The STM32F405xx and STM32F407xx family is based on the high-performance ARM® Cortex®-M4 32-bit RISC core operating at a frequency of up to 168 MHz. The Cortex-M4 core features a Floating point unit (FPU) single precision which supports all ARM single-precision data-processing instructions and data types. It also implements a full set of DSP instructions and a memory protection unit (MPU) which enhances application security.  
The STM32F405xx and STM32F407xx family incorporates high-speed embedded memories (Flash memory up to 1 Mbyte, up to 192 Kbytes of SRAM), up to 4 Kbytes of backup SRAM, and an extensive range of enhanced I/Os and peripherals connected to two APB buses, three AHB buses and a 32-bit multi-AHB bus matrix.  
All devices offer three 12-bit ADCs, two DACs, a low-power RTC, twelve general-purpose 16-bit timers including two PWM timers for motor control, two general-purpose 32-bit timers. a true random number generator (RNG). They also feature standard and advanced communication interfaces.

**Features**

* Core: ARM® 32-bit Cortex®-M4 CPU with FPU, Adaptive real-time accelerator (ART Accelerator™) allowing 0-wait state execution from Flash memory, frequency up to 168 MHz, memory protection unit, 210 DMIPS/1.25 DMIPS/MHz (Dhrystone 2.1), and DSP instructions
* Memories
* Up to 1 Mbyte of Flash memory
* Up to 192+4 Kbytes of SRAM including 64-Kbyte of CCM (core coupled memory) data RAM
* Flexible static memory controller supporting Compact Flash, SRAM, PSRAM, NOR and NAND memories
* LCD parallel interface, 8080/6800 modes
* Clock, reset and supply management  
  - 1.8 V to 3.6 V application supply and I/Os  
  - POR, PDR, PVD and BOR  
  - 4-to-26 MHz crystal oscillator  
  - Internal 16 MHz factory-trimmed RC (1% accuracy)  
  - 32 kHz oscillator for RTC with calibration  
  - Internal 32 kHz RC with calibration
* Low-power operation  
  - Sleep, Stop and Standby modes  
  - VBAT supply for RTC, 20×32 bit backup registers + optional 4 KB backup SRAM
* 3×12-bit, 2.4 MSPS A/D converters: up to 24 channels and 7.2 MSPS in triple interleaved mode
* 2×12-bit D/A converters
* General-purpose DMA: 16-stream DMA controller with FIFOs and burst support
* Up to 17 timers: up to twelve 16-bit and two 32-bit timers up to 168 MHz, each with up to 4 IC/OC/PWM or pulse counter and quadrature (incremental) encoder input
* Debug mode  
  - Serial wire debug (SWD) & JTAG interfaces  
  - Cortex-M4 Embedded Trace Macrocell™
* Up to 140 I/O ports with interrupt capability  
  - Up to 136 fast I/Os up to 84 MHz  
  - Up to 138 5 V-tolerant I/Os
* Up to 15 communication interfaces  
  - Up to 3 × I2C interfaces (SMBus/PMBus)  
  - Up to 4 USARTs/2 UARTs (10.5 Mbit/s, ISO 7816 interface, LIN, IrDA, modem control)  
  - Up to 3 SPIs (42 Mbits/s), 2 with muxed full-duplex I2S to achieve audio class accuracy via internal audio PLL or external clock  
  - 2 × CAN interfaces (2.0B Active)  
  - SDIO interface
* Advanced connectivity  
  - USB 2.0 full-speed device/host/OTG controller with on-chip PHY  
  - USB 2.0 high-speed/full-speed device/host/OTG controller with dedicated DMA, on-chip full-speed PHY and ULPI  
  - 10/100 Ethernet MAC with dedicated DMA: supports IEEE 1588v2 hardware, MII/RMII
* 8- to 14-bit parallel camera interface up to 54 Mbytes/s
* True random number generator
* CRC calculation unit
* 96-bit unique ID
* RTC: subsecond accuracy, hardware calenda