Overview

D13x is a high performance MCU family based on RISCV, industrial full-HD and smart control. Equipped with a powerful 2D image accelerator, PNG decoder, JPEG decoder engine and various display interfaces, as well as providing wide industrial temperatures, D13x is of high reliability and openness. It can be widely applied in HMI, gateways, serial display screens, smart home devices, and other pan-industrial sectors.

Features

✧ CPU Core

- Single-core 32-bit CPU based on RISC-V
- I-Cache 32KB, D-Cache 32KB
- I-TCM 128KB, D-TCM 128KB
- Single/ double-precision floating-point unit (FPU), integrated with DSP instruction set
- Up to 480MHz@1.2V of operating frequency

✧ Memory Subsystem

- 64 KB BROM, 1MB SRAM, and 2MB NOR Flash
- Equipped with 4/8-MB PSRAM with a maximum speed of 200 MHz
- Booting from SPI NAND/NOR, EMMC, and SD cards available.
- Mass production via USB, UART, and SD cards, as well as firmware upgrades via USB flash drives.
- Encryption with SHA-256/ TRNG/ RSA
- SPI on-the-fly encryption and decryption

✧ Multiple Media Subsystem

- PNG decoding and JPEG encoding/decoding at 720P@60fps.
- Rotation at any angle, scaling, and Porter-Duff blending with up to 1080P@60fps of 2D graphics acceleration.
- Gamma, dithering, and color matrix adjustments.
- Up to 1366x768@60fps for hardware overlay of video and UI layers
- RGB888/ LVDS/ MIPI-DSI 1366x768@60fps outputs
- I8080/ SPI screen interface output
- YUV422/BT.656 CMOS digital parallel port input at 1080P@30fps
- Dual-channel DMIC input and dual-channel PWM audio output

✧ Peripherals

- One 10/100M Ethernet EMAC.
- One USB2.0 DRD with independent HS PHY.
- One I2S/PCM interface.
- A 16-bit 200-MHz programmable PBUS
- Dual CAN2.0A/B compatible interfaces
- Two SD card/SDIO interfaces
- Three I2C interfaces
- Four SPI interfaces
- Four complementary PWMs and 12 high-performance EPWMs
- Six CAPs with capture functionality and 10 QEPs
- Eight UARTs with automatic RS485 receive-transmit control switching
- Six groups of GPIOs totaling 84 independently configurable IOs
- One CIR with infrared input and output functions
- Four-wire resistive touch screen (RTP)

✧ RTC Subsystem

- Built in oscillator, external 32768Hz crystal

required
- Built in 128bit universal read/write register
- Built-in 32bit timer
- Support Alarm function, use IO to output Alarm signal
- Built in software calibration function
- Minimum sleep power consumption<3uA
- Built in automatic switch cell for power supply and battery

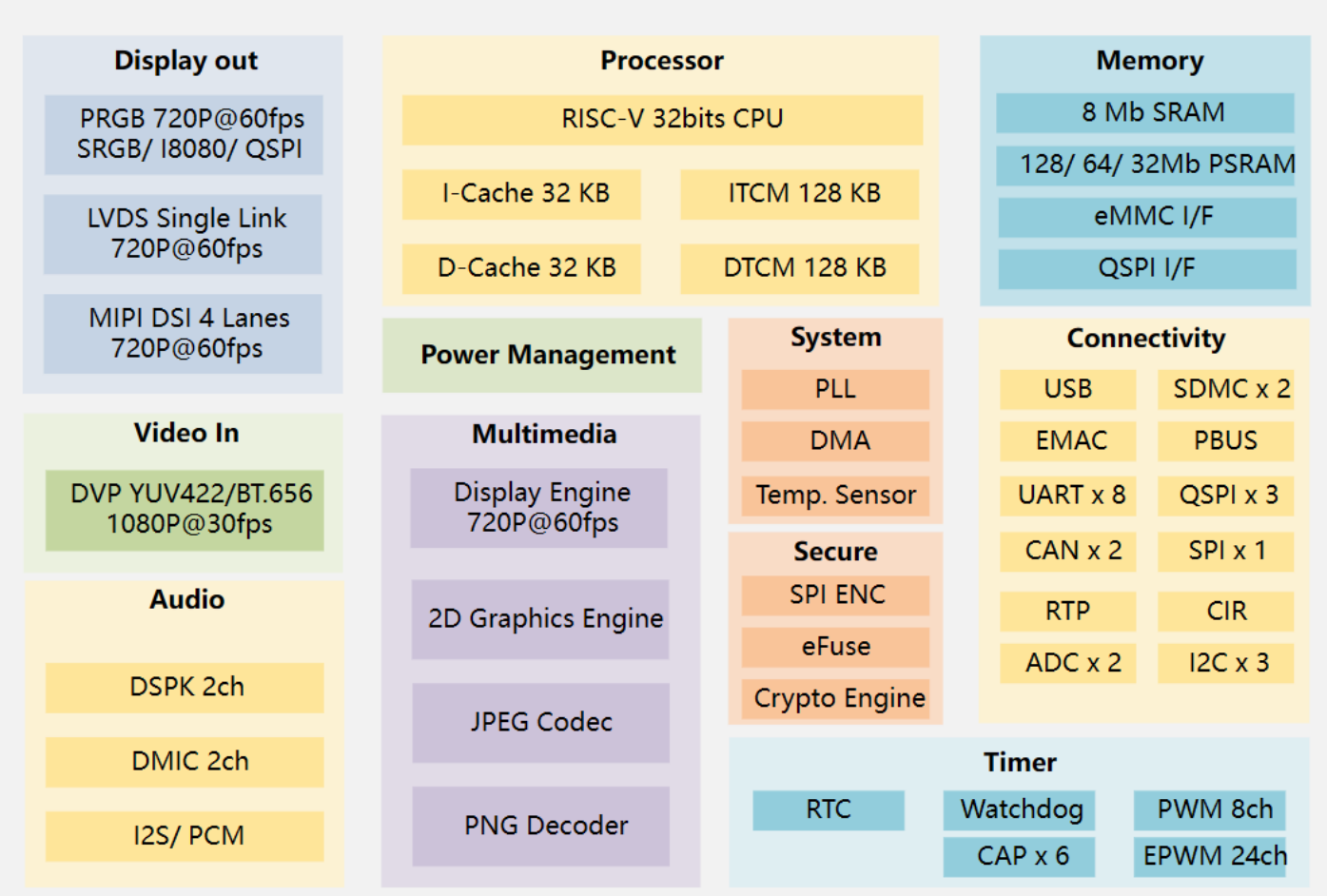
✧ Package

- QFN68（7*7mm 0.35mm pitch）
- QFN88（10*10mm 0.4mm pitch）
- QFN100（12*12mm 0.4mm pitch）

- Tj -40~125℃

✧ Software

- RT-Thread and Bare-metal system support
- Eclipse, VS Code and other IDE tools available
- LVGL/AWTK and other GUI framework support
- Independent compilation and operation of APPs



D13X Architecture