

NanoRice binocular camera development board data sheet V1.0

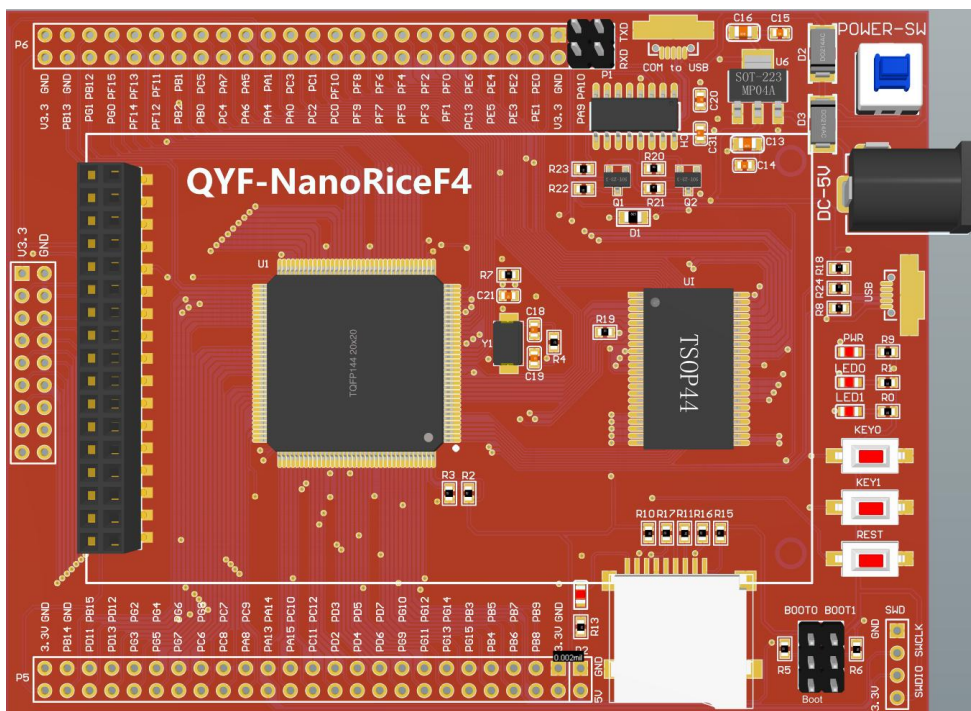
1. Product overview

The NanoRice binocular camera development board uses STM32F407ZGT6 or STM32H743ZIT6 as the main chip.

The camera interface realizes the acquisition of the binocular camera and displays it on the TFT LCD screen. It can capture images of static or slow scenes or processing, to achieve ranging and other low-cost binocular occasions.

2. Development board configuration

- (1) Main chip: STM32F407ZGT6 or STM32H743ZIT6
- (2) SRAM: Onboard 512K16-bit SRAM
- (3) LCD: 16-bit TFT liquid crystal, 2.8 inches, 240x320 pixels
- (4) A USB to serial interface, which can be downloaded directly from the serial port (no need to set BOOT)
- (5) One USB2.0 interface
- (6) A TFT interface
- (7) A DC power interface, 5-12V input
- (8) A switch button
- (9) One reset button, two user buttons
- (10) 3 user LEDs
- (11) A SWD download interface
- (12) Boot setting port
- (13) All available pins lead out



3. Main functions

(1) STM32F407ZGT6

Core:

Arm [®] 32-bitCortex [®]-M4CPUwithFPU,Adaptivevreal-timeaccelerator(ARTAccelerator)allowing0-waitstateexecutionfromFlashmemory, frequencyupto168MHz,memoryprotectionunit,210DMIPS/1.25DMIPS/MHz(Dhrystone2.1),andDSPinstructions

Memories

- Upto1MbyteofFlashmemory
- Upto192+4KbytesofSRAMincluding64-KbyteofCCM(corecoupledmemory)dataRAM
- 512bytesofOTPmemory
- FlexiblestaticmemorycontrollersupportingCompactFlash,SRAM,PSRAM,NORandNANDmemories

LCDparallelinterface,8080/6800modes

Clock,resetandsupplymanagement

- 1.8Vto3.6VapplicationsupplyandI/Os
- POR,PDR,PVDandBOR
- 4-to-26MHzcrystaloscillator
- Internal16MHzfactory-trimmedRC(1%accuracy)
- 32kHzoscillatorforRTCwithcalibration
- Internal32kHzRCwithcalibration

Low-poweroperation

- Sleep,StopandStandbymodes
- V_{BAT} supplyforRTC,20×32bitbackupregisters+optional4KBbackupSRAM

3×12-bit,2.4MSPSA/Dconverters:upto24channelsand7.2MSPSinterleavedmode

2×12-bitD/Aconverters

General-purposeDMA:16-streamDMAcontrollerwithFIFOsandburstsupport

Upto17timers:uptotwelve16-bitandtwo32-bittimersupto168MHz,eachwithupto4IC/OC/PWMorpulsecounterandquadrature

(incremental)encoderinput

Debug mode

- Serialwiredebug(SWD)&JTAGinterfaces
- Cortex-M4EmbeddedTraceMacrocell™

Upto140I/Oportswithinterruptcapability

- Upto136fastI/Osupto84MHz
- Upto1385V-tolerant I/Os
- Upto15communicationinterfaces
- Upto3×ICintefaces(SMBus/PMBus)
- Upto4USARTs/2UARTs(10.5Mbit/s,ISO7816interface,LIN,IrDA,modemcontrol)
- Upto3SPIs(42Mbits/s),2withmuxedfull-duplexIStoachieveaudioclassaccuracyviainternalaudioPLLorexternalclock
- 2×CANinterfaces(2.0BAActive)
- SDIOinterface

Advancedconnectivity

- USB2.0full-speeddevice/host/OTGcontrollerwithon-chipPHY
- USB2.0high-speed/full-speeddevice/host/OTGcontrollerwithdedicatedDMA,on-chipfull-speedPHYandULPI
- 10/100EthernetMACwithdedicatedDMA:supportsIEEE1588v2hardware,MII/RMII

8-to14-bitparallelcamerainterfaceupto54Mbytes/s

Truerandomnumbergenerator

CRCcalculationunit

96-bituniqueID

RTC:subsecondaccuracy,hardwarecalendar

(2) STM32H743ZIT6

Core

- 32-bit ARM® Cortex®-M7 core with double-precision FPU and L1 cache: 16Kbytes of data and 16Kbytes of instruction cache; frequency up to 480MHz, MPU, 102.7DMIPS/2.14DMIPS/MHz (Dhrystone 2.1), and DSP instructions

Memories

- Up to 2Mbytes of Flash memory with read-while-write support
- Up to 1Mbyte of RAM: 192Kbytes of TCMRAM (inc. 64Kbytes of ITCMRAM + 128Kbytes of DTCMRAM for time-critical routines), Up to

864Kbytes of user SRAM, and 4Kbytes of SRAM in Backup domain

- Dual mode Quad-SPI memory interface running up to 133MHz
- Flexible external memory controller with up to 32-bit data bus: SRAM, PSRAM, SDRAM/LP SDR SDRAM, NOR/NAND Flash memory clocked

up to 100MHz in Synchronous mode

- CRC calculation unit

Security

- ROP, PC-ROP, active tamper
- General-purpose input/outputs
- Up to 168 I/O ports with interrupt capability
- Reset and power management
- 3 separate power domains which can be independently clock-gated or switched off:
- 1.62 to 3.6V applications supply and I/Os
- POR, PDR, PVD and BOR
- Dedicated USB power embedding a 3.3V internal regulator to supply the internal PHYs
- Embedded regulator (LDO) with configurable scalable output to supply the digital circuitry
- Voltage scaling in Run and Stop mode (6 configurable ranges)
- Backup regulator (~0.9V)
- Voltage reference for analog peripheral/V REF+
- Low-power modes: Sleep, Stop, Standby and V BAT supporting battery charging

Low-power consumption

- V BAT battery operating mode with charging capability
- CPU and domain power state monitoring pins
- 2.95µA in Standby mode (Backup SRAM OFF, RTC/LSE ON)
- Clock management
- Internal oscillators: 64MHz HSI, 48MHz HSI48, 4MHz CSI, 32kHz LSI
- External oscillators: 4-48MHz HSE, 32.768kHz LSE
- 3× PLLs (1 for the system clock, 2 for kernel clocks) with Fractional mode

Interconnect matrix

- 4 DMA controllers to unload the CPU
- 1× high-speed master direct memory access controller (MDMA) with linked lists support
- 2× dual-port DMAs with FIFO
- 1× basic DMA with request router capabilities

Up to 35 communication peripherals

- 4× I2C/SMBus+ interfaces (SMBus/PMBus)
- 4× USARTs/4× UARTs (ISO7816 interface, LIN, IrDA, up to 12.5Mbit/s) and 1× LPUART
- 6× SPIs, 3 with muxed duplex I2S audio class accuracy via internal audio PLL or external clock, 1× I2S in LP domain (up to 150MHz)
- 4× SAI (serial audio interface)
- SPDIF RX interface
- SWPMI single-wire protocol master/I/F
- MDIO slave interface

- 2×SD/SDIO/MMC interfaces (upto 125MHz)
- 2×CAN controllers: 2 with CANFD, 1 with time-triggered CAN (TT-CAN)
- 2×USB OTG interfaces (1FS, 1HS/FS) crystal-less solution with LPM and BCD
- Ethernet MAC interface with DMA controller
- HDMI-CEC
- 8-to-14-bit camera interface (upto 80MHz)

11 analog peripherals

- 3×ADCs with 16-bit max. resolution (upto 36 channels, upto 3.6MSPS)
- 1× temperature sensor
- 2× 12-bit D/A converters (1MHz)
- 2× ultra-low-power comparators
- 2× operation amplifiers (7.3MHz bandwidth)
- 1× digital filters for sigma-delta modulator (DFSDM) with 8 channels/4 filters

Graphics

- LCD-TFT controller upto XGA resolution
- Chrom-ART graphical hardware accelerator (DMA2D) to reduce CPU load
- Hardware JPEG codec

Upto 22 timers and watchdogs

- 1× high-resolution timer (2.1ns max resolution)
- 2× 32-bit timers with upto 4 IC/OC/PWM or pulse counter and quadrature (incremental) encoder input (upto 240MHz)
- 2× 16-bit advanced motor control timers (upto 240MHz)
- 10× 16-bit general-purpose timers (upto 240MHz)
- 5× 16-bit low-power timers (upto 240MHz)
- 2× watchdogs (independent and window)
- 1× SysTick timer
- RTC with sub-second accuracy and hardware calendar

Debug mode

- SWD & JTAG interfaces
- 4-Kbyte Embedded Trace Buffer

True random number generators (3 oscillators each)

96-bit unique ID

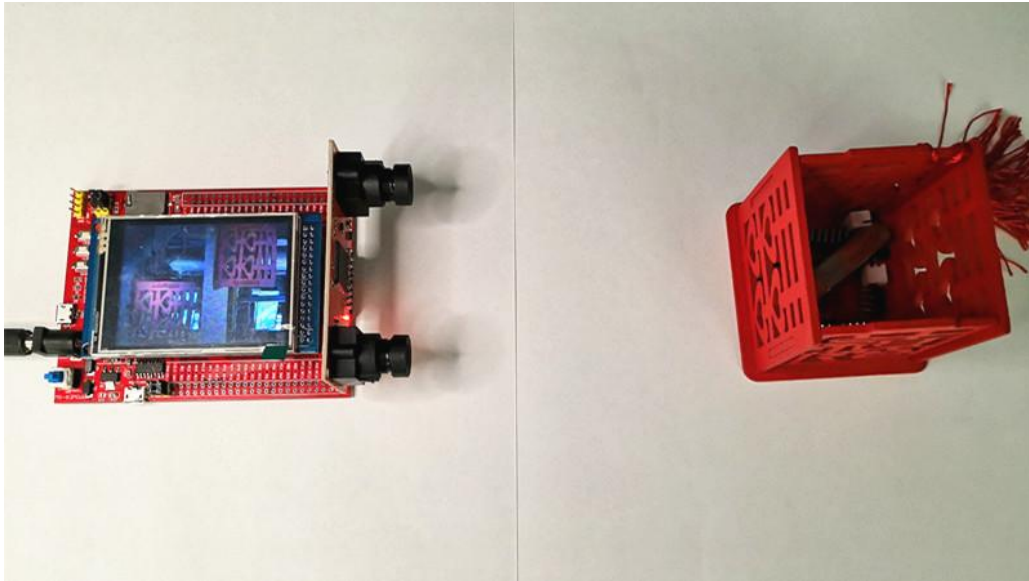
All packages are ECOPACK2 compliant

4. Product specifications

- (1) Product size: 105x80mm
- (2) Weight: about 200g
- (3) TFT-LCD: 2.8 inches 280x320 pixels
- (4) DC input: 5V-12V (optional)

5. How to use

- (1) Insert the binocular camera
- (2) Burn firmware through SWD
- (3) Connect the USB cable, any one of the 2 USB ports can be used
- (4) After normal, the LCD will display double images



6. Precautions:

In general, USB power supply can be used to meet the requirements of the development board. If there are voltage instability problems such as screen flickering and jittering, you can use the

The input voltage of the DC terminal meets the power supply requirements of the board.