
STM32 F4

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STM32 F4 Series [35]

Produced

From 2011 to Current

Max. CPU clock rate

84 to 180 MHz

Min. feature size

90 nm

Instruction set

Thumb, Thumb-2,
Sat Math, DSP, FPU

Microarchitecture

ARM Cortex-M4F [2]

The STM32 F4-series is the first group of STM32 microcontrollers based on the ARM Cortex-M4F core. The F4-series is also the first STM32 series to have DSP and floating point instructions. The F4 is pin-to-pin compatible with the STM32 F2-series and adds higher clock speed, 64K CCM static RAM, full duplex I²S, improved real-time clock, and faster ADCs. The summary for this series is:[17][24][25][35][36]

Core:

ARM Cortex-M4F core at a maximum clock rate of 84 / 168 / 180 MHz.

Memory:

Static RAM consists of up to 192 KB general purpose, 64 KB core coupled memory (CCM), 4 KB battery-backed, 80 bytes battery-backed with tamper-detection erase.

Flash consists of 512 / 1024 / 2048 KB general purpose, 30 KB system boot, 512 bytes one-time programmable (OTP), 16 option bytes.

Each chip has a factory-programmed 96-bit unique device identifier number.

Peripherals:

Common peripherals included in all IC packages are USB 2.0 OTG HS and FS, two CAN 2.0B, one SPI + two SPI or full-duplex I²S, three I²C, four USART, two UART, SDIO for SD/MMC cards, twelve 16-bit timers, two 32-bit timers, two watchdog timers, temperature sensor, 16 or 24 channels into three ADCs, two DACs, 51 to 140 GPIOs, sixteen DMA, improved real-time clock (RTC), cyclic redundancy check (CRC) engine, random number generator (RNG) engine.

Larger IC packages add 8/16-bit external memory bus capabilities.

The STM32F4x7 models add ethernet MAC and camera interface.

The STM32F41x/43x models add a cryptographic processor for DES / TDES / AES, and a hash processor for SHA-1 and MD5.

The STM32F4x9 models add a LCD-TFT controller.

Oscillators consists of internal (16 MHz, 32 kHz), optional external (4 to 26 MHz, 32.768 to 1000 kHz).

IC packages: WLCSP64, LQFP64, LQFP100, LQFP144, LQFP176, UFBGA176. STM32F429/439 also offers LQFP208 and UFBGA216.

Operating voltage range is 1.8 to 3.6 volt.