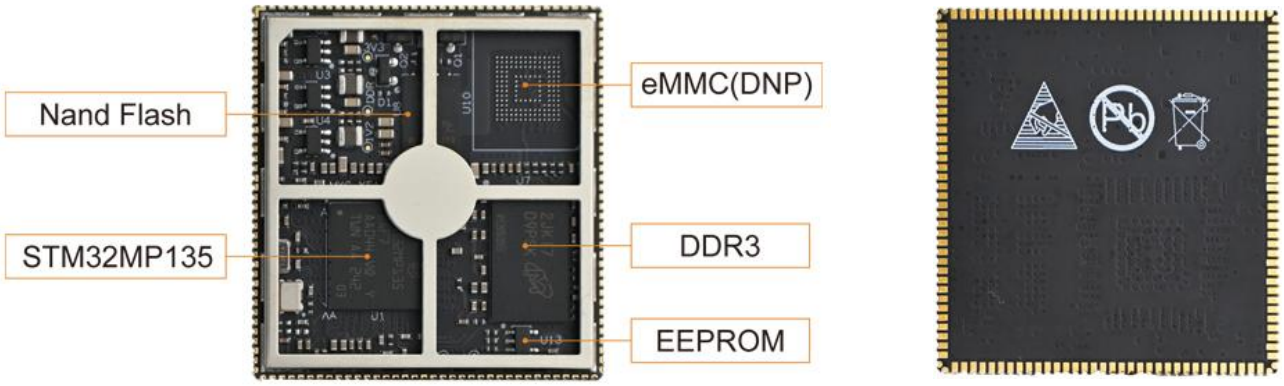
MYiR 米尔电子
Make Your Idea Real

MYC-YF13X CPU Module

Overview

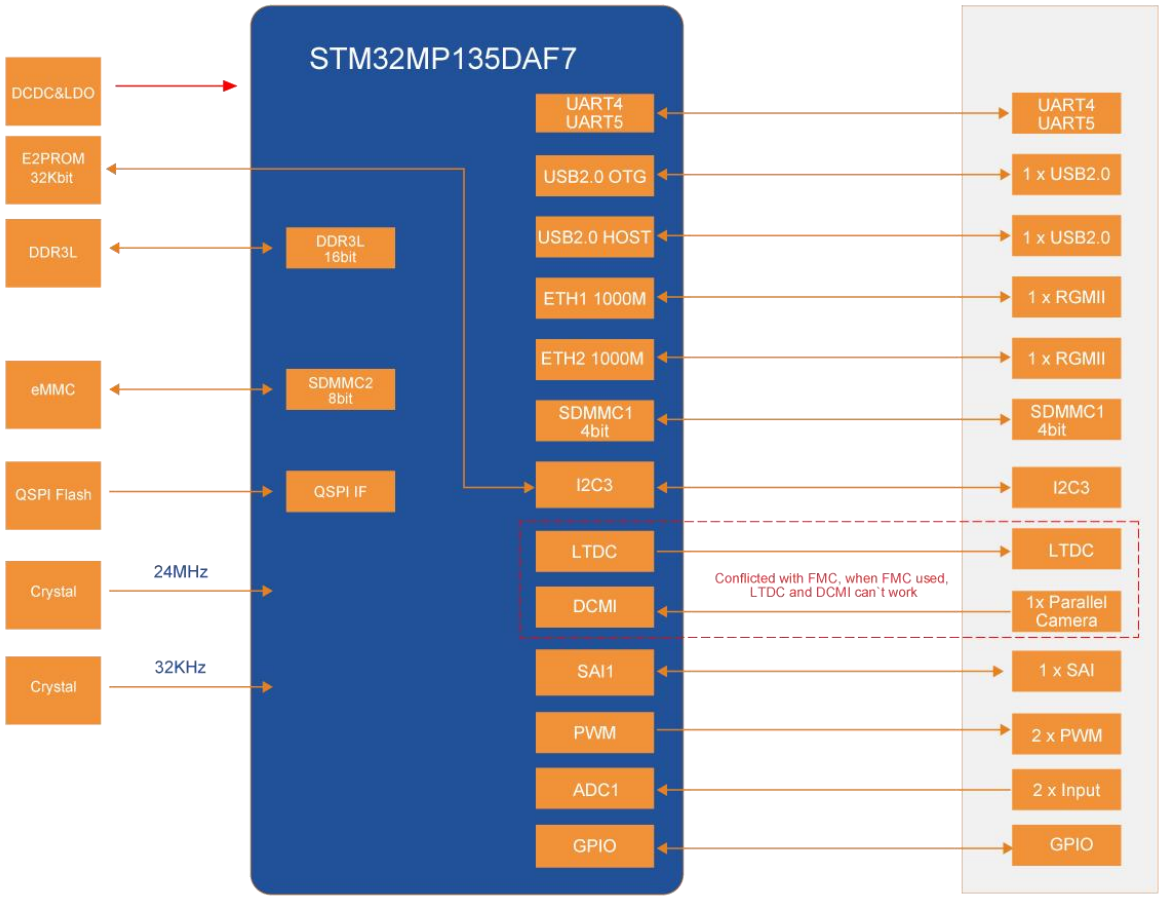
- ✓ *1GHz ST STM32MP135 ARM Cortex-A7 Processor*
- ✓ *256/512MB DDR3L, 256MB Nand Flash/4GB eMMC, 32Kbit EEPROM*
- ✓ *1.0mm pitch 148-pin Stamp Hole Expansion Interface*
- ✓ *Supports Running Linux 5.15*

Measuring only 37mm by 39mm, the **MYC-YF13X CPU Module** is a compact System-on-Module (SoM) based on **ST STM32MP135** processor (STM32MP135DAF7) which among the STM32MP1 series processor and features 1GHz single ARM Cortex-A7 core. It has onboard DDR3L, Nand Flash or eMMC, and 32Kbit EEPROM. A variety of peripheral and IO signals are brought out through the 1.0 mm pitch 148-pin stamp-hole (Castellated-Hole) expansion interface. With high reliability, extensive peripheral resources and low cost, the MYC-YF13X can be used in a wide range of applications such as energy power, industrial control, industrial gateway, industrial HMI, and more others.



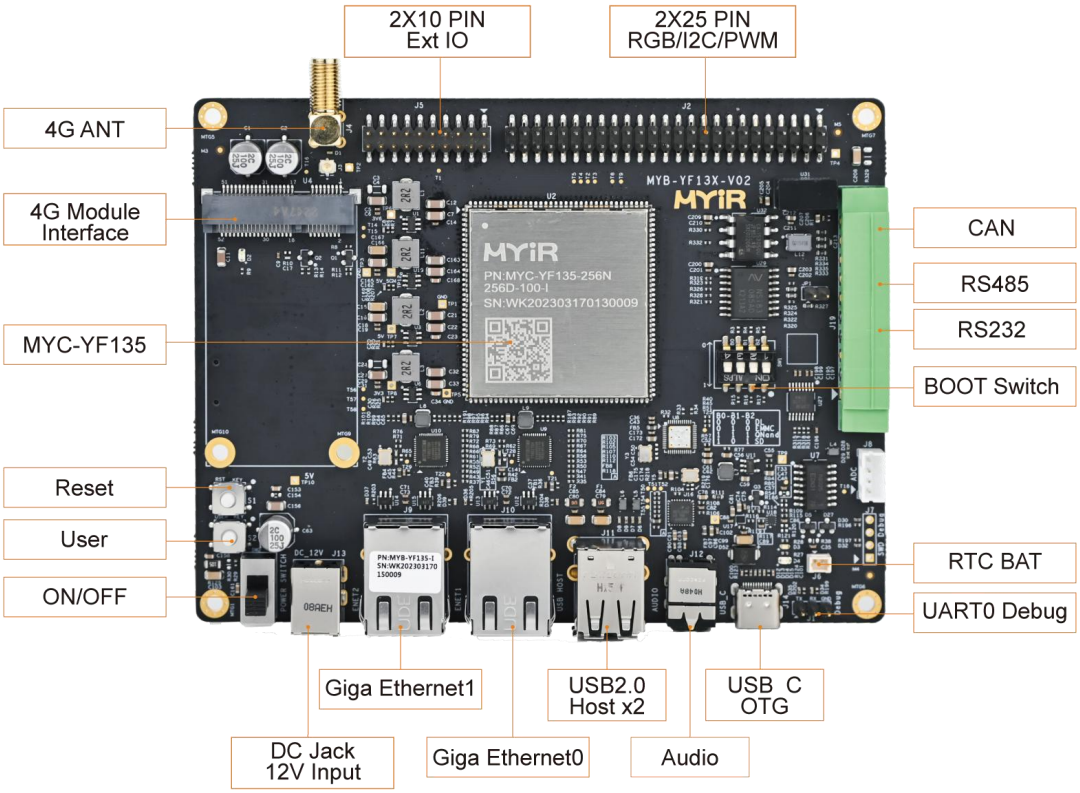
MYC-YF13X CPU Module Top-view and Bottom-view (delivered with shielding cover installed by default)

The **MYC-YF13X CPU Module** is capable of running Linux 5.15. MYIR provides image files, kernel and driver source codes, application demos and compilation tools to enable users to start their development rapidly and easily.

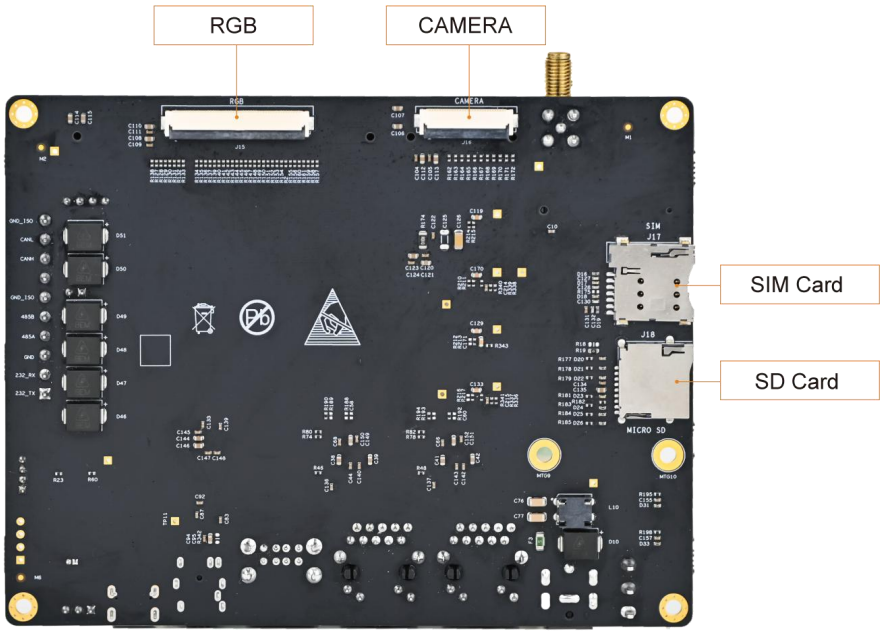


MYC-YF13X CPU Module Function Block Diagram

The **MYD-YF13X Development Board** is provided for evaluating and prototyping based on **STM32MP135** series microprocessors. It is built around the **MYC-YF13X CPU Module** and has brought out a rich set of peripherals and interfaces to the base board including RS232, RS485, two USB 2.0 HOST and one USB 2.0 OTG, two Gigabit Ethernet, CAN, one Micro SD card slot, one USB based Mini-PCIe 4G Module interface with one SIM card holder, LCD interface, Camera interface, Audio input and output as well as two extension headers. It is delivered with Quick Start Guide, one USB to TTL serial cable, one 12V/2A Power adapter and one DC Power jack adapter to help users start up the development right away out-of-the-box. MYIR also offers **MY-LCD70TP-C LCD Module**, **MY-CAM011B Camera Module** and **MY-RGB2HDMI Module** as the options for the board.



MYD-YF13X Development Board (Top-view)



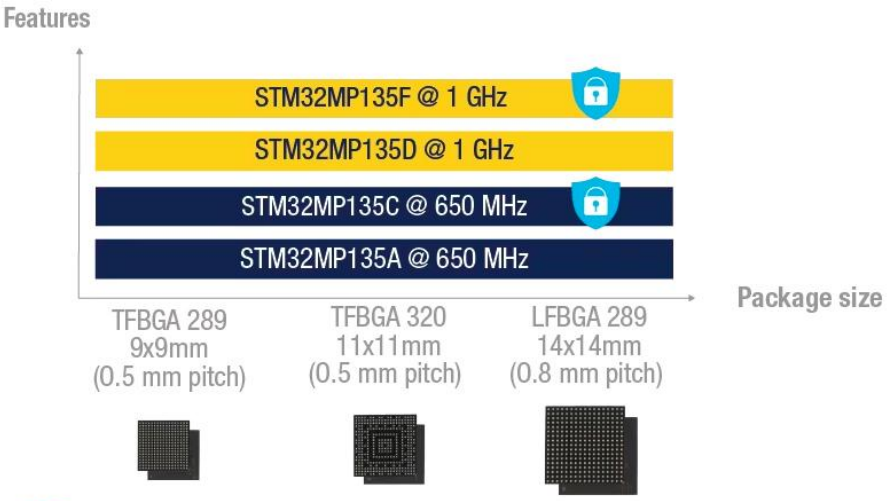
MYD-YF13X Development Board (Bottom-view)

Hardware Specification

The **MYC-YF13X CPU Module** is using 11 x 11mm, 0.5 mm ball pitch, 320ball TFBGA package, 1GHz **ST STM32MP135DAF7** MPU which belongs to the **ST STM32MP135** product line and features a single Arm Cortex-A7 core running up to 1GHz, a dedicated LCD-TFT parallel display interface, a 16-bit parallel camera and dual Ethernet ports to offer cost- & energy-efficient processing capabilities. The STM32MP135 line is available in 3 different packages for a cost-efficient PCB architecture.

Feature	Description
CPU	32-bit Arm® Cortex®-A7 1GHz
External Storage	up to LPDDR2/LPDDR3-1066 16-bit up to DDR3/DDR3L-1066 16-bit Dual Quad-SPI memory interface 16-bit data bus: parallel interface to connect external ICs and SLC NAND memories with up to 8-bit ECC
Video Engine	Video Encoder / Decoder support up to WXGA (1366 × 768) @60 fps or up to Full HD (1920 x 1080) @ 30 fps pixel clock up to 90 MHz two layers (incl. 1 secured) with programmable color
Analog Peripheral	2 ADCs with 12-bit max. resolution up to 5 Msps 1 x temperature sensor 1 x digital filter for sigma-delta modulator (DFSDM) with 4 channels and 2 filters Internal or external ADC reference VREF+
RTC	Internal oscillators: 64 MHz HSI oscillator, 4 MHz CSI oscillator, 32 kHz LSI oscillator External oscillators: 8-48 MHz HSE oscillator, 32.768 kHz LSE oscillator 4 x PLLs with fractional mode
Controller	56 physical channels in total 1 x high-speed general-purpose master direct memory access controller (MDMA) 3 x dual-port DMAs with FIFO and request router capabilities for optimal peripheral management
Safety Engine	TrustZone® peripherals, 12 x tamper pins including 5 x active tampers Temperature, voltage, frequency and 32 kHz monitoring
Connection	5 x I2C FM+ (1 Mbit/s, SMBus/PMBus) 4 x UART + 4 x USART (12.5 Mbit/s, ISO7816 interface, LIN, IrDA, SPI slave) 5 x SPI (50 Mbit/s, including 4 with full-duplex I 2S audio class accuracy via internal audio PLL or external clock) 2 x SAI (stereo audio: I2S, PDM, SPDIF Tx) SPDIF Rx with 4 inputs 2 x SDMMC up to 8 bits (SD/eMMC/SDIO) 2 x CAN controllers supporting CAN FD protocol 2 x USB 2.0 high-speed Host – or 1 × USB 2.0 high-speed Host +1 × USB 2.0 high-speed OTG simultaneously 2 x Ethernet MAC/GMAC – IEEE 1588v2 hardware, MII/RMII/RGMII 8- to 16-bit camera interface, 3 Mpix @30 fps or 5Mpix @15 fps incolor or monochrome with pixel clock @120 MHz (max freq)
Packaging	BGA 320 balls, 11 mm x 11 mm size,0.5 mm ball pitch

STM32MP135 Processor Resources



STM32MP135 Block Diagram

Mechanical Parameters

- Dimensions: 37mm x 39mm
- PCB Layers: 10-layer design
- Power supply: +5V/1A
- Working temperature: -40~85 Celsius (industrial grade)

Processor

- Up to 1GHz ST STM32MP135 ARM Cortex-A7 processor (STM32MP135DAF7)

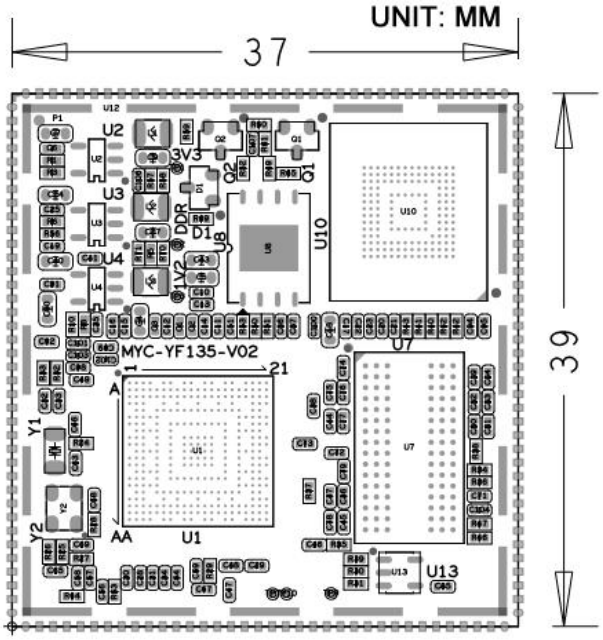
Memory

- 256/512MB DDR3L
- 256MB Nand FLASH/4GB eMMC
- 32Kbit EEPROM

Peripherals and Signals Routed to Pins

- 1.0mm pitch 148-pin Stamp Hole Expansion Interface
  - 2 x RGMII
  - 2 x USB2.0
  - 8 x UART
  - 2 x SCI
  - 2 x CAN FD
  - 4 x I2S
  - 5 x I2C
  - 2 x ADC
  - 1 x RGB
  - 1 x Parallel Camera
  - 2 x SAI
  - Up to 108 GPIOs

Note: the peripheral signals brought out to the expansion interface are listed in maximum number. Some signals are reused. Please refer to the processor datasheet and the CPU Module pinout description file.



MYC-YF13X Dimensions Chart

Software Features

The **MYC-YF13X CPU Module** supports Linux and comes with software packages. The kernel and many peripheral drivers are available in source code to assist clients expedite their ideas. The following are a summary of the software features:

Item	Feature	Description	Source Code
Bootstrap program	Tf-a	First boot program tf-a-STM32MP-2.6	YES
Bootloader	U-boot	Second boot program uboot_2021.10	YES
Linux kernel	Linux 5.15	Customized base on official kernel_5.15.67 version	YES
Device driver	USB Host	USB Host driver	YES
	USB OTG	USB OTG driver	YES
	I2C	I2C driver	YES
	SPI	SPI driver	YES
	Ethernet	YT8521SH driver	YES
	SDHI	eMMC/SD card driver	YES
	LVDS	LCD driver	YES
	4G	4G driver	YES
	PWM	PWM control	YES
	ADC	ADC driver	YES
	RTC	RTC driver	YES
	GPIO	General GPIO driver	YES
	UART	RS232/TTL driver	YES
	CAN	CAN driver	YES
	RS485	RS485 driver	YES
File system	myir-image-core	image without GUI interface built with Yocto	YES
	myir-image-full	full-featured image built with Yocto	YES

MYC-YF13X Software Features

Order Information

Product Item	Part No.	Packing List
MYC-YF13X CPU Module	MYC-YF135-256N256D-100-I	✓ One MYC-YF13X CPU Module
	MYC-YF135-4E512D-100-I	
MYD-YF13X Development Board	MYD-YF135-256N256D-100-I	✓ One MYD-YF13X Development Board (including MYC-YF13X CPU Module) ✓ One USB to UART Debug cable ✓ One 12V/2A Power adapter ✓ One DC Power jack adapter ✓ One Quick Start Guide
	MYD-YF135-4E512D-100-I	
MY-LCD70TP-C 7 inch LCD Module	MY-TFT070CV2	**Add-on Options** ✓ MY-TFT070CV2 LCD Module ✓ MY-CAM011B BUS Camera Module ✓ MY-RGB2HDMI
MY-CAM011B BUS Camera Module	MY-CAM011B	
MY-RGB2HDMI RGB-to-HDMI Module	MY-RGB2HDMI	

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