



Hello, and welcome to this introduction to the STM32H7 Series training session.

It describes the feature sets of the various lines available in the STM32H7 microcontroller series.

STM32H7 High performance Tailored for your needs

- Single and Dual core versions
- High performance up to **480MHz** in Dual core and up to **550MHz** in Single core
- 128KB to 2MB Flash Dual Bank
- Up to 1.4MB RAM
- More security features (Boot, Tamper ...), OTFDEC on external memories, Crypto/Hash and security services (optional)
- 35 communication peripherals
- 16-bit ADC up to 3.6MSPs, up to 5 MSPS in 12-bit, Comparators, Op Amp
- TT-FD-CAN and FD-CAN
- High-Resolution timer (2.1ns)
- Low-Power Timers
- LDO and SMPS option
- Up to 140 °C junction temperature / 125 °C ambient (optional)

	Product line	f _{max} (MHz)	Dual- Bank Flash memory (Kbytes)	RAM (Kbytes)	OctalSPI & I2C FIDEC	Ethernet	Graphics	Power supply	Stop mode (typical) / RAM reten- tion
CORE, MEMORIES AND ACCELERATION <ul style="list-style-type: none"> Single-core Cortex-M7 up to 550 MHz Dual-core Cortex-M7 480 MHz and Cortex-M4 240 MHz Flash and RAM acceleration SP-FPU and DP-FPU 4 x DMA Mathematics (only H723/H733/725/735/730) CONNECTIVITY <ul style="list-style-type: none"> Up to 2 x USB2.0 OTG FS/H 2 x CAN USART, UART, SPI, PC Up to 3 x CAN (2 x FD and 1 x TT) HDMA-CC FM3: Dual-core Quad-SPI or 2 x Octo-SPI Camera IF AUDIO <ul style="list-style-type: none"> 2 x I2S + audio PLL 4 x I2A 2 x 12-bit DAC SPDIF-RX GRAPHIC <ul style="list-style-type: none"> Chrom-ART Accelerator™ OTHER <ul style="list-style-type: none"> Crypto/Flash option (except H742) Security services option (except H742) TRNG DFSDM 	STM32H747/757	480 + 240	Up to 2 Mbytes	1 Mbyte (incl. 128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup) + 4 Kbytes backup2			TT-F-LCD JPEG codec MP9-DSI	SMPS + LDO	300 µA / 1 MB 250 µA / 769KB
	STM32H746/756	480 + 240	Up to 2 Mbytes	1 Mbyte (incl. 128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup) + 4 Kbytes backup2			TT-F-LCD JPEG codec	SMPS + LDO	300 µA / 1 MB 250 µA / 769KB
	STM32H7A3/783	280	Up to 2 Mbytes	1.4MB (incl. 128K DTCM, 64K ITCM, 1184K+SRAM, 4K backup)			TT-F-LCD JPEG codec Chrom-GRIC	SMPS + LDO	32 µA / 1.4MB 26 µA / 326B
	STM32H743/753	480	Up to 2 Mbytes	1 Mbyte (incl. 128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup) + 4 Kbytes backup2			TT-F-LCD JPEG codec	LDO	1270 µA / 1MB 910 µA / 769KB
	STM32H742	480	Up to 2 Mbytes	602 Kbytes (incl. 128 Kbytes DTCM + 64 Kbytes ITCM + 16 Kbytes backup) + 4 Kbytes backup2				LDO	1270 µA / 902B 910 µA / 769KB
	STM32H725/735	550	Up to 1 Mbyte	564KB (incl. 128K DTCM, 432KB Syst + 4K backup)			TT-F-LCD	SMPS + LDO	200 µA / 564KB
	STM32H723/733	550	Up to 1 Mbyte	564KB (incl. 128K DTCM, 432KB Syst + 4K backup)			TT-F-LCD	LDO	530 µA / 564KB
	STM32H7B0	280	128 Kbytes	1.4MB (incl. 128K DTCM, 64K ITCM, 1184K+SRAM, 4K backup)			TT-F-LCD JPEG codec Chrom-GRIC	SMPS + LDO	32 µA / 1.4MB 26 µA / 326B
	STM32H750	480	128 Kbytes	1 Mbyte (incl. 128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup) + 4 Kbytes backup2			TT-F-LCD JPEG codec	LDO	1270 µA / 1MB 910 µA / 769KB
	STM32H730	550	128 Kbytes	564KB (incl. 128K DTCM, 432KB Syst + 4K backup)			TT-F-LCD	SMPS + LDO	200 µA / 564KB 530 µA / 564KB

Notes:
 1. Optional - dedicated CPN, STM32H733, STM32H735, STM32H735, STM32H735, STM32H735, STM32H735 for the Crypto Variants
 2. 125 °C ambient / 140 °C junction. Dedicated part numbers on STM32H725/735, STM32H746/756
 3. Crypto and Security services on CPN: STM32H733, STM32H735 and STM32H750
 4. SMPS available only on STM32H730 CPN
 5. SMPS only on the CPN selected in LDO

The STM32H7 series of very high-performance MCUs comes with an ARM® Cortex®-M7 core and an optional ARM® Cortex®-M4 core for a dual-core CPN. Taking advantage of up to 2 x 32-Kbytes L1 cache for instruction and data, the STM32H7 devices deliver the maximum theoretical performance of the Cortex-M7 core no matter whether the code is executed from the embedded Flash or from the external memory: 2424 CoreMark /1027 DMIPS at 480 MHz fCPU1 and 2778 CoreMark/1177 DMIPS at 550MHz fCPU1. In dual core variants, the Cortex-M4 core offers 800 CoreMark /300 DMIPS at 240 MHz fCPU2



The STM32H723/33 line offers the performance of the Cortex-M7 core (with double-precision floating point unit) running at up to 550 MHz. It's L1 cache provides 32 KBytes for instruction and 32 Kbytes for data, the ITCM RAM can be increased to 256 KBytes, all those fast memory accesses boost execution performance.

The STM32H733 integrates a crypto/hash processor providing hardware acceleration for AES-128, -192 and -256, with support for GCM and CCM, Triple DES, and hash (MD5, SHA-1 and SHA-2) functions.

STM32H725/H735

Single Core Entry cost with SMPS

System SMPS, LDO, USB and backup regulators POR/PDR/PVD/BOR Multi-power domains Xtal oscillators 32 kHz + 4 -48 MHz Internal RC oscillators 32 kHz + 4, 48 & 64 MHz 3x PLL Clock control RTC/AWU 1x SysTick timer 2x watchdogs (independent and window) 46/67/97/119/121/128 I/Os Cyclic redundancy check (CRC) Unique ID Digital Temperature sensor	Chrom-ART Accelerator™ Cache I/D 32+32 Kbytes Arm® Cortex®-M7 550 MHz	1-Mbyte single-bank Flash memory RAM 560KB incl. Up to 256KB ITCM FMC/SRAM/NOR/NAND/SDRAM 2x Octo-SPI 1024-bit + 4-Kbyte backup SRAM
Control 2x 16-bit motor control PWM synchronized AC timer 10x 16-bit timers 4x 32-bit timers 5x Low-power timer Optional extended temperature range support (125°C)	Floating point unit (DP-FPU) Nested vector interrupt controller (NVIC) JTAG/SW debug/ETM Memory Protection Unit (MPU) ROP, PC-ROP anti-tamper	Connectivity TFT LCD controller HDMI-CEC 6x SPI, 4x I²S, 5x I²C Camera interface, PSSI Ethernet MAC 10/100 with IEEE 1588 MDIO slave 3x FD CAN (Flexible Data rate) 1x USB 2.0 OTG FS/HS 2x SDMMC 5x USART + 5 UART LIN, smartcard, IrDA, modem control 1x Low-power UART 2x SAI (Serial audio interface) SPDIF input x4 DFSDM (8 inputs/4 filters) SWP (Single Wire Protocol)
Crypto/Hash processor 3DES, AES 256, GCM, CCM SHA-1, SHA-256, MD5, HMAC Security services SFI and SB-SFU	AXI and Multi-AHB bus matrix 4x DMA True random number generator (RNG)	Analog 2x 12-bit, 2-channel DACs 2 x 16-bit ADC (up to 3.6 MSPS) 18 channels 1 x 12-bit ADC (up to 5 MSPS) 12 channels 2x COMP 2x OpAmp



- Up to 550MHz
- Available in 512KB and 1MB Flash
- SMPS power supply
- Optional crypto variants offering security services (SFI and SB-SFU) support
- Optional support of extended Temperature range: 125 °C on specific part numbers
- A wide choice of packages and form factors

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On top of features provided by the STM32H723/33 line, the STM32H725/35 line embeds a SMPS to scale down the supply voltage, decreasing device power consumption. It can also be used to supply external circuitry and can also be combined with the LDO for specific use cases. It proposes an optional extended ambient temperature range up to 125 °C with junction temperature range up to 140°C. The STM32H735 integrates the same crypto function as STM32H733.

System SMPS, LDO, USB and backup regulators POR/PDR/PVD/BOR Dual-power domains Xtal oscillators 32 kHz + 4 ~48 MHz Internal RC oscillators 32 kHz + 4, 48 & 64 MHz 3x PLL Clock control RTC/AWU 1x SysTick timer 2x watchdogs (independent and window) Up to 168 I/Os Cyclic redundancy check (CRC) Unique ID	Chrom-ART Accelerator™ Chrom-GRC™ JPEG Codec Acceleration Cache I/D 16+16 Kbytes Arm® Cortex® -M7 280 MHz	2-Mbyte dual-bank Flash memory RAM 1376KB incl. 64KB ITCM FMC/SRAM/NOR/NAND/SDRAM 2x OctoSPI 1024-byte + 4-Kbyte backup SRAM
Control 2x 16-bit motor control PWM synchronized AC timer 10x 16-bit timers 2x 32-bit timers 2x Low-power timer	Floating point unit (DP-FPU) Nested vector interrupt controller (NVIC) JTAG/SW debug/ETM Memory Protection Unit (MPU) ROP, PC-ROP active-tamper	Connectivity TFT LCD controller HDMI-CEC 6x SPI, 3x PS, 4x I2C Camera interface MDIO slave 2x FDCAN (Flexible Data rate) 1x USB 2.0 OTG FS 2x SDMMC 5x USART + 5 UART LIN, smartcard, IrDA, modem control 1x Low-power UART 2x SAI (Serial audio interface) SPDIF input x4 DFSDM (8 inputs/4 filters)
Crypto/Hash processor 3DES, AES 256, GCM, CCM SHA-1, SHA-256, MD5, HMAC, OTFDEC Security services SFI and SB-SFU	AXI and Multi-AHB bus matrix 3x DMA True random number generator (RNG)	Analog 3x 12-bit, 2-channel DACs 2 x 16-bit ADC (up to 3.6 Msps) 20 channels/up to 2 MSPS Temperature sensor 2x COMP 2x OpAmp

STM32H7A/7B

Single Core best balance between performance and power

- Up to 280MHz
- Large embedded RAM 1.4MB
- Available in 1 and 2MB Flash
- Optional Crypto/Hash and security services
- 32 µA in STOP mode with 1.4 MB RAM content retained
- A wide choice of packages and form factors

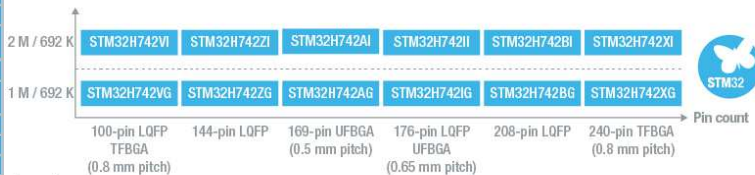
The STM32H7A/H7B lines offers the best balance between the performance of the Cortex-M7 core (with double-precision floating point unit) running up to 280 MHz and a very contained power consumption in low power modes for energy sensitive applications. It embeds 1.4 MByte RAM and up to 2 MBytes flash. The STM32H7B integrates a crypto/hash processor providing hardware acceleration for AES-128, -192 and -256, with support for GCM and CCM, Triple DES, and hash (MD5, SHA-1 and SHA-2) functions.

STM32H742

Single Core Entry Level

System LDO, USB and backup regulators POR/PDR/PVD/BOR Multi-power domains Xtal oscillators 32 kHz + 4 ~48 MHz Internal RC oscillators 32 kHz + 4, 48 & 64 MHz 3x PLL Clock control RTC/AWU 1x SysTick timer 2x watchdogs (independent and window) 82/114/131/140/168 I/Os Cyclic redundancy check (CRC) Unique ID	Chrom-ART Accelerator™ Cache I/D 16+16 Kbytes Arm® Cortex®-M7 480 MHz	2-Mbyte dual-bank Flash memory RAM 688KB incl. 64KB ITCM FMC/SDRAM/NOR/NAND/SDRAM Dual Quad-SPI 1024-byte + 4-Kbyte backup SRAM
Control 2x 16-bit motor control PWM synchronized AC timer 10x 16-bit timers 2x 32-bit timers 5x Low-power timer 16-bit High res. timer	Floating point unit (DP-FPU) Nested vector interrupt controller (NVIC) JTAG/SW debug/ETM Memory Protection Unit (MPU) ROP, PC-ROP anti-tamper	Connectivity HDMI-CEC 6x SPI, 3x I²S, 4x I²C Camera Interface Ethernet MAC 10/100 with IEEE 1588 MDIO slave 2x FDCAN (Flexible Data rate) 1x USB 2.0 OTG FS/HS 1x USB 2.0 OTG FS 2x SDMMC 4x USART + 4 UART LIN, smartcard, IrDA, modem control 1x Low-power UART 4x SAI (Serial audio interface) SPDIF input x4 DFSDM (8 inputs/4 filters) SWP (Single Wire Protocol)
	AXI and Multi-AHB bus matrix 4x DMA True random number generator (RNG)	Analog 2x 12-bit, 2-channel DACs 3 x 16-bit ADC (up to 3.6 Msps) 20 channels/up to 2 MSPS Temperature sensor 2x COMP 2x OpAmp

Flash memory size / RAM size (bytes)



Legend:

■ without HW crypto/hash

- An entry level version of the STM32H7 series
- Up to 480MHz
- Available in 1 and 2 MB Flash memory
- Easy migration from the F7 and F4 series due to pin for pin compatibility on common packages
- A wide choice of packages and form factors

The STM32H742 line offers the performance of the Cortex-M7 core (with double-precision floating point unit) running up to 480 MHz. It embeds up to 2MBytes of Flash memory

STM32H743/H753

Single Core General Purpose

System	Chrom-ART Accelerator™ JPEG Codec Acceleration	2-Mbyte dual-bank Flash memory RAM 1056KB incl. 64KB ITCM FMC/SRAM/NOR/NAND/ SDRAM Dual Quad-SPI 1024-byte + 4-Kbyte backup SRAM
	Cache I/D 16+16 Kbytes	
Control	Arm® Cortex®-M7 480 MHz	
	Floating point unit (DP-FPU) Nested vector interrupt controller (NVIC) JTAG/SW debug/ETM Memory Protection Unit (MPU) ROP, PC-ROP anti-tamper	
optional	Crypto/Hash processor 3DES, AES 256, GCM, CCM SHA-1, SHA-256, MD5, HMAC Security services SFI and SB-SFU	AXI and Multi-AHB bus matrix 4x DMA True random number generator (RNG)

Flash memory size / RAM size (bytes)



Legend:

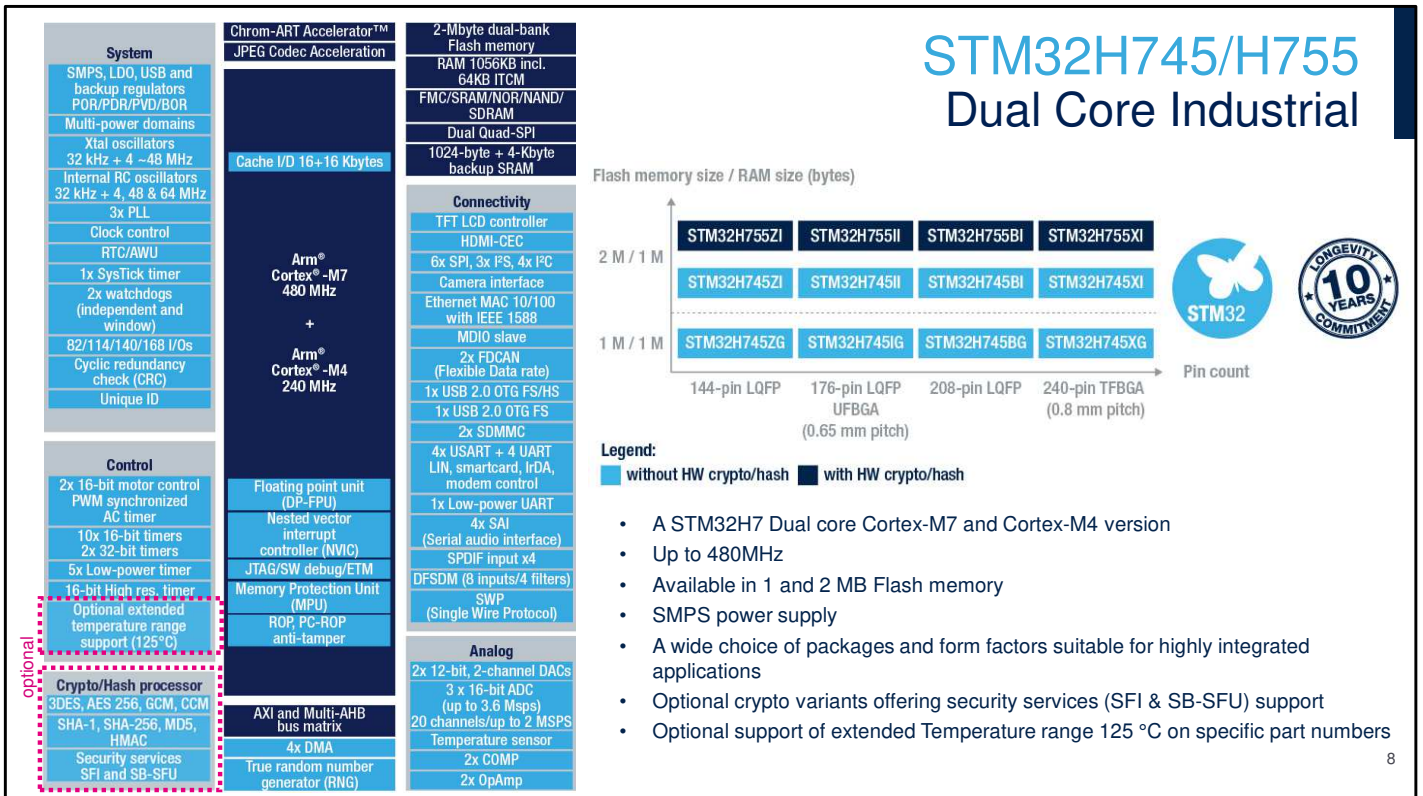
without HW crypto/hash with HW crypto/hash

- Up to 480MHz
- Available in 1 and 2 MB Flash memory
- Easy migration from the F7 and F4 series due to the pin for pin compatibility on common packages
- Optional crypto variants offering the security services (SFI and SB-SFU) support
- A wide choice of packages and form factors

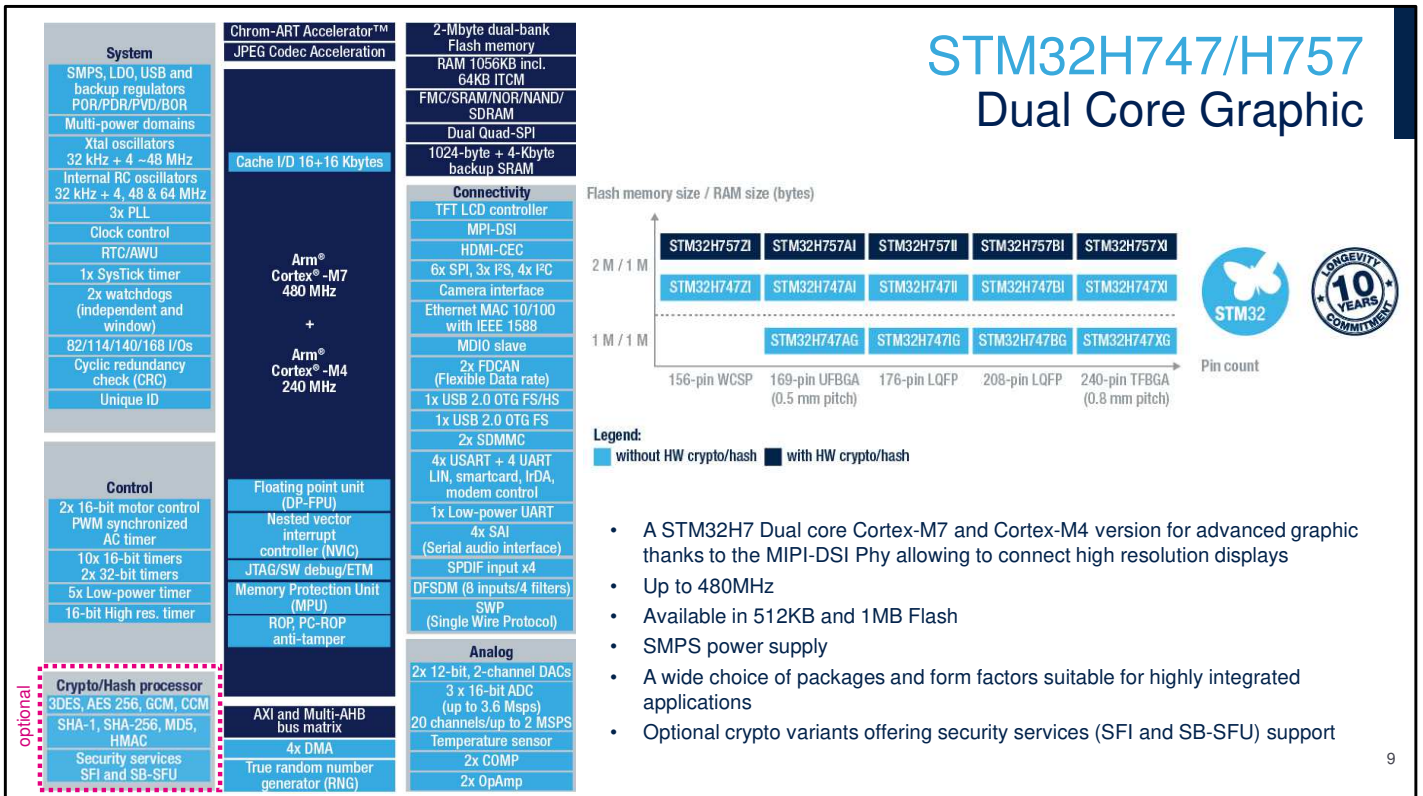
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On top of features proposed by the STM32H742 line, the STM32H743/753 line offers more RAM, an LCD-TFT controller interface with dual-layer support, and a JPEG hardware accelerator for fast JPEG encoding and decoding, off-loading the CPU.

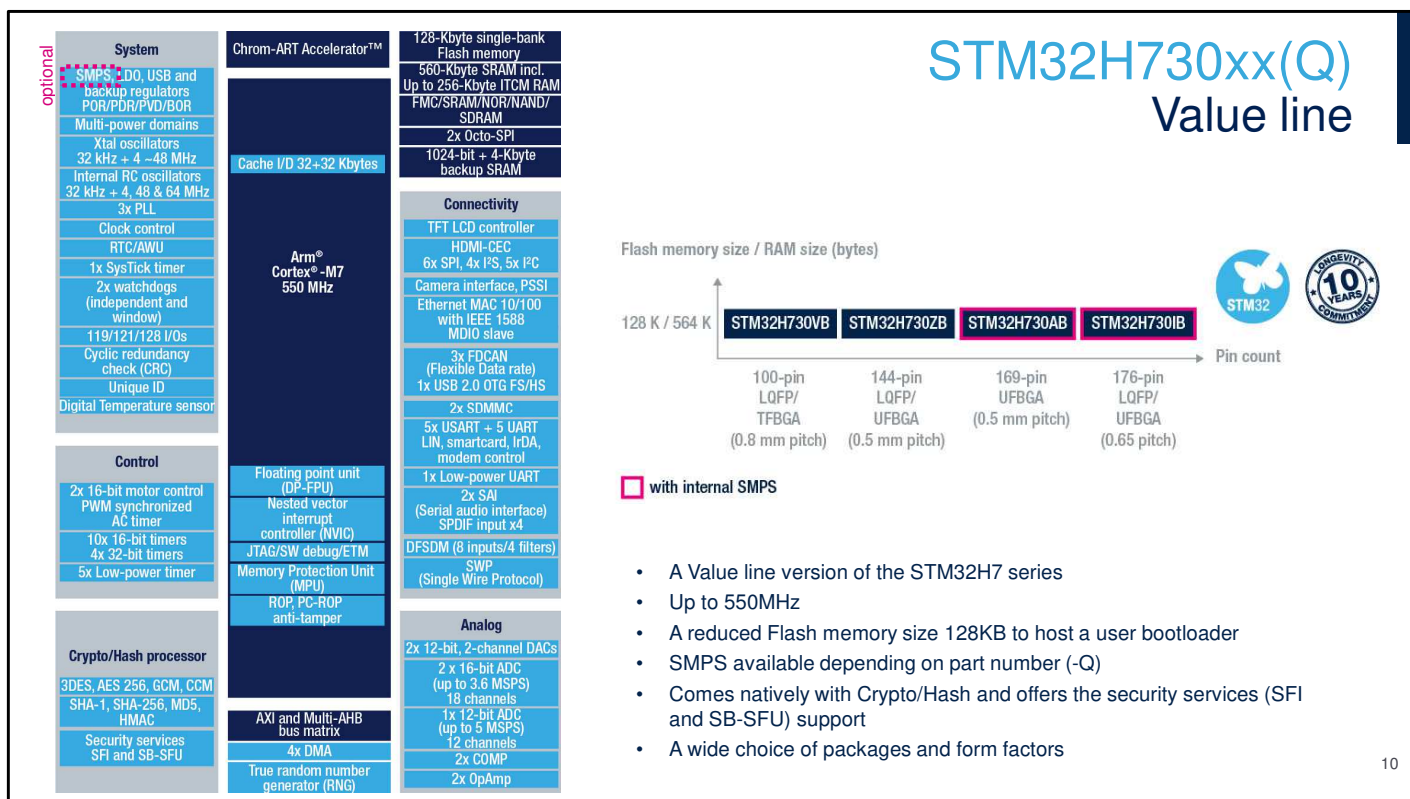
The STM32H753 integrates a crypto/hash processor providing hardware acceleration for AES-128, -192 and -256, with support for GCM and CCM, Triple DES, and hash (MD5, SHA-1 and SHA-2) functions.



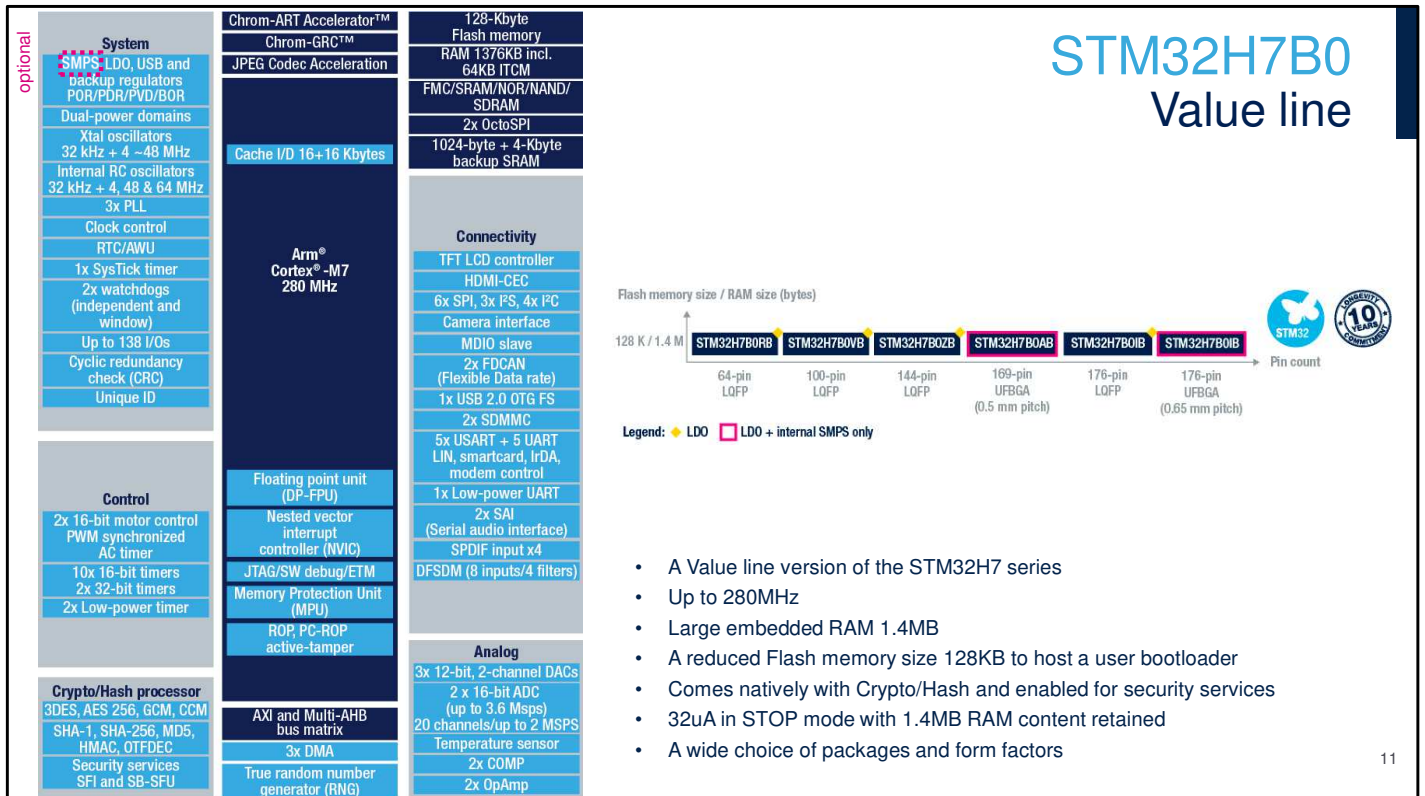
On top of features proposed by STM32H743/753, the STM32H745/755 embeds a SMPS to scale down the supply voltage, decreasing device power consumption. It proposes an optional extended ambient temperature range up to 125 °C with junction temperature range up to 140°C. The STM32F755 integrates the crypto/hash processor.



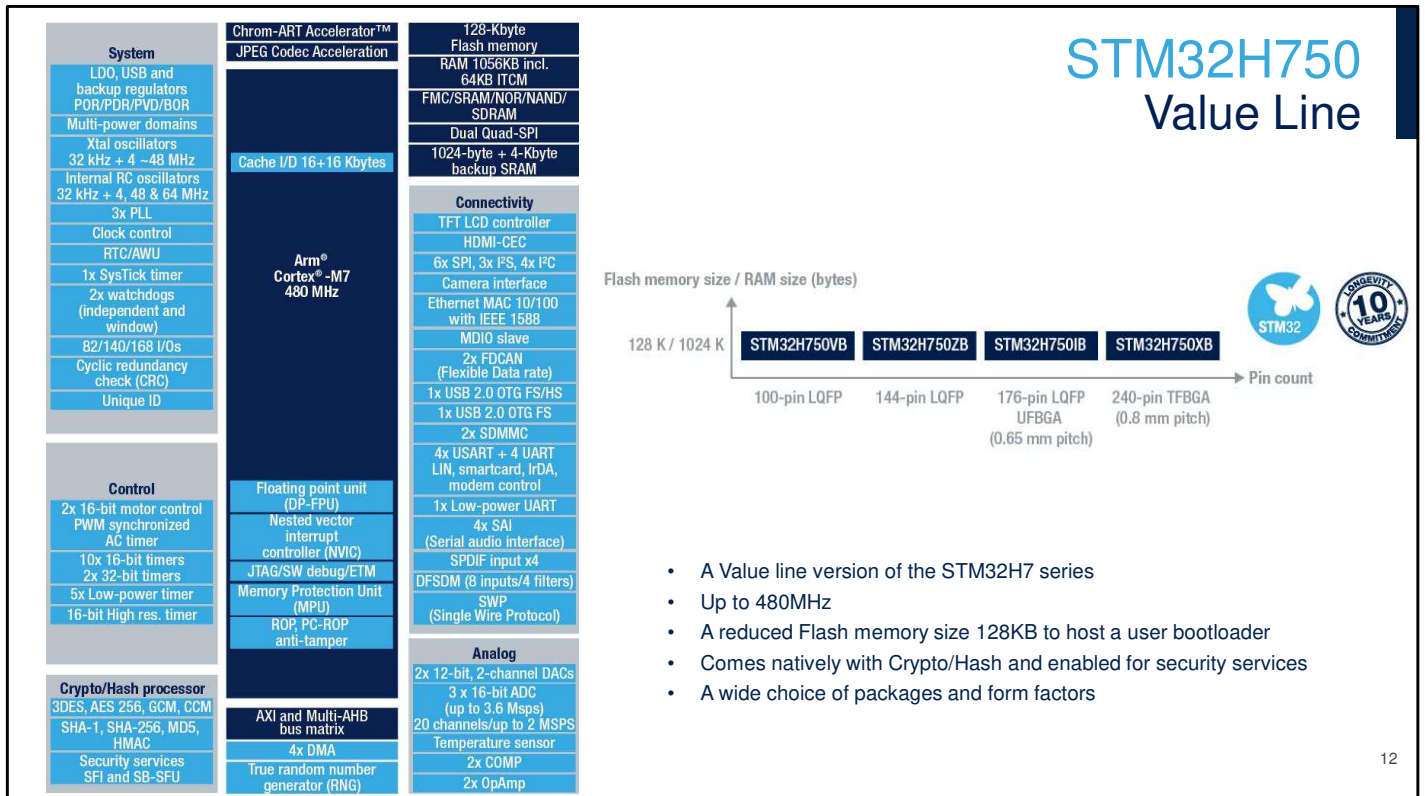
The STM32H747/757 graphic line expands the family, offering an additional Cortex-M4 core (with single-precision floating point unit), the MIPI-DSI interface and some additional power schemes with SMPS. The STM32F757 integrates the crypto/hash processor.



The Value Line STM32H730/H7B0/H750 offers an entry point to the STM32H7 series, cost effective, while the devices come with 128KB Flash memory to host for example a user Bootloader. This line is very suitable for applications where external memories are required. It comes natively in crypto variants only. STM32H730 is the value line of the STM32H723/33/25/35 family.



STM32H7B0 is the value line of the STM32H7A3/B3 family.



STM32H750 is the value line of the STM32H742/43/45/55 family.



Pick the right STM32H7 development tool



STM32H7 class	Cores/Speed	Part numbers	Evaluation boards	Discovery Kits	Nucleo boards
STM32H74/5	Single Core 480 MHz	STM32H743	STM32H743I-EVAL2	-	NUCLEO-H743ZI2
		STM32H753, Crypto enabled	STM32H753I-EVAL2	-	NUCLEO-H753ZI
		STM32H750 Value Line, Crypto enabled	-	STM32H750B-DK	-
	Dual Core 480MHz + 240MHz	STM32H745	-	STM32H745I-DISCO	NUCLEO-H745ZI-Q
		STM32H747	STM32H747I-EVAL	STM32H747I-DISCO STM32H747I-DISC1	-
		STM32H755/757, Crypto enabled	STM32H757I-EVAL	-	NUCLEO-H755ZI-Q
STM32H7A/B	Single Core 280 MHz	STM32H7A3	-	-	NUCLEO-H7A3ZI-Q
		STM32H7B3, Crypto enabled	STM32H7B3I-EVAL	STM32H7B3I-DK	-
		STM32H7B0, Value line, Crypto enabled	STM32H7B3I-EVAL *	STM32H7B3I-DK *	-
STM32H72/3	Single Core 550MHz	STM32H723/733	-	-	NUCLEO-H723ZG
		STM32H725/735	-	STM32H735G-DK	-
		STM32H730, Value line, Crypto enabled	-	STM32H735G-DK *	-

* Recommended board (no dedicated board for this part number)



The STM32H7 family benefits from the software and hardware tools available for STM32 microcontrollers. A wide range of development boards is proposed to map all features and variants



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