

## MYD-YA157C Development Board

- MYC-YA157C CPU Module as Controller Board
- STMicroelectronics STM32MP1 MPU based on 650MHz Dual Arm Cortex-A7 and 209MHz Cortex-M4 Cores
- 512MB DDR3, 4GB eMMC Flash, On-board Gigabit Ethernet PHY
- RS232, RS485, 1 x USB Type-C DRP, 1 x USB2.0 HOST, Gigabit Ethernet, CAN, WiFi/Bluetooth, Micro SD Card Slot
- Supports RGB888 based LCD/HDMI and MIPI-DSI Display
- Supports Running Linux OS

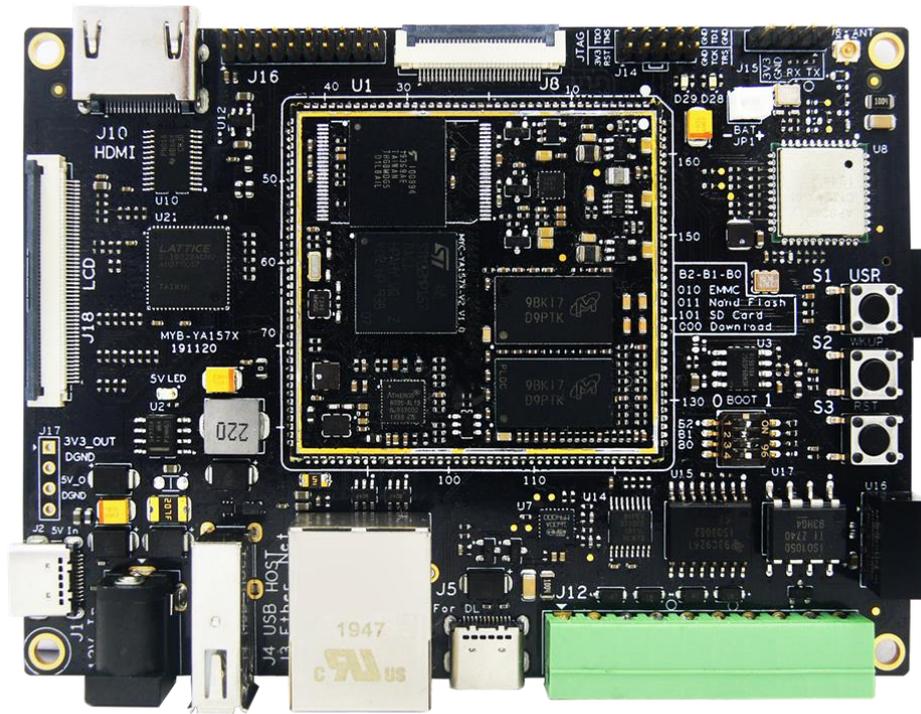


Figure 1-1 MYD-YA157C Development Board

The [MYD-YA157C development board](#) consists of a compact CPU Module [MYC-YA157C](#) and a base board to provide a complete evaluation platform for [ST STM32MP1 Processors](#) which features dual-core Arm Cortex-A7 operating at up to 650 MHz and an embedded Cortex-M4 core operating at up to 209 MHz. Typical applications are industrial control, consumer electronics, smart home, medical and more other energy-efficient applications which require rich performance and low power.

The [MYD-YA157C](#) has a base board which installed [MYC-YA157C CPU Module](#) through 1.0mm pitch 164-pin stamp-hole (Castellated-Hole) interface. The MYC-YA157C CPU Module is a highly-integrated SoM which combines the [STM32MP157](#) processor ([STM32MP157AAC3](#)), 512MB DDR3, 4GB eMMC as well as an integrated GigE PHY chip. The base board has brought out rich peripherals through connectors and headers such as RS232, RS485, USB Type-C DRP, USB2.0 HOST, Gigabit Ethernet, WiFi/Bluetooth, CAN, Micro SD Card Slot, JTAG, RGB888 based LCD/HDMI, MIPI-DSI, etc.

The [MYD-YA157C development board](#) is delivered with one Quick Start Guide, one Type-C cable, one USB to TTL serial cable and one WiFi/Bluetooth antenna to provide user a complete platform for evaluating and prototyping based on STM32MP1 series microprocessors. MYIR also offers [MY-CAM002U Camera Module](#) and [MY-TFT070CV2 LCD Module](#) as options for the board.

The [MYD-YA157C](#) is running Linux OS. MYIR provides abundant software resources for Yocto 2.6 based MYIR MEasy-HMI system, Yocto 2.6 based ST Weston system, Ubuntu 18.04 system and MYIR MEasy-IOT system including kernel and driver source code, STM32CubeProgrammer and STM32CubeMX tools to enable users to start their development rapidly and easily.

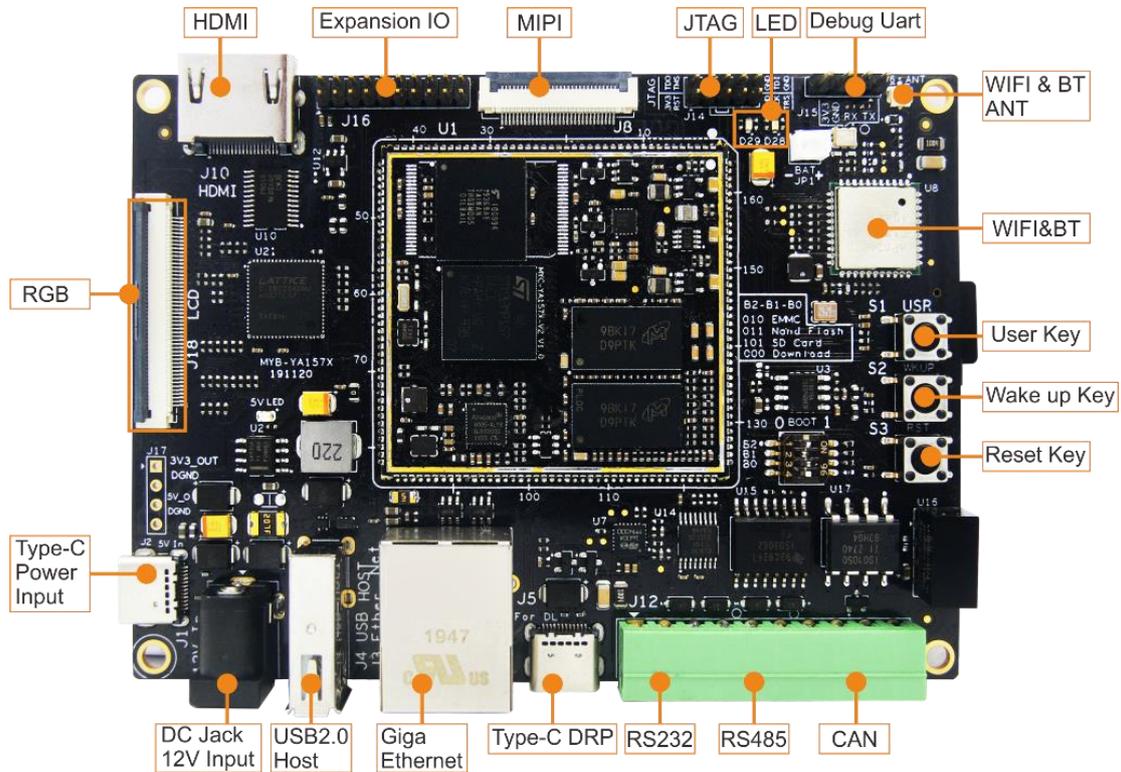


Figure 1-2 MYD-YA157C Development Board Top-view

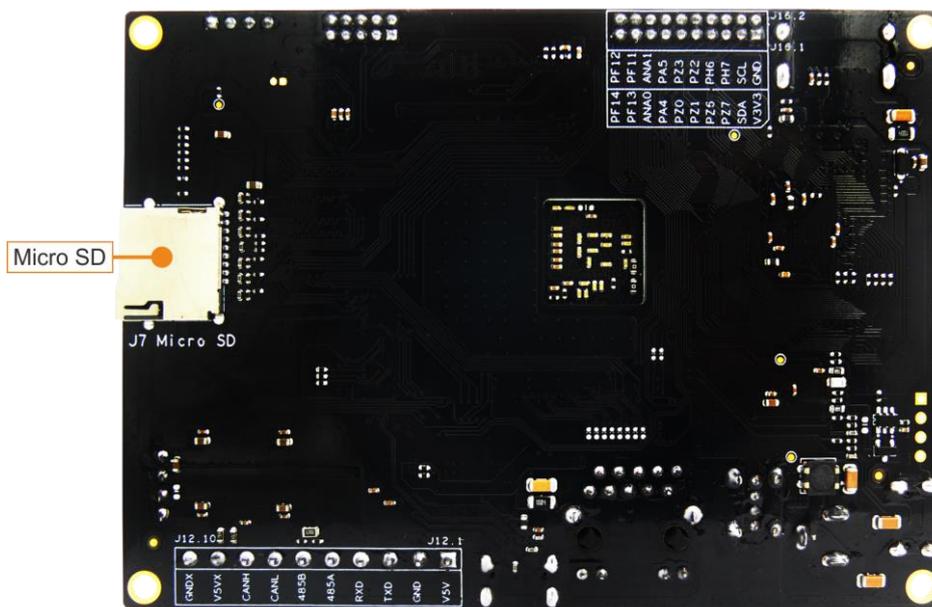


Figure 1-3 MYD-YA157C Development Board Bottom-view

**Hardware Specification**

The MYC-YA157C CPU Module is using STMicroelectronics [STM32MP157AAC3](#) 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>mcu</sub>	3D GPU	f <sub>gpu</sub>	HW	FD-CAN	MIPI®-DSI
		core	(MHz)	core	(MHz)		(MHz)	Crypto		
<b>CONNECTIVITY</b> <ul style="list-style-type: none"> <li>• 2 x USB2.0 HS Host</li> <li>• USB2.0 OTG FS/HS</li> <li>• 3 x SDMMC/SDIO</li> <li>• USART, UART, SPI, I<sup>2</sup>C</li> <li>• 2 x (TT)FD-CAN2.0*</li> <li>• Gigabit Ethernet IEEE 1588***</li> <li>• FMC (NAND Flash)</li> <li>• Camera VF</li> <li>• Dual mode Quad-SPI</li> <li>• DSI 2 Gbit/s*</li> </ul>	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

Table 1-4 Features of STM32MP1 Processors

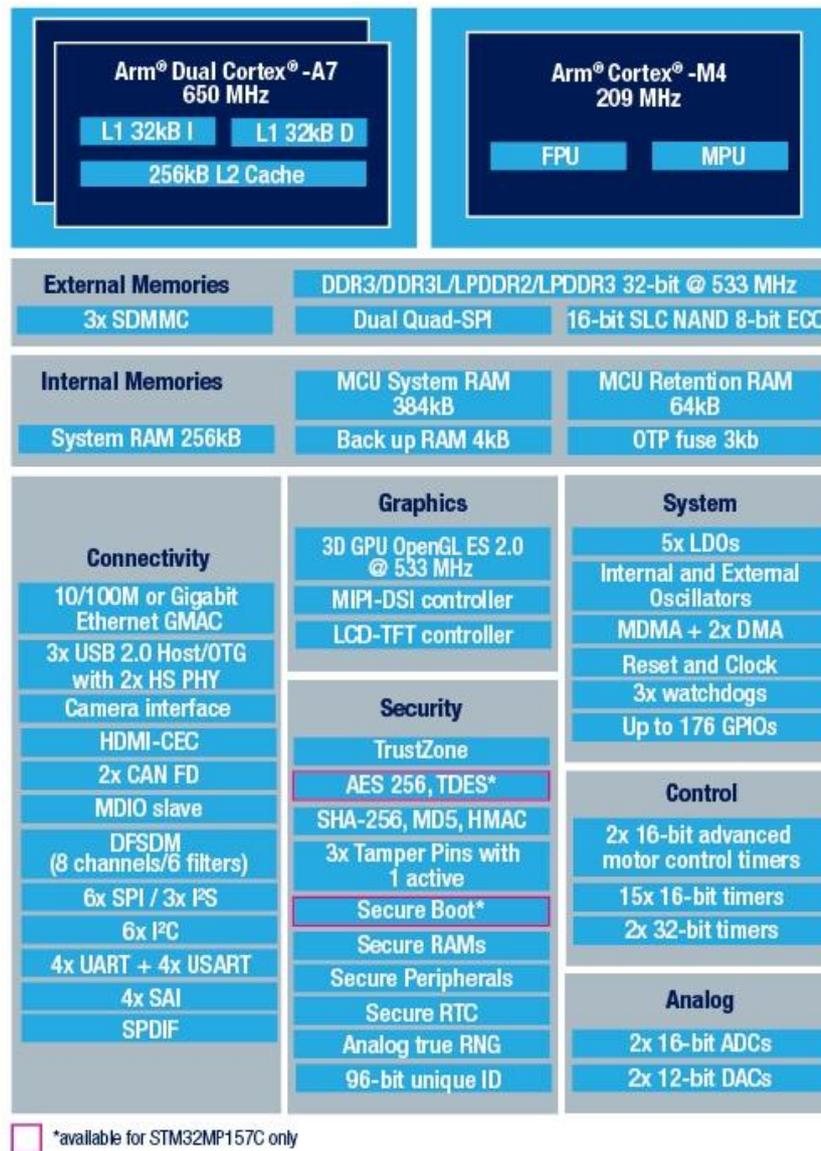


Figure 1-5 STM32MP157 Block Diagram

The MYD-YA157C Development Board is using MYC-YA157C CPU Module as core controller board. It takes full features of STM32MP1 processor and the main features are characterized as below:

**Mechanical Parameters**

- Dimensions: 110mm x 80mm (base board), 45mm x 43mm (CPU Module)
- PCB Layers: 4-layer design (base board), 8-layer design (CPU Module)
- Power supply: +12V/1.5A or USB Type-C Power supply (base board), 5V/0.5A (CPU Module)
- Working temperature: 0~70 Celsius (commercial grade) or -40~85 Celsius (industrial grade)

**The MYD-YA157C Controller Board (MYC-YA157C CPU Module)**

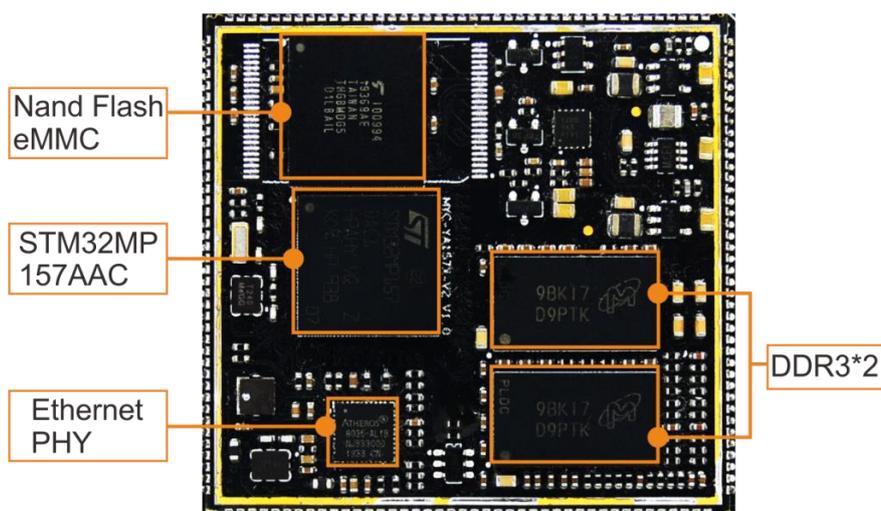


Figure 1-6 MYC-YA157C CPU Module

**Processor**

- STMicroelectronics STM32MP157AAC3 Microprocessor
  - Up to 650MHz dual-core Arm Cortex-A7 32-bit RISC core
  - Up to 209MHz Arm Cortex-M4 32-bit RISC core with FPU/MPU
  - Integrated 3D GPU

**Memory**

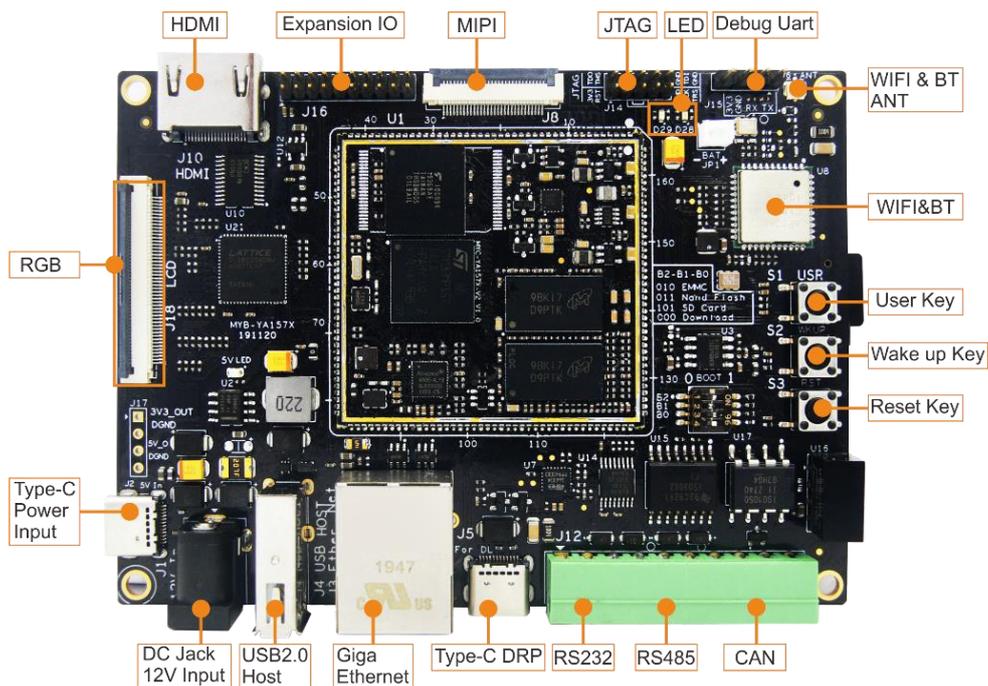
- 512MB DDR3 (supports up to 1GB DDR3)
- 4GB eMMC Flash (supports up to 64GB eMMC)
- Nand Flash (alternative design with eMMC, supporting 256MB / 512MB /1GB Nand Flash)

**Peripherals and Signals Routed to Pins**

- One 10/100/1000M Ethernet PHY
- 1.0mm pitch 164-pin Stamp Hole Expansion Interface
  - 8 x Serial ports
  - 6 x I2C
  - 6 x SPI
  - 1 x SAI
  - 1 x USB 2.0 Host and 1 x USB 2.0 OTG
  - 2 x SDIO
  - 2 x CAN
  - 1 x MIPI-DSI
  - 1 x Digital Camera Interface (DCMI)
  - 1 x RGB Interface (supports RGB888, resolution up to 1366 x 768 @60fps)
  - Up to 97 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 MYD-YA157C Development Board Base Board**



*Figure 1-7 MYD-YA157C Development Board*

- Serial ports
  - Debug UART
  - 1 x RS485, isolated power signal
  - 1 x RS232
- USB
  - 1 x USB2.0 Host port
  - 1 x USB Type-C DRP
- 1 x CAN, isolated power signal
- 1 x JTAG Interface (2.0mm pitch 2 x 5-pin headers)
- 1 x 10/100/1000 Mbps Ethernet interface (RJ45)
- WiFi/Bluetooth Module (complies with IEEE 802.11 b/g/n standard and supports Bluetooth V4.2)
- 1 x External antenna connector (simultaneous BT/WLAN receive with single antenna)
- 1 x Micro SD card slot
- RGB888 based LCD/HDMI (supports resolution up to 1366 x 768 pixels at 60Hz)
- 1 x MIPI-DSI Display Interface (supports display resolution up to 1366 x 768 pixels at 60Hz)
- 3 x Buttons (one for Wake up, one for Reset and one for USER)
- 1 x 2.0mm 2\*10-pin male expansion header

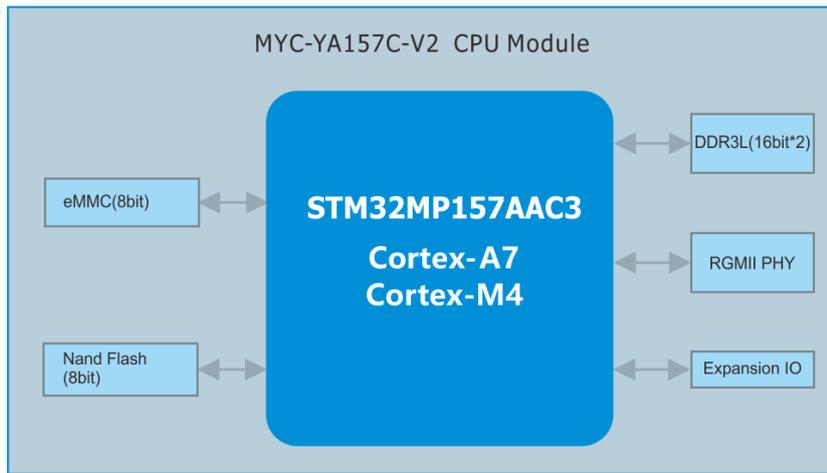


Figure 1-8 MYC-YA157C CPU Module Function Block Diagram

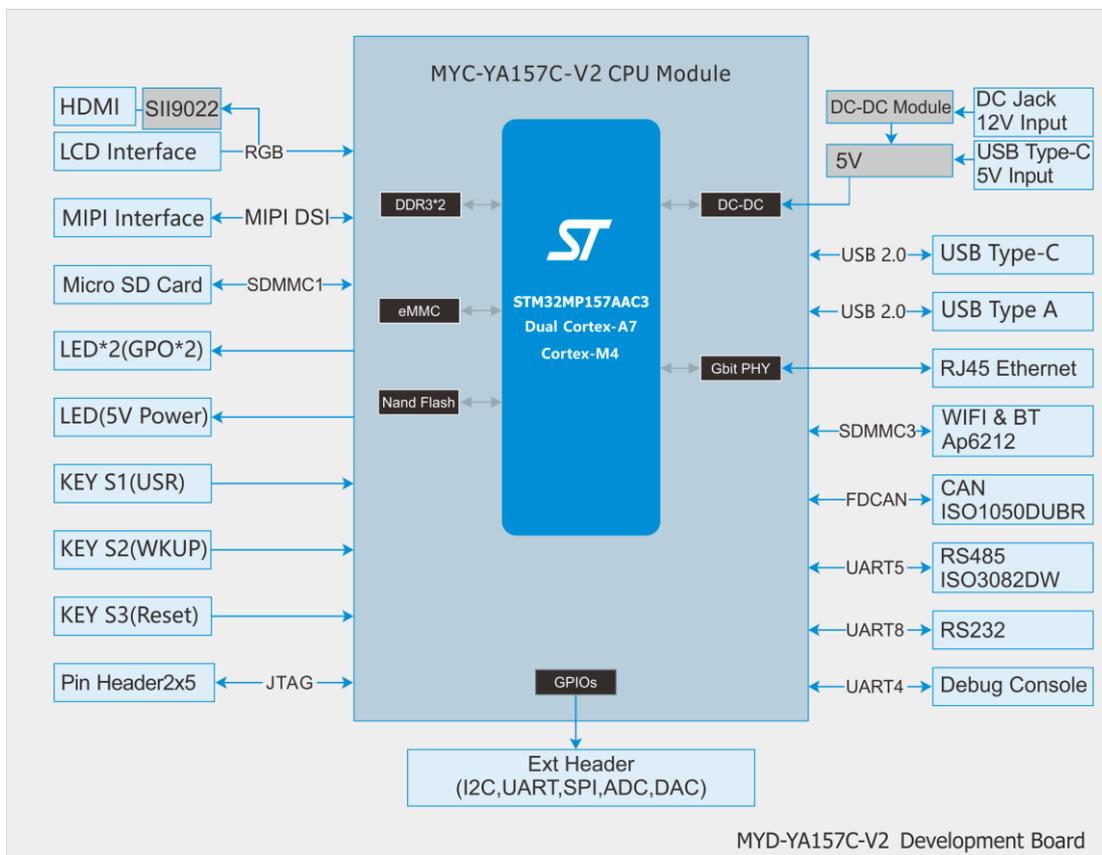


Figure 1-9 MYD-YA157C Development Board Function Block Diagram



**Software Features**

Item	Features	Description	Source Code
Bootstrap program	TF-a-2.0	Arm Trusted Firmware	YES
Bootloader	U-boot-2018.11	Kernel bootstrap	YES
Linux kernel	Linux-4.19.94	Customized based on ST kernel_4.19.94 version for MYD-YA157C	YES
Drivers	Nand Flash	Nand Flash driver	YES
	USB Host	USB Host driver	YES
	USB OTG	USB OTG driver	YES
	I2C	I2C driver	YES
	SPI	SPI driver	YES
	TTY	TTY Serial port driver	YES
	Ethernet	10M/100M/1000M Ethernet driver	YES
	MMC	eMMC/TF card driver	YES
	LCD	LCD driver, supports MYIR's 7-inch LCD with 800 x 480 pixels resolution	YES
	HDMI	HDMI driver	YES
	Touch	Capacitive touch screen driver	YES
	PWM	PWM driver	YES
	RTC	RTC driver	YES
	GPIO	GPIO driver	YES
	CAN	FDCAN Bus driver	YES
	RS485	RS485 driver	YES
	RS232	RS232 driver	YES
	MIPI	MIPI display driver	YES
	Camera	USB Camera driver (OV2659)	YES
	ADC	ADC driver	YES
WiFi & BT	AP6212 WiFi/BT driver (SDIO)	YES	
Watchdog	Watchdog driver	YES	
File system	rootfs	Yocto 2.6 for ST Weston system	YES
	rootfs	MEasy HMI demo system developed by MYIR	YES
	rootfs	MEasy-IOT demo system developed by MYIR	YES
	Ubuntu core system	Based on ubuntu18.04	YES
Tool	SDK	arm-ostl-linux-gnueabi 8.2.0	BIN
	Yocto2.6	System construction tool	YES
	STM32CubeProgrammer	ST programmer software	BIN
	Win32DiskImager	Creating SD card boot tool	BIN
	SDCardUpdater	Creating production burning tool	YES
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
	stm32cube_fw_mp1	M4 core testing example	YES
IDE	STM32CubeIDE	ST Integrated Development Environment	BIN

Table 1-1 MYD-YA157C Software Features

The MYD-YA157C runs Linux OS and is provided with software packages. Based on Linux 4.19.9 kernel, MYIR has provided abundant software resources for Yocto 2.6 based MYIR MEasy-HMI system, Yocto 2.6 based ST Weston system, Ubuntu 18.04 system and MYIR MEasy-IOT system including kernel and driver source code, STM32CubeProgrammer and STM32CubeMX tools to enable users to start their development rapidly and easily.

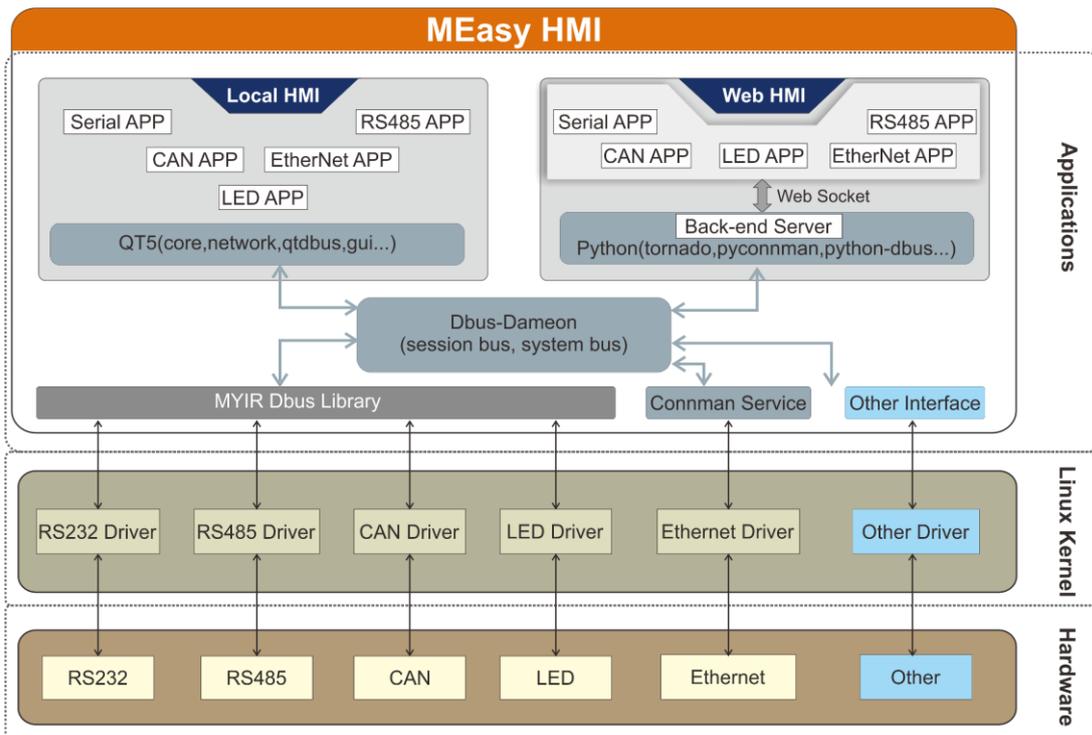


Figure 1-12 MEasy-HMI System Structure

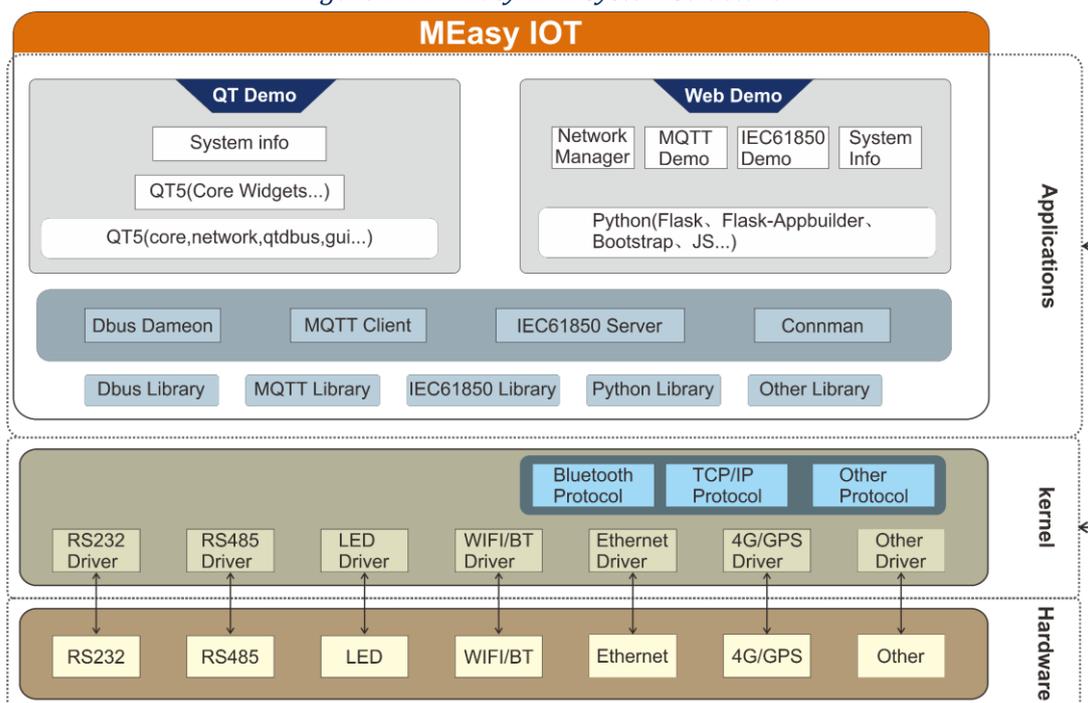


Figure 1-13 MEasy-IOT System Structure

**Order Information**

Product Item	Part No.	Packing List
MYD-YA157C Development Board	MYD-YA157C-V2-4E512D-65-C	<ul style="list-style-type: none"> <li>➤ One MYD-YA157C Board (including MYC-YA157C CPU Module and base board)</li> <li>➤ One USB Type-C cable</li> <li>➤ One USB to UART Serial cable</li> <li>➤ One WiFi/Bluetooth Antenna</li> <li>➤ One Quick Start Guide</li> </ul>
	MYD-YA157C-V2-4E512D-65-I	
MYC-YA157C CPU Module	MYC-YA157C-V2-4E512D-65-C	<b>Add-on Options</b> <ul style="list-style-type: none"> <li>➤ MYC-YA157C CPU Module</li> <li>➤ MY-TFT070CV2 LCD Module</li> <li>➤ MY-CAM002U Camera Module</li> </ul>
	MYC-YA157C-V2-4E512D-65-I	
MY-LCD70TP-C LCD Module (with capacitive touch screen)	MY-TFT070CV2	
MY-CAM002U USB Camera Module	MY-CAM002U	


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