STM32 32-bit MCUs
ARM Cortex™-M core
Releasing your creativity
32-bit Flash microcontrollers powered by the ARM® Cortex™-M processor

The STM32 family of 32-bit Flash microcontrollers based on the ARM Cortex™-M processor is designed to offer new degrees of freedom to MCU users. By bringing a complete 32-bit product range that combines high-performance, real-time, low-power and low-voltage operation, while maintaining full integration and ease of development, the STM32 family helps you create new applications and design in the innovations you have long been dreaming about.

FIVE REASONS TO CHOOSE THE STM32 PLATFORM

More than 420 compatible devices

<table>
<thead>
<tr>
<th>Real-time performance</th>
<th>Outstanding power efficiency</th>
<th>Superior and innovative peripherals</th>
<th>Maximum integration</th>
<th>Extensive ecosystem</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cortex™-M processor</td>
<td>ART Accelerator, Chrom-ART Accelerator, CCM-SRAM, Multi-AHB bus matrix, Excellent real-time up to 180 MHz/225 DMIPS zero-wait state execution performance from Flash</td>
<td>&lt; 1 µA RTC in V_{cc} mode, ultra-low dynamic power consumption 140 µA/MHz 1.65 to 3.6 V V_{cc} 0.45 µA Stop mode and 0.3 µA Standby mode</td>
<td>USB-OTG High Speed, camera interface, Ethernet, CAN, TFT controller, crypto/hash processor, PGA, sigma-delta 16-bit ADC and 12-bit ADC (up to 5 MSPS), external memory interface, CEC</td>
<td>ARM + ST ecosystem (eval boards, discovery kits, software libraries, RTOS)</td>
</tr>
</tbody>
</table>

STM32 platform

32-bit Flash microcontrollers powered by the ARM® Cortex™-M processor

The STM32 family of 32-bit Flash microcontrollers based on the ARM Cortex™-M processor is designed to offer new degrees of freedom to MCU users. By bringing a complete 32-bit product range that combines high-performance, real-time, low-power and low-voltage operation, while maintaining full integration and ease of development, the STM32 family helps you create new applications and design in the innovations you have long been dreaming about.

FIVE REASONS TO CHOOSE THE STM32 PLATFORM

More than 420 compatible devices

<table>
<thead>
<tr>
<th>Real-time performance Cortex™-M processor</th>
<th>Outstanding power efficiency</th>
<th>Superior and innovative peripherals</th>
<th>Maximum integration</th>
<th>Extensive ecosystem</th>
</tr>
</thead>
<tbody>
<tr>
<td>ART Accelerator, Chrom-ART Accelerator, CCM-SRAM, Multi-AHB bus matrix, Excellent real-time up to 180 MHz/225 DMIPS zero-wait state execution performance from Flash</td>
<td>ART Accelerator, Chrom-ART Accelerator, CCM-SRAM, Multi-AHB bus matrix, Excellent real-time up to 180 MHz/225 DMIPS zero-wait state execution performance from Flash</td>
<td>ART Accelerator, Chrom-ART Accelerator, CCM-SRAM, Multi-AHB bus matrix, Excellent real-time up to 180 MHz/225 DMIPS zero-wait state execution performance from Flash</td>
<td>ART Accelerator, Chrom-ART Accelerator, CCM-SRAM, Multi-AHB bus matrix, Excellent real-time up to 180 MHz/225 DMIPS zero-wait state execution performance from Flash</td>
<td>ART Accelerator, Chrom-ART Accelerator, CCM-SRAM, Multi-AHB bus matrix, Excellent real-time up to 180 MHz/225 DMIPS zero-wait state execution performance from Flash</td>
</tr>
</tbody>
</table>
STM32, A SOLID FOUNDATION FOR GROWTH

With the STM32, ST offers a comprehensive portfolio of advanced MCUs that we are committed to extending in capability, competitive pricing and features to cover the needs of developers.

STM32 PERFORMANCE

DMIPS
200
180
160
140
120
100
80
60
40
20
0

30 33 38 61 90 150 225

MHz

STM32F4
STM32F3
STM32F2
STM32F1
STM32F0
STM32L1
STM32W
ADDRESSING THE THREE DIMENSIONS OF MICROCONTROLLER EFFECTIVENESS

With its broad range of products, the STM32 addresses the three dimensions of microcontrollers: performance, low power and integration for cost efficiency

High-performance MCUs with DSP and FPU

- STM32 F4 series based on Cortex-M4, from 84 MHz/105 DMIPs up to 180 MHz/225 DMIPS
- ART Accelerator™ allowing 0-wait execution from Flash, and 7-layer bus matrix
- Low dynamic consumption: from 140 µA/MHz on STM32F401, up to 238 µA/MHz on STM32F42x/43x
- Low power consumption in Stop mode:
  - 11 µA typ on the STM32F401 and less than 350 µA on the STM32F405/407/415/417
- HS-USB, IEEE 1588 Ethernet, camera interface

Mixed-signal MCUs with DSP and FPU

- STM32 F3 series based on Cortex-M4 with up to 72 MHz/63 DMIPS (from Flash) or 90 DMIPS (from CCM-SRAM)
- Up to 48-Kbyte SRAM and CCM-SRAM
- Rich analog peripherals plus low-/mid-density memory: 7x comparators, 4x op-amps (PGA), 4x 12-bit ADC (5 MSPS), 3x 16-bit ΔΣ ADC and 2x 3-phase MC timer (144 MHz)

High-performance MCUs

- STM32 F2 based on Cortex-M3 up to 120 MHz/150 DMIPS
- ART Accelerator™ and 7-layer bus matrix
- Low dynamic consumption: 188 µA/MHz
- HS-USB, IEEE 1588 Ethernet, camera interface

Mainstream MCUs

- Based on Cortex-M3 running up to 72 MHz
- Large peripheral set: ADC and DAC, 12 bits, comm peripherals (USART, USB, SPI, I²C and more), multiple timers, maximum integration

Entry-level MCUs

- STM32 F0 based on Cortex-M0 up to 48 MHz/38 DMIPS
- ADC and DAC, 12 bits, comparator
- Communication peripherals (USART, SPI, I²C FM+ and HDMI CEC)
- 3-phase motor control

Ultra-low-power MCUs

- STM32 L1 ultra-low-power platform
- Low voltage down to 1.65 V
- 32 MHz processing performance
- Ultra-low static consumption
  - 0.45 µA Stop mode
  - 0.3 µA Standby mode

Wireless MCUs, IEEE 802.15.4

- STM32 W based on Cortex-M3 running up to 24 MHz
- 2.4 GHz IEEE 802.15.4 transceiver and lower MAC with excellent Wireless performance:
  - Rx sensibility up to -100 dBm
  - Output power configurable up to +8 dBm
- Low-power-mode consumption: 0.4 µA with RAM retention
## STM32 PRODUCT LINES

**Common core peripherals and architecture:**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Abbreviation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication peripherals:</td>
<td>FS</td>
<td>Full speed</td>
</tr>
<tr>
<td>- USART, SPI, I²C</td>
<td>HS</td>
<td>High speed</td>
</tr>
<tr>
<td>- Multiple general-purpose timers</td>
<td>MC</td>
<td>Motor control</td>
</tr>
<tr>
<td>- Integrated reset and brown-out warning</td>
<td>PGA</td>
<td>Programmable gain amplifier</td>
</tr>
<tr>
<td>- Multiple DMA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2x watchdogs</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Real-time clock</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Integrated regulator PLL and clock circuit</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- External memory interface (FSMC)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 3x 12-bit DAC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 4x 12-bit ADC</td>
<td></td>
<td>(Up to 5 MSPS)</td>
</tr>
<tr>
<td>- Main oscillator and 32 kHz oscillator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Low-speed and high-speed internal RC oscillators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- -40 to +85 °C and up to 105 °C operating temperature range</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Low voltage 2.0 to 3.6 V or 1.65/1.7 to 3.6 V (depending on series)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Temperature sensor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Feature</th>
<th>Abbreviation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 180 MHz Cortex-M4 with DSP and FPU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 256-Kbyte Flash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 2-Mbyte Flash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2x USB 2.0 OTG FS/HS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3-phase MC timer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 2x CAN 2.0B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- SDIO 2x PS audio Camera IF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Ethernet IEEE 1588</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Crypto/hash processor and RNG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### STM32 F3 series - Mixed-signal with DSP (STM32F302/303/313/373/383)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Abbreviation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 72 MHz Cortex-M4 with DSP and FPU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 48-Kbyte SRAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 1-Mbyte Flash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- USB 2.0 FS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3-phase MC timer (144 MHz)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 2x CAN 2.0B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- SDIO 2x PS audio Camera IF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 3x 16-bit ΣΔ ADC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 4x PGA</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### STM32 F2 series - High performance (STM32F205/215/207/217)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Abbreviation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 120 MHz Cortex-M3 CPU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 128-Kbyte SRAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 1-Mbyte Flash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- USB 2.0 OTG FS/HS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3-phase MC timer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 2x CAN 2.0B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- SDIO 2x PS audio Camera IF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Ethernet IEEE 1588</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Crypto/hash processor and RNG</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### STM32 F1 series - Mainstream - 5 product lines (STM32F100/101/102/103 and 105/107)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Abbreviation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Up to 72 MHz Cortex-M3 CPU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 96-Kbyte SRAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 1-Mbyte Flash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- USB 2.0 OTG FS/FS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3-phase MC timer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 2x CAN 2.0B</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- SDIO 2x PS audio Camera IF</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Ethernet IEEE 1588</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### STM32 F0 series - Entry level (STM32F050/051)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Abbreviation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 48 MHz Cortex-M0 CPU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 12-Kbyte SRAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 128-Kbyte Flash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 3-phase MC timer</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Comparator</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- CEC</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### STM32 L1 series - Ultra-low-power (STM32L100/151/152/162)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Abbreviation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 32 MHz Cortex-M3 CPU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 48-Kbyte SRAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 384-Kbyte Flash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- USB FS device</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 12-Kbyte EEPROM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- LCD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2x comparators</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- BOR</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- MSI</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- VScal</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- AES</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### STM32 W series - Wireless (STM32W108)

<table>
<thead>
<tr>
<th>Feature</th>
<th>Abbreviation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>- 24 MHz Cortex-M3 CPU</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 16-Kbyte SRAM</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Up to 256-Kbyte Flash</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- 2.4 GHz IEEE 802.15.4 Transceiver</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Lower MAC Digital baseband</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- AES</td>
<td></td>
<td>128-bit</td>
</tr>
</tbody>
</table>

### Abbreviations:

- **FS**: Full speed
- **HS**: High speed
- **MC**: Motor control
- **PGA**: Programmable gain amplifier
- **FS**: Full speed
- **HS**: High speed
- **MC**: Motor control
- **PGA**: Programmable gain amplifier
- **MSI**: Multi-speed internal oscillator
- **RNG**: Random number generator
- **VScal**: Voltage scaling
- **FPU**: Floating point unit
- **SDIO**: Secure digital input/output
- **DSC**: Digital signal controller
STM32, THE OPTIMAL PLATFORM CHOICE

The STM32 is the optimal choice to support many applications with the same platform. All product lines in the seven series are pin-to-pin and software compatible, making it easy to upgrade to a higher or downgrade to a lower memory size. Numerous applications may be addressed using the sole STM32 platform.

STM32 PORTFOLIO
STM32 F4 SERIES BLOCK DIAGRAM

This block diagram shows all the available peripherals. For exact product content, refer to the device summary.

**System**
- Power supply 1.2 V regulator POR/PDR/PVD
- Xtal oscillators 32 kHz + 4 to 26 MHz
- Internal RC oscillators 32 kHz + 16 MHz
- PLL
- Clock control
- RTC/AYW
- 1x Systick timer
- 82/114/140/168 I/Os
- 2x watchdogs (independent and window)
- Cyclic redundancy check (CRC)

**ART Accelerator™**
- ARM Cortex-M4 180 MHz

**Up to 2-Mbyte dual bank Flash**
- 256-Kbyte SRAM
- TFT LCD controller
- Chrom-ART Accelerator™
- FMC/SSRAM/NOR/NAND/CF/SDRAM
- 80-byte + 4-Kbyte backup SRAM
- 512 OTP bytes

**Connectivity**
- Floating point unit (FPU)
- Nested vector interrupt controller (NVIC)
- MPU
- JTAG/SW debug/ETM

**Multi-AHB bus matrix**
- 16-channel DMA

**Crypto/hash processor 2**
- 3DES, AES 256, GCM, CCM
- SHA-1, SHA-256, MD5, HMAC
- True random number generator (RNG)

**ART Accelerator™**
- Camera interface
- 6x SPI, 2x I²S, 3x I²C
- Ethernet MAC 10/100 with IEEE 1588
- 2x CAN 2.0B
- 1x USB 2.0 OTG FS/HS
- 1x USB 2.0 OTG FS
- 1x SDIO
- 4x USB 2.0 + 4 UART
- LIN, smartcard, IrDA, modem control
- 1x SAI (Serial audio interface)

**Analog**
- 2-channel 2x 12-bit DAC
- 3x 12-bit ADC
- 24 channels / 2 MSPS
- Temperature sensor

**Notes:**
1. HS requires an external PHY connected to the ULPI interface
2. Crypto/hash processor on STM32F415, STM32F417, STM32F437 and STM32F439
3. With digital filter feature

**APPLICATIONS**
- Industrial
  - PLC
  - Inverters
  - Printers, scanners
  - Industrial networking
  - Solar inverters
- Building and security
  - Alarm systems
  - Access control
  - HVAC
  - Power meters
- Medical
  - Glucose meters
  - Portable medical care
  - VPAP, CPAP
  - Patient monitoring
- Appliances
  - 3-phase motor drives
  - Application control
  - User interfaces
  - Induction cooking
- Consumer
  - Home audio
  - Gaming
  - PC peripherals
  - Digital cameras, GPS
### Superior and Innovative Peripherals

#### The Need for Analog

<table>
<thead>
<tr>
<th>Peripherals</th>
<th>STM32 F4 series</th>
<th>STM32 F3 series</th>
<th>STM32 F2 series</th>
<th>STM32 F1 series</th>
<th>STM32 F0 series</th>
<th>STM32 L1 series</th>
<th>STM32 W series</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADC conversion time</td>
<td>0.41 μs (2.4 MSPS)</td>
<td>0.2 μs (5 MSPS), (50 kSPS)</td>
<td>0.5 μs (1 MSPS)</td>
<td>1 μs (1 MSPS)</td>
<td>1 μs (1 MSPS)</td>
<td>5.3 μs (188 kSPS)</td>
<td></td>
</tr>
<tr>
<td>ADC accuracy</td>
<td>12-bit</td>
<td>12-bit</td>
<td>12-bit</td>
<td>12-bit</td>
<td>12-bit</td>
<td>12-bit</td>
<td>12-bit</td>
</tr>
<tr>
<td>DAC</td>
<td>2-channel, 12-bit</td>
<td>2-channel, 12-bit</td>
<td>2-channel, 12-bit</td>
<td>2-channel, 12-bit</td>
<td>2-channel, 12-bit</td>
<td>2-channel, 12-bit</td>
<td>-</td>
</tr>
</tbody>
</table>

#### The Need for Connectivity

| CAN             | Up to 2 independent CAN | Up to 2 independent CAN | Up to 2 independent CAN | -              | -              | -              |
| Ethernet        | 10/100 Mbit/s MAC with hardware IEEE 1588 | - | 10/100 Mbit/s MAC with hardware IEEE 1588 | -              | -              | -              |
| USB             | Full speed and high speed host, device or OTG | Full speed devices | Full speed and high speed host, device or OTG | Full speed devices and clock recovery | Full speed devices | -              |
| CEC bus         | -              | -              | -              | Consumer electronics control for consumer devices | Consumer electronics control for consumer devices | -              |
| Flexible static memory | 4 independent banks, 8/16-bit data bus, supports SRAM, PSRAM, NAND and NOR Flash, parallel graphic LCD | - | 4 independent banks, 8/16-bit data bus, supports SRAM, PSRAM, NAND and NOR Flash, parallel graphic LCD | -              | -              | -              |
| Camera interface| 8- to 14-bit parallel | -              | 8- to 14-bit parallel | -              | -              | -              |
| RF              | -              | -              | -              | -              | -              | -              | 2.4 GHz IEEE 802.15.4 transceiver and lower MAC |

---

*STM32 series: STM32 F4, STM32 F3, STM32 F2, STM32 F1, STM32 F0, STM32 L1, STM32 W*
MOTOR CONTROL
The STM32 is perfectly suited to 3-phase brushless single or dual motor control:
- Advanced PWM timer, fast ADC, high-performance core
- Class B compliancy with the EN/IEC 60335-1 norm
- Single or dual motor control

The STM32’s motor control ecosystem brings:
- Free 3-phase motor control software development kit (firmware and graphical customization tool) supporting AC induction motors (sensored) and PMSM motors (sensorless, Hall sensor or encoder) for vector control (field oriented control)
- Full developer vector drive PMSM motor control kits (hardware and firmware) based on the STM32F103 (order code: STM32F103B-MKIT) or STM32F100 (order code: STM32100B-MKIT)
- Digital PFC and dual FOC drive demo, free RTOS example
- STM Studio tool to monitor data in the user code when the motor control algorithm is running

ULTRA-LOW-POWER
STM32 L1 – Ultra-low-power modes

Typical current (@ 25 °C)

Dynamic Run from Flash
Low-power Run @ 32 kHz
Low-power sleep @ 32 kHz
Stop with or without RTC
Standby with or without RTC

183 µA/MHz
Range 3

9 µA

4.4 µA
+ 1 timer

1.2 µA
0.5 µA

0.9 µA
0.3 µA

Notes:
- POR/PDR on
- RAM content preserved
- Wake-up time from Stop < 8 µs
- Run and Sleep consumption value are independent of VDD
- Stop and Standby values measured at VDD = 1.8 V
- Low-power Run and low-power Sleep are measured with Flash off
- Backup register byte preserved

STM32 L1
ST’s STM32 family of 32-bit ARM Cortex™-M-core-based microcontrollers are supported by a complete range of low-cost and high-end, evaluation software, debugging and programming tools. This complete line includes third-party solutions that come complete with C/C++ compiler, integrated development environment and in-circuit debugger/programmer featuring a JTAG/SWD application interface. Developers can also explore and start applications easily with any of a range of affordable, easy-to-use starter kits.

The superb combination of a state-of-the-art and efficient library of software drivers and extensive support for all major tool providers offers a fast route to best fit and an optimized development process.

**START TODAY WITH STM32-DISCOVERY KITS**

Discovery kits are the cheapest and quickest way to discover the STM32 family. These quick-start evaluation boards embed an ST-LINK or ST-LINK/V2 debug probe and are supported by IDE from Atollic, Keil, IAR and TASKING.

**STM32 F4 series (order code: STM32F4DISCOVERY with STM32F407VGTT6 MCU)**

To discover the STM32 F4 series, the STM32F4-Discovery highlights the performances of the F4 series with audio (input, output) and USB Host capabilities. Expand the functionality of the STM32F4 Discovery kit with Ethernet connectivity, LCD Display and a 1.3 mega pixel Camera board (order codes: STM32F4DIS-BB, STM32F4DIS-LCD and STM32F4DIS-CAM)

**STM32 F3 series (order code: STM32F3DISCOVERY with STM32F303xx MCU)**

The STM32F3-Discovery is the perfect kit to discover not only the richness of the STM32 F3 series, but also ST’s MEMS gyroscope and e-compass.

**STM32 F1 series (order code: STM32VLDISCOVERY with STM32F100RB MCU)**

Based on the STM32 F1 series Value line, the STM32 Value line Discovery kit will satisfy hobbyists, first-time developers and students.

**STM32 F0 series (order code: STM32F0DISCOVERY with STM32F0518R MCU)**

Discover the STM32 F0 series based on the Cortex-M0 core. A prototyping board is included for easy connection of additional components and modules.

**STM32 L1 series (order codes: STM32L152C-DISCO with STM32L152RCT6 MCU and STM32L100C-DISCO with STM32L100RCT6 MCU)**

Based on the STM32 L1 series, the STM32L1-Discovery kit includes a 6-digit LCD display, a touch-sensing slider, 2 LEDs, a user button and current measurement.

**STM32 EVOPRIMER**

Play, explore and develop applications on the EvoPrimer with Raisonance toolset, free demos and an online community at www.stm32circle.com to stimulate creative designs.

Order codes:
- STM3240GPRIMER (STM32 F4 series)
- STM3210CPRIMER (STM32 F1 series Connectivity line)
- STM3210GPRIMER (STM32 F1 series Performance line)
- STM32L15PRIMER (STM32 L1 series)
STM32-COMSTICK
Evaluate STM32 networking features of the STM32 Connectivity line with STM32-ComStick (order code: STM32-COMSTICK).
This kit includes an integrated debugging/programming capability via USB and unlimited Hitex HI TOP5 and TASKING VX C compilers.

STM32W RF CONTROL KIT
Low-cost RF control kit: The STM32W RF Control Kit is a low-cost and quick way to get started using STM32W-based point-to-point wireless control applications.
Order code: STM32WC-RFCKIT

<table>
<thead>
<tr>
<th>Part number</th>
<th>Featured product</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM3210B-SK/HIT</td>
<td>STM32F103RBT6</td>
<td>Hitex kit with unlimited HI TOP5, TASKING VX compilers, STM32-PerformanceStick with integrated debugging/programming via USB, extension I/O board with peripheral evaluation features, Dashboard GUI</td>
</tr>
<tr>
<td>STM3210E-SK/HIT</td>
<td>STM32F103VET6</td>
<td>IAR Embedded Workbench for ARM (for up to 32 Kbytes of code), IAR C/C++ compiler, J-Link (USB/JTAG), evaluation board</td>
</tr>
<tr>
<td>STM3210C-SK/IAR</td>
<td>STM32F107VCT6</td>
<td>IAR Embedded Workbench for ARM (for up to 32 Kbytes of code), IAR C/C++ compiler, J-Link (USB/JTAG), evaluation board</td>
</tr>
<tr>
<td>STM323240G-SK/IAR</td>
<td>STM32F207ZGT6</td>
<td>Raisonance REva kit with RIDE (debug up to 32 Kbytes of code), GNU C/C++ compiler, modular evaluation hardware with integrated RLink (USB/JTAG)</td>
</tr>
<tr>
<td>STM3210B-MCKIT</td>
<td>STM32F103VBT6</td>
<td>ST motor control starter kit with complete sensor and sensorless libraries, evaluation hardware platform for vector drive of 3-phase brushless magnet synchronous motors, plus Segger J-LINK for host PC interface</td>
</tr>
</tbody>
</table>

EVALUATION BOARDS FOR STM32
Evaluation boards from ST implement the complete range of device peripherals for STM32 devices.

<table>
<thead>
<tr>
<th>Part number</th>
<th>Featured product</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM3240G-EVAL</td>
<td>STM32F407GH6</td>
</tr>
<tr>
<td>STM32303G-EVAL</td>
<td>STM32F303VCT6</td>
</tr>
<tr>
<td>STM32373G-EVAL</td>
<td>STM32F373VCT6</td>
</tr>
<tr>
<td>STM3220G-EVAL</td>
<td>STM32F207GH6</td>
</tr>
<tr>
<td>STM3210C-EVAL</td>
<td>STM32F107VCT6</td>
</tr>
<tr>
<td>STM3210E-EVAL</td>
<td>STM32F103ZGT6</td>
</tr>
<tr>
<td>STM3210B-EVAL</td>
<td>STM32F100VBT6</td>
</tr>
<tr>
<td>STM32100E-EVAL</td>
<td>STM32F100ZET6</td>
</tr>
<tr>
<td>STM323018G-EVAL</td>
<td>STM32F417IGH6</td>
</tr>
<tr>
<td>STM32221G-EVAL</td>
<td>STM32F217IGH6</td>
</tr>
<tr>
<td>STM32429IH-EVAL</td>
<td>STM32F429NIH6U</td>
</tr>
<tr>
<td>STM32439IH-EVAL</td>
<td>STM32F439NIH6U</td>
</tr>
<tr>
<td>STM32L152D-EVAL</td>
<td>STM32L152ZDT6</td>
</tr>
</tbody>
</table>

Note: * Available in Q3/2013

STM32W EVALUATION KIT
Complete kit to evaluate the capabilities of the STM32W in different configurations: remote control (ZigBee RF4CE stack) and point-to-point network (simplified MAC library).
- Main kit order code: STM32W108C-SK (256-Kbyte Flash device)
- Extension kit order code: STM32W108C-KEXT
STM32 SOFTWARE DEVELOPMENT TOOLS

Third-party solutions come complete with IDE, C/C++ compiler, debugger and JTAG/SWD debug probes. Available from main tools providers, including Atollic, IAR, Keil, Raisonance and TASKING.

MicroXplorer

Easily start your STM32 applications with MicroXplorer, a free graphical tool enabling users to select in the ST portfolio an STM32 based on peripherals needed, to configure very easily the pinout based on the operating mode of the peripherals used and then to generate the corresponding C initialization code.

www.st.com/microxplorer

STM Studio

Fine tune, debug and diagnose STM32 applications with STM Studio, a free graphical tool to monitor and visualize variables at run time. Connected to the STM32 via a standard debug probe (such as the ST-LINK/V2), STM Studio reads variables on-the-fly (non intrusive) while the application is running. Different graphic views are available to match the needs of debugging. Numerous other features are available to help diagnose running applications.

www.st.com/stm-studio

Java for STM32

Start developing applications for the STM32 in Java. Benefit from Java and the highly-optimized STM32 Java virtual machine to increase software engineering productivity. Ideal for feature-rich applications with human-machine interfaces and Internet protocol connectivity.

Evaluation kits:
STM3220G-JAVA (for STM32 F2 series)
STM3240G-JAVA (for STM32 F4 series)

Development environment:
STM32-JAVA

STM32 Embedded Target for MATLAB and Simulink

STM32 Embedded Target enables developers to quickly deploy their application models in MATLAB and Simulink to the STM32 F4 series MCUs. It allows you to check the STM32 F4 execution results versus Simulink simulation behavior using PIL testing. The Simulink blockset library with STM32 F4 peripherals is ready for integration in the final application with the algorithm code generated by Embedded Coder.

www.st.com/stm32-mat-target

Microsoft .NET Micro Framework for STM32

After the NETMF for STM32 F1, the Mountaineer Group (http://www.mountaineer.org/) has ported NETMF to the STM32 F2 and STM32 F4. This port presents drivers for the on-chip peripherals: GPIOs, analog inputs and outputs, I²C, SPI, UARTs, USB, internal Flash, power management, timers, and more. It is available at the Codeplex site, www.netmf.codeplex.com


STM32 software solutions

From the hardware abstraction layer, through middleware and up to the application field, the STM32 software ecosystem is extensive, providing a consistent set of solutions, coming from more than 20 partners, based on open-source, or even built in-house. All STM32 peripherals are functionally covered, including peripheral library, DSP library, crypto library, file systems, USB, Ethernet, Bluetooth, Wi-Fi, display, industrial, audio, motor control, and medical applications.

Contact your local ST sales and marketing office for more information on the solutions described in this document.

Hardware abstraction layer

STM32 standard peripheral library:

Complete set of device drivers for all the standard device peripherals, with many examples.

CMSIS DSP library:

Standardized interface, with more than 50 math operations (FIR, FFT, matrix, and more) accelerated with DSP instructions.

STM32 crypto library:

Software implementation of cryptographic algorithms, optimized for STM32.

STM32 self-test routines Class B norm certification:

Complete software for EN/IEC 60335-1 Class B norm.

Middleware

STM32 USB libraries:

Complete firmware packages for USB, slave and host, with many covered classes.

STM32 TCP/IP stacks:

Several stacks are available, such as LWIP or NicheLite. Partners offer more extensive protocol support, or other communication means such as Wi-Fi.

StemWin graphical library:

based on SEGGER emWin graphical library, StemWin is a professional solution, enabling Graphical User Interfaces (GUI) building up with any STM32, and LCD and controller, taking benefit from STM32 Hardware accelerations, whenever possible. It comes with a full set of widgets and services, like remote display and developments tools like on PC simulator and screens designer.

STM32 Bluetooth stack: Anywhere full Bluetooth stack with many different profiles. With our partner Alpwise.

Application fields

STM32 audio solutions:

Full range of audio software bricks, optimized for STM32: MP3 codec, MP3 decoder, WMA decoder, Speex speech codec, ADPCM compression, audio algorithms such as loudness control, channel mixer, 5-band equalizer, iPod/iPhone/iPad interface through iAP (iPod Application Protocol) interface, USB synchronization methods for streaming, and more. Contact your sales office for information on availability for specific STM32 part numbers.

STM32 motor control software:

Complete 3-phase motor-control software development kit (firmware and graphical customization tool) supporting single or dual PMSM motors in sensorless AC induction motors in sensorless mode and AC induction motors in sensorless mode, plus a patented single-shunt algorithm. This SDK is included in the STM32 motor control kits.

STM32 industrial protocols:

Full range of supported industrial protocols: Profinet, EtherCAT, Modbus, DeviceNet, CANopen, and more, via our partner network.

STM32 Continua certified solution:

Software bricks to build your Continua medical solution. Provided bricks are USB PhDC class (personal health device class), base framework protocol, glue agent and thermometer agent. Further agents can be implemented on demand.