MYC-JX8MPQ CPU Module

- *NXP i.MX 8M Plus Quad Application Processor based on 1.6 GHz Arm Cortex-A53 and 800MHz Cortex-M7 Cores*
- *A Neural Processing Unit (NPU) Operating at up to 2.3 TOPS*
- *3GB LPDDR4, 8GB eMMC Flash, 32MB QSPI Flash*
- *Power Management IC (PMIC)*
- *0.5mm pitch 314-pin MXM 3.0* Gold-finger-*edge-card Connector*
- *Supports Working Temperature Ranging from -40℃ to 85℃*
- *Supports Running Linux L5.10.9*

Figure 1-1 MYC-JX8MPQ CPU Module

Measuring 45mm by 82mm, the **MYC-JX8MPQ CPU Module** is a high-performance embedded ARM SoM based on NXP's powerful quad Arm Cortex-A53 **i.MX 8M Plus** processor with 800MHz ARM Cortex-M7 Real-time co-processor. The i.MX processor features an integrated **Neural Processing Unit (NPU)** operating at up to 2.3 TOPS, combining advanced 14LPC FinFET process technology to provide more possibility and reliability in machine learning and vision, Artificial Intelligence (AI), advanced multimedia and industrial automation fields. It has **3GB LPDDR4, 8GB eMMC and 32MB QSPI flash** default memory and storage configuration as well as PMIC. A number of peripheral and IO signals are access through one **0.5mm pitch 314-pin MXM 3.0 gold-finger-edge-card connector**. It is capable of running **Linux** OS and provided with plenty of software resources.

MYIR offers **MYD-JX8MPQ Development Board** for evaluating the **MYC-JX8MPQ CPU Module**, the base board has taken great computing and multimedia capabilities of the i.MX 8M Plus processor to provide **2 x MIPI-CSI (4-lane) Camera Interfaces, 1 x LVDS (dual-channel)/2 x LVDS (single-channel) /1 x MIPI-DSI (4-lane), up to 800Mhz HiFi4 Audio DSP and HDMI with up to 4k resolution**. It also has strong communication connectivity with **1 x Debug serial port, 1 x USB 3.0 OTG, 1 x USB 3.0 HOST, 2 x Gigabit Ethernet, 2 x CAN, 2 x M.2 Sockets (one for 5G LTE Module and one for PCIe SSD), 1 x 10-pin extension header for WiFi/Bluetooth module and one 2 x 20-pin UART/I2C/SPI/GPIO extension header which is compatible with Raspberry Pi interface, Micro SD card slot,** etc. MYIR can also offer design services to help customize the base board according to customers' requirements.

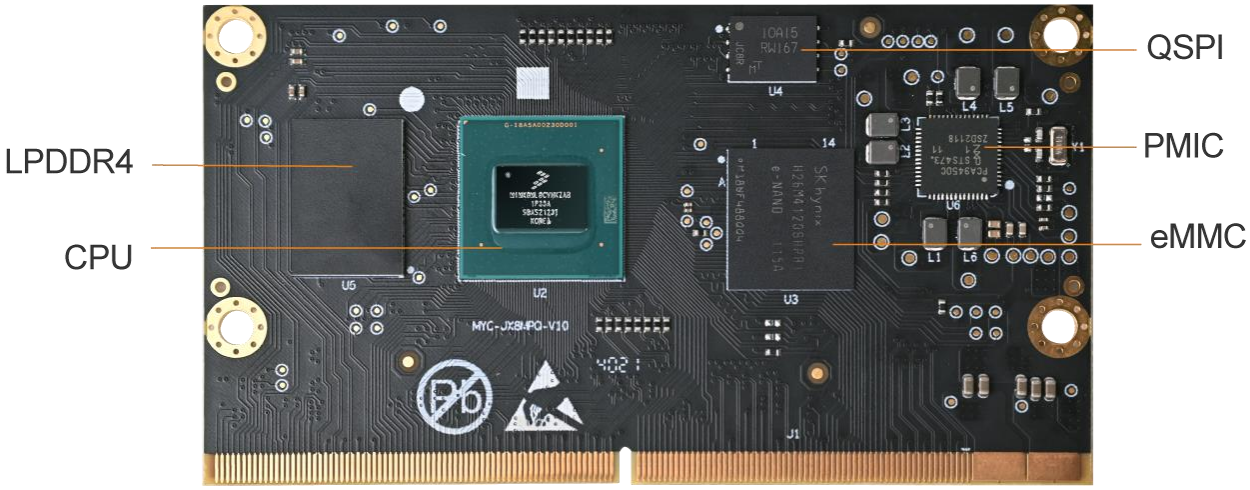

Figure 1-2 MYC-JX8MPQ CPU Module

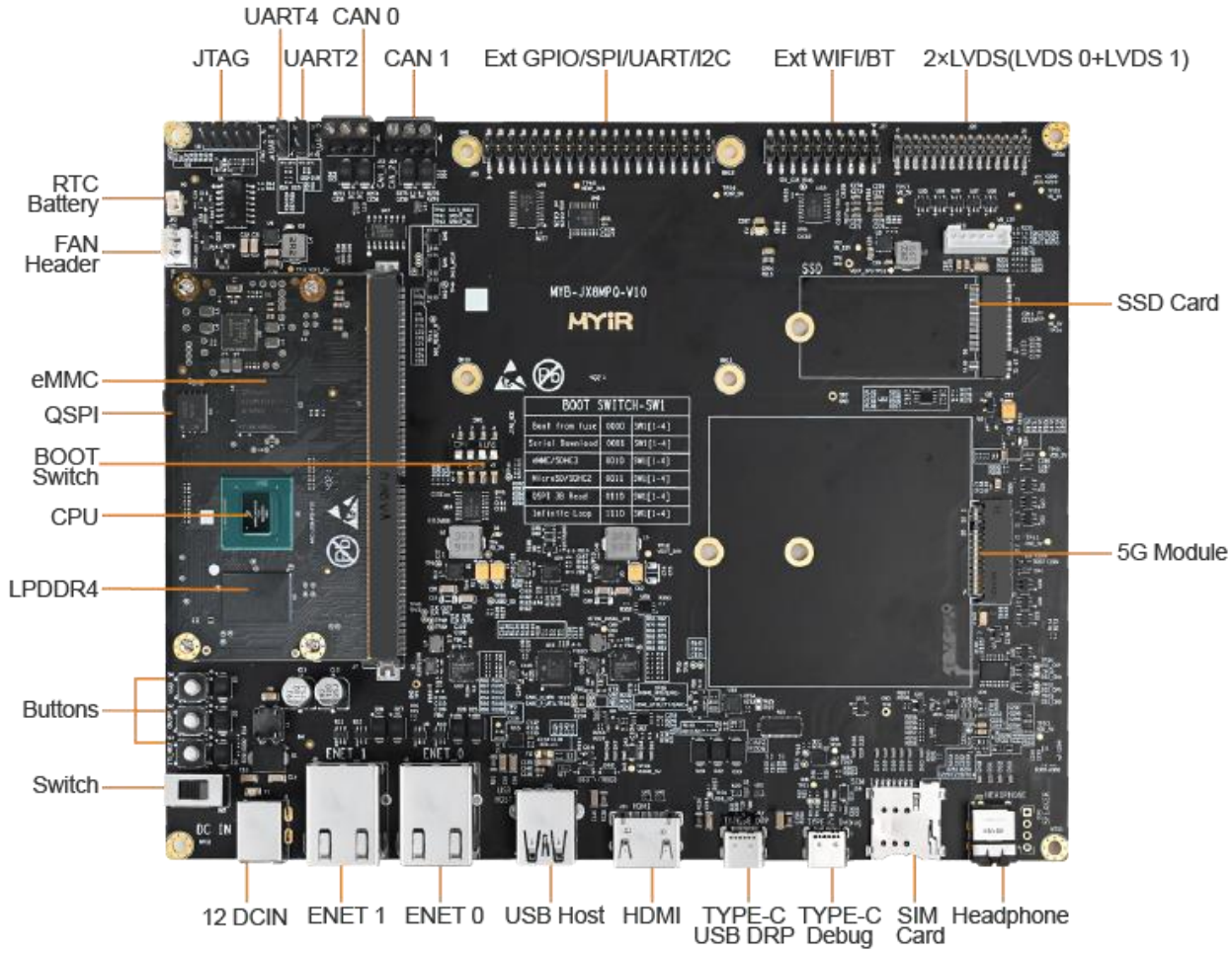

Figure 1-3 MYD-JX8MPQ Development Board Top-view

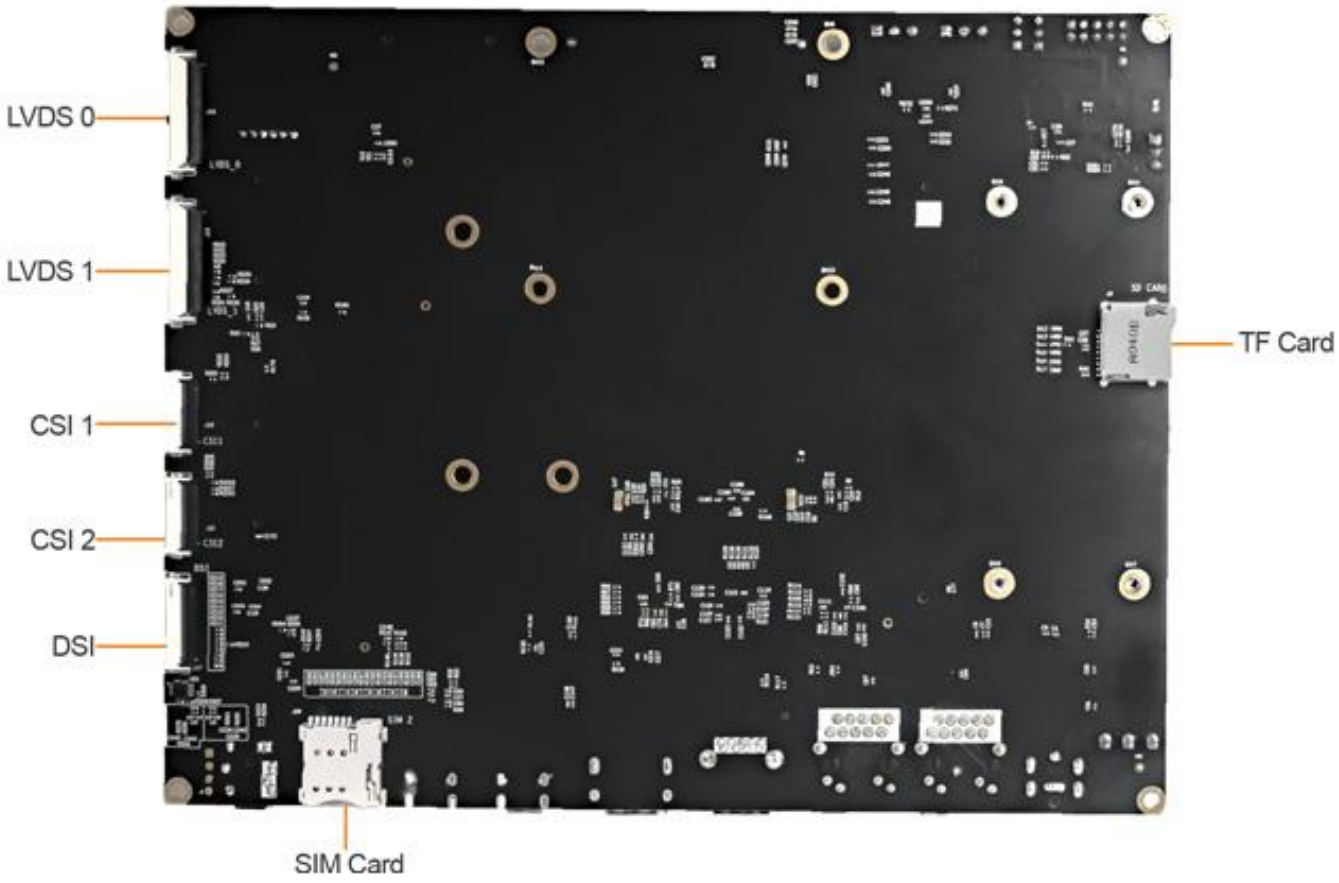

Figure 1-4 MYD-JX8MPQ Development Board Bottom-view

Hardware Specification

The MYC-JX8MPQ CPU Module is using NXP's 15 x 15 mm, 0.5 mm pitch, FCBGA bare die package i.MX 8M Plus Quad Application Processor (MIMX8ML8CVNKZAB) which is among the **i.MX 8M Plus family** and features as in below tables.

Family	Part Number	Configuration	Temperature
i.MX 8M Plus Quad	MIMX8ML8DVNLZAB	4x A53 (1.8Ghz), VPU, NPU, ISP	0°C - +95°C
i.MX 8M Plus Quad	MIMX8ML6DVNLZAB	4x A53 (1.8Ghz), VPU, ISP	0°C - +95°C
i.MX 8M Plus Quad Lite	MIMX8ML4DVNLZAB	4x A53 (1.8Ghz)	0°C - +95°C
i.MX 8M Plus Dual	MIMX8ML3DVNLZAB	2x A53 (1.8Ghz), VPU, NPU, ISP	0°C - +95°C
i.MX 8M Plus Quad	**MIMX8ML8CVNKZAB**	**4x A53 (1.6Ghz), VPU, NPU, ISP, CAN-FD**	**-40°C - +105°C**
i.MX 8M Plus Quad	MIMX8ML6CVNKZAB	4x A53 (1.6Ghz), VPU, ISP, CAN-FD	-40°C - +105°C
i.MX 8M Plus Quad Lite	MIMX8ML4CVNKZAB	4x A53 (1.6Ghz), CAN-FD	-40°C - +105°C
i.MX 8M Plus Dual	MIMX8ML3CVNKZAB	2x A53 (1.6Ghz), VPU, NPU, ISP, CAN-FD	-40°C - +105°C

Table 1-1 i.MX 8M Plus Family Application Processors

● ARM Cortex-A53, frequency up to 1.8Ghz; 800Mhz ARM Cortex-M7
● 16/32-bit DRAM interface, support LPDDR4-4000, DDR4-3200, DDR3L-1600
● x1, 8-bit NAND Flash
● x2, eMMC 5.1 Flash
● x3, SPI NOR FLASH
● x1, PCIe Gen3
● x2 USB 3.0 Type C controllers with integrated PHY (also supported USB 2.0) interfaces
● x3 uSDHC interface with eMMC 5.1 compliance
● x2 Gigabit Ethernet controller
● x4 UART, x6 I2C, x3 SPI
● Video Processing Unit 1080p60 HEVC/H.265 Main, Main 10 (up to level 5.1) 1080p60 VP9 Profile0,2 1080p60 AVC/H.264 Baseline, Main, High decoder 1080p60 AVC/H.264 encoder 1080p60 HEVC/H.265 encoder
● Graphic Processing Unit GC7000UL with OpenCL and Vulkan support 166 million triangles/sec Supports OpenGL ES 1.1, 2.0, 3.0, OpenCL 1.2, Vulkan GC520L for 2D acceleration
● LCDIF Display Controller Support up to 1080p60 display per LCDIF if no more than 2 instances used simultaneously, or 1x 1080p60 + 2x 720p60 if all 3 instances used simultaneously. One LCDIF drives MIPI DSI One LCDIF drives LVDS Tx One LCDIF drives HDMI Tx
● MIPI Interface 4-lane MIPI DSI interface Two instances of 4-lane MIPI CSI interface and HDR ISP
● Audio HiFi4 Audio DSP, SPDIF input and output， x6 SAI
● FCBGA, 0.5mm pitch, 15x15mm

Table 1-2 Features of i.MX 8M Plus Application Processor

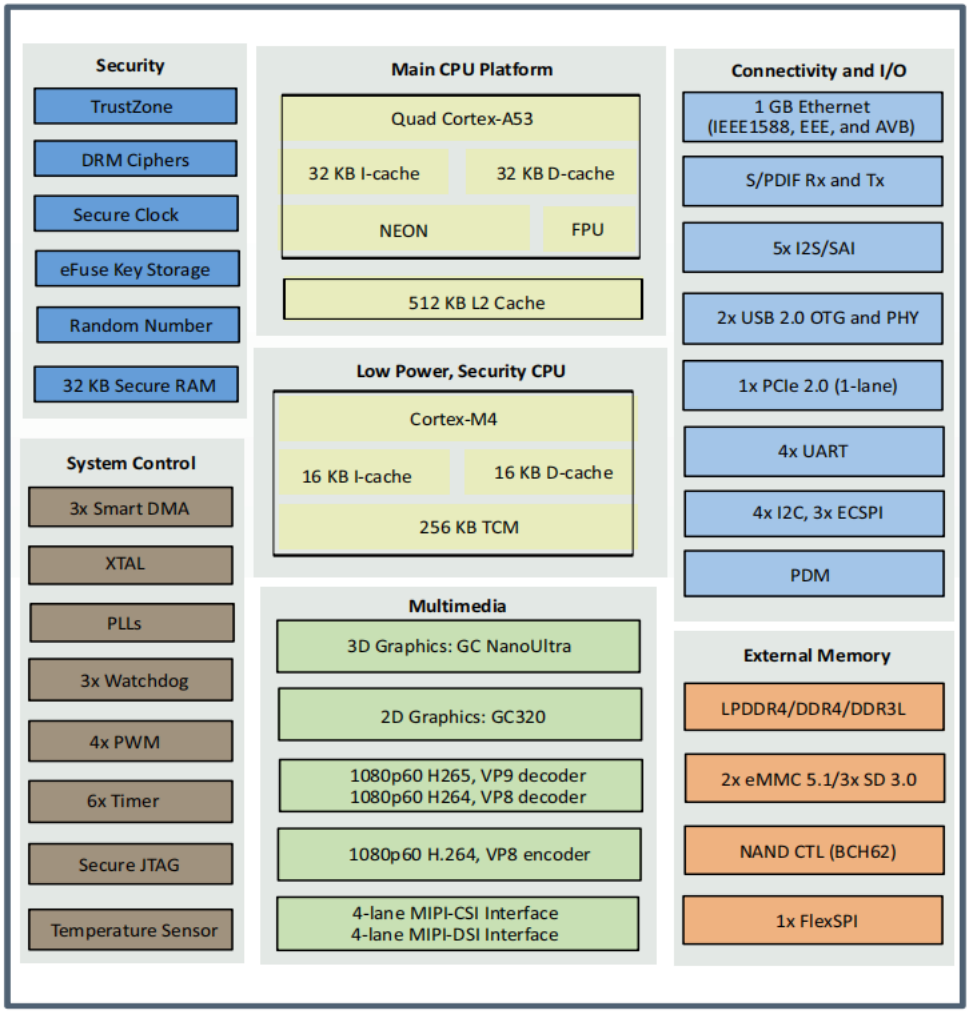

Figure 1-5 i.MX 8M Plus System Block Diagram

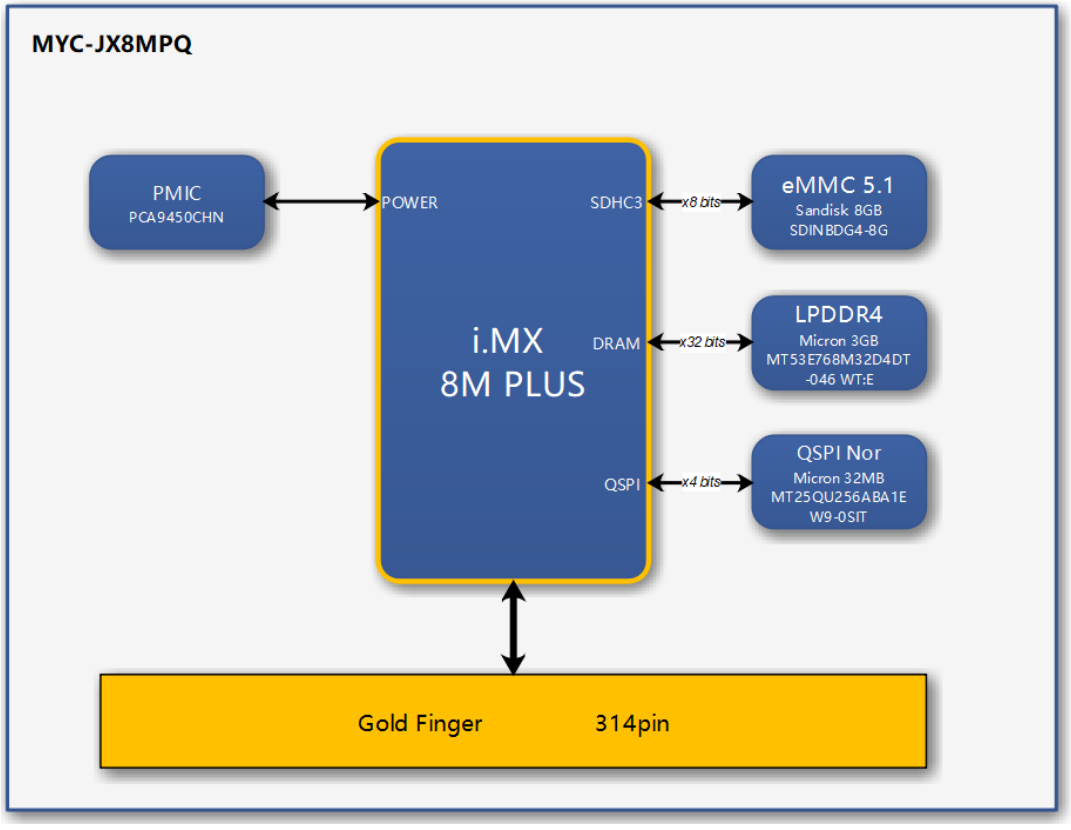

Figure 1-6 MYC-JX8MPQ CPU Module Function Block Diagram

Mechanical Parameters

- Dimensions: 45mm x 82mm
- PCB Layers: 8-layer design
- Power supply: +5V/1.1A (max)
- Working temperature: 0~70 Celsius (commercial grade) or 40~85 Celsius (industrial grade)

Processor

- NXP i.MX 8M Plus Quad Processor
  - 1.6 GHz Quad-core ARM Cortex-A53 CPU (MIMX8ML8CVNKZAB, industrial grade)
  - 800MHz Real-time ARM Cortex-M7 co-processor
  - Integrated 2.3 TOPS Neural Processing Unit (NPU)
  - Integrated 2D/3D GPU and 1080p VPU

Memory

- 3GB LPDDR4 (supports up to 6GB)
- 8GB eMMC Flash (supports up to 128GB)
- 32MB QSPI Flash

Peripherals and Signals Routed to Pins

- Power Management IC
- 0.5mm pitch 314-pin MXM 3.0 Gold-finger-edge-card Connector
  - 2 x 10/100/1000Mbps Ethernet
  - 1 x MIPI DSI
  - 2 x MIPI CSI
  - 4 x UART
  - 2 x USB 3.0
  - 6 x I2C
  - 3 x SPI
  - 2 x LVDS
  - 1 x HDMI
  - 1 x HiFi4 Audio DSP
  - 1 x PCIE3.0
  - 2 x CAN
  - 2 x uSDHC (uSDHC1: 8bit width, uSDHC2: 4bit width)

  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.

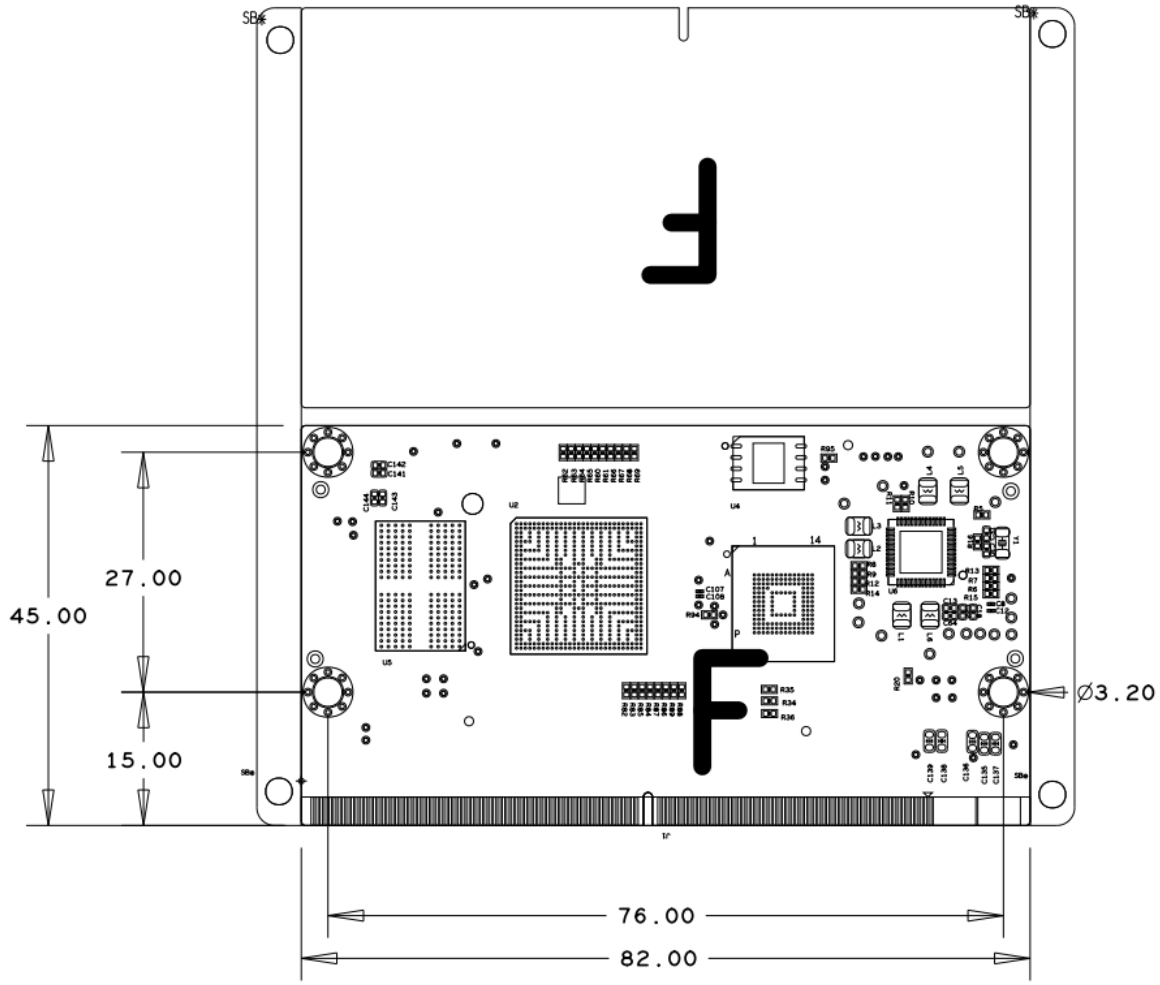

Figure 1-7 MYC-JX8MPQ Dimensions Chart (Top View)

Figure 1-8 MYC-JX8MPQ Dimensions Chart (Side View)

Software Features

MYIR's MYC-JX8MPQ CPU module is ready to run Linux which is provided with software package. Many peripheral drivers are in source code to help accelerate customer's designs. The software package provided is characterized as following:

Item	Features	Description	Source Code Provided
Bootstrap program	u-boot	The primary bootstrap based on U-boot 2020.04	YES
Linux kernel	Image	Based on Linux L5.10.9	YES
Drivers	PMIC	pca9450 PMIC driver	YES
	USB Host	USB Host driver	YES
	USB OTG	USB OTG driver	YES
	I2C	I2c Bus driver	YES
	SPI	SPI Bus driver	YES
	Ethernet	10/100/100M Ethernet driver	YES
	MMC	MMC/eMMC/TF card driver	YES
	PWM	PWM driver	YES
	RTC	RTC driver	YES
	IO	GPIO driver	YES
	Touch	Capacitive touch screen driver	YES
	Audio	WM8960 driver	YES
	Camera	OV5640 driver	YES
	WIFI/BT	AP6212 driver	YES
	Watchdog	Watchdog driver	YES
	5G LTE MODULE	EC20/RM500-Q	YES
	M.2	NVME driver	YES
File System	Yocto rootfs	Yocto 3.2.1 include QT5.15.0, armnn, tensorflow-lite	YES
Application Programs	GPIO KEY	KEY example	YES
	NET	TCP/IP socket C/S example	YES
	RTC	RTC example	YES
	UART	UART example	YES
	Audio	Audio example	YES
	Camera	Camera display example	YES
Compiler Tool Chain	Cross compiler	Yocto GCC 7.5.0	YES

Table 1-3 Linux Software Features