STM32G4 – Series Presentation

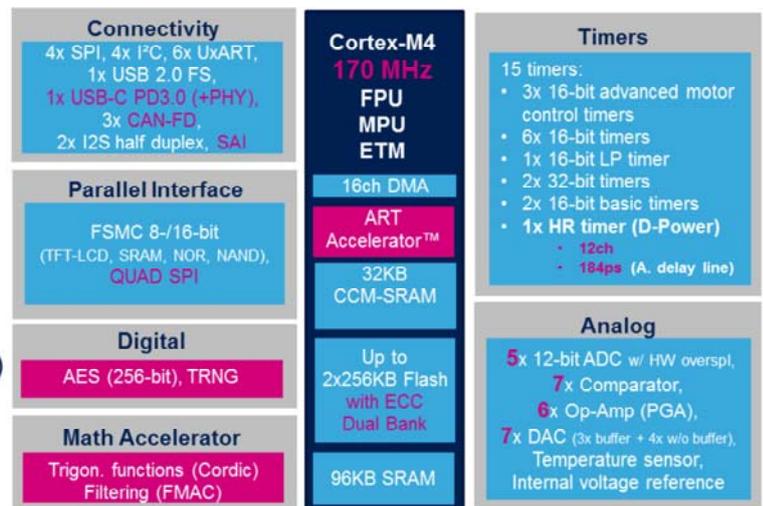Series Presentation
Revision 1.0

Hello, and welcome to this introduction to the STM32G4
Series training session.
It describes the feature sets of the various lines available in
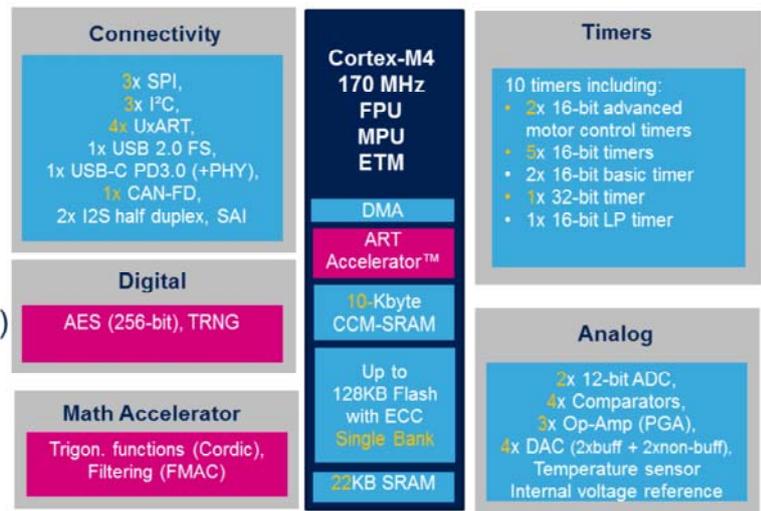the STM32G4 microcontroller series.

The block diagram for STM32G47x devices is provided here for reference.

The STM32G47x line offers a variety of communication assets, a rich set of analog peripherals, a practical crystal-less USB2.0 FS interface, USB-C power delivery functionality, up to 107 GPIOs, and multiple low-power modes to maximize the battery life. The mathematical Accelerators offer trigonometric functions and digital filtering computation in hardware, leaving the CPU unloaded for other tasks. HR timer with 184ps resolution is designed to control time sensitive applications as digital switched power sources and lighting applications. To speed up the CPU performance in time critical routines, the CCM memory supports code execution with zero wait states. On top of those features, a particular focus is done on embedding security hardware functions such as a 256-bit AES, PCROP and TRNG.

STM32G43x/44x – Block Diagram

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- CM4 DSP/FPU up to 170MHz (213 DMIPS)
  - 3x Accelerators: ART + CCM-SRAM + Mathematic
- Single bank 128KB Flash with ECC
  - Securable Memory Area (ex: FW upgrade)
- 32KB SRAM
  - 22KB SRAM + 10KB CCM with parity bit (partial)
- 1.71 – 3.6V voltage range
- RC oscillator 1% [-5°C..90°C]
- 12-bit ADC 4MSPS + HW oversampling.
- Max ambient temperature 125°C (limited spec)
- Run mode (from Flash): 153µA/MHz
- Stop mode: 59µA @ 25°C
- Standby: 120nA @ 25°C (RTC: + 660nA)
- Up to 86 I/Os
- Packages: LQFP100/80/64/48/32; QFN48/32; BGA64
- Robust EMC/ESD/EMS

Connectivity
3x SPI,
3x I²C,
4x UxART,
1x USB 2.0 FS,
1x USB-C PD3.0 (+PHY),
1x CAN-FD,
2x I2S half duplex, SAI

Digital
AES (256-bit), TRNG

Math Accelerator
Trigon. functions (Cordic),
Filtering (FMAC)

Cortex-M4
170 MHz
FPU
MPU
ETM
DMA
ART Accelerator™
10-Kbyte CCM-SRAM
Up to 128KB Flash with ECC Single Bank
22KB SRAM

Timers
10 timers including:
- 2x 16-bit advanced motor control timers
- 5x 16-bit timers
- 2x 16-bit basic timer
- 1x 32-bit timer
- 1x 16-bit LP timer

Analog
2x 12-bit ADC,
4x Comparators,
3x Op-Amp (PGA),
4x DAC (2xbuff + 2xnon-buff),
Temperature sensor
Internal voltage reference

life.augmented

The block diagram for STM32G43x devices is provided here for reference.

The STM32G43x line offers similar functionality as the STM32G47x line with a reduced number of peripherals instances (like analog and communication), excluding the HR timer and FSMC and reduced memories spaces. There is still a rich set of analog and communication peripherals, hardware accelerators, crystal-less USB2.0 FS interface, USB-C power delivery functionality, up to 86 GPIOs, and multiple low-power modes to maximize the battery life. The timer set is oriented for motor control applications. To speed up the CPU performance in time critical routines, the CCM memory supports code execution with zero wait states.

Specific STM32G4 features 1/2

- Rich set of analog peripherals
  - 5xADC, 7xDAC, 6xOPAMP, 7xCOMP, VREFBUF
- Core coupled memory (CCM) RAM
  - For time critical code execution without wait states (ISRs)
- Mathematical accelerators
  - Cordic: trigonometric functions accelerator
  - FMAC: Digital filter mathematical accelerator
- HR timer
  - 184ps resolution to support DSMPS (digital switched mode power supplies)
- 17 timers
  - Industrial application support: motor control, lighting, DSMPS

This slide lists some specific features of the STMG4 microcontroller.

- Rich set of analog peripherals
- CCM RAM memory for boosting fast routines
- Mathematical accelerators: Cordic and FMAC
- High resolution timer with 184ps resolution
- Rich set of timers to support a wide range of industrial applications

Specific STM32G4 features 2/2

- Memories features:
  - ECC on Flash
  - Dual bank Flash
  - HW parity check on part of SRAM
  - OTP area
  - FSMC, Quad-SPI (support for external memories)
- Integrated bootloader
  - Supporting USAT, SPI, I2C, USB
- Low power features
  - RTC, SRAM2 backup, VBAT mode, Stop/Standby/Shutdown mode

There are additional specific features:
- Memories features with focus on safety, firmware update and external memories support
- Embedded bootloader supporting most popular communication interfaces
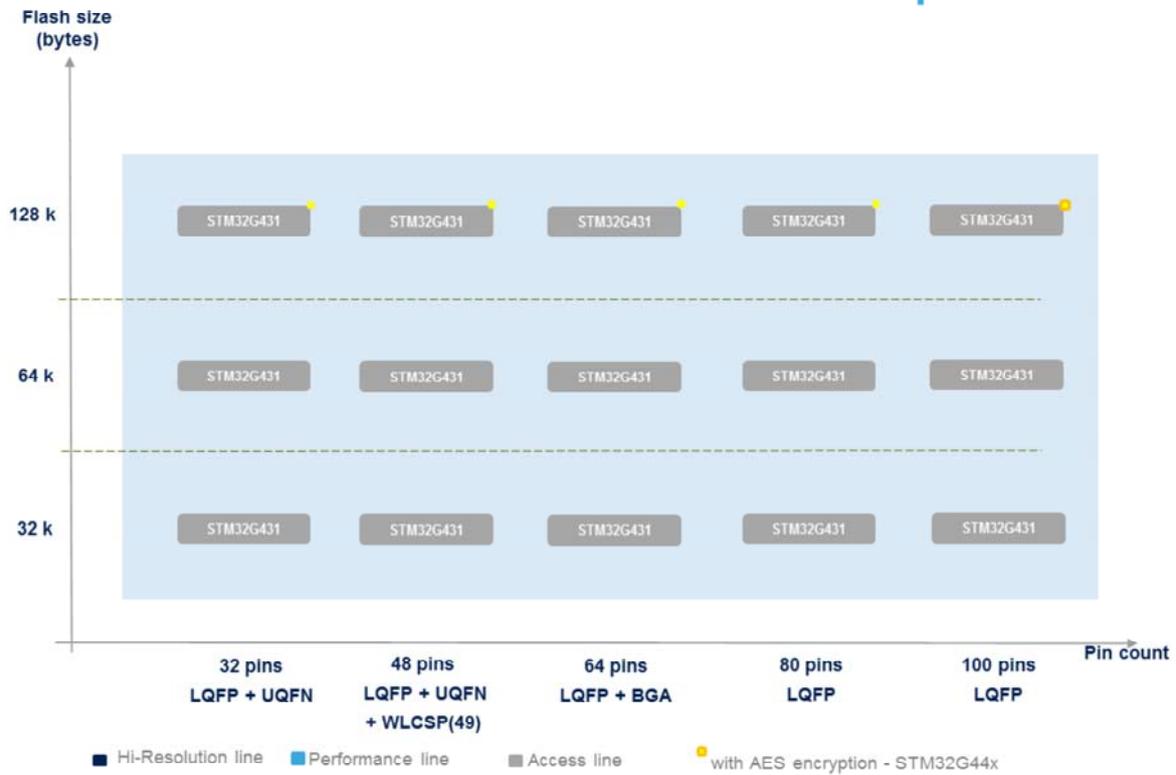- Low power features to save power in battery powered applications

STM32G47x/48x series - portfolio
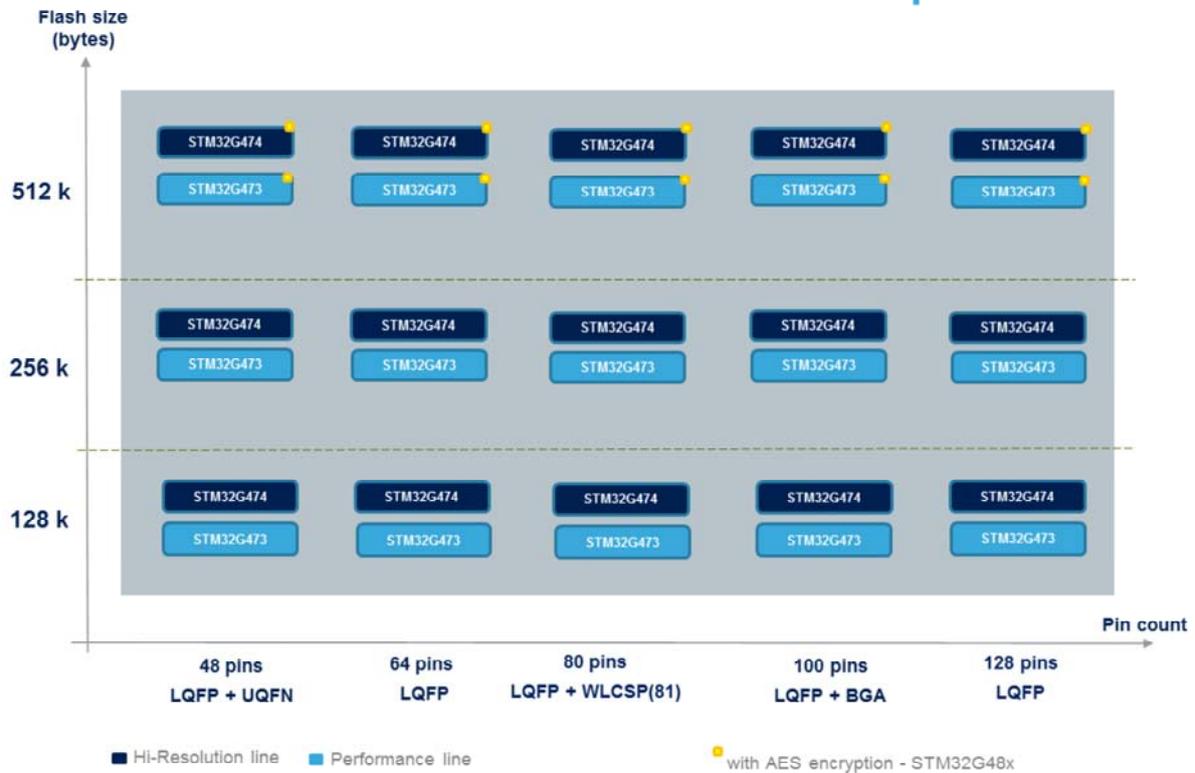
The STM32G73x line can be encapsulated in a wide range of packages.
AES encryption is available in selected configurations.

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