

# STM32F7 series

## ARM® Cortex®-M7 powered

### Releasing your creativity





# STM32<sup>®</sup> high performance

## Very high performance 32-bit MCU with DSP and FPU

The STM32F7 with its ARM<sup>®</sup> Cortex<sup>®</sup>-M7 core is the smartest MCU and has the best performance of the 32-bit STM32 family.

### PERFORMANCE

The STM32F7 delivers 1082 CoreMark/462 DMIPS executing from embedded Flash thanks to the ST ART Accelerator<sup>™</sup> at 216 MHz and up to twice the DSP performance, without compromising on power efficiency. External memory can be used with no performance penalty thanks to the L1 cache (up to I/D 16KB+16KB). Fully pin-to-pin and code compatible with the STM32F4 and the STM32 ecosystem.

**Benefits:** Allows creation of more responsive, innovative applications, running on either on-chip or off-chip memories. Easy upgrade for existing designs based on STM32F4.



### SMART ARCHITECTURE WITH NEW PERIPHERAL SET

The STM32F7 optimizes the system performance by combining brand-new peripherals around the Cortex-M7, with a superior interconnect architecture with AXI and multi AHB bus matrix, multiple DMA and the Chrom-ART Accelerator<sup>™</sup> hardware.

**Benefits:** Concurrent, high-speed data transfers between bus masters and slaves without loading the CPU.

### Large SRAM with overloading architecture

- Up to 512 Kbytes including 128 Kbytes of Data TCM RAM
- 16 Kbytes of instruction TCM RAM
- 4 Kbytes of backup SRAM

**Benefits:** Support for large data buffers, critical real-time data routines and backup.

### New peripheral sets

- Two SAI (with SPDIF output support), three I<sup>2</sup>S half-duplex and SPDIF input  
**Benefit:** Multiple audio channel input and output support.
- 2x USB OTG with dedicated power supply  
**Benefit:** Enables USB communication even when the MCU is powered at 1.8 V.
- Dual QuadSPI interface:  
**Benefit:** Connect cost-effective memories with only 1, 4 or 8 data pins.
- On-Chip USB High Speed Phy (on some variants):  
**Benefit:** More integration on high-speed USB communication

### POWER EFFICIENT

- Up to 6 CoreMark/mW at 1.8 V
- 130  $\mu$ A typical in Stop mode with all SRAM saved

**Benefit:** Put more innovation and creativity in power-constrained applications.



LQFP64	10 x 10 x 1.4 mm
LQFP100	14 x 14 x 1.4 mm
LQFP144	20 x 20 x 1.4 mm
LQFP176	24 x 24 x 1.4 mm
LQFP208	28 x 28 x 1.4 mm




UFPGA144	7 x 7 x 0.6 mm (pitch 0.5)
UFPGA176	10 x 10 x 0.6 mm (pitch 0.65)
TFPGA216	3 x 13 x 1.2 mm (pitch 0.8)



WLCSP100	< 4.3 x 4.7 mm
WLCSP143	< 5.9 x 4.6 mm
WLCSP180	< 6.2 x 5.6 mm

## UP TO SIX LINES FOR MORE PERFORMANCE

ARM® Cortex®-M7 – 216 MHz

<div>ACCELERATION</div> <ul style="list-style-type: none"><li>ART Accelerator™</li><li>L1 cache: data and instruction cache</li><li>Chrom-ART Accelerator™ (except. STM32F7x3/F7x2)</li><li>Floating Point Unit</li></ul> <div>CONNECTIVITY</div> <ul style="list-style-type: none"><li>2 x USB2.0 OTG FS/HS</li><li>SDIO (x2 on F76x &amp; F779)</li><li>USART, UART, SPI, I²C</li><li>CAN2.0</li><li>HDMI-CEC</li><li>Ethernet IEEE 1588 (except. STM32F7x3/F7x2)</li><li>FMC</li><li>MDIO slave (on F76x and F77x)</li><li>Camera I/F (except. STM32F7x3/F7x2)</li><li>Dual mode Quad-SPI</li></ul> <div>AUDIO</div> <ul style="list-style-type: none"><li>I²S + audio PLL</li><li>2 x SAI</li><li>2 x 12-bit DAC</li><li>SPDIF-RX</li></ul> <div>OTHER</div> <ul style="list-style-type: none"><li>16- and 32-bit timers</li><li>3 x 12-bit ADC 2.4 MSPS</li><li>Low voltage supply: 1.7 to 3.6 V</li><li>85 °C and 105 °C ranges</li></ul>		F <sub>CPU</sub> (MHz)	L1 cache (I/D)	FPU	Flash (bytes)	RAM (KB) + 16K ITCM + 4K backup	JPEG codec	CAN	DF SDM	TFT LCD controller	MPI®-DSI	
	Advanced lines											
	STM32F7x9 <sup>2</sup> STM32F7x8 <sup>1</sup>		216	16K+16K	Double Precision	1M to 2M (RWW)	512K (incl.128K DTCM)	•	3	•	•	•
	STM32F7x7 <sup>2</sup>		216	16K+16K	Double Precision	1M to 2M (RWW)		•	3	•	•	•
	STM32F7x6 <sup>2</sup>		216	4K+4K	Single Precision	512K to 1M	320K (incl.64K DTCM)		2		•	
	STM32F7x5	765	216	16K+16K	Double Precision	1M to 2M (RWW)	512K (incl.128K DTCM)		3	•		
		745	216	4K+4K	Single Precision	512K to 1M	320K (incl.64K DTCM)		2			
	Foundation lines											
	Product lines		F <sub>CPU</sub> (MHz)	L1 cache (I/D)	FPU	Flash (bytes)	RAM (KB) + 16K ITCM + 4K backup	JPEG codec	CAN	DF SDM	PC-RDP (protected code execution)	USB HS PHY
	STM32F7x3 <sup>2</sup>		216	8K+8K	Single Precision	256K to 512K	256K (incl.64K DTCM)		1		•	•
	STM32F7x2 <sup>2</sup>		216	8K+8K	Single Precision	256K to 512K			1		•	

Notes: <sup>1</sup> Voltage Regulator Off mode available for WLCSP180 package (STM32F778AIY6TR)

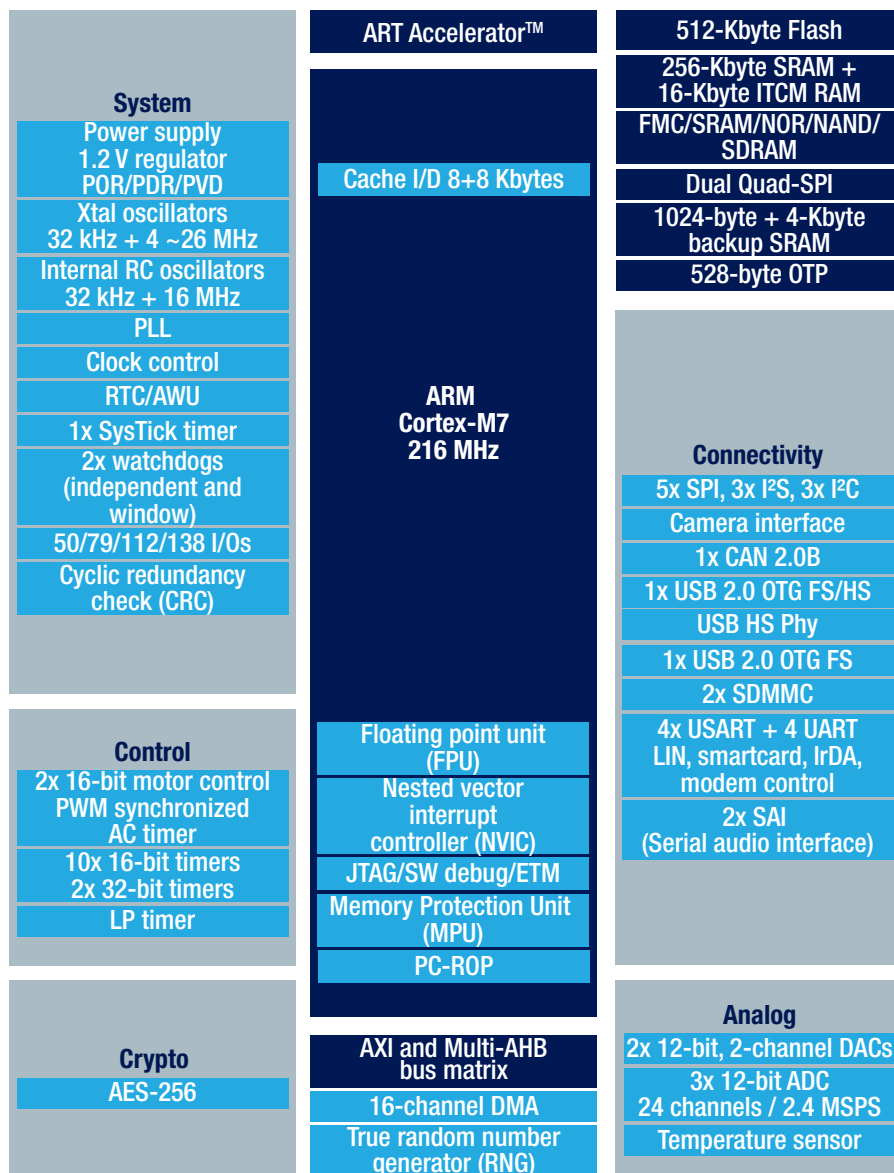
<sup>2</sup> Only STM32F332, STM32F333, STM32F756, STM32F777 and STM32F779 include HW crypto/hash functions



## STM32F733 BLOCK DIAGRAM



## STM32F779 BLOCK DIAGRAM



## STM32F7 ON-LINE TRAINING

[www.st.com/stm32f7-online-training](http://www.st.com/stm32f7-online-training)



## ST MCU FINDER

Free Android application to find the right STM32 MCU.

[www.st.com/stmcfinder](http://www.st.com/stmcfinder)

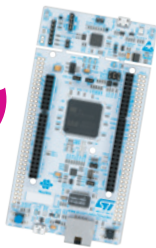


# STM32F7 ECOSYSTEM

## Hardware tools

[www.st.com/stm32hardwaretools](http://www.st.com/stm32hardwaretools)

### STM32 Nucleo board

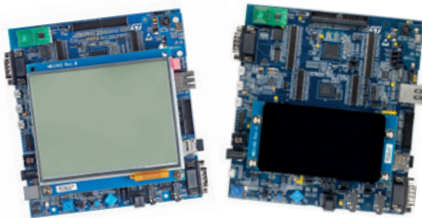


#### Flexible prototyping

NUCLEO-F746G  
NUCLEO-F767ZI  
NUCLEO-F722ZE\*

Note: \* Available in Q1/2017

### Evaluation board



### Discovery kit



#### Creative demos

STM32F746G-DISCO  
STM32F723E-DISCO\*  
STM32F769I-DISCO  
STM32F769I-DISC1

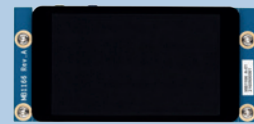
#### Full-feature evaluation

STM32746G-EVAL2  
STM32F769I-EVAL

#### Hardware Crypto/Hash devices

STM32756G-EVAL2  
STM32F779I-EVAL

### STM32F769 Discovery Kit Accessories



#### B-LCD40-DSI1\*

4" WVGA TFT LCD with MIPI-DSI interface and capacitive touch

Notes: \* for STM32F769I-DISC1 only



#### B-LCDAD-RPI1

15-pin single-row flexible printed circuit DSI adapter board



#### B-LCDAD-HDMI1

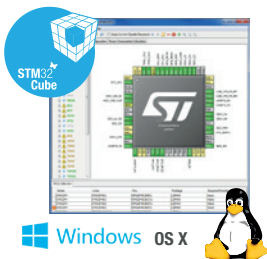
DSI to HDMI adapter

Note: on STM32F769 Discovery kits use the dual-row 8-way connector to host a 3rd-party Wi-Fi module available on the market

## Software tools

[www.st.com/stm32softwaretools](http://www.st.com/stm32softwaretools)

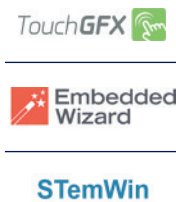
### STM32CubeMX



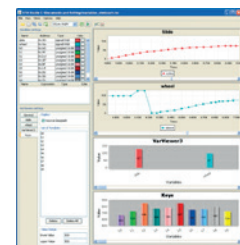
### Partner IDEs



### GUI solutions



### STMStudio



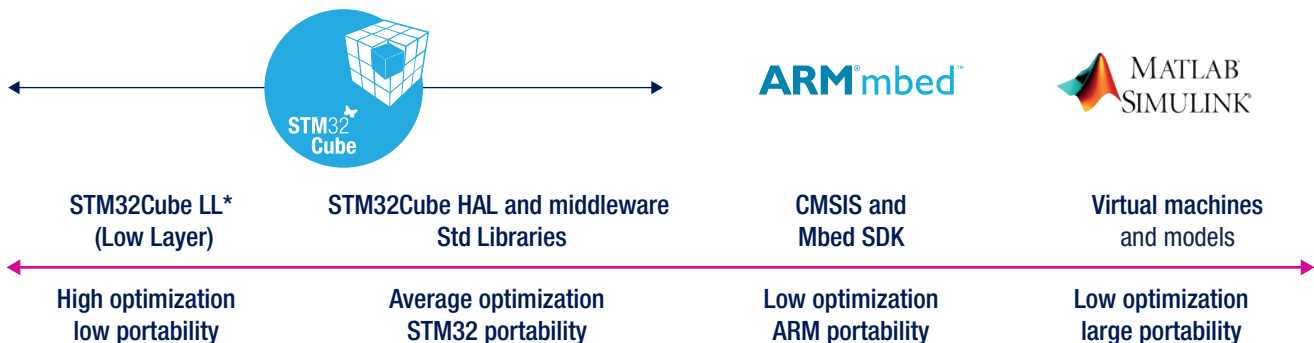
Configure and generate code

Compile and debug

Monitor

## Embedded Software

[www.st.com/stm32embeddedsoftware](http://www.st.com/stm32embeddedsoftware)



Note: \* Available in Q1/2017



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