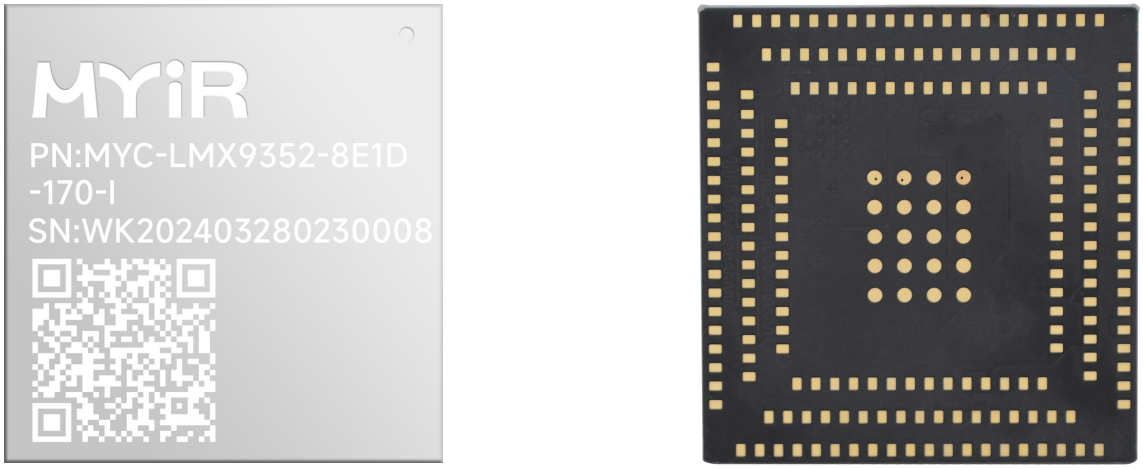
MYiR 米尔电子
Make Your Idea Real

MYC-LMX9X System-On-Module Overview

- ✓ *NXP i.MX 93 Processor based on 1.7GHz Dual ARM Cortex-A55 and 250MHz Cortex-M33 Cores*
- ✓ *Neural Processing Unit (NPU) operating at up to 0.5 TOPS*
- ✓ *1GB/2GB LPDDR4, 8GB eMMC Flash, 32KB EEPROM*
- ✓ *PCA9451AHNY Power Management IC*
- ✓ *218-pin Expansion Interface with LGA Package*
- ✓ *Supports Working Temperature Ranging from -40° C to 85° C*
- ✓ *Supports for Linux 6.12 and Debian 12*

Measuring only 37mm by 39mm, the MYC-LMX9X is a compact System-On-Module (SoM). It integrates the powerful i.MX9352 application processor (MIMX9352CVVXMAC), belonging to the esteemed NXP i.MX 93 family. Leveraging NXP's innovative Energy Flex architecture, this processor optimizes performance and power efficiency for Industrial, IoT and automotive devices. The i.MX9352 features dual ARM Cortex-A55 cores clocked at 1.7GHz and a Cortex-M33 MCU operating at 250MHz, along with a 0.5 TOPS NPU, enabling cost-effective and lightweight AI applications.

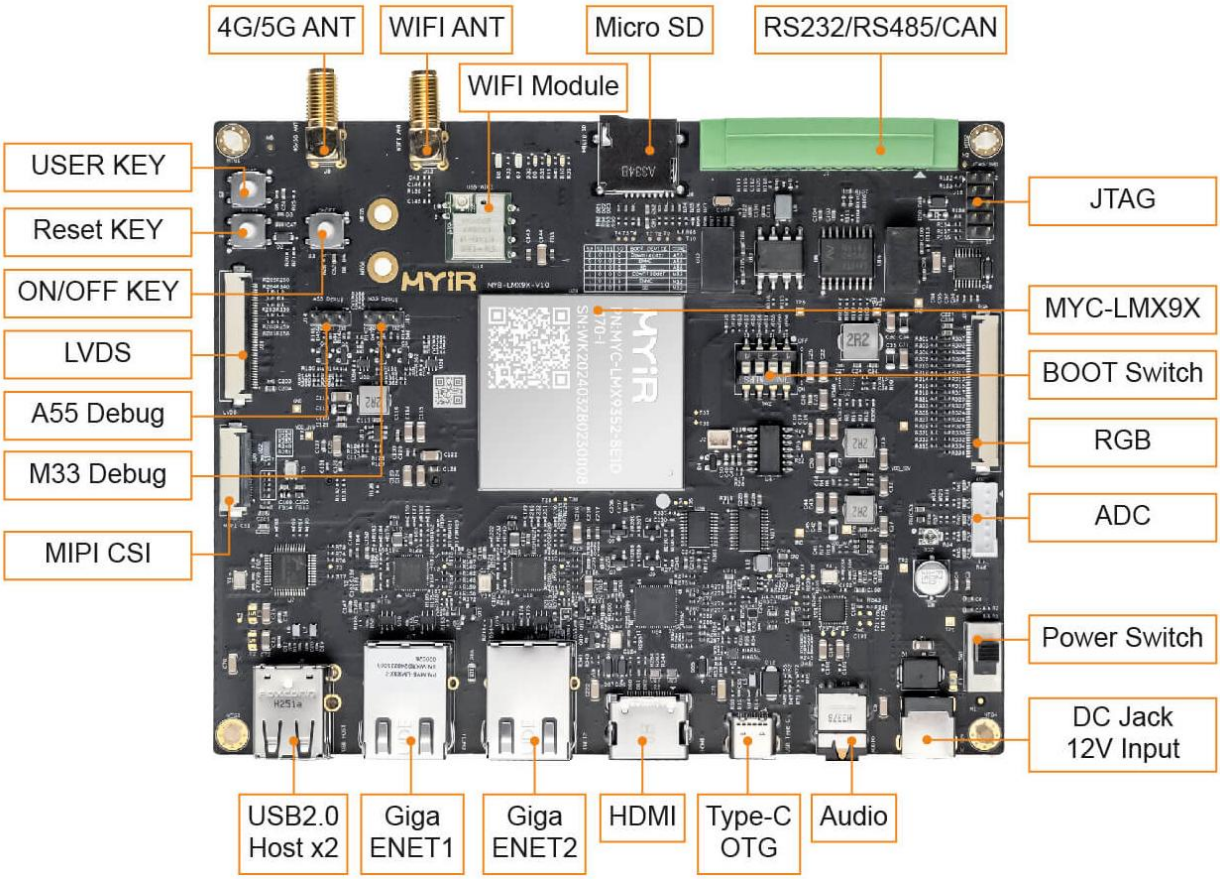
In addition to the i.MX9352 chip, the MYC-LMX9X incorporates 1GB/2GB LPDDR4, 8GB eMMC, 32KB EEPROM, and a power management IC (PMIC) on board. A range of peripheral and IO signals are available from the 218-pin expansion interface with LGA Package. Leveraging the i.MX93 processor, it supports multiple display interfaces and image processing capabilities, including MIPI-DSI, LVDS and RGB display interfaces, as well as MIPI-CSI and Parallel CSI interfaces. It boasts a rich set of high-speed interfaces for connectivity and fast data transfer, including 2x USB 2.0, 3x SD/SDIO 3.01, 2x Gigabit Ethernet with EEE, AVB, IEEE 1588 and TSN in one port for precise, low latency control loops, as well as 2x CAN-FD interfaces. The MYC-LMX9X is versatile and can be effectively utilized across various sectors such as EV charging stations, power & energy, healthcare equipment, industrial HMI, motion control, and engineering machinery, among others.



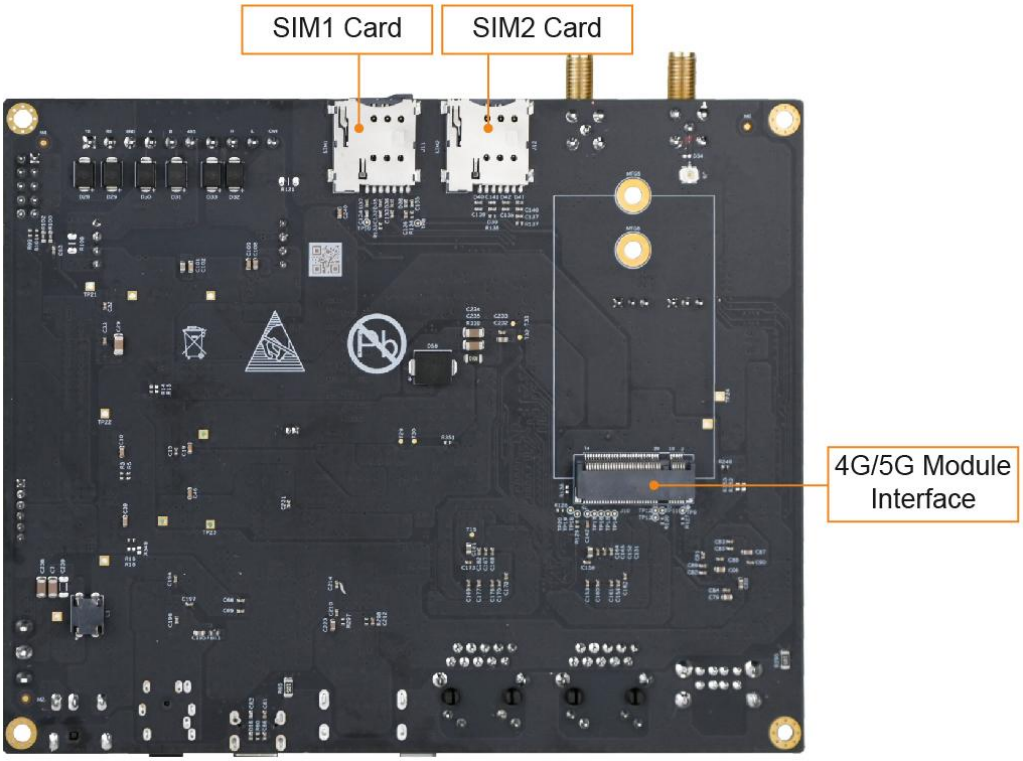
MYC-LMX9X System On Module (Top-view and Bottom-view)

The MYC-LMX9X supports for Linux 6.12 and Debian 12 operating system. MYIR provides a comprehensive software bundle, including kernel and driver source codes, along with compilation tools, to enable users to initiate their development quickly and effortlessly.

The MYD-LMX9X Development Board, centered around the MYC-LMX9X, boasts a diverse array of communication interfaces on its base board. These interfaces include RS232, RS485, two USB2.0, one USB OTG, two Gigabit Ethernet, one CAN, one Micro SD card slot, one M.2 Socket for USB based 4G/5G LTE Module with dual SIM card holders. Furthermore, it incorporates a USB2.0 based WiFi module, an Audio interface, a Mini-CSI interface, and multiple display interfaces: HDMI, LVDS, and RGB. MYIR also offers optional enhancements for the board, such as the MY-CAM003M Camera Module, the MY-TFT070CV2 LCD Module, and the MY-LVDS070C LVDS Module. These additions significantly expand the board's functionality, providing users with versatile capabilities to cater to their unique project needs.



MYD-LMX9X Development Board (Top-view)



MYD-LMX9X Development Board (Bottom-view)

Hardware Specification

The i.MX 93 family represents NXP's latest power-optimized processors for smart home, building control, contactless HMI, IoT edge, Automotive, and Industrial applications. The i.MX 93 includes powerful dual Arm® Cortex®-A55 processors with speeds up to 1.7 GHz integrated with a NPU that accelerates machine learning inference. A general-purpose Arm® Cortex®-M33 running up to 250 MHz is for real-time and low-power processing. Robust control networks are possible via CAN-FD interface. Also, dual 1 Gbps Ethernet controllers, one supporting Time Sensitive Networking (TSN), drive gateway applications with low latency.

i.MX93 Processor Block Diagram

The MYC-LMX9X is driven by the 11 x 11mm package (198 IO pins) i.MX 9352 processor, comprising dual Cortex-A55 cores running at 1.7 GHz alongside a Cortex-M33 core operating at 250MHz.

PN	NPU	Arm CPU	Package	Camera Interface	Display Interface	Networking & Connectivity	Audio
MIMX9352xxxxxxx	Y	2x	11x11mm (198 IO pins)	2-lane 1080p30 MIPI CSI, Parallel camera	4-lane 1080p60 MIPI DSI, 4-lane LVDS, Parallel display	2x GbE, 2x USB 2.0	7x I2S TDM
MIMX9351xxxxxxx	Y	1x					
MIMX9332xxxxxxx	N	2x					
MIMX9331xxxxxxx	N	1x					
MIMX9321xxxxxxx	Y	1x	9x9mm (138 IO pins)	Parallel camera	Parallel display	1x GbE, 1x USB 2.0	3x I2S TDM
MIMX9311xxxxxxx	N	1x					

i.MX 93 Product Features

The MYC-LMX9X takes full features of i.MX9352 processor and the main features are characterized as below:

Mechanical Parameters

- Dimensions: 37mm x 39mm
- PCB Layers: 10-layer design
- Power supply: +5V/1A
- Working temperature: -40~85 Celsius (industrial grade)

Processor

- NXP i.MX 9352 processor
  - Up to 1.7GHz Dual-core ARM Cortex-A55 CPU
  - 250MHz Real-time ARM Cortex-M33 co-processor
  - 0.5 TOPS Arm® Ethos™ U-65 microNPU

Memory

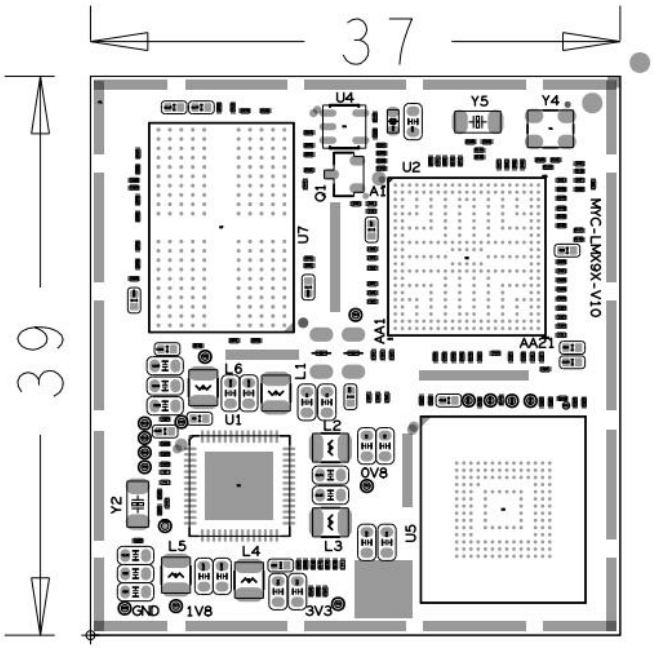
- 1GB/2GB LPDDR4
- 8GB eMMC (supports 4GB/16GB/32GB)
- 32KB EEPROM

Peripherals and Signals Routed to Pins

- Power Management IC (PCA9451AHNY)
- 218-pin LGA Expansion Interface
  - 2x RGMII
  - 2x USB2.0
  - 8x UART
  - 2x CAN FD
  - 8x I2C
  - 2x I3C
  - 8x SPI
  - 1x MIPI-DSI
  - 1x LVDS
  - 1x RGB
  - 1x MIPI-CSI
  - 1x Parallel CSI -
  - 3x SAI
  - 1x SPDIF
  - 4x ADC
  - 1x JTAG
  - Up to 87x GPIOs

  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 SOM pinout description file.

MYC-LMX9X Function Block Diagram



MYC-LMX9X Dimensions Chart (Unit: MM)

Software Features

The MYC-LMX9X comes with a complete software bundle and supports for Linux and Debian OS. To assist clients in rapidly developing projects, the source code for the kernel and various peripheral drivers is provided. The key features of the software are summarized as follows:

Item	Feature	Description	Source code
Bootloader	ATF	The initial bootloader ATF 2.8	YES
	SPL	The secondary bootloader SPL	YES
	U-boot	The third-stage bootloader u-boot_2025.04	YES
Linux kernel	Linux kernel	Based on the official kernel_6.12.49 version customization	YES
Drivers	PMIC	PCA9451AHNY 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	YT8531SH driver	YES
	SDHI	eMMC/SD card storage driver	YES
	HDMI	LT9611 driver	YES
	LVDS	LVDS driver	YES
	Audio	SGTL5000 audio driver	YES
	4G/5G	4G/5G driver	YES
	ADC	ADC driver	YES
	RTC	INS5T8025 driver	YES
	GPIO	Universal GPIO driver	YES
	UART	RS485/RS232/TT driver	YES
	CAN	CAN driver	YES
	Camera (MIPI)	OV5640 camera driver	YES
	WiFi/BT	FG6131EUXX-00 driver	YES
File system	myir-image-core	Image built in Yocto without GUI interface	YES
	myir-image-full	A fully functional image built with Yocto	YES
	myir-lmx9x-debian	Debian system, support xfce and general functions of Linux	YES

MYC-LMX9X Software Features

Order Information

<table>
<tr><th>Product Item</th><th>Part No.</th><th>Packing List</th></tr>
<tr><td rowspan="2">MYC-LMX9X
System-On-Module</td><td>MYC-LMX9352-8E1D-170-I</td><td rowspan="2">✓ One MYC-LMX9X System On Module</td></tr>
<tr><td>MYC-LMX9352-8E2D-170-I</td></tr>
<tr><td rowspan="2">MYD-LMX9X
Development Board</td><td>MYD-LMX9352-8E1D-170-I</td><td rowspan="2">✓ One MYD-LMX9X Development Board (including MYC-LMX9X SOM)
✓ One USB to TTL cable
✓ One 12V/2A Power adapter
✓ One Quick Start Guide</td></tr>
<tr><td>MYD-LMX9352-8E2D-170-I</td></tr>
<tr><td>MY-CAM003M
MIPI Camera Module</td><td>MY-CAM003M</td><td rowspan="3">Add-on Options
✓ MY-CAM003M Module
✓ MY-LVDS070C 7-inch LVDS Module
✓ MY-LCD70TP-C 7-inch LCD Module</td></tr>
<tr><td>MY-LVDS070C
7-inch LVDS Module</td><td>MY-LVDS070C</td></tr>
<tr><td>MY-LCD70TP-C
7-inch LCD Module</td><td>MY-TFT070CV2</td></tr>
<tr><td colspan="3">Note:
1. One MYD-LMX9X Development Board includes one MYC-LMX9X SOM mounted on the base board. If you need more SOMs, you can order extra ones.

2. Bulk discounts are available. Please contact MYIR for inquiries.

3. We accept custom design based on the MYD-LMX9X, whether reducing, adding or modifying the existing hardware according to customer's requirement.</td></tr>
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