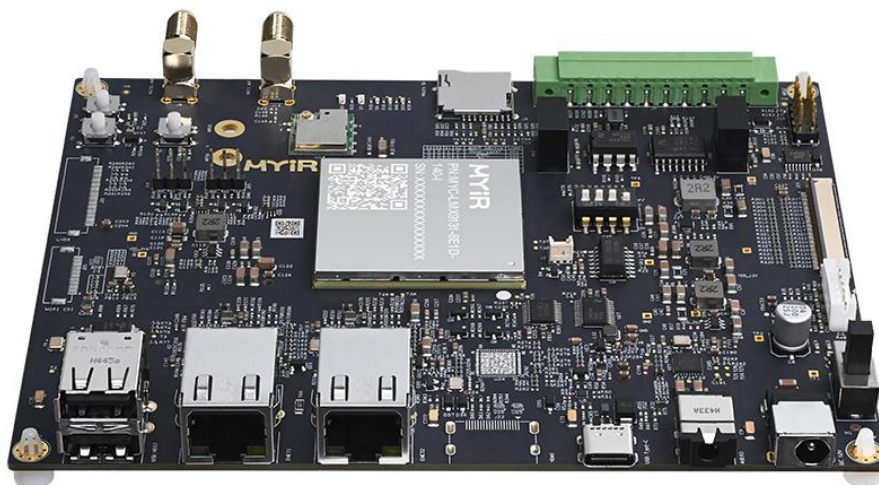


## MYD-LMX91 Development Board Overview



- ✓ MYC-LMX91 SOM as Controller Board
- ✓ NXP i.MX 9131 Application Processor based on 1.4 GHz Single Arm Cortex-A55
- ✓ 1GB LPDDR4, 8GB eMMC Flash, 32KB EEPROM
- ✓ 2x USB 2.0 Host, 1x USB 2.0 OTG, 1x Micro SD Card Slot, 1x JTAG, 1x ADC, CAN/RS485/RS232
- ✓ 2x Gigabit Ethernet, 1 x WiFi Module, 1x M.2 B-Key Socket for 4G/5G Module
- ✓ 1x RGB Display Interface, 1x Audio Input and Output
- ✓ Ready-to-Run Linux 6.6.36 OS

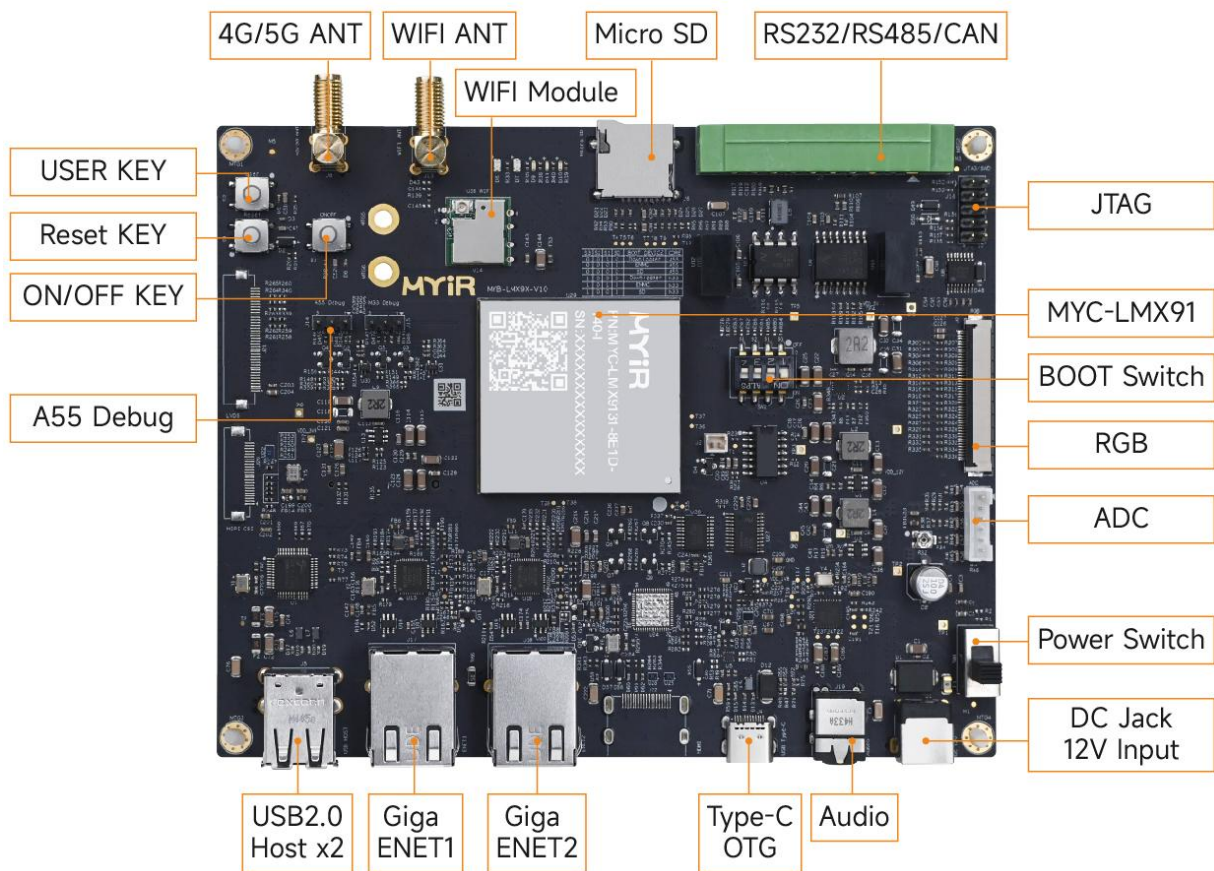


The MYD-LMX91 Development Board is a cost-effective evaluation platform designed specifically for the NXP i.MX 9131 processor. This processor boasts up to 1.4GHz single-core ARM Cortex-A55 which belongs to the highly favorable NXP i.MX 91 family. The board is ready to run Linux OS and supports industrial operating temperature range from -40 to +85 Celsius.

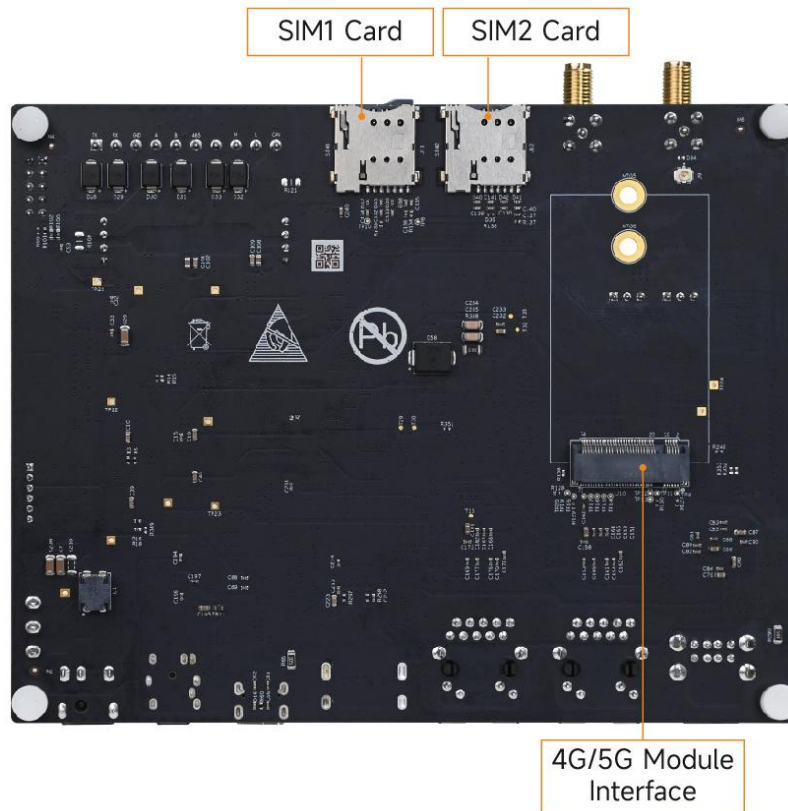
The MYD-LMX91 Development Board is built around the MYC-LMX91 SOM and has explored many features of the NXP i.MX 9131 SoC through the 218-pin LGA expansion interface. It provides a range of advanced connectivity options, including two Gigabit Ethernet, two USB2.0 HOST Type-A, one USB2.0 OTG Type-C, one CAN port, one RS232 port, one RS485 port, one JTAG, one ADC, one Micro SD card slot and one onboard WiFi module, enhancing network and data transfer capabilities. Additionally, it also has advanced multi-media capabilities to support RGB display and audio input and output.

The MYD-LMX91 Development Board is delivered with Quick Start Guide, one USB to TTL serial cable and one 12V/2A power adapter. MYiR also offers [MY-TFT070CV2 7-inch LCD Module](#) as an add-on option for this board.

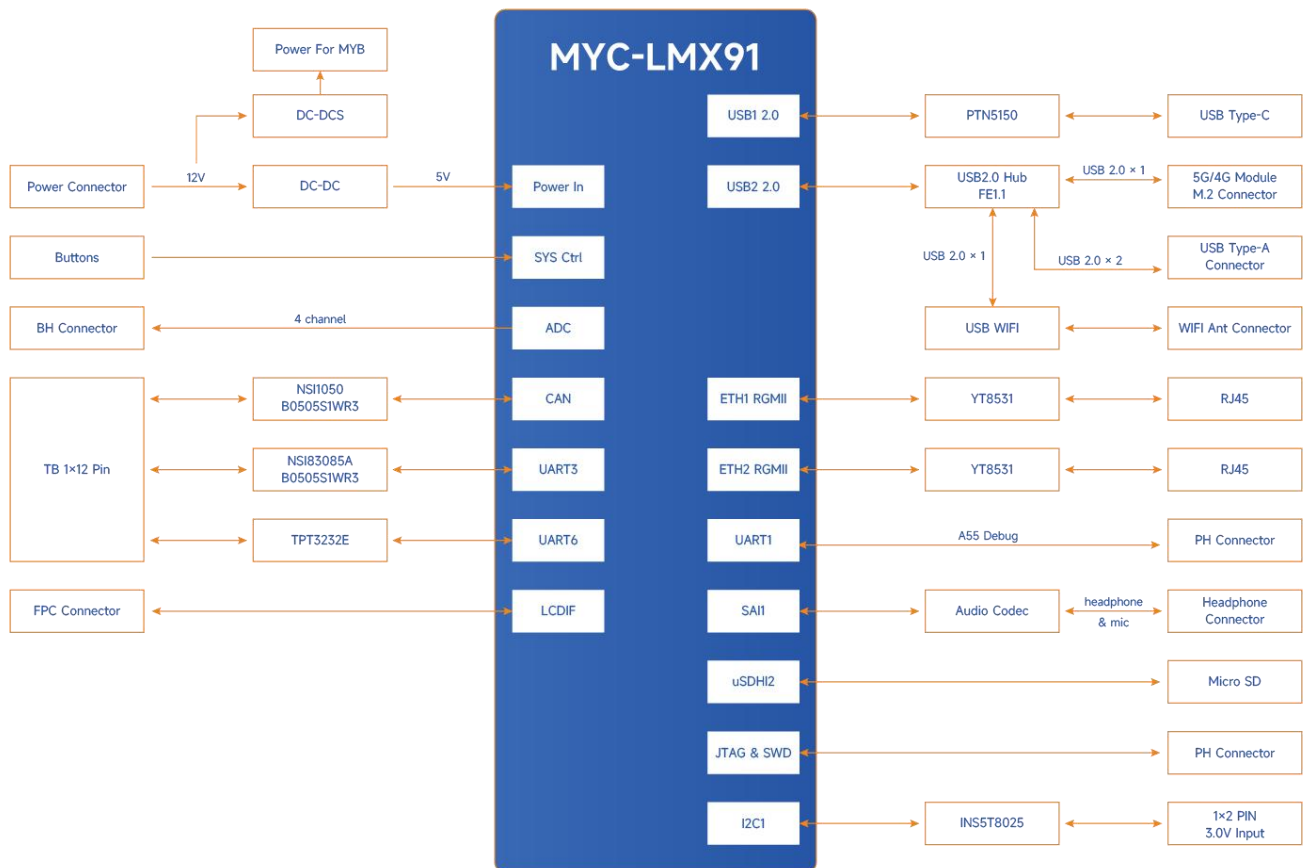
The MYD-LMX91 Development Board is capable of running Linux 6.6.36 Operating System, ensuring a stable and efficient performance. MYiR provides abundant software resources, including kernel and driver source code, as well as detailed documentations and tools that facilitate rapid and easy development for users. These resources provide the necessary support to developers, enabling them to focus on creating innovative and exciting applications.



*MYD-LMX91 Development Board (Top view)*



*MYD-LMX91 Development Board (Bottom view)*



*MYD-LMX91 Function Block Diagram*



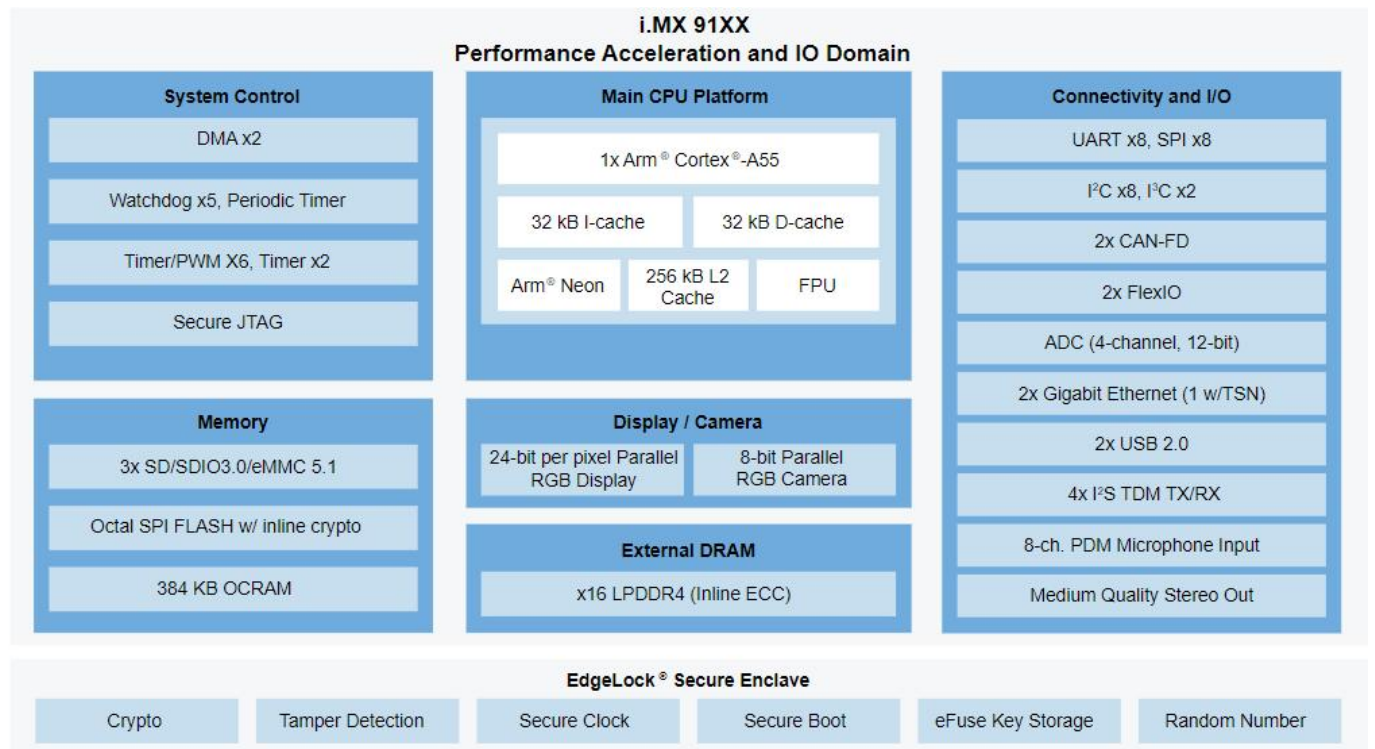


## Hardware Specification

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

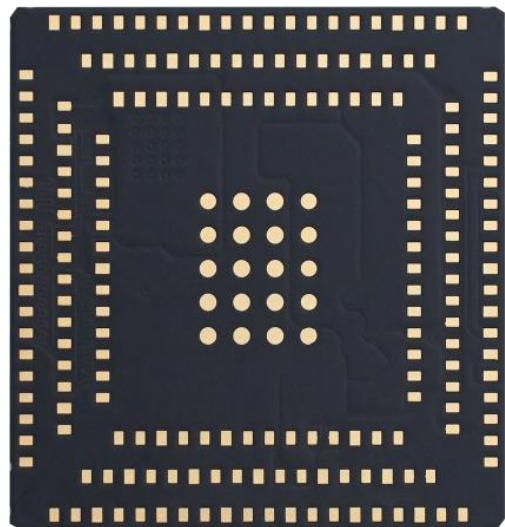


The MYD-LMX91 Development Board is using the MYC-LMX91 SOM as core controller board. It takes full features of NXP i.MX 9131 processor and the main features are characterized as below:

#### **Mechanical Parameters**

- Dimensions: 120mm x 150mm (base board), 37mm x 39mm (SOM)
- PCB Layers: 6-layer design (base board), 10-layer design (SOM)
- Power supply: +12V/2A (base board), +5V/2A (SOM)
- Working temperature: -40~85 Celsius (industrial grade)  
(WiFi Module: -20~70 Celsius)

#### **The MYD-LMX91 Controller Board (MYC-LMX91 SOM)**



*MYC-LMX91 System On Module (Top-view and Bottom-view)*

#### **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

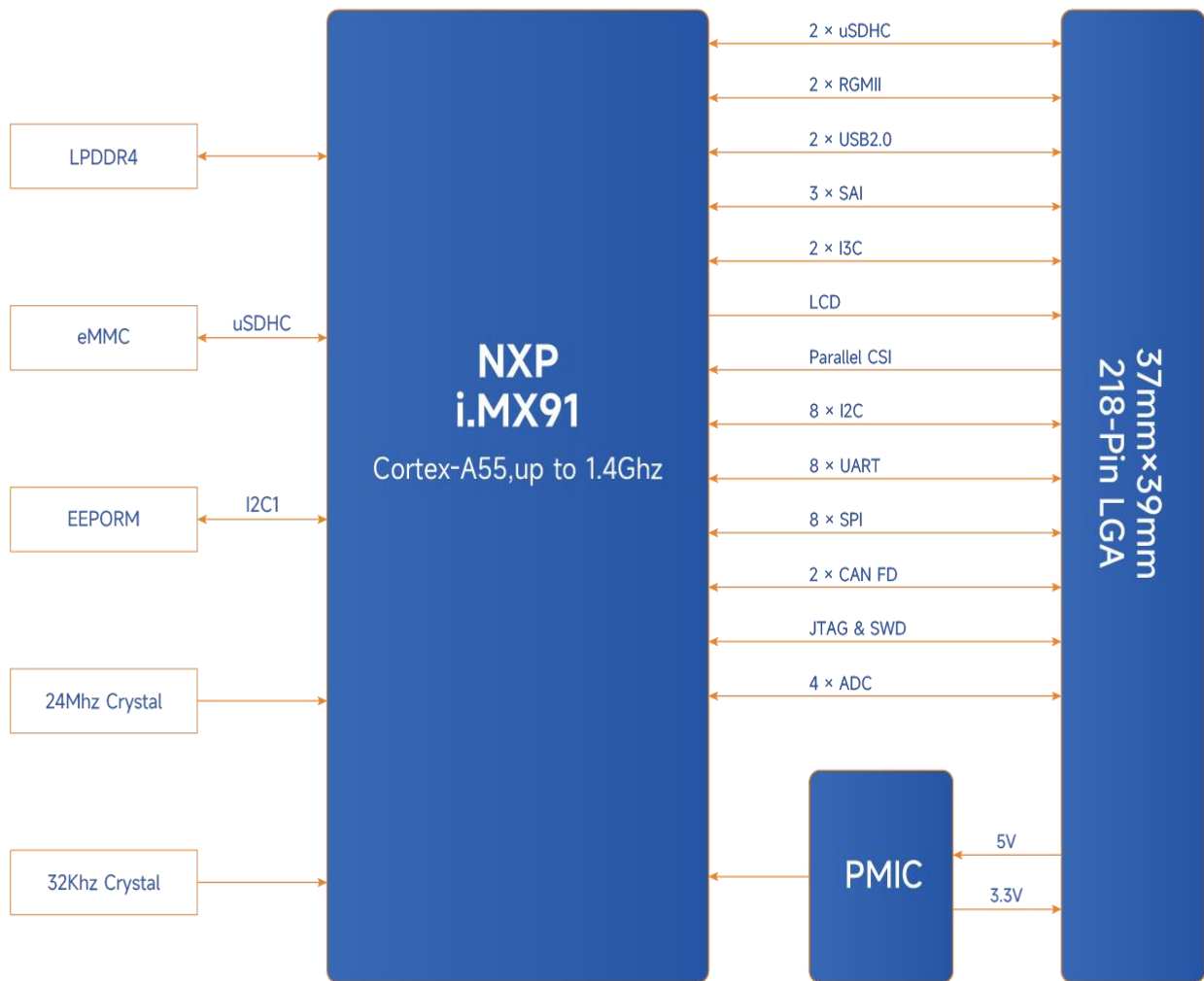
#### **Peripherals and Signals Routed to Pins**

- Power Management IC (PCA9451AHNY)
- 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
- 1x LCD
- 3x SAI

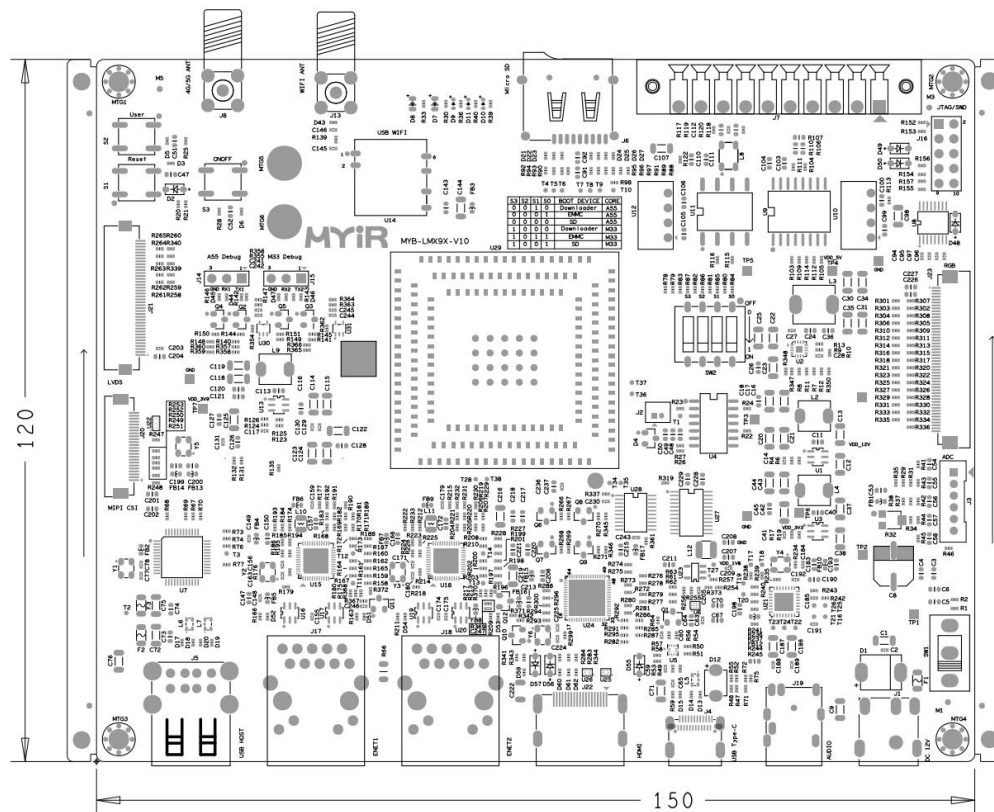
*Note: the peripheral signals brought out to the expansion interface are listed in maximum number. Some signals are reused. Please refer to the processor datasheet and the SOM pinout description file.*



*MYC-LMX91 Function Block Diagram*

## The MYD-LMX91 Development Board Base Board

- 1x Power Jack
- 1x Power Switch
- Serial Ports
  - 1x RS232
  - 1x RS485
  - 2x Debug Interfaces (one for Cortex-A55 core, one for JTAG)
- USB
  - 2x USB2.0 Host ports
  - 1x USB2.0 OTG port
  - 1x M.2 socket for USB based 4G/5G LTE Module
- 2x SIM card slots
- 1x WiFi Module
- 2x external antenna connectors (one for WiFi and one 4G/5G)
- 2x Gigabit Ethernet interfaces
- 1x CAN FD interface
- 1x Micro SD card slot
- 1x ADC
- 1x RGB Interface (J23, 0.5mm pitch 50-pin FPC connector)
- 1x Audio Input and Output Interface
- 3x Buttons (one for Reset, one for User, one for ON/OFF)



MYD-LMX91 Dimensions Chart (Unit: MM)



## Software Features

The MYD-LMX91 development board offers supports for Linux OS and is equipped with comprehensive software packages. To assist clients in speeding up their projects, the kernel and numerous peripheral drivers are provided in source code format. Below is a brief overview of the key software features:

| Item          | Features        | Description                                                    | Source Code |
|---------------|-----------------|----------------------------------------------------------------|-------------|
| Bootloader    | ATF             | First Bootloader Program ATF2.10                               | YES         |
|               | SPL             | Second Bootloader Program SPL                                  | YES         |
|               | U-boot          | Third Bootloader Program uboot_2024.04                         | YES         |
| Linux kernel  | Linux kernel    | Customized base on official kernel_6.6.36 version              | YES         |
| Device driver | 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         |
|               | RGB             | RGB driver                                                     | YES         |
|               | Audio           | SGTL5000 driver                                                | YES         |
|               | 4G/5G           | 4G/5G driver                                                   | YES         |
|               | ADC             | ADC driver                                                     | YES         |
|               | GPIO            | General Purpose GPIO driver                                    | YES         |
|               | UART            | RS232/RS485 driver                                             | YES         |
|               | CAN             | CAN driver                                                     | YES         |
|               | WiFi            | FG6131EUX-00 driver                                            | YES         |
| File system   | myir-image-core | Image built in Yocto without GUI, support for rt-linux         | YES         |
|               | myir-image-full | A fully functional image including QT and hmi built with Yocto | YES         |

MYC-LMX91 Software Features





## Order Information

| Product Item                                                                                                                                                                                                                                                                                                                                                                                                                                                                | Part No.               | Packing List                                                                                                                                                                                                       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| MYD-LMX91<br>Development Board                                                                                                                                                                                                                                                                                                                                                                                                                                              | MYD-LMX9131-8E1D-140-I | <ul style="list-style-type: none"> <li>✓ One MYD-LMX91 Development Board (including MYC-LMX91 SOM)</li> <li>✓ One USB to TTL cable</li> <li>✓ One 12V/2A Power adapter</li> <li>✓ One Quick Start Guide</li> </ul> |
| MYC-LMX91<br>System-On-Module                                                                                                                                                                                                                                                                                                                                                                                                                                               | MYC-LMX9131-8E1D-140-I | <ul style="list-style-type: none"> <li>✓ One MYC-LMX91 SOM</li> </ul>                                                                                                                                              |
| MY-TFT070CV2<br>LCD Module                                                                                                                                                                                                                                                                                                                                                                                                                                                  | MY-TFT070CV2           | <ul style="list-style-type: none"> <li>✓ 7-inch LCD Module with capacitive Touch Screen</li> </ul>                                                                                                                 |
| <p><i>Note:</i></p> <ol style="list-style-type: none"> <li>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.</li> <li>2. Bulk discounts are available. Please contact MYIR for inquiries.</li> <li>3. We accept custom design based on the MYD-LMX91, whether reducing, adding or modifying the existing hardware according to customer's requirement.</li> </ol> |                        |                                                                                                                                                                                                                    |



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