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-F756ZG* NUCLEO-F722ZE NUCLEO-F767ZI

Note: * Hardware crypto/Hash device

Discovery kits



Creative demos

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

STM32F769 Discovery Kit accessories



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





DSI to HDMI adapter

B-LCDAD-HDMI1

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



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 STM32746G-EVAL2 STM32F769I-EVAL

Hardware Crypto/Hash devices STM32756G-EVAL2 STM32F779I-EVAL

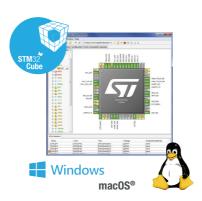
SOFTWARE TOOLS

www.st.com/stm32softwaretools

STM32CubeMX



STM32CubeMonitor-Power **STMStudio**







Configure and generate code

Compile and debug

Monitor & Program

EMBEDDED SOFTWARE

www.st.com/stm32embeddedsoftware

STM32Cube LL

(low-layer APIs)

High optimization

low portability



STM32Cube HAL and middleware STM32 Std Peripherals Libraries

Average optimization

STM32 portability

CMSIS and mbed SDK

Low optimization Arm portability

Low optimization large portability

MATLAB SIMULINK

Virtual machines

and models

Order code: BRSTM32F70718

ST COMMUNITY

Ask, learn, share, discuss, become famous and engage with the community of STM32



Bring your STM32 project to life with the ee educational and training resources on

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STM32F7 series

Arm® Cortex®-M7 powered Releasing your creativity

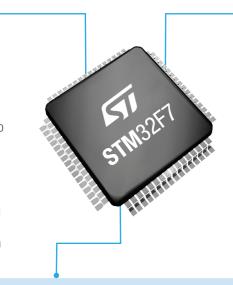


For more information on ST products and solutions, visit www.st.com/stm32f7

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

ACCELERATION • ART Accelerator™ • L1 cache: data and	STM32 F7		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
instruction cache	Advanced lines											
Chrom-ART Accelerator™ (except. STM32F7x3/F7x2/ F730) Floating Point Unit	STM32F7x9 ² STM32F7x8 ¹		216	16K+16K	Double Precision	1M to 2M (RWW)	512K	•	3	•	•	•
CONNECTIVITY • 2 x USB2.0 OTG FS/HS • SDMMC (x2 on F72x, F73x,	STM32F7x7 ²		216	16K+16K	Double Precision	1M to 2M (RWW)	(incl.128K DTCM)	•	3	•	•	
F76x & F77x) • USART, UART, SPI, I ² C • CAN2.0 • HDMI-CEC • Ethernet IEEE 1588 (except.	STM32F7x6 ²		216	4K+4K	Single Precision	512K to 1M	320K (incl.64K DTCM)		2		•	
9 STM32F7x3/F7x2) - FMC - MDIO slave	STM32F7x5	765	216	16K+16K	Double Precision	1M to 2M (RWW)	512K (incl.128K DTCM)		3	•		
Camera I/F (except. STM32F7x3/F7x2/F730) Dual mode Quad-SPI	31W32F7X5	745	216	4K+4K	Single Precision	512K to 1M	320K (incl.64K DTCM)		2			
AUDIO • PS + audio PLL					For	undation li	200					
 1°S + audio PLL 2 x SAI 2 x 12-bit DAC SPDIF-RX 	Product lines		F _{CPU} (MHz)	L1 cache (I/D)	FPU	Flash (bytes)	RAM (KB) + 16K ITCM + 4K backup	C.	\N	PC- ROP	TFT LCD controller	USB HS PHY
OTHER	STM32F7x3°		216	8K+8K	Single	256K to			1	•		
16- and 32-bit timers3 x 12-bit ADC 2.4 MSPSLow voltage supply:	STM32F7x3		216	8K+8K	Precision Single Precision	512K 256K to 512K	256K (incl.64K DTCM)	1		•		
1.7 to 3.6 V						Value lines						
 85 °C and 105 °C ranges Up to 125 °C supported as maximum junction temperature 		730	216	8K+8K	Single Precision	64K	256K (incl.64K DTCM)	1	I	•		•
AES/TDES Crypto and HASH hardware acceleration ²	STM32F7x0	750	216	4K+4K	Single Precision	64K	320K (incl.64K DTCM)	2	2		•	

Notes: 1. Voltage Regulator Off mode available for WLCSP180 package (STM32F778AlY6TR)

2. Only STM32F730, STM32F750, STM32F732, STM32F733, STM32F756, STM32F777 and STM32F779 include HW crypto/hash functions

STM32F779 BLOCK DIAGRAM

	Chrom-ART Accelerator™	2-Mbyte dual
	JPEG Codec Acceleration	bank Flash
System	ART Accelerator™	512-Kbyte SRAM + 16-Kbyte ITCM RAM
Power supply		FMC/SRAM/NOR/NAND
1.2 V regulator		SDRAM
POR/PDR/PVD		Dual Quad-SPI
Xtal oscillators		32 registers +
32 kHz + 4 ~26 MHz	Cache I/D 16+16 Kbytes	4-KByte backup RAM
Internal RC oscillators 32 kHz + 16 MHz		1024-byte OTP
32 KHZ + 10 WHZ		·
Clock control		Connectivity
RTC/AWU	A @ O . I . @ M.	TFT LCD controller MIPI®-DSI
1x SysTick timer	Arm® Cortex®-M7 216 MHz	HDMI-CEC
2x watchdogs	210 11112	6x SPI, 3x I ² S, 4x I ² C
(independent and		Camera interface
window)		Ethernet MAC 10/100
82/114/140/168 I/Os		with IEEE 1588
Cyclic redundancy check (CRC)		MDIO slave
SHOOK (SHO)		3x CAN 2.0B
		1x USB 2.0 OTG FS/HS
		1x USB 2.0 OTG FS
	Floating point unit	2x SDMMC
Control	(FPU)	4x USART + 4 UART
2x 16-bit motor control	Nested vector	LIN, smartcard, IrDA,
PWM synchronized AC timer	interrupt	modem control
10x 16-bit timers	controller (NVIC)	2x SAI
2x 32-bit timers	JTAG/SW debug/ETM	(Serial audio interface
LP timer	Memory Protection Unit	SPDIF input x4
2	(MPU)	DFSDM
Curuto/Hook processor		Analog
Crypto/Hash processor 3DES, AES 256, GCM, CCM	AXI and Multi-AHB	2x 12-bit, 2-channel DA
	bus matrix	3x 12-bit ADC
SHA-1, SHA-256, MD5, HMAC	16-channel DMA	24 channels / 2.4 MSF
HIVIAC	True random number generator (RNG)	Temperature sensor

STM32F750 VALUE LINE BLOCK DIAGRAM

ART Accelerator™ 64-Kbyte Flash

		256-Kbyte SRAM + 16-Kbyte ITCM RAM
System		FMC/NOR/NAND/
Power supply		SDRAM
1.2 V regulator POR/PDR/PVD	Cache I/D 8+8 Kbytes	Dual Quad-SPI
Xtal oscillators		32 registers +
32 kHz + 4 ~26 MHz		4-KByte backup RAM
Internal RC oscillators		528-byte OTP
32 kHz + 16 MHz		·
PLL		
Clock control		
RTC/AWU	Arm® Cortex®-M7	
1x SysTick timer	216 MHz	
2x watchdogs		Connectivity
(independent and window)		5x SPI, 3x I ² S, 3x I ² C
50/82/138 I/Os		Camera interface
Cyclic redundancy		1x CAN 2.0B
check (CRC)		1x USB 2.0 OTG FS/HS
		USB HS Phy*
		1x USB 2.0 OTG FS
		2x SDMMC
	Floating point unit	4x USART + 4 UART
Control	(FPU)	LIN, smartcard, IrDA,
2x 16-bit motor control PWM synchronized	Nested vector	modem control
AC timer	interrupt controller (NVIC)	2x SAI
10x 16-bit timers	JTAG/SW debug/ETM	(Serial audio interface)
2x 32-bit timers	Memory Protection Unit	
LP timer	(MPU)	
	PC-ROP	
		A color
	AVI I M II' ALID	Analog
Crypto	AXI and Multi-AHB bus matrix	2x 12-bit, 2-channel DAC
AES-256	16-channel DMA	3x 12-bit ADC 24 channels / 2.4 MSPS
	True random number	Temperature sensor
	generator (RNG)	Temperature sensor
Note (*) : only available on LOFP144 and LIFE		

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



STM32F7 ON-LINE TRAINING

www.st.com/stm32f7-online-training