STM32H7 series
Powered by
Arm® Cortex®-M7 & -M4
releasing your creativity

STM32

STM32H7
high performance

High-performance MCUs with Arm® Cortex®-M7 core and Arm® Cortex®-M4

The STM32H7 series offer the performance of the Arm® Cortex®-M7 core running up to 550 MHz and add a 240 MHz Arm® Cortex®-M4 core in dual-core lines. Combined with a smart architecture based on a multi-power domain, developers can always use the best configuration to optimize data transfers and CPU load while minding the power budget.

With its embedded hardware accelerators and its extensive digital and analog peripherals, the feature-rich STM32H7 is ideal for industrial environments where fast reaction time is essential. The HMI components (graphic and audio support) allow the device to provide an outstanding user-experience.

CORE, MEMORIES AND ACCELERATION
- Arm® Cortex®-M7 core up to 480 MHz and Arm® Cortex®-M4* core up to 240 MHz in dual core variants
- Arm® Cortex®-M7 core up to 550 MHz in single core variants
- Up to 32 KB + 32 KB I/D L1 Cache
- Double-precision FPU
- 4 x DMA controllers
- 128 KB up to 2 MB dual bank Flash and up to 1.4 MB RAM

Note: * only in STM32H745, STM32H755, STM32H747 and STM32H757

CONNECTIVITY
- Up to 2 x USB 2.0 OTG FS/HS
- USART, UART, SPI, and I²C
- 2 x CAN (1 x FD and 1 x TT/FD)
- Ethernet MAC
- FMC, Quad-SPI and Dual Octal-SPI
- 2 x SDMMC

AUDIO
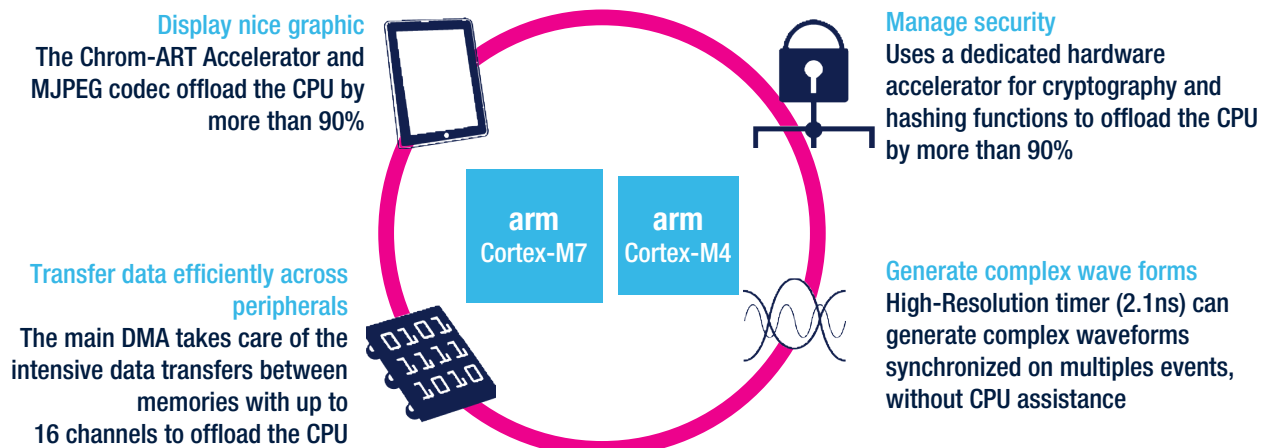- 3 x I²S + audio PLL
- 4 x SAI
- 2 x 12-bit DAC
- SPDIF-RX

GRAPHICS
- LCD TFT controller
- JPEG Codec
- Chrom-ART Accelerator™
- Chrom-GRC™

OTHER
- Optional crypto
- DFSDM
- 16- and 32-bit timers
- Up to 3× ADCs with 16-bit max. resolution (up to 3.6 MSPS)
- 1 x ADC with 12-bit max. resolution (up to 5 MSPS)
- Analog (comp, AOP)
- Power supply 1.7V to 3.6V down to 1.62V in regulator bypass mode
- Up to 140 °C supported as maximum junction temperature

Two powerful cores supported by a robust architecture

Display nice graphic
The Chrom-ART Accelerator and MJPEG codec offload the CPU by more than 90%

Manage security
Uses a dedicated hardware accelerator for cryptography and hashing functions to offload the CPU by more than 90%

Transfer data efficiently across peripherals
The main DMA takes care of the intensive data transfers between memories with up to 16 channels to offload the CPU

Generate complex wave forms
High-Resolution timer (2.1ns) can generate complex waveforms synchronized on multiples events, without CPU assistance

arm Cortex-M7   arm Cortex-M4

UP TO SEVEN LINES FOR MORE VERSATILITY

CORE, MEMORIES AND ACCELERATION	Product line	f_{CPU} (MHz)	Dual-Bank Flash memory (bytes)	RAM (bytes)	OctoSPI & OTFDEC[3]	Ethernet	Graphic	Power supply	Stop mode (typical) / RAM retention
• Single-core Cortex-M7 up to 550 MHz	**Dual-core lines**								
• 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 H723/733/725/735/730)	**STM32H747/757**[1]	480 + 240	Up to 2 Mbytes	1 Mbyte (incl.128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup[1]) + 4 Kbytes backup[2]		•	TFT-LCD JPEG codec MIPI-DSI	SMPS + LDO	360 µA / 1MB 250 µA / 768KB
	STM32H745/755[1]	480 + 240	Up to 2 Mbytes	1 Mbyte (incl.128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup[1]) + 4 Kbytes backup[2]		•	TFT-LCD JPEG codec	SMPS + LDO	360 µA / 1MB 250 µA / 768KB
	Single-core lines								
CONNECTIVITY • Up to 2 x USB2.0 OTG FS/HS • 2 x SDMMC • USART, UART, SPI, I²C • Up to 3 x CAN (2 x FD and 1 x TT) • HDMI-CEC • FMC, Dual-mode Quad-SPI or 2 x Octo-SPI • Camera I/F	**STM32H7A3/7B3**[1]	280	Up to 2 Mbytes	1,4MB (incl.128K DTCM, 64K ITCM, 1184K+SRAM, 4K backup)	•		TFT-LCD JPEG codec Chrom-GRC	SMPS + LDO	32 µA / 1.4MB 28 µA / 32KB
	STM32H743/753[1]	480	Up to 2 Mbytes	1 Mbyte (incl.128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup[1]) + 4 Kbytes backup[2]		•	TFT-LCD JPEG codec	LDO	1270 µA / 1MB 910 µA / 768KB
AUDIO • 3 x I²S + audio PLL • 4 x SAI • 2 x 12-bit DAC • SPDIF-RX	**STM32H742**	480	Up to 2 Mbytes	692 Kbytes (incl.128 Kbytes DTCM + 64 Kbytes ITCM + 16 Kbytes backup[1]) + 4 Kbytes backup[2]		•		LDO	1270 µA / 692KB 910 µA / 704KB
GRAPHIC • Chrom-ART Accelerator™	**STM32H725/735**[3]	550	Up to 1 Mbyte	564KB (incl.128K DTCM, 432KB Syst + 4K bckup)	•	•	TFT-LCD	SMPS[5] + LDO	200 µA / 564KB
OTHER • Crypto/Hash option (except H742)[1] • Security services option (except H742)	**STM32H723/733**[3]	550	Up to 1 Mbyte	564KB (incl.128K DTCM, 432KB Syst + 4K bckup)	•	•	TFT-LCD	LDO	520 µA / 564KB
	Value line								
• TRNG • DFSDM • 16- and 32-bit timers • HRTimer (except STM32H7A/H7B/H7B0/H723/H725/H730/H733/H735)	**STM32H7B0**	280	128 Kbytes	1,4MB (incl.128K DTCM, 64K ITCM, 1184K+SRAM, 4K backup)	•		TFT-LCD JPEG codec Chrom-GRC	SMPS + LDO	32 µA / 1.4MB 28 µA / 32KB
• Up to 3 x 16-bit ADC (up to 3.6 MSPS) • Analog (compt,AOP) • Voltage range 1.62 to 3.6 V (except 100-pin and VFQFPN68 packages : 1.71 to 3.6 V)	**STM32H750**	480	128 Kbytes	1 Mbyte (incl.128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup[1]) + 4 Kbytes backup[2]		•	TFT-LCD JPEG codec	LDO	1270 µA / 1MB 910 µA / 768KB
• Multi-power domains • -40°C up to 105°C ambiant • -40°C up to 125°C ambiant[2]	**STM32H730**	550	128 Kbytes	564KB (incl.128K DTCM, 432KB Syst + 4K bckup)	•	•	TFT-LCD	SMPS[4] + LDO	200 µA / 564KB 520 µA / 564KB

Notes :
1. Optional - dedicated CPN, STM32H733, STM32H735, STM32H753, STM32H755, STM32H757, STM32H7B3 for the Crypto Variants
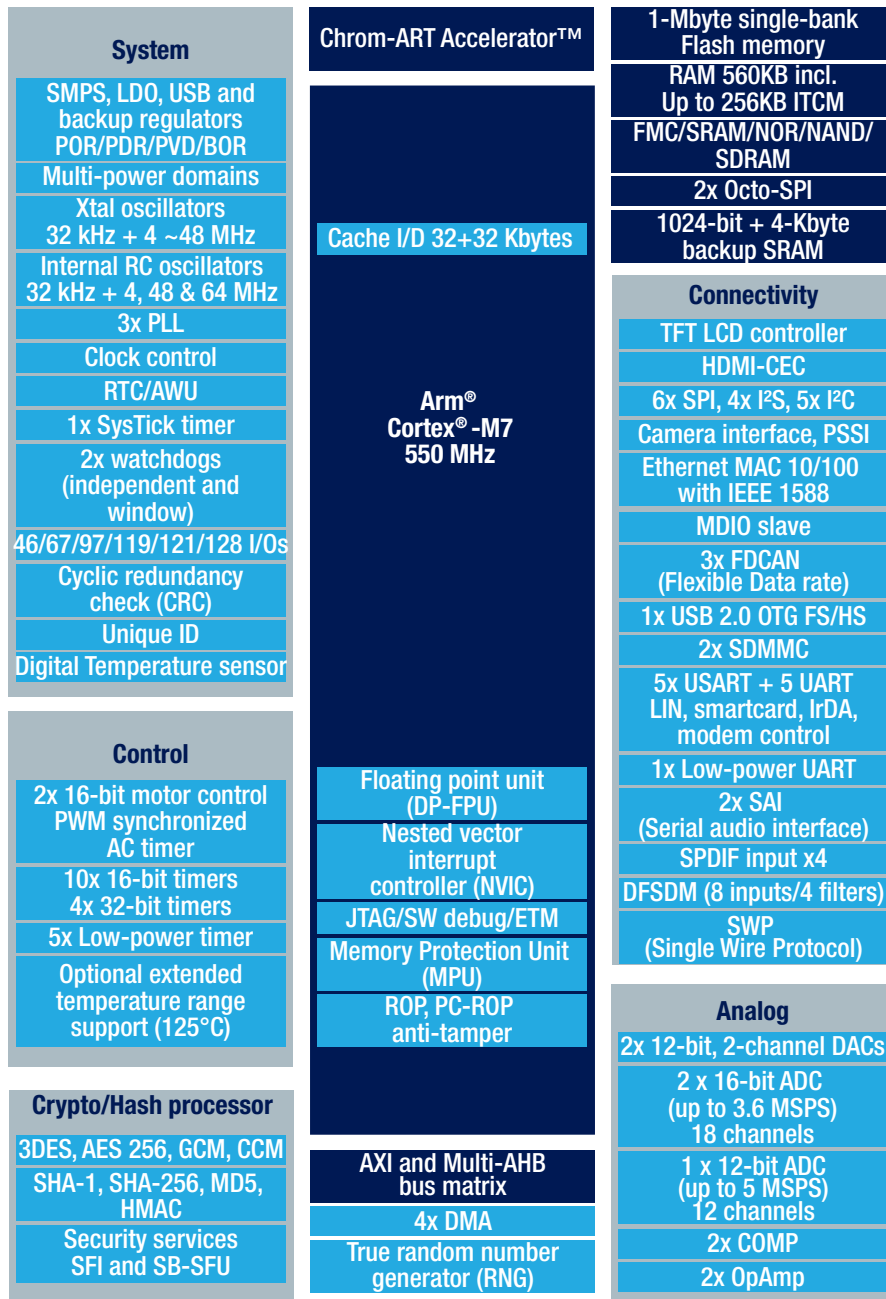2. 125 °C ambiant / 140 °C junction. Dedicated part numbers on STM32H725/H735, STM32H745/H755
3. Crypto and Security services on CPN : STM32H733, STM32H735 and STM32H730
4. SMPS available only on STM32H730Q CPN
5. SMPS only on the QFN68 variant (no LDO)

STM32H735 BLOCK DIAGRAM

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

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)

Crypto/Hash processor

3DES, AES 256, GCM, CCM
SHA-1, SHA-256, MD5, HMAC
Security services SFI and SB-SFU

Chrom-ART Accelerator™

Cache I/D 32+32 Kbytes

Arm® Cortex® -M7 550 MHz

Floating point unit (DP-FPU)

Nested vector interrupt controller (NVIC)

JTAG/SW debug/ETM

Memory Protection Unit (MPU)

ROP, PC-ROP anti-tamper

AXI and Multi-AHB bus matrix

4x DMA

True random number generator (RNG)

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

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 FDCAN (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)

Analog

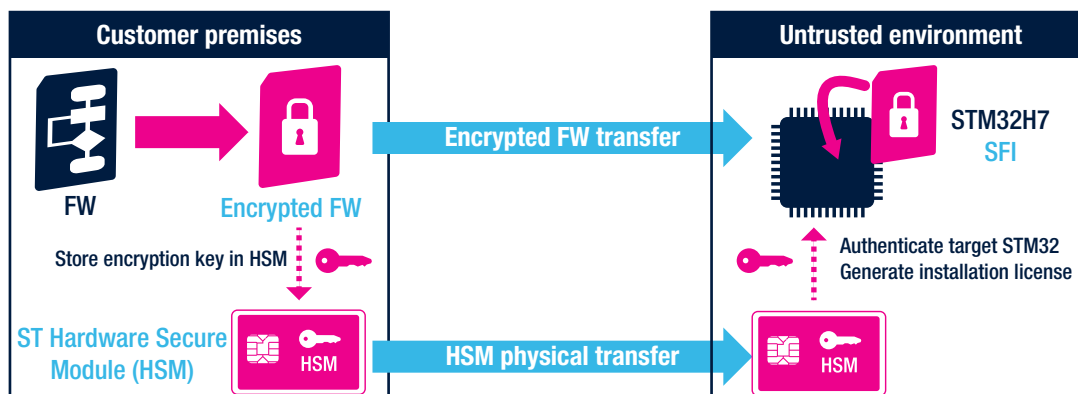| |
|---|
| 2x 12-bit, 2-channel DACs |
| 2 x 16-bit ADC (up to 3.6 MSPS) 18 channels |
| 1 x 12-bit ADC (up to 5 MSPS) 12 channels |
| 2x COMP |
| 2x OpAmp |

The STM32Trust ecosystem combines knowledge, design tools, and ready-to-use original ST software to build strong cyber-protection into new IoT devices, leveraging industry best-practices.
www.st.com/stm32trust

STM32 Trust

Secure your production flow with Secure Firmware Install (SFI*)

Manage STM32 authentication, firmware decryption and installation

Customer premises

FW → Encrypted FW

Store encryption key in HSM

ST Hardware Secure Module (HSM)

Encrypted FW transfer →

HSM physical transfer →

Untrusted environment

STM32H7 SFI

Authenticate target STM32 Generate installation license

Note: *optional – SFI service available on specific part numbers

STM32H7
ecosystem

HARDWARE TOOLS
www.st.com/stm32hardwaretools

Part numbers		Product Line	Core	SMPS	Crypto-HASH	Display	Ethernet	NOR Serial Flash (Mbits)	SDRAM (Mbits)	HyperRAM™	SRAM (Mbits)	NOR (Mbits)	eMMC (Gbytes)	SDCard (Bbytes)
Nucleo-144 boards														
	NUCLEO-H723ZG	General-purpose	1	-	No	No	Yes	No	-	-	-	-	-	-
	NUCLEO-H743ZI2	General-purpose	1	-	No	No	Yes	No	-	-	-	-	-	-
	NUCLEO-H745ZI-Q	Industrial	2	Internal	No	No	Yes	No	-	-	-	-	-	-
	NUCLEO-H753ZI	General-purpose	1	-	Yes	No	Yes	No	-	-	-	-	-	-
	NUCLEO-H755ZI-Q	Industrial	2	Internal	Yes	No	Yes	No	-	-	-	-	-	-
	NUCLEO-H7A3ZI-Q	General-purpose	1	Internal	Yes	No	No	No	-	-	-	-	-	-
Discovery kits														
	STM32H735G-DK	Industrial	1	Internal	Yes	4.3" RGB	Yes	1 x 512 Mb Octo-SPI	-	128 Mb	-	-	-	-
	STM32H745I-DISCO	Industrial	2	Internal	No	4.3" RGB	Yes	2 x 512 Mb Quad-SPI	128 Mb	-	-	-	4 GB	-
	STM32H747I-DISCO	Graphic	2	Internal	No	4" DSI	Yes	2 x 512 Mb Quad-SPI	256 Mb	-	-	-	-	-
	STM32H747I-DISC1	Graphic	2	Internal	No	No	Yes	2 x 512 Mb Quad-SPI	256 Mb	-	-	-	-	-
	STM32H750B-DK	Value	1	-	Yes	4.3" RGB	Yes	2 x 512 Mb Quad-SPI	128 Mb	-	-	-	4 GB	-
	STM32H7B3I-DK	Graphic	1	Internal	Yes	4.3" RGB	No	1 x 512 Mb Octo-SPI	128 Mb	-	-	-	-	-
Evaluation boards														
	STM32H743I-EVAL2	General-purpose	1	-	No	5.7" RGB	Yes	2 x 512 Mb Quad-SPI	256 Mb	-	16 Mb	128 Mb	-	8 GB
	STM32H753I-EVAL2	General-purpose	1	-	Yes	5.7" RGB	Yes	2 x 512 Mb Quad-SPI	256 Mb	-	16 Mb	128 Mb	-	8 GB
	STM32H747I-EVAL	Graphic	2	Internal	No	4" DSI	Yes	2 x 512 Mb Quad-SPI	256 Mb	-	16 Mb	128 Mb	-	8 GB
	STM32H757I-EVAL	Graphic	2	Internal	Yes	4" DSI	Yes	2 x 512 Mb Quad-SPI	256 Mb	-	16 Mb	128 Mb	-	8 GB
	STM32H7B3I-EVAL	Graphic	1	Internal	Yes	7" RGB	No	1 x 512 Mb Octo-SPI	256 Mb	-	16 Mb	128 Mb	-	-

SOFTWARE TOOLS

www.st.com/stm32softwaretools

STM32CubeMX

Windows

macOS®

IDEs

arm KEIL   SysProgs   IAR SYSTEMS   SEGGER

TASKING   RAISONANCE   EMPROG

aC6   ARDUINO   iSYSTEM

STM32 CubeIDE   arm MBED

Free IDE

Note:
- Arm Keil, IAR-EWARM, STM32CubeIDE and aC6 support multi-core debugging

STM32CubeProgrammer
STM32CubeMonitor

STM32 CubeProgrammer

STM32 CubeMonitor

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Configure and generate code   Compile and debug   Monitor & program

EMBEDDED SOFTWARE

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Customers Applications		
STM32Cube embedded software		
STM32Cube Expansion Packages from ST		STM32Cube Expansion Packages from Partners

STM32 Cube

Connect   Secure   Process   Move/Actuate

Sense   Convert   Power-up

embOS

CANopen

STM32Cube MCU Packages

STM32Cube MCU Middleware

free RTOS   TCP /IP   (USB)   (hub)   (touch)   802.15.4

STM32Cube HAL & LL drivers

Arm® Cortex®-M
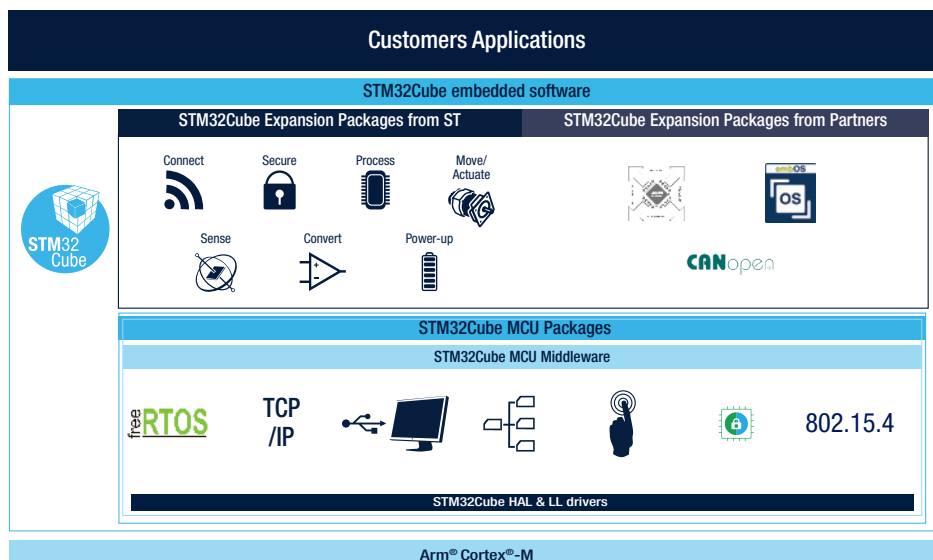
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