MYC-C8MMX

Product Manual

Version V1.3

Version History

Version	Explain	Date
V1.0	Initial version	2019.11.12
V1.1	Change myc-c8mmx dimension drawing	2020.01.01
V1.2	Modify boot statement	2020.06.06
V1.3	Update physical picture of myc-c8mmx core board	2020.07.01

Contents

1. Product Abstract

In recent years, with the rapid development of embedded and Internet of Things technology, various types of automatic equipment, intelligent sales, ticket sales and automatic service facilities, have gradually emerged in streets and office buildings, which are expected to lead the trend of modern shopping. Based on Linux ,Android system, high-definition video support, multiple wireless communication modes, embedded card with high-performance computing has become the basic hardware platform of this kind of intelligent products.

In response to industry applications and customer needs, MYIR launched MYD-C8MMX development board, a development platform based on NXP company's i.MX 8M Mini chips, to meet the board requirements of this kind of high-performance products. The development kit is consist of the form of core board (MYC-C8MMX) and base board (MYB-C8MMX), providing peripheral interfaces such as LVDS (or MIPI), camera input (CSI), 4G module expansion (with SIM card holder), WIFI Bluetooth module, USB, serial port and etc. It also provides the complete software package of Linux and Android 9 as well as the supporting documentation. In order to help customers reduce the difficulty of development, accelerate product development, shorten the time to market products.

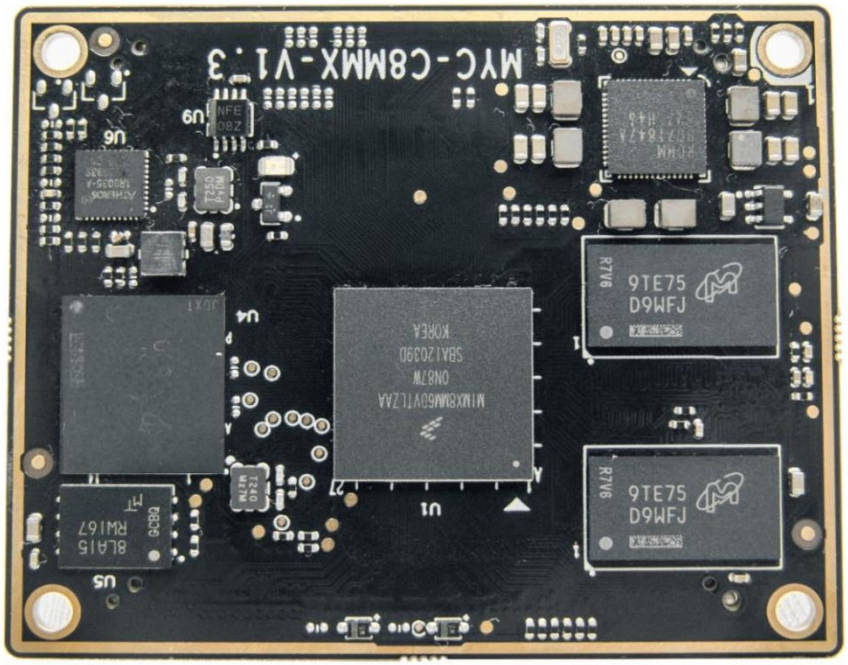


Figure 1-1 MYC-C8MMX CPU Module

The processor on MYC-C8MMX board is in FCPBGA486, which can be compatible with various models of i.MX 8M Mini Dual/8M Mini QuadLite/8M Mini Quad subsystem. There are some differences in resources between different types of processors. The standard version provides the following two configurations for users to choose:

Product model	MYC-C8MMQ6-8E2D-160-I	MYC-C8MMQ6-8E2D-180-C
CPU	MIMX8MM6CVTKZAA	MIMX8MM6DVTLZAA
Operation temperature	-40℃ - +85℃	0℃ - +70℃
DDR	2GB DDR4	2GB DDR4
Memory	8GB eMMC	8GB eMMC

Table 1-1 MYC-C8MMX Ordering Information

For batch orders, MYIR provides options and customization services such as main chips and memory.

The following is an introduction to the main functions of i.MX 8M Mini Dual/8M Mini Quad/QuadLite chips:

Feature	i.MX 8M Mini Quad/QuadLite i.MX 8M Mini Dual
Main CPU	2x or 4x Cortex-A53 @ 1.8GHz, 512kB L2
Microcontroller	Cortex-M4 400MHz
DDR	x16/x32 LPDDR4/DDR4/DDR3L
GPU	GC NanoUltra 3D (1 shader) + GC320 2 OpenGL ES 2.0
Display Features	LCDIF
Display Interfaces	1x MIPI-DSI
Video Decode	1080p60 HEVC H.265, VP8, H.264,VP9
Video Encode	1080p60 H.264 VP8
Audio Interface	5x SAI (12Tx + 16Rx external I2S lanes) Each lane up to 24.576MHz BCLK (32-bit, 2-ch 384KHz, up to 32-ch TDM); 4Tx + 4Rx support 49.152MHz BCLK for 768KHz
Digital Mic Input	8ch PDM DMIC input
Camera Interface	1x MIPI-CSI (4-lanes each)
USB	2x USB2.0
PCIe	1x PCIe 2.0
Ethernet	1x GbE
SDIO/eMMC	3x SDIO/eMMC
I2C	4
Process	Samsung 14LPC FinFET
Packages	14x14mm, 0.5p
Temperature	-40°C to 105°C (Tj)

Table 1-2 MYC-C8MMX Processor Resources

2. Hardware Characteristics

2.1 CPU Characteristics

2.1.1 i.MX 8M Mini Series Processors

NXP i.MX 8M Mini Series is based on high performance, 2x or 4x Cortex-A53 + Cortex-M4 core processor. The processor runs at 1.8GHz and supports 16/32 bit LPDDR4/DDR4/DDR3L. It integrates power management, security unit and abundant interconnection interface. It has high performance, low power consumption, flexible memory options, high-speed interface and industry-leading audio and video functions. It provides a secure and high performance solution for the application of the Internet of Things. The structure diagram of i.MX 8M Mini is as follows:

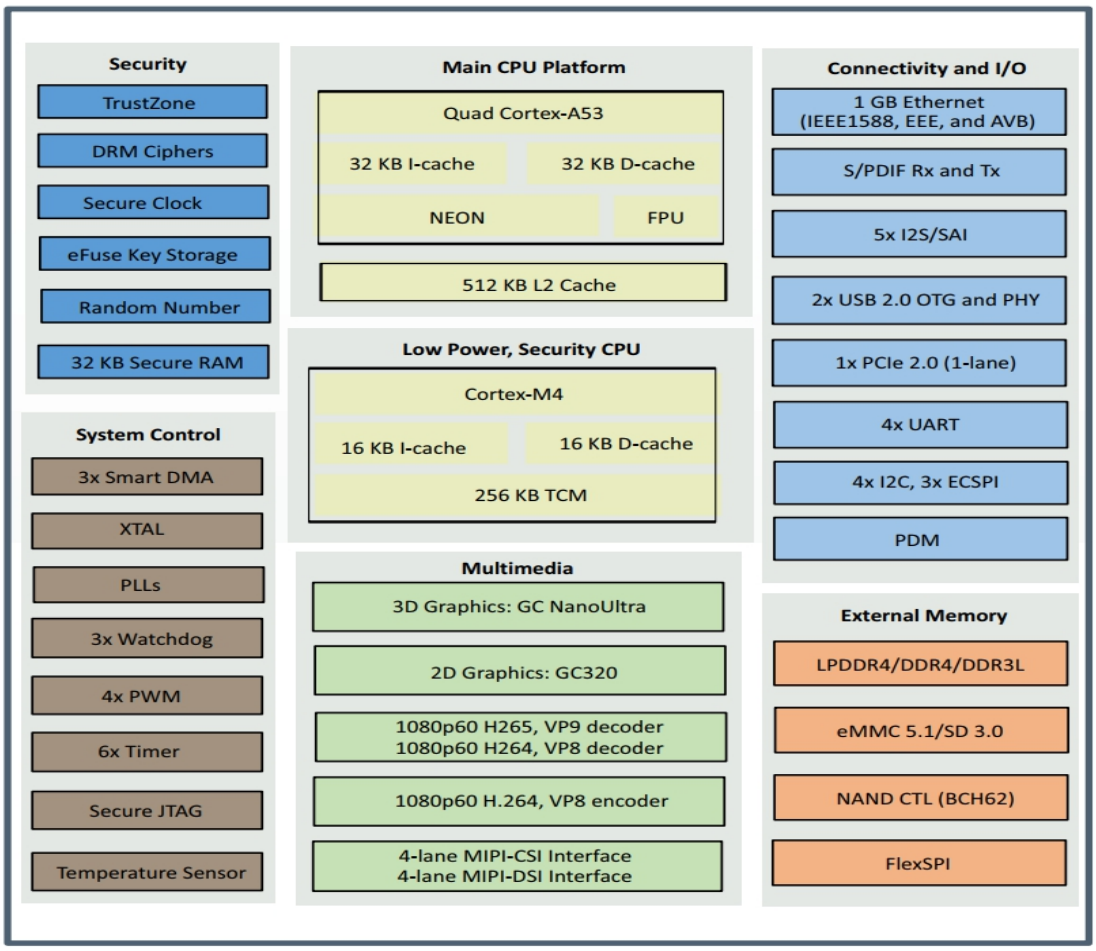


Figure 2-1 i.MX 8m Mini Functional Structure

For more information on i.MX 8M Mini, please visit the following website：

www.nxp.com/products/processors-and-microcontrollers/arm-based-processors-and-mcus/i.mx-applications-processors/i.mx-8-processors/i.mx-8m-mini-arm-cortex-a53-cortex-m4-audio-voice-video:i.MX8MMINI

2.2 Board Resource

MYC-C8MMX core board is designed with high-density and high-speed circuit board and compatible with i.MX 8M Mini Dual/8M Mini QuadLite/8M Mini Quad series. Processor, DDR4, eMMC, Ethernet, QSPI and PMU power management circuits are integrated on board within space of 49x60mm. CPU module and base boardare connected by two 100PIN connectors, which are convenient to operate, stable and reliable, and have higher cost performance. The structure is shown in Figure 2-2.

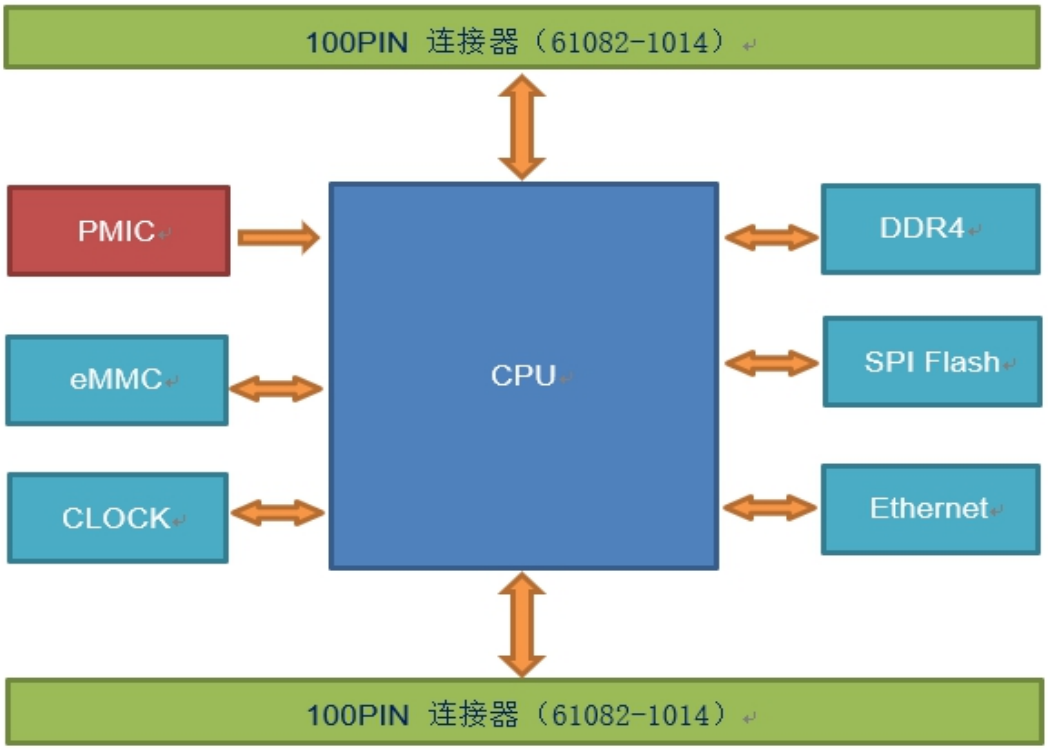


Figure 2-2 Board Resource

Function	Parameter	Configure
CPU	MIMX8MM6CVTKZAA MIMX8MM6DVTLZAA	Optional
DDR4	Standard 2GB(MT40A512M16LY-062E IT)	Optional
Qspi Flash	Standard 32MB(MT25QU256ABA1EW9-0SIT)	Optional
eMMC	Standard 8G	Optional
Ethernet	10M/100M /1000M PHY	Standard
Expand IO Connector	GPIO x 103	Standard

Table 2-1 Board Resource

2.3 Expansion Connector Resource

MYC-C8MMX CPU Modules reserves 144 pins of expansion interface, which contains abundant peripheral resources. See the table below for details:

Project	Parameter
Ethernet	1X10M/100 M/1000M PHY
GPIO	Up to 103XGPIO
UART	Up to 4XUart
I2C	Up to 3XI2C
SPI	Up to 3XSpi
USB2.0	2XUSB2.0
PCIE	1XPCIE
PWM	4XPWM
I2S/SAI	5XI2S/SAI

Camera	1XMIPI CSI
DSI	1XMIPI Output

Table 2-2 Expansion Connector Resource List

Note: The table above only lists the maximum configurable number of peripherals. For details, please refer to the chip data manual.

3. Interfaces

3.1 Expansion Connector（2*100PIN Connector）

MYC-C8MMX CPU Module and base board are connected by 2*100PIN connectors,with using the part of 61082-1014 from FCI.

Information about the part ,please refer to the following figure:

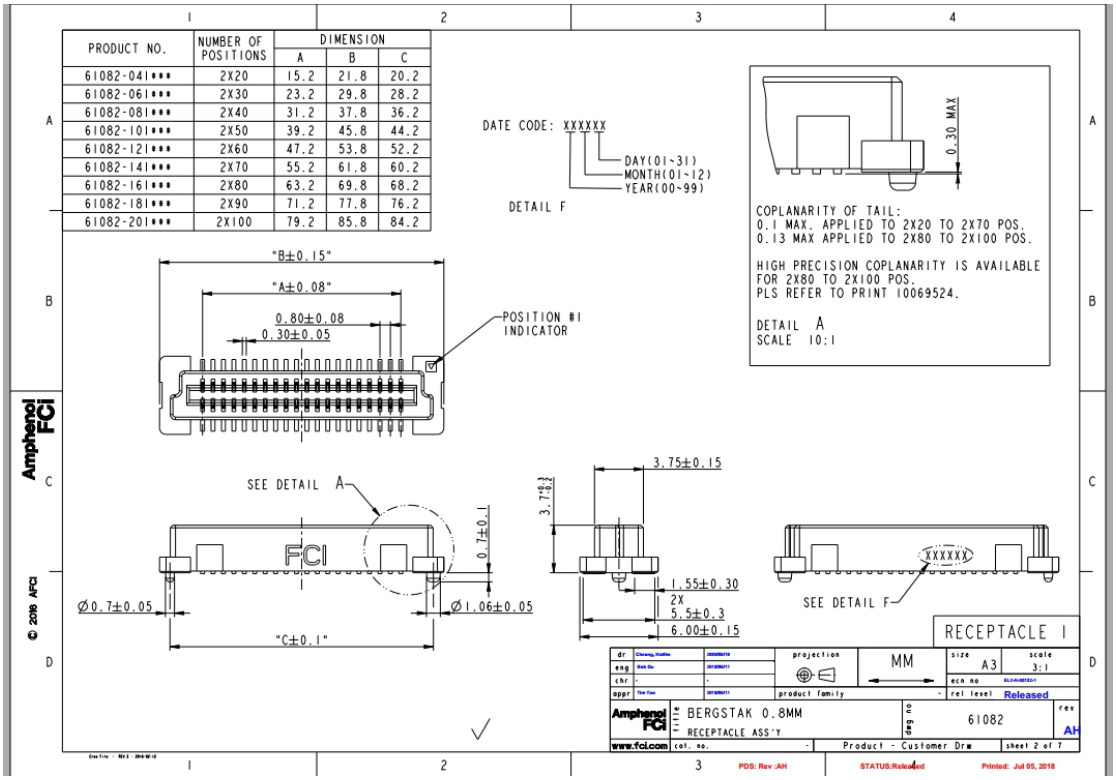


Figure 3-1 Specification of FCI 61082-1014

3.2 Pin Description Table

For the PIN description of MYC-C8MMX CPU module,please refer to the attached information <MYC-C8MMX card socket pin description table>

4.Hardware Design

4.1 Power scheme

i.MX 8M Mini series processors have built-in power management unit, which greatly simplifies the design of chip power supply. According to the data-sheet of the processor, the power supply of the chip is divided into five power domains, which are as follows:

Item	Voltage	Power Rail	
1	3.3V	NVCC_3V3, Iomax=3000mA	
2	0.8V	VDD_SOC_0V8 Iomax=3000mA	VDD_SNVS_0V8 Iomax=10mA
3	0.9V	VDD_ARM_0V9 Iomax=3000mA VDD_DRAM&PU_0V9 Iomax=3000mA	VDDA_0V9 Iomax=250mA VDD_PHY_0V9 Iomax=300mA
4	1.2V	NVCC_DRAM_1V2 Iomax=3000mA	VDD_PHY_1V2
5	1.8V	VDD_1V8 Iomax=1500mA	VDD_PHY_1V8 Iomax=300mA VDDA_1V8 Iomax=300mA

Table 4-1 CPU Power Distribution Meter

MYC-C8MMX CPU module integrated PMIC with part number of BD71847MWV from ROHM. The power supply structure is shown in the following figure.

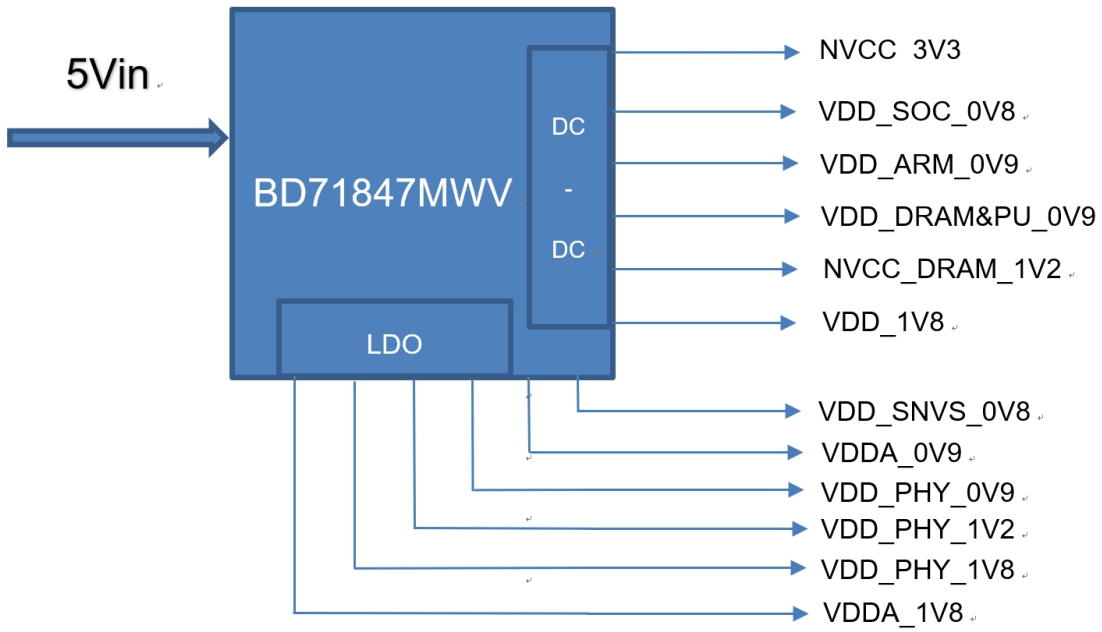


Figure 4-1 MYC-C8MMX Power Topology

4.2 Clock resources

Clock of the CPU module is design as below:

- 24Mhz CPU Clock（Y1）

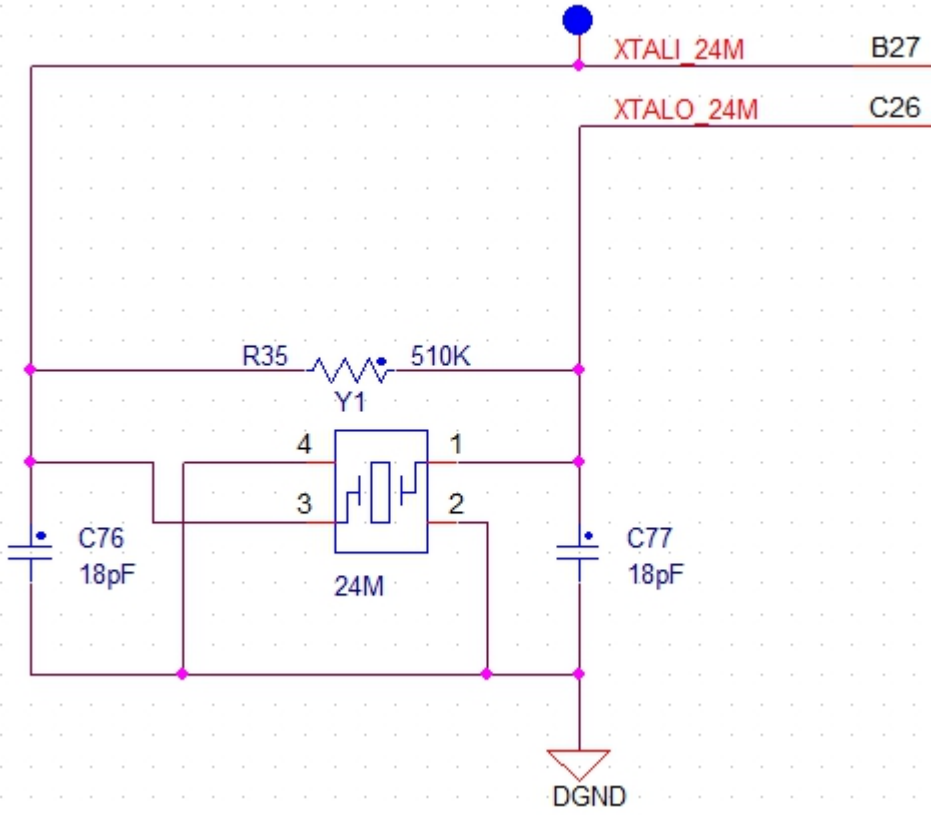


Figure 4-2 Clock resources

4.3 DDR4

MYC-C8MMX connects two memory chips on the main chip MMDC bus. i.MX 8M Mini series processors can support LPDDR4, DDR4, DDR3L. This MYC-C8MMX core board supports DDR4 (1GB, 2GB, 4GB, etc.)

MYC-C8MMQ6-8E2D-160-I Model:MT40A512M16LY-062E IT：E Brand: Micron

MYC-C8MMQ6-8E2D-180-C Model: MT40A512M16LY-062E E Brand: Micron

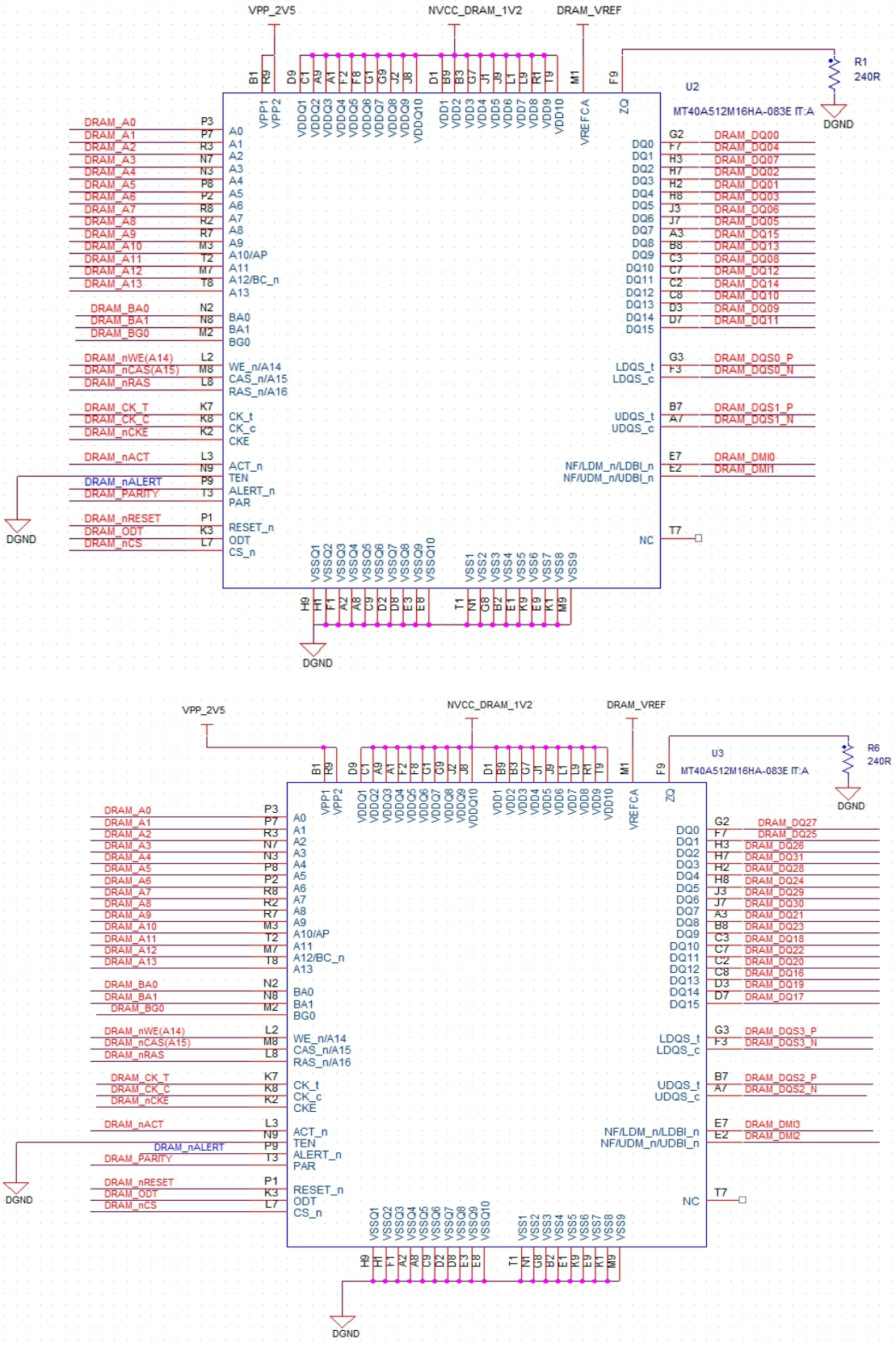
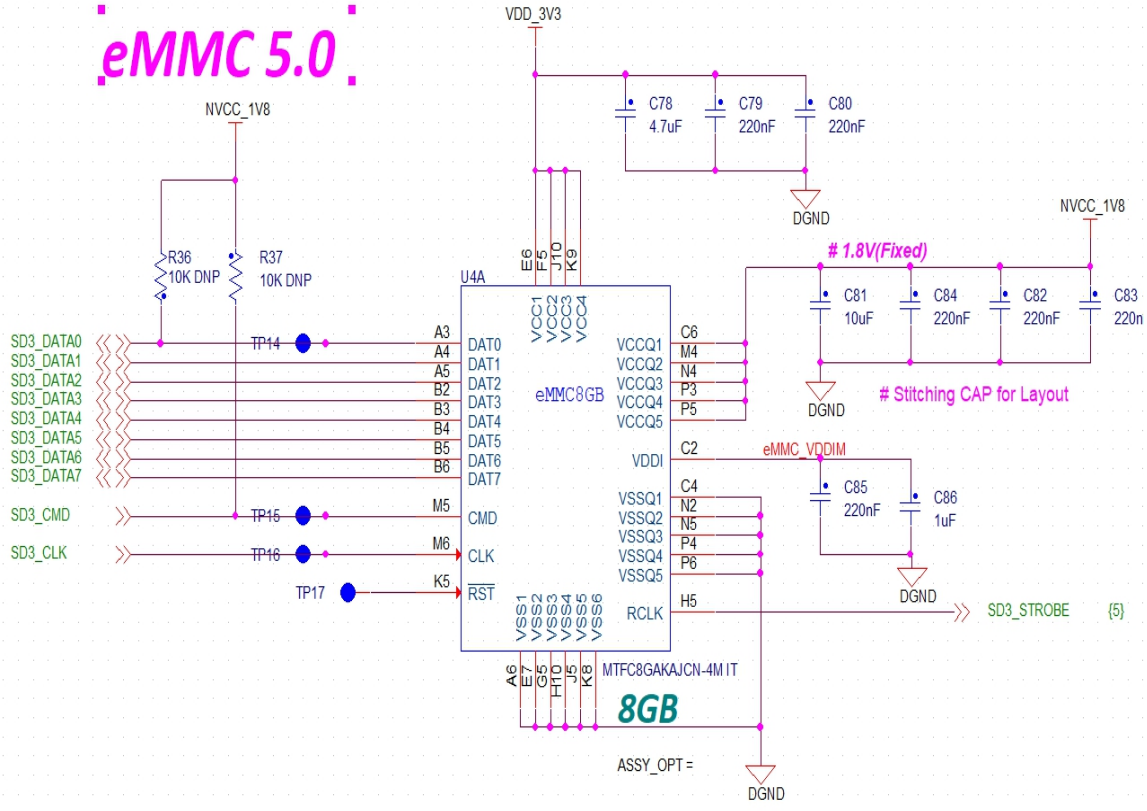


Figure 4-3 DDR4

4.4 eMMC Memory

EMMC is an embedded Flash chip solution with standardized interfaces. It simplifies the interface design and solves the problem of driver compatibility caused by different standards among Flash manufacturers. The eMMC on the MYC-C8MMX board is connected to the processor's MCC3 controller with 8-bit MMC data line width. The default carrying capacity of eMMC version core board is 8GB, and the specific part number for the industrial grade CPU module is MTFC8GAKAJCN-4M IT.



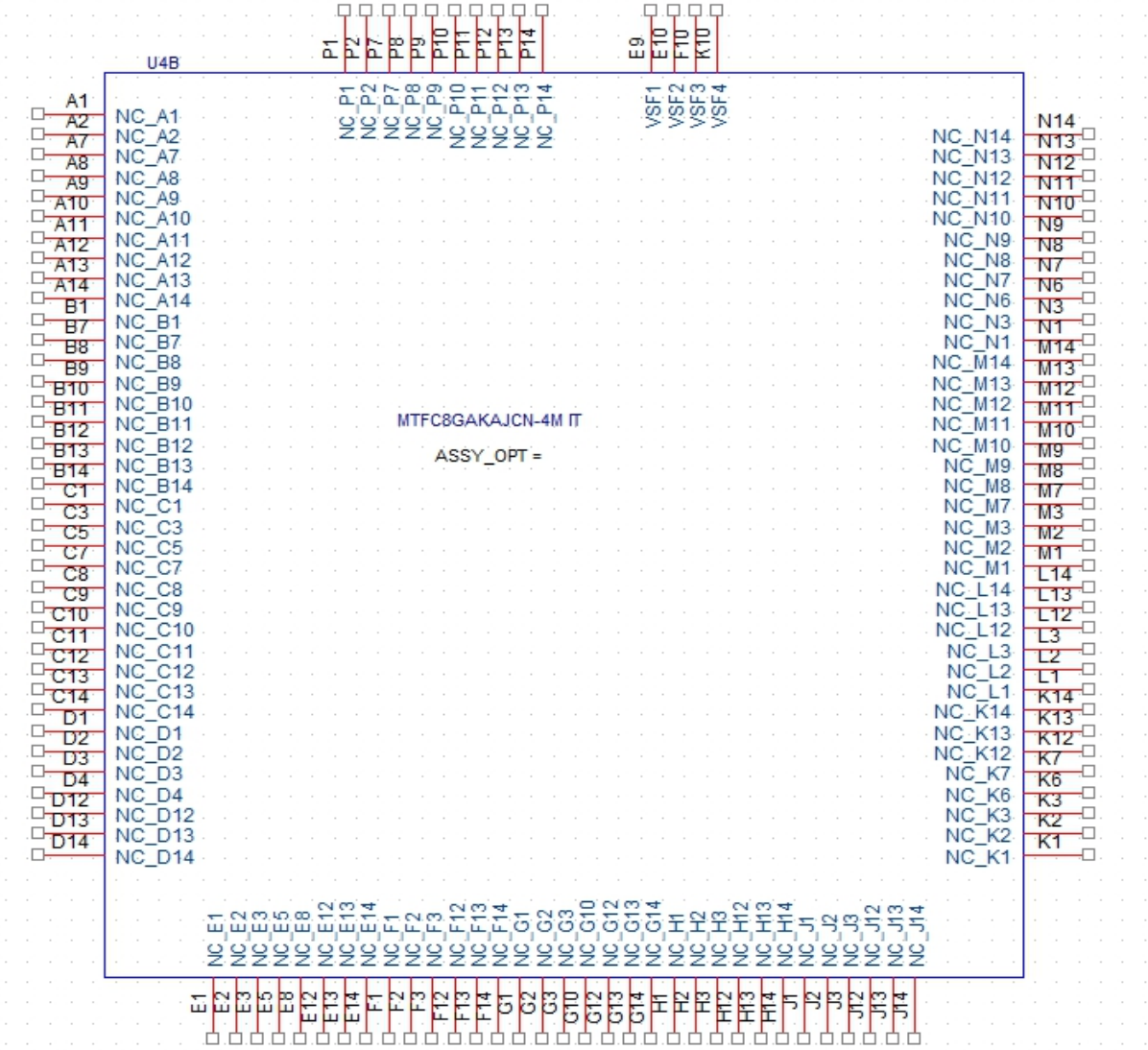


Figure 4-4 eMMC Memory

4.5 Ethernet

MYC-C8MMX core board carries a 10M/100M/1000M Ethernet PHY. The chip uses AR8035-AL1B-R of Qualcomm, which is connected to the processor's ETH1 controller

through RGMII mode. The specific connection mode is as follows:

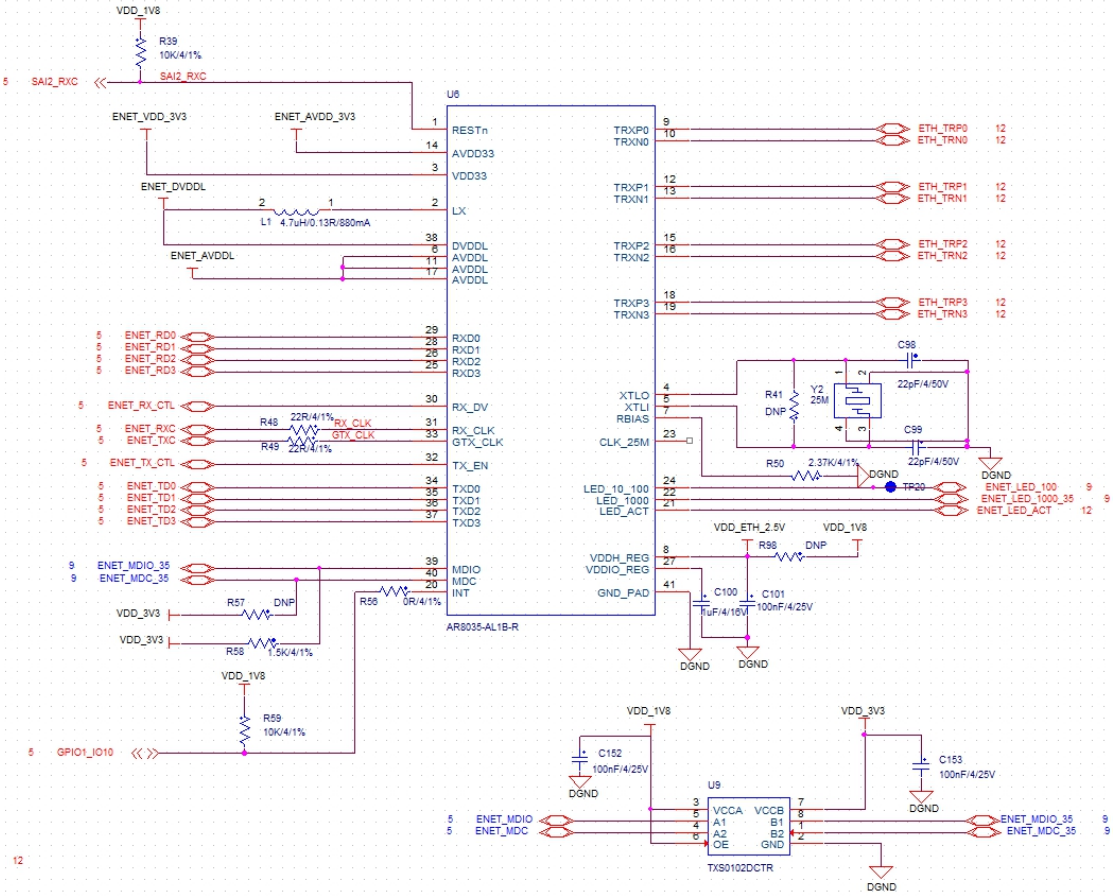


Figure 4-5 Ethernet

4.6 **QSPI Flash Memory**

MYC-C8MMX CPU carries a memory with SPI interface. The chip uses MT25QU256ABA1EW9-0SIT, a high-speed, full-duplex serial communication bus. Clock Line (CLK), Chip Selection (CS), Data Output (DO), Data Input (DI), respectively. They are connected to the ESPI interface of the processor. The specific connection mode is as

follows:

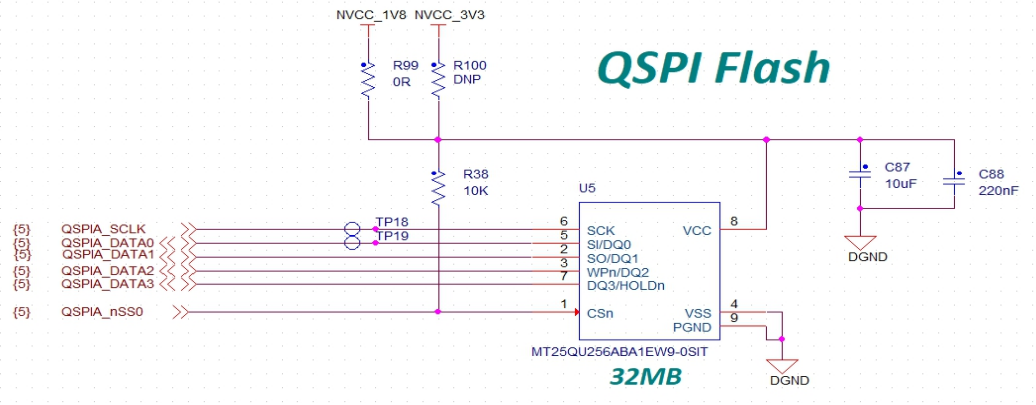


Figure 4-6 QSPI Flash

5.Electronic Characteristics

5.1 Working temperature

Application Scenarios	Parameter				Des.
	Min	Nor	Max	Unit	
Commercial grade	0	--	+70	℃	--
Industrial grade	-40	--	+85	℃	--

Table 5-1 Work temperature

5.2 GPIO DC Characteristics

Item	Lable	Parameter				Des
		Min	Nor	Max	Unit	
Input High Voltage	V_{IH}	2	--	NVCC_3V3	V	--
Input Low Voltage	V_{IL}	0	--	0.8	V	--
Output High Voltage	V_{OH}	2.4	---	--	V	--
Output Low Voltage	V_{OL}	--	--	0.2	V	--

Table 5-2-1 GPIO 3.3V DC Characteristics

Item	Lable	Parameter				Des
		Min	Nor	Max	Unit	
Input High Voltage	V_{IH}	0.7xVDD	--	NVCC_1V8	V	--
Input Low Voltage	V_{IL}	0	--	0.2xVDD	V	--
Output High Voltage	V_{OH}	V_{DD} - 0.2	---	--	V	--
Output Low Voltage	V_{OL}	--	--	0.2	V	--

Table 5-2-2 GPIO 1.8V DC Characteristics

5.3 Power DC Characteristics

Parameter	Lable	Parameter				Des
		Min	Nor	Max	Unit	
System Voltage	VSYS	4.5	5	5.5	V	--
System Current	I_{vsys}	---	0.23	---	A	--
RTC Voltage	VDD_BAT	2.4	--	3.6	V	--
RTC Current	I_{VDD_BAT}	---	10	---	uA	--

Table 5-3 Power DC Characteristics

6. Mechanical Characteristics

6.1 Mechanical Data

- Size：49 x 60 mm
- PCB parameter： 8-layer design, gold sinking process, independent and complete grounding layer
- Interface type：The mechanical dimensions of MYC-C8MMX (in mm) are shown in Fig. 6-1.

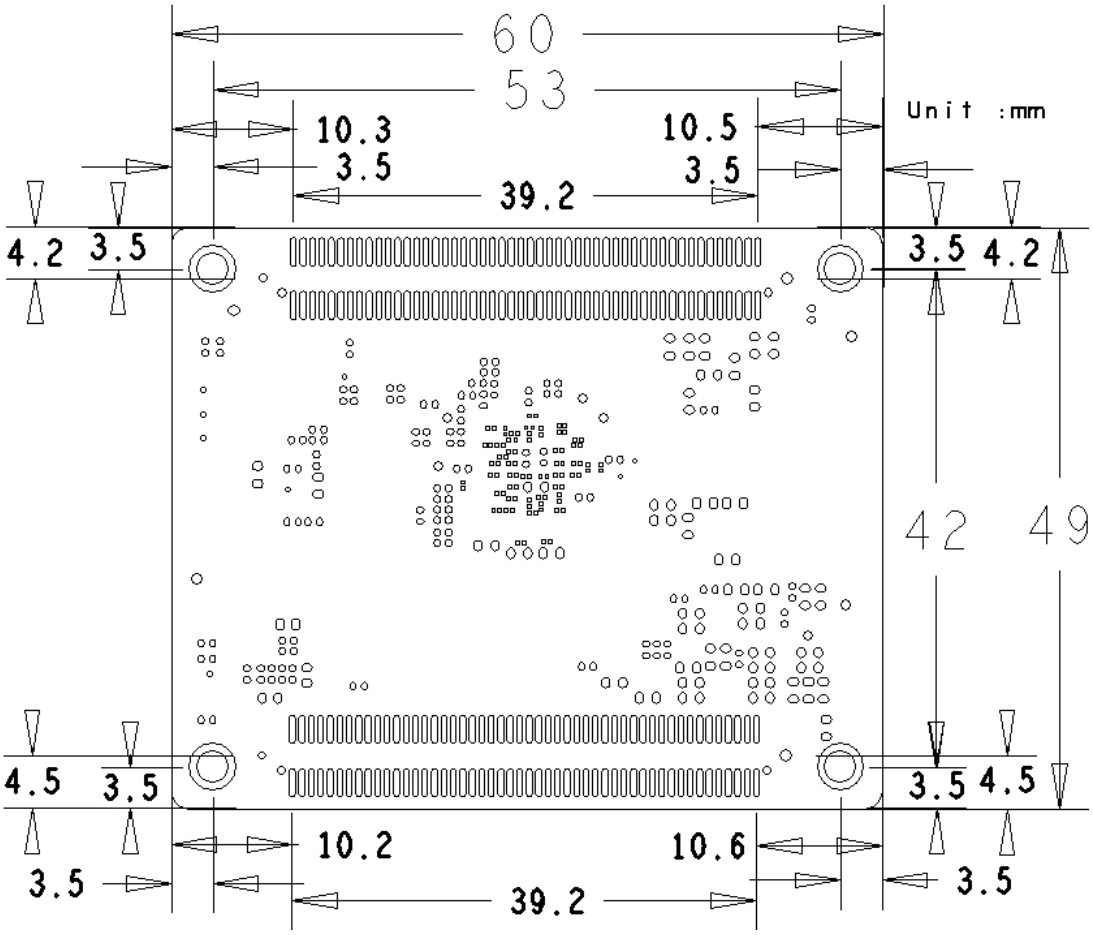


Figure 6-1 MYC-C8MMX Dimensions

7. Development Kits

The evaluation kit of MYD-C8MMX CPU Module is powered by 12V and 2A DC. It is equipped with LCD (10.1-inch single-channel LVDS interface screen or 21.5-inch double-channel LVDS interface screen), camera, three-way USB2.0 interface, ethernet, WIFI+BT, 4G module, audio, TF card, two-way serial port, ESPI interface, SSD card (PCIE interface), IO extension and other functions. It also provides Linux 4.14.78 operating system. Driver support. Along with the development board, it provides relevant information including user manual, PDF schematic diagram of the bottom board, peripheral driver, BSP source package, development tools and so on. It provides stable design reference and perfect software development environment for developers, which can effectively help developers improve development efficiency, shorten development cycle, optimize design quality, and accelerate product development and marketing time.

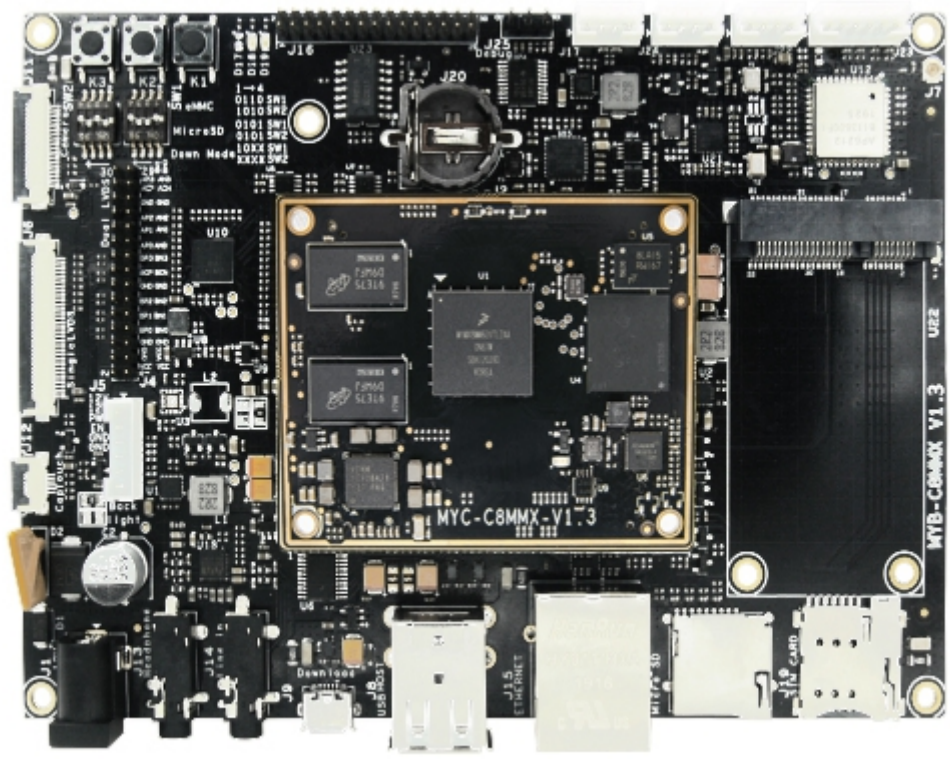


Figure 7-1 MYD-C8MMX Development Kit

For more details, please refer to the web link： http://www.myirtech.com