

## FET-MX9352-C SoM

FET-MX9352-C SoM is the world's first system on module designed by Forlinx as a gold partner of NXP based on i.MX 9352 at the processor's alpha phase. It contains two Cortex-A55 cores at speed up to 1.7GHz and one Cortex-M33 co-processor.

8x UART, 2x Ethernet(contains 1 TSN), 2x USB2.0, 2x CAN-FD and other common interfaces.It's more advanced than i.MX6 and i.MX8, integrating NPU engine for deep learning accelerating. It has a compact appearance can fit various applications.

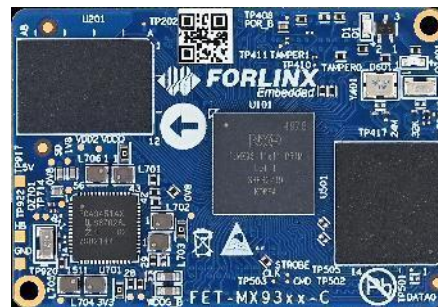
### Features:

- A core+ M core, multi-task processing with real-time control ;
- 0.5 TOPS Ethos U-65 microNPU for light AI applications;
- Dual Gigabit Ethernet with one enabled with TSN;
- One dual-lane MIPI-CSI;
- Various interfaces ready-to-use, excellent integrity of signal and power.;
- Advanced performance and cost efficient

### SoM features :

|                       |                                                                                                                  |
|-----------------------|------------------------------------------------------------------------------------------------------------------|
| <b>CPU</b>            | <b>NXP i.MX9352</b><br><b>MPU:</b> Cortex-A55 @1.5GHz<br><b>MCU:</b> Cortex-M33 @250 MHz<br><b>NPU:</b> 0.5 TOPS |
| <b>RAM</b>            | 1GB LPDDR4                                                                                                       |
| <b>ROM</b>            | 8GB eMMC                                                                                                         |
| <b>Voltage input</b>  | DC 5V                                                                                                            |
| <b>Operating temp</b> | -40~85°C                                                                                                         |
| <b>Package</b>        | Board-to-board connector(2*100-pin, 0.4mm pitch, combined height 1.5mm)                                          |

Note: NPU is not available.



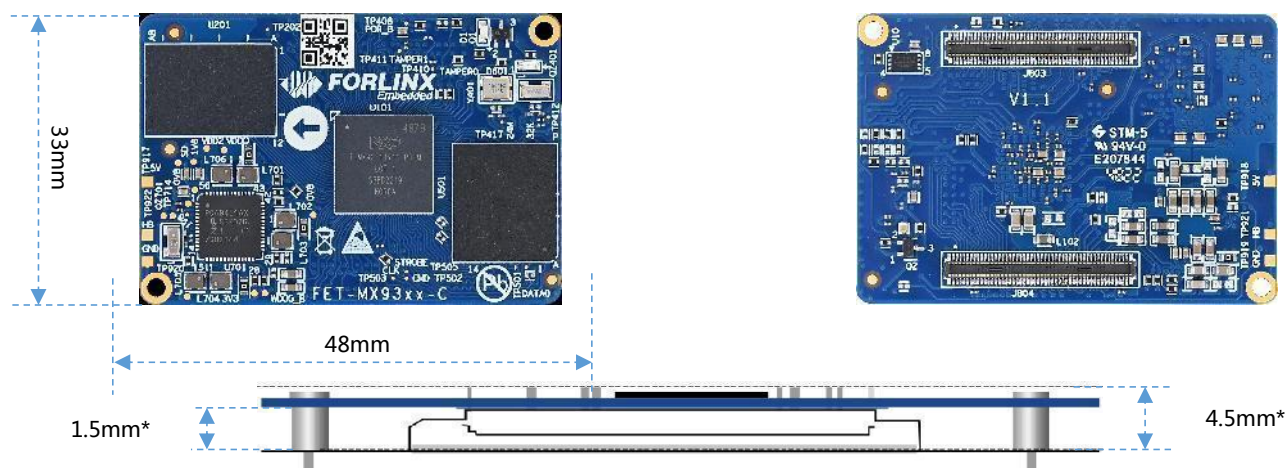
|              |          |                      |
|--------------|----------|----------------------|
| 2×A55+1×M33  | 1.5GHz   | 0.5 TOPS             |
| Architecture | Clock    | NPU                  |
| CAN-FD       | TSN      | -40~85°C             |
| 2            | Ethernet | Operating temp width |

## ■ SoM features:

| Interface    | QTY | Spec.                                                                                                                                                                                                                                                                                                  |
|--------------|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| LCD          | 1   | Parallel RGB888, up to 1366×768p60 or 1280×800p60                                                                                                                                                                                                                                                      |
| LVDS         | 1   | Single 4-lane supports 720p60, up to 1366×768p60 or 1280×800p60                                                                                                                                                                                                                                        |
| MIPI-DSI     | 1   | 1x 4-lane MIPI DSI<br>Compatible with MIPI-DSI V1.2 and MIPI D-HPY V1.2<br>Pixel clock up to 200MHz, and pixel filling rate 140 MP/s, 24-bit<br>Supports resolution of 1080p60 or 1920x 1200p60, each lane up to 1.5GHz                                                                                |
| Ethernet     | ≤2  | 2x RGMII with one supports TSN;<br>Ethernet with TSN supports QoS, supports 802.1Qbv and 802.1Qbu<br>Transmission rate 10/100/1000 Mbps, complies with IEEE 802.3                                                                                                                                      |
| UART         | ≤8  | Baud rate up to 5Mbps                                                                                                                                                                                                                                                                                  |
| CAN-FD       | ≤2  | Supports CAN-FD and CAN 2.0B                                                                                                                                                                                                                                                                           |
| USB          | ≤2  | Two USB2.0 controllers integrated with PHY                                                                                                                                                                                                                                                             |
| SD card slot | ≤1  | Complies with SD3.0;<br>Supports SDR up to 200MHz and DDR up to 50MHz                                                                                                                                                                                                                                  |
| SDIO         | ≤1  | Complies with SDIO3.0                                                                                                                                                                                                                                                                                  |
| SAI          | ≤3  | SAI1 supports 2 lanes, SAI2 supports 4 lanes, and SAI3 supports 1 lane;<br>Full-duplex serial supports frame synchronization, such as I2S, AC97, TDM and codec/ DSP                                                                                                                                    |
| SPDIF        | 1   | Supports original capturing mode;<br>Supports L-PCM and IEC61937 forms                                                                                                                                                                                                                                 |
| PDM          | 1   | 24-bit, supports linear phase response and AOP MIC                                                                                                                                                                                                                                                     |
| MIPI-CSI     | 1   | Compiles both MIPI CSI-2 V1.3 and MIPI D-PHY V1.2;<br>Supports up to 2 RX data lanes (and 1 RX clock lane)<br>Pixel clock up to 200MHz, pixel filling rate up to 150MP/s under rated voltage and over speed voltage;<br>80Mbps~1.5 Gbps under high-speed mode, and 10Mbps rating under low power mode; |
| SPI          | ≤8  | Supports to configure master and slave modes                                                                                                                                                                                                                                                           |
| I2C          | ≤8  | Rating up to 100Kbit/s in standard mode, and 400Kbit/s in fast-speed mode, 1000Kbit/ s in enhanced fast-speed mode, 3400Kbit/s in high-speed mode, and 5000Kbit/s in super fast speed mode.                                                                                                            |
| I3C          | ≤2  | Supports 400Kbit/s fast speed mode and 1000Kbit/s enhanced fast speed mode, backward compatible with I2C.                                                                                                                                                                                              |
| ADC          | ≤4  | One 12-bit 4-lane 1MS/s ADC                                                                                                                                                                                                                                                                            |
| JTAG         | 1   | For M33 core debugging                                                                                                                                                                                                                                                                                 |



## Exterior and dimensions:



Height diagram after installation

tolerance  $\pm 0.2\text{mm}$ 

## OS:

|                       |                                                                                |
|-----------------------|--------------------------------------------------------------------------------|
| OS version            | Linux 5.15.52+Qt 6.3.2                                                         |
| Firmware installation | <ul style="list-style-type: none"> <li>• TF card</li> <li>• USB OTG</li> </ul> |

### Driver list:

| Linux5.10 | Interface  | Function         | Chipset                                          |
|-----------|------------|------------------|--------------------------------------------------|
|           | RGMII      | Gigabit Ethernet | RTL8211FSI-CG                                    |
|           | USB        | WiFi/ BT         | BL-M8723DU1                                      |
|           | USB        | 4G modem         | EC25/EC20                                        |
|           | USB        | Serial/ RS485    | XR21V1414IM48                                    |
|           | USB        | UVC camera       | /                                                |
|           | I2C        | RTC              | RTC8010/PCF8563                                  |
|           | MIPI-CSI   | camera           | OV5645                                           |
|           | SAI        | Sound card       | NAU88C22YG                                       |
|           | MIPI-DSI   | 7'' MIPI-DSI     | FIT-LCD7.0 V2.1MIPI with resolution of 1024x 600 |
|           | LVDS       | 10.1'' display   | 1280x 800                                        |
|           | LCD-RGB888 | 7'' LCD          | FIT-LCD7.0V2.1 with resolution of 1024x 600      |
|           | SD card    | TF card          | General purpose                                  |
|           | CAN/CAN-FD | General purpose  | General purpose                                  |
|           | GPIO       | /                | General purpose                                  |
|           | ADC        | 1                | General purpose                                  |
|           | PWM        | LCD backlight    | /                                                |

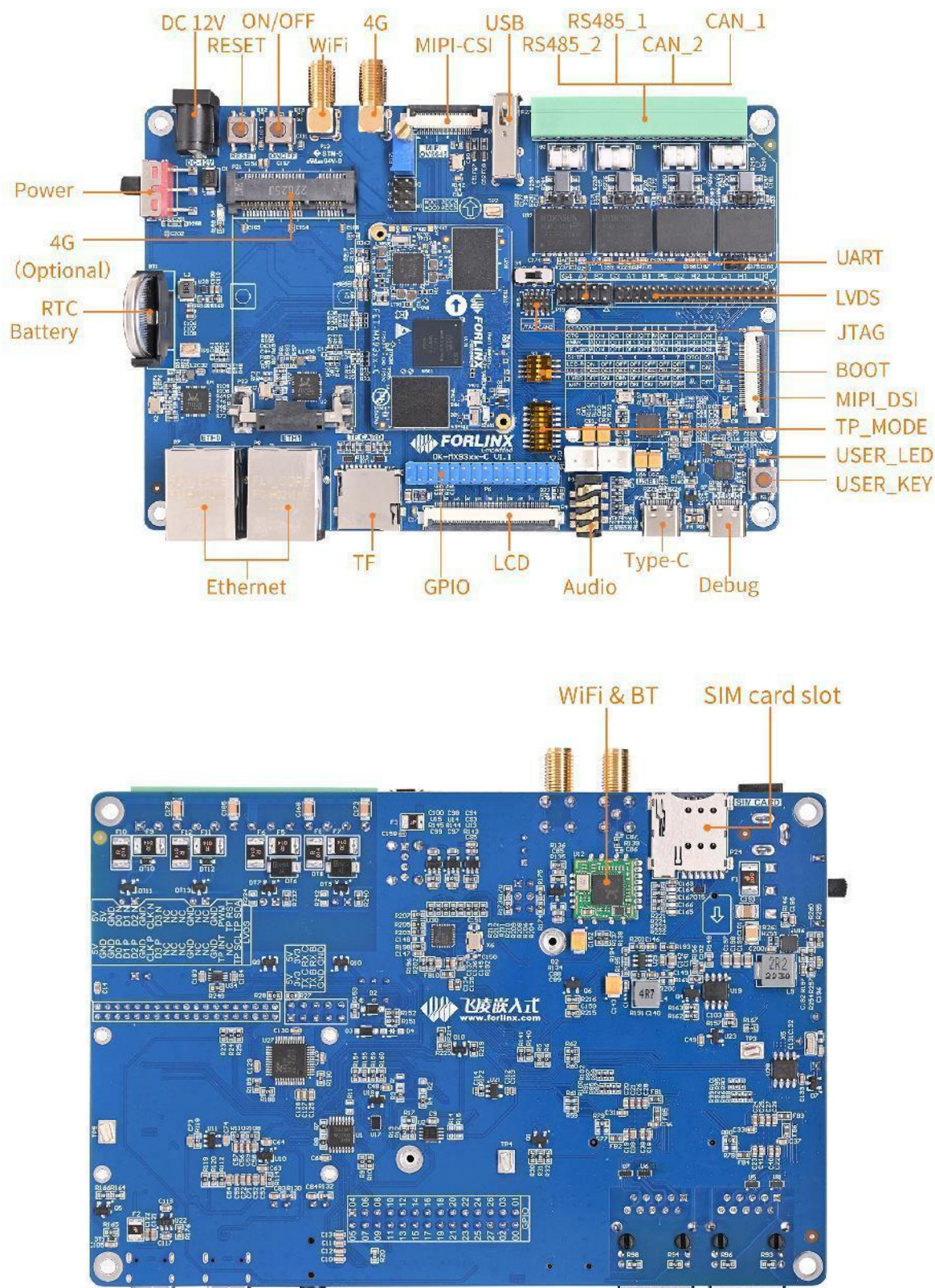
## Provided technical files

|              |                                                                                                                                                    |
|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| Linux5.15.52 | User manual, compiling guideline, kernel source code, file system, OS image, VM ubuntu image, SD card tool, USB OTG tool, QT demos and source code |
| Hardware     | User manual, carrier board schematic, carrier board PCB(AD), datasheet, carrier board and SoM DXF files, pinmux sheet                              |

## Order options:

| Model                     | Core number | CPU speed  | RAM | Flash | Working temp | Phase     |
|---------------------------|-------------|------------|-----|-------|--------------|-----------|
| FET-MX9352-C+151GSE8GIB11 | 2x A55      | A55@1.5GHz | 1GB | 8GB   | -40~85℃      | sampling  |
| FET-MX9352-C+171GSE8GCxxx | 2x A55      | A55@1.7GHz | 1GB | 8GB   | 0~70℃        | scheduled |
| FET-MX9331-C+151GSE8GIxxx | 1x A55      | A55@1.5GHz | 1GB | 8GB   | -40~85℃      | scheduled |

## Development board/ kit



## Carrier board features

| Peripheral   | QTY | Spec.                                                                                                                                                   |
|--------------|-----|---------------------------------------------------------------------------------------------------------------------------------------------------------|
| LCD          | 1   | RGB888 24-bit, up to 1366×768p60 or 1280×800p60                                                                                                         |
| LVDS         | 1   | single 8-bit, up to 1366×768p60 or 1280×800p60                                                                                                          |
| MIPI-DSI     | 1   | 4 lanes, up to 1920×1200p60                                                                                                                             |
| TF card slot | 1   | For OS image flashing, complies with SD card 3.0 protocol                                                                                               |
| 4G modem     | 1   | Mini-PCIE slot, available for EC20 module with external antenna                                                                                         |
| Ethernet     | 2   | 2x 10M/100M/1000M RJ45 connector, ENET1/ETH1 supports TSN                                                                                               |
| GPIO         | 28  | dual-row pin headers, multiplexed with LCD                                                                                                              |
| ADC          | 4   | 12-bit ADC with sampling rate 1MS/s                                                                                                                     |
| CAN-FD       | 2   | with static, surge and pulse protection circuits level 4, and Galvanic isolation complies with CAN2.0B                                                  |
| RS485        | 2   | with static, surge and pulse protection circuits level 4, and Galvanic isolation with automatic transceiving control                                    |
| USB2.0       | 2   | USB1 by TYPE-C, can be used for OS image flashing;<br>USB2 is expanded from HUB, circuited to 4G, WiFi /BT, USB to 4 serial, and USB-A female connector |
| UART         | 2   | 3.3V TTL, by pin headers with pitch of 2.54mm                                                                                                           |
| WiFi& BT     | 1   | on-board BL-M8723DU, 2.4GWiFi, Bluetooth 2.1/4.2                                                                                                        |
| RTC          | 1   | on-board RTC battery holder, for real-time updating                                                                                                     |
| Audio        | 1   | 1 four-part phone jack with dual-channel HP and MIC and 2 speaker jacks.                                                                                |
| Camera       | 1   | MIPI-CSI, fits OV5645 module                                                                                                                            |
| KEY          | 3   | reset, power on/ off and user key                                                                                                                       |
| LED          | 1   | user defined                                                                                                                                            |
| GPIO         | 9   | 9xGPIO(3.3V), 5V, 3.3V and 1.8V power by pin headers with pitch of 2.54mm                                                                               |
| Debug        | 1   | serial converted to USB for debug, TYPE-C connector                                                                                                     |
| JTAG         | 1   | 10-pin(2×5) headers with pitch of 2.0mm                                                                                                                 |