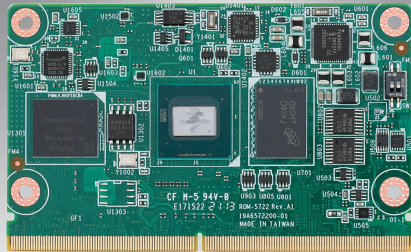


# AOM-5521

## NXP i.MX95 Cortex®-A55 AI-on-Module Nano

Preliminary



### Features

- NXP Arm® Cortex®-A55 i.MX95 Six Cores up to 2.0 GHz
- 1 x Arm Cortex-M7 core & 1 x Cortex-M33 core
- Onboard LPDDR5 8 GB, 6400MT/s memory
- 1 x 10 Gigabit Ethernet, 2 x Gigabit LAN
- 1 x 4 lane MIPI-DSI, 1 x Dual channel LVDS
- 1 x USB3.2 Gen1By1, 4 x USB2.0, 1 x USB 2.0 OTG, 4 x UART, 5 x I2C, 14 x GPIO, 2 x PCIe3.0, 2 x CAN-FD
- Neural network accelerator built-in
- Supports Yocto Linux



### Introduction

The Advantech AOM-5521 stands as a state-of-the-art AI-on-Module, incorporating the robust NXP i.MX95 System-on-Chip (SOC). This SOC features an impressive configuration, with up to six Arm Cortex-A55 cores, accompanied by a dedicated Cortex-M7 and M33 real-time processor, and an added Neural Network accelerator. The AOM-5521 provides extensive connectivity options, including USB 2.0, USB 3.2 Gen1By1, 10 Gigabit Ethernet, MIPI-CSI, PCI Express, as well as both a dual-channel LVDS and a 4-lane MIPI-DSI Display interface. These remarkable features position the AOM-5521 as an exceptional choice for a wide variety of embedded applications.

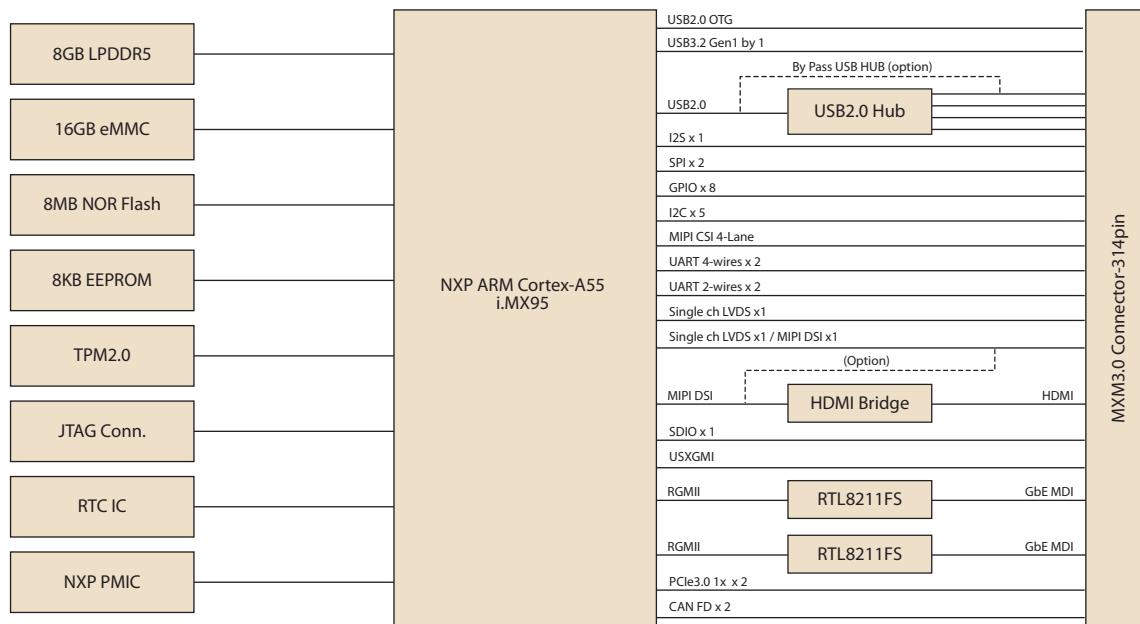
AOM-5521 is paired with Advantech SOM-DB2510 carrier board for faster end product peripheral integration and time-to-market. The reference schematics and layout checklists documentations for carrier board development will be provided along with the open-sourced Linux BSP, test utilities, hardware design utilities and reference drivers.



### Specifications

|                  |                       |  |                  |
|------------------|-----------------------|--|------------------|
| Form Factor      |                       | AOM Nano   |                  |
| Processor System | CPU                   | NXP i.MX95 Cortex-A55 Six core (up to 2.0GHz)  |                  |
|                  | MCU                   | 1 x Arm Cortex-M7 core & 1 x Cortex-M33 core   |                  |
| Memory           | Technology            | LPDDR5 6400MT/s  |                  |
|                  | Capacity              | On-board 8GB LPDDR5  |                  |
|                  | Flash                 | 16 GB eMMC NAND Flash for O.S. and 8 MB QSPI NOR Flash for board information                             |                  |
| NPU              | NPU                   | Neural Network accelerator   |                  |
| Graphics         | LVDS/MIPI DSI         | 1 x 4 lane MIPI-DSI (Optional)<br>1 x Dual channel LVDS  |                  |
|                  | HDMI                  | 1 x HDMI (Optional)  |                  |
|                  | Parallel RGB          | -  |                  |
|                  | VGA                   | -  |                  |
|                  | Graphics Engine       | 2D/3D Graphic Acceleration supporting 1G Pixel/s, OpenVG 1.1, Open GL ES3.1, Vulkan, and Open CL 1.2 FP. |                  |
|                  | H/W Video Codec       | Decoder: H.265, H.264, 4Kp30<br>Encoder: H.265, H.264, 4Kp30   |                  |
| Ethernet         | Chipset               | 1 x NXP i.MX95 integrated USXGMII, 2 x NXP i.MX95 integrated RGMII                                       |                  |
|                  | Speed                 | 1 x 10 GbE, 2 x 10/100/1000 Mbps   |                  |
| RTC              | RTC                   | Yes  |                  |
| Debug port       |                       | JTAG   |                  |
| WatchDog Timer   |                       | Yes (1-6553s, power on/off 4s)   |                  |
| Security         |                       | TPM 2.0  |                  |
| I/O              | PCIe                  | 2 x PCIe 3.0   |                  |
|                  | SATA                  | -  |                  |
|                  | USB                   |  | 1 USB3.2 Gen1By1 |
|                  |                       |  | 4 USB 2.0        |
|                  |                       |  | 1 USB 2.0 OTG    |
|                  | Audio                 | 2 x I²S  |                  |
|                  | SPDIF                 | -  |                  |
|                  | SDIO                  | 1  |                  |
|                  | Serial Port           | 2 x 4-wire UART and 2 x 2-wire UART  |                  |
|                  | SPI                   | 2  |                  |
|                  | CAN                   | 2 x CAN-FD   |                  |
|                  | GPIO                  | 14   |                  |
|                  | I²C                   | 5  |                  |
|                  | Camera Input          | 1 x 4-lane MIPI CSI  |                  |
|                  | System Bus            | -  |                  |
| Touch            | -                     |  |                  |
| Keypad           | -                     |  |                  |
| Power            | Power Supply Voltage  | Fixed 5V DC source   |                  |
|                  | Power Consumption     | TBD  |                  |
| Environment      | Operating Temperature | 0 ~ 60 °C/ -40 ~ 85 °C   |                  |
|                  | Operating Humidity    | 95% relative humidity, non-condensing  |                  |
| Mechanical       | Dimensions (W x D)    | 82 x 50 mm   |                  |
| Operation System |                       | Yocto Linux  |                  |
| Certifications   |                       | CE/FCC Class B   |                  |

## Block Diagram



## Ordering Information

| Part No.          | CPU               | Memory | Flash Memory | UART | 10 GbE | GbE | USB3.2 Gen1By1 | USB 2.0 | Display             | I2S | I2C | SPI | Operating Temperature |
|-------------------|-------------------|--------|--------------|------|--------|-----|----------------|---------|---------------------|-----|-----|-----|-----------------------|
| AOM-5521WTXX-XXXX | i.MX95 Hexa-cores | 8GB    | 16GB         | 4    | 1      | 2   | 1              | 5       | 1 x MIPI DSI (Opt.) | 2   | 5   | 3   | -40 ~ 85 °C           |
| AOM-5521CTXX-XXXX | i.MX95 Hexa-cores | 8GB    | 16GB         | 4    | 1      | 2   | 1              | 5       | 1 x Dual ch LVDS    | 2   | 5   | 3   | 0 ~ 60 °C             |

\* DRAM and eMMC of other capacity are available through project-based support. Please contact sales for details.

## Development Board

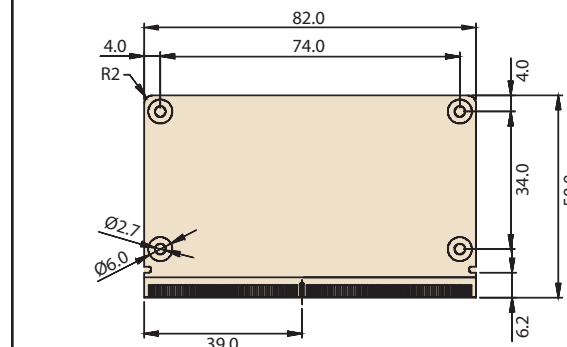
| Part No.        | Description   |
|-----------------|---------------|
| SOM-DB2510-R0A1 | Carrier Board |

## Optional Accessories

| Part No.          | Description                                      |
|-------------------|--|
| 1701200220        | Debug port cable                                 |
| 1700019474        | D-SUB 9P(F)/D-SUB 9P(F) RS232/RS485 100c         |
| TBD               | Heat Spreader                                    |
| TBD               | Semi Heat Sink (0 ~ 60 °C)                       |
| TBD               | Semi Heat Sink (-40 ~ 85 °C)                     |
| 96PSA-A36W12R1-3  | ADAPTER 100-240V 36W 12V 3A                      |
| 1700001524        | Power Cord 3P UL 10A 125V 180cm                  |
| 170203183C        | Power Cord 3P Europe (WS-010+WS-083) 183cm       |
| 1700019146        | Power Cord CCC 3P 10A 250V 183cm                 |
| 170203180A        | Power Cord 3P UK 2.5A/3A 250V 1.83M              |
| 1700008921        | Power Cord 3P PSE 183cm                          |
| SQF-ISDM1-16G-21C | SQF SD Card I-SD UHS-I MLC 16G (0~70°C)          |
| SQF-ISDM1-16G-21E | SQF I-SD UHS-I MLC 16G (-40~85°C)                |
| EWM-W163M201E     | 802.11 a/b/g/n/ac.QCA6174A,2T2R,w/BT4.1,M.2 2230 |
| 1750008717-01     | Dipole Ant. D.B 2.4/5G WIFI 3dBi SMA/M-R BLK     |
| 1750007965-01     | Antenna Cable R/P SMA (M) to MHF4, 300mm         |
| EWM-C117FL06E*    | LTE 4G,3G WCDMA/DC-HSPA+, 2G module, MPCI-L280H  |
| 1750008303-01     | Antenna AN0727-64SP6BSM                          |
| 1750006009        | Antenna Cable SMA (F) to MHF 1.32 25cm           |

## Dimensions

Unit: mm



\*Please contact us for suggesting suitable cellular module for your region.

# Embedded Linux Support and Design-in Services

## Hardware Certified Ubuntu and Yocto with Eco Partner Services

Linux is the most popular embedded OS for transportation, outdoor services, factory automation, and mission critical applications. Its open source and kernel reliability features ease security updates, and make it particularly adaptable to new AI and Edge computing technology. Advantech has cooperated with Canonical and other software partners to provide hardware certified Ubuntu image and Yocto BSP as Linux offerings. The Advantech, Embedded Linux, and Android Alliance (ELAA) delivers local software services and consultation.



### Features

|   |   |   |  |
|---|---|---|--|
| <b>Certified OS and BSP</b> <ul style="list-style-type: none"> <li>Platform compatibility tests</li> <li>Preloaded functional driver and software stacks</li> </ul> | <b>Licensed Services</b> <ul style="list-style-type: none"> <li>License authorized Canonical delivers 10-years of bug fixes and security updates</li> <li>In-house bundled service</li> </ul> | <b>Numerous AI and Edge Resources</b> <ul style="list-style-type: none"> <li>Containerized technology for service provision and deployment</li> <li>AI resources from Caffe, TensorFlow, and mxnet</li> </ul> | <b>Local Partner Alliance</b> <ul style="list-style-type: none"> <li>Embedded Linux and Android Alliance (ELAA)</li> </ul> |
|---|---|---|--|

# WISE-DeviceOn

## Massive IoT Device Management Utility

IoT deployment and management typically involves numerous disparate devices installed on multiple sites. These devices require effective monitoring, managing, and tracking. Advantech's easy-to-use WISE-DeviceOn interface enables users to remotely monitor device health, troubleshoot problems, and send software/firmware updates over-the-air (OTA). In sum, DeviceOn empowers quick real-time responsiveness to emerging problems.



### Features

| Comprehensive Management   | Remote Access  | Efficient Operations   |
|--|--|--|
| <ul style="list-style-type: none"><li>• Devices status</li><li>• Peripherals/firmware</li><li>• Open for extension</li></ul> | <ul style="list-style-type: none"><li>• Real-time monitoring</li><li>• Remote controls</li><li>• Troubleshooting</li></ul> | <ul style="list-style-type: none"><li>• Zero-touch on-boarding</li><li>• OTA updates</li><li>• Batch control</li></ul> |

### Product Highlights



**SOM-6883**

High-performance 11<sup>th</sup> Gen Intel<sup>®</sup> COMe Type 6 Module



**MIO-5375**

Compact 11<sup>th</sup> Gen Intel<sup>®</sup> Outdoor Focused 3.5" SBC



**EPC-B5587**

10<sup>th</sup> Gen Intel<sup>®</sup> Xeon<sup>®</sup> based Edge server



**EPC-R3220**

Arm based IoT Edge Gateway