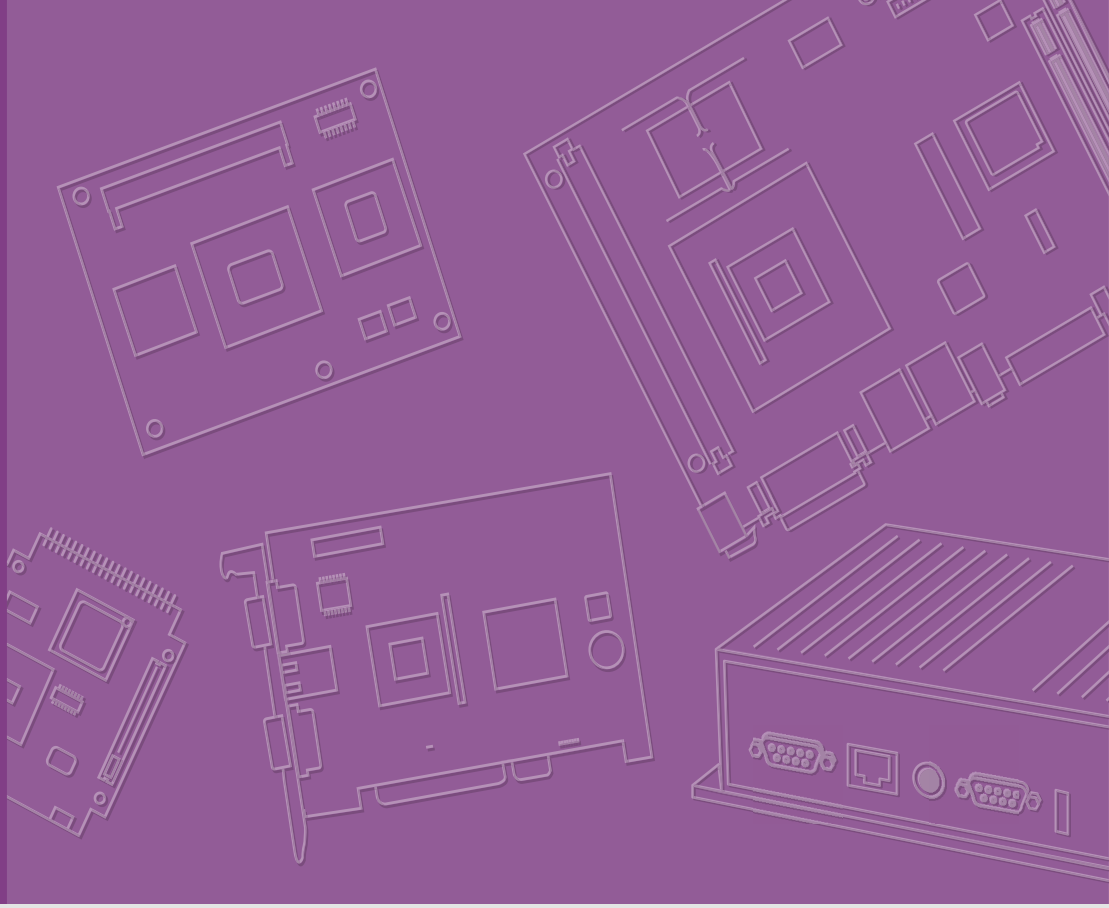

User Manual

AFE-A503/ASR-A503

Qualcomm® IQ-9075M, AMR Control System

AFE-A503 (System)
ASR-A503 (SBC)

ADVANTECH

Enabling an Intelligent Planet

Attention!

This product contains a hard copy of the Chinese user manual for China CCC certification purposes. A PDF of the English user manual can be downloaded from the company website. Please disregard the hard copy Chinese user manual if the product is not sold and/or installed in China

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Part No. 2006A50300 Edition 1

Printed in Taiwan July 2026

Product Warranty (2 years)

Advantech warrants the original purchaser that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe your product to be defective, follow the steps outlined below.

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

Declaration of Conformity

FCC Class B

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for assistance.

Technical Support and Assistance

1. Visit the Advantech website at www.advantech.com/support to obtain the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
   - Product name and serial number
   - Description of your peripheral attachments
   - Description of your software (operating system, version, application software, etc.)
   - A complete description of the problem
   - The exact wording of any error messages

Warnings, Cautions, and Notes

Warning! *Warnings indicate conditions that if not observed can cause personal injury!*

Caution! *Cautions are included to help prevent hardware damage and data losses. For example,*

"Batteries are at risk of exploding if incorrectly installed. Do not attempt to recharge, force open, or heat the battery. Replace the battery only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions."

Note! *Notes provide additional optional information.*

Packing List

Before setting up the system, check that the items listed below are included and in good condition. If any item does not accord with the table, please contact your dealer immediately.

AFE-A503 System

- 1 x AFE-A503 unit
- 1 x AFE-RM06-00A1
- 1 x 2-pin plug-in block for power in
- 1 x PWR IN connector, 3-Pin, F (PN: 1652004519)
- 1 x Terminal plug 1x4, F (PN: 1652005282)
- 1 x Terminal plug 2x3, F (PN: 1652008233-01)
- 1 x Terminal plug 2x10, F (PN: 1652008720-01)
- 1 x Terminal plug 2x4, F (PN: 1652008721-01)
- 1 x Wall-mount bracket (PN: 1960099390N002)

ASR-A503 Main board

- 1 x ASR-A503 unit
- 1 x Active cooler (PN: 1970006284T001)
- 1 x CANbus cable (PN: 1700030518-01)
- 1 x DIO D-SUB cable 25cm (PN: 1700030508-01)
- 1 x PWR IN connector, 3-Pin, F (PN: 1652004519)

Optional Accessories

- 1 x AFE-RM06-00A1 (isolated CAN and GPIO IO card for IQ9), reference chapter 4.2.5
- 1 x AFE-RM06-00A2 (MAX96724, 8 ports GMSL and isolated CAN, GPIO for
- IQ9), reference chapter 4.2.5
- 8 x GMSL cable (PN: 1751000759-01)
- 1 x POE module (PN: MIOE-PSE-DPA1), thermal pad reference chapter 4.2.4
- 1 x 150W AC to DC adapter (PN: 96PSA-A150W24T2-4)
- 1 x Power cable 3-pin 183 cm, USA type (PN: 1702002600)
- 1 x Power cable 3-pin 183 cm, EU type (PN: 1702002605)
- 1 x Power cable 3-pin 183 cm, UK type (PN: 1702031801-11)
- 1 x Power cable, 3-Pin 183 cm, China/Australia type (PN: 1700000596-11)

Ordering Information

Part Number	Description
AFE-A503-M1A1U	AFE-A503, Qualcomm IQ-9075M, 32GB/128GB w' iso (w/o GMSL)
AFE-A503-M2A1U	AFE-A503 Qualcomm IQ-9075M, 32GB/128GB w' iso (w/ 8 ports GMSL)
ASR-A503-M1A1U	Qualcomm IQ-9075M, 32GB, 128GB 4” SBC
AFE-RM06-00A1	AFE-A503 isolation CAN, GPIO board
AFE-RM06-00A2	ASSY AFE-RM06 A101-1, iso. CAN/GPIO (w/ 8 GMSL)

Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from all power outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket must be located near the equipment and easily accessible.
5. Protect the equipment from humidity.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
7. The power outlet sockets should have grounded connections.
8. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
9. All cautions and warnings on the equipment should be noted.
10. If the equipment is not used for a long time, disconnect it from the power source to avoid damage from transient overvoltage.
11. Never pour liquid into an opening. This may cause fire or electrical shock.
12. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
13. If any of the following occurs, have the equipment checked by service personnel:
    - The power cord or plug is damaged.
    - Liquid has penetrated the equipment.
    - The equipment has been exposed to moisture.
    - The equipment is malfunctioning, or does not operate according to the user manual.
    - The equipment has been dropped and damaged.
    - The equipment shows obvious signs of breakage.
14. Do not leave the equipment in an environment with a storage temperature of below -40°C (-40°F) or above 85°C (185°F) as this may damage the components. The equipment should be kept in a controlled environment.
15. Any unverified component may cause unexpected damage. To ensure correct installation, always use the components (e.g., screws) provided in the accessory box.
16. CAUTION: Batteries are at risk of exploding if incorrectly replaced. Replace only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.
17. Always disconnect the power cord from the chassis before manually handling the hardware. Do not implement connections or configuration changes while the device is powered on. Sudden power surges may damage sensitive electronic components.
18. In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position does not exceed 70 dB (A).
19. DISCLAIMER: These instructions are provided according to IEC 704-1 standards.
    Advantech disclaims all responsibility for the accuracy of any statements contained herein.
20. Use a power cord connected to a socket-outlet with a grounded connection.
21. This product is intended to be supplied by a UL-Listed power supply suitable for use at minimum Tma 55°C whose output meets ES1 (or SELV) and output is rated: 20-36 Vdc, 7.5-4.16 A. Please contact Advantech for further information.

22. RESTRICTED ACCESS AREA: The equipment should only be installed in a Restricted Access Area.
23. PoE without routing to outside plant.

Consignes de Sécurité

1. *Veuillez lire attentivement ces instructions de sécurité.*
2. *Veuillez conserver ce manuel de l'utilisateur pour référence ultérieure.*
3. *Veuillez débrancher cet équipement de la prise secteur avant le nettoyage. Utilisez un chiffon humide. Ne pas utiliser de détergent liquide ou pulvérisé pour le nettoyage. Utilisez une feuille ou un chiffon humide pour le nettoyage.*
4. *Pour les équipements enfichables, la prise de courant doit être à proximité de l'équipement et doit être facilement accessible.*
5. *S'il vous plaît garder cet équipement de l'humidité.*
6. *Posez cet équipement sur une surface fiable lors de l'installation. Une chute ou une chute pourrait causer des blessures.*
7. *La prise de courant doit avoir une connexion mise à la terre.*
8. *Placez le cordon d'alimentation de sorte que personne ne puisse marcher dessus.*
   Ne placez rien sur le cordon d'alimentation.
9. *Tous les avertissements et mises en garde sur l'équipement doivent être notés.*
10. *Si l'appareil n'est pas utilisé pendant une longue période, débranchez-le du secteur pour ne pas être endommagé par une surtension transitoire.*
11. *Ne jamais verser de liquide dans les ouvertures de ventilation; Cela pourrait provoquer un incendie ou un choc électrique.*
12. *N'ouvrez jamais l'équipement. Pour des raisons de sécurité, seul le personnel de maintenance qualifié doit ouvrir l'équipement.*
13. *Si l'une des situations suivantes se présente, faites vérifier le matériel par le personnel de service:*
    - *Le cordon d'alimentation ou la fiche est endommagé.*
    - *Un liquide a pénétré dans l'appareil.*
    - *L'équipement a été exposé à l'humidité.*
    - *L'équipement ne fonctionne pas bien ou vous ne pouvez pas le faire. fonctionner conformément au manuel d'utilisation.*
    - *Equipment L'équipement est tombé et a été endommagé.*
    - *Equipment L'équipement présente des signes évidents de rupture.*
14. *Ne laissez pas cet équipement dans un environnement où la température de stockage peut être inférieure à -40° C (-40° F) ou supérieure à 85° C (185° F). Cela pourrait endommager l'équipement. L'équipement doit être dans un environnement contrôlé.*
15. *Tout composant non vérifié peut causer des dommages inattendus. Pour garantir une installation correcte, veuillez toujours utiliser les composants (ex. Vis) fournis avec la boîte d'accessoires.*
16. *ATTENTION: L'ordinateur est équipé d'un circuit d'horloge temps réel alimenté par batterie. Il y a un risque d'explosion si la batterie est remplacée de manière incorrecte. Remplacez uniquement avec le même type ou un type équivalent recommandé par le fabricant. Jetez les piles usagées conformément aux instructions du fabricant.*
17. *Débranchez toujours complètement le cordon d'alimentation de votre châssis lorsque vous utilisez du matériel. Ne faites pas de connexion quand l'appareil est sous tension. Les composants électroniques sensibles peuvent être endommagés par des surtensions soudaines.*

18. *Niveau de pression acoustique au poste de l'opérateur selon la norme CEI 704-1: 1982 n'est pas supérieur à 70 dB (A).*
19. *AVERTISSEMENT: Cet ensemble d'instructions est donné conformément à la norme CEI 704-1. Advantech décline toute responsabilité quant à l'exactitude des déclarations contenues dans ce.*
20. *Au moyen d'un cordon d'alimentation connecté à une prise de courant avec mise à la terre.*
21. *Ce produit est destiné à être alimenté par un bloc d'alimentation homologué UL adapté à une utilisation à Tma 55 degrés C min. dont la sortie est conforme à ES1 (ou SELV) et dont la sortie est nominale: 20-36 Vdc, 7.5-4.16 A, si besoin d'aide supplémentaire, veuillez contacter Advantech pour plus d'informations.*
22. *ZONE D'ACCÈS RESTREINT: L'équipement ne doit être installé que dans une zone d'accès restreint.*
23. *PoE sans routage vers l'usine extérieure.*

Contents

Chapter 1

General Introduction

1.1 Introduction

The Advantech ASR-A503/AFE-A503 is a high-end robotic controller series powered by Qualcomm IQ-9075M, featuring compact dimensions: single board 115 x 165 mm, system 175 x 119 x 80 mm. The ASR-A503/AFE-A503 delivers up to dense 100TOPS of AI computing performance for AMR AI control and supports the Advantech Robotic Suite, offering a fast development platform for customers building robotic applications.

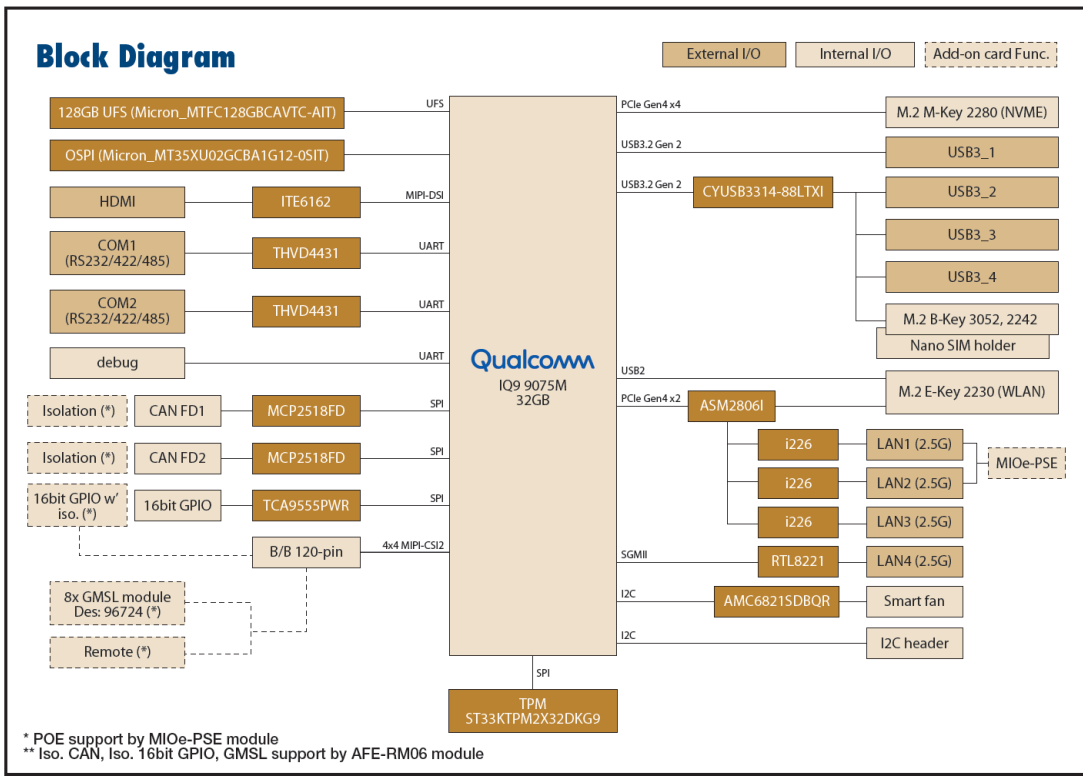
1.2 Specifications

Table 1.1: Specifications

CPU	SoC	IQ-9075M
	CPU	Kryo™ CPU Gen 6
	Clock Speed	2.36 GHz
	Number of CPU Cores	8
Memory	Technology	LPDDR5
	Max. Capacity	Up to 32GB
	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 TOPS, sparse 200 TOPS
Display	HDMI	1 x HDMI port 1.4a up to 4K@24Hz, 24bpp
Ethernet	Controller	LAN1-3: Intel i226; LAN4: RTL8221
	Speed	2.5GbE
I/O	Ethernet	4 x RJ-45 Optional PoE: LAN1-2 with PoE (available with MIOe-PSE power solution) PoE out: 50Vdc, each max. 0.3A, total max. 30W
	USB Type-A	1 x USB3.2 Gen 2 (10 Gbps), OTG, each 5V/1.5A
		3 x USB3.2 Gen.1 (5 Gbps), each 5V/1.5A
	COM Port	2 x RS-232/422/485
	GPIO	2 x 8-bit general purpose input output I/O isolation by option
	CAN Bus	1 x CAN2.0 A/B& CAN-FD, isolation by option
	GMSL	8 x GMSL (MIPI-CSI 4x 4-lane)
	FAN	1 x 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

Table 1.1: Specifications		
Expansion	M.2 E-Key	1 x E-Key 2230 (PCIe x1, USB2.0, UART)
	M.2 B-Key	1 x B-Key 3052, 2242 (USB 3.2, USB2.0) w/ Nano-SIM
	M.2 M-Key	1 x M-Key 2280 (PCIe Gen4 x4)
	120-pin B2B	1 x CANFD, 1xGPIO, 8x GMSL (MIPI-CSI 4x4 lanes)
Power	Supply Voltage	Vin: 20-36 V_{DC}
	Power Management	AT, ATX
Environment	Temperature	System Operating: Standard: -20~55°C (-4 ~ 131°F) with 0.7 m/s airflow, Storage: -40 ~ 85°C (-40 ~ 185°F) SBC Operating: Standard: -20~70°C (-4 ~ 158°F), Storage: -40 ~ 85°C (-40 ~ 185°F)
	Humidity	Operating: 40°C @95% relative humidity, non-condensing; 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 B
	Safety	CB/UL/CCC/BSMI 62368

1.3 Block Diagram



Chapter 2

Mechanical Specification

2.1 System Layout

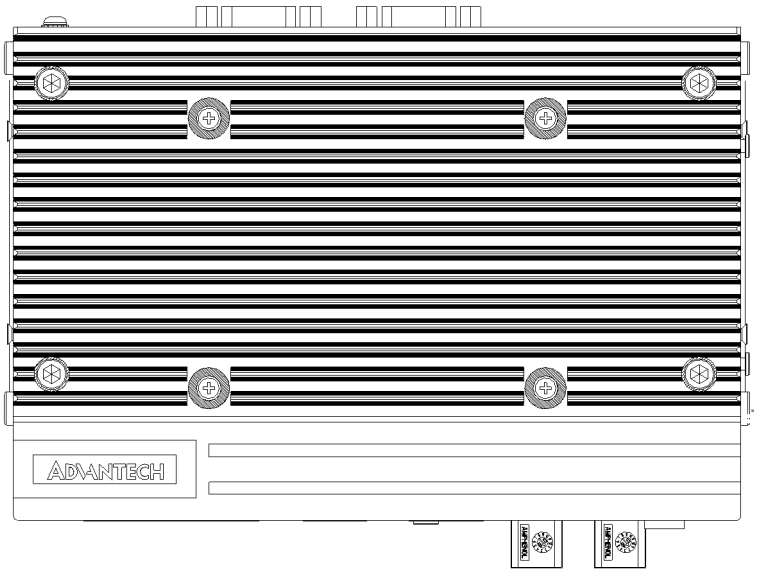


Figure 2.1 AFE-A503 Mechanical Diagram (Top Side)

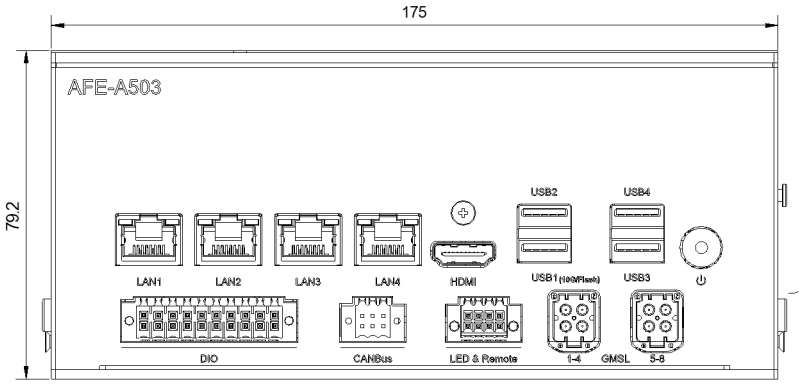


Figure 2.2 AFE-A503 Mechanical Diagram (Front IO Side With GMSL)

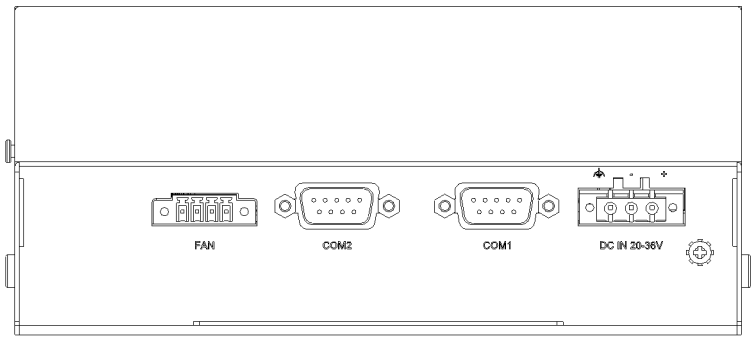


Figure 2.3 AFE-A503 Mechanical Diagram (Back IO Side with GMSL)

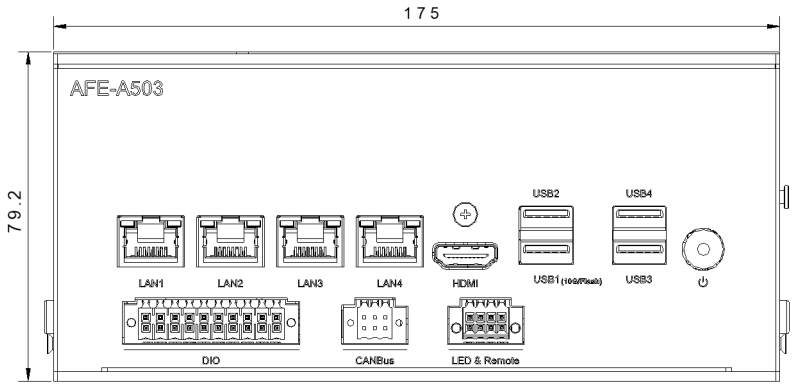


Figure 2.4 AFE-A503 Mechanical Diagram (Front IO Side)

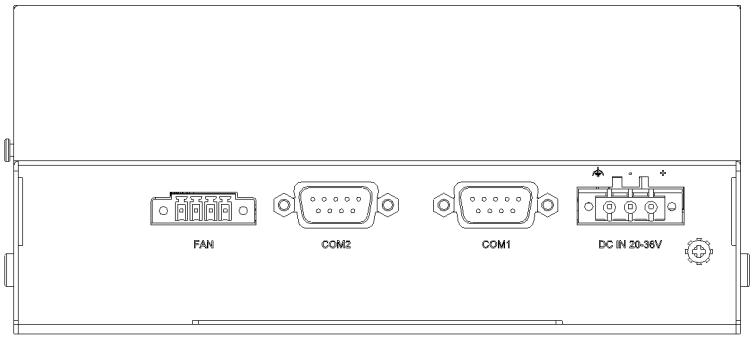


Figure 2.5 AFE-A503 Mechanical Diagram (Back IO Side)

2.2 Board Layout

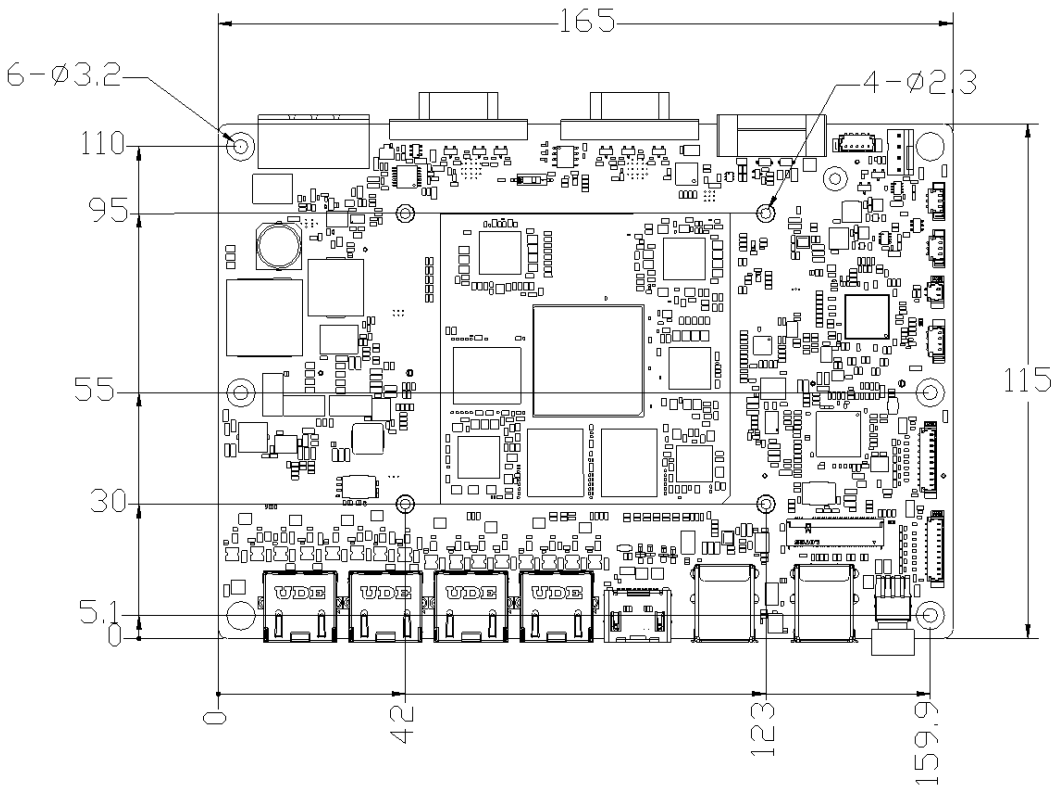


Figure 2.6 ASR-A503 Mechanical Diagram (Top Side)

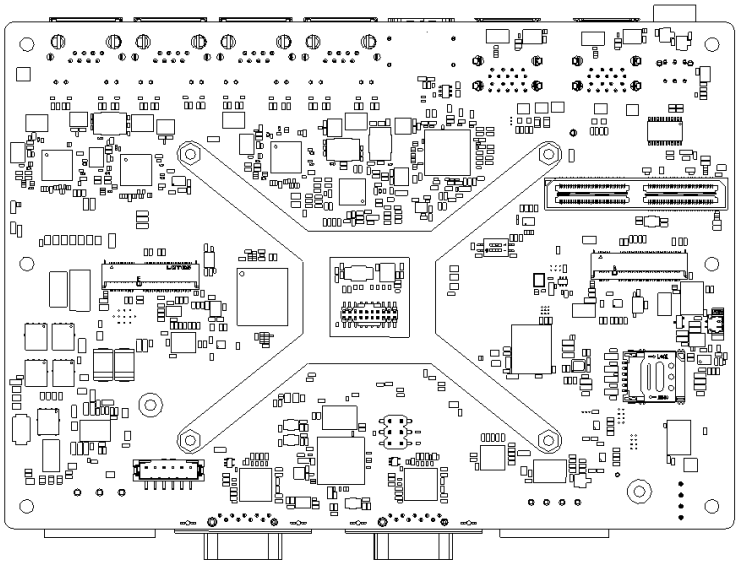


Figure 2.7 ASR-A503 Mechanical Diagram (Bottom Side)

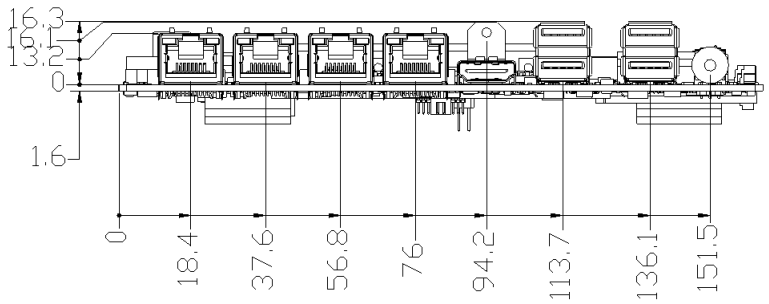


Figure 2.8 ASR-A503 Mechanical Diagram (Coastline)

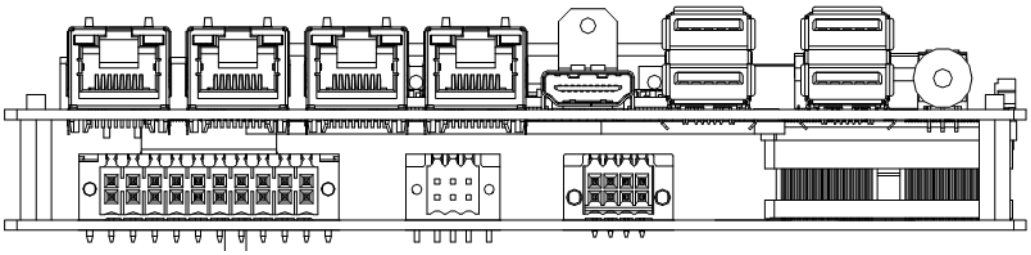


Figure 2.9 ASR-A503 Mechanical Diagram (Coastline; with AFE-RM06-00A1)

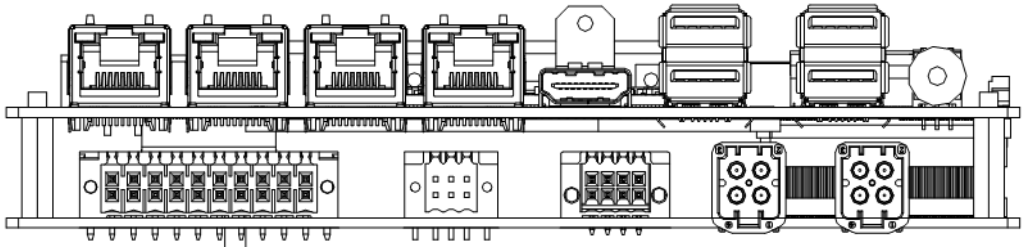


Figure 2.10 ASR-A503 Mechanical Diagram (Coastline; with AFE-RM06-00A2)

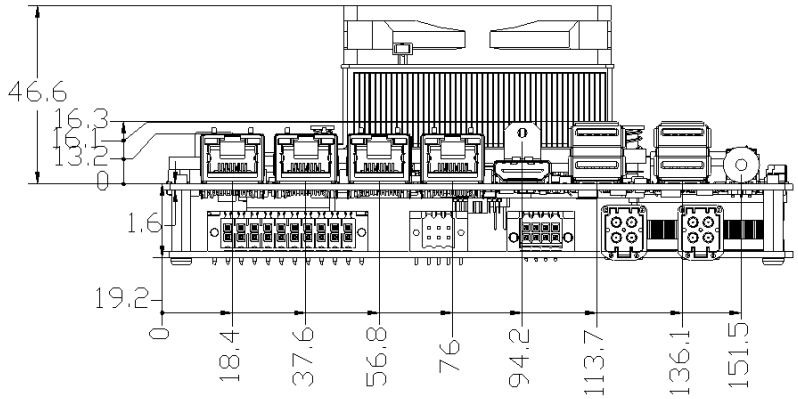


Figure 2.11 ASR-A503 Mechanical Diagram (Coastline; with AFE-RM06-00A2 and cooler)

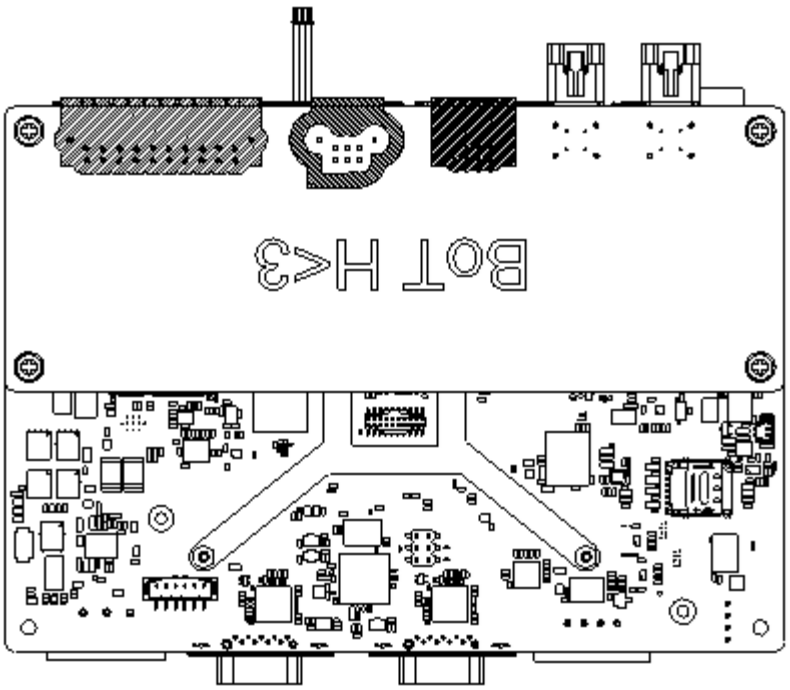


Figure 2.12 ASR-A503 Mechanical Diagram (Bottom Side; with AFE-RM06-00A2)

Chapter 3

Jumpers and Connectors

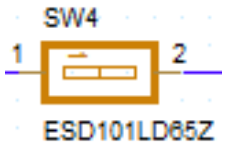
3.1 Switches

The AFE-A503 has a number of switches that allow you to configure your system to suit your application. The table below lists the functions of the various switches.

3.1.1 AT/ATX Mode: SW4

Table 3.1: AT/ATX Mode: SW4

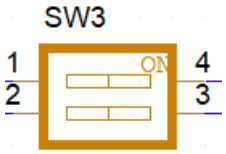
Part Number: 1600004550-01	
DIP SW SPSTx1/2P/-/VA/GFL/S/BK/H3.1	
Signal Pin Definition	
On: ATX mode	
Off: AT mode (Default)	



3.1.2 USB Download Mode Select: SW3

Table 3.2: USB Download Mode Select: SW3

Part Number: 1600004768-01	
DIP SW SPSTx2/4P/1.27/VA/GFL/S/BK/H2.3	
Pin	**Signal Pin Definition**
1-4: On 2-3: On	Enables USB download mode
1-4: Off 2-3: Off	Releases USB download mode (Default)



3.2 Connectors

Table 3.3: Connectors		
1	CN1	Power Input Connector
2	COMA	COM Port Connector
3	COMB	COM Port Connector
4	FAN1	Smart FAN Internal Connector
5	COMC_DEBUG	Debug Port Connector
6	FAN2	Smart FAN Internal Connector
7	CAN1	CAN Bus Connector
8	CAN2	CAN Bus Connector
9	CN17	Reset Connector
10	CN7	I2C Connector
11	GPIO2	GPIO Connector
12	GPIO1	GPIO Connector
13	SW2	Power On/Off Button
14	CN6	M.2 Key-M Connector
15	USB1	USB 3.2 Connector
16	USB2	USB 3.2 Connector
17	CN4	HDMI Connector
18	LAN1	RJ-45 Connector
19	LAN2	RJ-45 Connector
20	LAN3	RJ-45 Connector
21	LAN4	RJ-45 Connector
22	SW4	AT/ATX Mode
23	CN5	POE Power Connector
24	SIM1	Nano-SIM Card Holder
25	BAT1	RTC battery Connector
26	M2B1	M.2 B-Key Connector
27	MIPI1	B/B Conn. 120P
28	SW3	USB Download Mode Select
29	M2E_CN1	M.2 E-Key Connector

3.3 Connector Locations

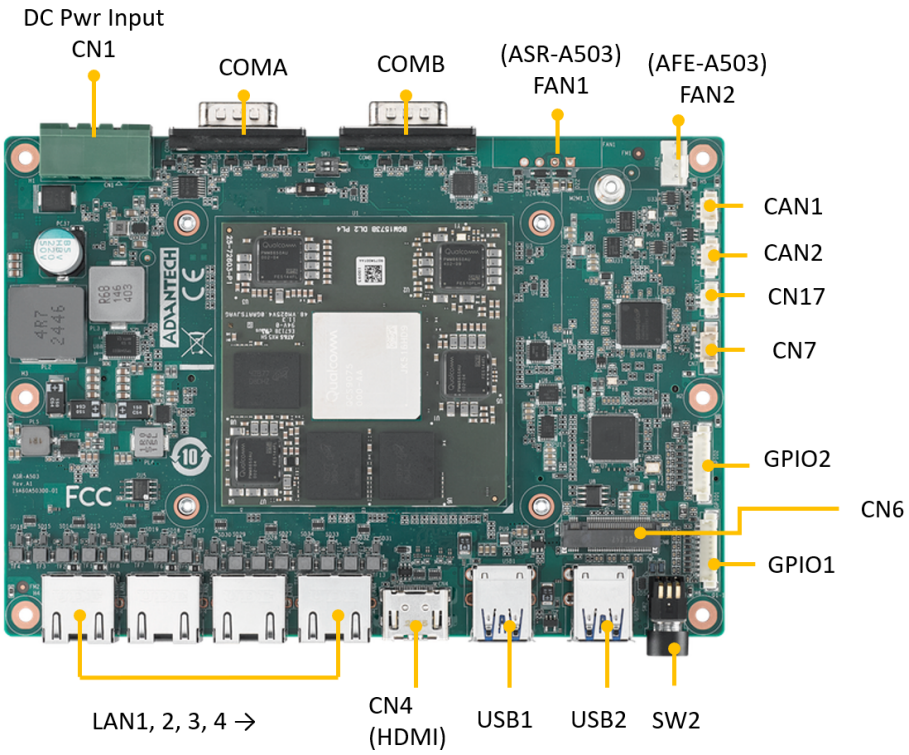


Figure 3.1 AFE-A503/ ASR-A503 Connector Location (TOP side)

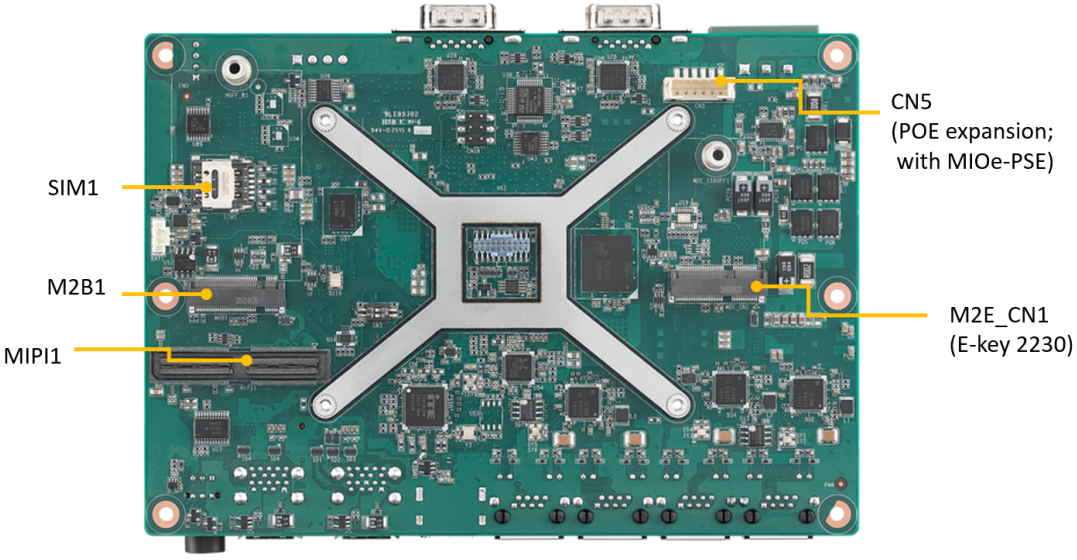


Figure 3.2 AFE-A503/ ASR-A503 Connector Location (Bottom side)

3.4 Connector Pin Definition

3.4.1 Power Input Connector: CN1

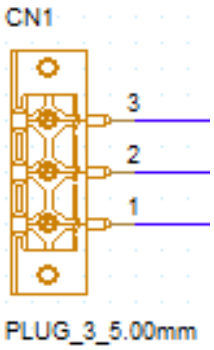


Table 3.4: Power Input Connector: CN1

PLUG-IN BLOCK 3P 5.0 mm 90D(M) DIP ME050-500-03	
Pin	**Signal Pin Definition**
1	Optionally, a reserved resistor (or capacitor) location can be connected to a screw hole H1.
2	GND
3	+ (20~36V)

3.4.2 COM Port Connector: COMA/COMB

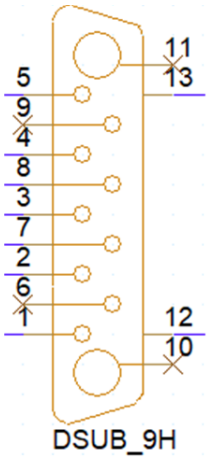


Table 3.5: COM Port Connector: COMA/COMB

DB9 Pin	RS-232	RS-485/RS-422 Full Duplex	RS-485 Half Duplex
1	DCD	TX-	Data-
2	RXD	TX+	Data+
3	TXD	RX+	
4	DTR	RX-	
5		Ground	
6	DSR		
7	RTS		
8	CTS		
9	RI		

3.4.3 Smart FAN Connector: FAN1

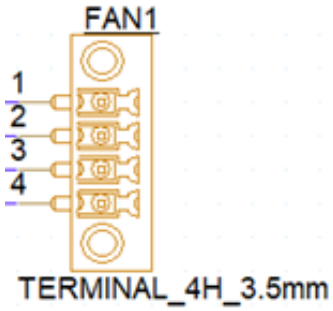


Table 3.6: Smart FAN Connector: FAN1

Terminal Block 1x4/3.5/PA66/RA(M)/Sn/D/BK//W SC	
Pin	**Signal Pin Definition**
1	GND
2	+12V
3	TACH
4	PWM

3.4.4 Debug Port Connector: COMC_DEBUG

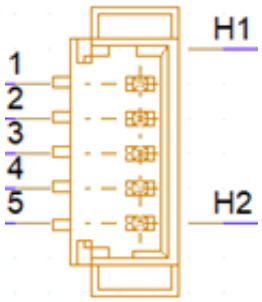


Table 3.7: Debug Port Connector: COMC_DEBUG	
WAFER 5P 1.25 mm 180D(M) SMD 85205-05701	
Pin	**Signal Pin Definition**
1	COM3_TXD
2	COM3_RTS#
3	COM3_RXD
4	COM3_CTS#
5	GND

3.4.5 Smart FAN Connector: FAN2

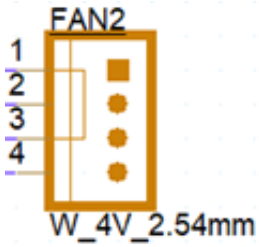


Table 3.8: Smart FAN Connector: FAN2	
Wafer 1x4P/2.54/PA66/VA(M)/Sn/D/WH/H10.05/L3.3	
Pin	**Signal Pin Definition**
1	GND
2	+12V
3	TACH
4	PWM

3.4.6 CAN Connector: CAN1

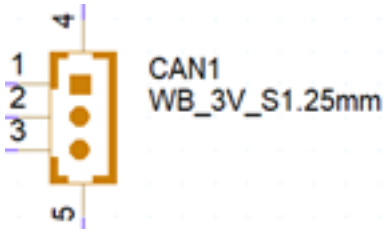


Table 3.9: CAN Connector: CAN1

WAFER 3P 1.25 mm 90D(M) SMD 85205-03001	
Pin	**Signal Pin Definition**
1	CAN0_D+
2	CAN0_D-
3	GND

3.4.7 CAN Connector: CAN2

Table 3.10: CAN Connector: CAN2

WAFER 3P 1.25 mm 90D(M) SMD 85205-03001	
Pin	**Signal Pin Definition**
1	CAN1_D+
2	CAN1_D-
3	GND

3.4.8 Reset Connector: CN17

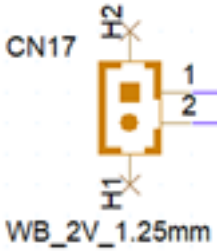


Table 3.11: Reset Connector: CN17	
Wafer 1x2P/1.25/VA/Matt Tin/S/WH/H 4.9 mm	
Pin	**Signal Pin Definition**
1	System reset
2	GND

3.4.9 I2C Connector: CN7

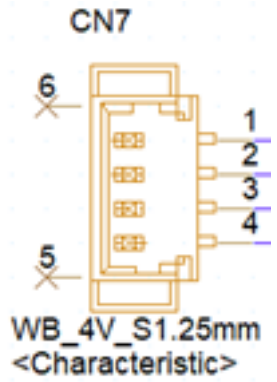


Table 3.12: I2C Connector: CN7	
WAFER 4P 1.25 mm 180D(M) SMD 85205-04001	
Pin	**Signal Pin Definition**
1	GND
2	I2C_SDATA
3	I2C_SCLOCK
4	+V3.3

3.4.10 GPIO Connector: GPIO1

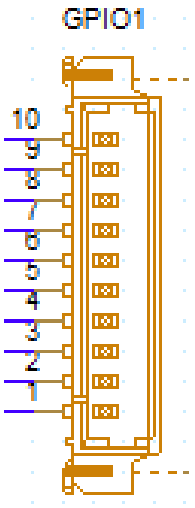


Table 3.13: GPIO Connector: GPIO1

Wafer 1x10P/1.25/VA/Matt Tin/S/WH/H4.9 mm

Pin	Signal Pin Definition
1	GND
2	GPIO_A_7
3	GPIO_A_2
4	GPIO_A_6
5	GPIO_A_1
6	GPIO_A_5
7	GPIO_A_0
8	GPIO_A_4
9	+V5
10	GPIO_A_3

3.4.11 GPIO Connector: GPIO2

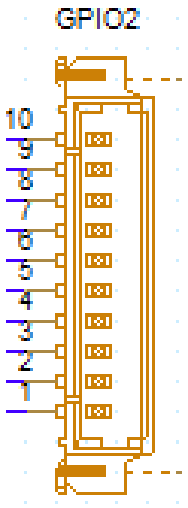


Table 3.14: GPIO Connector: GPIO2

Wafer 1x10P/1.25/VA/Matt Tin/S/WH/H4.9 mm

Pin	Signal Pin Definition
1	GND
2	GPIO_B_7
3	GPIO_B_2
4	GPIO_B_6
5	GPIO_B_1
6	GPIO_B_5
7	GPIO_B_0
8	GPIO_B_4
9	+V5
10	GPIO_B_3

3.4.12 Power On/Off Button: SW2

Part Number: 1600002144

Description: TACT SW TC006-N12AABUGUY-K-2 DIP 6P 8 x17.85 x12.6

The AFE-A503 has a Power On/Off button with LED indicators on the front side that show “On” (Green LED) and “Off/Suspend” status (Orange LED).

3.4.13 M.2 M-Key Connector: CN6

Table 3.15: M.2 M-Key Connector: CN6

M.2 M-KEY 75P/0.5/G-FL/RA/S/BK/H8.50/GEN 4

Pin	Signal Pin Definition
1	GND
2	+V3.3_M.2
3	GND
4	+V3.3_M.2
5	PCIe1_RX3_N
6	NC
7	PCIe1_RX3_P
8	NC
9	GND
10	M2M1_LED#
11	PCIe1_TX3_N
12	+V3.3_M.2
13	PCIe1_TX3_P
14	+V3.3_M.2
15	GND
16	+V3.3_M.2
17	PCIe1_RX2_N
18	+V3.3_M.2
19	PCIe1_RX2_P
20	NC
21	GND
22	NC
23	PCIe1_TX2_N
24	NC
25	PCIe1_TX2_P
26	NC
27	GND
28	NC
29	PCIe1_RX1_N
30	NC
31	PCIe1_RX1_P
32	NC
33	GND
34	NC
35	PCIe1_TX1_N
36	NC
37	PCIe1_TX1_P
38	NC
39	GND
40	NC
41	PCIe1_RX0_N
42	NC

Table 3.15: M.2 M-Key Connector: CN6	
43	PCIe1_RX0_P
44	NC
45	GND
46	NC
47	PCIe1_TX0_N
48	NC
49	PCIe1_TX0_P
50	PCIE1_RST_3P3_R_N
51	GND
52	PCIE1_CLKREQ_3P3_R_N
53	PCIe1_CLK_N
54	PCIE1_WAKE_3P3_R_N
55	PCIe1_CLK_P
56	NC
57	GND
58	NC
67	NC
68	NC
69	NC
70	+V3.3_M.2
71	GND
72	+V3.3_M.2
73	GND
74	+V3.3_M.2
75	GND
H1	NC
H2	NC
H3	NC
H4	NC

3.4.14 POE Power Connector: CN5

Table 3.16: POE Power Connector: CN5	
WAFER BOX 6P 2.0 mm 180D(M) SMD 88290-064G	
Pin	**Signal Pin Definition**
1	+V50_LAN1+
2	+V50_LAN1-
3	+V50_LAN2+
4	+V50_LAN2-
5	GND
6	+V12

3.4.15 RTC Battery Connector: BAT1

Table 3.17: RTC Battery Connector: BAT1	
Wafer 1 x 2P/1.25/VA/Matt Tin/S/WH/H 4.9 mm	
Pin	**Signal Pin Definition**
1	+VCOIN
2	GND

3.4.16 M.2 B-Key Connector: M2B1

Table 3.18: M.2 B-Key Connector: M2B1	
NGFF 75P/0.5 mm/(F)/LCP/RA/GFL/S/BK/H8.50/B-Key	
Pin	**Signal Pin Definition**
1	M2B1_CFG3
2	+V3.3
3	GND
4	+V3.3
5	GND
6	M2B1_PWR_OFF#
7	USB3_HUB_CM_P3
8	M2B1_WDISABLE1#
9	USB3_HUB_CM_N3
10	M2B1_GNSS_PPS
11	GND
20	NC
21	M2B1_CFG0
22	NC
23	M2B1_WAKE_ON_WWAN#
24	NC
25	M2B1_DPR
26	M2B1_W_DISABLE2#
27	GND
28	NC
29	M2B1_USB3_RX1-
30	M2B1_UIM_RESET
31	M2B1_USB3_RX1+
32	M2B1_UIM_CLK
33	GND
34	M2B1_UIM_DATA
35	M2B1_USB3_TX1-
36	M2B1_UIM_PWR
37	M2B1_USB3_TX1+
38	NC
39	GND
40	NC
41	NC

Table 3.18: M.2 B-Key Connector: M2B1	
42	NC
43	NC
44	NC
45	GND
46	NC
47	NC
48	NC
49	NC
50	NC
51	GND
52	NC
53	NC
54	NC
55	NC
56	NC
57	GND
58	NC
59	NC
60	NC
61	NC
62	NC
63	NC
64	NC
65	NC
66	NC
67	M2B1_RESET#
68	NC
69	M2B1_CFG1
70	+V3.3
71	GND
72	+V3.3
73	GND
74	+V3.3
75	M2B1_CFG2
H1	NC
H2	NC
H3	GND
H4	GND

3.4.17 B/B Conn. 120P: MIPI1

Table 3.19: B/B Conn. 120P: MIPI1

B/B Conn. 120P 0.5 mm 180D(F) SMD

Pin	Signal Pin Definition
1	CSI0_B0_LN0_P
2	CSI1_B0_LN0_P
3	CSI0_C0_LN0_N
4	CSI1_C0_LN0_N
5	GND
6	GND
7	CSI0_NC_CLK_P
8	CSI1_NC_CLK_P
9	CSI0_A0_CLK_N
10	CSI1_A0_CLK_N
11	GND
12	GND
13	CSI0_A1_LN1_P
14	CSI1_A1_LN1_P
15	CSI0_B1_LN1_N
16	CSI1_B1_LN1_N
17	GND
18	GND
19	CSI0_C1_LN2_P
20	CSI1_C1_LN2_P
21	CSI0_A2_LN2_N
22	CSI1_A2_LN2_N
23	GND
24	GND
25	CSI0_B2_LN3_P
26	CSI1_B2_LN3_P
27	CSI0_C2_LN3_N
28	CSI1_C2_LN3_N
29	GND
30	GND
31	CSI2_B0_LN0_P
32	CSI3_B0_LN0_P
33	CSI2_C0_LN0_N
34	CSI3_C0_LN0_N
35	GND
36	GND
37	CSI2_NC_CLK_P
38	CSI3_NC_CLK_P
39	CSI2_A0_CLK_N
40	CSI3_A0_CLK_N
41	GND
42	GND

Table 3.19: B/B Conn. 120P: MIPI1	
43	CSI2_A1_LN1_P
44	CSI3_A1_LN1_P
45	CSI2_B1_LN1_N
46	CSI3_B1_LN1_N
47	GND
48	GND
49	CSI2_C1_LN2_P
50	CSI3_C1_LN2_P
51	CSI2_A2_LN2_N
52	CSI3_A2_LN2_N
53	GND
54	GND
55	CSI2_B2_LN3_P
56	CSI3_B2_LN3_P
57	CSI2_C2_LN3_N
58	CSI3_C2_LN3_N
59	GND
60	GND
61	CCI0_I2C_SCL_1P8
62	+V1.2
63	CCI0_I2C_SDA_1P8
64	+V1.2
65	GND
66	+V1.2
67	CAM0_PWDN_1P8
68	GND
69	DES0_ERRB_MDPX3_1P8
70	FP_SYSRST#
71	DES0_LOCK_MDPX3_1P8
72	PWRBTN_MCU#
73	DES0_ENABLE_MDPX3_1P8
74	MD_ENABLE
75	DES0_FS_MDPX3_1P8
76	NC
77	NC
78	GND
79	GND
80	QUP0_SE4_I2C_SCL_5P0
81	CCI2_I2C_SCL_1P8
82	QUP0_SE4_I2C_SDA_5P0
83	CCI2_I2C_SDA_1P8
84	GND
85	GND
86	DB_COM3_TX
87	CAM1_PWDN_1P8
88	DB_COM3_RX
89	DES1_ERRB_MDPX3_1P8

Table 3.19: B/B Conn. 120P: MIPI1	
90	NC
91	DES1_LOCK_MDPX3_1P8
92	NC
93	DES1_ENABLE_MDPX3_1P8
94	NC
95	DES1_FS_MDPX3_1P8
96	NC
97	NC
98	NC
99	NC
100	NC
101	GND
102	+V1.8
103	TXCAN0_SYS
104	+V1.8
105	RXCAN0_SYS
106	GND
107	GND
108	+V3.3
109	TXCAN1_SYS
110	+V3.3
111	RXCAN1_SYS
112	+V3.3
113	DB_DETECT
114	GND
115	+V5
116	+V12
117	+V5
118	+V12
119	+V5
120	+V12

3.4.18 M.2 E-Key Connector: M2E_CN1

Table 3.20: M.2 E-Key Connector: M2E_CN1	
NGFF 75P/0.5 mm/(F)/LCP/RA/GFL/S/BK/H8.5 mm/E-Key	
Pin	**Signal Pin Definition**
1	GND
2	+V3.3_M2E
3	USB2_CM_P8+
4	+V3.3_M2E
5	USB2_CM_P8-
6	NC
7	GND
8	I2S3_SCK_M2E
9	NC
10	I2S3_WS_M2E
11	NC
12	I2S3_DATA0_M2E
13	NC
14	I2S3_DATA1_M2E
15	NC
16	NC
17	NC
18	GND
19	NC
20	GND
21	NC
22	BT0_UART_RX_M2E
23	NC
32	BT0_UART_TX_M2E
33	GND
34	BT0_UART_CTS_M2E
35	PCIE0_C_TX0_P
36	BT0_UART_RFR_M2E
37	PCIE0_C_TX0_N
38	NC
39	GND
40	NC
41	PCIE_M2E_RX0+
42	NC
43	PCIE_M2E_RX0-
44	NC
45	GND
46	NC
47	PCIE0_C_CLK_P
48	NC
49	PCIE0_C_CLK_N
50	SOC_SLEEP_CLK_M2E

Table 3.20: M.2 E-Key Connector: M2E_CN1	
51	GND
52	PCIE0_RST_M2E_N
53	PCIE0_CLKREQ_M2E_N
54	BT_DISABLE1#
55	PCIE0_WAKE_M2E_N
56	WLAN_DISABLE1#
57	GND
58	NC
59	NC
60	NC
61	NC
62	BTLE_UART_RX_M2E
63	GND
64	NC
65	NC
66	NC
67	NC
68	NC
69	GND
70	HST_SW_CTRL_M2E
71	NC
72	+V3.3_M2E

Chapter 4

Installation

This chapter provides instruction of how to install ASR-A503 board and AFE-A503 system, with default and optional accessories, for example, thermal solution, GMSL expansion AFE-RM06, and POE module MIOe-PSE.

4.1 Board Installation

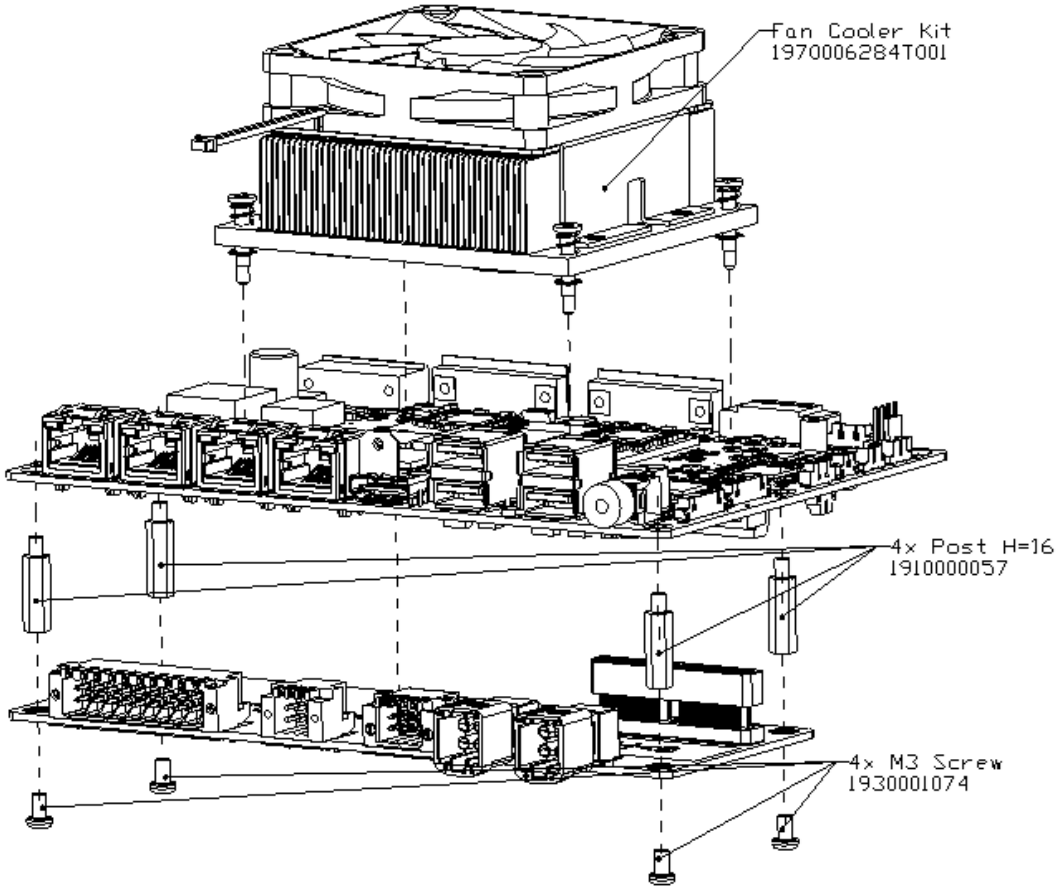


Figure 4.1 ASR-A503 assembled with cooler and AFE-RM06

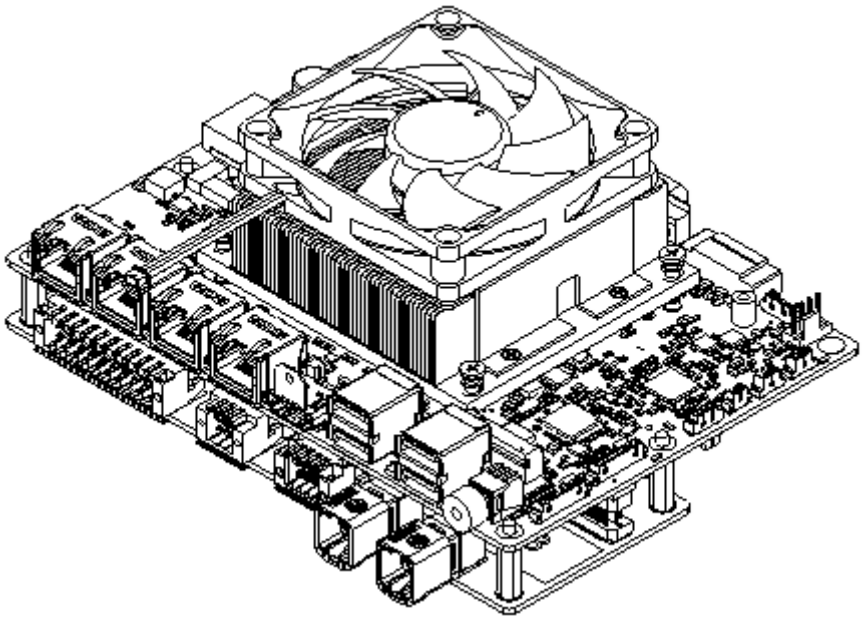
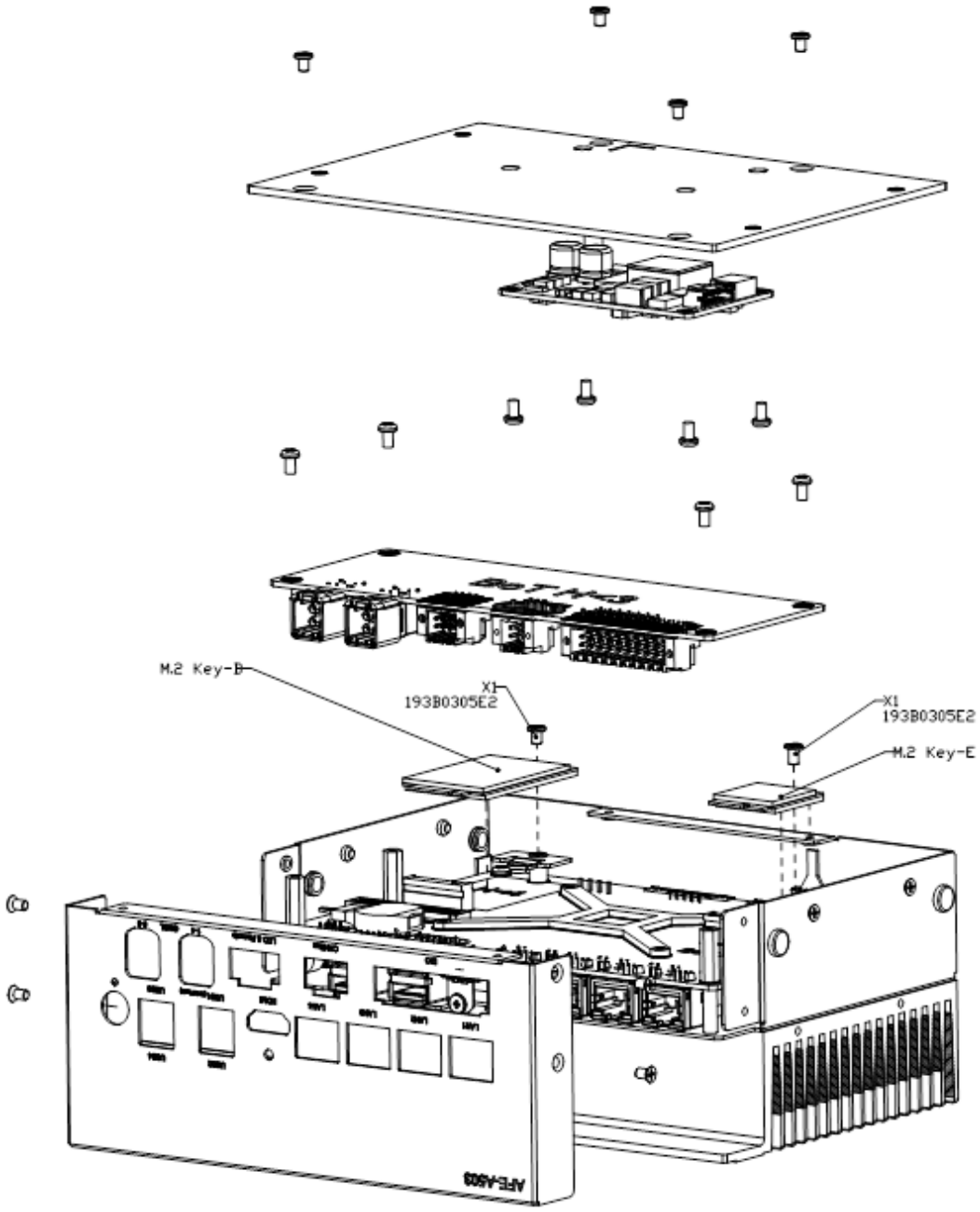


Figure 4.2 ASR-A503 assembled with cooler and AFE-RM06

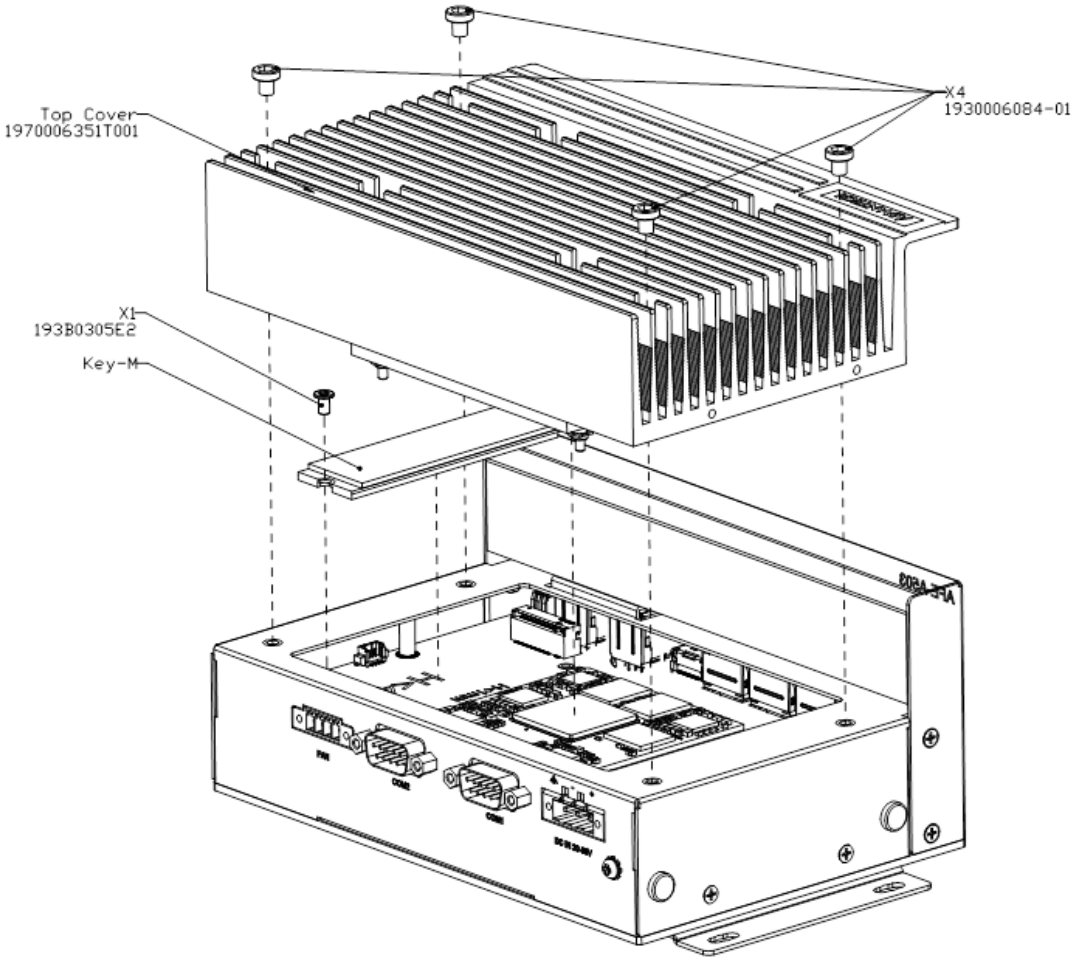
4.2 System Installation

4.2.1 M.2 B-Key/E-Key Installation

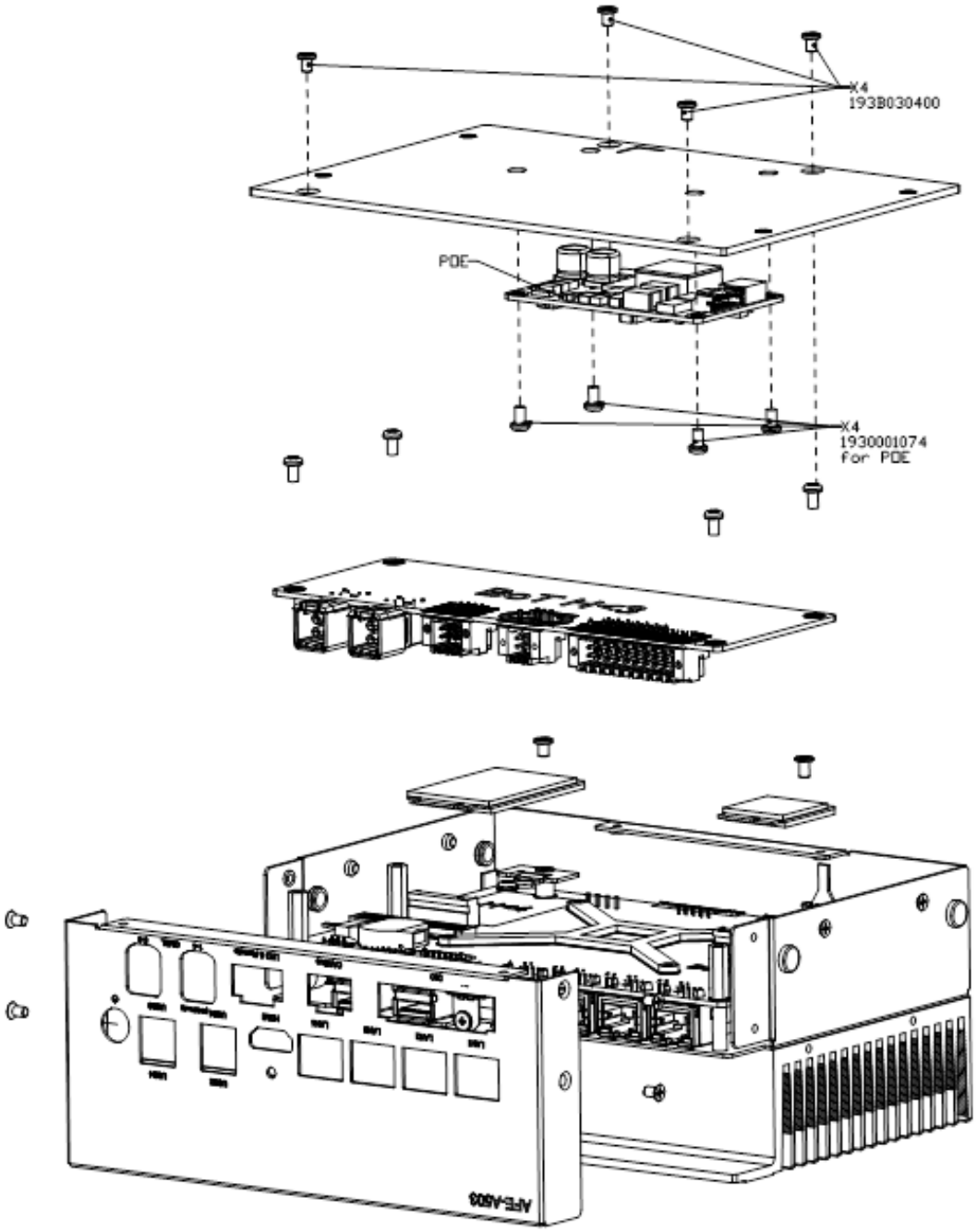
1. Loosen the 4 screws (193B030400) from the bottom, left and right side of the AFE-A503 as shown in the picture below.
2. Install the M.2 B-Key/E-Key module with screws (193B0305E2).
3. Secure the bottom cover with 8 screws (193B030400).



4.2.2 M.2 M-Key Installation

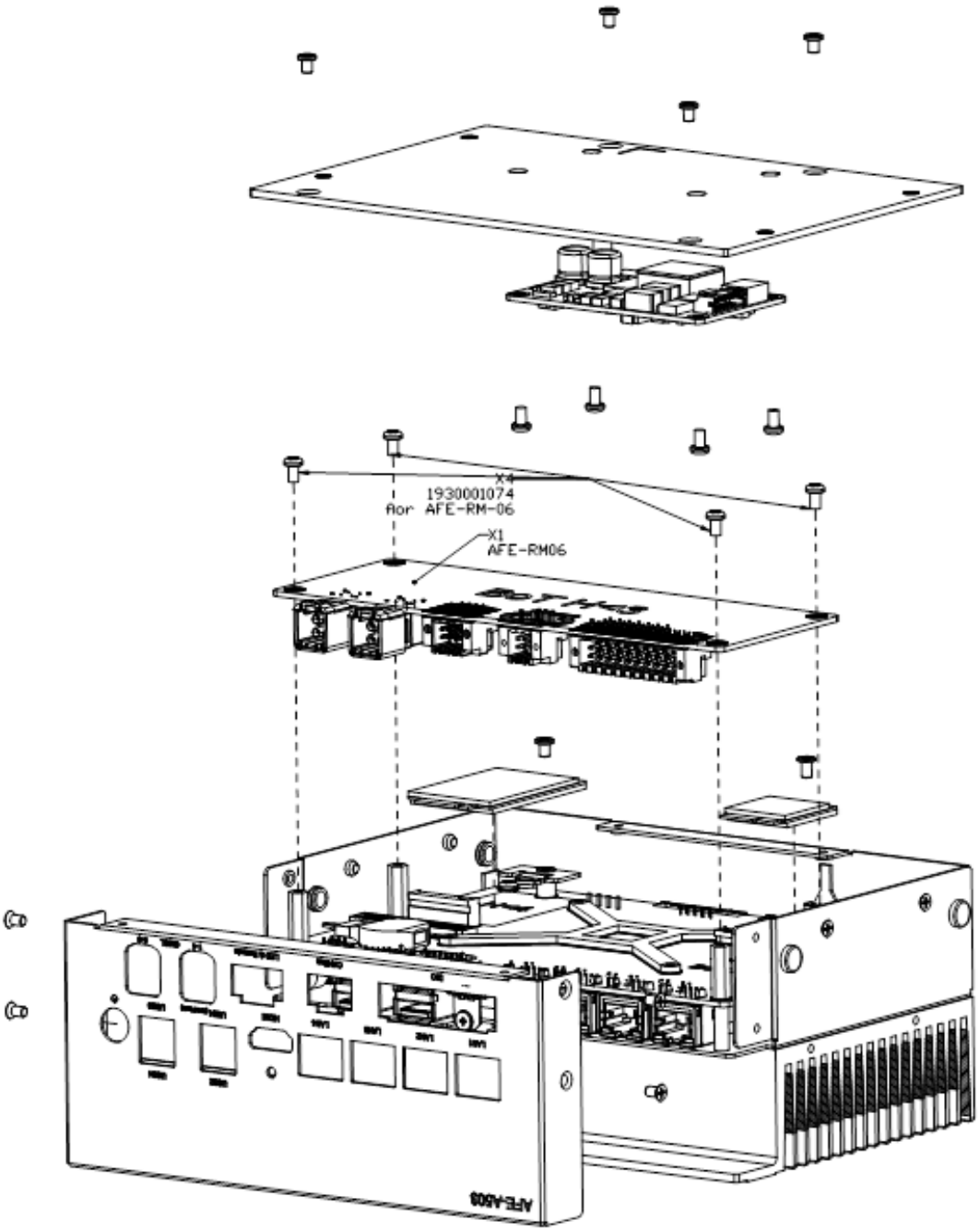


4.2.3 MIOe-PSE Installation



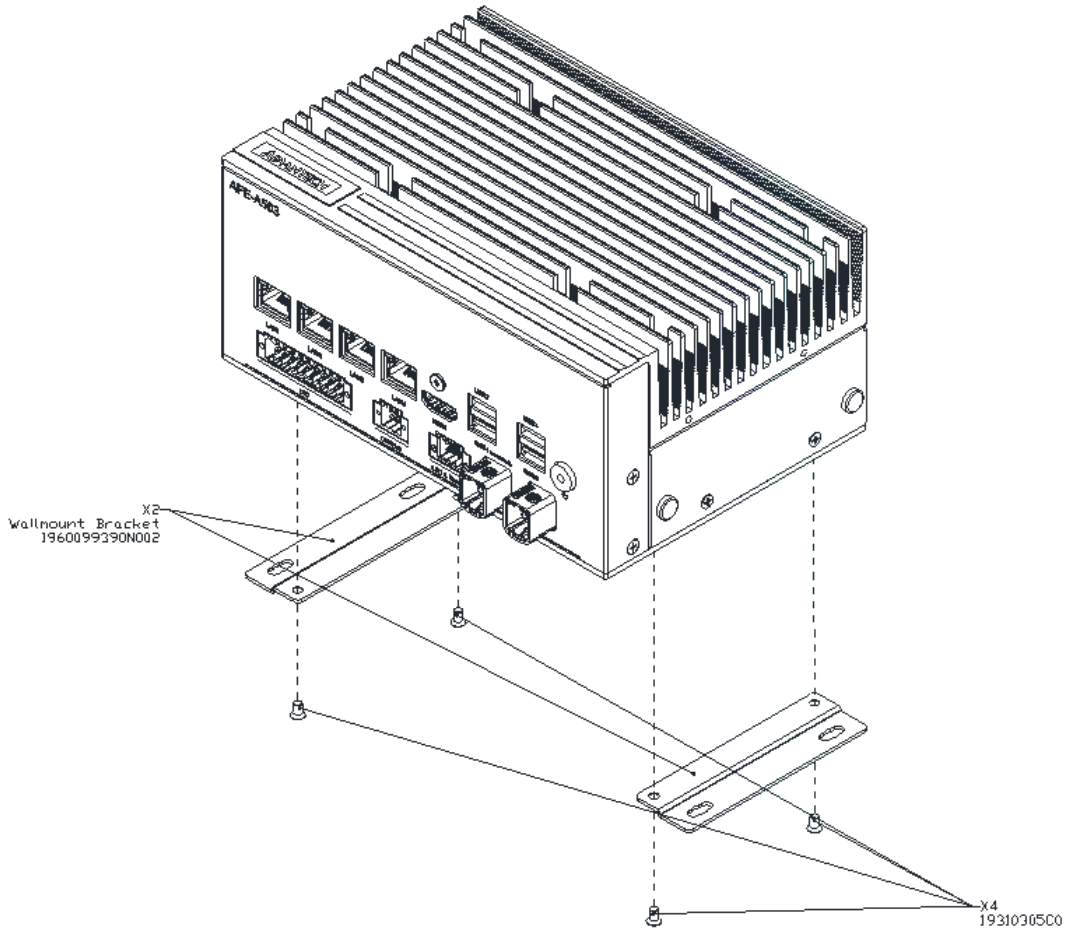
4.2.4 AFE-RM06-00A2 Installation

1. Remove the bottom cover.
2. Remove 2 x M3x5L screws on the I/O bracket.
3. Fix 2 x Copper Pillars and install GMSL board via MIOe-GMSL connector.
4. Install I/O bracket with 2 x M3x5L screws and fix board with 2 x M3x5L screws.
5. Re-place the bottom cover.



4.2.5 Wall Mount Kit Installation

1. Unscrew the 4 x M3x5L screws from the bottom side of AFE-A503.
2. Secure the 2 x Wall mount bracket using 4 x M3x5L screws on the bottom.
3. Secure the system to the wall using 4x M4 x5L (length only for reference)



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