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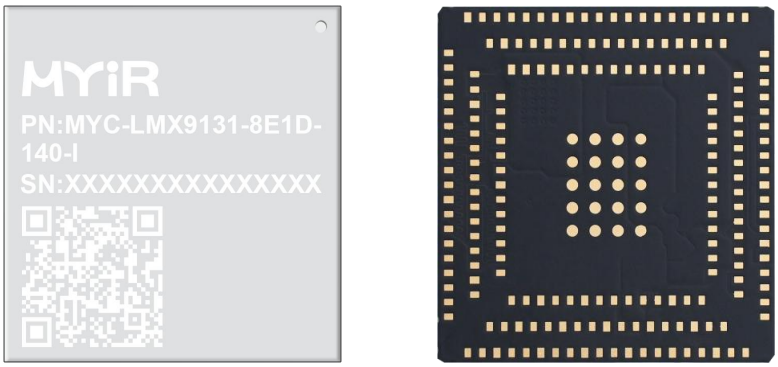
MYC-LMX91 System-On-Module Overview

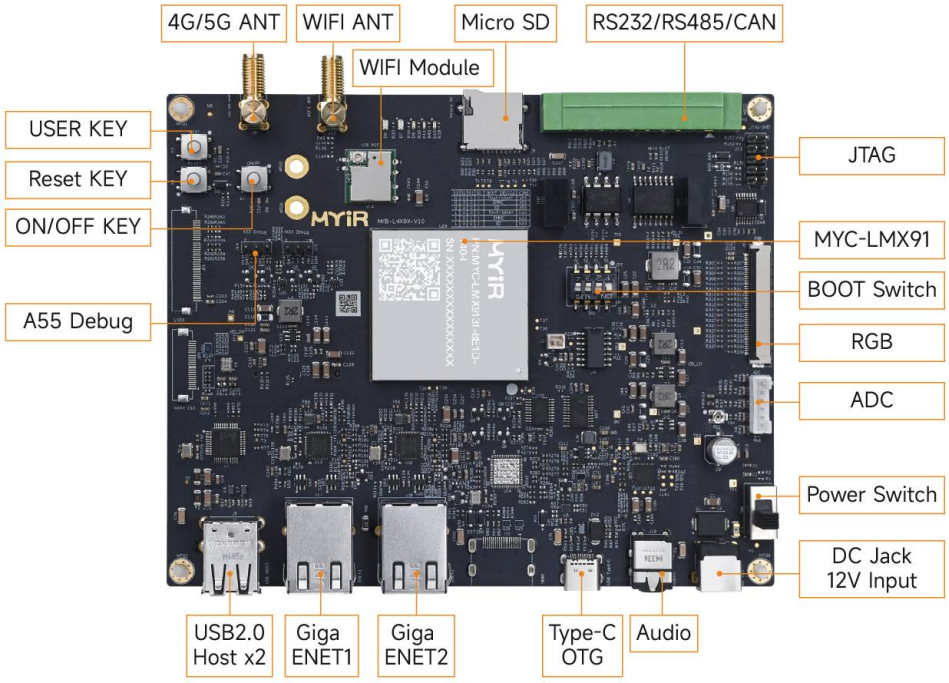
- ✓ *NXP i.MX 91 Processor based on 1.4GHz ARM Single Cortex-A55 Core*
- ✓ *1GB LPDDR4, 8GB eMMC, 32KB EEPROM*
- ✓ *2x Gigabit Ethernet, 2x USB, 8x UART, 8x SPI, 2x CAN-FD, RGB Display*
- ✓ *218-pin Expansion Interface with LGA Package*
- ✓ *Supports Working Temperature Ranging from -40 ° C to 85 ° C*
- ✓ *Ready-to-Run Linux OS*
- ✓ *Fully Compatible with MYIR's i.MX93 SOM*

The MYC-LMX91 is a compact and robust System-on-Module (SoM) measuring 37mm x 39mm, fully compatible with MYIR's MYC-LMX9X (i.MX93) module. It is powered by NXP's i.MX91 single-core ARM Cortex-A55 processor running at 1.4GHz. The module integrates 1GB LPDDR4 memory, 8GB eMMC storage and a 32KB EEPROM. It also features the PCA9451AHNY power management IC (PMIC). The MYC-LMX91 offers extensive peripheral and I/O connectivity through a 218-pin LGA expansion interface, including 2x Gigabit Ethernet, 2x USB, 8x UART, 8x SPI, 2x CAN-FD, and supports 24-bit Parallel RGB Display. It comes pre-installed with the Linux 6.6.36 operating system, backed by comprehensive documentation and software support. Designed for reliability and scalability, the MYC-LMX91 offers a cost-effective and high-performance embedded solution for next-gen smart devices, ideal for applications such as EV Charging Stations, HMIs, Smart Home & Building Automation, and Industrial Gateways.

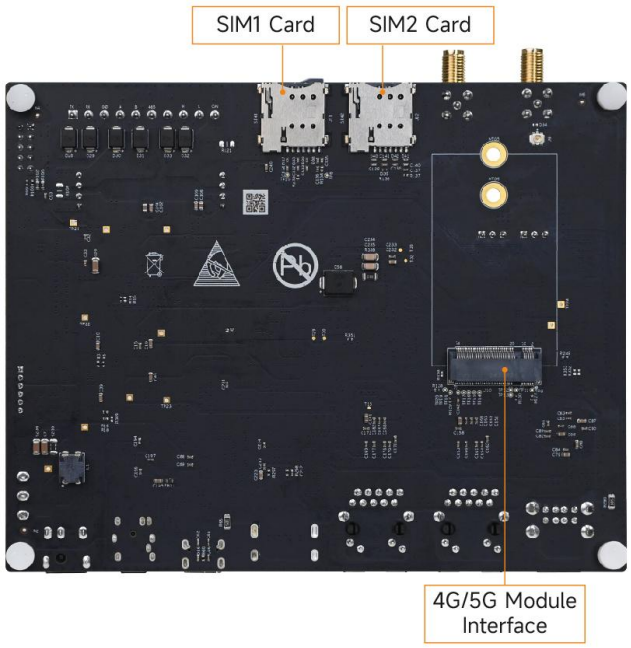


MYC-LMX91 Top-view and Bottom-view

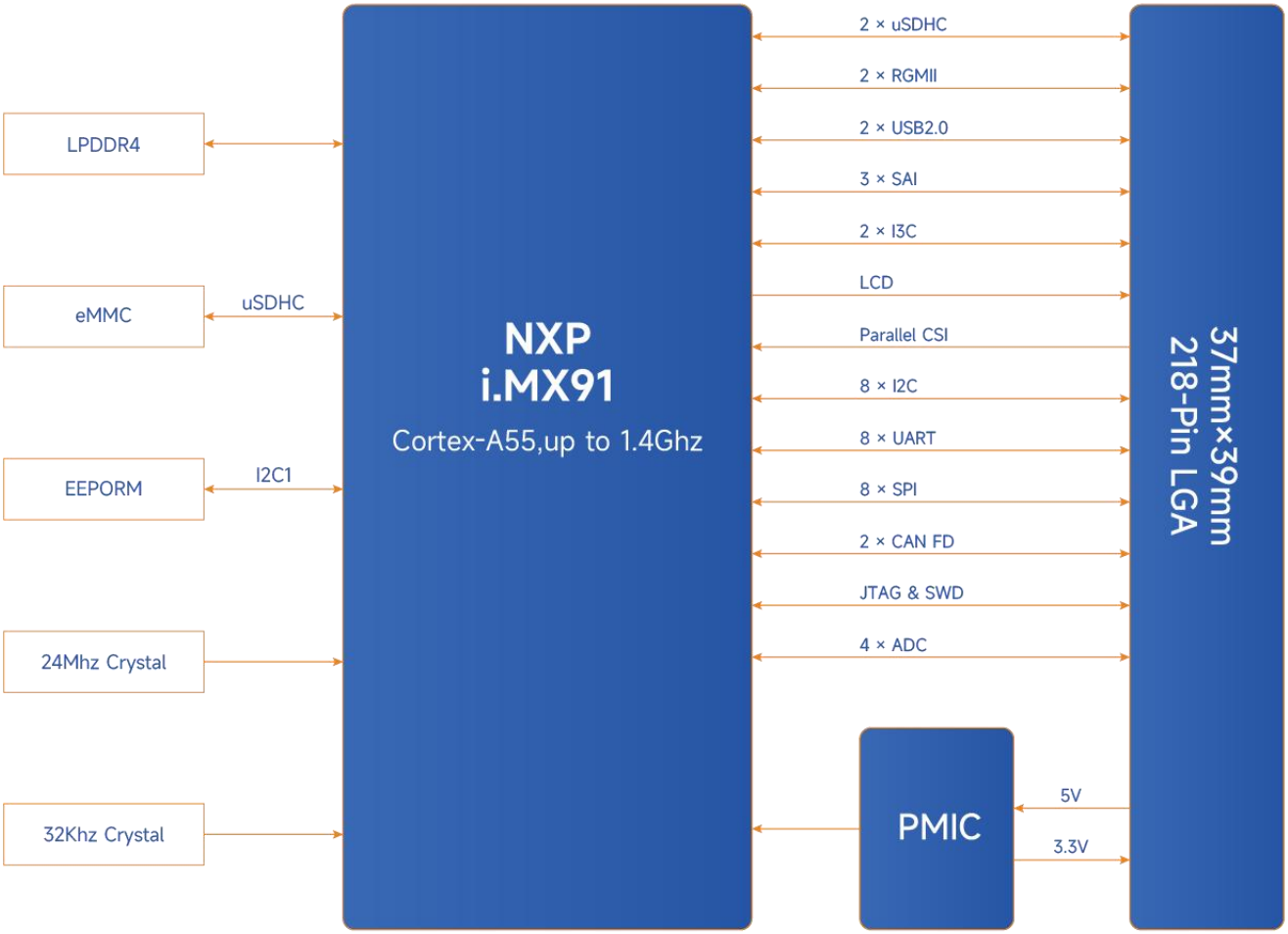
The MYD-LMX91 Development Board is a high-performance evaluation platform built around the MYC-LMX91 SoM. This feature-rich board offers dual Gigabit Ethernet ports, an M.2 B-Key socket for 4G/5G modules, onboard WiFi, RGB display interface, audio input/output, two USB 2.0 host ports, one USB OTG port, and a Micro SD card slot. For industrial applications, it provides CAN, RS485, and RS232 interfaces via phoenix terminals, along with JTAG debug interface and ADC inputs. The board comes preloaded with Linux 6.6.36 and supports an optional 7-inch LCD module (MY-TFT070CV2). With comprehensive peripherals and ready-to-use software support, it serves as a complete reference design for i.MX91-based solutions.



Top-view of MYD-LMX91 Development Board



Bottom-view of MYD-LMX91 Development Board



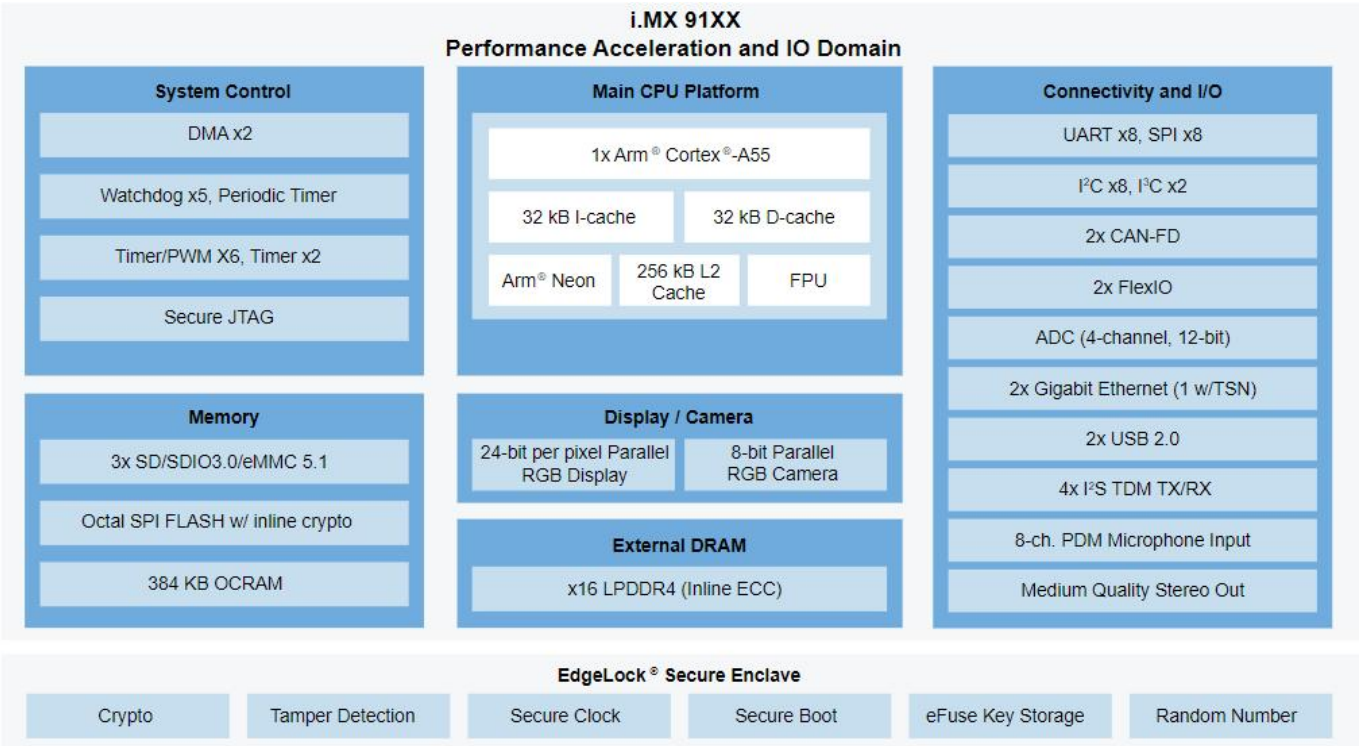
MYC-LMX91 Function Block Diagram

Hardware Specification

The MYC-LMX91 System-on-Module (SOM) mounted on the MYD-LMX91 Development Board utilizes a 1.0mm ball pitch and features the 1.4 GHz NXP i.MX91 microprocessor (MIMX9131CVVXJAA). This processor is part of the NXP i.MX91 product family of applications processors, which is powered by an Arm Cortex-A55 CPU. It supports modern LPDDR4 memory to ensure platform longevity, dual Gigabit Ethernet, and dual USB ports, as well as a comprehensive range of peripherals aimed at the medical, industrial, and consumer IoT market segments. It enables applications for smart home controllers, home entertainment, connected appliances, industrial automation, and medical platforms.

Parameter	MIMX9121CVVXCAA	MIMX9121DVVXCAA	MIMX9131CVVXJAA	MIMX9131DVVXJAA
Core	1× Cortex-A55	1× Cortex-A55	1× Cortex-A55	1× Cortex-A55
Frequency	800 MHz	800 MHz	1.4 GHz	1.4 GHz
Data Bus Width	64-bit	64-bit	64-bit	64-bit
Package Type	FCBGA-306	FCBGA-306	FCBGA-306	FCBGA-306
Pin Count	306	306	306	306
Voltage Range	0.8V – 0.9V	0.8V – 0.9V	0.8V – 0.9V	0.8V – 0.9V
Operating Temp Range	-40°C to 105°C	0°C to 95°C	-40°C to 105°C	0°C to 95°C
I/O Count	90	90	90	90
Interface Support	CAN FD, Ethernet, I2C, I2S, I3C, SPI, UART, USB	CAN FD, Ethernet, I2C, I2S, I3C, SPI, UART, USB	CAN FD, Ethernet, I2C, I2S, I3C, SPI, UART, USB	CAN FD, Ethernet, I2C, I2S, I3C, SPI, UART, USB
Memory Support	LPDDR4	LPDDR4	LPDDR4	LPDDR4
Graphics Acceleration	None	None	None	None
Security Features	Secure Boot, Encryption, eFuse, RNG, Secure RTC, Tamper Detection	Secure Boot, Encryption, eFuse, RNG, Secure RTC, Tamper Detection	Secure Boot, Encryption, eFuse, RNG, Secure RTC, Tamper Detection	Secure Boot, Encryption, eFuse, RNG, Secure RTC, Tamper Detection

i.MX 91 series Application Processors



NXP i.MX 91 *Block Diagram*

The MYC-LMX91 takes full features of NXP i.MX91 processor and the main features are characterized as below:

Mechanical Parameters

- Dimensions: 37mm x 39mm
- PCB Layers: 10-layer design
- Power supply: +5V/2A
- Working temperature: -40~85 Celsius (industrial grade)

Processor

- NXP i.MX91 Processor (MIMX9131CVVXJAA)
  - Cortex A55 processors operating up to 1.4GHz
  - Up to 2.4GT/s x16 LPDDR4 (w/Inline ECC)
  - 24 bit-per-pixel parallel RGB

Memory

- 1GB LPDDR4
- 8GB eMMC
- 32KB EEPROM

Peripherals and Signals Routed to Pins

- 218-pin LGA Expansion Interface
  - 2x RGMII
  - 2x USB2.0
  - 8x SPI
  - 8x UART
  - 2x CAN FD
  - 8x I2C
  - 2x I3C
  - 2x uSDHC
  - 1x JTAG/SWD
  - 4x ADC
  - 1x Parallel CSI
  - 3x SAI
  - 1x RGB

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.

Software Features

The MYC-LMX91 System-On-Module supports Linux 6.6.36, and comes with comprehensive software packages. To assist clients in accelerating their projects, the kernel and various peripheral drivers are provided in source code format. Here is a brief overview of the key software features:

Item	Features	Description	Source Code
Bootloader	ATF	First bootloader ATF2.10	YES
	SPL	Second bootloader SPL	YES
	U-boot	The second boot program uboot_2024.04	YES
Linux kernel	Linux kernel	Customized based on official kernel_6.6.36 version	YES
Device driver	USB HOST	USB HOST driver	YES
	USB OTG	USB OTG driver	YES
	I2C	I2C bus driver	YES
	SPI	SPI bus driver	YES
	RGB	RGB driver	YES
	Ethernet	YT8531SH driver	YES
	Audio	SGTL5000 audio driver	YES
	4G/5G	4G/5G driver	YES
	GPIO	General purpose GPIO driver	YES
	SDHI	EMMC/SD card storage driver	YES
	UART	RS485/RS232 driver	YES
	CAN	CAN driver	YES
	ADC	ADC driver	YES
	WiFi	FG6131EUXX-00 driver	YES
File System	myir-image-core	A Yocto built image that does not include a GUI interface and supports rt Linux	YES
	myir-image-full	A fully functional QT and HMI image built with Yocto	YES

MYC-LMX91 Software Features

Order Information

Product Item	Part No.	Packing List
MYC-LMX91 System-On-Module	MYC-LMX9131-8E1D-140-I	✓ One MYC-LMX91 SOM
MYD-LMX91 Development Board	MYD-LMX9131-8E1D-140-I	✓ One MYD-LMX91 Development Board (including MYC-LMX91 SOM) ✓ One USB-to-TTL cable ✓ One Quick Start Guide ✓ One 12V/2A Power adapter
MY-TFT070CV2 LCD Module	MY-TFT070CV2	✓ 7-inch LCD Module with capacitive Touch Screen

Note:

1. One MYD-LMX91 Development Board comprises one MYC-LMX91 SOM mounted onto the base board. If you require additional SOMs, you may place order for extras.

2. Bulk discounts are available. For inquiries, kindly contact MYIR.

3. We cater to custom design requests based on the MYD-LMX91, whether it involves reducing, adding or modifying the existing hardware components to suit the customers' specific needs.

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