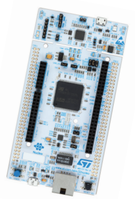
STM32F7 Ecosystem

HARDWARE TOOLS

www.st.com/stm32hardwaretools

STM32 Nucleo boards



The highly affordable STM32 144-pin Nucleo boards allow anyone to try out new ideas and to quickly create prototypes with any STM32 MCU.

Flexible prototyping

NUCLEO-F746ZG	NUCLEO-F722ZE
NUCLEO-F756ZG*	NUCLEO-F767ZI

Note: * Hardware crypto/Hash device

Discovery kits

Creative demos

STM32F746G-DISCO	STM32F769I-DISCO
STM32F723E-DISCO	STM32F769I-DISC1

STM32F769 Discovery Kit accessories

B-LCD40-DSI1*
4" WVGA TFT LCD with MIPI-DSI interface and capacitive touch

Note: * for STM32F769I-DISC1 only

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

B-LCDAD-RPI1
15-pin single-row flexible printed circuit DSI adapter board

Evaluation boards

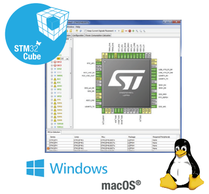
The STM32 eval boards have been designed as a complete demonstration and development platform for the Arm® Cortex STM32 MCUs.

Full-feature evaluation	Hardware Crypto/Hash devices
STM32746G-EVAL2	STM32756G-EVAL2
STM32F769I-EVAL	STM32F779I-EVAL

SOFTWARE TOOLS

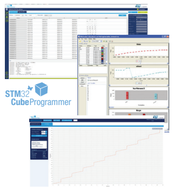
www.st.com/stm32softwaretools

STM32CubeMX



Partner IDEs

STM32CubeMonitor-Power STMStudio



Configure and generate code | Compile and debug | Monitor & Program

EMBEDDED SOFTWARE

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MATLAB SIMULINK

STM32Cube LL (low-layer APIs)	STM32Cube HAL and middleware STM32 Std Peripherals Libraries	CMSIS and mbed SDK	Virtual machines and models
High optimization low portability	Average optimization STM32 portability	Low optimization Arm portability	Low optimization large portability

ST COMMUNITY

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STM32F7 series
Arm® Cortex®-M7 powered
Releasing your creativity

STM32 F7

STM32F7 high performance

32-bit MCU with DSP and FPU

The STM32F7 with its ARM® Cortex®-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™ 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.

POWER EFFICIENT

- Up to 6 CoreMark/mW at 1.8 V
- 100 µA 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
UFBGA144	7 x 7 x 0.6 mm (pitch 0.5)
UFBGA176	10 x 10 x 0.6 mm (pitch 0.65)
TFBGA216	13 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

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™ 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 I²S 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 efficiency

- Up to 125°C supported as maximum junction temperature
  Benefit: leverage the full core and peripherals performance even when ambient temperature increases.

UP TO SEVEN LINES FOR MORE PERFORMANCE

Arm® Cortex®-M7 – 216 MHz

ACCELERATION
- ART Accelerator™
- L1 cache: data and instruction cache
- Chrom-ART Accelerator™ (except. STM32F7x3/F7x2/F730)
- Floating Point Unit

CONNECTIVITY
- 2 x USB2.0 OTG FS/HS
- SDMMC (x2 on F72x, F73x, F76x & F77x)
- USART, UART, SPI, I²C
- CAN2.0
- HDMI-CEC
- Ethernet IEEE 1588 (except. STM32F7x3/F7x2)
- FMC
- MDIO slave (on F76x and F77x)
- Camera I/F (except. STM32F7x3/F7x2/F730)
- Dual mode Quad-SPI

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

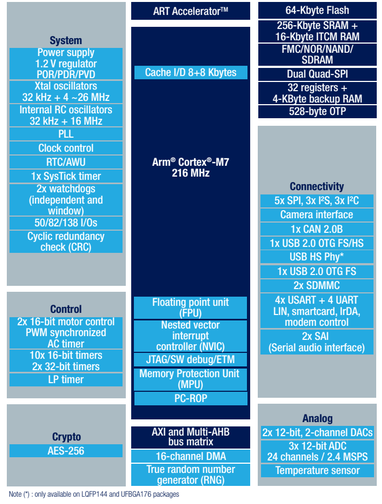
OTHER
- 16- and 32-bit timers
- 3 x 12-bit ADC 2.4 MSPS
- Low voltage supply: 1.7 to 3.6 V
- 85 °C and 105 °C ranges
- Up to 125°C supported as maximum junction temperature
- AES/TDES Crypto and HASH hardware acceleration[2]

Product		F_{CPU} (MHz)	L1 cache (I/D)	FPU	Flash (bytes)	RAM (KB) + 16K ITCM + 4K backup	JPEG codec	CAN	DF-SDM	TFT LCD controller	MIPI®-DSI
Advanced lines											
STM32F7x9[2] STM32F7x8[1]		216	16K+16K	Double Precision	1M to 2M (RWW)	512K (incl.128K DTCM)	•	3	•	•	•
STM32F7x7[2]		216	16K+16K	Double Precision	1M to 2M (RWW)		•	3	•	•	
STM32F7x6[2]		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_{CPU} (MHz)	L1 cache (I/D)	FPU	Flash (bytes)	RAM (KB) + 16K ITCM + 4K backup	CAN		PC-ROP	TFT LCD controller	USB HS PHY
STM32F7x3[1]		216	8K+8K	Single Precision	256K to 512K	256K (incl.64K DTCM)	1		•		•
STM32F7x2[1]		216	8K+8K	Single Precision	256K to 512K		1		•		
Value lines											
STM32F7x0	730	216	8K+8K	Single Precision	64K	256K (incl.64K DTCM)	1		•		•
	750	216	4K+4K	Single Precision	64K	320K (incl.64K DTCM)	2			•	

Notes: 1. Voltage Regulator Off mode available for WLCSP180 package (STM32F778AIY6TR)
2. Only STM32F730, STM32F750, STM32F732, STM32F733, STM32F756, STM32F777 and STM32F779 include HW crypto/hash functions

STM32F779 BLOCK DIAGRAM

STM32F750 VALUE LINE BLOCK DIAGRAM



Note (*) : only available on LQFP144 and UFBGA176 packages

STM32F7 ON-LINE TRAINING

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