STM32H7 series
Powered by Arm® Cortex®-M7
Releasing your creativity
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 power 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.

### 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
- From 128 KB up to 2 MB dual bank Flash / 1 MB RAM

* only in STM32H745, STM32H755, STM32H747 and STM32H757

### 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™

### 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 125 °C supported as maximum junction temperature

Two powerful cores supported by a robust architecture

- **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 480 MHz
- Dual-core Cortex-M7 480 MHz and Cortex-M4 240 MHz (STM32H7x5 and STM32H7x7 only)
- Flash and RAM acceleration
- SP-FPU and DP-FPU
- 4 x DMA

### Connectivity

- 2 x USB2.0 OTG FS/HS
- 2 x SDMMC
- 2 x CAN (1 x FD and 1 x TT)
- HDMI-CEC
- FMC, Dual-mode Quad-SPI
- Ethernet MAC IEEE1588
- 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)¹
- 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

<table>
<thead>
<tr>
<th>Product line</th>
<th>f_{cpu} (MHz)</th>
<th>Dual-Bank Flash memory (bytes)</th>
<th>RAM (bytes)</th>
<th>Graphic</th>
<th>Power supply</th>
<th>Ambient temperature range</th>
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<tbody>
<tr>
<td>STM32H7x7</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>TFT-LCD JPEG codec</td>
<td>DCDC + LDO</td>
<td>Standard 85 °C</td>
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<td>STM32H7x5</td>
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<td>1 Mbyte (incl. 128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup1) + 4 Kbytes backup2</td>
<td>TFT-LCD JPEG codec</td>
<td>DCDC + LDO</td>
<td>Standard 85 °C (Opt. Industrial CPN 125 °C)²</td>
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<td>STM32H7x3</td>
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<td>1 Mbyte (incl. 128 Kbytes DTCM + 64 Kbytes ITCM + 64 Kbytes backup1) + 4 Kbytes backup2</td>
<td>TFT-LCD JPEG codec</td>
<td>LDO</td>
<td>Standard 85 °C</td>
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<td>LDO</td>
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<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>TFT-LCD JPEG codec</td>
<td>LDO</td>
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**Notes:**

1 : optional - dedicated CPN, STM32H753, STM32H755, STM32H757 for the Crypto Variants
2 : available Q4-2019 - Maximum extended temperature range: 125 °C ambiant / 140 °C junction. Dedicated part numbers

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

Manage STM32 authentication, firmware decryption and installation

**Customer premises**

- FW
- Encrypted FW
- Store encryption key in HSM
- ST Hardware Secure Module (HSM)

**Untrusted environment**

- Encrypted FW transfer
- HSM physical transfer
- Authenticate target STM32
- Generate installation license

**Note:** *optional – SFI service available on specific part numbers*
## 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 Flash (Mbits)</th>
<th>SDRAM (Mbits)</th>
<th>SRAM (Mbits)</th>
<th>NOR (Mbits)</th>
<th>eMMC (Gbytes)</th>
<th>SDCard (Gbytes)</th>
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<td><strong>Discovery kits</strong></td>
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<td><strong>Evaluation boards</strong></td>
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</tbody>
</table>

### ACCESSORIES FOR STM32H747 DISCOVERY KIT

- **B-LCDAD-HDMI1**
  - DSI to HDMI adapter
- **B-LCDAD-RPI1**
  - 15-pin single row flexible printed circuit DSI adapter board
- **B-LCD40-DSI1**
  - 4” WVGA TFT LCD with MIPI DSI™ interface and capacitive touch screen
  
  *Note: * for STM32H747I-DISCO1 only
SOFTWARE TOOLS
www.st.com/stm32softwaretools

STM32CubeMX

IDEs

STM32CubeProgrammer
STM32CubeMonitor

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

STM32Cube LL
(low-layer APIs)

STM32Cube HAL and middleware
STM32 Std Peripherals Libraries

CMSIS and
mbed SDK

High optimization
low portability

Average optimization
STM32 portability

Low optimization
Arm portability

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

Order code: BRSTM32H70719
For more information on ST products and solutions, visit www.st.com/stm32h7