

MYD-C437X-PRU

Product Manual

Version History

Rev. Number	Date	Description
V1.0	2017.1.8	Initial Version

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1. Product Introduction

1.1 Product Abstract

The MYD-C437X-PRU Development Board is a complete evaluation platform especially designed for users to take full advantages of the Programmable Real-time Unit (PRU) as well as the 3D graphics acceleration features from TI Sitara AM437X ARM Cortex-A9 processors. It employs the MYC-C437X CPU Module as the core controller board which is mounted onto the MYD-C437X-PRU base board through two 0.8mm pitch 2*100-pin board-to-board connectors. The CPU Module is equipped with AM437x processor, 512MB DDR3, 4GB eMMC flash, 32KB EEPROM, Ethernet PHY and PMIC integrated on board. The base board has additionally extended a rich set of peripherals through headers and connectors from the SOM and some extended controller chips including serial ports, USB Host ports, one Mini USB port, Gigabit Ethernet, two 10/100Mbps Ethernet ports from the PRU-ICSS subsystems, CAN, RS485, Camera interface, Micro SD, LCD, Touch screen and more others.

1.2 Product Show



Figure 1-1 MYD-C437X-PRU Development Board

2. Hardware Parameter

2.1 Resource on CPU Module Board

The resource on the CPU module board shows in figure 2-1.

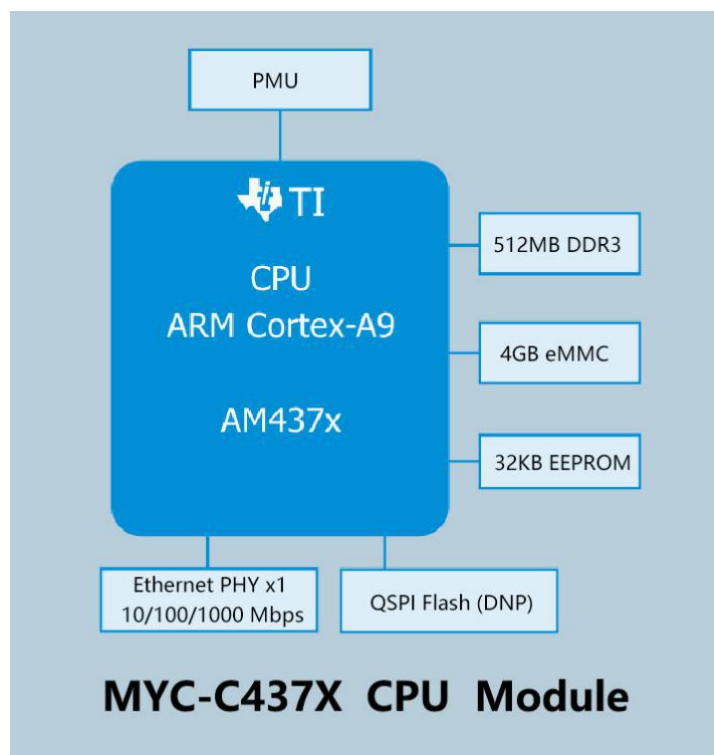


Figure 2-1 MYC-AM437X CPU Module Board

- ◆ 512MB DDR3 SDRAM, 16bit data line.
- ◆ 4GB eMMC (support 256MB / 512MB NAND FLASH)
- ◆ 32KB EEPROM
- ◆ 16MB QSPI Flash (DNP by default)
- ◆ 10/100/1000M Ethernet PHY
- ◆ Power LED and User LED
- ◆ Connector type:
Two 0.8mm pitch 100-pin Board-to-Board Expansion Connectors.

2.2 Interface about baseboard

The resource on the baseboard shows in figure 2-2.

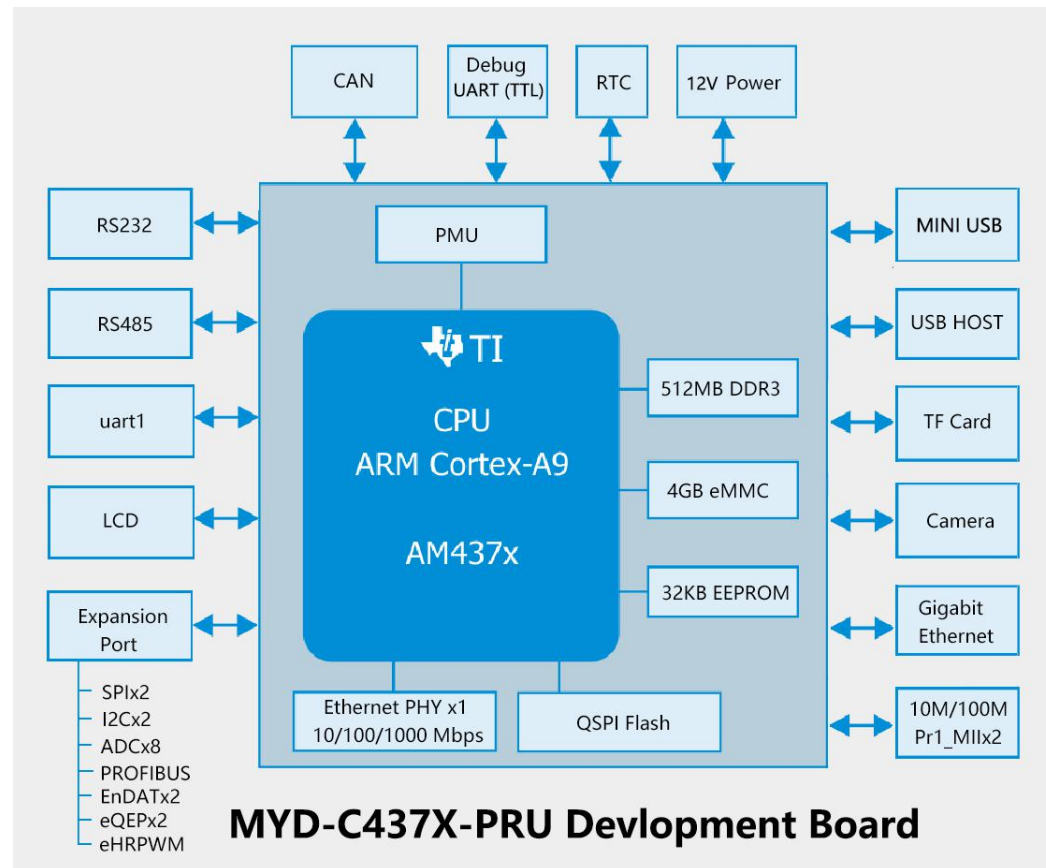


Figure 2-2 MYD-C437X-PRU Baseboard

- ◆ **LCD:**
 - ❖ 24 Bits True Color.Up to 2048X2048 resolution
- ◆ **TF Card**
 - ❖ One TF card interface
- ◆ **Interface:**
 - ❖ One UART For Debug,3 line
 - ❖ One RS232 with signals isolation
 - ❖ One RS485 with signals isolation
 - ❖ One CAN interface with signals isolation
 - ❖ One USB Host
 - ❖ One mini USB (support host or device)
 - ❖ One Gigabit Ethernet port
 - ❖ Two 10/100Mbps Ethernet ports from the PRU-ICSS subsystems
- ◆ **LED Indicator:**

- ❖ Three User LED
- ❖ One Power LED
- ◆ **Expand Port :**
 - ❖ Eight channels ADCs
 - ❖ Two SPI Ports
 - ❖ Two I2C Ports
 - ❖ Two Endat 2.2 Ports
 - ❖ Two eQEP Ports
 - ❖ eHRPWM

3. Interface

3.1 Connector On CPU Module Board

Please refer to the document *MYC-C437X Product Manual* in section 3.1.

3.2 Resource on Base board

The resource provided by MYD-C437X-PRU shows in figure 3-1.

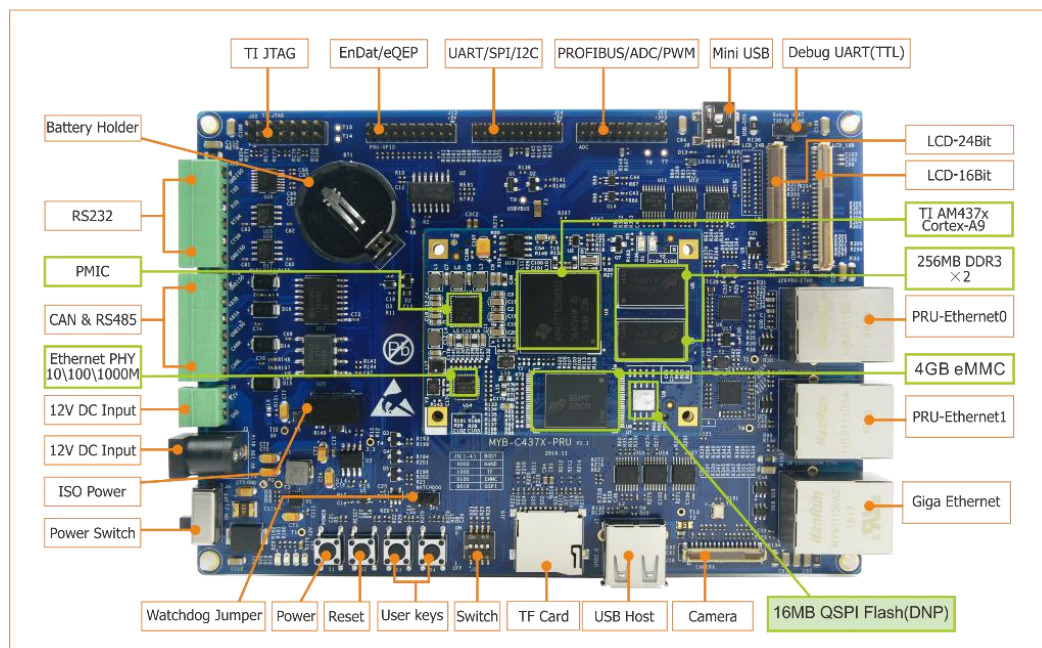


Figure 3-1 MYD-C437X-PRU Resources

4. Hardware Design

4.1 HW Design About CPU Module board

Please refer to the document *MYC-C437X Product Manual* .

4.2 HW Design About Baseboard

4.2.1 Power

MYD-C437X-PRU needs DC 12V as power input. Power tree shows in figure 4-2-1.

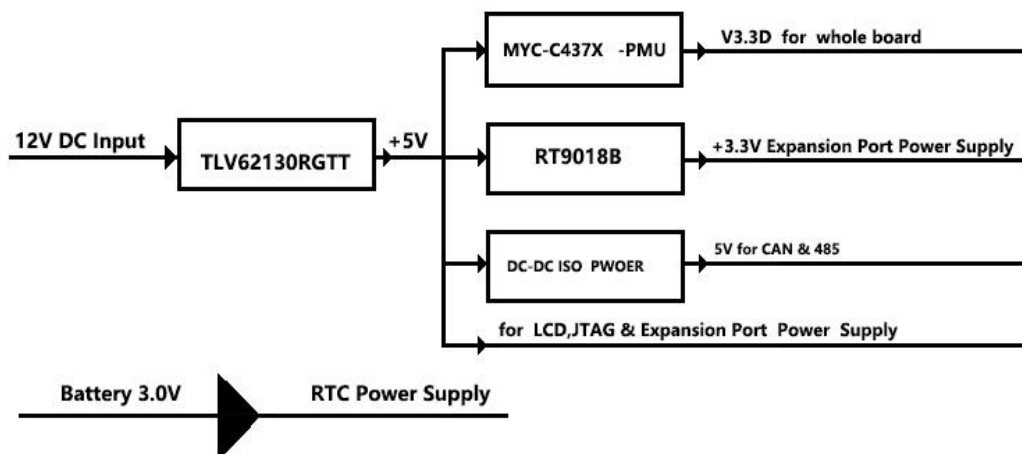


Figure 4-1 MYD-C437X-PRU Power Tree

4.2.2 Ethernet

MYD-C437X-PRU supports one Gigabit Ethernet as well as two 10/100Mbps Ethernet ports from the PRU-ICSS subsystems. The interface circuit shows in figure as follows.

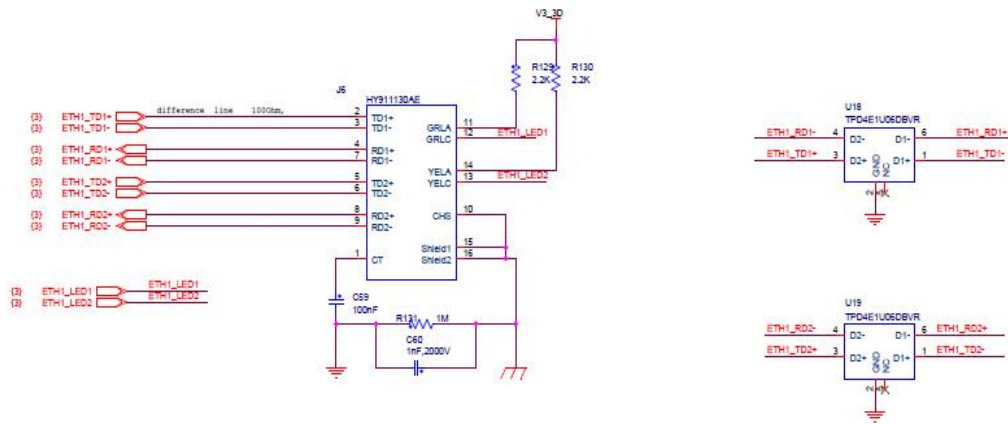


Figure 4-2 Ethernet PHY MDI to RJ45

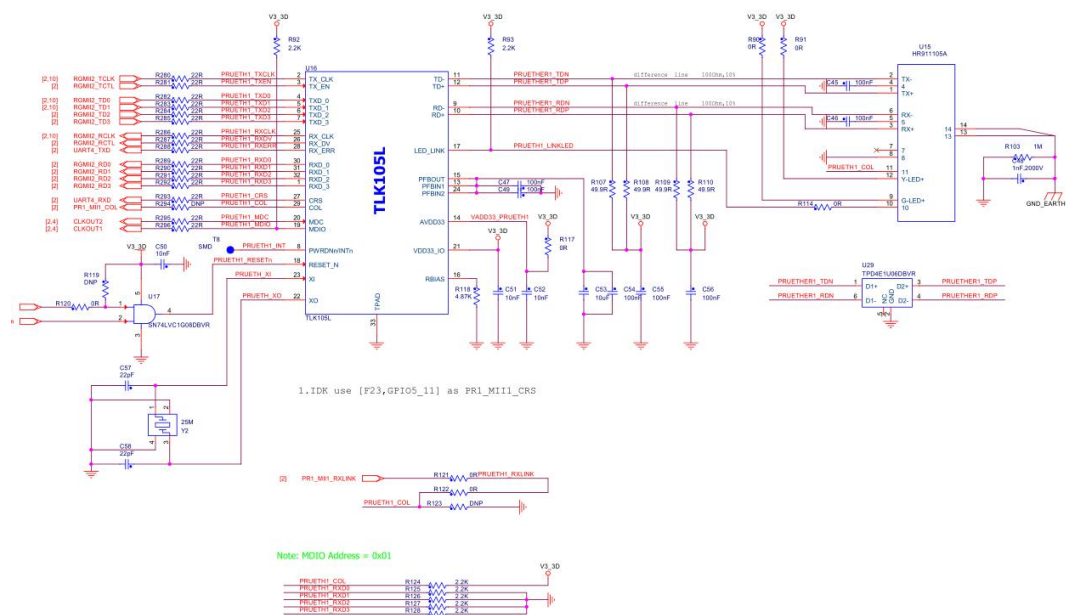


Figure 4-3 10/100Mbps Ethernet

4.2.3 LCD

AM437X LCDC supports up to 2048X2048 resolution. The interface circuit shows in figure as follows.

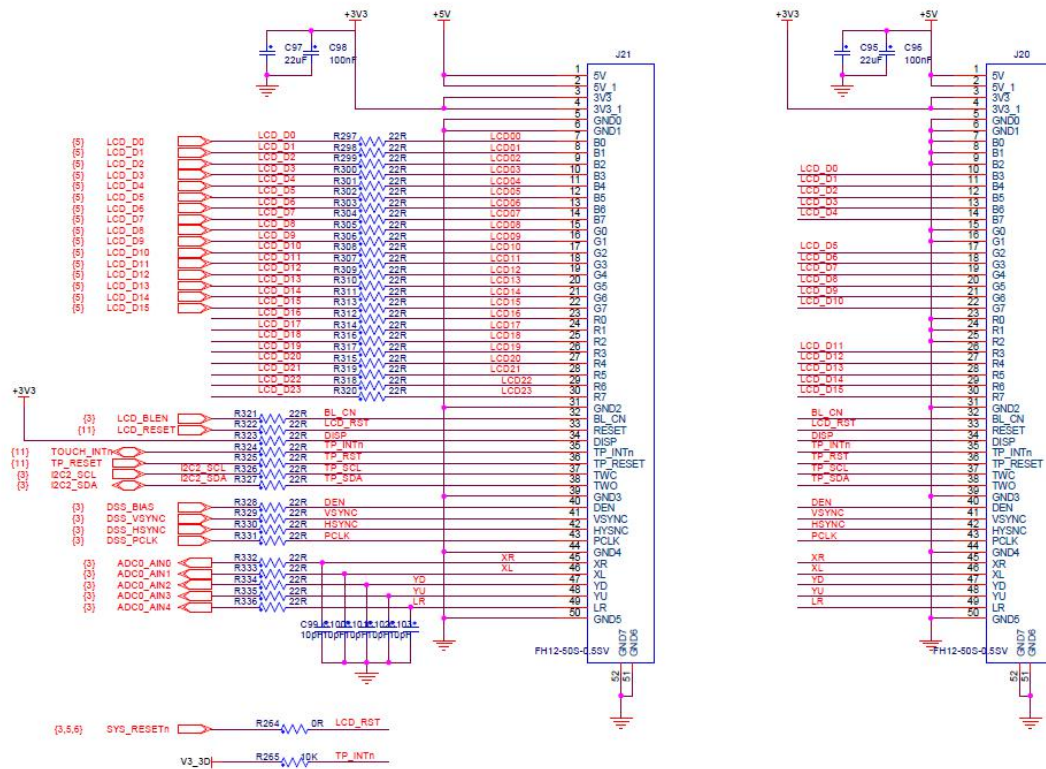


Figure 4-4 LCD Interface

4.2.4 USB

MYD-C437X-PRU provides one USB Host port and one MINI USB port. The MINI USB can be configured as USB Host or USB device. The interface circuit shows in figure as follows.

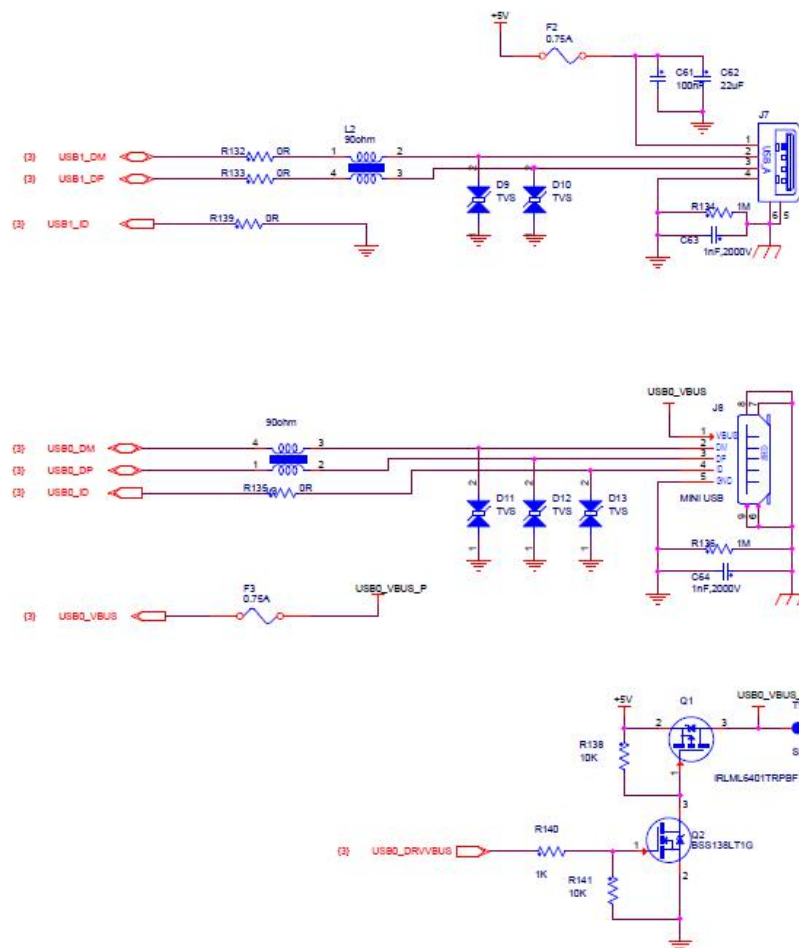


Figure 4-5 USB Interface

4.2.5 UART / RS232 / RS485

MYD-C437X-PRU provides UART, RS232, RS485 interface. The interface circuit shows in figures as follows.



Figure 4-6 Uart0 Debug

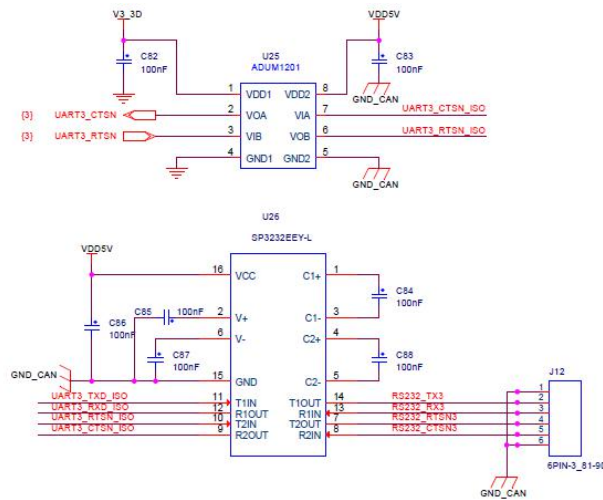


Figure 4-7 RS232

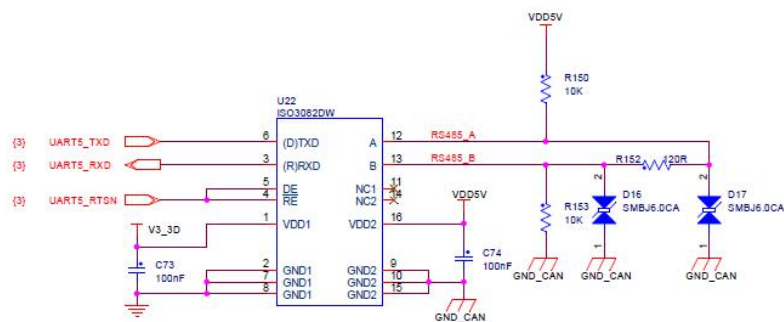


Figure 4-8 RS485

4.2.6 CAN

MYD-C437X-PRU provides one CAN port with signals isolation. The interface circuit shows in figure as follows.

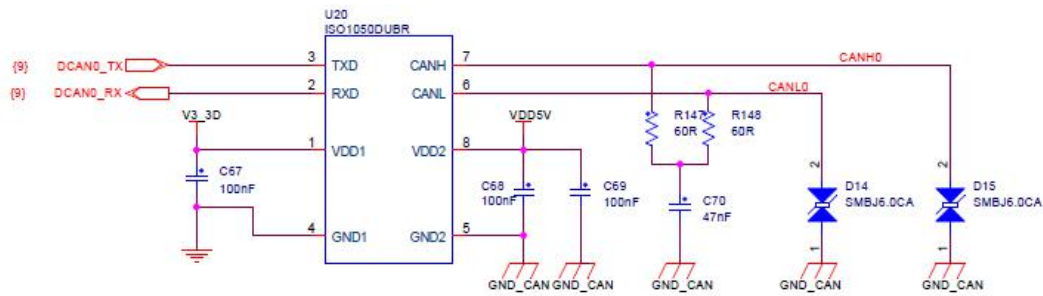


Figure 4-9 CAN

4.2.7 TF Card

MYD-C437X-PRU supports one TF Card. The interface circuit shows in figure as follows.

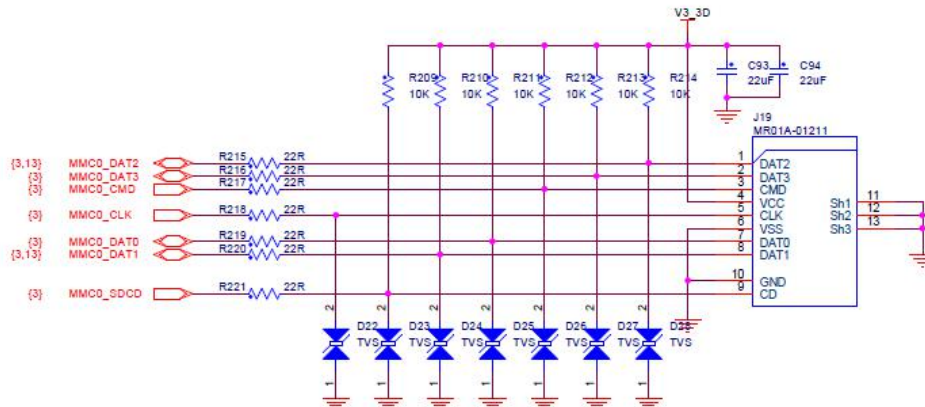


Figure 4-10 TF Card

Debug and Emulation Port is provided by MYD-C437X-PRU. The interface circuit shows in figure as follows.

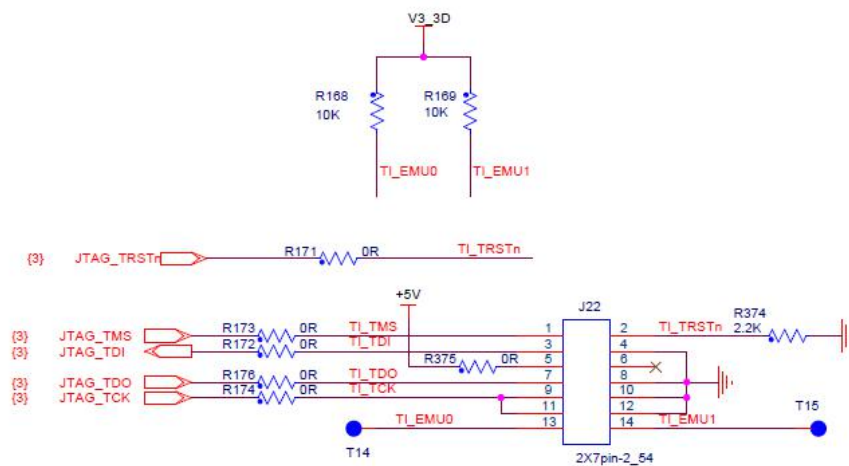


Figure 4-11 TI-JTAG Port

4.2.9 Expand Port

MYD-C437X-PRU provides three connectors for expand signals.

- 1) J13 provides eQEP, EnDat signals.

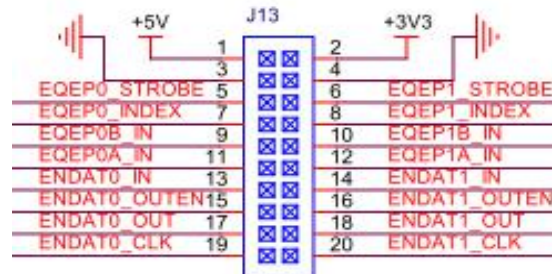


Figure 4-12 Signals on Connector J13

- 2) J14 provides UART, SPI, I2C signals.

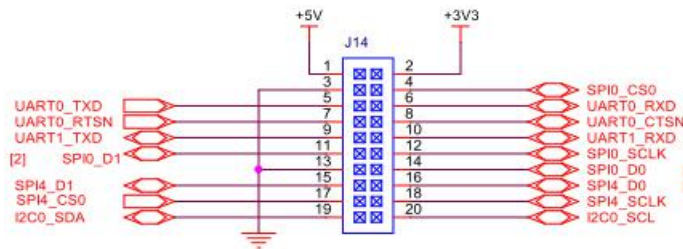


Figure 4-13 Signals on Connector J14

- 3) J23 provides GPIO, ADC signals.

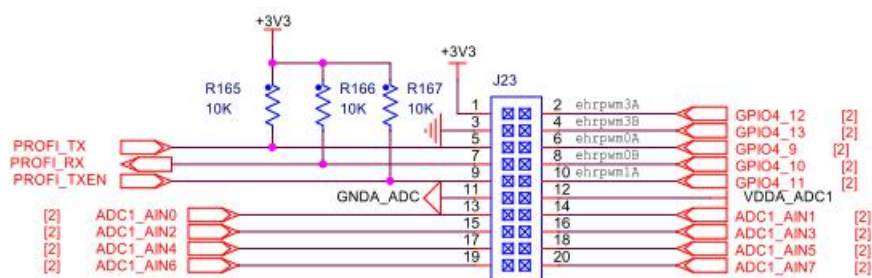


Figure 4-14 Signals on Connector J23

5. Electronic Parameter

5.1 Operate Temperature

Application Scenarios	Parameter					Des.
	MIN	Nor.	Max	Unit		
Commercial Level	0	—	+70	°C		—
Industrial Level	-40	—	+85	°C		—

5.2 GPIO Voltage

GPIO Voltage	Label	Parameter				Des.
		MIN	Nor.	MAX	Unit	
Input High voltage	V _{IH}	2.0	—	3.6	V	—
Input Low voltage	V _{IL}	-0.3	—	0.8	V	—
Output High Voltage	V _{OH}	2.9	—	—	V	—
Input Low Voltage	V _{OL}	—	—	0.4	V	—

5.3 Power Supply

Voltage	Label	Parameter				Des
		MIN	Nor	MAX	Unit	
Input Voltage	V _{IN}	9	—	12	V	—
Input Current	I _{IN}	—	330	—	mA	12V/330mA

6. Mechanical Parameter

- ◆ Operate Temperature:
 - ❖ Industrial Level Temperature: -40~+85 Degree
 - ❖ Commercial Level temperature: 0~+70 Degree
- ◆ Humidity: 20%~90%, Non-Condensing
- ◆ PCB Information:
 - ❖ CPU module board: 8 Layers PCB, Lead-Free, 65x40mmx1.6mm
 - ❖ Baseboard: 4 Layers PCB, Lead-Free, 150x105mmx1.6mm
- ◆ Interface Type: Two 0.8mm pitch 100-pin Board-to-Board Expansion Connectors
- ◆ Mechanical Information shows in figure as follows.

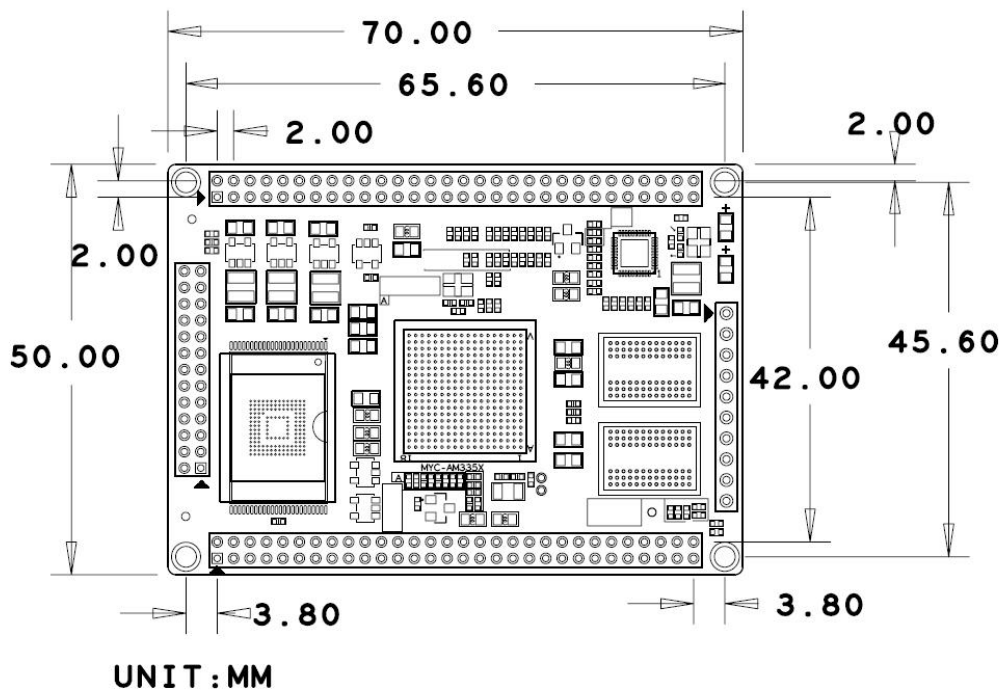
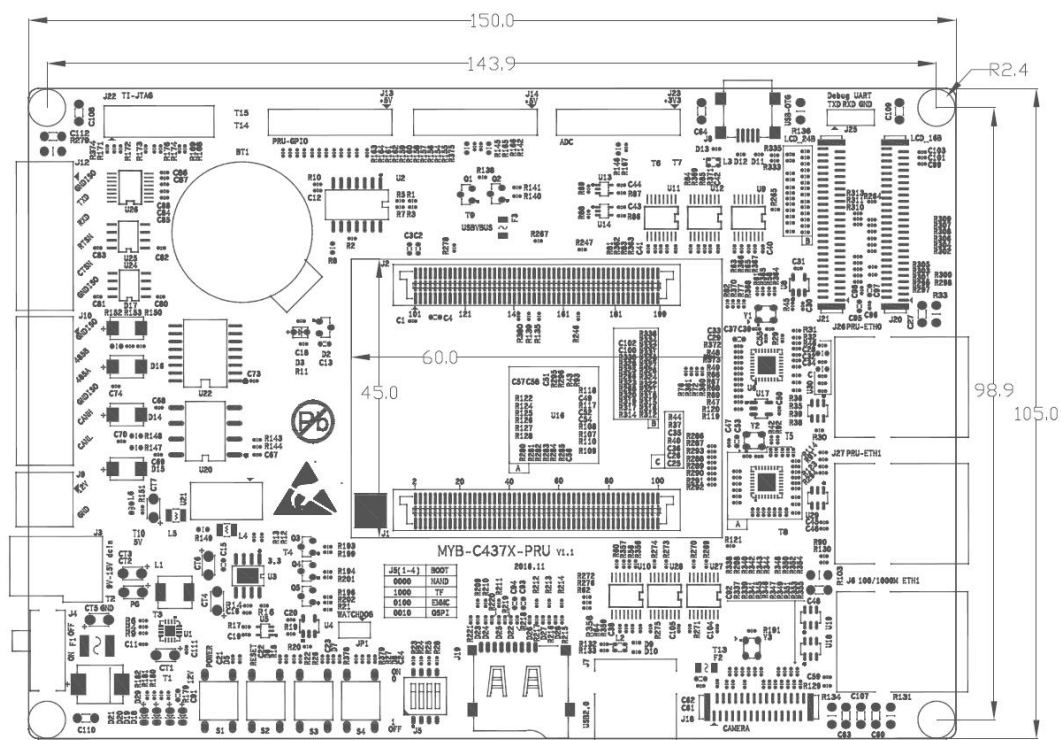


Figure 6-1 MYC-C437X CPU Module (unit: mm)



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

- 1) 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.
- 2) 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

MYIR provides services:

- ❖ driver development base on MYIR's products, like USB, Ethernet, LCD, etc.
- ❖ BSP drivers' development, API software development, etc.
- ❖ other products like power adapter, LCD panel, etc.
- ❖ ODM/OEM services.



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