

MYD-Y6ULX Development Board

- MYC-Y6ULX CPU Module as Controller Board
- 528Hz NXP i.MX 6UL/6ULL ARM Cortex-A7 Processors
- 1.0mm pitch 140-pin Stamp Hole Expansion Interface for Board-to-Board Connections
- 256MB DDR3 SDRAM, 256MB Nand Flash or 4GB eMMC Flash
- 2 x USB2.0 Host, 1 x USB2.0 OTG, 2 x 10/100 Mbps Ethernets , CAN, RS485, TF, LCD, Camera, Audio...
- Onboard SDIO based WiFi Module with External Antennas
- Mini-PCIe Slot for Optional USB based 4G LTE Module
- Optional 4.3 or 7 inch LCD/TSP and Camera Module
- Ready-to-Run Linux 4.1.15

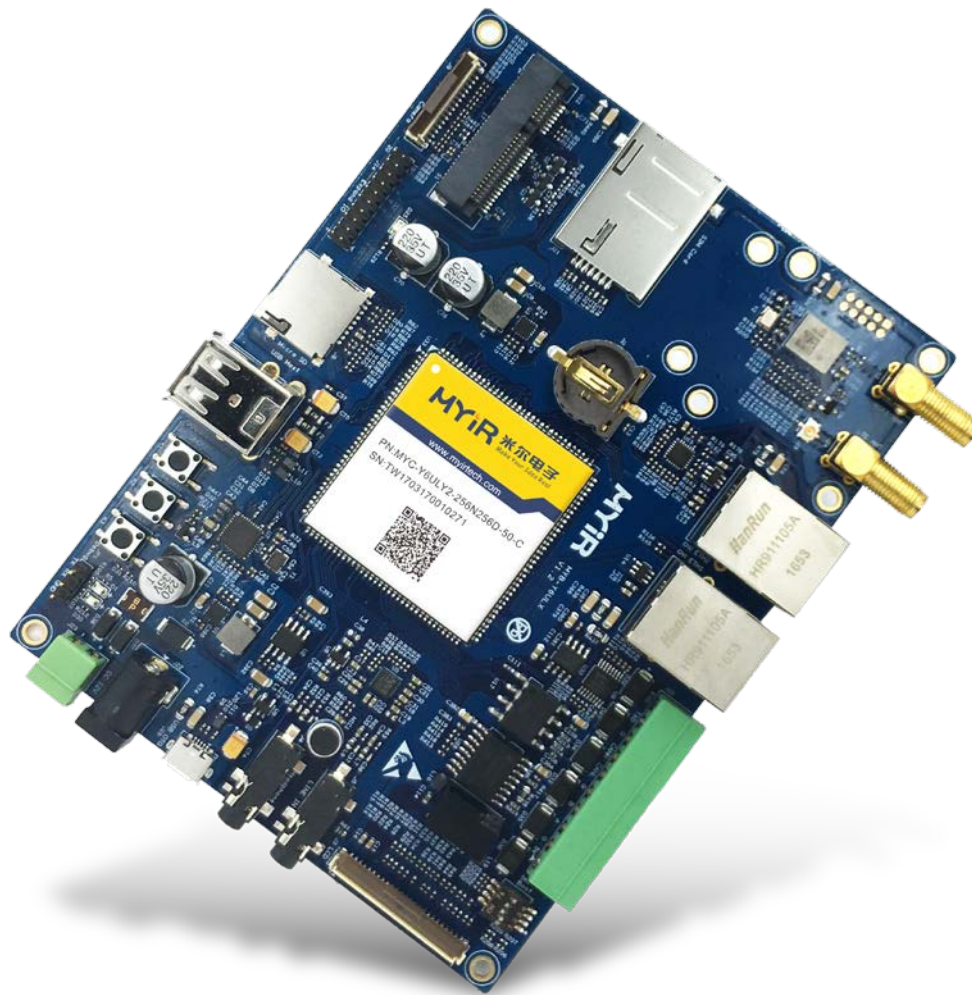


Figure 1-1 MYD-Y6ULX Development Board

Description

The [MYD-Y6ULX development board](#) is a complete evaluation platform for NXP's [i.MX 6UltraLite / 6ULL](#) processor family, which can operate at 528 MHz and features the most efficient [ARM Cortex-A7](#) core, providing various memory interfaces and enhancing the flexibility and convenience of the board to connect peripheral devices. The board is ready to run Linux and supports industrial operating temperature range from -40 to +85 Celsius.

The [MYD-Y6ULX development board](#) employs the [MYC-Y6ULX CPU Module](#) as the controller board by populating the CPU Module on its base board through 1.0mm pitch 140-pin stamp hole interface. The MYC-Y6ULX

CPU Module is mounted with a shield cover and integrated with core components including i.MX 6UltraLite / 6ULL processor, 256MB DDR3, 256MB Nand Flash or optional 4GB eMMC and Ethernet PHY. The base board has extended rich peripherals through connectors and headers like Serial ports, USB, Ethernet, CAN, Micro SD card, WiFi module, LCD/Touch screen, Camera, Audio as well as an optional Mini PCIe interface for USB based 4G LTE module. It is a versatile platform and solid reference design delivered with necessary cable accessories detailed documentations ideal for prototype and evaluation based on i.MX 6UL/6ULL solutions.

MYIR offers three models of MYD-Y6ULX development boards with mainly different features as shown in below table. User can select model according to their own requirement.

| MYD-Y6ULX | MYD-Y6ULG2-256N256D-50-I | MYD-Y6ULY2-256N256D-50-C | MYD-Y6ULY2-4E512D-50-C |
|---------------|--|--------------------------|--|
| MYC-Y6ULX | MYC-Y6ULG2-256N256D-50-I | MYC-Y6ULY2-256N256D-50-C | MYC-Y6ULY2-4E512D-50-C |
| Processor | MCIMX6G2CVM05AB | MCIMX6Y2DVM05AA | MCIMX6Y2DVM05AA |
| RAM | 256MB DDR3 | 256MB DDR3 | 512MB DDR3 |
| Flash | 256MB Nand Flash | 256MB Nand Flash | 4GB eMMC |
| WiFi | Support | Support | Cannot support Reuse SDIO with eMMC |
| Working Temp. | -40 to +85 Celsius | 0 to +70 Celsius | 0 to +70 Celsius |
| | WiFi Module can only support -20 to +65 Celsius. | | |

Table 1-1 Three Models of MYD-6ULX (default configurations)

Hardware Specification

The [MYC-Y6ULX CPU Module](#) is using the 14 x 14mm, 0.8 mm ball pitch, 289 MAPBGA package 528 MHz i.MX 6UltraLite / i.MX 6ULL ARM Cortex-A7 application processor which provides multiple compatible options of G0, G1, G2, G3, Y0, Y1 and Y2 sub family. The MCIMX6G2CVM05AB and MCIMX6Y2DVM05AA are optional as the default part with the board.

Expanding the i.MX 6 series, the i.MX 6UltraLite is a high performance, ultra-efficient processor family featuring an advanced implementation of a single ARM® Cortex®-A7 core, which operates at speeds up to 696 MHz. The i.MX 6UltraLite applications processor includes an integrated power management module that reduces the complexity of external power supply and simplifies power sequencing. Each processor in this family provides various memory interfaces, including 16-bit LPDDR2, DDR3, DDR3L, raw and managed NAND flash, NOR flash, eMMC, Quad SPI and a wide range of other interfaces for connecting peripherals such as WLAN, Bluetooth™, GPS, displays and camera sensors.

| Feature | MCIMX6G0 | MCIMX6G1 | MCIMX6G2 | MCIMX6G3 |
|---------------------|-------------------------------|---|---|---|
| Speed | 528 MHz | 528 MHz, 696 MHz | 528 MHz, 696 MHz | 528 MHz |
| Cache | 32 KB-I, 32 KB-D | 32 KB-I, 32 KB-D 128 KB L2 | 32 KB-I, 32 KB-D 128 KB L2 | 32 KB-I, 32 KB-D 128 KB L2 |
| OCRAM | 128 KB | 128 KB | 128 KB | 128 KB |
| DRAM | 16-bit LP-DDR2, DDR3/DDR3L | 16-bit LP-DDR2, DDR3/DDR4L | 16-bit LP-DDR2, DDR3/DDR5L | 16-bit LP-DDR2, DDR3/DDR6L |
| eFuse | 512-bit | 1024-bit | 1536-bit | 2048-bit |
| NAND (BCH40) | Yes | Yes | Yes | Yes |
| EBI | Yes | Yes | Yes | Yes |
| Ethernet | 10/100-Mbit/s x 1 | 10/100-Mbit/s x 1 | 10/100-Mbit/s x 2 | 10/100-Mbit/s x 2 |
| USB | OTG, HS/FS x 1 | OTG, HS/FS x 2 | OTG, HS/FS x 2 | OTG, HS/FS x 2 |
| CAN | 0 | 1 | 2 | 2 |
| Security | Basic | TRNG, Crypto Engine (AES/TDES/SHA), Secure Boot | TRNG, Crypto Engine (AES/TDES/SHA), Secure Boot | TRNG, Crypto Engine (AES with DPA/TDES/SHA/RSA), Secure Boot, tamper monitor, PCI4.0 pre-certification, OTF DRAM encryption |
| Graphic | None | None | PxP | PxP |
| CSI | None | None | 24-bit Parallel CSI | 24-bit Parallel CSI |
| LCD | None | None | 24-bit Parallel LCD | 24-bit Parallel LCD |
| Quad SPI | 1 | 1 | 1 | 1 |
| SDIO | 2 | 2 | 2 | 2 |
| UART | 4 | 8 | 8 | 8 |
| I2C | 2 | 4 | 4 | 4 |
| SPI | 2 | 4 | 4 | 4 |
| I2S/SAI | 1 | 3 | 3 | 3 |
| S/PDIF | 1 | 1 | 1 | 1 |
| Timer/PWM | Timer x 2, PWM x 4 | Timer x 4, PWM x 8 | Timer x 4, PWM x 8 | Timer x 4, PWM x 8 |
| 12-bit ADC | 1 x 10-ch. | 1 x 10-ch. | 2 x 10-ch. | 2 x 10-ch. |

Table 1-2 i.MX 6UltraLite Device Options

The i.MX 6ULL is a power efficient and cost optimized applications processor family featuring an advanced implementation of a single ARM Cortex-A7 core, which operates at speeds up to 900 MHz. The i.MX 6ULL applications processor includes an integrated power management module that reduces the complexity of an external power supply and simplifies power sequencing. Each processor in this family provides various memory interfaces, including 16-bit LPDDR2, DDR3, DDR3L, raw and managed NAND flash, NOR flash, eMMC, Quad SPI and a wide range of other interfaces for connecting peripherals such as WLAN, Bluetooth®, GPS, displays and camera sensors.

| Feature | MCIMX6Y0 | MCIMX6Y1 | MCIMX6Y2 |
|---------------------|-------------------------------|-------------------------------|-------------------------------|
| Core | ARM® Cortex-A7 | ARM® Cortex-A7 | ARM® Cortex-A7 |
| Speed | 528 MHz | 528 MHz | 528 MHz |
| Cache | 32 KB-I, 32 KB-D | 32 KB-I, 32 KB-D 128 KB L2 | 32 KB-I, 32 KB-D 128 KB L2 |
| OCRAM | 128 KB | 128 KB | 128 KB |
| DRAM | 16-bit LP-DDR2, DDR3/DDR3L | 16-bit LP-DDR2, DDR3/DDR4L | 16-bit LP-DDR2, DDR3/DDR5L |
| eFuse | 256-bit | 256-bit | 256-bit |
| NAND (BCH40) | Yes | Yes | Yes |
| EBI | Yes | Yes | Yes |
| Ethernet | 10/100-Mbit/s x 1 | 10/100-Mbit/s x 1 | 10/100-Mbit/s x 2 |
| USB | OTG, HS/FS x 1 | OTG, HS/FS x 2 | OTG, HS/FS x 2 |
| CAN | 0 | 1 | 2 |
| Graphic | None | None | PxP |
| CSI | None | None | 16-bit Parallel CSI |
| LCD | None | None | 24-bit Parallel LCD |
| Quad SPI | 1 | 1 | 1 |
| SDIO | 2 | 2 | 2 |
| UART | 4 | 8 | 8 |
| I2C | 2 | 4 | 4 |
| SPI | 2 | 4 | 4 |
| I2S/SAI | 1 | 3 | 3 |
| ESAI | 1 | 1 | 1 |
| S/PDIF | 1 | 1 | 1 |
| Timer/PWM | Timer x 2, PWM x 4 | Timer x 4, PWM x 8 | Timer x 4, PWM x 8 |
| 12-bit ADC | 1 x 10-ch. | 1 x 10-ch. | 2 x 10-ch. |
| Security | None | AES-128, HAB | AES-128, HAB |
| Temperature | -40°C to 105°C (Tj) | -40°C to 105°C (Tj) | 0°C to 90°C (Tj) |

Table 1-3 i.MX 6ULL Device Options

Mechanical Parameters

- Dimensions: 105mm x 140mm (base board), 37mm x 39mm (CPU Module)
- PCB Layers: 4-layer design (base board), 8-layer design (CPU Module)
- Power supply: +12V/1.5A (base board), +3.3V/0.3A (CPU Module)
- Working temperature: 0~70 Celsius (commercial grade) or -40~85 Celsius (industrial grade)

The MYD-Y6ULX Controller Board ([MYC-Y6ULX CPU Module](#))



Figure 1-2 [MYC-Y6ULX CPU Module](#) (delivered with shield cover)

Processor

- 528MHz NXP i.MX 6UltraLite / i.MX 6ULL ARM Cortex-A7 processor (MCIMX6G2CVM05AB or MCIMX6Y2DVM05AA by default)

Memory

- 256MB DDR3 SDRAM (supports up to 1GB)
- 256MB Nand Flash (4GB eMMC Flash is optional)

Peripherals and Signals Routed to Pins

 [MYC-Y6ULX Pinouts Description](#)

- One 10/100M Ethernet PHY
- 1.0mm pitch 140-pin stamp hole expansion interface
 - 2 x 10/100Mbps Ethernet
 - 8 x Serial ports
 - 4 x I2C
 - 2 x CAN
 - 4 x SPI
 - 8 x ADC
 - 8 x PWM
 - 3 x I2S
 - 1 x Parallel Camera Sensor Interface

- 1 x JTAG
- 1 x 24-bit LCD interface
- Up to 97 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.

The MYD-Y6ULX Base Board

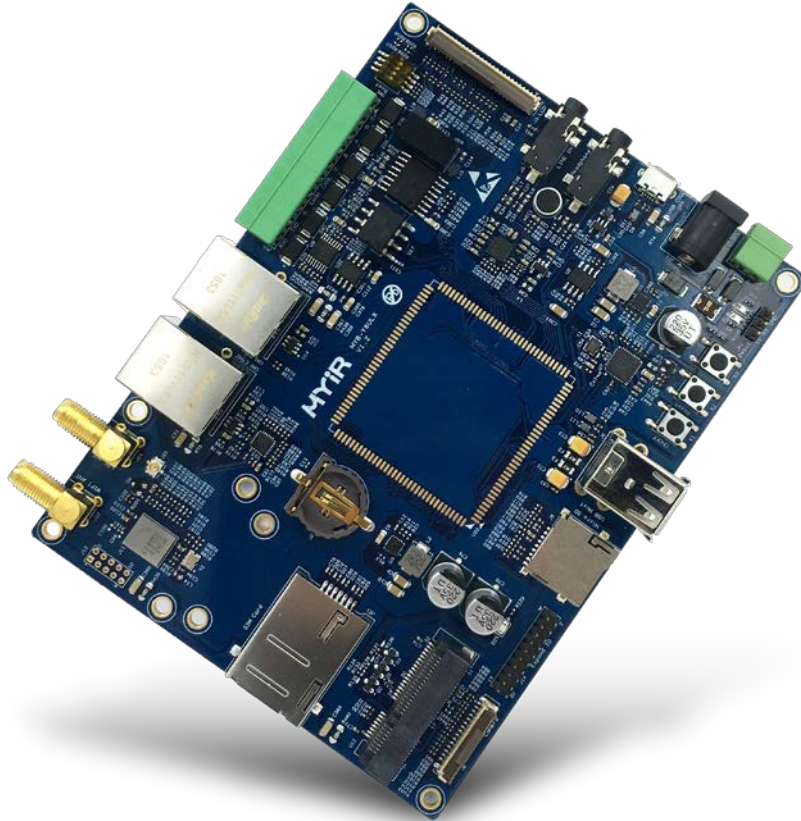


Figure 1-3 MYD-Y6ULX Base Board

- Serial ports
 - 1 x Debug serial port (TTL)
 - 1 x RS485 serial port (with isolation)
 - 1 x 3-wire RS232 serial port (with isolation)
- USB
 - 2 x USB2.0 Host ports
 - 1 x Micro USB2.0 OTG ports
- 1 x Mini PCIe interface (for optional USB based 4G LTE module)
- 1 x SIM card socket
- 1 x SDIO based WiFi module
- 2 x External antenna interfaces (one for WiFi module and one for 4G LTE module)
- 2 x 10/100 Mbps Ethernet interfaces
- 1 x Camera interface
- 1 x CAN interface (with isolation)
- 1 x Micro SD card slot
- 1 x LCD interface (16-bit true color, supports optional 4.3-inch and 7-inch TFT LCD)
- Battery backed RTC
- Audio input/output port (3.5mm jack)
- 3 x Buttons (1 x Reset button, 1 x User button, 1 x ON/OFF button)

- 2 x LEDs (1 x power indicator LED, 1 x user-defined LED)
- 1 x 2.0mm 20-pin male expansion connector
 - 1 x SPI
 - 1 x I2C
 - 2 x UART
 - 10 x GPIO

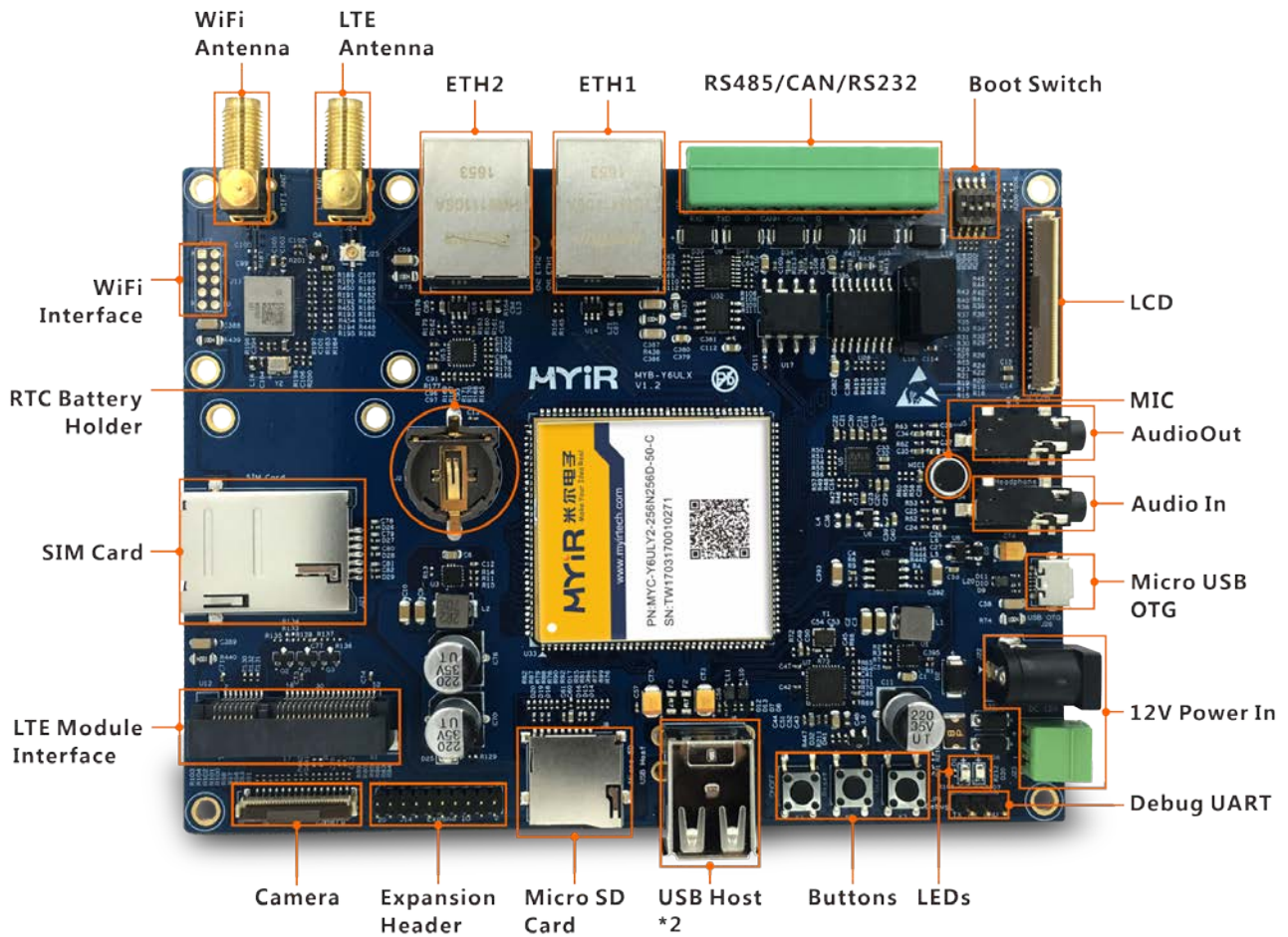


Figure 1-4 MYD-Y6ULX Development Board

Function Block Diagram

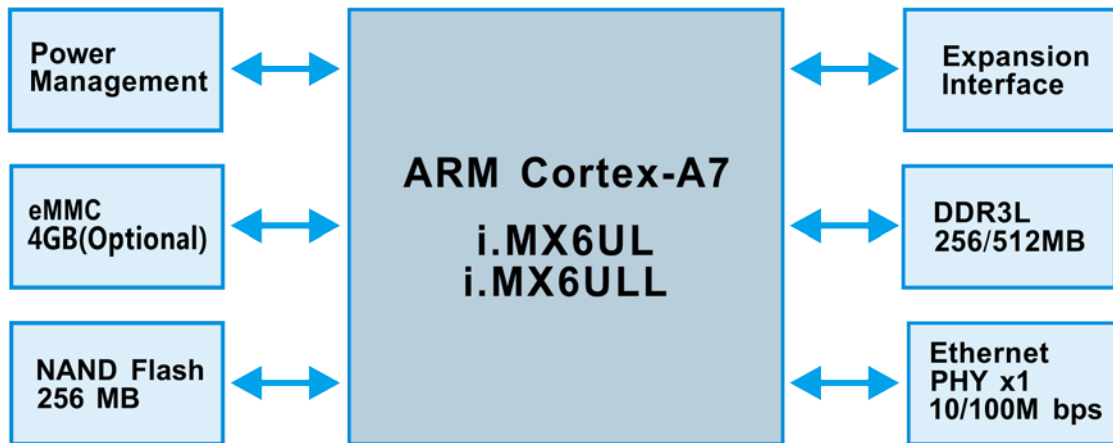


Figure 1-5 MYC-Y6ULX Function Block Diagram

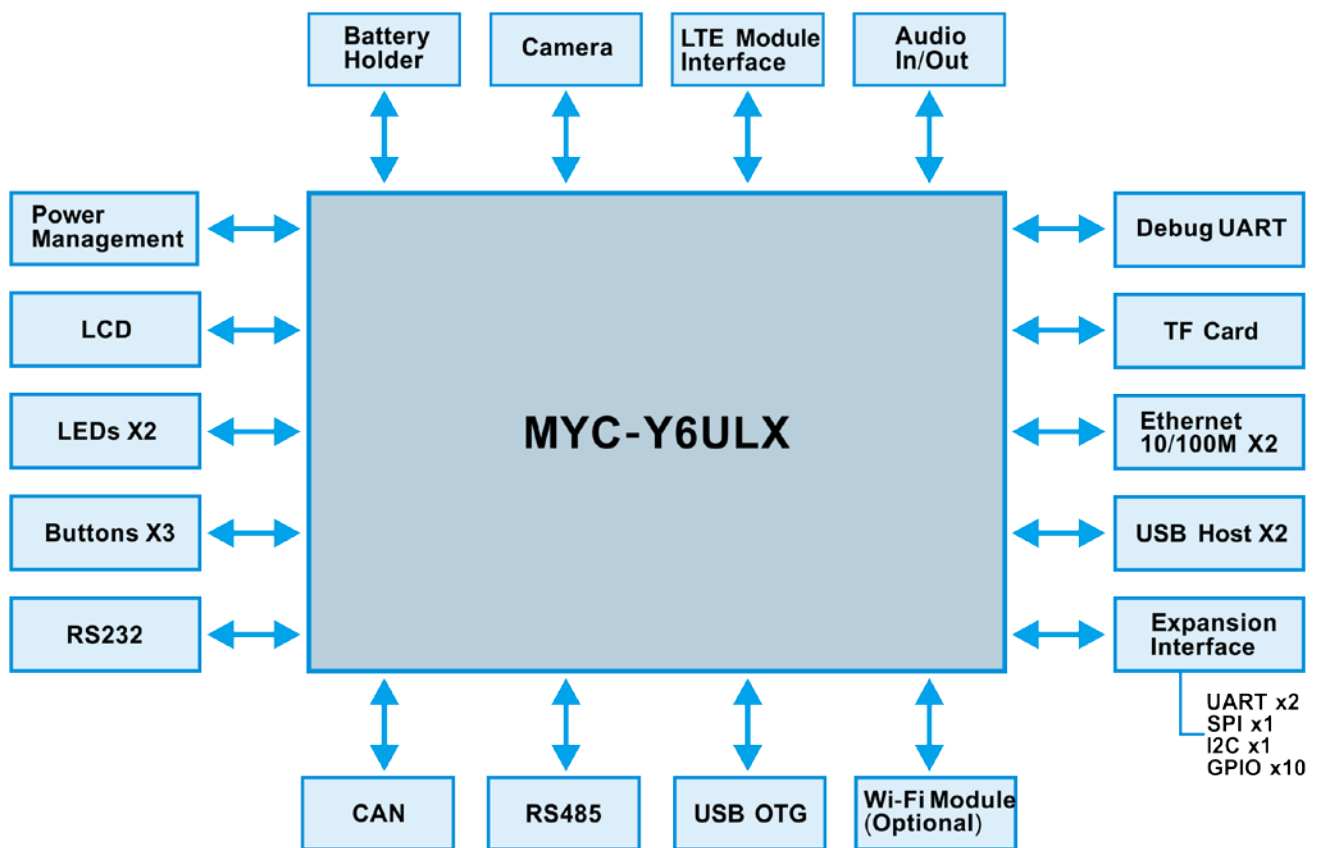


Figure 1-6 MYD-Y6ULX Function Block Diagram

Dimension Chart of MYD-Y6ULX

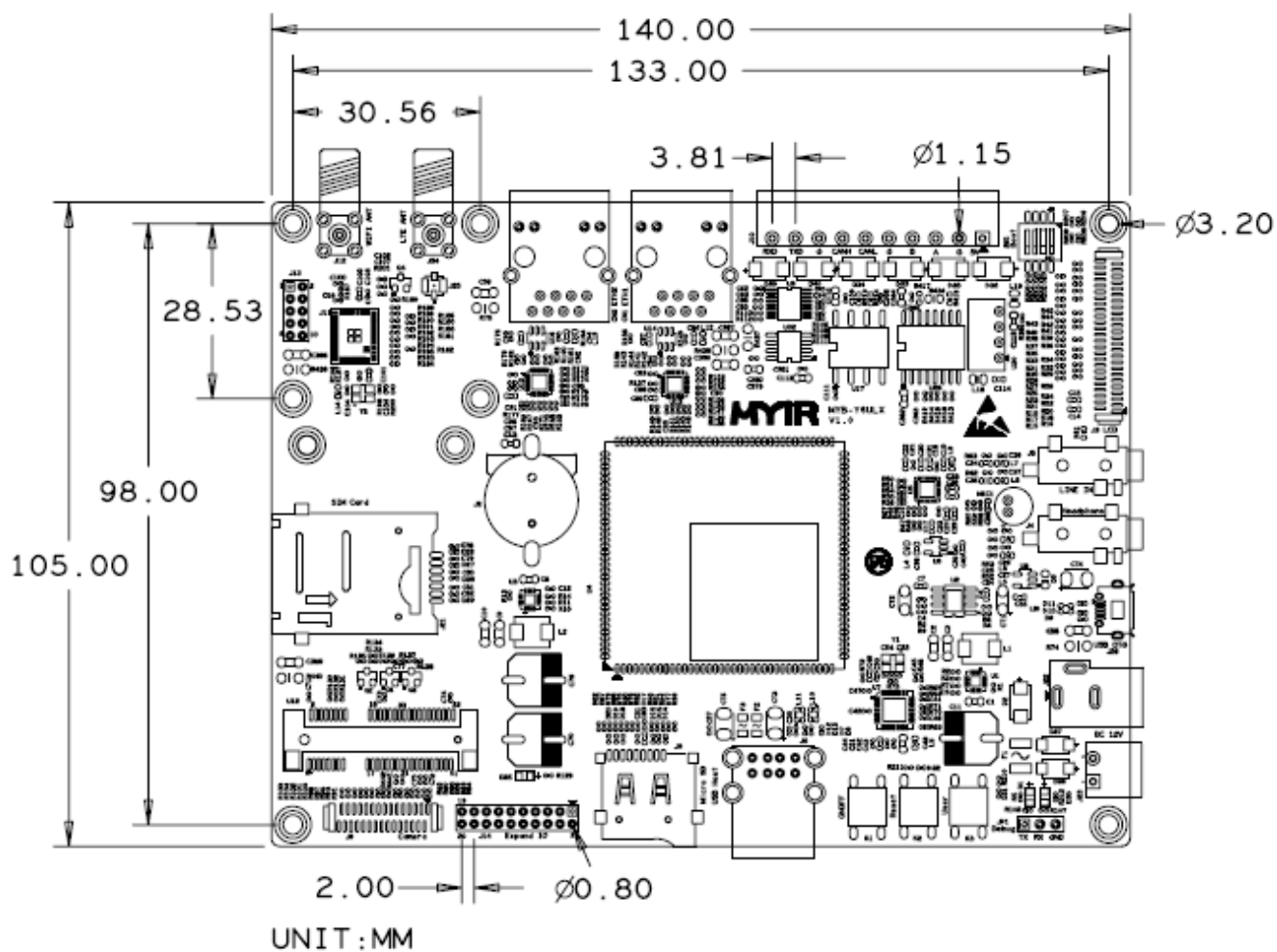


Figure 1-7 Dimension Chart of MYD-Y6ULX

Software Features

The MYD-Y6ULX development board supports running Linux Operating System and is provided with software packages. Software features are summarized as below:

| Item | Features | Description |
|---------------------|--------------------------|---|
| Bootstrap program | u-boot | The primary bootstrap (source code) |
| Kernel | Version | Linux 4.1.15 (source code, based on official imx_4.1.15_2.0.0_ga version) |
| Linux Drivers | USB | HOST and OTG driver (source code) |
| | Ethernet | Ethernet driver (source code) |
| | MMC | MMC/eMMC/TF card driver (source code) |
| | NandFlash | Nand Flash driver (source code) |
| | eMMC | eMMC driver (source code) |
| | WiFi | WiFi Module driver (SDIO signal, source code) |
| | 4G LTE | 4G LTE Module driver (USB signal, source code) |
| | Camera | Camera driver (source code, supports MYIR's MY-CAM011B) |
| | LCD Controller | LCD driver (source code, supports MYIR's 4.3- and 7- inch LCD) |
| | Touch Panel | Resistive and Capacitive touch screen driver (source code) |
| | RTC | RTC driver (source code) |
| | GPIO Button | Button driver (source code) |
| | GPIO LED | LED driver (source code) |
| | GPIO KEY | KEY driver (source code) |
| | UART | UART driver (source code) |
| | CAN | CAN driver (source code) |
| | RS485 | RS485 driver (source code) |
| | Audio | Audio (wm8904) driver (source code) |
| | UART | UART driver (source code) |
| | SPI | SPI driver (source code) |
| I2C | I2C driver (source code) | |
| File System | Yocto | Including QT5.6 (source code) |
| Compiler Tool Chain | Linaro GCC 4.9 hf | Binary file |
| | MetaToolchain | Built by Yocto, GCC 5.3 (Binary file) |
| | Applications Tool Chain | Built by Yocto, GCC 5.3 (Binary file) |

Table 1-4 Software Features of MYD-Y6ULX

Order Information

| Product Item | Part No. | Packing List |
|---|--------------------------|--|
| MYD-Y6ULX Development Board | MYD-Y6ULG2-256N256D-50-I | <ul style="list-style-type: none"> ➤ One MYD-Y6ULX Development Board ➤ One 12V/1.5A Power adapter ➤ One USB cable ➤ One Ethernet cable ➤ One 4G LTE antenna ➤ One WiFi antenna (MYC-Y6ULY2-4E512D-50-C has none.) <ul style="list-style-type: none"> ➤ One Product Disk (including user manual, datasheet, base board schematic, CPU module pinouts and software packages) |
| | MYD-Y6ULY2-256N256D-50-C | |
| | MYD-Y6ULY2-4E512D-50-C | |
| MYC-Y6ULX CPU Module | MYC-Y6ULG2-256N256D-50-I | |
| | MYC-Y6ULY2-256N256D-50-C | |
| | MYC-Y6ULY2-4E512D-50-C | |
| MY-LCD43TP 4.3-inch LCD Module with resistive touch screen | MY-TFT043RV2 | |
| MY-LCD70TP 7-inch LCD Module with resistive touch screen | MY-TFT070RV2 | |
| MY-LCD70TP-C 7-inch LCD Module with capacitive touch screen | MY-TFT070CV2 | |
| MY-CAM011B Camera Module | MY-CAM011B | Add-on Options <ul style="list-style-type: none"> ➤ MYC-Y6ULX CPU Module ➤ MY-LCD43TP 4.3-inch LCD Module ➤ MY-LCD70TP 7-inch LCD Module ➤ MY-LCD70TP-C 7-inch LCD Module ➤ MY-CAM011B Camera Module |


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