit	3x I²C Fast Mode Plus (2x SMBus, PMBus)
PLL + Prescaler	AHB-Lite bus matrix	2x FDCAN
Clock control	APB bus	USB FS 2.0 Device (crystal less) Host
RTC/AWU	Up to 512-Kbyte Flash memory	USB Power Delivery (incl. BMC + PHY)
Systick timer	Up to 144-Kbyte SRAM	
2x watchdogs (independent and window)	Boot ROM	
94 I/Os on 100 pins	12-channel DMA	
Cyclic redundancy check (CRC)		
Encryption	Analog	Control
AES (256-bit)	Temp. sensor	1x 32-bit timer
True RNG	1x 12-bit ADC SAR 16-channels / 2.5 MSPS	1x 16-bit Motor C. timer $f_{\text{MAX}} = 128 \text{ MHz}$ 4 PWM + 3 compl.
	1x 12-bit DAC 2ch	6x 16-bit timers one with $f_{\text{MAX}} = 128 \text{ MHz}$
	3x comparators	2x Low-power timers

- Timers up to 2xcpu resolution
- Real-time Clock
- I/O ports maximization
- 12-bit Ultra-fast ADC
- 12-bit DAC
- Comparators
- Safety features
- Advanced Security features

No compromise on what matters

- 32-bit Arm Cortex-M0+ core
- 2.0 to 3.6V power supply
- RAM maximization
- 1% internal clock
- Direct Memory Access (DMA)
- Communication peripherals
- USB FS 2.0 Device and Host (STM32G0B0)

System		Analog
Power supply POR/PDR	Arm® Cortex®-M0+ CPU Up to 64 MHz Nested vector interrupt Controller (NVIC) SW debug Memory Protection Unit	Temp. sensor
Xtal oscillator 32 kHz + 4 to 48 MHz		1x 12-bit ADC SAR 16-channels / 2.5 MSPS
Internal RC oscillators 32 kHz + 16 MHz		
PLL + Prescaler		
Clock control	AHB-Lite bus matrix	Connectivity
RTC/AWU	APB bus	3x SPI (I²S)
Systick timer	Up to 512-Kbyte Flash memory	6x USART (3x with LIN, smartcard, IrDA, modem control)
2x watchdogs (independent and window)	Up to 144-Kbyte SRAM	3x I²C Fast Mode Plus (2x SMBus, PMBus)
93 I/Os on 100 pins	20-byte backup registers	USB FS 2.0 Device / Host
Cyclic redundancy check (CRC)	Boot ROM	
	12-channel DMA	Control
		1x 16-bit Motor C. timer 4 PWM + 3 compl.
		6x 16-bit timers

- Timers
- Real-time Clock
- I/O ports maximization
- 12-bit Ultra-fast ADC
- Safety features

Integrated security features, ready for tomorrow's needs

Firmware IP protection

Mutual distrustful

Secret key storage

Authentication

Secure firmware upgrade

STM32G0

Securable Memory Area
Execute-only Protection
Read-out Protection
Write Protection
Memory Protection Unit (MPU)
AES-256 / SHA-256 Encryption
True Random Number Generator
Unique ID

User Flash

**Securable
Memory Area**



Standard user flash by default

Can be secured once exiting
No more access nor debug

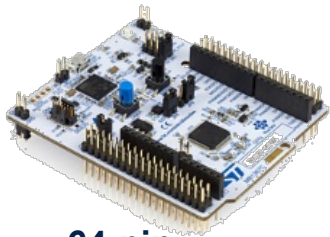
Configurable size

Good fit to store critical data

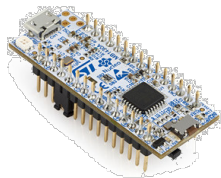
- **Critical routines**
- **Keys**

STM32G0 hardware solutions

Go fast, be first



64-pin



32-pin*



STM32 Nucleo

Flexible prototyping

- NUCLEO-G031K8*
- NUCLEO-G070RB
- NUCLEO-G071RB
- NUCLEO-G0B1RE

Evaluation boards

Full feature STM32G0 evaluation

- STM32G081B-EVAL
- STM32G0C1E-EV

Discovery kits

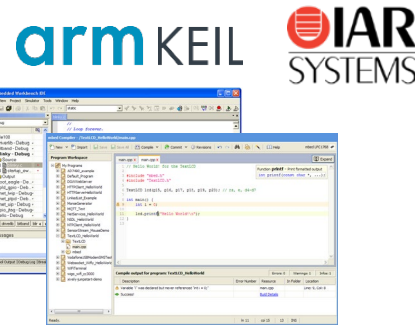
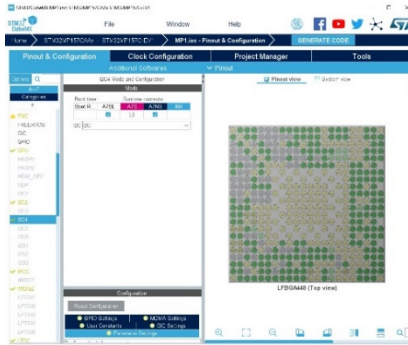
Key feature prototyping

- STM32G0316-DISCO
- STM32G071B-DISCO*

*(USB-PD Analyser)

STM32G0 software tools

Complete support of Arm Cortex-M ecosystem



All-in-one STM32 programming tool
Multi-mode, user-friendly



STM32CubeMX

STM32CubeMX

- Configure and generate Code
- Conflicts solver

IDEs Compile and Debug

Flexible Solutions

- Partners IDE, like IAR and Keil
- Free IDE based on Eclipse, like STM32CubeIDE

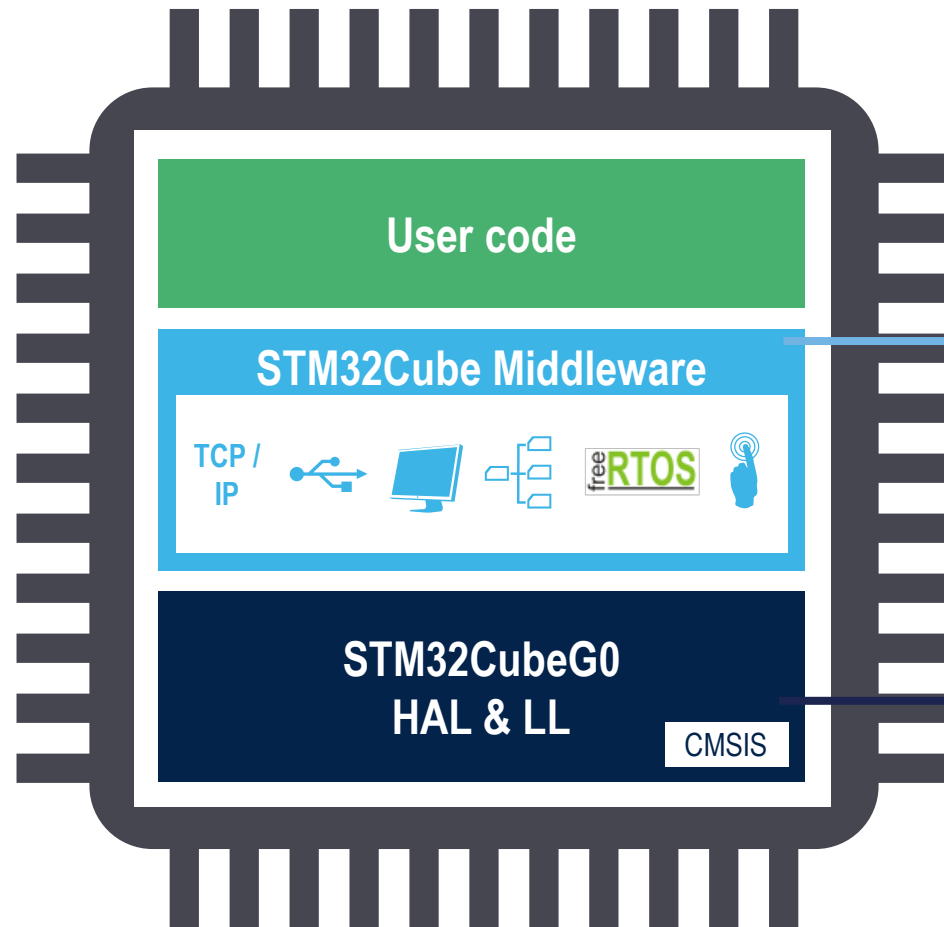
STM32 Programming Tool

STM32CubeProgrammer

- Flash and/or system memory
- GUI or command line interface

STM32G0 ecosystem

Platform approach or custom code: you choose



EMBEDDED SOFTWARE

- Open-source TCP/IP stack (lwIP)
 - USB Host and Device library from ST
 - STemWin graphical stack library from ST and SEGGER
 - Open-source FAT file system (FatFs)
 - Open-source real-time OS (FreeRTOS)
 - Dozens of examples
-
- STM32G0 Hardware Abstraction Layer (HAL) portable APIs
 - **High-performance, light-weight low-layer (LL) APIs**
 - High coverage for most STM32 peripherals
 - Production-ready and fully qualified
 - Dozens of usage examples
 - Open-source BSD license





Releasing your creativity



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Our technology starts with You



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