STM32H7R/S LINES

Unlocking new innovation possibilities with a scalable & secure bootflash MCU

Embrace design freedom and simplicity thanks to an innovative architecture and MCU ecosystem

The STM32H7RS lines, powered by the STM32 Cortex-M7, offer max performance with a 600 MHz bootflash MCU, making these lines ideal for high-speed real-time applications. Its external memory interfaces support eXecute-in-Place (XiP) applications, while the 2.5D GPU can handle up to WSVGA with minimal CPU load. This MCU offers advanced security features such as ST-iRoT, memory protection, crypto, and authentication, making it a secure and cost-effective choice for building future-proofed applications.
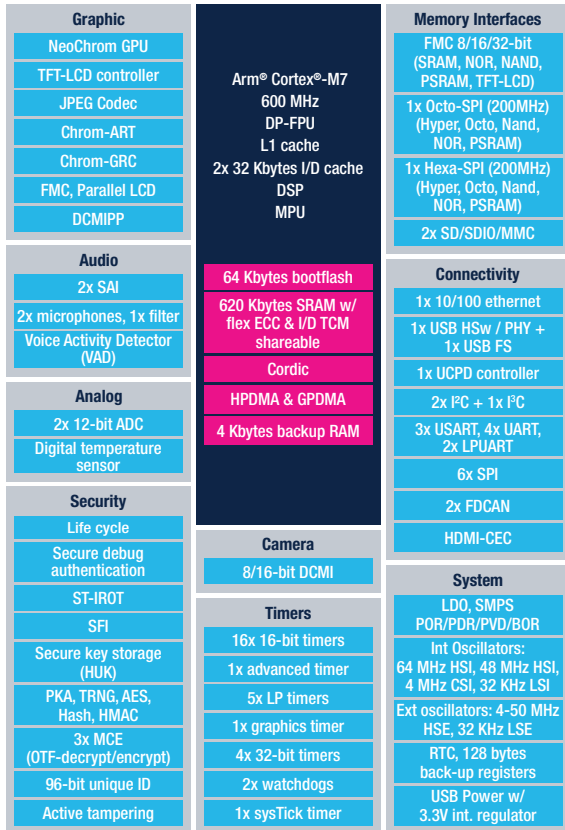
KEY FEATURES AND BENEFITS

- NeoChrom GPU:
  Accelerating 2.5D GUIs, making it easier to reach 60FPS GUIs with low MCU load.

- Advanced security:
  Debug authentication, secure application & silicon life-cycle, secure key-storage, immutable root of Trust (ST-IRoT), target SESIP3 and PSA certified level 3 certifications.

- 200 MHz xSPI:
  High speed, real-time capabilities from int./ext. Memories with on-the-fly decrypt/encrypt.

- USB HS/FS PHY, I3C:
  For USB power delivery support, 2 type-C connectors, dedicated DMA & dual USB FS/HS with PHY. I3C comm, enabling lower cost implementation with DMA for zero CPU interventions.
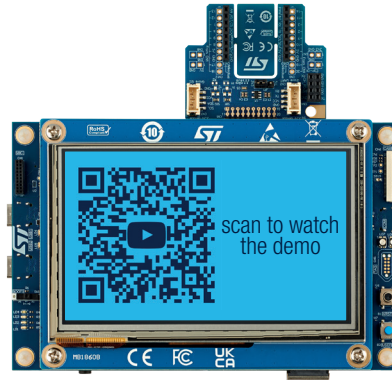
KEY APPLICATIONS

- IoT for Smart Industry applications:
  Gateways, robotics, security systems, sensor fusion, point of sales

- Smart home and professional appliances:
  Kitchen appliances, vacuum cleaners, robot lawn movers, air purifiers, thermostats

- Medical and healthcare:
  Digital health, medical imaging, therapy equipment

www.st.com/stm32h7r7-7s7
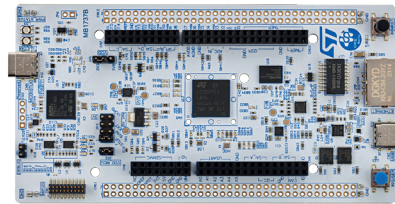
STM32H7RS BLOCK DIAGRAM

Graphic
- NeoChrom GPU
- TFT-LCD controller
- JPEG Codec
- Chrom-ART
- Chrom-GRC
- FMC, Parallel LCD
- DCMIPP

Audio
- 2x SAI
- 2x microphones, 1x filter
- Voice Activity Detector (VAD)

Analog
- 2x 12-bit ADC
- Digital temperature sensor

Security
- Life cycle
- Secure debug authentication
- ST-IROT
- SFI
- Secure key storage (HUK)
- PKA, TRNG, AES, Hash, HMAC
- 3x MCE (OTF-decrypt/encrypt)
- 96-bit unique ID
- Active tampering

Arm® Cortex®-M7
600 MHz
DP-FPU
L1 cache
2x 32 Kbytes I/D cache
DSP
MPU

64 Kbytes bootflash
620 Kbytes SRAM w/ flex ECC & I/D TCM shareable
Cordic
HPDMA & GPDMA
4 Kbytes backup RAM

Camera
- 8/16-bit DCMI

Timers
- 16x 16-bit timers
- 1x advanced timer
- 5x LP timers
- 1x graphics timer
- 4x 32-bit timers
- 2x watchdogs
- 1x sysTick timer

Memory Interfaces
- FMC 8/16/32-bit (SRAM, NOR, NAND, PSRAM, TFT-LCD)
- 1x Octo-SPI (200MHz) (Hyper, Octo, Nand, NOR, PSRAM)
- 1x Hexa-SPI (200MHz) (Hyper, Octo, Nand, NOR, PSRAM)
- 2x SD/SDIO/MMC

Connectivity
- 1x 10/100 ethernet
- 1x USB HSw / PHY + 1x USB FS
- 1x UCPD controller
- 2x I²C + 1x I³C
- 3x USART, 4x UART, 2x LPUART
- 6x SPI
- 2x FDCAN
- HDMI-CEC

System
- LDO, SMPS POR/PDR/PVD/BOR
- Int Oscillators: 64 MHz HSI, 48 MHz HSI, 4 MHz CSI, 32 KHz LSI
- Ext oscillators: 4-50 MHz HSE, 32 KHz LSE
- RTC, 128 bytes back-up registers
- USB Power w/ 3.3V int. regulator

HARDWARE TOOLS

A full set of development boards enables flexible prototyping as well as full STM32H7S evaluation.
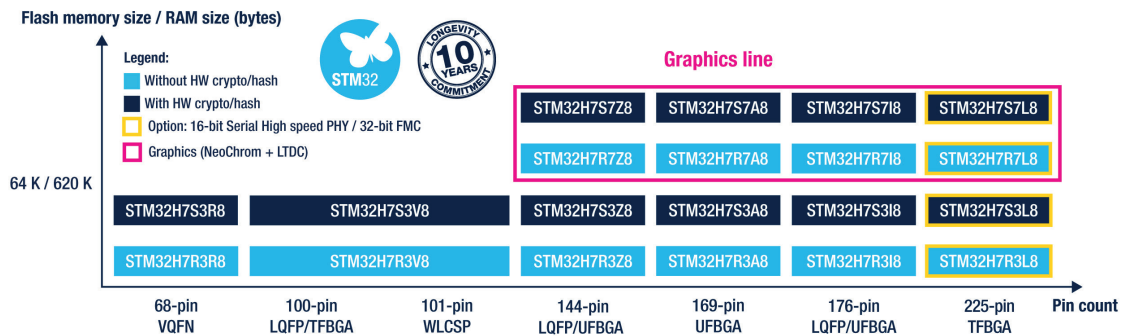
scan to watch the demo

STM32H7S78-DK
Essential prototyping
256-Mbit Octo-SPI NOR Flash, Ethernet, USB, Stlink debugger, Arduino UNO extension interface.

NUCLEO-H7S3L8
Feature-rich prototyping
1 Gbit Octo-SPI NOR Flash, 256 Mbit Octo-SPI PSRAM, WVGA TFT display, Ethernet, USB, microSD, audio, microphone mems, Stlink debugger, Arduino UNO and Camera extension interfaces.

STM32H7RS PORTFOLIO

Flash memory size / RAM size (bytes)

Legend:
- Without HW crypto/hash
- With HW crypto/hash
- Option: 16-bit Serial High speed PHY / 32-bit FMC
- Graphics (NeoChrom + LTDC)

STM32

LONGEVITY 10 YEARS COMMITMENT

Graphics line

STM32H7S7Z8	STM32H7S7A8	STM32H7S7I8	STM32H7S7L8
STM32H7R7Z8	STM32H7R7A8	STM32H7R7I8	STM32H7R7L8

64 K / 620 K

STM32H7S3R8	STM32H7S3V8		STM32H7S3Z8	STM32H7S3A8	STM32H7S3I8	STM32H7S3L8
STM32H7R3R8	STM32H7R3V8		STM32H7R3Z8	STM32H7R3A8	STM32H7R3I8	STM32H7R3L8

| 68-pin VQFN | 100-pin LQFP/TFBGA | 101-pin WLCSP | 144-pin LQFP/UFBGA | 169-pin UFBGA | 176-pin LQFP/UFBGA | 225-pin TFBGA | Pin count |

START DEVELOPING NOW!

STM32Cube ecosystem
More than **1 million developers** have chosen STM32Cube, making it the reference in the industry.

STM32CubeH7RS firmware package

STM32 Cube

STM32 for GUI

STM32 Cloud Solutions