High-performance MCUs with Arm® Cortex®-M7 core and Arm® Cortex®-M4

The STM32H7 series offer the performance of the Cortex-M7 core running up to 480 MHz and add a 240 MHz Cortex-M4 core in dual-core lines. Combined with a smart architecture based on a multi-power domain, developers can always use the best configuration to optimize data transfers and CPU load while minding the power budget.

With its embedded hardware accelerators and its extensive digital and analog peripherals, the feature-rich STM32H7 is ideal for industrial environments where fast reaction time is essential. The HMI components (graphic and audio support) allow the device to provide an outstanding user-experience.

Two powerful cores supported by a robust architecture

CORE, MEMORIES AND ACCELERATION

- Cortex-M7 core @ 480 MHz
- Cortex-M4 core @ 240 MHz*
- 16 KB + 16 KB I/D L1 Cache
- Double-precision FPU
- 4 x DMA controllers
- 128 KB up to 2 MB dual bank Flash and up to 1.4 MB RAM

Note: * only in STM32H745, STM32H755, STM32H747 and STM32H757

CONNECTIVITY

- Up to 2 x USB 2.0 OTG FS/HS
- UART, USART, SPI, and I2C
- 2 x CAN (1 x FD and 1 x TT/FD)
- Ethernet MAC
- FMC, Quad-SPI and Dual Octal-SPI
- 2 x SDMMC

AUDIO

- 3 x I2S + audio PLL
- 4 x SAI
- 2 x 12-bit DAC
- SPDIF-RX

GRAPHICS

- LCD TFT controller
- JPEG Codec
- Chrom-ART Accelerator™
- Chrom-GRC™

OTHER

- Optional crypto
- DFSDM
- 16- and 32-bit timers
- 3× ADCs with 16-bit max. resolution (up to 3.6 MSPS)
- Analog (comp, AOP)
- Power supply 1.7V to 3.6V down to 1.62V in regulator bypass mode
- Up to 140 °C supported as maximum junction temperature

Display nice graphic

The Chrom-ART Accelerator and MJPEG codec offload the CPU by more than 90%

Transfer data efficiently across peripherals

The main DMA takes care of the intensive data transfers between memories with up to 16 channels to offload the CPU

Manage security

Uses a dedicated hardware accelerator for cryptography and hashing functions to offload the CPU by more than 90%

Generate complex wave forms

High-Resolution timer (2.1ns) can generate complex waveforms synchronized on multiples events, without CPU assistance
## CORE, MEMORIES AND ACCELERATION
- Single-core Cortex-M7 up to 480 MHz
- Dual-core Cortex-M7 480 MHz and Cortex-M4 240 MHz
- Flash and RAM acceleration
- SP-FPU and DP-FPU
- 4 x DMA

### CONNECTIVITY
- 2 x USB2.0 OTG FS/HS
- 2 x SDMMC
- USART, UART, SPI, I²C
- 2 x CAN (1 x FD and 1 x TT)
- HDMI-CEC
- FMC, Dual-mode Quad-SPI
- Camera I/F
- Analog (comp, AOP)

### AUDIO
- 3 x I²S + audio PLL
- 4 x SAI
- 2 x 12-bit DAC
- SPDIF-RX

### GRAPHIC
- Chrom-ART Accelerator™

### OTHER
- Crypto/Hash (except H742)†
- Security services (except H742)
- TRNG
- DFSDM
- 16- and 32-bit timers, HRTimer
- 3 x 16-bit ADC (up to 3.6 MSPS)
- Voltage range 1.62 to 3.6 V (except 100-pin package: 1.71 to 3.6 V)
- Multi-power domains
- -40°C to up 105°C ambient
- -40°C to up 125°C ambient

### Dual-core lines

<table>
<thead>
<tr>
<th>Product line</th>
<th>f&lt;sub&gt;cpu&lt;/sub&gt; (MHz)</th>
<th>Dual-Bank Flash memory (bytes)</th>
<th>RAM (bytes)</th>
<th>OctoSPI &amp; OTFDEC</th>
<th>Ethernet</th>
<th>Graphic</th>
<th>Power supply</th>
<th>Stop mode (typical) / RAM retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM32H747/757†</td>
<td>480 + 240</td>
<td>Up to 2 Mbytes</td>
<td>1 Mbyte (incl.128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup1) + 4 Kbytes backup2</td>
<td>-</td>
<td>TFT-LCD JPEG codec</td>
<td>SMPS + LDO</td>
<td>360 µA / 1MB 250 µA / 768KB</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
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<th>f&lt;sub&gt;cpu&lt;/sub&gt; (MHz)</th>
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</thead>
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<td>-</td>
<td>TFT-LCD JPEG codec</td>
<td>SMPS + LDO</td>
<td>360 µA / 1MB 250 µA / 768KB</td>
<td></td>
</tr>
</tbody>
</table>

### Single-core lines

<table>
<thead>
<tr>
<th>Product line</th>
<th>f&lt;sub&gt;cpu&lt;/sub&gt; (MHz)</th>
<th>Dual-Bank Flash memory (bytes)</th>
<th>RAM (bytes)</th>
<th>OctoSPI &amp; OTFDEC</th>
<th>Ethernet</th>
<th>Graphic</th>
<th>Power supply</th>
<th>Stop mode (typical) / RAM retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM32H7A3/7B3†</td>
<td>280</td>
<td>Up to 2 Mbytes</td>
<td>1,4MB (incl.128K DTCM, 64K ITCM, 1184K+SRAM, 4K backup)</td>
<td>-</td>
<td>TFT-LCD JPEG codec</td>
<td>Chrom-GRC</td>
<td>SMPS + LDO</td>
<td>32 µA / 1.4MB 28 µA / 32KB</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Product line</th>
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<th>Dual-Bank Flash memory (bytes)</th>
<th>RAM (bytes)</th>
<th>OctoSPI &amp; OTFDEC</th>
<th>Ethernet</th>
<th>Graphic</th>
<th>Power supply</th>
<th>Stop mode (typical) / RAM retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM32H743/753†</td>
<td>480</td>
<td>Up to 2 Mbytes</td>
<td>1 Mbyte (incl.128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup1) + 4 Kbytes backup2</td>
<td>-</td>
<td>TFT-LCD JPEG codec</td>
<td>LDO</td>
<td>1270 µA / 1MB 910 µA / 768KB</td>
<td></td>
</tr>
</tbody>
</table>

### Value line

<table>
<thead>
<tr>
<th>Product line</th>
<th>f&lt;sub&gt;cpu&lt;/sub&gt; (MHz)</th>
<th>Dual-Bank Flash memory (bytes)</th>
<th>RAM (bytes)</th>
<th>OctoSPI &amp; OTFDEC</th>
<th>Ethernet</th>
<th>Graphic</th>
<th>Power supply</th>
<th>Stop mode (typical) / RAM retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM32H7B0</td>
<td>280</td>
<td>128 Kbytes</td>
<td>1,4MB (incl.128K DTCM, 64K ITCM, 1184K+SRAM, 4K backup)</td>
<td>-</td>
<td>TFT-LCD JPEG codec</td>
<td>Chrom-GRC</td>
<td>SMPS + LDO</td>
<td>32 µA / 1.4MB 28 µA / 32KB</td>
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</table>

<table>
<thead>
<tr>
<th>Product line</th>
<th>f&lt;sub&gt;cpu&lt;/sub&gt; (MHz)</th>
<th>Dual-Bank Flash memory (bytes)</th>
<th>RAM (bytes)</th>
<th>OctoSPI &amp; OTFDEC</th>
<th>Ethernet</th>
<th>Graphic</th>
<th>Power supply</th>
<th>Stop mode (typical) / RAM retention</th>
</tr>
</thead>
<tbody>
<tr>
<td>STM32H750</td>
<td>480</td>
<td>128 Kbytes</td>
<td>1 Mbyte (incl.128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup1) + 4 Kbytes backup2</td>
<td>-</td>
<td>TFT-LCD JPEG codec</td>
<td>LDO</td>
<td>1270 µA / 1MB 910 µA / 768KB</td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Optional - dedicated CPN, STM32H753, STM32H755, STM32H757, STM32H7B3 for the Crypto Variants
2. 125 °C ambient / 140 °C junction. Dedicated part numbers on STM32H745/H755

---

STM32H7 ONLINE TRAINING
[www.st.com/stm32h7-online-training](http://www.st.com/stm32h7-online-training)
Secure your production flow with Secure Firmware Install (SFI*)

Manage STM32 authentication, firmware decryption and installation

<table>
<thead>
<tr>
<th>System</th>
<th>Chrom-ART Accelerator™ JPEG Codec Acceleration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Multi-power domains</td>
<td>Cache I/D 16+16 Kbytes</td>
</tr>
<tr>
<td>Xtal oscillators</td>
<td>3DES, AES 256, GCM, CCM</td>
</tr>
<tr>
<td>32 kHz + 4 ~ 48 MHz</td>
<td>SHA-1, SHA-256, MD5, HMAC</td>
</tr>
<tr>
<td>Internal RC oscillators</td>
<td>Crypto/Hash processor</td>
</tr>
<tr>
<td>32 kHz + 4, 48 &amp; 64 MHz</td>
<td>3DES, AES 256, GCM, CCM</td>
</tr>
<tr>
<td>3x PLL</td>
<td>SHA-1, SHA-256, MD5, HMAC</td>
</tr>
<tr>
<td>Clock control</td>
<td>STM32H757 Block Diagram</td>
</tr>
<tr>
<td>RTC/AWU</td>
<td>1x SysTick timer</td>
</tr>
<tr>
<td>1x SysTick timer</td>
<td>2x watchdogs (independent and window)</td>
</tr>
<tr>
<td>2x watchdogs</td>
<td>82/114/140/168 I/Os</td>
</tr>
<tr>
<td>(independent and window)</td>
<td>Cyclic redundancy check (CRC)</td>
</tr>
<tr>
<td>Cache I/D 16+16 Kbytes</td>
<td>Unique ID</td>
</tr>
<tr>
<td>Control</td>
<td>Floating point unit (DP-FPU)</td>
</tr>
<tr>
<td>2x 16-bit motor control</td>
<td>Nested vector interrupt controller (NVIC)</td>
</tr>
<tr>
<td>PWM synchronized AC timer</td>
<td>JTAG/SW debug/ETM</td>
</tr>
<tr>
<td>10x 16-bit timers</td>
<td>Memory Protection Unit (MPU)</td>
</tr>
<tr>
<td>2x 32-bit timers</td>
<td>ROP, PC-ROP anti-tamper</td>
</tr>
<tr>
<td>5x Low-power timer</td>
<td>AXI and Multi-AHB bus matrix</td>
</tr>
<tr>
<td>16-bit high-resolution timer</td>
<td>4x DMA</td>
</tr>
<tr>
<td>Retro</td>
<td>True random number generator (RNG)</td>
</tr>
</tbody>
</table>

STM32H757 BLOCK DIAGRAM

Cyclic redundancy check (CRC)

AXI and Multi-AHB bus matrix

Cache I/D 16+16 Kbytes

STM32H7

The STM32Trust ecosystem combines knowledge, design tools, and ready-to-use original ST software to build strong cyber-protection into new IoT devices, leveraging industry best-practices.

www.st.com/stm32trust

Secure your production flow with Secure Firmware Install (SFI*)

Customer premises

Untrusted environment

Encrypted FW transfer

Encrypt FW

Store encryption key in HSM

ST Hardware Secure Module (HSM)

HSM physical transfer

Authenticate target STM32

Generate installation license

Note: *optional – SFI service available on specific part numbers
# STM32H7 Ecosystem

**HARDWARE TOOLS**

www.st.com/stm32hardwaretools

<table>
<thead>
<tr>
<th>Part numbers</th>
<th>Product Line</th>
<th>Core</th>
<th>SMPS</th>
<th>Crypto-HASH</th>
<th>Display</th>
<th>Ethernet</th>
<th>NOR Serial Flash (Mbits)</th>
<th>SDRAM (Mbits)</th>
<th>SRAM (Mbits)</th>
<th>NOR (Mbits)</th>
<th>eMMC (Gbytes)</th>
<th>SDCard (Bytes)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NUCLEO-H743ZI</strong></td>
<td>General-purpose</td>
<td>1</td>
<td>-</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>NUCLEO-H745ZI-Q</strong></td>
<td>Industrial</td>
<td>2</td>
<td>Internal</td>
<td>No</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>NUCLEO-H753ZI</strong></td>
<td>General-purpose</td>
<td>1</td>
<td>-</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>NUCLEO-H755ZI-Q</strong></td>
<td>Industrial</td>
<td>2</td>
<td>Internal</td>
<td>Yes</td>
<td>No</td>
<td>Yes</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td><strong>NUCLEO-H7A3ZI-Q</strong></td>
<td>General-purpose</td>
<td>1</td>
<td>Internal</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

**Discovery kits**

| STM32H745I-DISCO | Industrial | 2 | Internal | No | 4.3” RGB | Yes | 2 x 512 Mb Quad-SPI | 128 Mb | - | - | 4 GB | - |
| STM32H747I-DISCO | Graphic | 2 | Internal | No | 4” DSI | Yes | 2 x 512 Mb Quad-SPI | 256 Mb | - | - | - | - |
| STM32H747I-DISC1 | Graphic | 2 | Internal | No | No | Yes | 2 x 512 Mb Quad-SPI | 256 Mb | - | - | - | - |
| STM32H750B-DK | Value | 1 | - | Yes | 4.3” RGB | Yes | 2 x 512 Mb Quad-SPI | 128 Mb | - | - | 4 GB | - |
| STM32H7B3I-DK | Graphic | 1 | Internal | Yes | 4.3” RGB | No | 1 x 512 Mb Octo-SPI | 128 Mb | - | - | - | - |

**Evaluation boards**

| STM32H743I-EVAL2 | General-purpose | 1 | - | No | 5.7” RGB | Yes | 2 x 512 Mb Quad-SPI | 256 Mb | 16 Mb | 128 Mb | - | 8 GB |
| STM32H753I-EVAL2 | General-purpose | 1 | - | Yes | 5.7” RGB | Yes | 2 x 512 Mb Quad-SPI | 256 Mb | 16 Mb | 128 Mb | - | 8 GB |
| STM32H747I-EVAL | Graphic | 2 | Internal | No | 4” DSI | Yes | 2 x 512 Mb Quad-SPI | 256 Mb | 16 Mb | 128 Mb | - | 8 GB |
| STM32H757I-EVAL | Graphic | 2 | Internal | Yes | 4” DSI | Yes | 2 x 512 Mb Quad-SPI | 256 Mb | 16 Mb | 128 Mb | - | 8 GB |
| STM32H7B3I-EVAL | Graphic | 1 | Internal | Yes | 7” RGB | No | 1 x 512 Mb Octo-SPI | 256 Mb | 16 Mb | 128 Mb | - | 8 GB |
SOFTWARE TOOLS
www.st.com/stm32softwaretools

STM32CubeMX
IDEs
STM32CubeProg
STM32CubeMonPwr

Configure and generate code
Compile and debug
Monitor & program

Notes:
- ARM Keil, IAR and ac6 support multi-core debugging
- STM32CubeIDE will support multi-core debugging in Q4 2019.

EMBEDDED SOFTWARE
www.st.com/stm32embeddedsoftware

Customers Applications
STM32Cube Embedded Software

STM32Cube Expansion Packages from ST
STM32Cube Expansion Packages from Partners

STM32Cube MCU Packages
STM32Cube MCU Middleware

STM32Cube HAL & LL drivers

Arm® Cortex®-M

ST COMMUNITY
Ask, learn, share, discuss, and engage with the community of STM32 enthusiasts on community.st.com/stm32

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STM32 EDUCATION
Bring your STM32 project to life with the free educational and training resources available on st.com/stm32education