

MYD-JX8MMA7 Development Board

- *MYC-JX8MMA7 CPU Module as Controller Board*
- *Up to 1.8GHz NXP i.MX 8M Mini Quad ARM Cortex-A53 and 400MHz Cortex-M4 Cores*
- *Xilinx XC7A25T Artix-7 FPGA*
- *2GB LPDDR4, 8GB eMMC and 32MB QSPI Flash for ARM, 256MB DDR3 and 32MB QSPI Flash for FPGA*
- *1x Gigabit Ethernet, 1 x 5G Module Interface, 2 x SFP Interfaces, 1x FMC Extension Interface*
- *2 x USB 2.0 Host, 1 x USB 2.0 OTG, 1 x WIFI/BT Module Interface, 2 x Micro SD Slots*
- *Supports HDMI and LVDS Display, MIPI CSI and Parallel CSI, Audio Input and Output*
- *Supports Working Temperature Ranging from -40°C to 85°C*
- *Supports Running Linux OS*

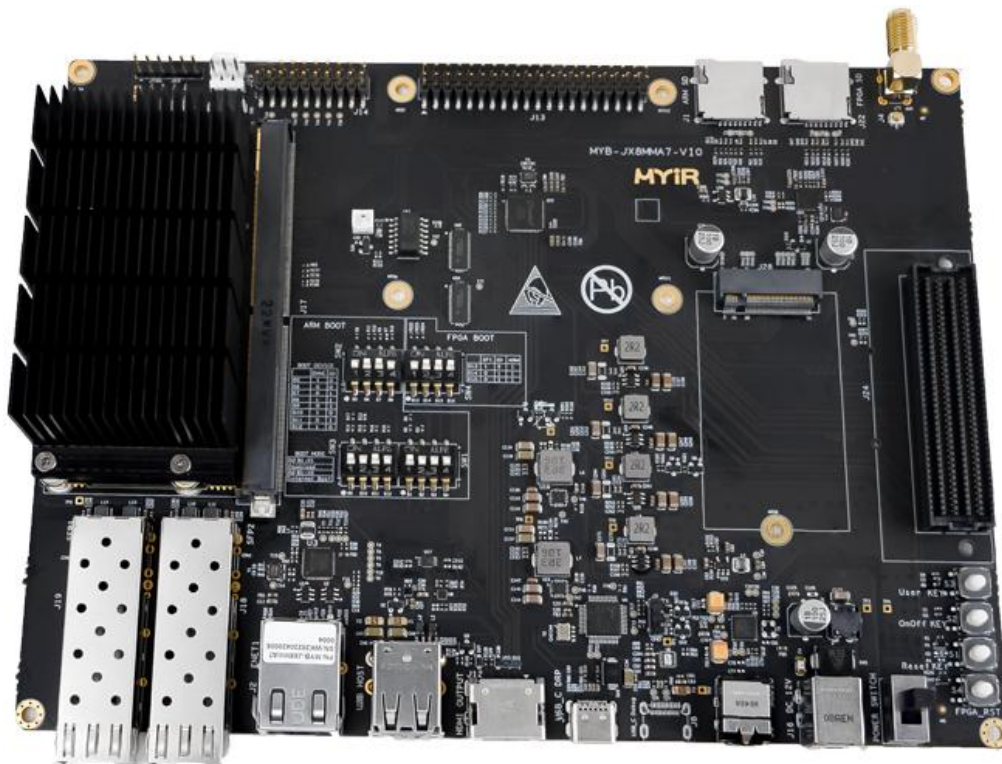


Figure 1-1 MYD-JX8MMA7 Development Board (delivered with heatsink by default)

The [MYD-JX8MMA7 Development Board](#) consists of the high-performance [MYC-JX8MMA7 CPU Module](#) and a versatile base board, which is a powerful and interesting design using ARM+FPGA processing architecture. The board adopts NXP's [i.MX 8M Mini](#) processor which features up to 1.8GHz quad ARM Cortex-A53 and 400MHz Cortex-M4 cores and is used as the main processor to achieve data processing, control, communication and display; while the Xilinx [XC7A25T Artix-7](#) FPGA is used as the auxiliary processor which is cost and transceiver optimized and used to achieve high-speed data acquisition and processing. The board is a complete evaluation platform suitable for applications with high requirements for data acquisition, multimedia and display, such as high-end medical devices and industrial data acquisition systems.

The [MYC-JX8MMA7 CPU Module](#) is an ARM+FPGA SoM integrated with [i.MX8M Mini](#) ARM processor and [XC7A25T Artix-7](#) FPGA device. It has 2GB LPDDR4, 8GB eMMC and 32MB QSPI flash for ARM, 256MB DDR3 and 32MB QSPI flash for FPGA, as well as two dedicated PMIC (ROHM BD71847AMWV) respectively for ARM and FPGA. A variety of peripherals and IO signals are available through the 0.05 mm pitch 314-pin MXM 3.0 gold-finger-edge-card connector to make it easy to connect with MYIR's standard base board of [MYD-JX8MMA7](#).

development board or customized base boards from users. A rich set of peripherals have been brought out through connectors and headers to the MYD-JX8MMA7 base board such as two USB Host and one USB OTG, one Gigabit Ethernet, two SFP module interfaces, one USB 2.0 based M.2 Key B 5G Module interface, one SDIO based WiFi/ Bluetooth interface, two Micro SD slots, HDMI and LVDS display interfaces, MIPI CSI and Parallel CSI interfaces, audio input/output interface, two Micro SD slots, one FMC expansion interface, one Raspberry PI compatible expansion module interface, etc.

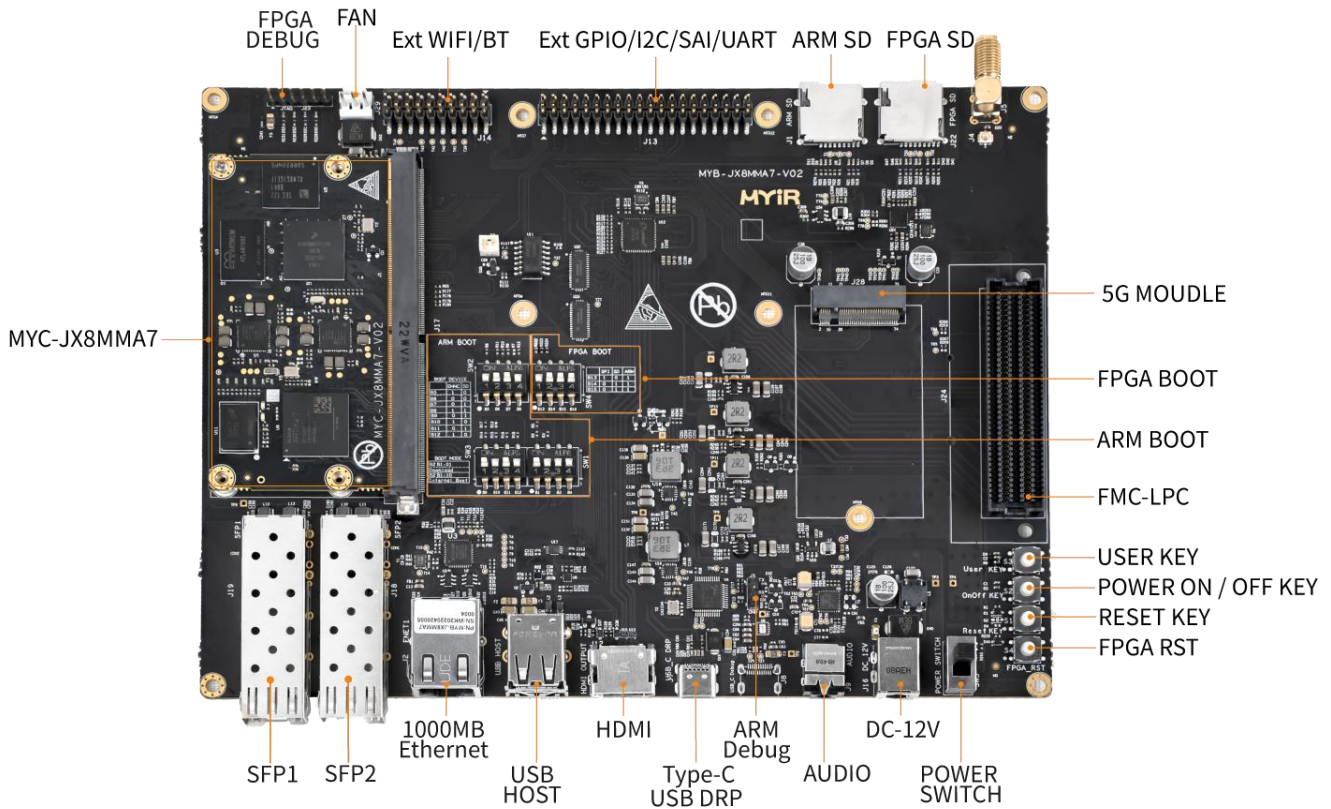


Figure 1-2 MYD-JX8MMA7 Development Board Top-view

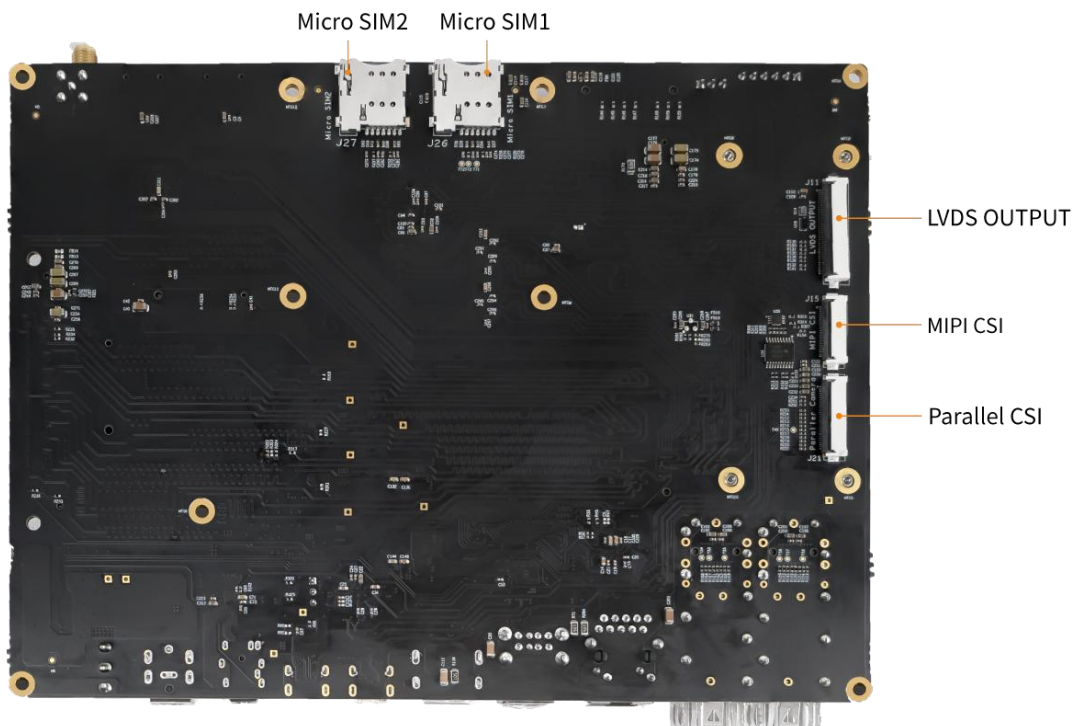


Figure 1-3 MYD-JX8MMA7 Development Board Bottom-view

The [MYD-JX8MMA7](#) is ready to run Linux OS and provided with abundant software resources and detailed documentations to enable users to start their development rapidly and easily. The board is delivered with necessary cable accessories . MYIR also offers [MY-CAM011B BUS Camera Module](#), [MY-CAM003M MIPI Camera Module](#), [MY-WIREDCOM RPI Module](#) (RS232/RS485/CAN), [MY-WF005S WiFi/BT Module](#) and [MY-LVDS070C LCD Module](#) as options for the board which have greatly enhanced the functionality of the board.

Hardware Specification

The **MYC-JX8MMA7 CPU Module** is using NXP's 14 x 14 mm, 0.5 mm pitch, FCBGA486 package **i.MX 8M Mini** Quad Application Processor (MIMX8MM6DVTLZAA / MIMX8MM6CVTKZAA) and an integrated **Xilinx XC7A25T Artix-7** FPGA.

The i.MX 8M Mini processors used are among the i.MX 8M Mini family (i.MX 8M Mini Quad/QuadLite, i.MX 8M Mini Dual/DualLite, i.MX8M Mini Solo/SoloLite) which represent NXP's latest video and audio experience combining state-of-the-art media-specific features with high-performance processing while optimized for lowest power consumption. With commercial and industrial level qualification and backed by NXP's product longevity program, the i.MX 8M Mini family may be used in any general purpose industrial and IoT application. The main features are as in below table:

Feature	MIMX8MM6CVTKZAA	MIMX8MM6DVTLZAA
Marketing Description	i.MX 8M Mini Quad	i.MX 8M Mini Quad
Core: Number of cores (SPEC)	4	4
Core Type	Arm Cortex-A53	Arm Cortex-A53
Operating Frequency [Max] (MHz)	1600	1800
Co Processor Type	Arm Cortex-M4F	Arm Cortex-M4F
Co Processor Frequency (MAX) (MHz)	400	400
External Memory Supported	DDR3L SDRAM, DDR4 SDRAM, ECC, LPDDR4 DRAM, NAND FLASH, NOR FLASH, QSPI	
L2 Cache (Max) (KB)	512	
Ethernet Type	1 Gbps + IEEE 1588 + AVB	
Serial Communication	3 x SPI, 4 x I ² C, 4 x UART	
PCIe 2.0	1	
USB Controllers	2	
Video Decode Acceleration	HD1080p60, H.265, H.264, VP8, VP9	
Video Encode Acceleration	HD1080p60, H.264, VP8	
Display	1 x MIPI-DSI	
Camera	1 x MIPI-CSI	
GPU 2D / GPU 3D	1x shader, Vivante GC320, Vivante GCNanoUltra	
Audio Specific Modules	8-ch PDM input, SAI/I2S	
Junction Temperature (Min) (°C)	-40	0
Junction Temperature (Max) (°C)	105	95

Table 1-1 Features of i.MX 8M Mini processor

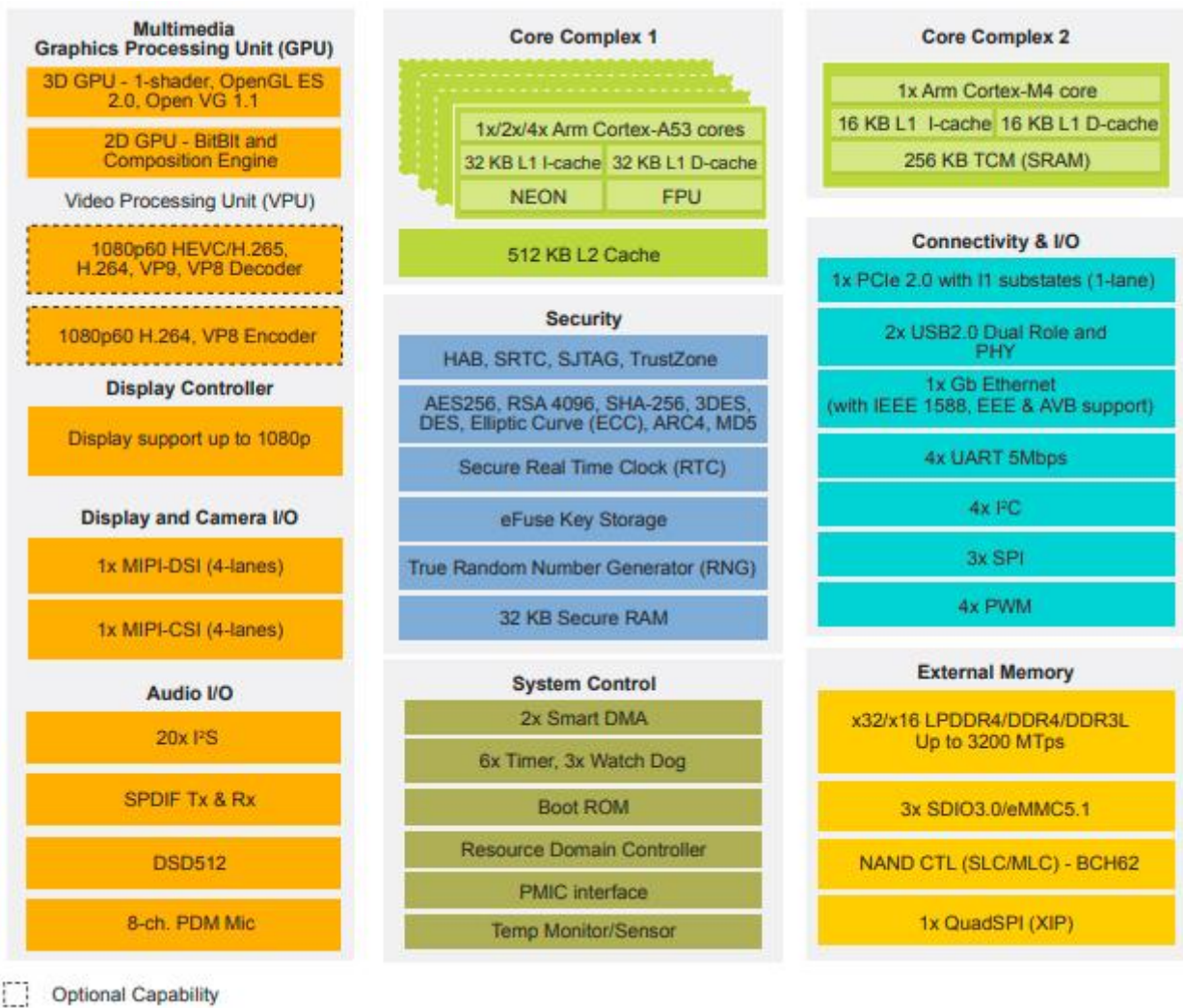


Figure 1-4 i.MX 8M Mini Processors Family Block Diagram

The **Xilinx XC7A25T** devices (XC7A25T-2CSG325C / XC7A25T-2CSG325I) used are among the Artix-7 devices family which provides high performance-per-watt fabric, transceiver line rates, DSP processing, and AMS integration in a cost-optimized FPGA, featuring the MicroBlaze™ soft processor and 1,066Mb/s DDR3 support, and is the best value for a variety of cost and power-sensitive applications including software-defined radio, machine vision cameras, and low-end wireless backhaul. The main features are as in below table:

Artix-7 XC7A25T-2CSG325	Parameter
Logic Cells	23,360
Slices	3,650
CLB Flip-Flops	29,200
Maximum Distributed RAM (Kb)	313
Block RAM/FIFO w/ ECC (36 Kb each)	45
Total Block RAM (Kb)	1,620
CMTs (1 MMCM + 1 PLL)	3
Maximum Single-Ended I/O	150
Maximum Differential I/O Pairs	72
DSP Slices	80
Analog Mixed Signal (AMS) / XADC	1
Configuration AES / HMAC Blocks	1
GTP Transceivers (6.6 Gb/s Max Rate)	4
Temperature Grade	XC7A25T-2CSG325C (-2 speed grade, 0°C to +85°C) XC7A25T-2CSG325I (-2 speed grade, -40°C to +100°C)

Table 1-2 Features of Artix-7 XC7A25T FPGA

The MYD-JX8MMA7 Development Board is using MYC-JX8MMA7 CPU Module as core controller board. It takes full features of i.MX 8M Mini processor and Artix-7 XC7A25T FPGA, the main features are characterized as below:

Mechanical Parameters

- Dimensions: 200mm x 150mm (base board), 82mm x 45mm (CPU Module)
- PCB Layers: 6-layer design (base board), 10-layer design (CPU Module)
- Power supply: +12V/2A (base board), 5V/2A (CPU Module)
- Working temperature: 0~70 Celsius (commercial grade) or -40~85 Celsius (industrial grade)

The MYD-JX8MMA7 Controller Board (MYC-JX8MMA7 CPU Module)

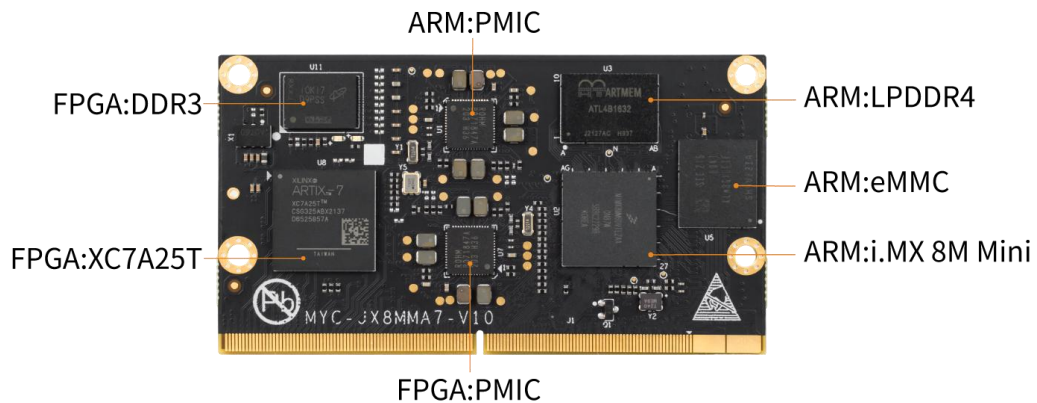


Figure 1-5 MYC-JX8MMA7 CPU Module Top-view

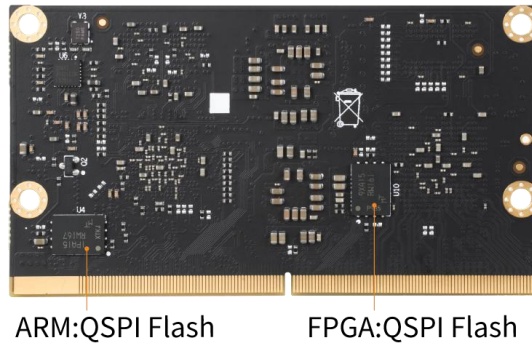


Figure 1-6 MYC-JX8MMA7 CPU Module Bottom-view

Processor

- NXP i.MX 8M Mini Processor
 - Up to 1.8 GHz Quad-core ARM Cortex-A53 CPU
 - 400MHz Real-time Cortex-M4 co-processor
 - Integrated 2D/3D GPU and 1080p VPU
- Xilinx Artix-7 XC7A25T-2CSG325 FPGA

Memory

- ARM: 2GB LPDDR4, 8GB eMMC, 32MB QSPI Flash
- FPGA: 256MB DDR3, 32MB QSPI Flash

Power Management IC

- Two PMIC (ROHM BD71847AMWV, one for ARM and one for FPGA)

Peripherals and Signals Routed to Pins

- 0.5mm pitch 314-pin MXM 3.0 Gold-finger-edge-card Connector

Item	Features	Item	Features
ARM		FPGA	
Ethernet	1*RGMII	GTP	3
USB2.0	2* USB2.0	Logic Cells	23,360
Camera	1* MIPI CSI	Slices	3,650
SDIO	2*SDIO	CLB Flip-Flops	29,200
UART	4*UART	DSP Slices	80
I2C	2*I2C		
SPI	3*SPI		
Display Output	1*MIPI-DSI		
Audio	3* I2S		
<p><i>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.</i></p>			

Table 1-3, 1-4 Peripherals and Signals Routed to 314-pin Expansion Connector

The MYD-JX8MMA7 Development Board Base Board

- 1 x Power Jack
- 1 x Power Switch
- 2 x Micro SD Slot (one for ARM and one for FPGA)
- 1 x ARM Debug Serial Port, 1 x FPGA Debug Interface
- 2 x USB 2.0 HOST Port (Type-A), 1 x USB 2.0 OTG Port (Type-C)
- 1 x 10/100/1000 Mbps Ethernet Interface (RJ45)
- 1 x WIFI/BT Module Interface
(2.54mm 2 x 10-pin male header, supports MYIR's MY-WF005S WIFI/Bluetooth module)
- 1 x 5G Module Interface of USB2.0 protocol M.2 B Type Socket
- 2 x SFP Optical Module Interfaces
- 1 x FMC expansion interface
- 1 x LVDS Display Interface
- 1 x HDMI Display Interface
- 1 x MIPI CSI Interface (supports MYIR's MY-CAM003M Camera Module)
- 1 x Parallel CSI Interface (supports MYIR's MY-CAM011B Camera Module)
- 1 x Audio Input/Output Interface
- 1 x 2.54mm pitch 2*20-pin male expansion header (GPIO/I2C/SAI/UART, compatible with Raspberry PI standard 40-pin extension interface, supports MYIR's MY-WIREDCOM RPI Module)
- 4 x Buttons (two for Reset, one for Power On/Off, one for User)

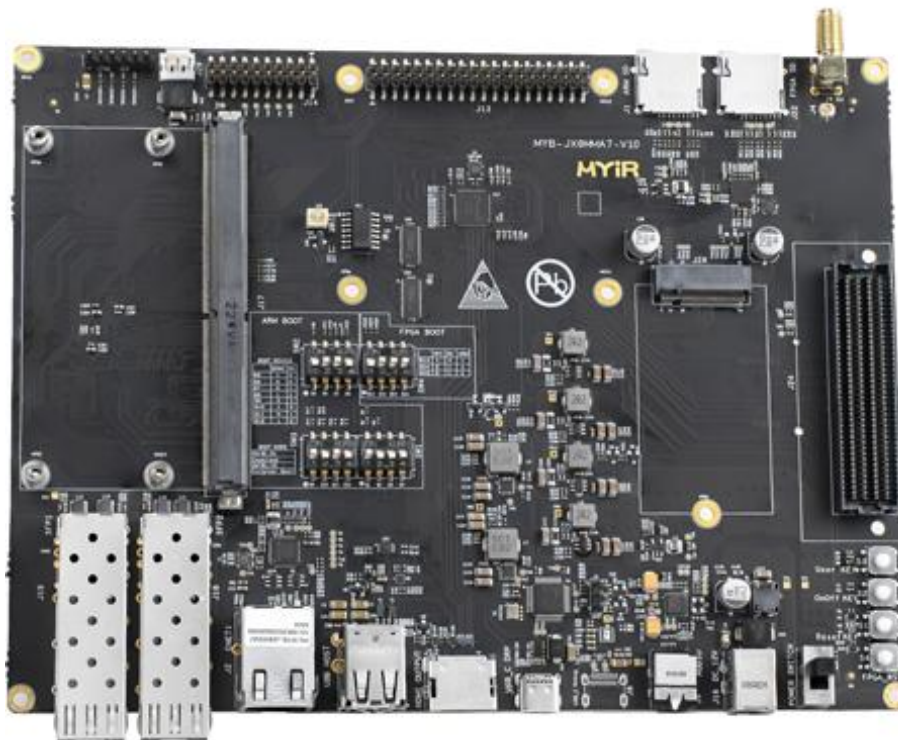


Figure 1-7 MYD-JX8MMA7 Development Board Base Board

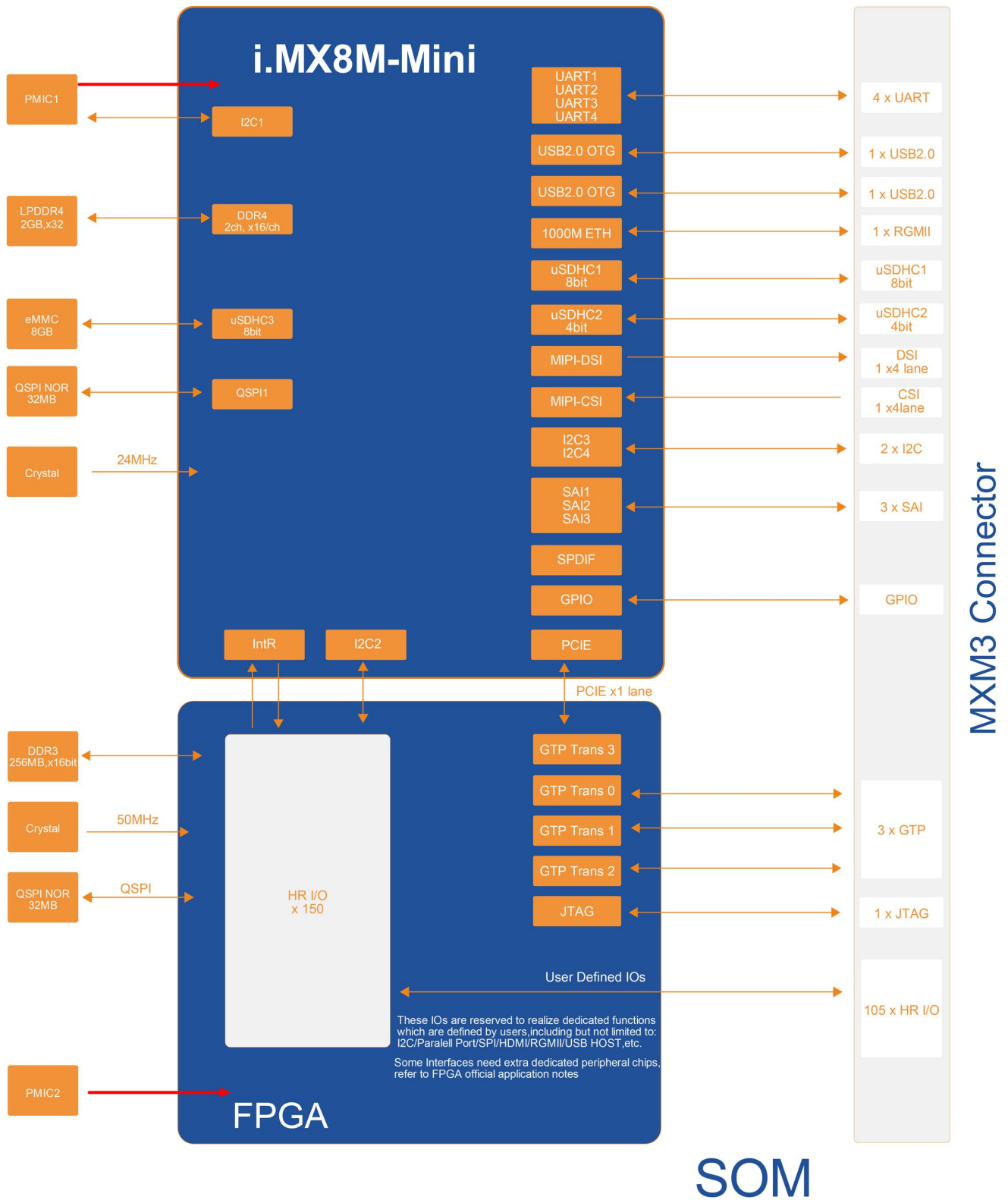


Figure 1-8 MYC-JX8MMA7 CPU Module Function Block Diagram

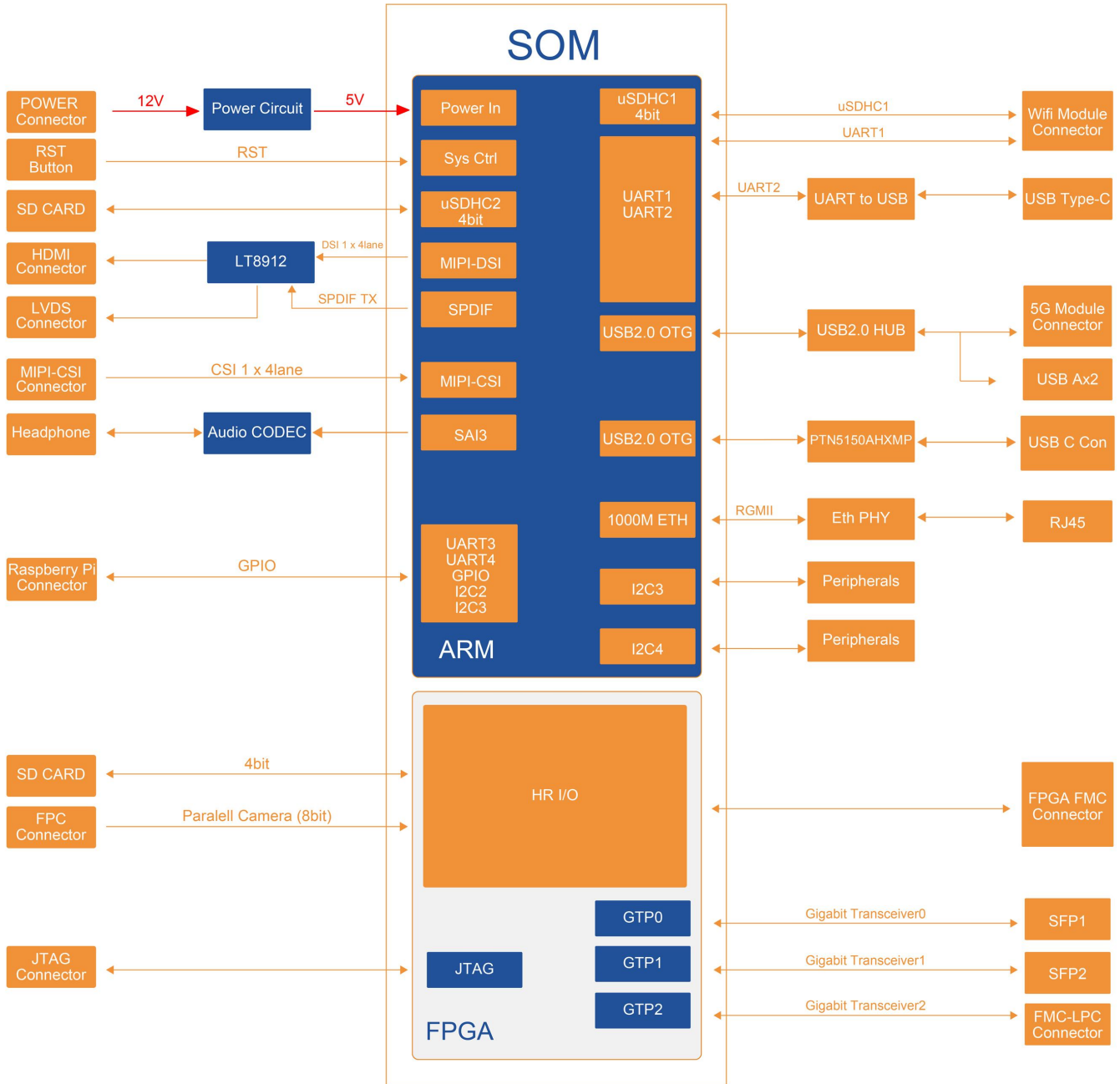


Figure 1-9 MYD-JX8MMA7 Development Board Function Block Diagram

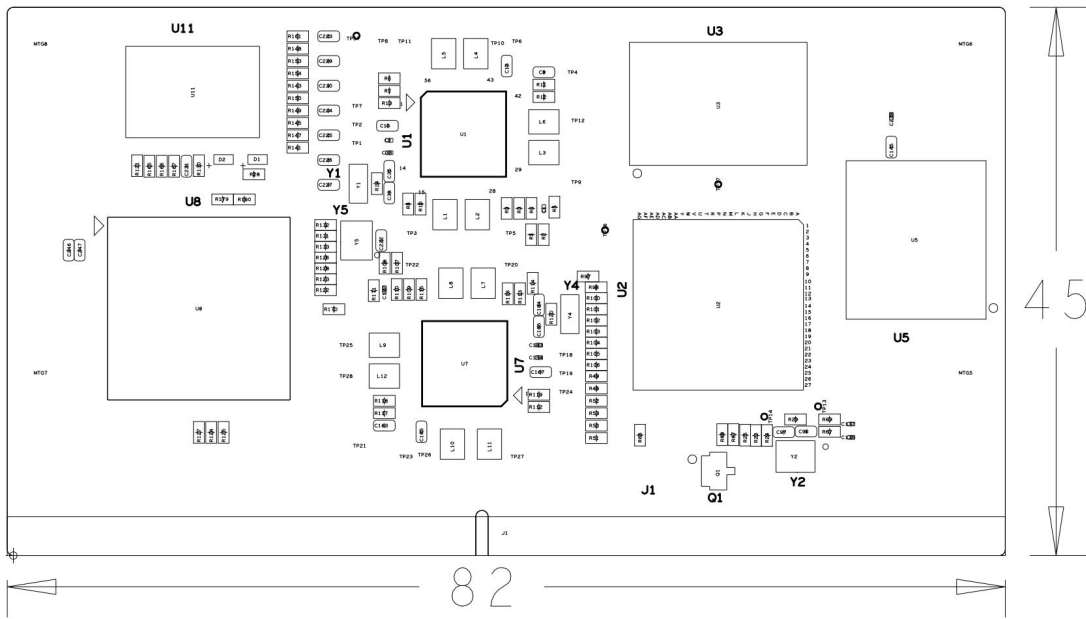


Figure 1-10 MYC-JX8MMA7 CPU Module Dimensions Chart

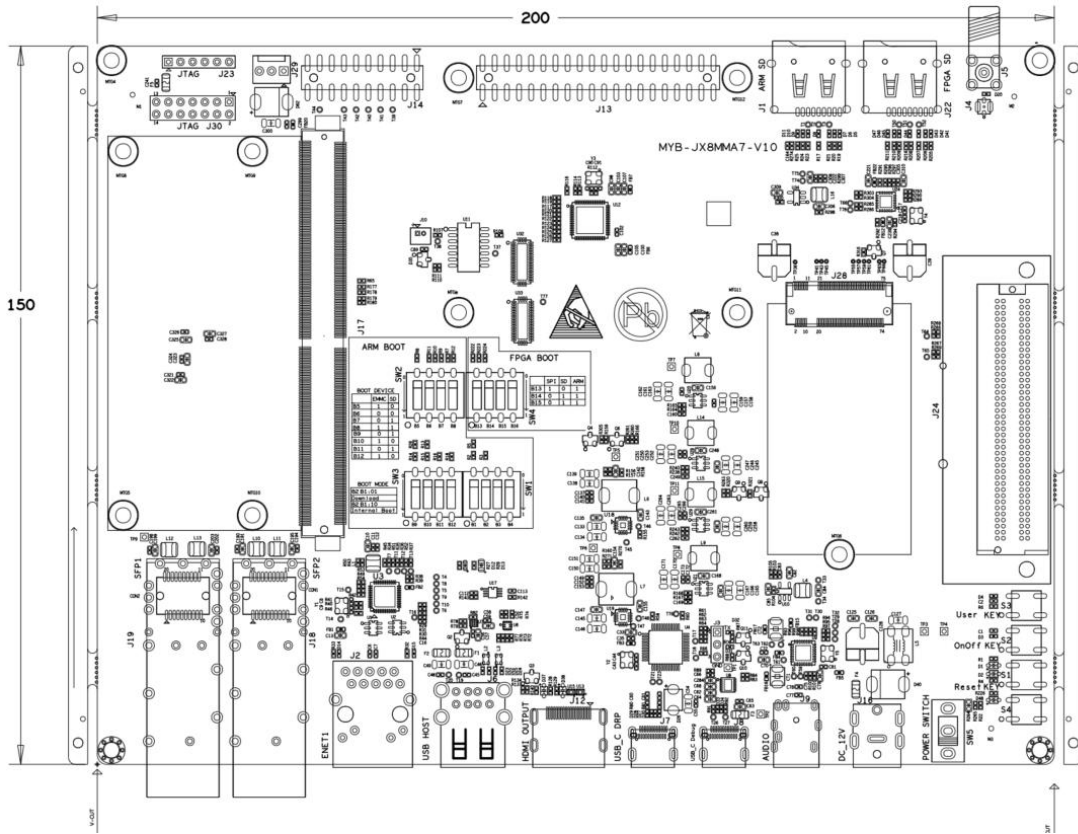


Figure 1-11 MYD-JX8MMA7 Development Board Dimensions Chart

Software Features

The MYD-JX8MMA7 development board supports Linux OS and comes with software packages. The kernel and many peripheral drivers are available in source code to assist clients expedite their development. The following are a summary of the software features:

Item	Features	Description	Source Code Provided
Bootloader	U-boot	Boot program U-boot 2021.04	YES
Linux kernel	Image	Customized based on official kernel_5.10.72	YES
Drivers	MMC	eSDHC driver	YES
	SPI	SPI driver	YES
	I2C	I2C driver	YES
	Ethernet	Gigabit Ethernet driver	YES
	USB Host	USB driver	YES
	USB OTG	USB driver	YES
	UART	UART driver	YES
	GPIO key	Key driver	YES
	WiFi & BT	Brcm driver	YES
	RTC	RTC driver	YES
	GPIO Led	Led driver	YES
	MIPI DSI	MIPI driver	YES
	CSI	CSI driver	YES
Touch	Touch screen driver	YES	
File System	myir-image-full	File system with GUI interface built on Yocto	YES
	myir-image-core	File system without QT built on Yocto	YES

Table 1-2 Linux Software Features