



STM32F7 – Series presentation

Revision 1.0



Hello, and welcome to this introduction to the STM32F7 microcontroller series.

This short presentation describes the various lines available in the STM32F7 series of very high-performance MCUs with an ARM® Cortex®-M7 core.

STM32F7 product lines

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| ACCELERATION • ART Accelerator™ • L1 cache: data and instruction cache • Chrom-ART Accelerator™ • Floating Point Unit CONNECTIVITY • 2 x USB2.0 OTG FS/HS • SDIO (x2 on F76x & F779) • USART, UART, SPI, I ² C • CAN2.0 • HDMI-CEC • Ethernet IEEE 1588 • FMC • MDIO slave (on F76x and F77x) • Camera I/F • Dual mode Quad-SPI AUDIO • I ² S + 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 3.6V • 85 °C and 105 °C ranges | Product line | f _{CPU} (MHz) | L1 cache (I/D) | FPU | FLASH (bytes) | RAM (Kbytes) | JPEG codec | CAN | DFSDM | TFT-LCD controller | MIPI®-DSI | |
|--|--------------|---------------------------|----------------|------------------|------------------|---|--|-----|-------|--------------------|-----------|---|
| | | STM32F7x9** STM32F7x8* | 216 | 16K+16K | Double-precision | 1M to 2M (RWW) | 512K (incl.128K DTCM) + 16K ITCM + 4K backup | • | 3 | • | • | • |
| | | STM32F7x7** | 216 | 16K+16K | Double-precision | 1M to 2M (RWW) | 512K (incl.128K DTCM) + 16K ITCM + 4K backup | • | 3 | • | • | |
| | | STM32F7x6** | 216 | 4K+4K | Single-precision | 512K to 1M | 320K (incl.64K DTCM) + 16K ITCM + 4K backup | | 2 | | • | |
| | | 765 STM32F7x5 | 216 | 16K+16K | Double-precision | 1M to 2M (RWW) | 512K (incl.128K DTCM) + 16K ITCM + 4K backup | | 3 | • | | |
| | 745 | 216 | 4K+4K | Single-precision | 512K to 1M | 320K (incl.64K DTCM) + 16K ITCM + 4K backup | | 2 | | | | |



Notes:

* Voltage Regulator Off mode available for WLCSP180 package (STM32F778AIY6TR)
 ** Only STM32F756, STM32F777 and STM32F779 include HW crypto/hash processor

Taking advantage of ST's ART Accelerator™ as well as an L1 cache, STM32F7 microcontrollers deliver the maximum theoretical performance of the Cortex-M7 core no matter if code is executed from embedded Flash or external memory: 1082 CoreMark /462 DMIPS at 216 MHz f_{CPU}.

- The STM32F746/756 line offers the performance of the Cortex-M7 core (with floating point unit) running up to 216 MHz. The STM32F756 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.
- The STM32F767/777 line expands the family in offering a double-precision FPU, a JPEG codec and additional interfaces

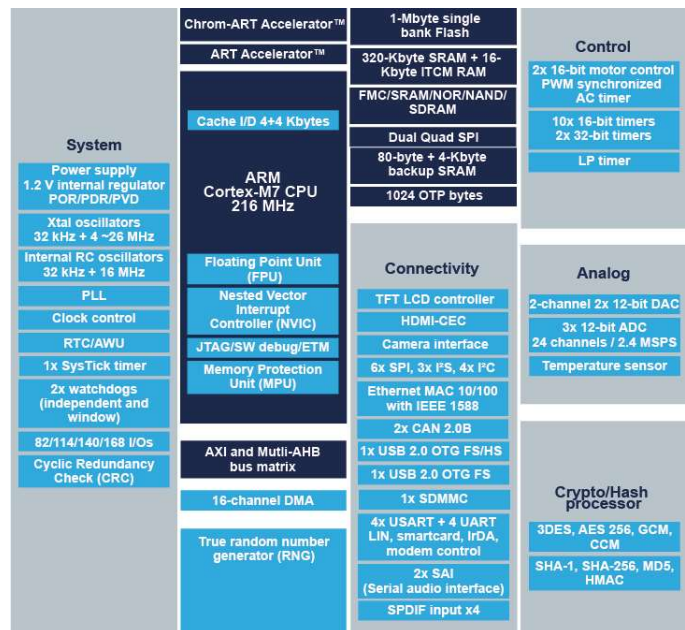
such as a 3rd CAN or a 2nd SD Card interface. The STM32F777 integrates the crypto/hash processor.

- The STM32F769/779 line offers the MIPI-DSI interface on the larger pin count packages. The STM32F779 integrates the crypto/hash processor.
- The STM32F745 line is similar to the STM32F746 with the exception of the TFT controller which is not available in the STM32F745.
- The STM32F765 line is similar to the STM32F767 with the exception of the TFT controller and JPEG codec which are not available in the STM32F765.

STM32F74x block diagram

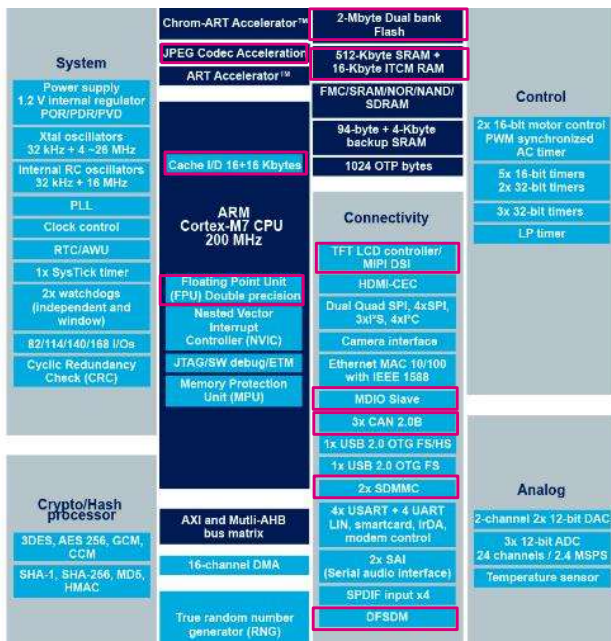
- Same packages as STM32F429

- WLCSP 143
- LQFP 100,144,176,208
- BGA 100, 176, 216



This block diagram summarizes the key features and available packages for STM32F745/746/756 devices. The STM32F746 line integrates the Cortex-M7 core (with floating point unit) running up to 216 MHz, with up to 1 Mbyte of Flash, 320 Kbytes of SRAM and up to 25 communication interfaces in addition to an LCD-TFT controller with a dedicated Chrom-ART™ accelerator for advanced graphics processing and analog interfaces. The STM32F756 line has similar features as the STM32F746 and also includes a crypto/hash processor. The STM32F745 line is similar to the STM32F746 with the exception of the TFT controller which is not available in the STM32F745.

STM32F76x block diagram



- ARM Cortex-M7 with double precision floating point unit (DFPU)
- 2 Mbytes of Flash memory (RWW) / 512 Kbytes of SRAM
- Dedicated supply for SDMMC2, 2x SDMMC I/F, 3x CAN, MIPI DSI, JPEG Codec accelerator, DFSDM, and MDIO Slave interface
- Same packages as STM32F429
 - WLCSP 180 (168 active) pitch 0,4mm
 - LQFP 100, 144, 176, 208
 - BGA 176, 216

This block diagram summarizes the key features and available packages for STM32F765/76x/77x devices. The STM32F766 line integrates the Cortex-M7 core (with floating point unit) running up to 216 MHz, with up to 2 Mbytes Flash memory with Read While Write feature, 512 Kbytes of SRAM and up to 25 communication interfaces in addition to an LCD-TFT controller with a dedicated Chrom-ART™ accelerator for advanced graphics processing and analog interfaces.

The STM32F769/779 line offers the MIPI-DSI interface on the larger pin count packages. The STM32F779 integrates the crypto/hash processor.

The STM32F756 line has similar feature as the STM32F746 and it includes a crypto/hash processor.

The STM32F745 line is similar to the STM32F746 with the exception of the TFT controller which is not available in the STM32F745.