

MYB-6ULX

Product Manual

Version V1.0

22-Sep-2017

Version History

Version	Description	Date
V1.0	Initial version	22-Sep-2017

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1. Product Abstract

MYB-6ULX is an extension module developed by MYiR based on MYS-6ULX-IOT and MYS-6ULX-IND single board computers. The module is a fully industrial design, which is integrated with rich peripherals including Ethernet, Audio, CAN, RS485, Camera, USB Debug UART, RTC, Expansion header. The application range of MYS-6ULX single board computer has been greatly improved.

For a detailed description of the MYS-6UL-IOT and MYS-6UL-IND single-board computers, please refer to the user manual or visit the following website.

<http://www.myirtech.com/list.asp?id=561>

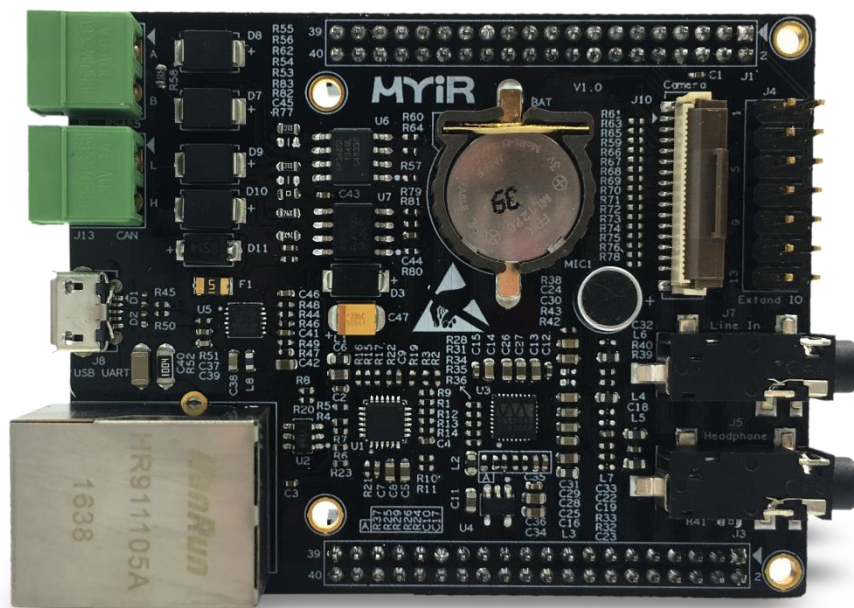


Figure 1-1 MYB-6ULX

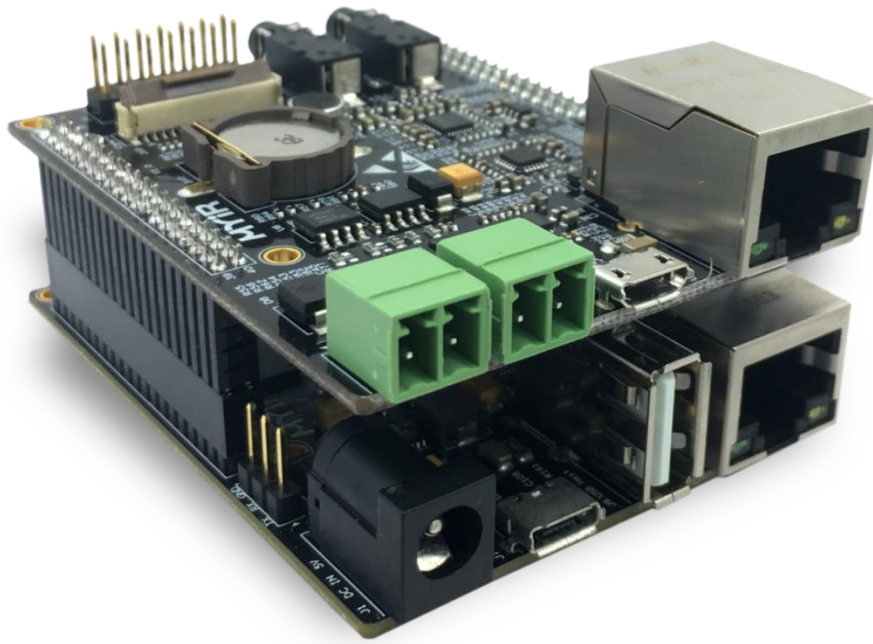


Figure 1-2 MYD-6ULX

2. Hardware Characteristics

2.1 Board Resource

The MYB-6ULX and MYS-6ULX single board computer are connected by two 40 pin headers which are 2.0 mm pitch. In addition, four fixed holes are reserved. Users can improve the stability of the assembly by adding copper pillars and screws.

The MYB-6ULX expansion module takes full advantage of the IO resources on the expansion interface of the MYS-6ULX single board computer to maximize the peripherals and reserve an IO expansion header which is including SPI, UART, I2C and some GPIO.

Please refer to the below for detail.

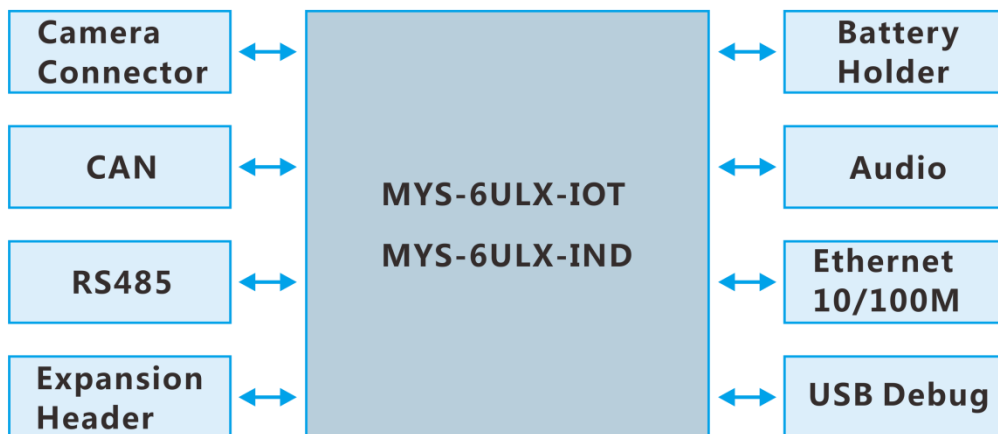


Figure 2-1 Function Block Diagram of MYB-6UX

- 1 x 10/100Mbps Ethernet interface
- 1 x CAN interface
- 1 x RS485
- 1 x USB Debug UART
- Audio
 - 1 x Microphone
 - 1 x Line In
 - 1 x Stereo Audio Output port (Headphone)

- 1 x 8 bit parallel camera interface.
- 1 x RTC battery holder
- 1 x 14 pins expansion header
 - 1 x SPI, 2 x UART, 2 x I2C (some signals are reused)

2.2 Expansion Header

The MYB-6ULX expansion module is equipped with a 14 pins double row header (J4) with 2.54 mm pitch. Users can extend additional function according to their needs.

Please refer the below to the pin multiplexing.

Function	CPU Pin Number	Header Pin Number	Header Pin Number	CPU Pin Number	Function
VCC_5V(Output)	-	1	2	-	VDD_3V3(Output)
Ground	-	3	4	P15	GPIO
UART2_TXD/EC SPI3.SS0/I2C4.S CL	J17	5	6	G17	UART4_TXD/ I2C1.SCL
UART2_RXD/EC SPI3.SCLK/I2C4. SDA	J16	7	8	G16	UART4_RXD/ I2C1.SDA
UART2_RTS/EC SPI3.MOSI	H14	9	10	B5	GPIO
UART2_CTS/EC SPI3_MISO	J15	11	12	E6	GPIO
Ground	-	13	14	-	Ground

Table 2-1 Pin MUX of The Expansion Header

3. Interfaces

Rich peripheral interface resources are provided on the MYB-6ULX Expansion module.

Detailed resources and the location on the board provided as below.

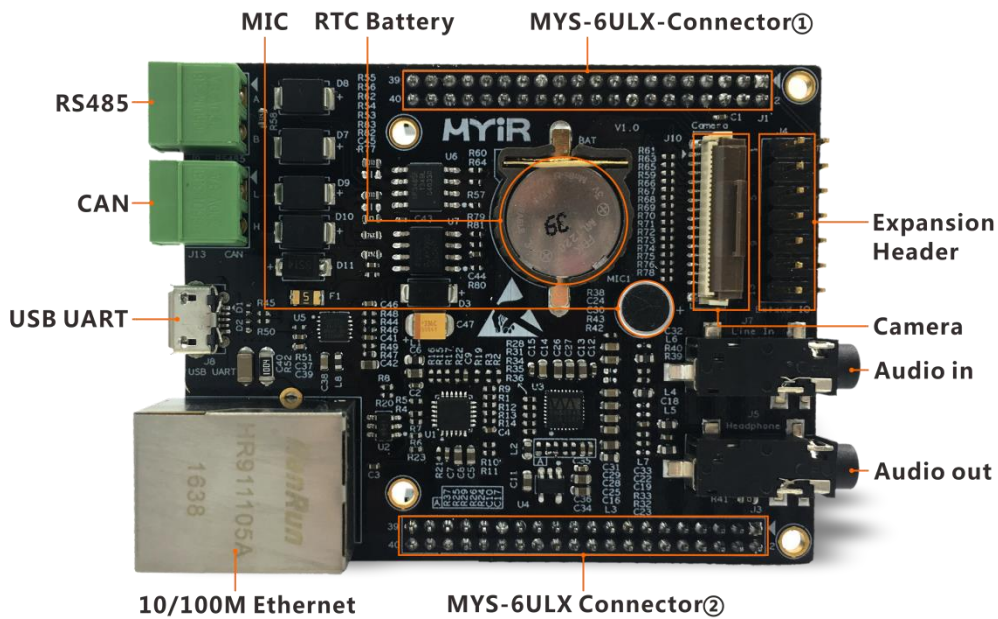


Figure 3-1 MYB-6ULX Resources

Please refer to the interface list as below.

Interface	Designator	Description
SBC Interface	J1,J3	MYS-6ULX-IND\MYS-6ULX-IOT single board computer interface
RS485	J9	RS485 interface
CAN	J11	CAN interface
USB Debug	J8	USB Debug UART interface
Ethernet	CN1	10/100M Ethernet interface
Camera	J10	8 bit parallel camera interface
Battery holder	BAT	RTC battery holder (size1220/1225)
Audio	J5	3.5mm headphone output
	J7	3.5mm line in
	MIC1	Microphone in
Expansion header	J4	IO expansion header

Table 3-1 List of MYB-6ULX Resources

4. Hardware Design

4.1 Power supply

As an expansion module for the MYS-6ULX single board computer, MYB-6ULX can not be used alone, and it must be used with MYS-6ULX. We can choose power in terminal one of the J1, J7 (on the MYS-6ULX) and J8 (on the MYB-6ULX). The system is power by 5V, if users need the RTC function, you have to mount a battery on the MYB-6ULX battery holder. 1220/1225 size with 3.0V Voltage is recommended.

Please refer to below topological graph for detail. It is not conflicted when multiple voltages are present at the same time.

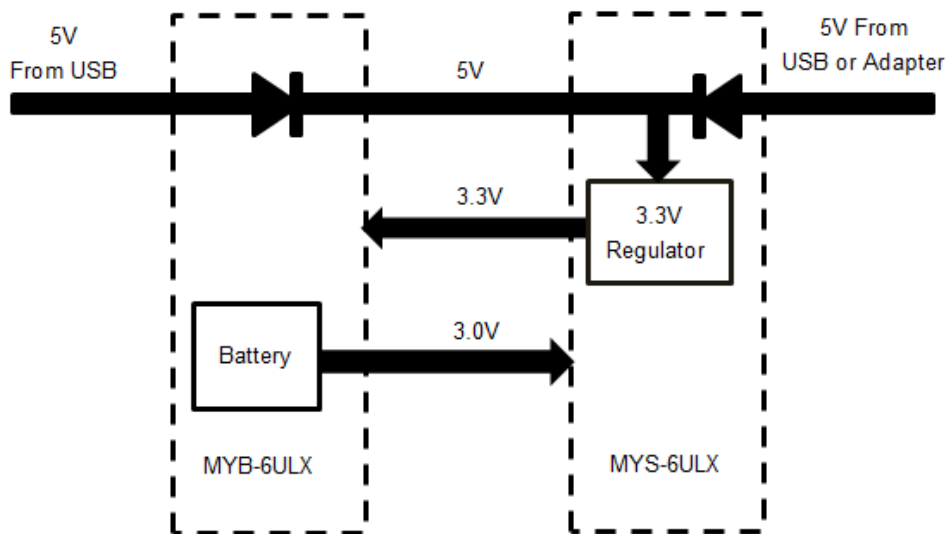


Figure 4-1 MYB-6ULX Power Tree

4.2 Ethernet

MYB-6ULX is equipped with an Ethernet operating at 10/100 Mb/s, which is offering a standard RJ45 connector (With voltage transformer inside the socket). The PHY silicon with a part number of LAN8720AI-CP from Microchip is used. The PHY address of MIDO bus is 001. Please refer to the schematic of the Ethernet of the board as below.

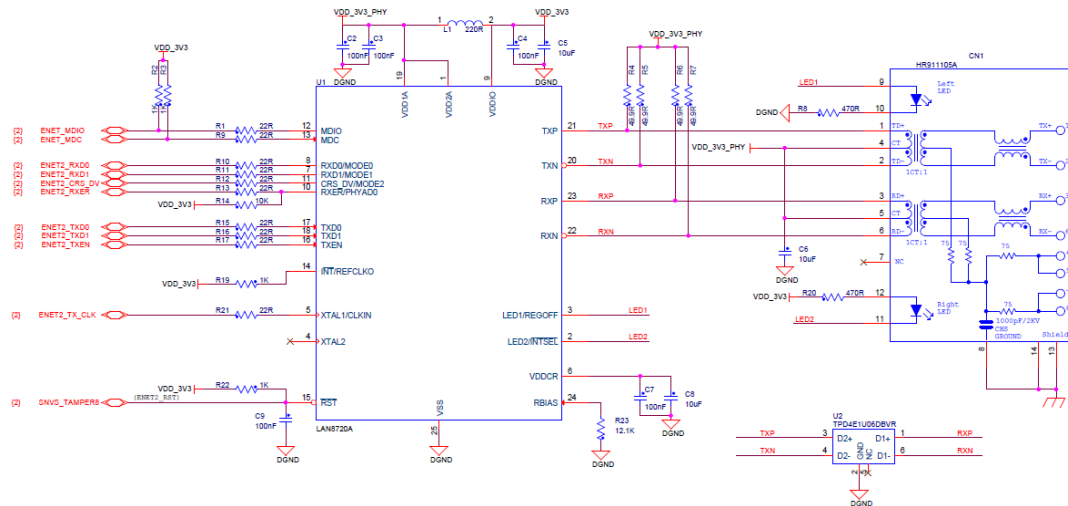


Figure 4-2 Ethernet

4.3 Audio CODEC

WM8904 Audio CODEC silicon from Wolfson is equipped on MYB-6ULX. It provides high quality audio performance. One (1) unit of 3.5mm headphone interface, 1 unit of audio in and one unit of MIC are expanded for the comprehensive audio application.

I2S signal of WM8904 is connected to the SAI2 controller of the CPU and I2C of WM8904 is connected to I2C2. Please refer to the schematic below for detail.

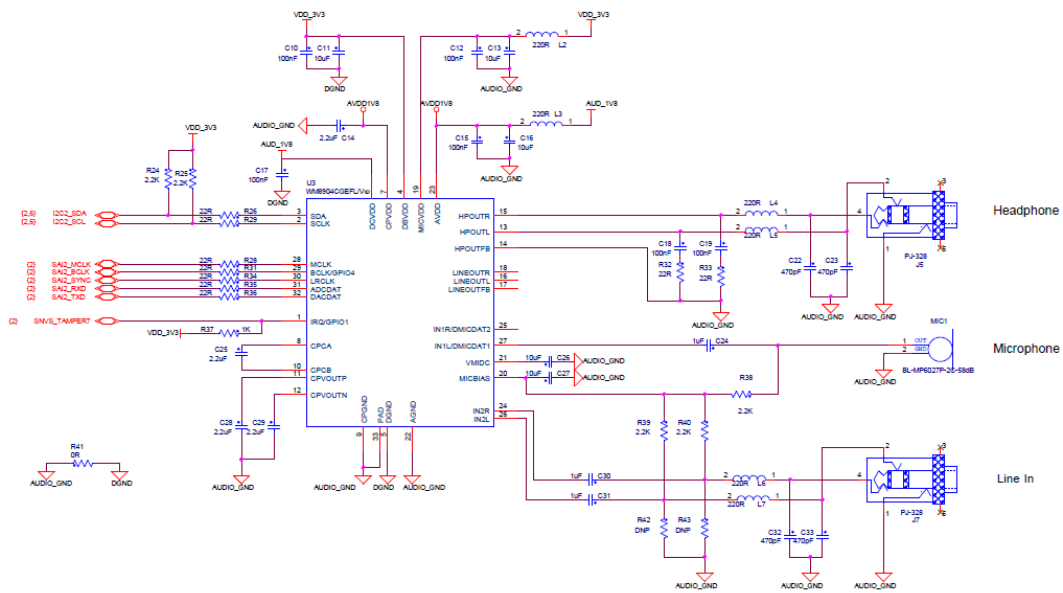


Figure 4-3 Audio Codec

4.4 CAN

A Controller Area Network (CAN bus) is a robust vehicle bus standard designed to allow microcontrollers and devices to communicate with each other in applications without a host computer. It meets the specific requirements of the field, such as real-time processing, electromagnetic interference (EMI), the environment reliable work, cost-effective and the bandwidth requirements.

The processor has two CAN bus controllers, has a complete CAN protocol version 2.0B specification, supports standard and extended message frames. One CAN port is offered on MYB-6ULX due to the PIN reuse. MYB-6ULX is equipped with a CAN transceiver. The part number of the transceiver is TJA1050T from NXP. For more details about the TJA1050T chip, please see its datasheet.

Please refer to the schematic of the CAN below for detail.

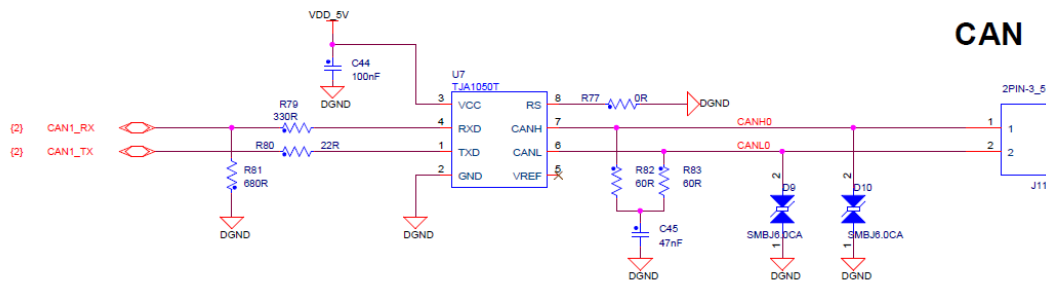


Figure 4-4 CAN

4.5 RS485

MYB-6ULX is equipped with an RS485 interface. This function is connected to the UART3 controller on the processor. Sending or receiving is controlled by a GPIO. The UART controller supports 7 bit or 8 bit data bits, 1 or 2 stop bits, and programmable parity. The chip of the transceiver is SP3485EN-L from EXAR, for more details about the SP3485EN-L chip, please see its datasheet.

Please refer to the schematic of the RS485 below for detail.

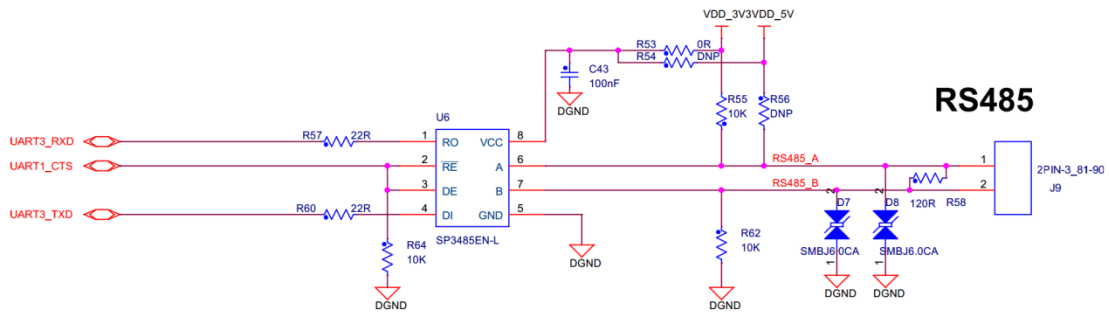


Figure 4-5 RS485

4.6 RTC Battery

RTC function is designed into the MYB-6ULX expansion module, which enables the RTC function of the system by holding a 1220/1225 battery when the main power supply is down.

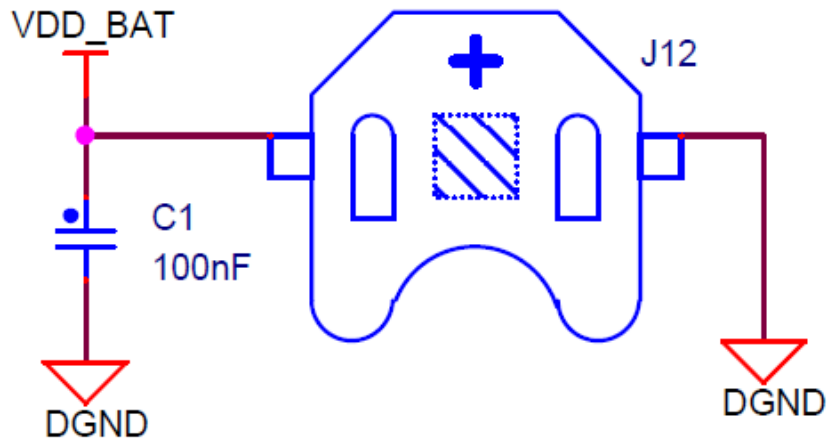


Figure 4-6 RTC Battery Holder Circuit

4.7 Camera

MYB-6ULX is equipped with a parallel camera interface. Although the processor supports up to 24bit parallel camera interface, because of the chip pin multiplexing relationship, MYB-6ULX can only support 8bit parallel camera interface. The connector is a 0.5mm

pitch FPC connector. Users can use MY-CAM011B camera module to evaluate this function. For a detailed description of the MY-CAM011B camera module, please refer to the user manual or visit the following website.

<http://www.myirtech.com/list.asp?id=534>

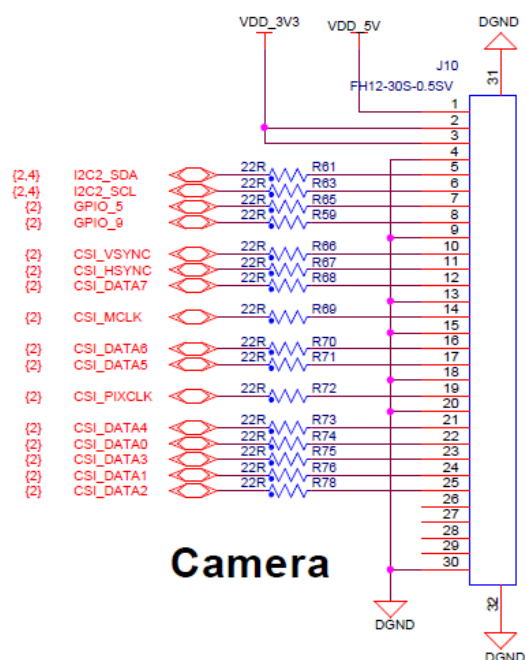


Figure 4-7 Camera

4.8 USB Debug

MYB-6ULX is equipped with an USB to UART. It can be used to connect the computer and debug the board as a control terminal. The connector of the USB port is the standard type B micro USB connector. It is easy for the user to find the right cable to connect the computer and the board. The bridge chip is chosen from FTDI's FT234XD, FTDI provides driver support for a variety of operating systems such as Mac, OS, Windows, and Linux.

To download the driver, please visit <http://www.ftdichip.com/>

Please refer to the schematic of the USB debug UART below for detail.

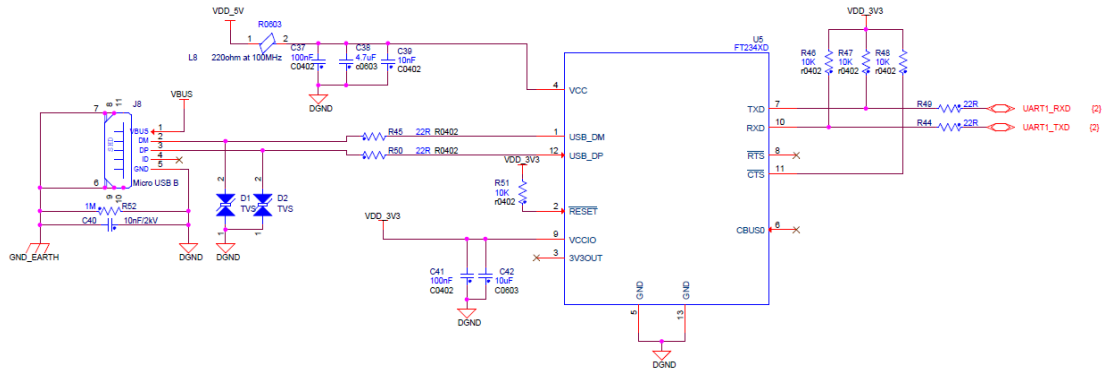


Figure 4-8 USB Debug UART

4.9 Expansion Header

The MYB-6ULX expansion module is equipped with a 14 pins double row header with 2.54 mm pitch. It provides SPI, serial port, I2C and other common resources which allow users to connect to other peripherals.

Please refer to the schematic of the Expansion Header below for detail. For the pin reuse, please refer to [chapter 2.2](#).

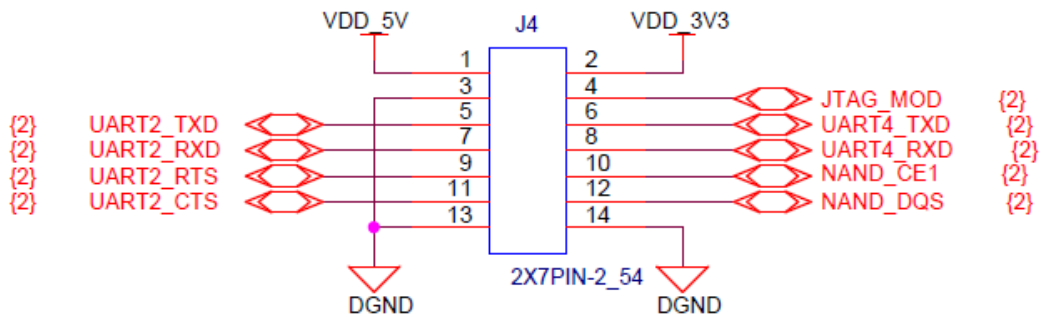


Figure 4-9 Expansion Header

5. Electronic Characteristics

5.1 Operating Temperature

Application Scenarios	Parameter				Description
	MIN	Nor.	Max	Unit	
Industrial Level	-40	—	+85	°C	—

Table 5-1 Operating Temperate

5.2 Power Supply Characteristics

Item	Label	Parameter				Description
		MIN	Normal	MAX	Unit	
System Voltage	5V	4.8	5.0	5.5	V	Power In
System Current	I _{v5.0}	---	0.25	---	A	Linux system, No LCD, Working with MYS-6ULX-IND
RTC Voltage	VDD_BAT	2.4	--	3.6	V	RTC Power In

Table 5-2 Power Supply Characteristics

5.3 GPIO DC Characteristics

Item	Label	Parameter				Description
		MIN	Normal	MAX	Unit	
Input High Voltage	V _{IH}	2.3	--	3.3	V	--
Input Low Voltage	V _{IL}	0	--	0.99	V	--
Output high Voltage	V _{OH}	3.15	---	--	V	--
Output Low Voltage	V _{OL}	--	--	0.15	V	--

Table 5-3 GPIO DC Characteristics

6. Mechanical Characteristics

- ◆ PCB Layers
4 Layers PCB, Immersion Gold Process, Lead-Free
- ◆ Mechanical
70x55mm

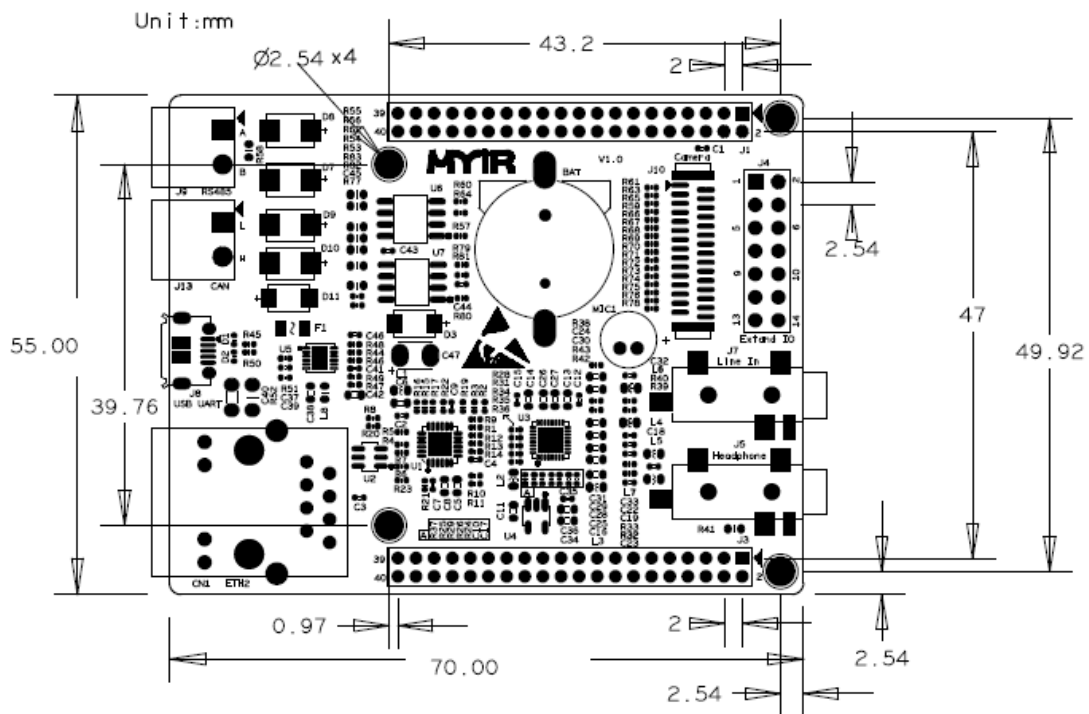


Figure 6-1 Mechanical Information of MYB-6ULX

For more details about the board, please refer to the DXF file.

Appendix 1 Warranty & Technical Support Services

MYIR Tech Limited is a global provider of ARM hardware and software tools, design solutions for embedded applications. We support our customers in a wide range of services to accelerate your time to market.

MYIR is an ARM Connected Community Member and work closely with ARM and many semiconductor vendors. We sell products ranging from board level products such as development boards, single board computers and CPU modules to help with your evaluation, prototype, and system integration or creating your own applications. Our products are used widely in industrial control, medical devices, consumer electronic, telecommunication systems, Human Machine Interface (HMI) and more other embedded applications. MYIR has an experienced team and provides custom design services based on ARM processors to help customers make your idea a reality.

The contents below introduce to customers the warranty and technical support services provided by MYIR as well as the matters needing attention in using MYIR's products.

Service Guarantee

MYIR regards the product quality as the life of an enterprise. We strictly check and control the core board design, the procurement of components, production control, product testing, packaging, shipping and other aspects and strive to provide products with best quality to customers. We believe that only quality products and excellent services can ensure the long-term cooperation and mutual benefit.

Price

MYIR insists on providing customers with the most valuable products. We do not pursue excess profits which we think only for short-time cooperation. Instead, we hope to establish long-term cooperation and win-win business with customers. So we will offer reasonable prices in the hope of making the business greater with the customers together hand in hand.

Delivery Time

MYIR will always keep a certain stock for its regular products. If your order quantity is less than the amount of inventory, the delivery time would be within three days; if your order quantity is greater than the number of inventory, the delivery time would be always four to six weeks. If for any urgent delivery, we can negotiate with customer and try to supply the goods in advance.

Technical Support

MYiR has a professional technical support team. Customer can contact us by email (support@myirtech.com), we will try to reply you within 48 hours. For mass production and customized products, we will specify person to follow the case and ensure the smooth production.

After-sale Service

MYiR offers one year free technical support and after-sales maintenance service from the purchase date. The service covers:

1. Technical support service

- a) MYiR offers technical support for the hardware and software materials which have provided to customers;
- b) To help customers compile and run the source code we offer;
- c) To help customers solve problems occurred during operations if users follow the user manual documents;
- d) To judge whether the failure exists;
- e) To provide free software upgrading service.

However, the following situations are not included in the scope of our free technical support service:

- a) Hardware or software problems occurred during customers' own development;
- b) Problems occurred when customers compile or run the OS which is tailored by themselves;
- c) Problems occurred during customers' own applications development;
- d) Problems occurred during the modification of MYiR's software source code.

2. After-sales maintenance service

The products except LCD, which are not used properly, will take the twelve months free maintenance service since the purchase date. But following situations are not included in the scope of our free maintenance service:

- a) The warranty period is expired;
- b) The customer cannot provide proof-of-purchase or the product has no serial number;
- c) The customer has not followed the instruction of the manual which has caused the damage the product;
- d) Due to the natural disasters (unexpected matters), or natural attrition of the components, or unexpected matters leads the defects of appearance/function;

- e) Due to the power supply, bump, leaking of the roof, pets, moist, impurities into the boards, all those reasons which have caused the damage of the products or defects of appearance;
- f) Due to unauthorized weld or dismantle parts or repair the products which has caused the damage of the products or defects of appearance;
- g) Due to unauthorized installation of the software, system or incorrect configuration or computer virus which has caused the damage of products.

Warm tips:

- 1) MYIR does not supply maintenance service to LCD. We suggest the customer first check the LCD when receiving the goods. In case the LCD cannot run or no display, customer should contact MYIR within 7 business days from the moment get the goods.
- 2) Please do not use finger nails or hard sharp object to touch the surface of the LCD.
- 3) MYIR suggests user purchasing a piece of special wiper to wipe the LCD after long time use, please avoid clean the surface with fingers or hands to leave fingerprint.
- 4) Do not clean the surface of the screen with chemicals.
- 5) Please read through the product user manual before you using MYIR's products.
- 6) For any maintenance service, customers should communicate with MYIR to confirm the issue first. MYIR's support team will judge the failure to see if the goods need to be returned for repair service, we will issue you RMA number for return maintenance service after confirmation.

3. Maintenance period and charges

- a) MYIR will test the products within three days after receipt of the returned goods and inform customer the testing result. Then we will arrange shipment within one week for the repaired goods to the customer. For any special failure, we will negotiate with customers to confirm the maintenance period.
- b) For products within warranty period and caused by quality problem, MYIR offers free maintenance service; for products within warranty period but out of free maintenance service scope, MYIR provides maintenance service but shall charge some basic material cost; for products out of warranty period, MYIR provides maintenance service but shall charge some basic material cost and handling fee.

4. Shipping cost

During the warranty period, the shipping cost which delivered to MYIR should be responsible by user; MYIR will pay for the return shipping cost to users when the product is repaired. If the warranty period is expired, all the shipping cost will be responsible by users.

5. Products Life Cycle

MYIR will always select mainstream chips for our design, thus to ensure at least ten years continuous supply; if meeting some main chip stopping production, we will inform customers in time and assist customers with products updating and upgrading.

Value-added Services

1. MYIR provides services of driver development base on MYIR's products, like serial port, USB, Ethernet, LCD, etc.
2. MYIR provides the services of OS porting, BSP drivers' development, API software development, etc.
3. MYIR provides other products supporting services like power adapter, LCD panel, etc.
4. ODM/OEM services.



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