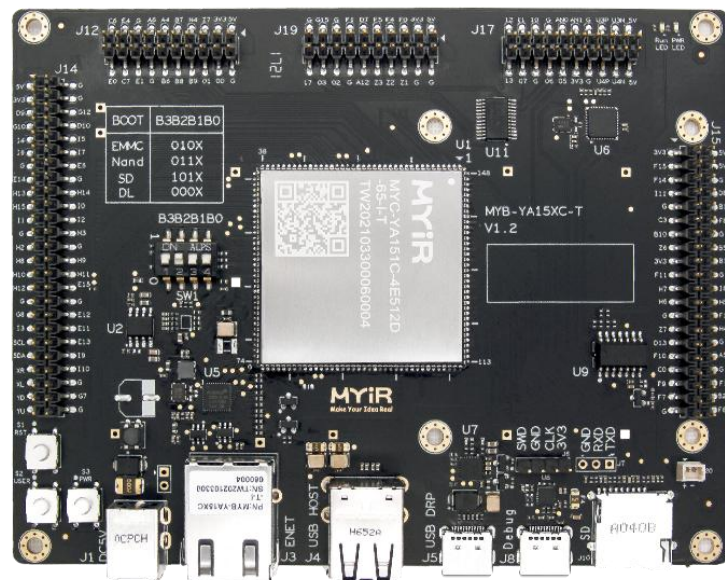




# MYD-YA15XC-T Development Board Overview



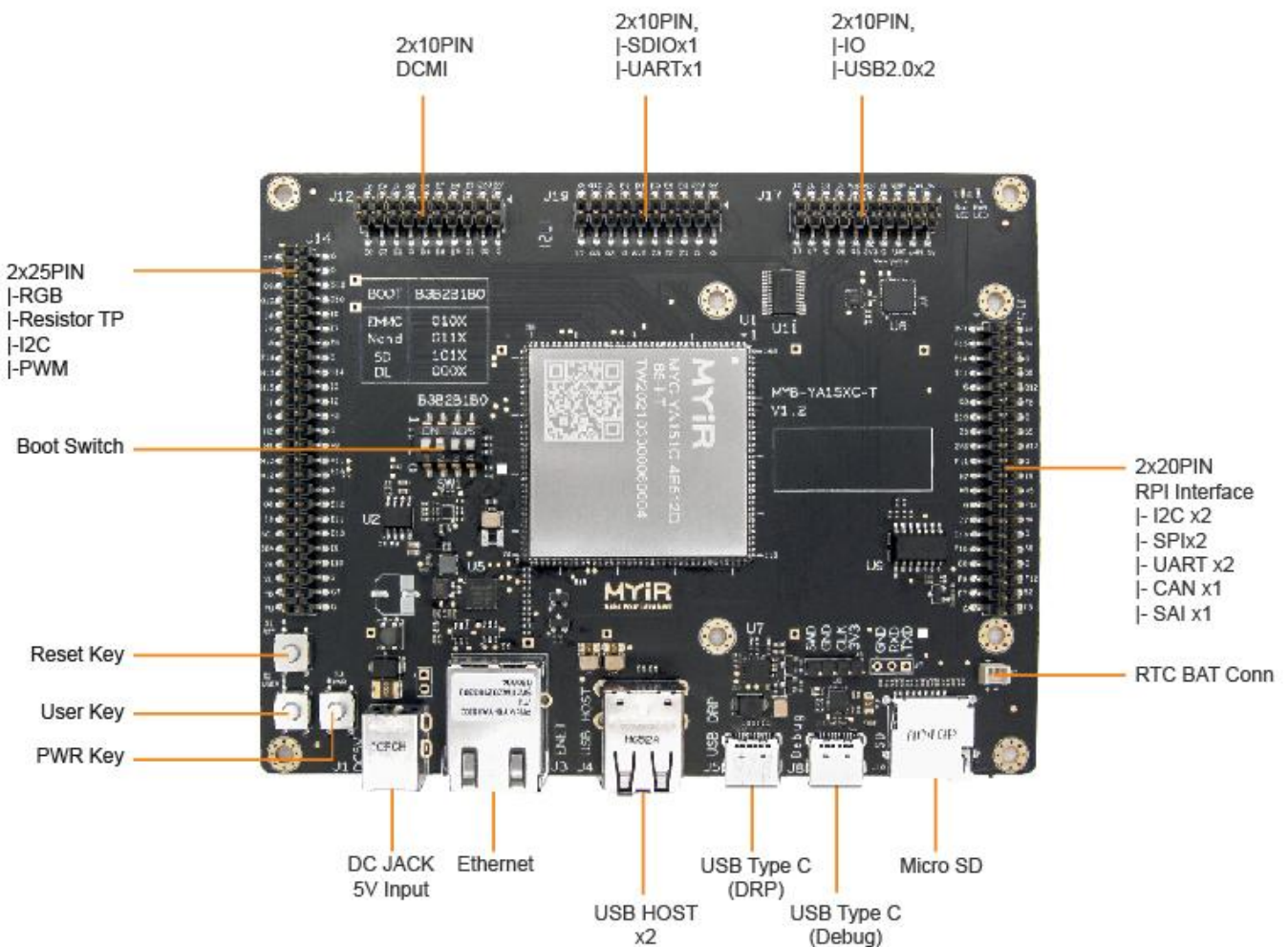
- ✓ MYC-YA15XC-T CPU Module as Controller Board
- ✓ ST STM32MP1 MPU based on 650MHz Single or Dual Arm Cortex-A7 and 209MHz Cortex-M4 Cores
- ✓ 256MB/512MB DDR3L, 256MB Nand Flash/ 4GB eMMC, 32KB EEPROM, Power Management IC (PMIC)
- ✓ 1 x USB Type-C DRP, 2 x USB2.0 HOST, Gigabit Ethernet, LCD, Camera, Micro SD Card Slot
- ✓ Supports Running Linux OS
- ✓ Optional 7-inch LCD Module, Camera Module, RGB-to-HDMI Module, WiFi/BT Module and RPI Module



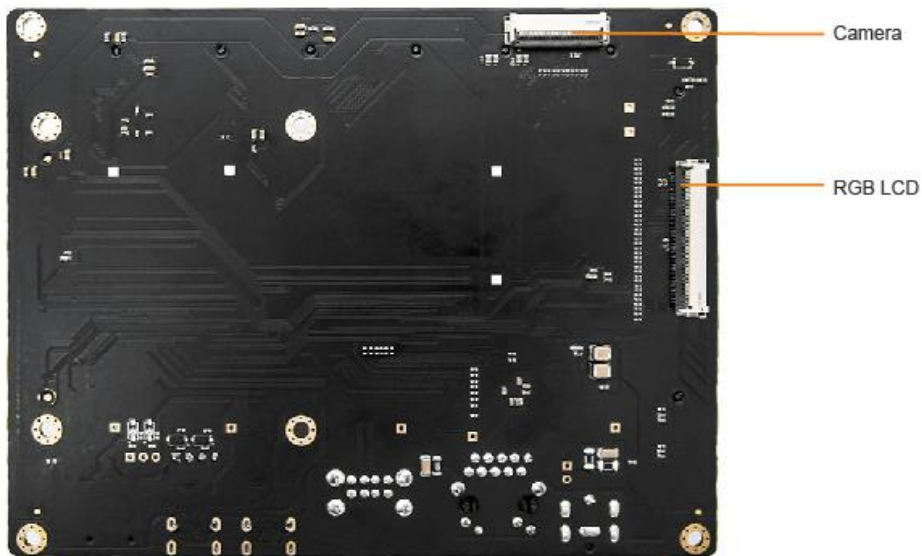
The [MYD-YA15XC-T development board](#) is using the [MYC-YA15XC-T CPU Module](#) as core controller board which is populated on a specially designed base board through 1.0 mm pitch 148-pin stamp-hole (Castellated-Hole) expansion interface. The MYD-YA15XC-T is a good reference design for using [ST STM32MP1 Processors](#) which features 650MHz Single or Dual Arm Cortex-A7 and 209MHz Cortex-M4 Cores. Typical applications are industrial control, consumer electronics, smart home, medical and more other energy-efficient applications which require rich performance and low power.

The [MYC-YA15XC-T CPU Module](#) has integrated the [STM32MP151](#) processor (STM32MP151AAC3T by default), a Power-Management IC [STPMIC1](#), DDR3L, Nand Flash or eMMC and 32KB EEPROM. In addition to the main components, the MYD-YA15XC-T has extended a number of peripherals through connectors to its base board including Debug Serial port, USB Type-C DRP, Dual USB2.0 HOST, Gigabit Ethernet, Micro SD Card Slot, LCD and Camera as well as GPIOs through pin headers. MYIR also offers [MY-CAM011B Camera Module](#), [MY-RGB2HDMI Module](#), [MY-WF005S WiFi/BT Module](#), [MY-WIREDCOM RPI Module](#) (RS232/RS485/CAN) and [MY-TFT070CV2 LCD Module](#) as options for the board which have greatly enhanced the functionality of the board.

The [MYD-YA15XC-T](#) is running Linux with provided 5.4.31 kernel and many drivers in source code. It is delivered with one Quick Start Guide, one USB Type-C cable, one DC power jack plug adapter and one 5V/2A power adapter to enable users to start rapid development when getting the board out-of-box.



MYD-YA15XC-T Development Board Top-view



MYD-YA15XC-T Development Board Bottom-view

### Hardware Specification

The MYD-YA15XC-T Development Board is using STMicroelectronics [STM32MP151AAC3T](#) Microprocessor with 12 x 12 mm, 0.5 mm pitch, TFBGA361 package which is among the [STM32MP1 Series](#). The STM32MP1 series is based on a heterogeneous single or dual Arm Cortex-A7 and Cortex-M4 cores architecture, strengthening its ability to support multiple and flexible applications, achieving the best performance and power figures at any time. The Cortex-A7 core provides access to open-source operating systems (Linux/Android) while the Cortex-M4 core leverages the STM32 MCU ecosystem. It is available in 3 different lines which are pin-to-pin compatible:

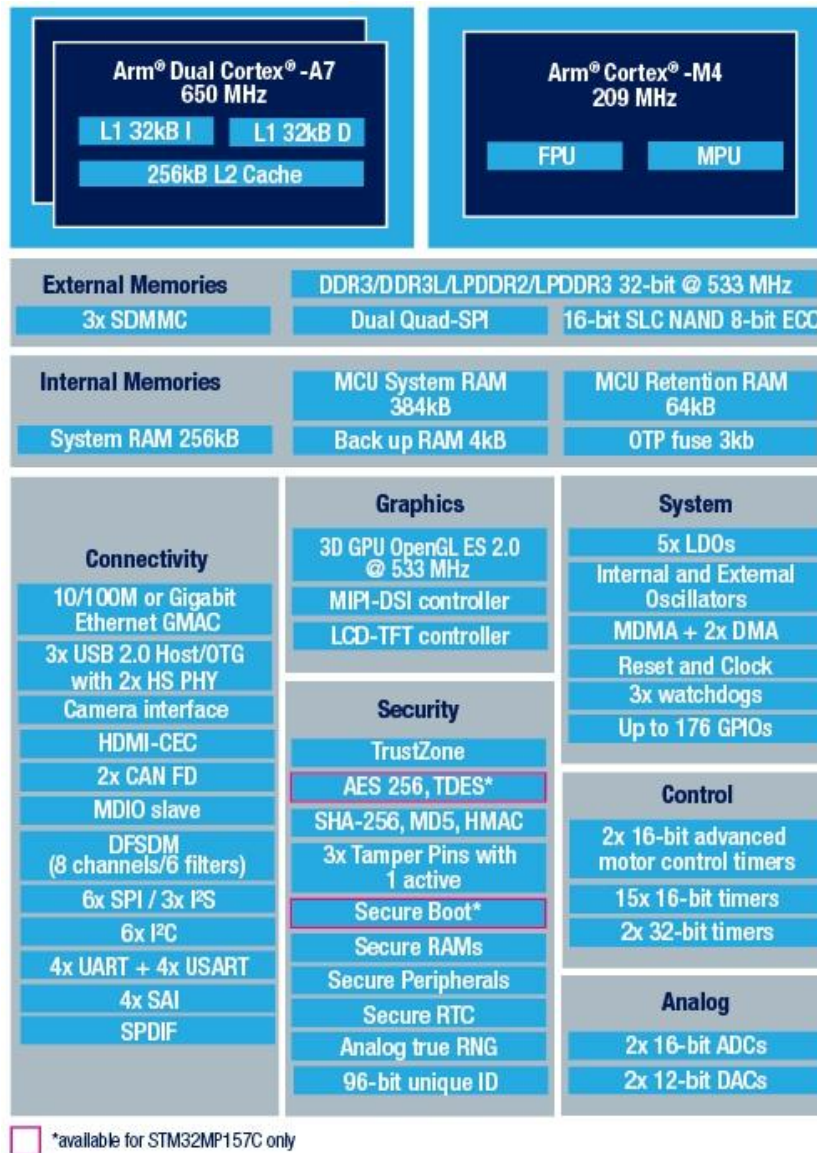
- [STM32MP157](#): Dual Cortex-A7 cores @ 650 MHz, Cortex-M4 core @ 209 MHz, 3D GPU, DSI display interface and CAN FD
- [STM32MP153](#): Dual Cortex-A7 cores @ 650 MHz, Cortex-M4 core @ 209 MHz and CAN FD
- [STM32MP151](#): Single Cortex-A7 core @ 650 MHz, Cortex-M4 core @ 209 MHz

Each line comes with a security option (cryptography & secure boot)

ACCELERATION	STM32 MP1	Cortex®-A7	f <sub>cpu</sub>	Cortex®-M4	f <sub>cpu</sub>	3D GPU	f <sub>gpu</sub>	HW	FD-CAN	MIPI®-DSI
		core	(MHz)	core	(MHz)		(MHz)	Crypto		
<b>Arm® Cortex®-A7 – 650 MHz</b> • Dual core Arm® Cortex®-A7 processor • L1 and L2 caches • 3D Graphic Processing Unit* • Floating Point Unit → Arm® Neon™ • Arm® Cortex®-M4 209 MHz coprocessor • MDMA + DMA • LPDDR2/LPDDR3 16/32**-bit 533 MHz • DDR3/DDR3L 16/32**-bit 533 MHz <b>CONNECTIVITY</b> • 2 x USB2.0 HS Host • USB2.0 OTG FS/MS • 3 x SDMMC/SDIO • USART, UART, SPI, I²C • 2 x (TT)FD-CAN2.0* • Gigabit Ethernet IEEE 1588** • FMC (NAND Flash) • Camera VF • Dual mode Quad-SPI • DSI 2 Gbit/s*	Product Lines									
	STM32MP151A	1	650	1	209	-	-	-	-	-
	STM32MP151C							•		
	STM32MP153A	2	650	1	209	-	-	-	2	-
	STM32MP153C							•		
	STM32MP157A	2	650	1	209	•	533	-	2	•
STM32MP157C							•			

Notes:  
 \* Not available in all product lines  
 \*\* 16/32-bit for LFBGA448 and TFBGA361 packages, 16-bit only for LFBGA354 and TFBGA257 packages  
 \*\*\* 10/100M Ethernet only for LFBGA354 and TFBGA257 packages

### Features of STM32MP1 Processors



STM32MP15X Block Diagram

The [MYD-YA15XC-T Development Board](#) is using [MYC-YA15XC-T CPU Module](#) as core controller board. It takes full features of STM32MP1 processor and the main features are characterized as below:

**Mechanical Parameters**

- Dimensions: 137.30mm x 105mm (base board), 39mm x 37mm (CPU Module)
- PCB Layers: 4-layer design (base board), 10-layer design (CPU Module)
- Power supply: +5V/2A (base board), 5V/0.5A (CPU Module)
- Working temperature: -40~85 Celsius (industrial grade)



**The MYD-YA15XC-T Controller Board ([MYC-YA15XC-T CPU Module](#))**

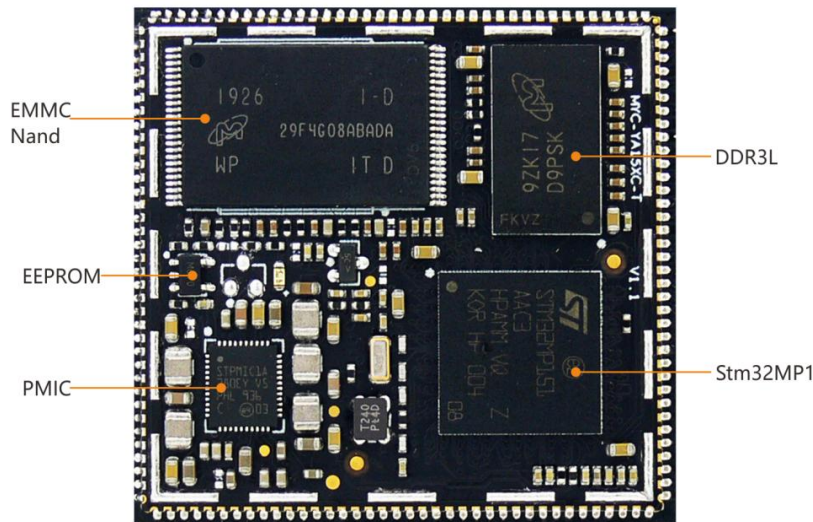


Figure 1-6 MYC-YA15XC-T CPU Module (delivered with shielding cover by default)

**Processor**

- STMicroelectronics STM32MP151AAC3 Microprocessor (STM32MP153AAC3 and STM32MP157AAC3 are compatible and can be customized)

The STM32MP1 series is available in 3 different lines which are pin-to-pin compatible:

- STM32MP151: Single Cortex-A7 core up to @ 800 MHz, Cortex-M4 core @ 209 MHz
- STM32MP153: Dual Cortex-A7 cores up to @ 800 MHz, Cortex-M4 core @ 209 MHz and CAN FD
- STM32MP157: Dual Cortex-A7 cores up to @ 800 MHz, Cortex-M4 core @ 209 MHz, 3D GPU, DSI display interface and CAN FD

**Memory**

- 256MB DDR3L, 256MB Nand Flash / 512MB DDR3L, 4GB eMMC Flash
- 32KB EEPROM

**Peripherals and Signals Routed to Pins**

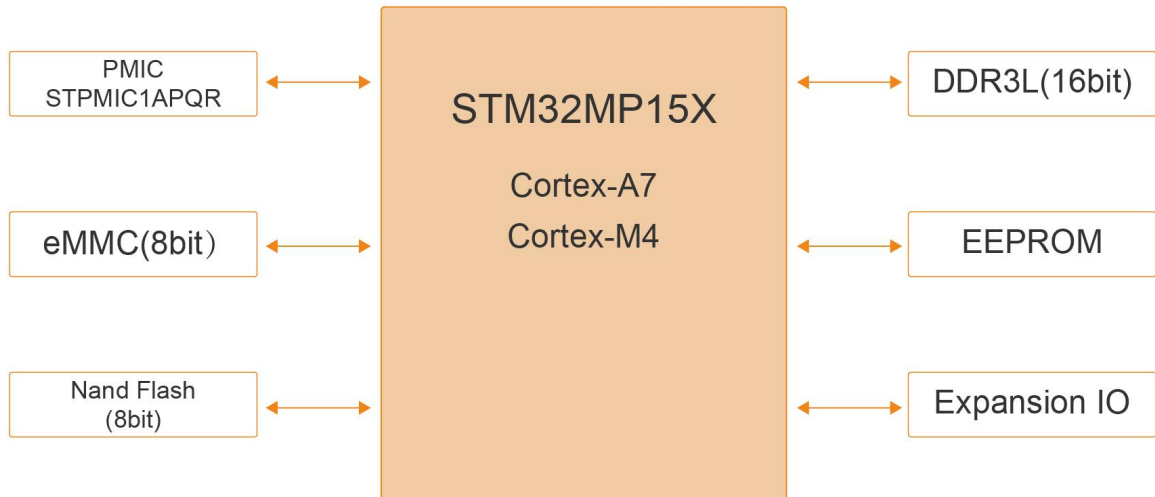
- Power Management IC (STPMIC1APQR)
- 1.0mm pitch 164-pin Stamp Hole Expansion Interface
  - 8 x Serial ports
  - 5 x I2C
  - 4 x SPI
  - 16 x ADC
  - 2 x SDIO
  - 1 x RGMII
  - 2 x USB Host or 1 x USB Host plus 1 x USB OTG
  - 2 x CAN (only for STM32MP153 and STM32MP157)
  - 5 x LPTIM and 10 TIM
  - 1 x RGB Interface (supports 16-/18-/24-bit, resolution up to 1366 x 768 @60fps)
  - Up to 109 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.*

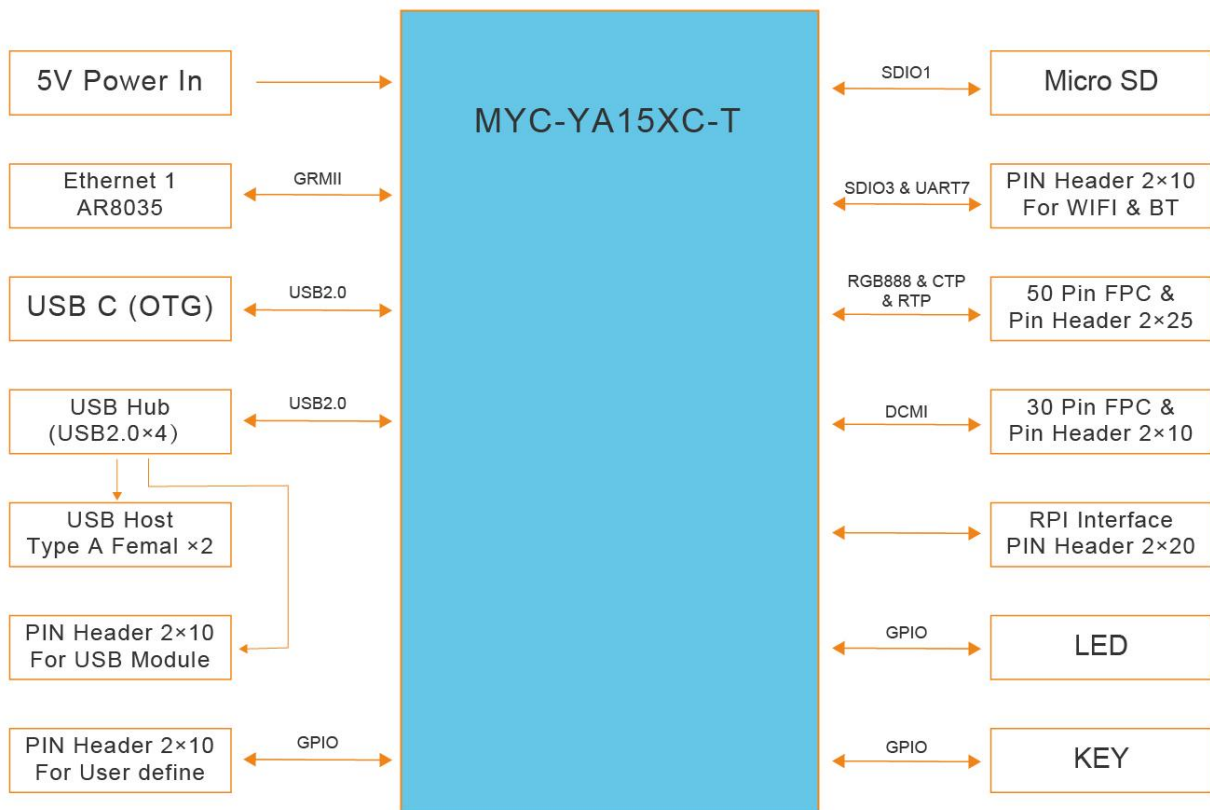


## **The MYB-YA15XC-T Base Board**

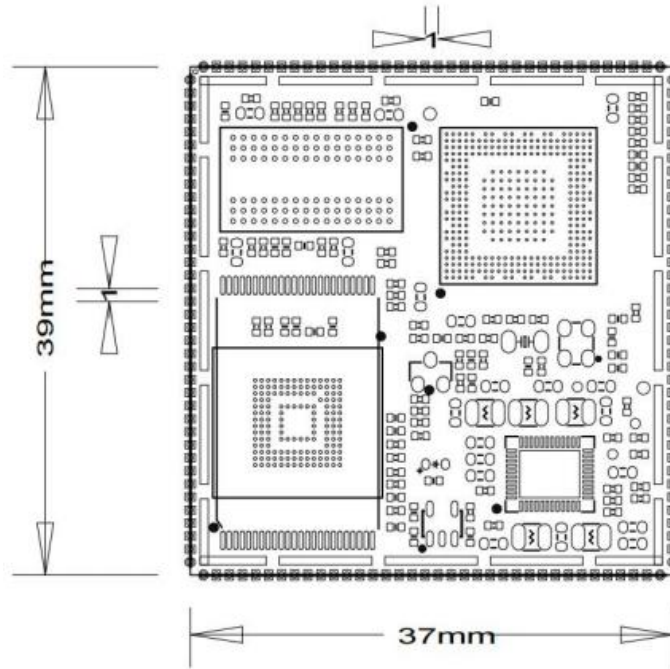
- 1 x Power Jack
- 1 x Debug UART (USB Type-C connector)
- 2 x USB2.0 Host port
- 1 x USB Type-C DRP
- 1 x 10/100/1000 Mbps Ethernet interface (RJ45)
- 1 x Micro SD card slot
- 1 x Camera Interface (0.5mm pitch 30-pin FPC connector)  
*Supports MYIR's MY-CAM011B Camera Module through J12*
- 1 x CSI Signal Interface (J12, 2.54mm 2\*10-pin male expansion header)
- 1 x LCD Interface (0.5mm pitch 50-pin FPC connector, supports resolution up to 1366 x 768 @60fps)  
*Supports MYIR's MY-LCD70TP-C LCD Module with Capacitive Touch Screen through the LCD interface*  
*Supports MYIR's MY-RGB2HDMI Module through the LCD interface to extend HDMI output function*
- 1 x RGB/TP Extension Interface (J14, 2.54mm 2\*25-pin male expansion header)
- 1 x RPI Interface (J15, 2.54mm 2\*20-pin male expansion header)
  - 2 x SPI
  - 2 x UART
  - 2 x I2C
  - 1 x CAN
  - 1 x SAI*Supports MYIR's MY-WIREDCOM RPI Module through J15 to extend CAN, RS485 and RS232 functions*
- 1 x 2.54mm 2\*10-pin male expansion header (J17)
  - 2 x USB
  - 2 x ADC
  - GPIOs
- 1 x 2.54mm 2\*10-pin male expansion header (J19)
  - 1 x SDIO
  - 2 x UART*Supports MYIR's MY-WF005S WiFi/BT Module through the J19*
- 2 x LEDs (one for power indicator and one for system running indicator)
- 1 x RTC batter holder (1.25mm pitch 2-pin connector)
- 3 x Buttons (one for Power On/Off, one for Reset and one for USER)



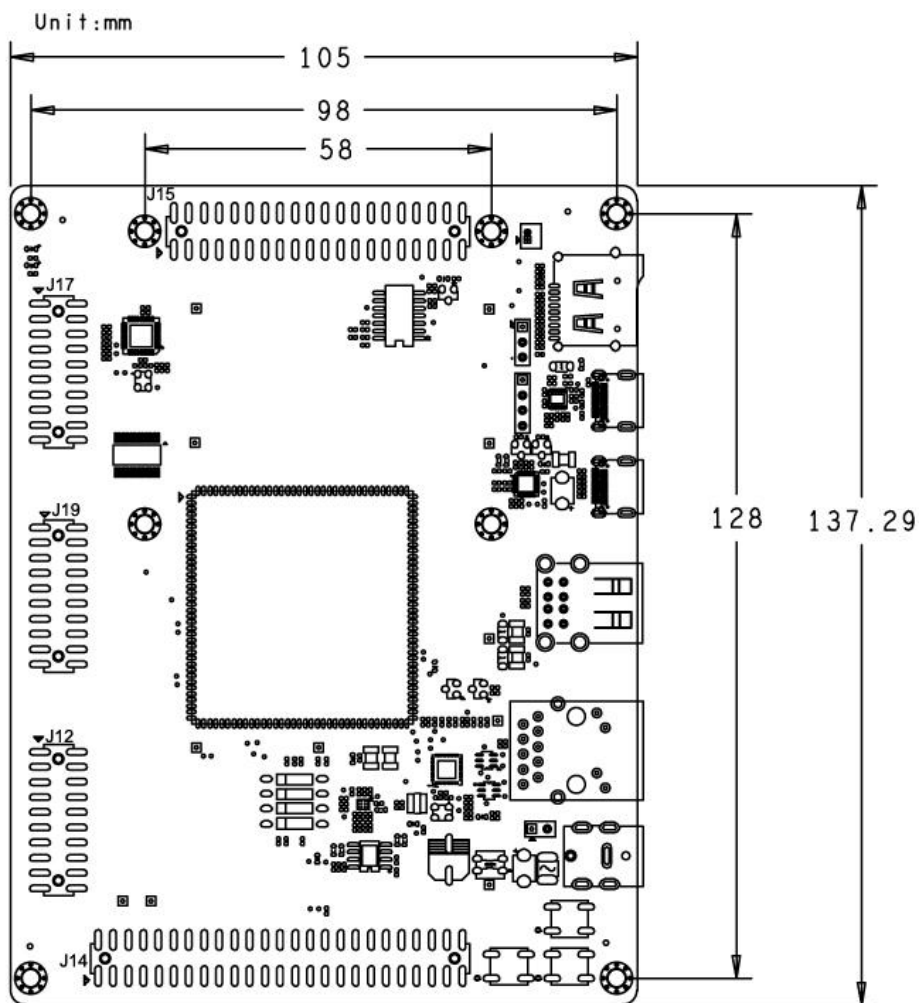
MYC-YA15XC-T CPU Module Function Block Diagram



MYD-YA15XC-T Development Board Function Block Diagram



MYC-YA15XC-T Dimensions Chart



MYD-YA15XC-T Dimensions Chart





## Software Features

Item	Features	Description	Source Code
Bootstrap program	TF-A-2.2	Arm Trusted Firmware	YES
Bootloader	U-boot-2020.01	Kernel bootstrap	YES
Linux kernel	Linux-5.4.31	Customized based on ST kernel_5.4.31 version for MYD-YA15XC-T	YES
Drivers	NAND	Nand Flash driver	YES
	MMC	eMMC driver	YES
	USB Host	USB Host driver	YES
	USB OTG	USB OTG driver	YES
	I2C	I2C driver	YES
	SPI	SPI driver	YES
	Ethernet	10M/100M/1000M Ethernet driver	YES
	RS232/RS485/Uart	Serial driver	YES
	LCD	LCD driver, supports MYiR's 7-inch LCD with 800 x 480 pixels resolution	YES
	Touch	Capacitive touch screen driver	YES
	RTC	RTC driver	YES
	GPIO key	Key driver	YES
	GPIO LED	LED driver	YES
	CAN	CAN Bus driver	YES
	HDMI	HDMI driver	YES
WiFi & BT	WiFi/BT driver (SDIO)	YES	
File system	myir-image-full	Full-featured file system with MEasy HMI V2.0	YES
	myir-image-core	Simplified system with core features	YES
Tools	STM32CubeProgrammer	ST programmer software	BIN
	STM32CubeMX	ST configuration integration tool	BIN
	STM32CubeIDE	ST development tool	BIN
Applications	GPIO LED	LED example	YES
	GPIO KEY	KEY example	YES
	NET	TCP/IP Socket C/S example	YES
	RTC	RTC example	YES
	RS232	RS232 example	YES
	RS485	RS485 example	YES
	CAN	CAN example	YES
	LCD	LCD Display example	YES
	Camera	Camera Display example	YES
	UART	UART example	YES
	HMI 2,0	MYiR-MEeasy_hmi 2.0	YES
Compiler Tool Chain	Cross compiler	arm-ostl-linux-gnueabi-gcc 9.3.0	BINARY
Yocto Project™	Yocto	Dunfell 3.1	YES

### MYD-YA15XC-T Software Features