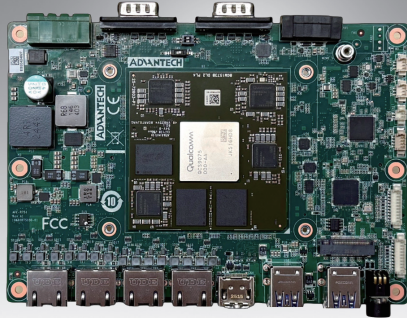


# ASR-A503

## Qualcomm® IQ9075M, Robot Controller Board

Preliminary



### Features

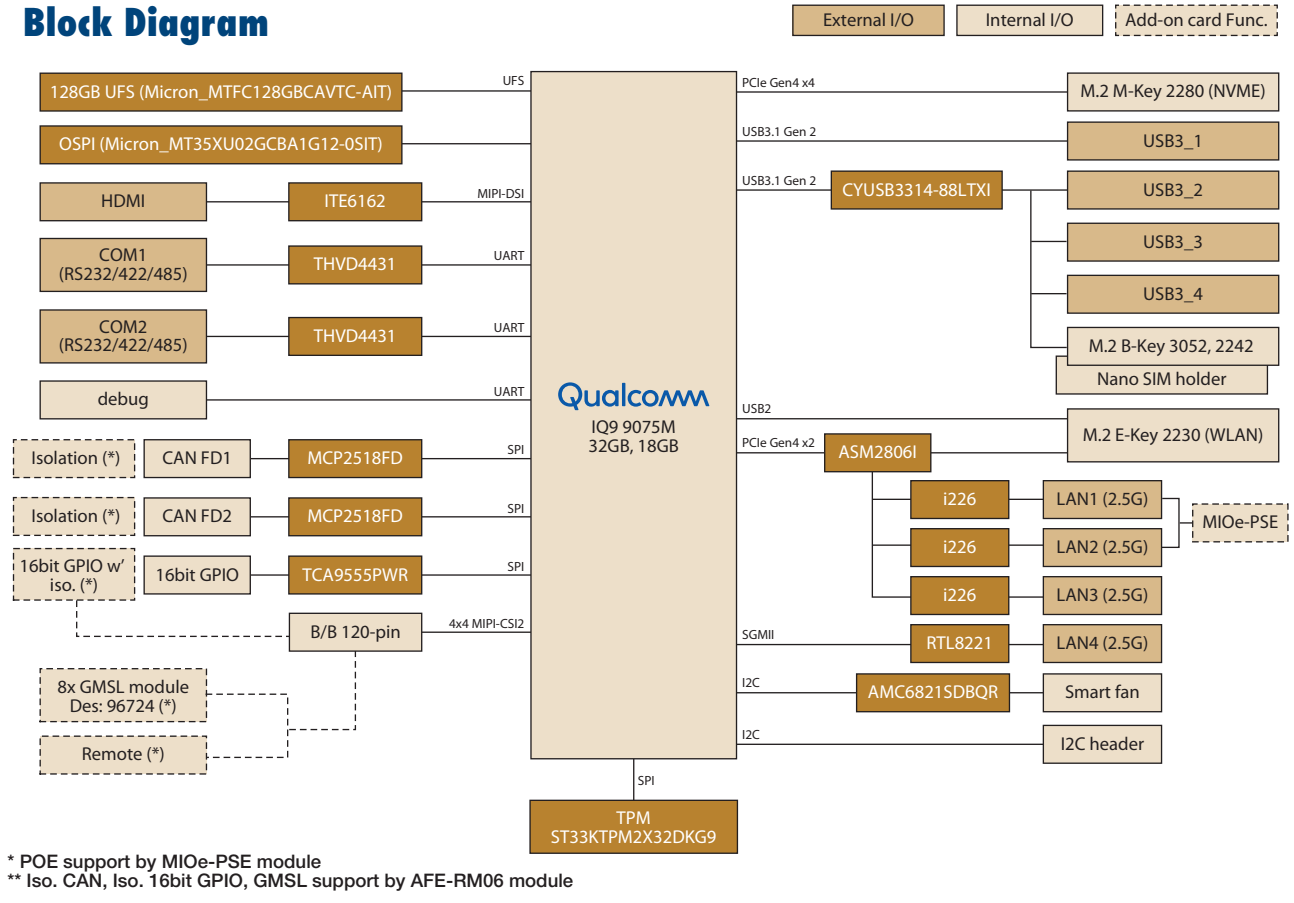
- AMR AI control system up to 100 TOPS
- Dedicated I/Os for AMR: 4x GbE, 4xUSB, 2x CAN FD, 16-bit DIO
- 3x M.2 Expansions: 1x E-Key, 1x B-Key, 1x M-Key (support NVMe)
- Sensor connection for camera, LiDAR, IMU, and optional GMSL...etc.
- Supports Ubuntu 24.04
- Supports Advantech Robotic Suite



### Specifications

|               |                        |                                                                                                                   |
|---------------|------------------------|-------------------------------------------------------------------------------------------------------------------|
| CPU           | SoC                    | IQ9075M                                                                                                           |
|               | CPU                    | Kryo™ CPU Gen 6                                                                                                   |
|               | Clock Speed            | 2.36 GHz                                                                                                          |
|               | Number of CPU Cores    | 8                                                                                                                 |
| Memory        | Technology             | LPDDR5 3200MHz                                                                                                    |
|               | Max. Capacity          | Up to 36GB                                                                                                        |
|               | Data Rate              | 3200MHz                                                                                                           |
| Storage       | UFS                    | Up to 128GB                                                                                                       |
|               | NVMe                   | Support through M.2 M-Key                                                                                         |
| GPU & AI      | GPU                    | Adreno 663                                                                                                        |
|               | Clock Speed            | Up to 800 MHz                                                                                                     |
|               | AI DSP                 | Hexagon                                                                                                           |
|               | Performance            | Up to dense 100 TPOS, sparse 200 TOPS                                                                             |
| Display       | HDMI                   | 1x HDMI port 1.4a up to 4K@ 24Hz, 24bpp                                                                           |
| Ethernet      | Controller             | LAN1-3: Intel i226; LAN4: RTL8221                                                                                 |
|               | Speed                  | 2.5GbE                                                                                                            |
| I/O           | Ethernet               | 4x RJ45<br>Optional PoE: LAN1-2 with PoE (available with MIOe-PSE power solution)                                 |
|               | USB Type-A             | 1x USB3.1 Gen 2 (10 Gbps), OTG<br>3x USB3.1 Gen.1 (5 Gbps)                                                        |
|               | COM Port               | 2x RS-232/422/485                                                                                                 |
|               | GPIO                   | 16bit general purpose input output I/O, up to 32bit with AFE-RM06 extension board                                 |
|               | CAN Bus                | 2x CAN2.0 A/B& CAN-FD (5Mbps), optional isolation CAN FD with AFE-RM06 extension board (total 2 ports)            |
|               | GMSL                   | 8x GMSL (MIPI-CSI 4x 4-lane)                                                                                      |
|               | FAN                    | 1x Smart Fan 1A@12V                                                                                               |
|               | LED/ Reset             | Power-on, Reset                                                                                                   |
| Board Feature | Watchdog Timer         | Support                                                                                                           |
|               | TPM                    | TPM 2.0                                                                                                           |
|               | Time Sync              | Support GNSS-based time sync                                                                                      |
| Expansion     | M.2 E-Key              | 1x E-Key 2230 (PCIe x1, USB2.0, UART)                                                                             |
|               | M.2 B-Key              | 1x B-Key 3052, 2242 (USB 3.2, USB2.0) w/ Nano-SIM                                                                 |
|               | M.2 M-Key              | 1x M-Key 2280 (PCIe Gen4x4)                                                                                       |
|               | GMSL                   | 8x GMSL (by option)                                                                                               |
| Power         | Supply Voltage         | Vin: 20~36V, ± 10%                                                                                                |
|               | Power Management       | AT, ATX                                                                                                           |
|               | Max. Consumption       | TBD                                                                                                               |
|               | Idle Consumption       | TBD                                                                                                               |
| Environment   | Temperature            | Operating: Standard: -20~70° C (-4°F to 131°F), Storage: -40 ~ 85° C (-40 ~ 185° F)                               |
|               | Humidity               | Operating: 40° C @ 95% relative humidity, non-condensing<br>Storage: 60° C @ 95%relative humidity, non-condensing |
|               | Vibration Resistance   | Up to 3.5 Grms                                                                                                    |
| Certification | EMC                    | CE/FCC Class B, ESD 8KV/15KV Criteria A                                                                           |
| Mechanical    | Dimensions (W x D x H) | 115 x 165 mm (4.5 x 6.5 inches)                                                                                   |
|               | Net Weight             | 235g                                                                                                              |

## Block Diagram



## Ordering Information

| Part No.       | SoC     | Memory      | HDMI | GbE | USB | COM | CAN | DIO   | DC-in     | Made in |
|----------------|---------|-------------|------|-----|-----|-----|-----|-------|-----------|---------|
| ASR-A503-M1A1U | IQ9075M | 36GB LPDDR5 | 1    | 4   | 4   | 2   | 2   | 16bit | 20-36V DC | Taiwan  |

## Packing List

| Part Number    | Description                          | Quantity |
|----------------|--------------------------------------|----------|
| -              | ASR-A503 unit                        | 1        |
| 1970006284T001 | ASR-A503 active cooler               | 1        |
| 1700030518-01  | CANBus Cable D-SUB 9P 15cm           | 2        |
| 1700030508-01  | DIO D-SUB cable 25cm                 | 2        |
| 1652004519     | 1 x 3-pin plug-in block for power in | 1        |

## Embedded OS/ API

| Part Number | Description                      |
|-------------|----------------------------------|
| TBD         | Ubuntu 24.04                     |
| TBD         | Ready by Advantech Robotic Suite |

## Optional Accessories

| Part Number                       | Description                                                                             | Suggest Quantity per ASR-A503 |
|-----------------------------------|-----------------------------------------------------------------------------------------|-------------------------------|
| 96PSA-A150W24T2-4                 | AC to DC adapter, DC 24V 150W                                                           | 1                             |
| MIOE-PSE-DPA1* (need thermal pad) | MIOe-PSE Dual Port 15.4W PoE PSE module                                                 | 1                             |
| AFE-RM06-00A1                     | AFE-A503 Isolation IO board                                                             | 1                             |
| AFE-RM06-00A2                     | AFE-A503 8ports GMSL, isolation IO board, bundled with 1 to 4 MINI FAKRA to FAKRA cable | 1                             |
| 1751000759-01                     | Cable Ant. FAKRA-Z/F FAKRA-Z/F RG174 BLK 1M                                             | 8                             |
| 1751000758-01                     | Cable MINI FAKRA B-Z/F FAKRA-Z/M 1x4 BLK L300                                           | 2                             |

## Front I/O View



## Rear I/O View

