



ORIENT DISPLAY
MAKE THINGS POSSIBLE

**SPECIFICATION
FOR
IoT MODULE
MODULE NO: AMV-MX8MA0
REVISION NO: 0**

Customer's Approval:

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| |
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| | SIGNATURE | DATE |
|---------------------------|-----------|------|
| PREPARED BY (RD ENGINEER) | | |
| CHECKED BY | | |
| APPROVED BY | | |

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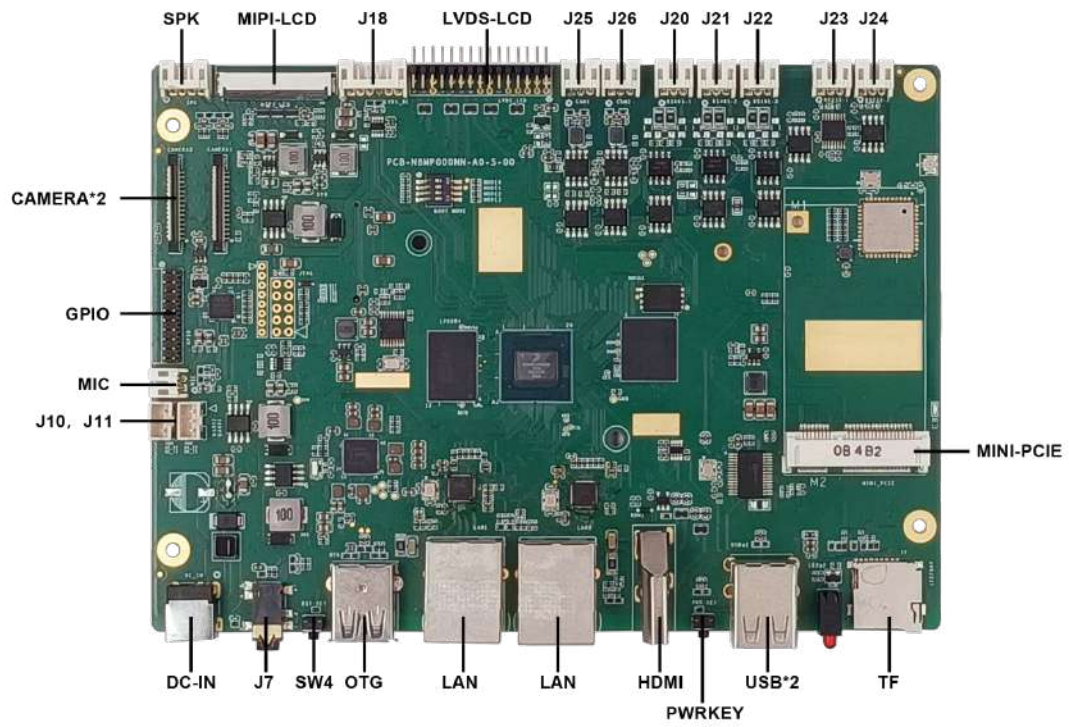
1.MODULE DESCRIPTION

AMV-MX8MA0 motherboard uses the i.MX 8M Plus chip, The i.MX 8M Plus family focuses on neural processing unit (NPU) and vision system, advance multimedia, and industrial automation with high reliability. The i.MX 8M Plus is a powerful quad Arm® Cortex®-A53 processor with speed up to 1.8 GHz integrated with a NPU of 2.3 TOPS that greatly accelerate machine learning inference. The vision engine is composed of two camera inputs and a HDR-capable Image Signal Processor (ISP) capable of 375 MPixels/s. The advanced multimedia capabilities include 1080p60 video encode and decode H.265 and H.264. A 3D and 2D graphic acceleration supporting 1 GPixel/s, OpenVG 1.1, Open GL ES3.1, Vulkan, and Open CL 1.2 FP. Multiple audio and microphone interfaces for Immersive Audio and Voice systems. For industrial applications, real time control is enabled by an integrated 800 MHz Arm® Cortex®-M7. Robust control networks are possible via CAN-FD interfaces. And a dual Gb Ethernet, one supporting Time Sensitive Networking (TSN), drive gateway applications with low latency. High industrial system reliability for safety is leveraged by DRAM Inline ECC as well as ECC support on internal software-accessible SRAMs.

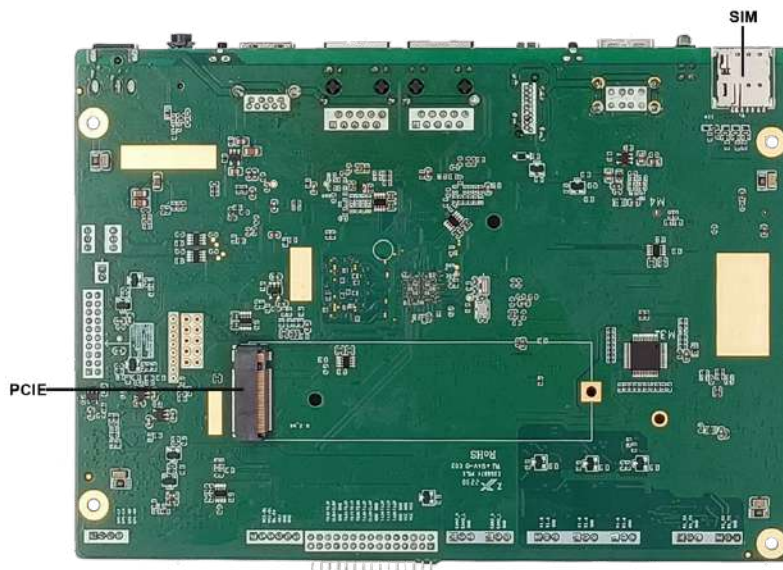
2.GENERAL INFORMATION

| Product Introduce | |
|--------------------------|--|
| System | |
| CPU | Quad Arm® Cortex®-A53 processor with speed up to 1.8 GHz Single-core general purpose CORTEX-M4 up to 400MHz |
| Store | 2GB+16GB |
| Display interface | HDMI*1 MIPI*1 (support 1080P , Reuse with LVDS) LVDS*1(support 1920*1200 , dual 8-bit) |
| Network interface | WIFI (Optional) MiniPCIE 4G (Optional) LAN*2 (1000M) |
| Camera | MIPI*2 |
| Communication interface | USB2.0*2、TF、SIM、RS232*2、RS485*3、CAN*2、UART*2 |
| Audio interface | MIC、SPK(4Ω/3.2W*2) |
| Module Power Supply | 8-36V DC |
| Module Power Consumption | TBD |
| System upgrade | Support local USB upgrade |
| OSD Language | Multilingualism |
| Module Size | 120.32*167.49*1.60mm |
| Weight | TBD |


3. INTERFACE DESCRIPTION



Positive



Backside


DC_IN: 9-24V DC 

J7: Audio 3.5mm POLE interface 


SW4: RST-KEY 

OTG: 

LAN*2: 

HDMI: 

SW2: PWR-KEY 

USB*2: 

TF: 

J23、J24: RS232 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|--------|---------|--------|
| 1 | COM_RX | 3 | GND |
| 2 | COM_TX | / | / |

J20、J21、J22: RS485 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|---------|---------|--------|
| 1 | RS485_B | 3 | GND |
| 2 | RS485_A | / | / |

J25、J26: CAN 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|--------|---------|--------|
| 1 | CAN_H | 3 | GND |
| 2 | CAN_L | / | / |

LVDS_LCD: 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|-------------|---------|-------------|
| 1 | VCC_LVDS | 16 | LVDS0_CLK_P |
| 2 | VCC_LVDS | 17 | LVDS0_TX3_N |
| 3 | VCC_LVDS | 18 | LVDS0_TX3_P |
| 4 | GND | 19 | LVDS1_TX0_N |
| 5 | GND | 20 | LVDS1_TX0_P |
| 6 | GND | 21 | LVDS1_TX1_N |
| 7 | LVDS0_TX0_N | 22 | LVDS1_TX1_P |
| 8 | LVDS0_TX0_P | 23 | LVDS1_TX2_N |
| 9 | LVDS0_TX1_N | 24 | LVDS1_TX2_P |
| 10 | LVDS0_TX1_P | 25 | GND |
| 11 | LVDS0_TX2_N | 26 | GND |
| 12 | LVDS0_TX2_P | 27 | LVDS1_CLK_N |
| 13 | GND | 28 | LVDS1_CLK_P |
| 14 | GND | 29 | LVDS1_TX3_N |
| 15 | LVDS0_CLK_N | 30 | LVDS1_TX3_P |

J18: LVDS BL 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|-------------|---------|----------|
| 1 | VCC_BL_LVDS | 4 | LVDS_PWM |
| 2 | VCC_BL_LVDS | 5 | GND |
| 3 | LVDS_BL_EN | 6 | GND |

MIPI_LCD: 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|---------|---------|-----------|
| 1 | LEDK | 21 | GND |
| 2 | LEDK | 22 | MIPI_D2N |
| 3 | LEDA | 23 | MIPI_D2P |
| 4 | LEDA | 24 | GND |
| 5 | / | 25 | MIPI_D3N |
| 6 | UPDN | 26 | MIPI_D3P |
| 7 | SHLR | 27 | GND |
| 8 | RST | 28 | / |
| 9 | STBYB | 29 | / |
| 10 | VDD_3V3 | 30 | IOVCC_1V8 |

| | | | |
|----|-----------|----|-------------|
| 11 | / | 31 | / |
| 12 | GND | 32 | / |
| 13 | MIPI_D0N | 33 | BL_EN / NC |
| 14 | MIPI_D0P | 34 | BL_PWM / NC |
| 15 | GND | 35 | / |
| 16 | MIPI_D1N | 36 | / |
| 17 | MIPI_D1P | 37 | / |
| 18 | GND | 38 | / |
| 19 | MIPI_CLKN | 39 | / |
| 20 | MIPI_CLKP | 40 | / |

SPK: 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|----------|---------|----------|
| 1 | SPKOUTLP | 3 | SPKOUTRP |
| 2 | SPKOUTLN | 4 | SPKOUTRN |

CAMERA*2: 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|----------------------|---------|-----------|
| 1 | DOVDD18 | 16 | MIPI_D3+ |
| 2 | AF_28 | 17 | MIPI_D3- |
| 3 | DVCC12 | 18 | GND |
| 4 | DOVDD18 | 19 | MIPI_D2+ |
| 5 | / | 20 | MIPI_D2- |
| 6 | GND | 21 | GND |
| 7 | AVDD_2.8V | 22 | MIPI_D1+ |
| 8 | GND | 23 | MIPI_D1- |
| 9 | I ² C_SDA | 24 | GND |
| 10 | I ² C_SDL | 25 | MIPI_CLK+ |
| 11 | RST | 26 | MIPI_CLK- |
| 12 | PWDN | 27 | GND |
| 13 | GND | 28 | MIPI_D0+ |
| 14 | MCLK | 29 | MIPI_D0- |
| 15 | GND | 30 | GND |

GPIO: 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|-------------|---------|---------------------------|
| 1 | VCC 5V | 11 | ECSPI2_MISO |
| 2 | VCC 5V | 12 | SAI5_RXD1 |
| 3 | / | 13 | ECSPI2_SCLK |
| 4 | / | 14 | SAI5_RXD0 |
| 5 | GND | 15 | GND |
| 6 | GND | 16 | SAI5_RXD2 |
| 7 | ECSPI2_SS0 | 17 | I ² C2_SDA_3V3 |
| 8 | SAI5_RXFS | 18 | SAI1_RXFS |
| 9 | ECSPI2_MOSI | 19 | I ² C2_SCL_3V3 |
| 10 | SAI5_RXC | 20 | SAI1_RXC |

MIC: 

| Pin No. | Symbol | Pin No. | Symbol |
|---------|----------|---------|----------|
| 1 | MIC_IN2P | 2 | MIC_IN2N |

J10、J11: UART 

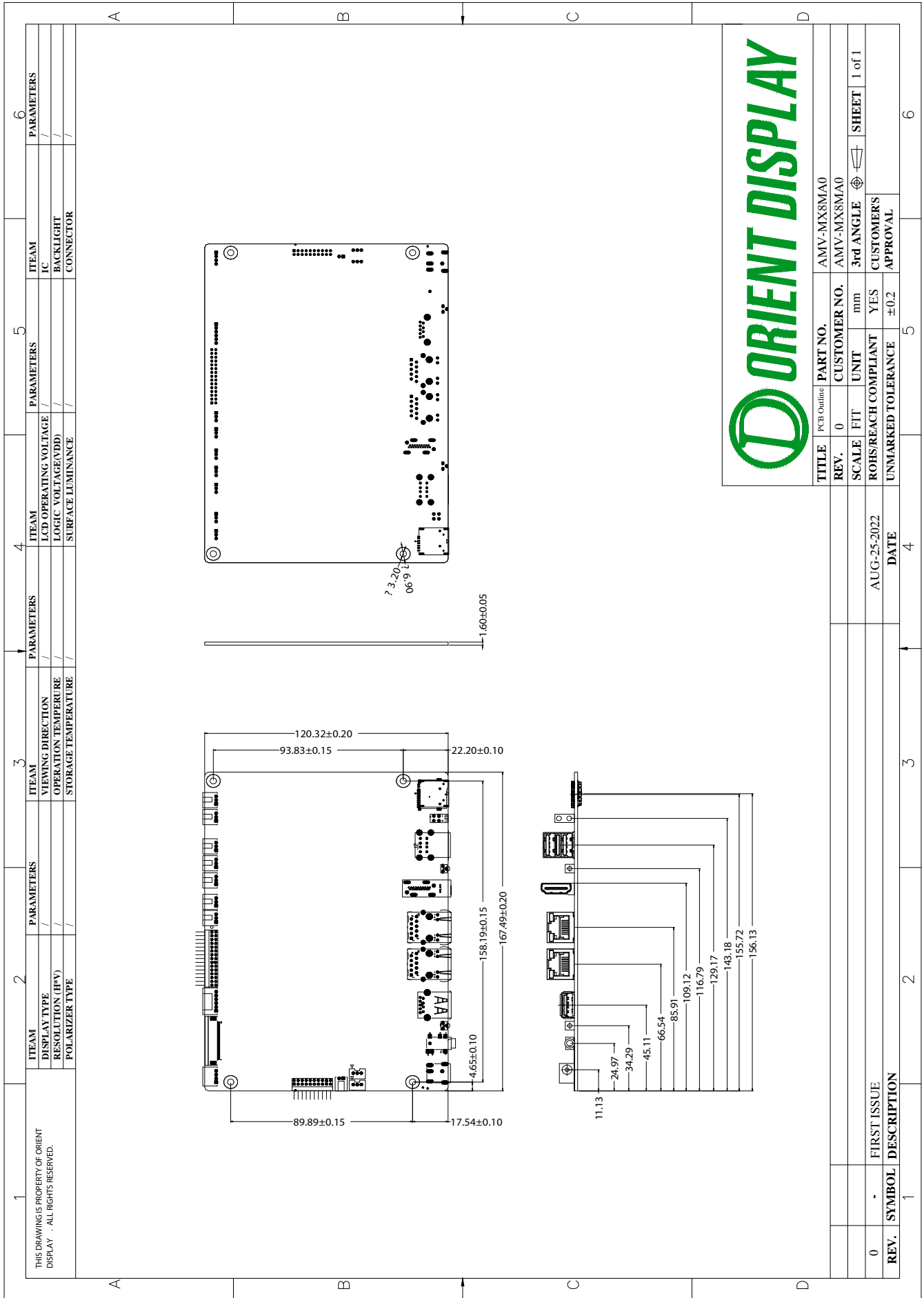
| Pin No. | Symbol | Pin No. | Symbol |
|---------|---------|---------|---------|
| 1 | GND | 3 | UART_TX |
| 2 | UART_RX | / | / |

MINI_PCIE: M2 interface 

M.2_MK: M.2 NGFF Socket M Key interface 

SIM: 

4. MOUDLE EXTERNAL DIMENSIONS



5.ABSOLUTE MAXIMUM RATINGS

| Item | Symbol | Min. | Max. | Unit |
|------------------------------------|--------|------|------|------|
| Power Supply Input Voltage(Module) | VDD | 8.0 | 36.0 | V |
| Operation Temperature | Top | -10 | +60 | °C |
| Storage Temperature | Tst | -20 | +70 | °C |
| Humidity | RH | - | 90% | %RH |

6.RELIABILITY TEST CONDITIONS

| No. | Test Item | Test condition | Inspection after test | | | | | | | | | |
|---------|-------------------------------------|---|---|--------------------|-----------------|-----|--------|---------|--------|---------|--------|---------|
| 1 | High Temperature Storage Test | +70°C/72 hours | Inspection after 2~4 hours storage at room temperature, the sample shall be free from defects : 1.Current changing value before test and after test is 50% larger; 2. Function defect : Non-display, abnormal-display 3.Visual defect : Glass crack. | | | | | | | | | |
| 2 | Low Temperature Storage Test | -20°C/72 hours | | | | | | | | | | |
| 3 | High Temperature Operating Test | +60°C/48 hours | | | | | | | | | | |
| 4 | Low Temperature Operating Test | -10°C/48 hours | | | | | | | | | | |
| 5 | Temperature Cycle Storage Test | -20°C ~ 25°C ~ +70°C/10 cycles (30 min.) (10 min.) (30 min.) | | | | | | | | | | |
| 6 | High Temperature High Humidity Test | +40°C*90% RH/48 hours | | | | | | | | | | |
| 7 | Vibration Test | Frequency : 250 r/min Amplitude : 1 inch Time: 45 min | | | | | | | | | | |
| 8 | Drop Test | Drop direction: 1 corner/3 edges/6 sides ,10 times | | | | | | | | | | |
| | | <table border="1"> <thead> <tr> <th>Packing weight(kg)</th> <th>Drop height(cm)</th> </tr> </thead> <tbody> <tr> <td><11</td> <td>80±1.6</td> </tr> <tr> <td>11≤G<21</td> <td>60±1.2</td> </tr> <tr> <td>21≤G<31</td> <td>50±1.0</td> </tr> <tr> <td>31≤G<40</td> <td>40±0.8</td> </tr> </tbody> </table> | | Packing weight(kg) | Drop height(cm) | <11 | 80±1.6 | 11≤G<21 | 60±1.2 | 21≤G<31 | 50±1.0 | 31≤G<40 |
| | | Packing weight(kg) | Drop height(cm) | | | | | | | | | |
| | | <11 | 80±1.6 | | | | | | | | | |
| | | 11≤G<21 | 60±1.2 | | | | | | | | | |
| 21≤G<31 | 50±1.0 | | | | | | | | | | | |
| 31≤G<40 | 40±0.8 | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| | | | | | | | | | | | | |
| 9 | ESD Test | Air discharge: ±8 KV, 10 times Contact discharge: ±4 KV, 10 times | | | | | | | | | | |

Remark :

- 1.The tested samples should be applied to only one test item.
- 2.Sample size for each test item is 3~5 pcs.
- 3.For High temperature high humidity test, Pure water(Resistance>10MΩ) should be used.
- 4.In case of malfunction defect caused by ESD damage, if it would be recovered to normal state after resetting, it would be judged as a good part.
- 5.Failure judgement criterion: Basic specification, Electrical characteristic, Mechanical characteristic, Optical characteristic.

7.REMARK:

- Avoid any inappropriate external force or strong vibration in the assembly process.
- High temperature, high humidity or rapid temperature changes may affect performance. Store and use the product in an appropriate environment.
- Avoid dust, oil mist, acid, alkali and chloride damage to the product.
- Wear wrist straps, antistatic gloves and clothes during assembly to prevent electrostatic discharge (ESD).
- When assembling, use ionic fan to prevent electrostatic discharge (ESD).
- Follow the correct time sequence when operating.
- Turn off the power when connecting or disconnecting the circuit.