MYIR Make Your Idea Real

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MYC-YA15XC-T CPU Module Overview

- ✓ 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 Flash, 32KB EEPROM
- ✓ Power Management IC (PMIC)
- ✓ 1.0mm pitch 148-pin Stamp Hole Expansion Interface
- ✓ Supports Running Linux OS

Measuring only 39mm by 37mm, the **MYC-YA15XC-T CPU Module** is MYIR's another System-on Module (SoM) based on **ST STM32MP1** series processors after the first release of the **MYC-YA157C CPU Module** The new MYC-Y157XC-T module has integrated the **STM32MP151AAC3** processor by default and a dedicated Power Management IC **STPMIC1** also from STMicroelectronics. It has onboard DDR3L, Nand Flash or eMMC and 32KB EEPROM. A number of peripherals and IO signals are brought out through 1.0 mm pitch 148-pin stamp-hole (Castellated-Hole) expansion interface to make the module an excellent embedded
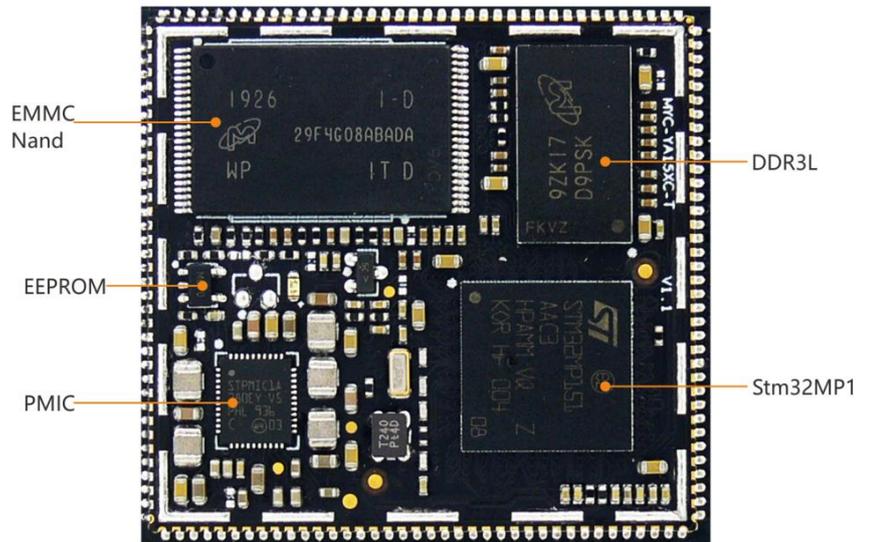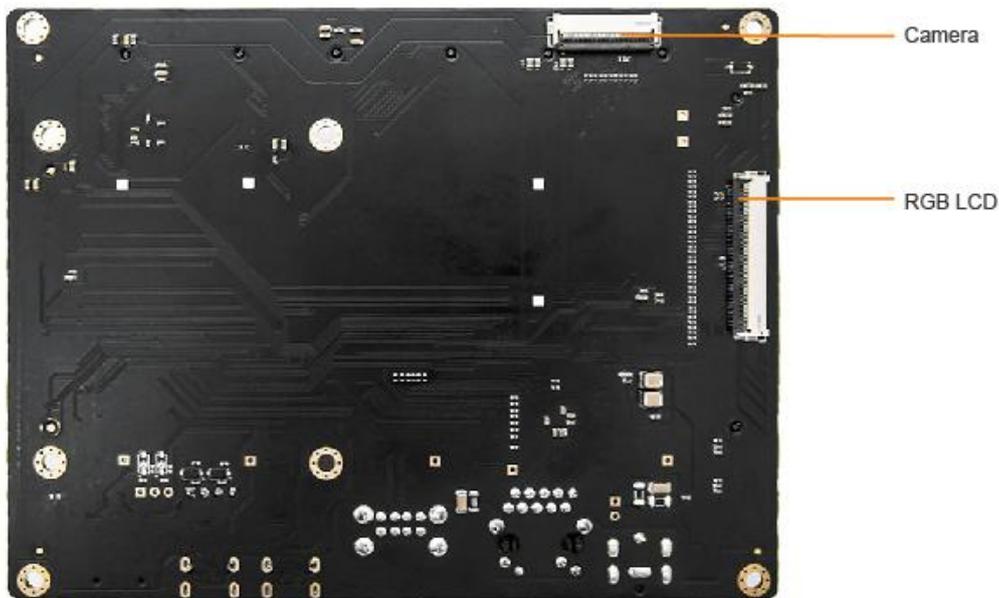

MYC-YA15XC-T CPU Module

controller for applications like industrial control, consumer electronics, smart home, medical and etc. The **MYC-YA15XC-T** is running Linux with provided 5.4.31 kernel and many drivers in source code.

The **MYD-YA15XC-T development board** is designed based on the **MYC-YA15XC-T CPU Module** and has extended various peripherals to the base board through connectors including Debug serial port, USB Type-C DRP, USB2.0 HOST, Gigabit Ethernet, Micro SD Card Slot, LCD, Camera, etc. A number of IO signals are brought out through pin headers as well. The **MYD-YA15XC-T development board** 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. 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.
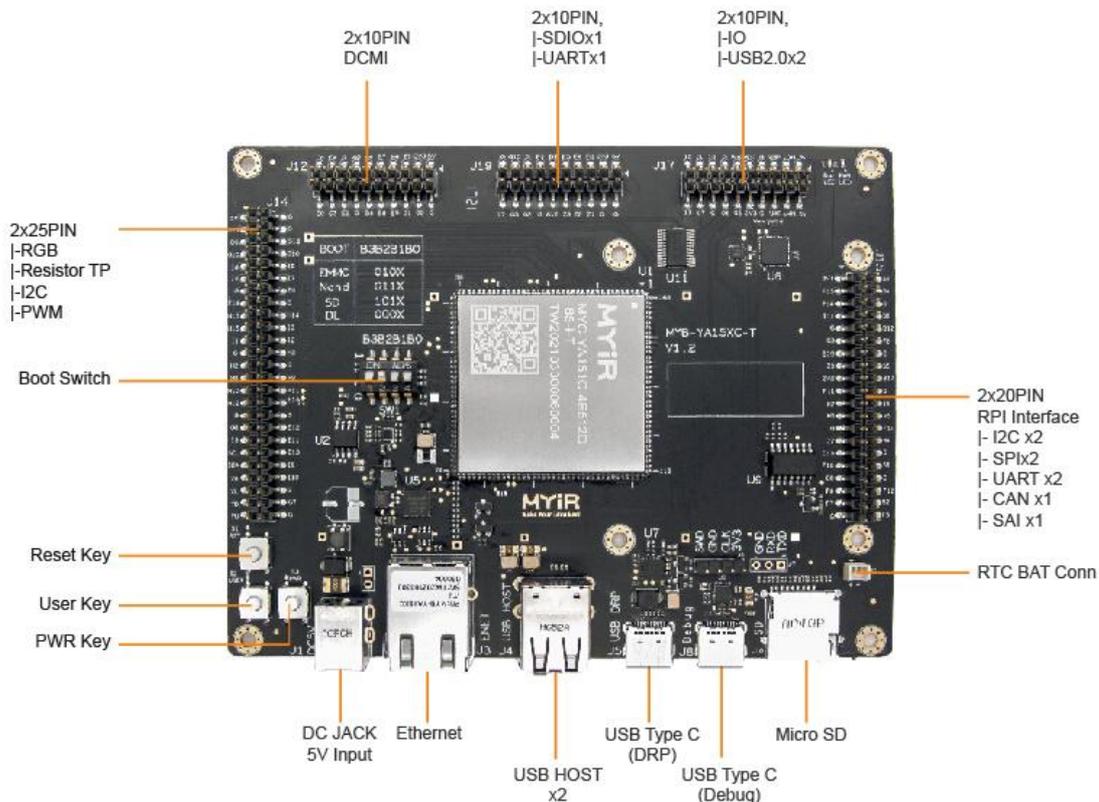
MYD-YA15XC-T Development Board Top-view

MYD-YA15XC-T Development Board Bottom-view

Hardware Specification

The MYC-YA15XC-T CPU Module is using STMicroelectronics STM32MP151AAC3 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		Cortex®-A7 core	f_{CPU} (MHz)	Cortex®-M4 core	f_{MCU} (MHz)	3D GPU	f_{GPU} (MHz)	HW Crypto	FD-CAN	MIPI®-DSI
• 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 **Product lines**										
STM32MP151A		1	650	1	209	-	-	-	-	-
STM32MP151C								•		
STM32MP153A		2	650	1	209	-	-	-	2	-
STM32MP153C								•		
STM32MP157A		2	650	1	209	•	533	-	2	•
STM32MP157C								•		

CONNECTIVITY
- 2 x USB2.0 HS Host
- USB2.0 OTG FS/HS
- 3 x SDMMC/SDIO
- USART, UART, SPI, I²C
- 2 x (TT)FD-CAN2.0*
- Gigabit Ethernet IEEE 1588***
- FMC (NAND Flash)
- Camera I/F
- Dual mode Quad-SPI
- DSI 2 Gbit/s*

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

STM32MP1 Series Processors

Arm® Dual Cortex® -A7 650 MHz	Arm® Cortex® -M4 209 MHz
L1 32kB I L1 32kB D	FPU MPU
256kB L2 Cache	

External Memories	DDR3/DDR3L/LPDDR2/LPDDR3 32-bit @ 533 MHz	
3x SDMMC	Dual Quad-SPI	16-bit SLC NAND 8-bit ECC

Internal Memories	MCU System RAM 384kB	MCU Retention RAM 64kB
System RAM 256kB	Back up RAM 4kB	OTP fuse 3kb

Connectivity	Graphics	System
10/100M or Gigabit Ethernet GMAC	3D GPU OpenGL ES 2.0 @ 533 MHz	5x LDOs
3x USB 2.0 Host/OTG with 2x HS PHY	MIPI-DSI controller	Internal and External Oscillators
Camera interface	LCD-TFT controller	MDMA + 2x DMA
HDMI-CEC	Security	Reset and Clock
2x CAN FD	TrustZone	3x watchdogs
MDIO slave	AES 256, TDES*	Up to 176 GPIOs
DFSDM (8 channels/6 filters)	SHA-256, MD5, HMAC	Control
6x SPI / 3x I²S	3x Tamper Pins with 1 active	2x 16-bit advanced motor control timers
6x I²C	Secure Boot*	15x 16-bit timers
4x UART + 4x USART	Secure RAMs	2x 32-bit timers
4x SAI	Secure Peripherals	Analog
SPDIF	Secure RTC	2x 16-bit ADCs
	Analog true RNG	2x 12-bit DACs
	96-bit unique ID	

☐ *available for STM32MP157C only

STM32MP15X Block Diagram

Mechanical Parameters

- Dimensions: 39mm x 37mm
- PCB Layers: 10-layer design
- Power supply: +5V/0.5A
- Working temperature: 0~70 Celsius (commercial grade) or 40~85 Celsius (industrial grade)

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 and Storage

- 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 148-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 x 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.
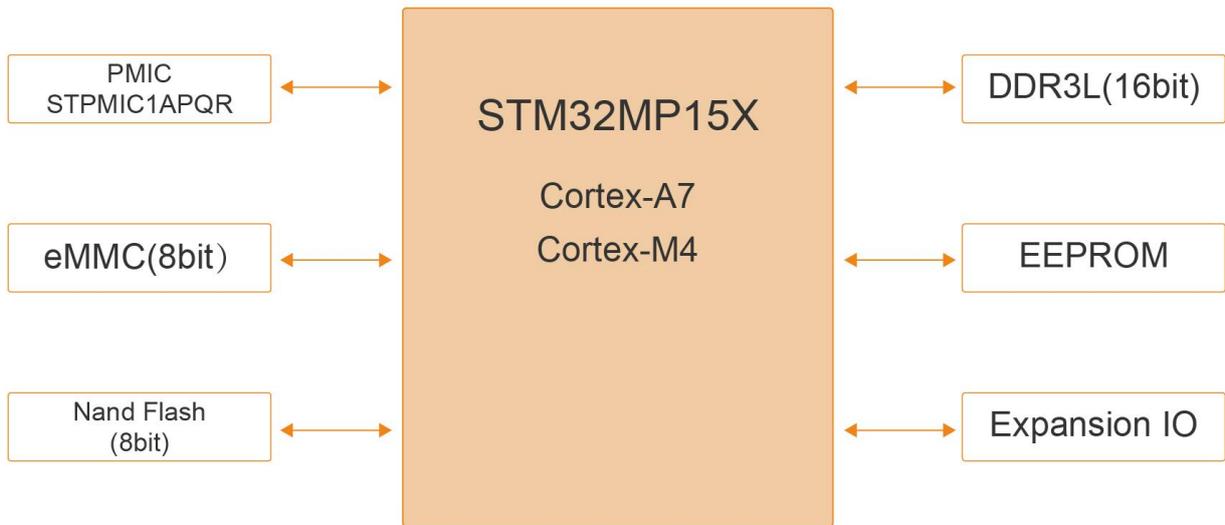
MYC-YA15XC-T CPU Module Function Block Diagram
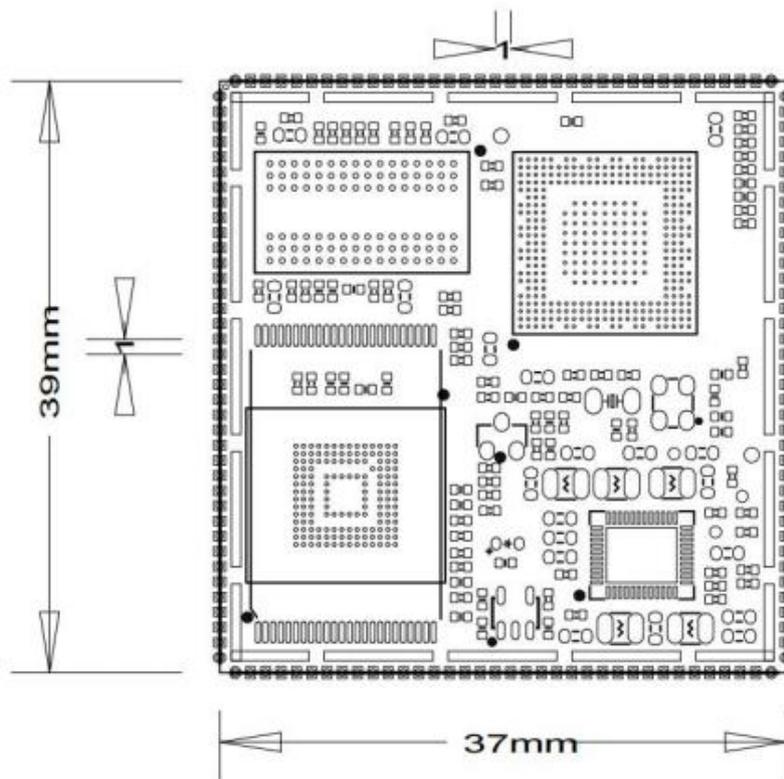
MYC-YA15XC-T Dimensions Chart

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-MEasy_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

Order Information

Product Item	Part No.	Packing List
MYC-YA15XC-T CPU Module	MYC-YA151C-4E512D-65-C-T	✓ One MYC-YA15XC-T CPU Module
	MYC-YA151C-4E512D-65-I-T	
	MYC-YA151C-256N256D-65-C-T	
	MYC-YA151C-256N256D-65-I-T	
MYD-YA15XC-T Development Board	MYD-YA151C-V2-256N256D-65-I-T	✓ One MYD-YA15XC-T Development Board (including MYC-YA15XC-T CPU Module) ✓ One 5V/2A Power adapter ✓ One USB Type-C cable ✓ One DC power jack plug adapter ✓ One Quick Start Guide
	MYD-YA151C-4E512D-65-I-T	
MY-LCD70TP-C LCD Module	MY-TFT070CV2	7-inch LCD Module with capacitive touch screen
MY-RGB2HDMI RGB to HDMI Module	MY-RGB2HDMI	RGB to HDMI Module
MY-WIREDCOM RPI Module	MY-WIREDCOM	RPI Module for extension of RS232/RS485/CAN
MY-WF005S WiFi/BT Module	MY-WF005S	WiFi/Bluetooth Module
MY-CAM011B Camera Module	MY-CAM011B	Camera Module

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