

MBB1005AF

**Intel® Core™ Ultra 200S Series DT
processors (Arrow Lake-S)
ATX Motherboard**

User's Manual

Version 1.0a
(September 2025)

Copyright

© 2025 IBASE Technology, Inc. All rights reserved.

No part of this publication may be reproduced, copied, stored in a retrieval system, translated into another language or transmitted in any form or by any means, electronic, mechanical, photocopying, or otherwise, without the prior written consent of IBASE Technology, Inc. (hereinafter referred to as "IBASE").

Disclaimer

IBASE reserves the right to make changes and improvements to the products described in this document without prior notice. While every effort has been made to ensure accuracy, IBASE does not guarantee the document is free from errors.

IBASE assumes no liability for incidental or consequential damages arising from misapplication or inability to use the product or the information contained herein, nor for any infringements of rights of third parties, which may result from its use.

Trademarks

All the trademarks, registrations and brands mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective owners.

Compliance



This product has passed CE tests for environmental specifications and limits and complies with applicable EU directives. In a domestic environment, it may cause radio interference, requiring users to take appropriate measures."



This product complies with Class B limits under Part 15 of the FCC Rules, providing reasonable protection against harmful interference in residential installations. It generates, uses, and can radiate radio frequency energy. If not installed and used according to the manufacturer's instructions, it may cause harmful interference to radio communications.

WEEE



This product must not be disposed of as normal household waste, in accordance with the EU directive on Waste Electrical and Electronic Equipment (WEEE - 2012/19/EU). Instead, it should be disposed of by returning it to a municipal recycling collection point. Check local regulations for disposal of electronic products.

Green IBASE



This product complies with RoHS 2 restrictions, which prohibit the use of certain hazardous substances in electrical and electronic equipment. The following substances must not exceed the specified concentrations:

- Hexavalent chromium: 1,000 ppm
- Polybrominated biphenyls (PBBs): 1,000 ppm
- Polybrominated diphenyl ethers (PBDEs): 1,000 ppm
- Cadmium: 100 ppm
- Mercury: 1,000 ppm
- Lead: 1,000 ppm
- Bis(2-ethylhexyl) phthalate (DEHP): 1,000 ppm
- Butyl benzyl phthalate (BBP): 1,000 ppm
- Dibutyl phthalate (DBP): 1,000 ppm
- Diisobutyl phthalate (DIBP): 1,000 ppm

Important Safety Information

Please read the precautions before using the board.

Care for your iBASE products:

- Before cleaning the PCB, ensure the device is unplugged and powered off
- Use circuit board cleaner or alcohol carefully to avoid damaging sensitive components.
- Vacuum the dust with a computer vacuum cleaner to prevent the fan from being clogged.



WARNING

Attention during use:

- Do not use this product near water.
- Do not spill water or any other liquids on this product.
- Do not place heavy objects on the product, as this may damage internal components or affect performance.

Anti-static precautions

- Wear an anti-static wrist strap to avoid electrostatic discharge.
- Place the PCB on an anti-static mat.
- Hold the edges of the PCB when handling.
- When handling, avoid touching the surface of the PCB and hold it by its edges or non-metallic components.
- Ground yourself by touching a grounded metal object, such as a metal pipe or grounded equipment, to discharge static.

Caution:

Danger of explosion if the internal lithium-ion battery is replaced by an incorrect type. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions or recycle them at a local recycling facility or battery collection point.

Warranty Policy

- **IBASE standard products:**

24-month (2-year) warranty from the date of shipment. If the date of shipment cannot be ascertained, the product serial numbers can be used to determine the approximate shipping date.

- **3rd-party parts:**

12-month (1-year) warranty from delivery for the 3rd-party parts that are not manufactured by IBASE, such as CPU, CPU cooler, memory, storage devices, power adapter, panel and touchscreen.

- * Products that fail due to misuse, accident, improper installation or unauthorized repair shall be treated as out of warranty and the customer will be responsible for repair and shipping charges.

Technical Support & Services

1. Visit the IBASE website at www.ibase.com.tw to find the latest information about the product.
2. If you need any further assistance from your distributor or sales representative, prepare the following information of your product and elaborate upon the problem.
 - Product model name
 - Product serial number
 - Detailed description of the problem
 - Any error messages (text or screenshots)
 - The arrangement of the peripherals
 - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, please visit the IBASE website to apply for an RMA number.

Table of Contents

Chapter 1	General Information.....	1
1.1	Introduction	2
1.2	Features	2
1.3	Packing List.....	3
1.4	Specifications	3
1.5	Block Diagram	5
1.6	Product View	6
1.7	Dimensions	8
Chapter 2	Hardware Configuration	9
2.1	Essential Installations	10
2.1.1	Installing the Memory	10
2.2	Setting the Jumpers.....	11
2.3	Jumper & Connector Locations.....	12
2.4	Jumpers Quick Reference	13
2.4.1	JP1: Flash Descriptor Security Override (reserved)	13
2.4.2	JP2, JP3: PCI Express Bifurcation.....	14
2.4.3	JP4: Clear RTC	15
2.4.4	JP5: Clear CMOS.....	15
2.4.5	JP6: GPI_BOOTLOADER (reserved)	16
2.4.6	JP7: AT/ATX Select.....	16
2.4.7	JP8: Flash Descriptor Security Override (Factory use only) ..	17
2.4.8	JP9: Sierra EM9 series 5G card USB/PCIe Select.....	18
2.5	Connectors Quick Reference.....	19
2.5.1	CN1: HD Audio Jacks.....	20
2.5.2	CN2: 2.5G LAN (i226V)+ USB 3.2 GEN2 #3/#4 CN3: 2.5G LAN (i226LM) + USB 3.2 GEN2 #1/#2	20
2.5.3	CN4: DP++.....	21
2.5.4	CN5: DP++ (top) / HDMI (bottom).....	21
2.5.5	CN6: COM1 (top) and COM2 (bottom)	22
2.5.6	CN7: USB 3.2 #7	23
2.5.7	CN9, CN10, CN12, CN13: SATA #4/#6/#5/#7	23
2.5.8	CPU_FAN1: CPU Fan Power Connector	24
2.5.9	SYS_FAN1, SYS_FAN2: System Fan Power Connector	25
2.5.10	J1: Audio Front Panel Connector.....	26
2.5.11	J2, J3: COM4, COM3	27

2.5.12	J4: M.2 M-Key NVME (CPU).....	28
2.5.13	J5: Digital I/O (4in, 4out)	29
2.5.14	J6: M.2 M-Key NVME (CPU).....	30
2.5.15	J11: S3 Status Connector	31
2.5.16	J12: USB3 #9/#10.....	32
2.5.17	J13: M.2 E-Key w/ CNVI	33
2.5.18	J14, J16, J17, J20: DDR5 UDIMM CHB0/1, CHA0/1.....	34
2.5.19	J15: USB2 #11/#12.....	35
2.5.20	J18: M.2 B-Key	36
2.5.21	J19: SIM Card Slot.....	37
2.5.22	J21: Front Panel Settings Connector.....	38
2.5.23	J22: 24-pin ATX Power Connector	39
2.5.24	J23: SPI Flash Connector (Factory use only)	40
2.5.25	ATX_12V_2X1: AT 12V Power Connector	40
Chapter 3	Drivers Installation	41
3.1	Introduction	42
3.2	Intel® Chipset Software Installation Utility	42
3.3	VGA Driver Installation.....	45
3.4	Intel(R) Smartsound Drivers Installation	47
3.5	Realtek Audio DCH Drivers Installation	48
3.6	LAN Driver Installation	49
3.7	Intel® ME Drivers Installation	50
3.8	Intel® SIO Drivers Installation	52
3.9	Intel® PMT Drivers Installation	54
3.10	Intel® NPU IO Drivers Installation	55
3.11	Intel® GNA IO Drivers Installation	56
Chapter 4	BIOS Setup.....	57
Appendix	79	
A.	I/O Port Address Map	80
B.	Interrupt Request Lines (IRQ)	82
C.	Watchdog Timer Configuration.....	83
D.	Onboard Connector Types	87
E.	MBB1005AF USB Power Control Bit Mapping.	88

Chapter 1

General Information

The information provided in this chapter includes:

- Features
- Packing List
- Specifications
- Block Diagram
- Product View
- Dimensions

1.1 Introduction

The **MBB1005AF** is an ATX motherboard designed for Intel® Core™ Ultra 200S Series desktop processors (Arrow Lake-S) with up to 65W TDP, featuring the LGA1851 socket and Intel® Q870 chipset. Supporting up to 192GB of DDR5 memory across four DIMM slots, it enables high-performance computing with robust expandability for industrial and edge applications. The board drives up to four independent displays via HDMI 2.0b and triple DisplayPort 1.4a (DP++), and offers dual 2.5GbE LAN with Intel® I226 controllers, one with iAMT support for remote management. High-speed I/O includes five USB 3.2 Gen2, two USB 3.2 Gen1, two USB 2.0, four COM, and four SATA III ports, along with rich expansion through PCI-E Gen5/Gen4/PCI slots and four versatile M.2 slots for NVMe, wireless, or cellular modules. Designed for reliability, it integrates watchdog timer, digital I/O, TPM 2.0, and advanced manageability features to meet the demands of AI, imaging, and edge computing environments.



1.2 Features

- Intel® LGA1851 Core™ Ultra 9/7/5 200S Series Processors, up to 65W
- 4x DDR5 UDIMM sockets, Max. 192GB
- Intel® Core™ Ultra 200S processor integrated graphic supports HDMI (2.0b) and 3x DisplayPort (1.4a) (DP++)
- LAN 1: Intel® I226LM, supports 2.5G and iAMT
- LAN 2: Intel® I226V, supports 2.5G only
- 5x USB 3.2 (Gen2), 2x USB 3.2 (Gen1), 2x USB 2.0, 4x COM, 4x SATA III
- 1x PCI-E (x16) [Gen.5.0]; 2x PCI-E(x4) [Gen.4.0] ; 1x PCI-E(x1) [Gen.4.0]; 2x PCI
- 4x M.2, including E-Key (2230), B-Key (3052) and 2x M-Key (2280)
- Watchdog timer, Digital I/O, iAMT (19.0), TPM (2.0)

1.3 Packing List

Your MBB1005AF package includes the items listed below. If any item is missing, contact the distributor or dealer from whom you purchased the product.

- MBB1005AF x 1
- IO Shield x 1
- SATA cable x 1

1.4 Specifications

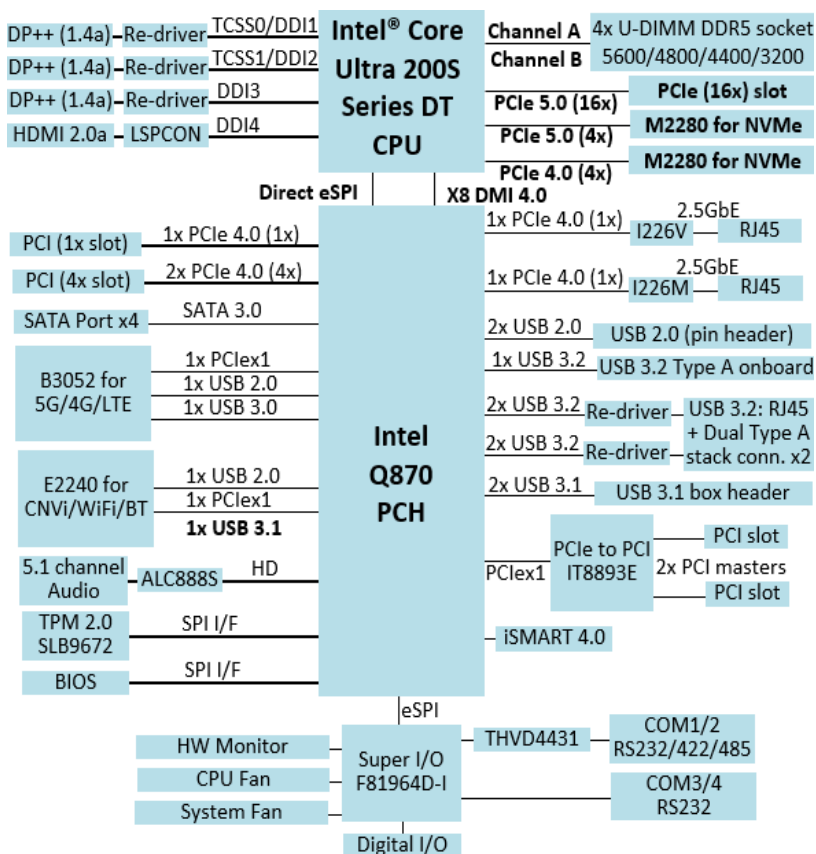
Model	MBB1005AF
Form Factor	ATX Motherboard
CPU Type	Intel® LGA1851 Core™ Ultra 200S Series DT Processors (Arrow Lake-S)
CPU Socket	LGA1851
PCH	Q870
Memory	4x DDR5 UDIMM sockets, Up to DDR5 -5600 memory module, Max. 192GB
Watchdog Timer	256 levels
HW Monitor	Yes
Storage Interface	SATA III & NVMe
Expansion Slots	1x PCI-E (x16) [Gen 5.0] 2x PCI-E(x4) 1x PCI-E(x1) 2x PCI
Mini Type Slots	2x M.2 (M-Key, type:2280, PCI-E(4x)) 1x M.2 (E-Key, type:2230, USB 2.0 + PCI-E(1x)) 1x M.2 (B-Key, type:3052, USB 3.2 + PCI-E(1x))
Graphics	Intel® LGA1851 Core™ Ultra 200S Series DT processor integrated graphics
Display Output	1x HDMI (2.0b) + 3x DisplayPort (1.4a) (DP++)
Ethernet	LAN 1: Intel® I226LM, supports 2.5G and iAMT LAN 2: Intel® I226V, supports 2.5G only
I/O Chipset	Fintek F81964D-I

Serial Port	4x COM ports: 2x RS-232/422/485 + 2x RS-232
USB 2.0	2x USB 2.0 via pin-headers
USB 3.0	4x USB 3.2 (10 Gbps) @edge connector 2x USB 3.2 (5 Gbps) @onboard box-header 1x USB 3.2 (10 Gbps) @onboard Type-A connector
Serial ATA	4x SATA III
Audio	Built-in HD Audio controller + Realtek ALC888S w/ 5.1 channels
TPM	Supports dTPM(2.0) & fTPM (optional)
Others	Digital I/O (4-in/4-out), Watchdog timer PDPC, iSMART(4.0)
Dimensions (L x W)	305mm x 244mm (12" x 9.6")

Environment	
Operating Temperature	0°C~60°C (32°F~140°F)
Storage Temperature	-20°C~80°C (-4°F~176°F)
Relative Humidity	90% (non-condensing @60°C)

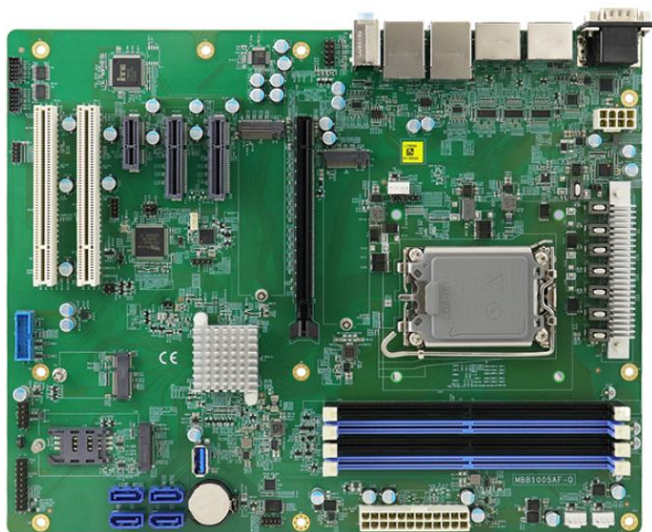
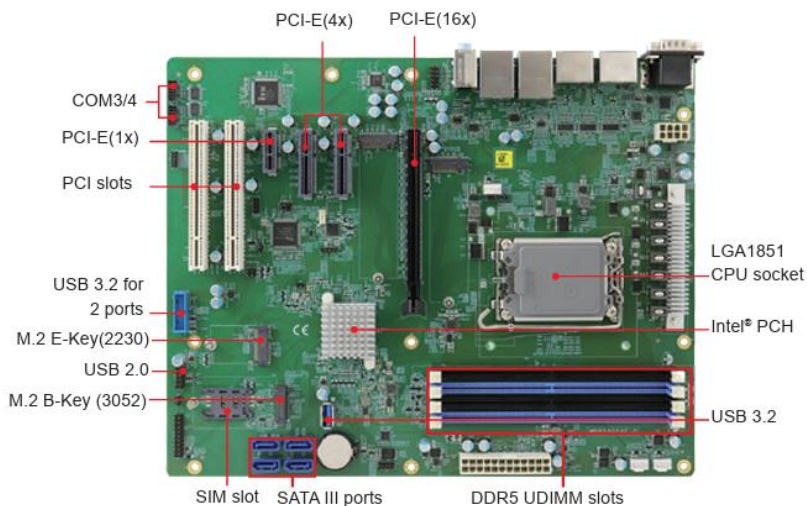
All specifications are subject to change without prior notice.

1.5 Block Diagram



1.6 Product View

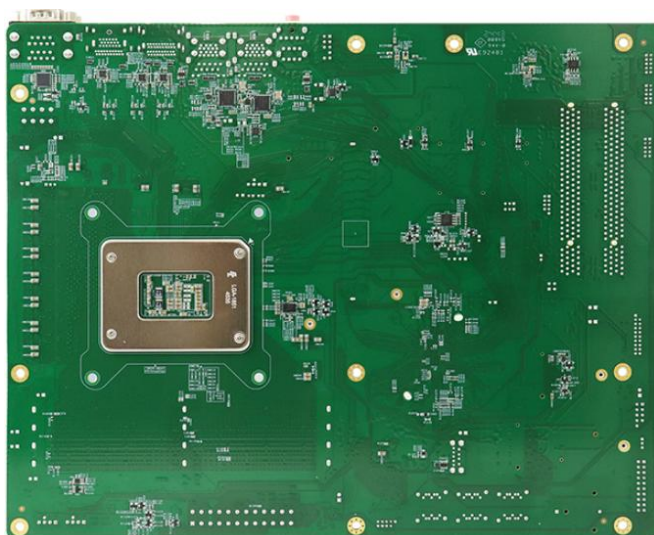
Top View



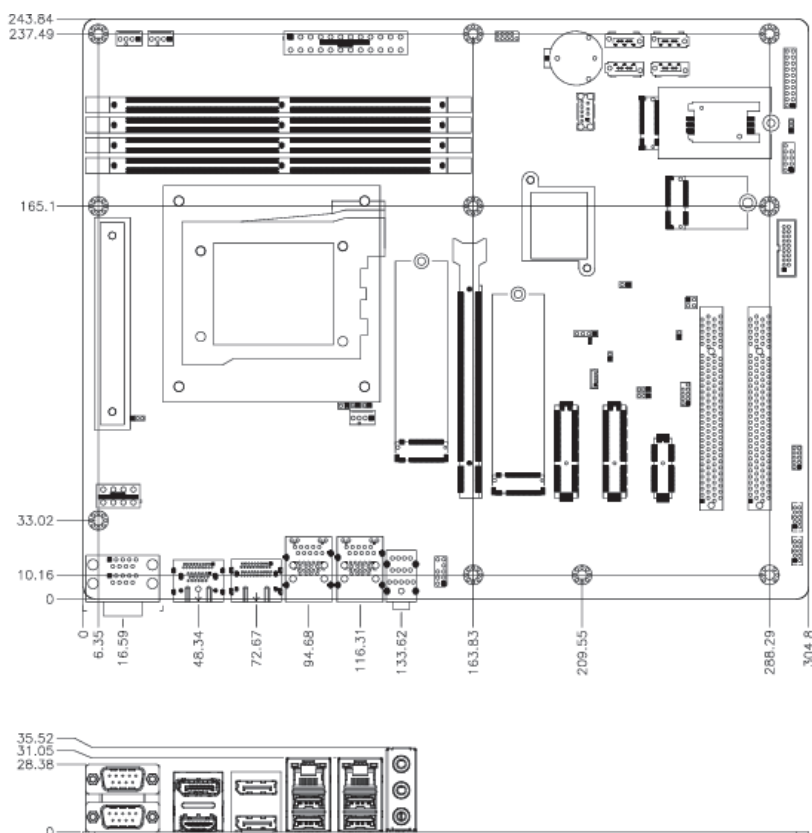
I/O View



Rear View



1.7 Dimensions



Chapter 2

Hardware Configuration

This section provides information on jumper settings and connectors on the MBB1005AF and other installation information necessary for setting up a functional system. The topics covered are:

- Essential installations
- Jumper and connector locations
- Jumper settings and connector descriptions

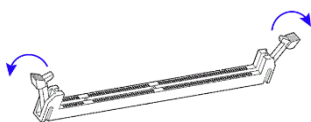
2.1 Essential Installations

Follow the instructions below to install the memory modules.

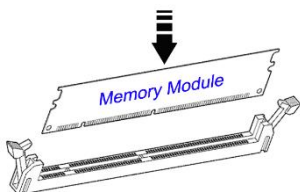
2.1.1 Installing the Memory

To install the modules:

1. Locate the memory slots on board.
2. Align the key of the memory module with the ridge in the memory slot then insert the module vertically and press it down firmly until the clips on both ends lock into place.



1. Gently push the module in an upright position until the clips on both ends lock into place, securing the module when it is fully seated.

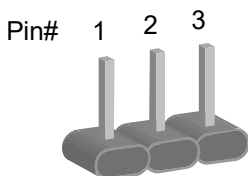


To remove the module, press both ejector tabs outwards to release the module from the slot.

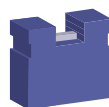
2.2 Setting the Jumpers

Configure the MBB1005AF by using jumpers for various settings and features. If you are unsure about the optimal configuration for your application, please consult your supplier or distributor.

Jumpers are short-length conductors made of metal pins mounted on a non-conductive base on the circuit board. Jumper caps are placed over the pins to either enable or disable specific functions. For 3-pin jumpers, you may connect: **Pin 1-2** or **Pin 2-3**.

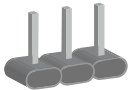
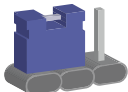
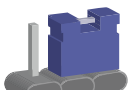


A 3-pin jumper



A jumper cap

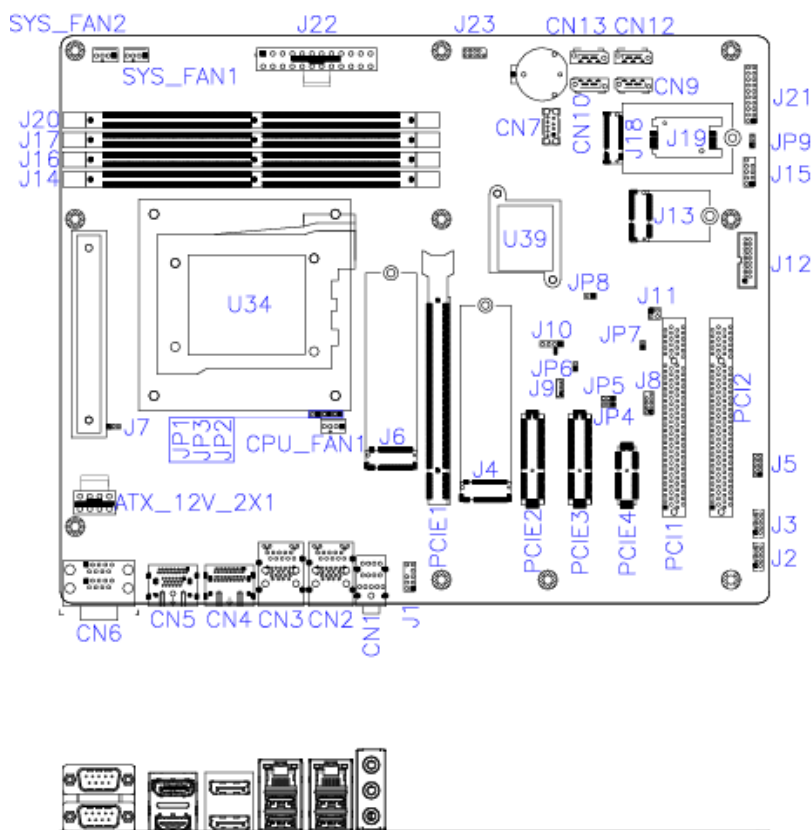
Refer to the illustration below to set jumpers.

Jumper	Pin Configuration	Description
	Pins open	Jumper is open (function is disabled)
	Pins 1-2 closed	Jumper is closed on pins 1-2
	Pins 2-3 closed	Jumper is closed on pins 2-3

When two pins of a jumper are encased in a jumper cap, this jumper is **closed**, i.e., turned **On**.

When a jumper cap is removed from two jumper pins, this jumper is **open**, i.e., turned **Off**.

2.3 Jumper & Connector Locations

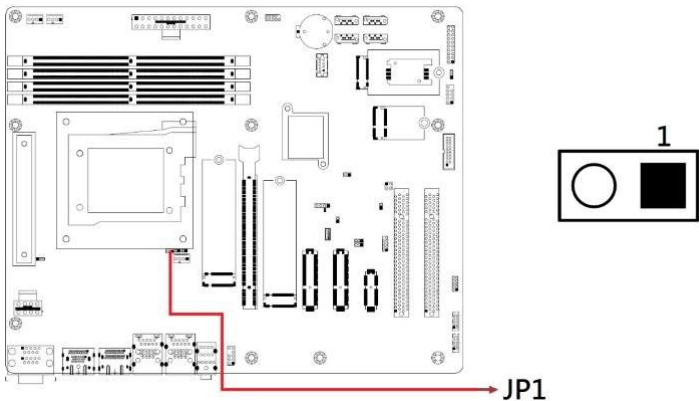


MBB1005AF

2.4 Jumpers Quick Reference

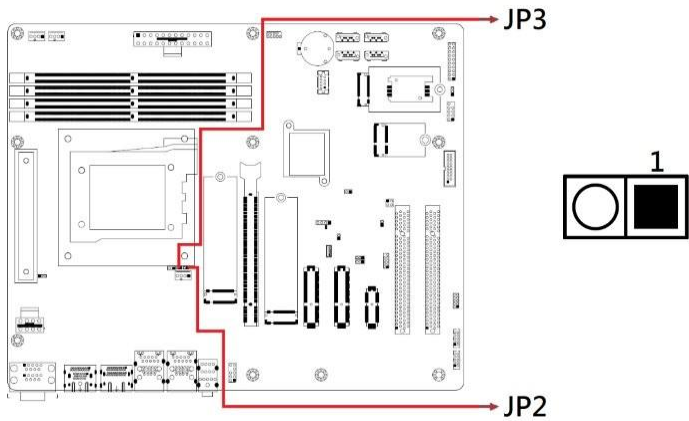
Jumper	Function
JP1	Flash Descriptor Security Override (reserved)
JP2, JP3	PCI Express Bifurcation
JP4	Clear RTC
JP5	Clear CMOS
JP6	GPI_BOOTLOADER (reserved)
JP7	AT/ATX Select
JP8	Flash Descriptor Security Override (Factory use only)
JP9	Sierra EM9 series 5G card USB/PCIe select

2.4.1 JP1: Flash Descriptor Security Override (reserved)



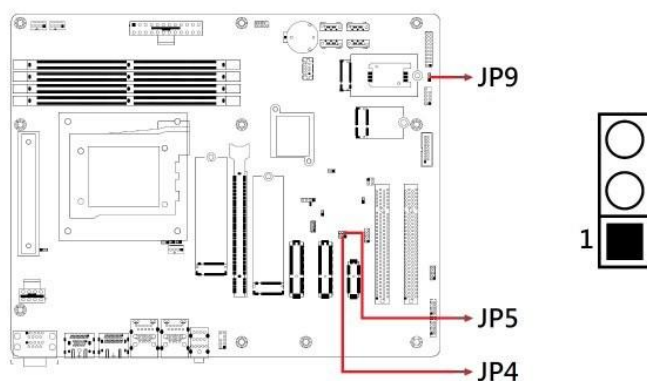
Function	Pins closed	Illustration
Disable (default)	Open	 1
Enable	Close	 1

2.4.2 JP2, JP3: PCI Express Bifurcation



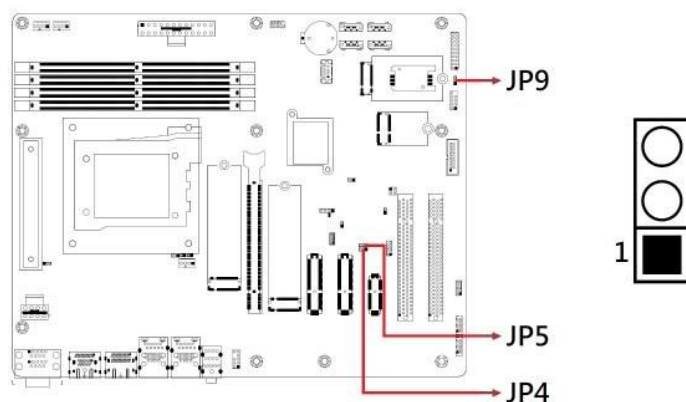
Function	Pins closed	Illustration
1 x PCIe (x16) (default)	JP2: Open	 1
	JP3: Open	 1
2 x PCIe (x8)	JP2: Close	 1
	JP3: Open	 1
1 x PCIe (x8) 2 x PCIe (x4)	JP2: Close	 1
	JP3: Close	 1

2.4.3 JP4: Clear RTC



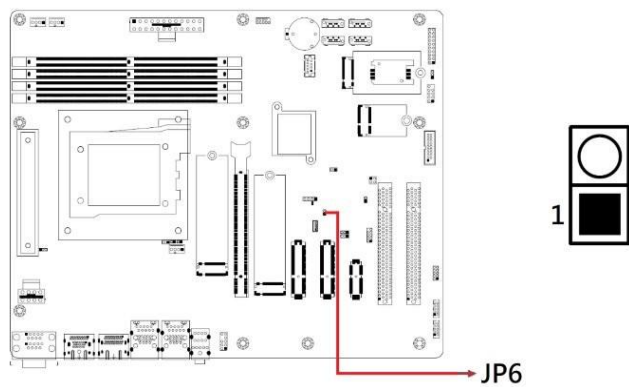
Function	Pins closed	Illustration
Normal (default)	1-2	1
Clear RTC	2-3	1

2.4.4 JP5: Clear CMOS



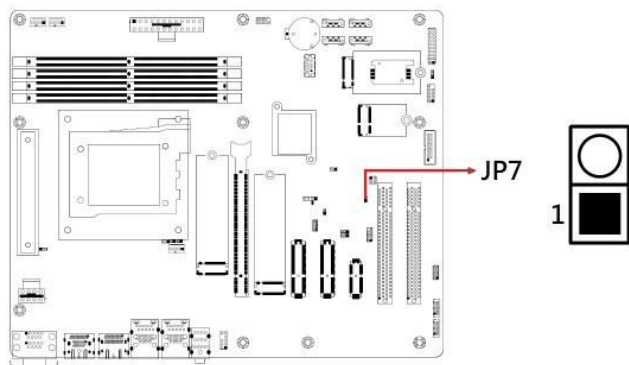
Function	Pins closed	Illustration
Normal (default)	1-2	1
Clear CMOS	2-3	1

2.4.5 JP6: GPI_BOOTLOADER (reserved)



Function	Pins closed	Illustration
Normal (default)	Open	 1
Enable	Close	 1

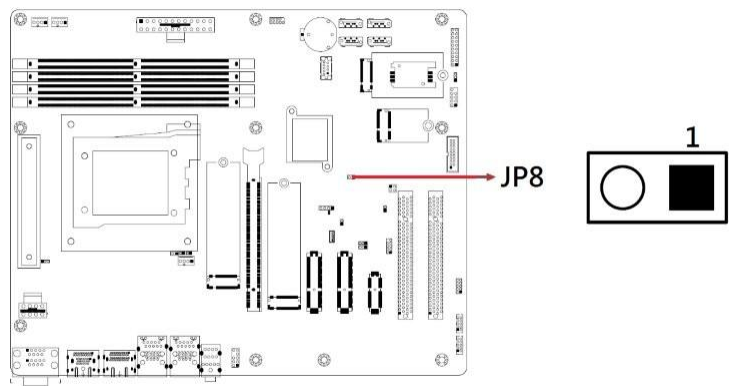
2.4.6 JP7: AT/ATX Select



Function	Pins closed	Illustration
ATX	JP7: Open	 1
AT	JP7: Close	 1

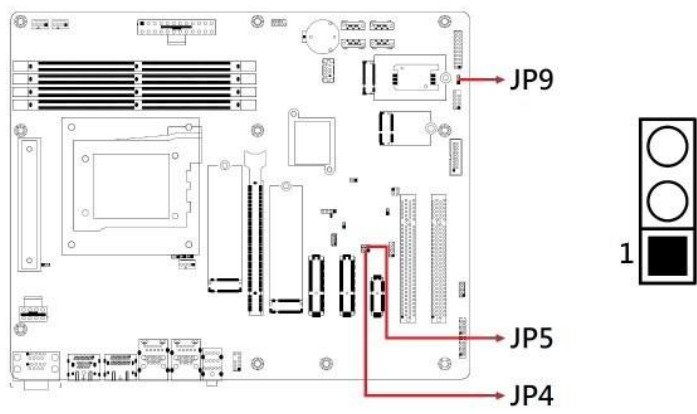
2.4.7

JP8: Flash Descriptor Security Override (Factory use only)



Function	Pins closed	Illustration
Disabled (default)	Open	 1
Enabled	Close	 1

2.4.8 JP9: Sierra EM9 series 5G card USB/PCIe Select

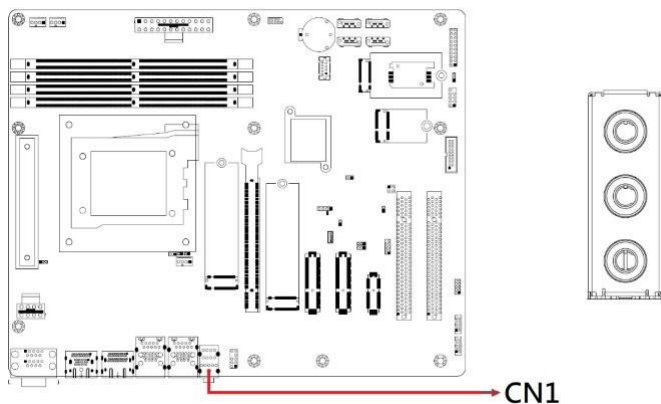


Function	Pins closed	Illustration
USB	Pin 1-2 Short/Closed (default)	 1
PCIe	Pin 2-3 Short/Closed	 1

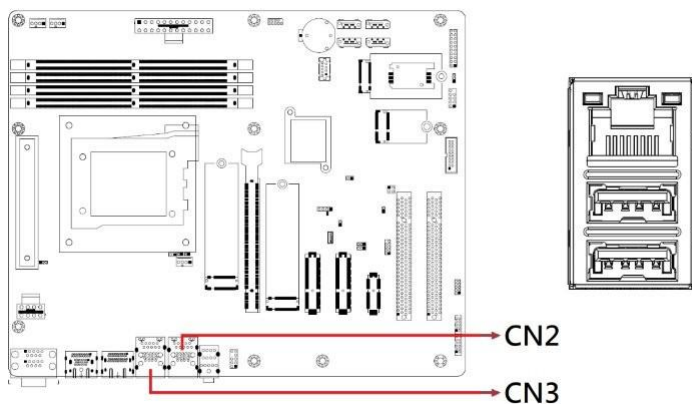
2.5 Connectors Quick Reference

Connector	Function
CN1	HD Audio Jacks
CN2	2.5G LAN (i226V) + USB 3.2 GEN2 #3/#4
CN3	2.5G LAN (i226LM) + USB 3.2 GEN2 #1/#2
CN4	DP++
CN5	DP++ (top) / HDMI (bottom)
CN6	COM1 (top) and COM2 (bottom)
CN7	USB 3.2 #7
CN9	SATA #4
CN10	SATA #6
CN12	SATA #5
CN13	SATA #7
J1	Audio front panel
J2	COM4
J3	COM3
J4	M.2 M-Key NVME (CPU)
J5	Digital I/O (4in, 4out)
J6	M.2 M-Key NVME (CPU)
J7	PWM programming (Factory use only)
J8	eSPI Debug (Factory use only)
J9	iSmart JTAG (Factory use only)
J10	iSmart debug UART (Factory use only)
J11	S3 Status connector
J12	USB3 #9/#10
J13	M.2 E-key w/CNVI
J14	DDR5 UDIMM CHB 0
J15	USB2 #11/#12
J16	DDR5 UDIMM CHB 1
J17	DDR5 UDIMM CHA 0
J18	M.2 B-Key
J19	SIM Card slot
J20	DDR5 UDIMM CHA 1
J21	Front Panel Settings
J22	24-pin ATX Power Connector
J23	SPI Flash Connector (Factory use only)

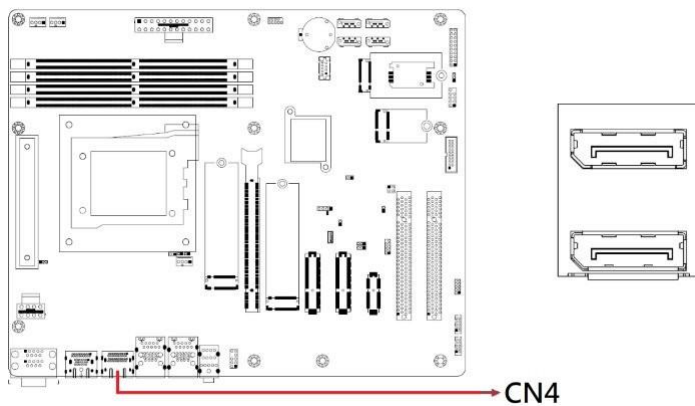
2.5.1 CN1: HD Audio Jacks



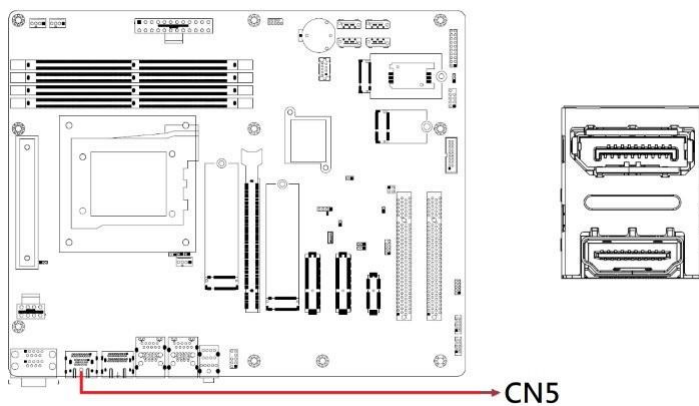
2.5.2 CN2: 2.5G LAN (i226V)+ USB 3.2 GEN2 #3/#4 CN3: 2.5G LAN (i226LM) + USB 3.2 GEN2 #1/#2



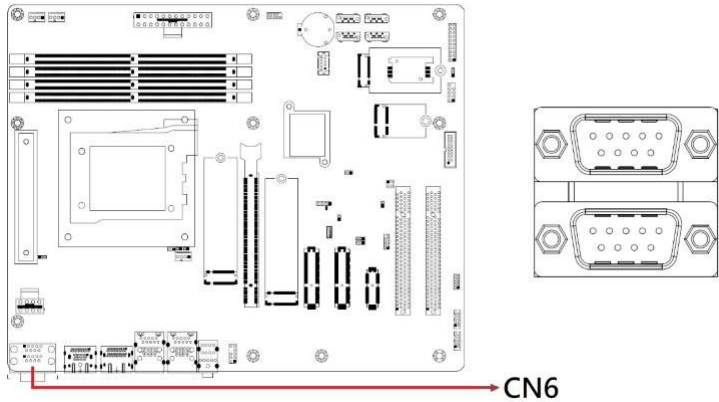
2.5.3 CN4: DP++



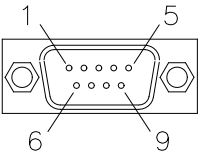
2.5.4 CN5: DP++ (top) / HDMI (bottom)



2.5.5 CN6: COM1 (top) and COM2 (bottom)

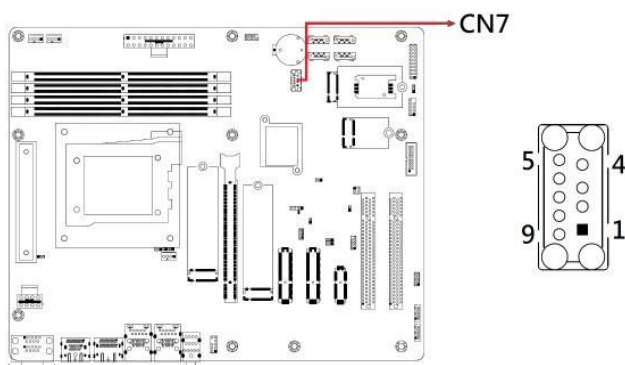


Pin	Signal Name		
	RS-232	RS-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC

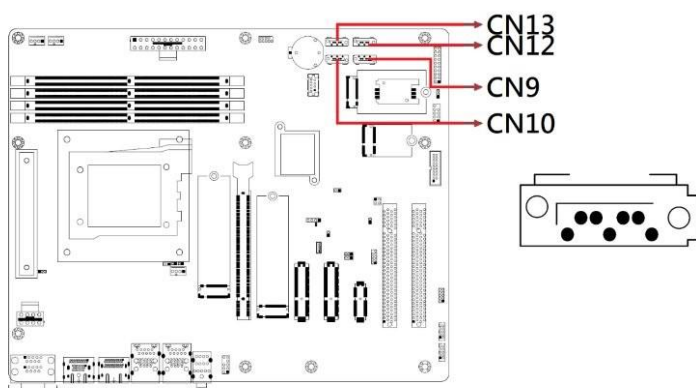


Note: COM1 and COM2 supports RS-232/RS-422/RS-485

2.5.6 CN7: USB 3.2 #7

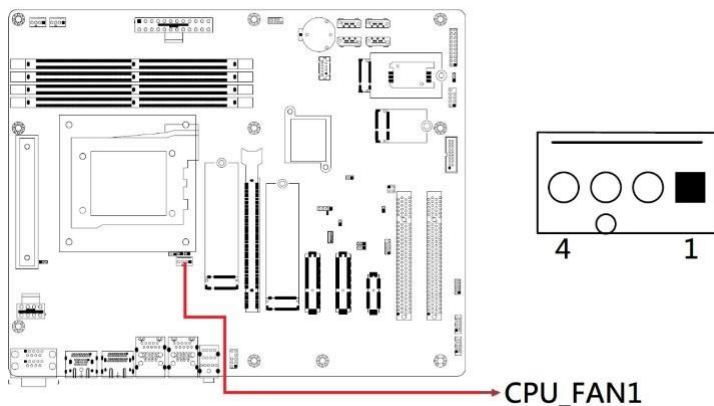


2.5.7 CN9, CN10, CN12, CN13: SATA #4/#6/#5/#7



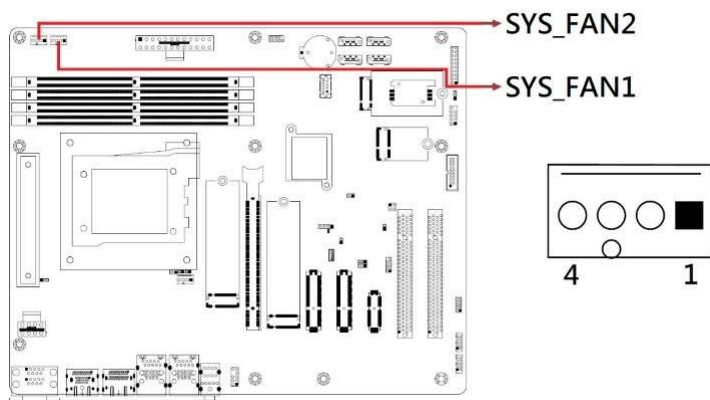
Pin	Signal Name
1	Ground
2	TX+
3	TX-
4	Ground
5	RX-
6	RX+
7	Ground

2.5.8 CPU_FAN1: CPU Fan Power Connector



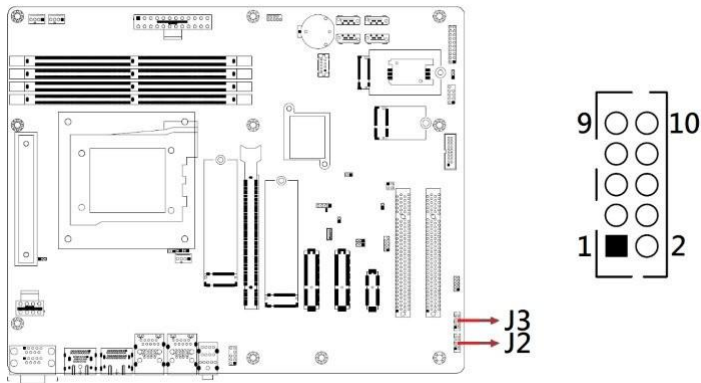
Pin	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

2.5.9 SYS_FAN1, SYS_FAN2: System Fan Power Connector



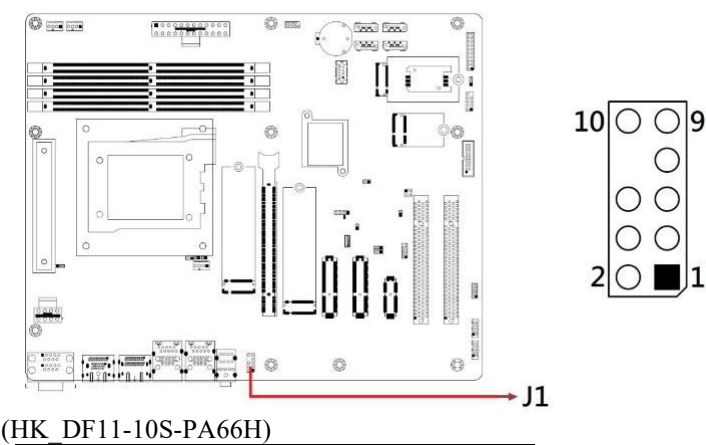
Pin	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

2.5.10 J1: Audio Front Panel Connector



Signal Name	Pin	Pin	Signal Name
MIC IN_L	1	2	Ground
MIC IN_R	3	4	DET
LINE_R	5	6	Ground
Sense	7	8	Key
LINE_L	9	10	Ground

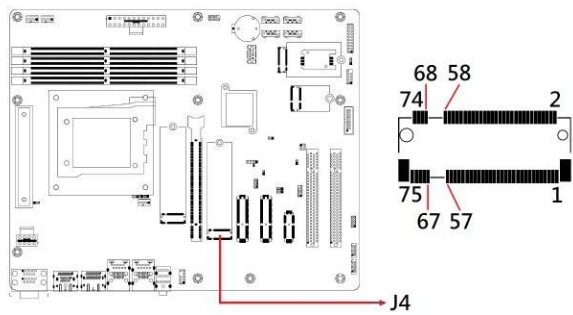
2.5.11 J2, J3: COM4, COM3



(HK_DF11-10S-PA66H)

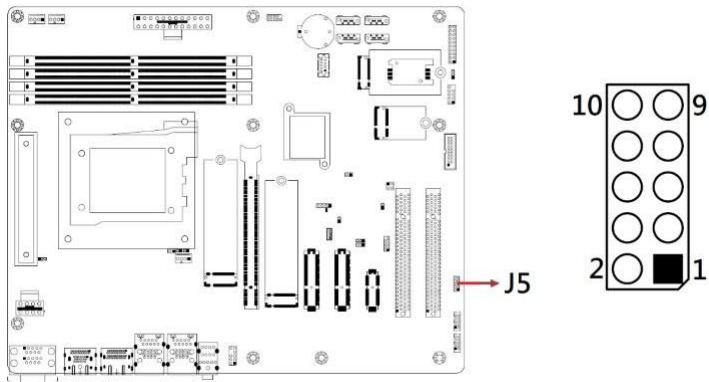
Signal Name	Pin	Pin	Signal Name
DCD#	1	2	SIN#
SOUT	3	4	DTR#
GND	5	6	DSR#
DTR#	7	8	CTS#
RI#	9	10	Key

2.5.12 J4: M.2 M-Key NVME (CPU)



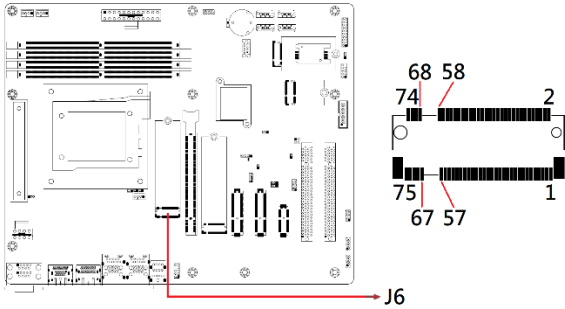
Pin	Assignment	Pin	Assignment
1	GND	2	3.3V
3	GND	4	3.3V
5	PCIE RXN3	6	NC
7	PCIE RXP3	8	NC
9	GND	10	SSD_LED
11	PCIE TXN3	12	3.3V
13	PCIE TXP3	14	3.3V
15	GND	16	3.3V
17	PCIE RXN2	18	3.3V
19	PCIE RXP2	20	NC
21	GND	22	NC
23	PCIE TXN2	24	NC
25	PCIE TXP2	26	NC
27	GND	28	NC
29	PCIE RXN1	30	NC
31	PCIE RXP1	32	NC
33	GND	34	NC
35	PCIE TXN1	36	NC
37	PCIE TXP1	38	NC
39	GND	40	NC
41	PCIE RXN0	42	NC
43	PCIE RXP0	44	NC
45	GND	46	NC
47	PCIE TXN0	48	NC
49	PCIE TXP0	50	PCIE_RST#
51	GND	52	CLK_REQ#
53	PCIE_CLK_N	54	PCIE_WAKE#
55	PCIE_CLK_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	SUS_CLK
69	NC	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	GND		

2.5.13 J5: Digital I/O (4in, 4out)



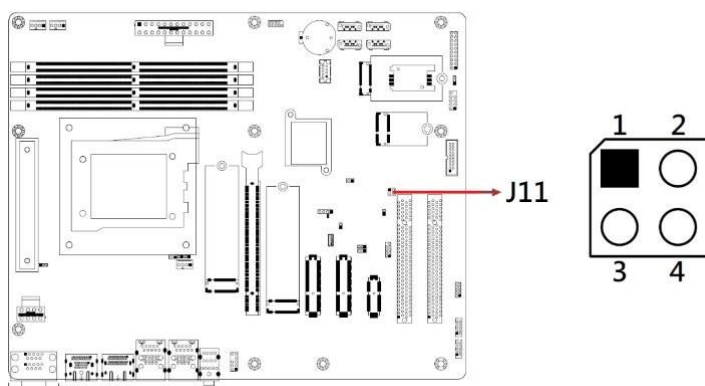
Signal Name	Pin	Pin	Signal Name
Ground	1	2	+5V
Out3	3	4	Out1
Out2	5	6	Out0
IN3	7	8	IN1
IN2	9	10	IN0

2.5.14 J6: M.2 M-Key NVME (CPU)



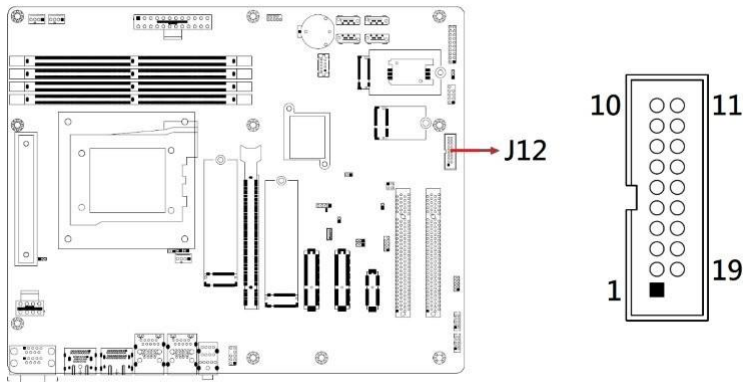
Pin	Assignment	Pin	Assignment
1	GND	2	3.3V
3	GND	4	3.3V
5	PCIE RXN3	6	NC
7	PCIE RXP3	8	NC
9	GND	10	SSD_LED
11	PCIE TXN3	12	3.3V
13	PCIE TXP3	14	3.3V
15	GND	16	3.3V
17	PCIE RXN2	18	3.3V
19	PCIE RXP2	20	NC
21	GND	22	NC
23	PCIE TXN2	24	NC
25	PCIE TXP2	26	NC
27	GND	28	NC
29	PCIE RXN1	30	NC
31	PCIE RXP1	32	NC
33	GND	34	NC
35	PCIE TXN1	36	NC
37	PCIE TXP1	38	NC
39	GND	40	NC
41	PCIE RXN0	42	NC
43	PCIE RXP0	44	NC
45	GND	46	NC
47	PCIE TXN0	48	NC
49	PCIE TXP0	50	PCIE_RST#
51	GND	52	CLK_REQ#
53	PCIE_CLK_N	54	PCIE_WAKE#
55	PCIE_CLK_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	NC
67	NC	68	SUS_CLK
69	NC	70	3.3V
71	GND	72	3.3V
73	GND	74	3.3V
75	GND		

2.5.15 J11: S3 Status Connector



Signal Name	Pin	Pin	Signal Name
3VDUAL	1	2	Ground
VCC3	3	4	Ground

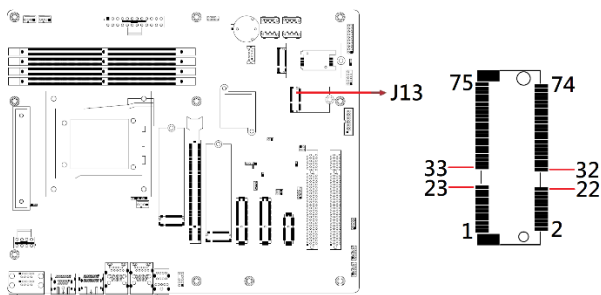
2.5.16 J12: USB3 #9/#10



(PINREX_52X-40-20GU52)

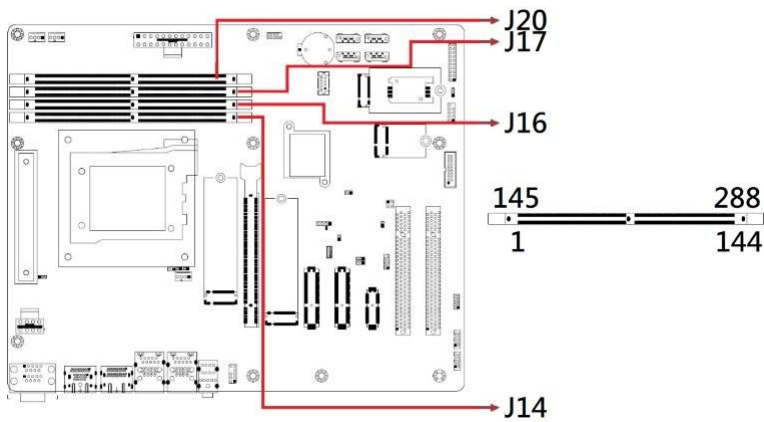
Signal Name	Pin	Pin	Signal Name
VCC	1	X	
P1_SSRX-	2	19	VCC
P1_SSRX+	3	18	P2_SSRX-
GND	4	17	P2_SSRX+
P1_SSTX-	5	16	GND
P1_SSTX+	6	15	P2_SSTX-
GND	7	14	P2_SSTX+
P1_U2_D-	8	13	GND
P1_U2_D+	9	12	P2_U2_D
NC	10	11	P2_U2_D+

2.5.17 J13: M.2 E-Key w/ CNVI



Pin	Assignment	Pin	Assignment
1	GND	2	3.3V
3	USB D+	4	3.3V
5	USB D-	6	NC
7	GND	8	NC
9	CNV_WR_D1_DN	10	M.2 BT PCMFRM
11	CNV_WR_D1_DP	12	NC
13	GND	14	M.2 BT PCMOUT
15	CNV_WR_D0_DN	16	NC
17	CNV_WR_D0_DP	18	GND
19	GND	20	UART_BT_WAKE#
21	CNV_WR_CLK_DN	22	CNV_BRI_RSP
23	CNV_WR_CLK_DN	24	NC
25	NC	26	NC
27	NC	28	NC
29	NC	30	NC
31	NC	32	CNV_RGI_DT
33	GND	34	CNV_RGI_RSP
35	PCIE_TXP	36	CNV_BRI_DT
37	PCIE_TXN	38	CNV_WLAN_CLINK_RST_N
39	GND	40	CNV_WLAN_CLINK_DATA
41	PCIE_RXP	42	CNV_WLAN_CLINK_CLK
43	PCIE_RXN	44	NC
45	GND	46	NC
47	PCIE_CLK_P	48	NC
49	PCIE_CLK_N	50	SUS_CLK
51	GND	52	PCIE_RST#
53	CLK_REQ#	54	BT_RF_OFF
55	PCIE_WAKE#	56	WIFI_RF_OFF
57	GND	58	NC
59	CNV_WT_D1_DN	60	NC
61	CNV_WT_D1_DP	62	NC
63	GND	64	NC
65	CNV_WT_D0_DN	66	PCIE_RST#
67	CNV_WT_D0_DP	68	NC
69	GND	70	PCIE_WAKE#
71	CNV_WT_CLK_DN	72	3.3V
73	CNV_WT_CLK_DN	74	3.3V
75	GND		

2.5.18 J14, J16, J17, J20: DDR5 UDIMM CHB0/1, CHA0/1



Recommended Memory Configurations

	J20 CHA/1 (Blue)	J17 CHA/0 (Black)	J16 CHB/1 (Blue)	J14 CHB/0 (Black)
1 Module	V			
1 Module			V	
2 Module	V		V	
4 Module	V	V	V	V

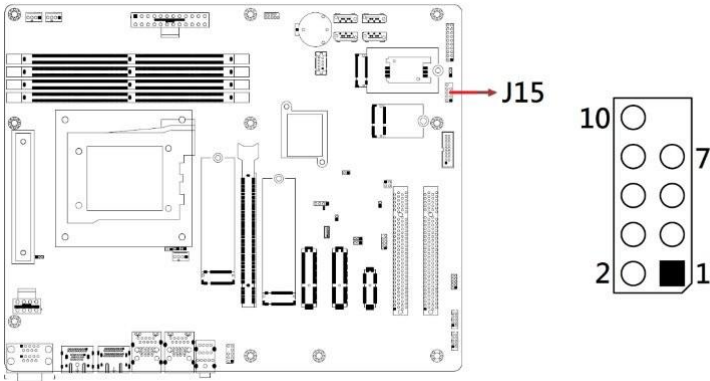
DDR5-5600 module

CHA		CHB		Speed
DIMM0(Black)	DIMM1(Blue)	DIMM0(Black)	DIMM1(Blue)	
J14	J16	J17	J20	
V				3200
	V			5600
V	V			4400 (Rank 2) 4800 (Rank 1)
		V		3200
			V	5600
		V	V	4400 (Rank 2) 4800 (Rank 1)
V		V		3200
	V		V	5600
V	V	V	V	4400 (Rank 2) 4800 (Rank 1)

DDR5-4800 module

CHA		CHB		Speed
DIMM0(Black)	DIMM1(Blue)	DIMM0(Black)	DIMM1(Blue)	
J14	J16	J17	J20	
V				3200
	V			4800
V	V			4400 (Rank 2) 4800 (Rank 1)
		V		3200
			V	4800
		V	V	4400 (Rank 2) 4800 (Rank 1)
V		V		3200
	V		V	4800
V	V	V	V	4400 (Rank 2) 4800 (Rank 1)

2.5.19 J15: USB2 #11/#12

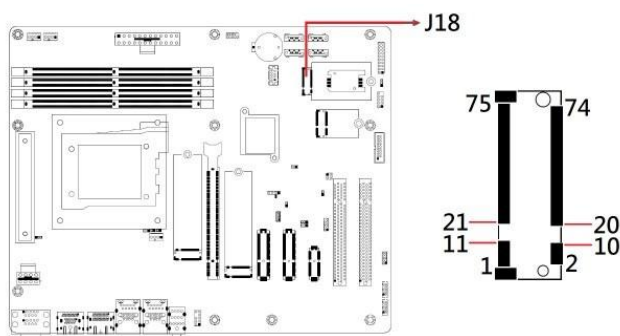


(E-CALL_0126-01-2811009)

Signal Name	Pin	Pin	Signal Name
Vcc	1	2	VCC
D0-	3	4	D1-
D0+	5	6	D1+
Ground	7	8	GND

KEY	9	10	NC
-----	---	----	----

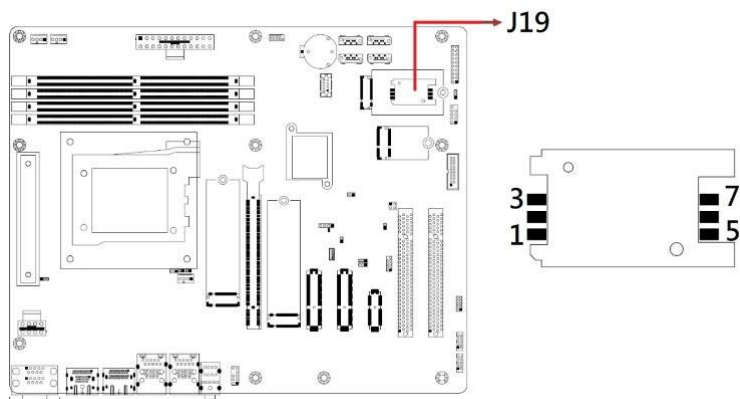
2.5.20 J18: M.2 B-Key



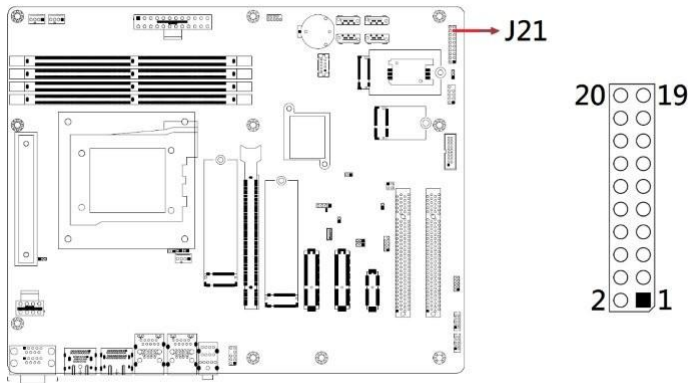
Pin	Assignment	Pin	Assignment
1	NC	2	3.3V
3	GND	4	3.3V
5	GND	6	FULL_CARD_POWER_OFF#
7	USB_D+	8	W_DISABLE1#
9	USB_D-	10	NC
11	GND	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	NC
19	NC	20	GPIO5
21	NC	22	GPIO6
23	NC	24	GPIO7
25	NC	26	NC
27	GND	28	NC
29	USB3_RXN	30	SIM_RST#
31	USB3_RXP	32	SIM_CLK
33	GND	34	SIM_IO
35	USB3_TXN	36	SOM_VCC
37	USB3_TXP	38	NC
39	GND	40	NC
41	PCIE_RXN	42	NC
43	PCIE_RXP	44	NC
45	GND	46	NC
47	PCIE_TXN	48	NC
49	PCIE_TXP	50	PCIE_RST#
51	GND	52	CLK_REQ#
53	PCIE_CLK_N	54	PCIE_WAKE#
55	PCIE_CLK_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	SIM_CD
67	NC	68	SUS_CLK
69	NC	70	3.3V

71	GND	72	3.3V
73	GND	74	3.3V
75	NC		

2.5.21 J19: SIM Card Slot

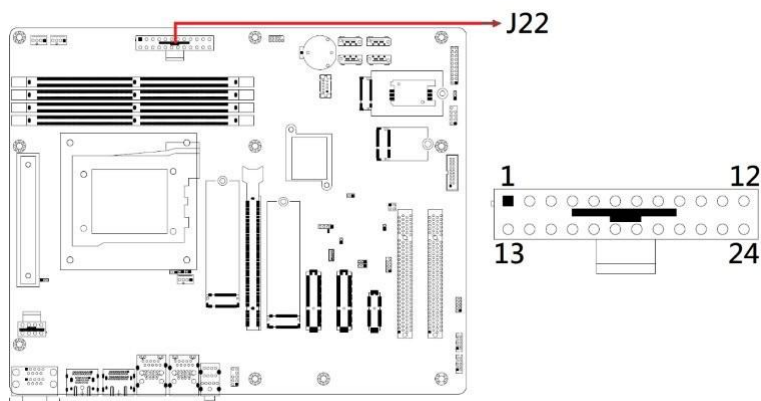


2.5.22 J21: Front Panel Settings Connector



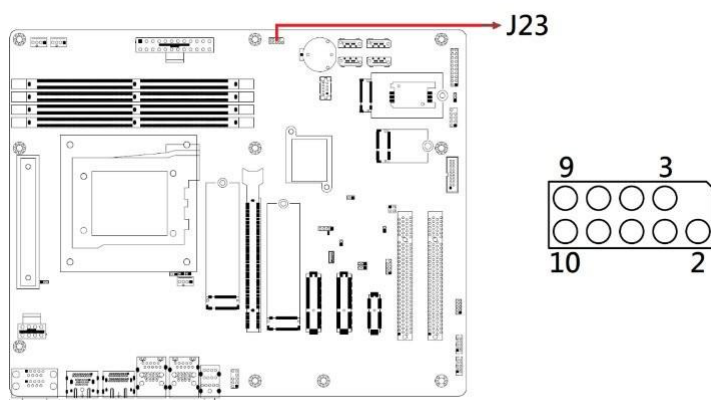
Signal Name	Pin	Pin	Signal Name
Power LED+	1	2	NC
GND	3	4	NC
Power LED-	5	6	GND
NC	7	8	NC
GND	9	10	NC
GND	11	12	NC
Power BTN	13	14	Power BTN
NC	15	16	NC
Reset BTN	17	18	Reset BTN
HDD LED+	19	20	HDD LED-

2.5.23 J22: 24-pin ATX Power Connector

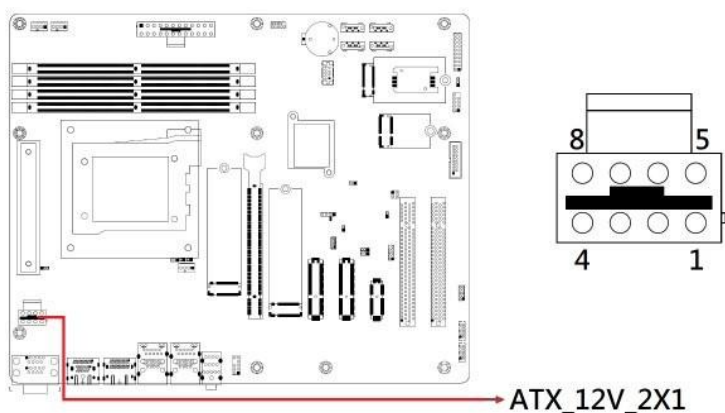


Signal Name	Pin	Pin	Signal Name
3.3V	13	1	3.3V
-12V	14	2	3.3V
Ground	15	3	Ground
PS-ON	16	4	+5V
Ground	17	5	Ground
Ground	18	6	+5V
Ground	19	7	Ground
NC	20	8	Power good
+5V	21	9	5VSB
+5V	22	10	+12V
+5V	23	11	+12V
Ground	24	12	3.3V

2.5.24 J23: SPI Flash Connector (Factory use only)



2.5.25 ATX_12V_2X1: AT 12V Power Connector



Signal Name	Pin	Pin	Signal Name
Ground	1	5	+12V
Ground	2	6	+12V
Ground	3	7	+12V
Ground	4	8	+12V

Chapter 3

Drivers Installation

This chapter introduces installation of the following drivers:

- Intel® Chipset Software Installation Utility
- VGA Driver Installation
- Intel(R) Smartsound Drivers Installation
- Realtek Audio DCH Drivers Installation
- LAN Driver Installation
- Intel® ME Drivers Installation
- Intel® SIO Drivers Installation
- Intel® PMT Drivers Installation
- Intel® NPU IO Drivers Installation
- Intel® GNA IO Drivers Installation

3.1 Introduction

This section describes the installation procedures for software and drivers under Windows 11.

Note: After installing the Windows operating system, you must install the Intel® Chipset Software Installation Utility first before proceeding with the installation of other drivers.

3.2 Intel® Chipset Software Installation Utility

The Intel® Chipset Software Installation Utility must be installed first to properly configure INF files for Plug & Play functionality of Intel chipset components. Follow the steps below:

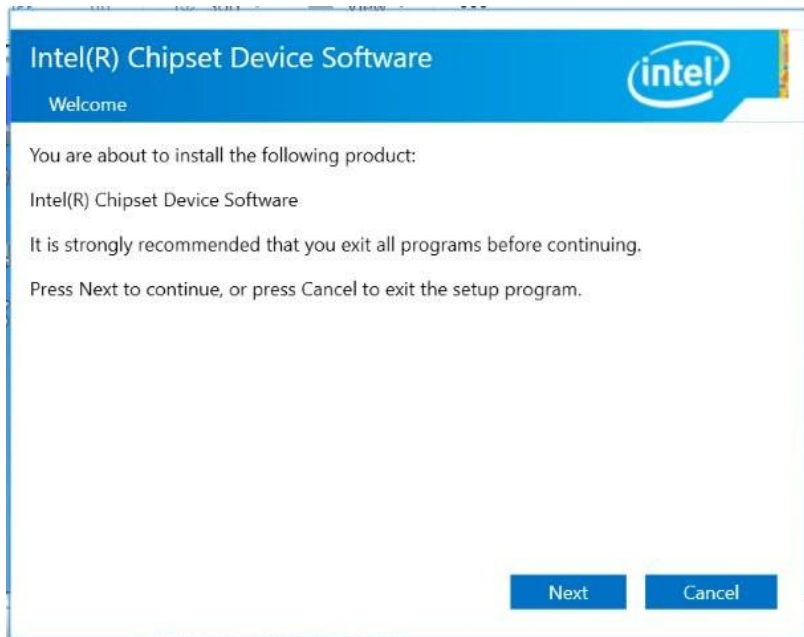
1. Visit the IBASE website and navigate to the product's Download page. Download the compressed driver file to your computer. Double-click the file to extract it. Run CDGuide.exe to open the main driver interface. In the interface, click Intel on the left pane, then select Intel® Arrow Lake-S Chipset Drivers on the right.



2. Click **Intel(R) Chipset Software Installation Utility**.



3. When the *Welcome* screen appears, click **Next**.



4. Accept the terms in the software license agreement.



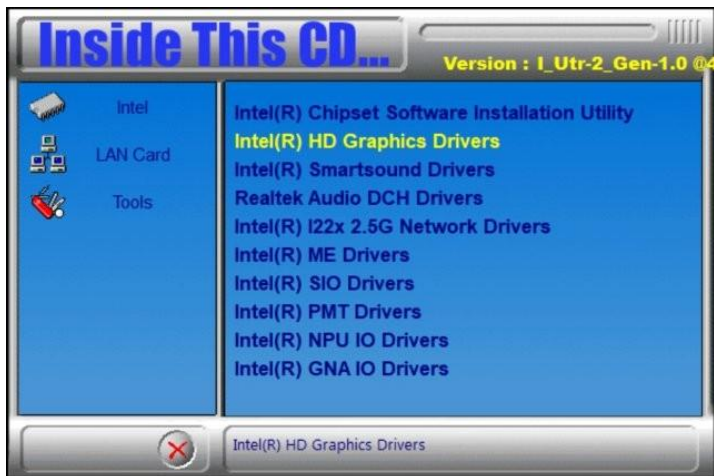
5. On the *Readme File Information* screen, click **Install**.



6. When installation is complete, click **Finish**.

3.3 VGA Driver Installation

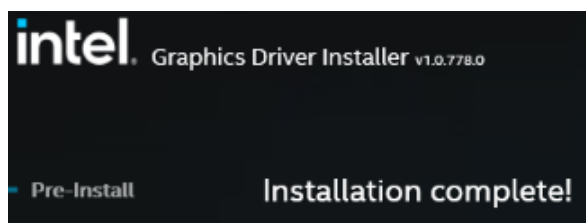
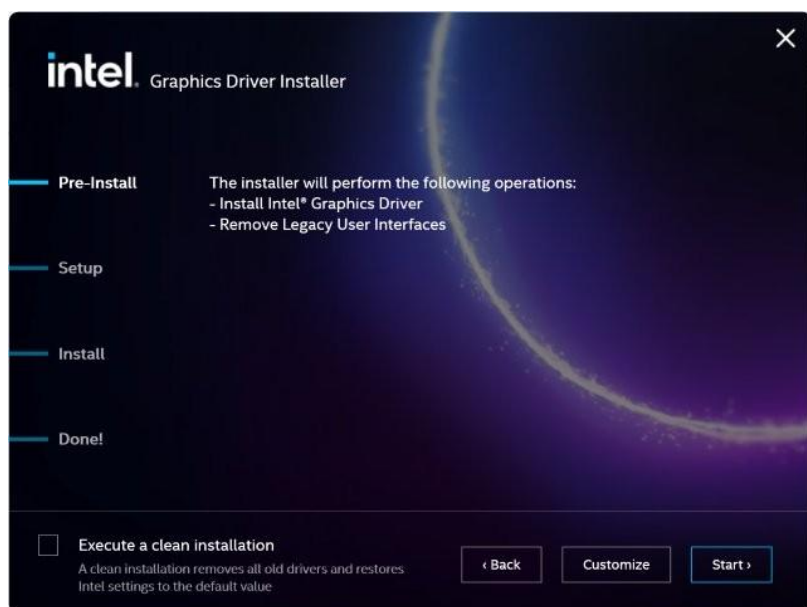
1. Click **Intel** on the left pane and then **Intel(R) Arrow Lake-S Chipset Drivers** on the right.
2. Click **Intel(R) HD Graphics Driver**.



3. Click **Begin installation**.



4. Click **I agree** in the INTEL SOFTWARE LICENSE AGREEMENT screen.
5. Click **Start**. When installation is complete, click Finish.

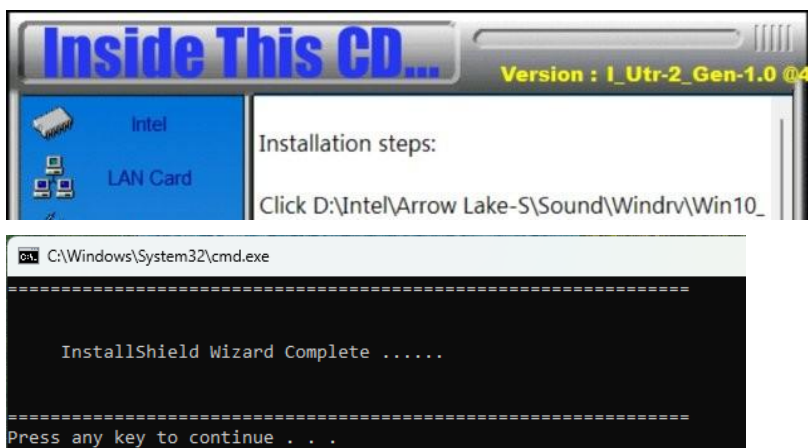


3.4 Intel(R) Smartsound Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) Arrow Lake-S Chipset Drivers** on the right pane. Click **Intel(R) Smartsound Drivers** on the right.



2. Run the file in the path shown below for the InstallShield Wizard to start and complete the installation of the Intel Smartsound drivers. When installation has been completed, press any key to continue.

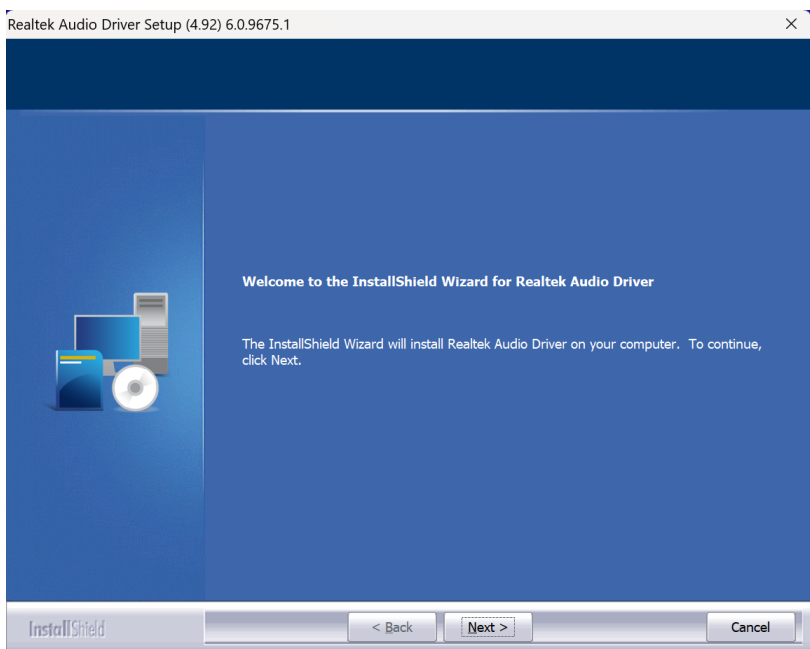


3.5 Realtek Audio DCH Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) Arrow Lake-S Chipset Drivers** on the right. Click **Realtek Audio DCH Drivers**.



2. Click **Next** when the Welcome to the InstallShield Wizard for Realtek Audio Driver screen appears.



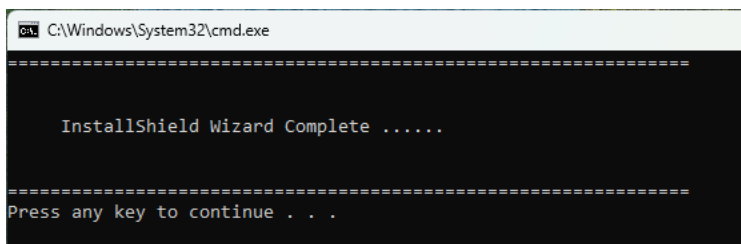
3. After the Installshield Wizard has completed the installation, restart the computer.

3.6 LAN Driver Installation

1. Click **Intel** on the left pane and then **Intel(R) Arrow Lake-S Chipset Drivers** on the right. Click **Intel(R) I22x 2.5G Network Drivers**.



2. Follow the steps until InstallShield Wizard completes the installation.

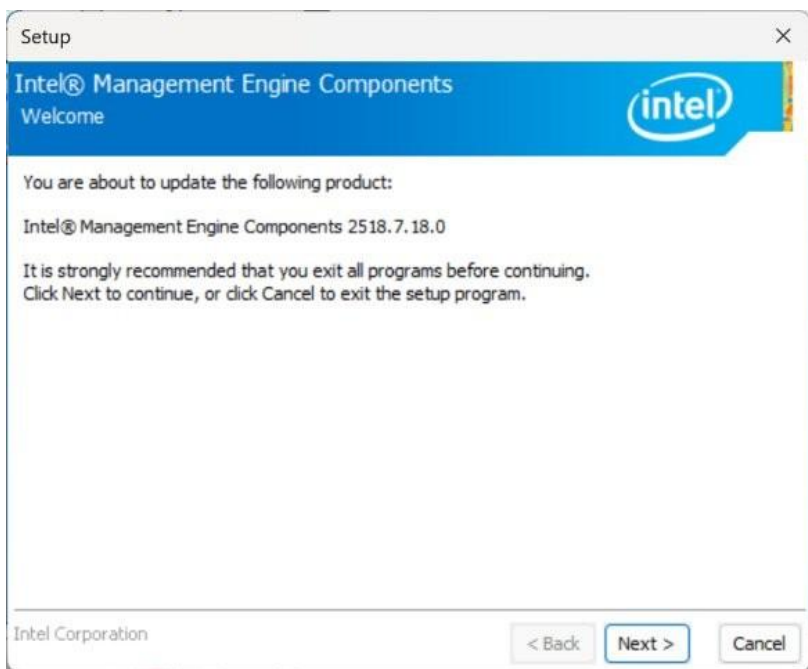


3.7 Intel® ME Drivers Installation

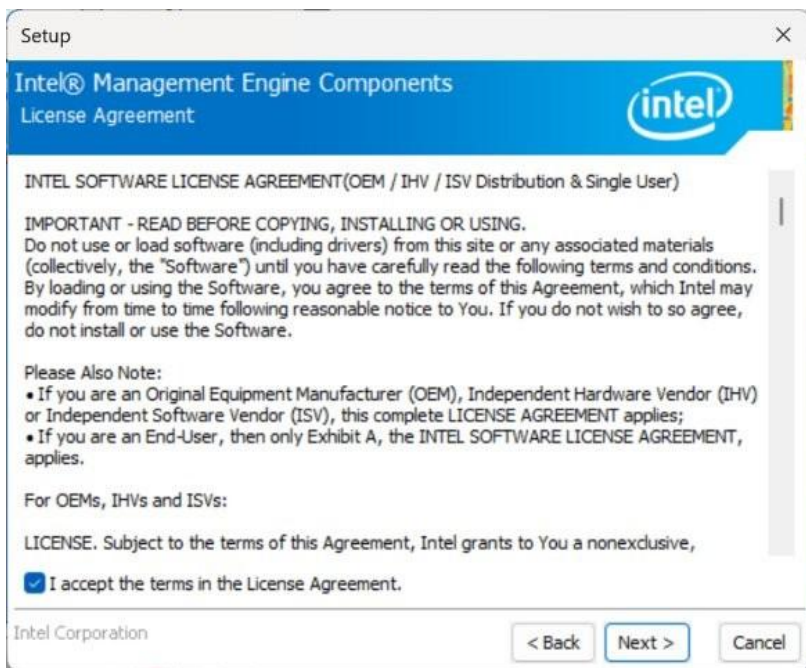
1. Click **Intel** on the left pane and then **Intel(R) Arrow Lake-S Chipset Drivers** on the right. Click **Intel(R) ME Drivers**.



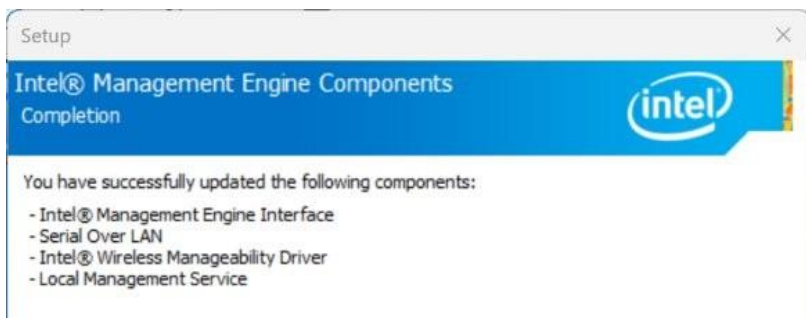
2. When the Welcome screen appears, click **Next**.



3. Accept the terms in the license agreement and click **Next**.



4. In the Destination Folder screen, click **Next** to install to the default folder, or click Change to choose another destination folder.
5. When installation is complete, click **Finish**.

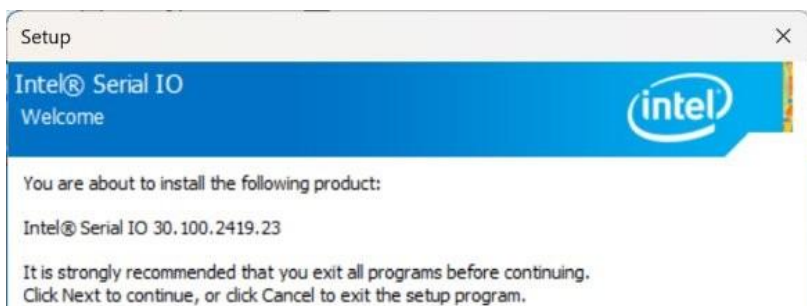


3.8 Intel® SIO Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) Arrow Lake-S Chipset Drivers** on the right. Click **Intel(R) SIO Drivers**.



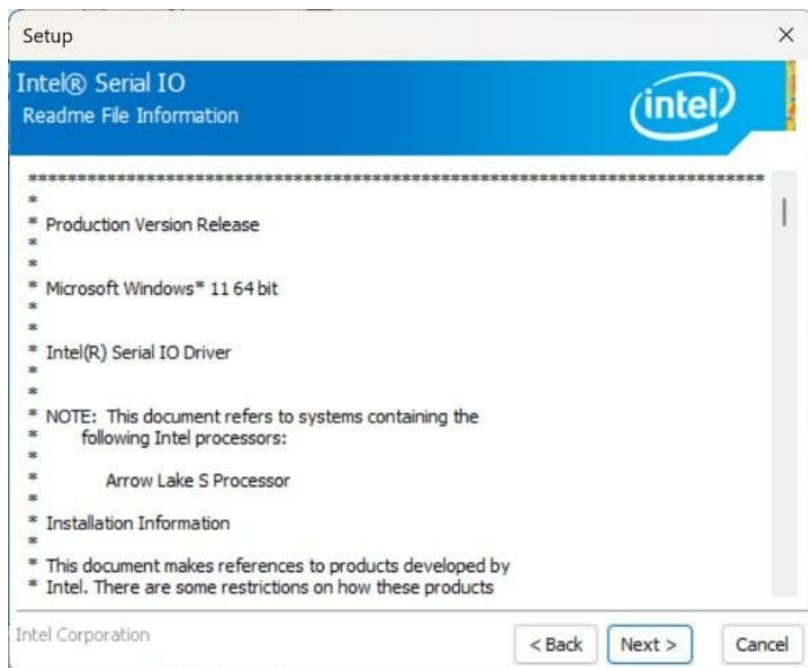
2. When the Welcome screen appears, click **Next**.



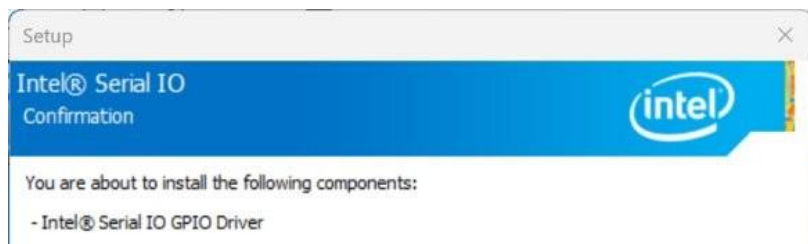
3. Accept the terms in the license agreement and click **Next**.



4. In the Readme File Information screen, click **Next**.



5. In the Confirmation screen, click **Next**.



6. In the Completion screen, click Finish.

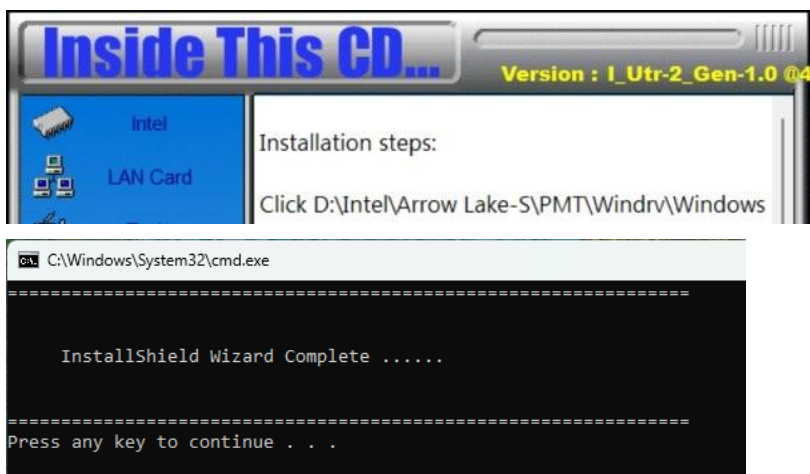


3.9 Intel® PMT Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) Arrow Lake-S Chipset Drivers** on the right. Click **Intel(R) PMT Drivers**.

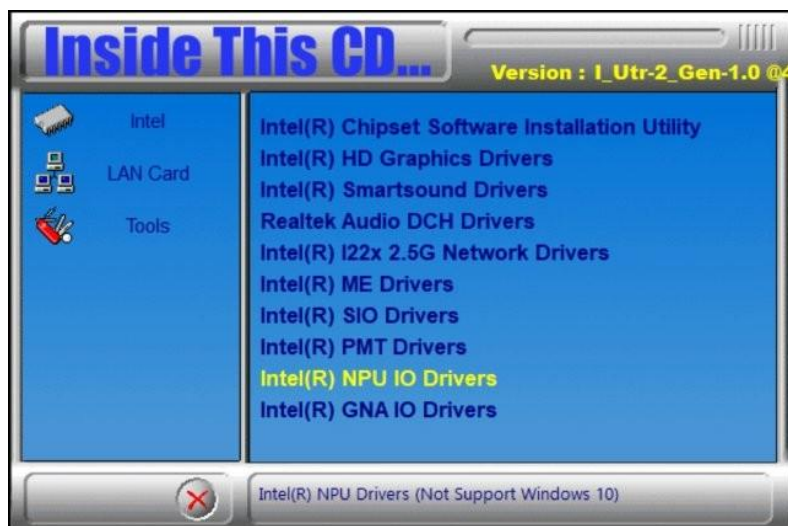


2. Follow the steps until InstallShield Wizard completes the installation.

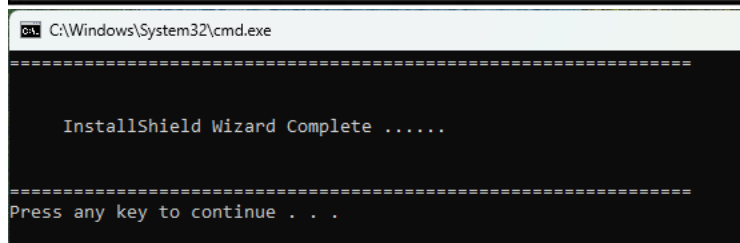


3.10 Intel® NPU IO Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) Arrow Lake-S Chipset Drivers** on the right. Click **Intel(R) NPU IO Drivers**.



2. Follow the steps until InstallShield Wizard completes the installation.



3.11 Intel® GNA IO Drivers Installation

1. Click **Intel** on the left pane and then **Intel(R) Arrow Lake-S Chipset Drivers** on the right. Click **Intel(R) GNA IO Drivers**.



2. Follow the steps until InstallShield Wizard completes the installation.



Chapter 4

BIOS Setup

This chapter describes the different settings available in the AMI BIOS that comes with the board. The topics covered in this chapter are as follows:

- Main Settings
- Advanced Settings
- Chipset Settings
- Security Settings
- Boot Settings
- Save & Exit

4.1 Introduction

The BIOS (Basic Input/Output System) installed in the ROM of your computer system supports Intel® processors. The BIOS provides critical low-level support for standard devices such as disk drives and serial ports. It also provides password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

4.2 BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Pressing the key immediately allows you to enter the Setup utility. If you are a little bit late pressing the key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup.

If you still need to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again.

The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

When you enter the BIOS Setup utility, the *Main Menu* screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Warning: It is strongly recommended that you avoid making any changes to the chipset defaults.

These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could make the system unstable and crash in some cases.

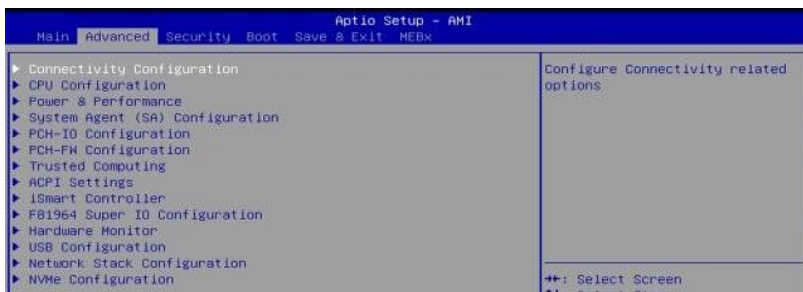
4.3 Main Settings



BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the Date elements.
System Time	Set the time. Use the <Tab> key to switch between the Time elements.

4.4 Advanced Settings

This section allows you to configure system features according to your preference.



4.4.1 Connectivity Configuration



BIOS Setting	Description
CNVi Mode	This option configures Connectivity. Auto Detection – means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; Disable Integrated – disables Integrated Solution.
BT Audio Offload	This is an option to enable/disable BT Audio Offload which enables audio input from BT device to the audio DSP and enables power efficient audio output to BT device.
Skip VDID Check	This is an option to enable Skip VDID Check for CNVd.
Preboot BLE	This will be used to enable Preboot Bluetooth.
Discrete Bluetooth Module	Serial IO UART0 needs to be enabled to select BT Module. Default: Disabled
BT Tile Mode	Enable/Disable Tile
Advanced Settings	Configure ACPI objects for wireless devices Default: Disabled
WWAN Configuration	Configure WWAN related options. WWAN Device: enable or disable M.2 WWAN device
WWAN Device	Select the M.2 WWAN device options to enable 4G-7360/7560 (Intel) 5G – M80 (MediaTek) modems.

4.4.2 CPU Configuration

Advanced Aptio Setup - AMI	
CPU Configuration ▶ Efficient-core Information ▶ Performance-core	Displays the E-core Information
ID 0xC0662 Brand String Intel(R) Core(TM) Ultra 7 265 VMX Supported SMX/TXT Supported Intel (VMX) Virtualization Technology [Enabled]	

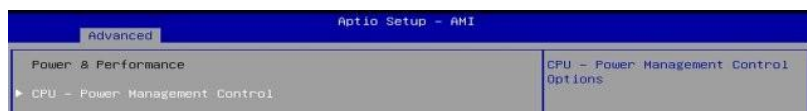
Advanced Aptio Setup - AMI	
Efficient-core Information	
L1 Data Cache	384 KB
L1 Instruction Cache	768 KB
L2 Cache	12288 KB
L3 Cache	30 MB

Advanced Aptio Setup - AMI	
Performance-core	
L1 Data Cache	384 KB
L1 Instruction Cache	512 KB
L2 Cache	24576 KB
L3 Cache	30 MB

Advanced Aptio Setup - AMI	
CPU Configuration ▶ Efficient-core Information ▶ Performance-core	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
ID 0xC0662 Brand String Intel(R) Core(TM) Ultra 7 265 VMX Supported SMX/TXT Supported Intel (VMX) Virtualization Technology [Enabled]	

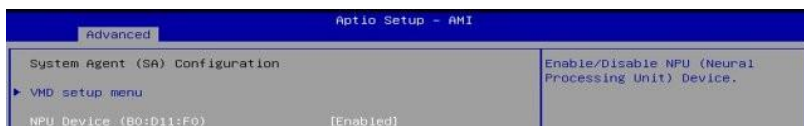
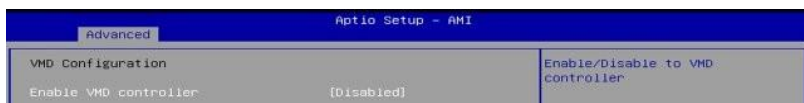
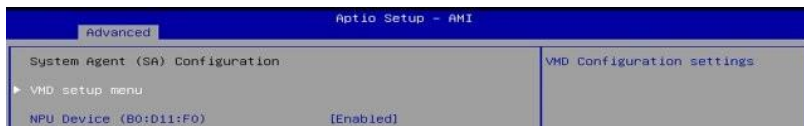
BIOS Setting	Description
Efficient-core Information	Displays the E-core information.
Performance-core	Displays the P-core information.
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

4.4.3 Power & Performance



BIOS Setting	Description
CPU – Power Management Control	CPU – Power Management Control Options
Intel SpeedStep	Allows more than two frequency ranges to be supported
Race To Halt (RTH)	Enable/Disable Race to Halt feature. RTH will dynamically increase CPU frequency in order to enter pkg C-State faster to reduce overall power.
Intel Speed Shift Technology	Enable/Disable Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P-states.
Turbo Mode	Enable/Disable processor Turbo Mode.

4.4.4 System Agent (SA) Configuration



BIOS Setting	Description
VMD setup menu	VMD Configuration settings
Enable VMD controller	Enable/Disable to VMD controller
NPU Device (80:D11:F0)	Enable/Disable NPU (Neural Processing Unit) Device.

4.4.5 PCH-IO Configuration

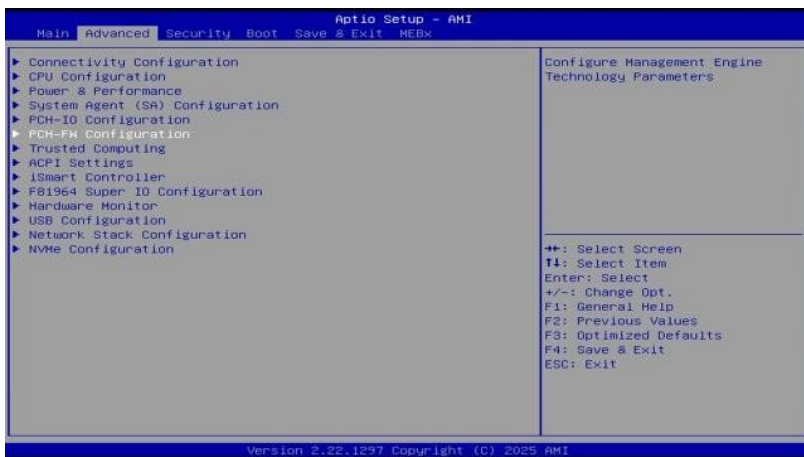
Advanced Aptio Setup - AMI	
PCH-IO Configuration	SATA Device Options Settings
▶ SATA Configuration	
J18 USB 3.0 Control	[Enabled]

Advanced Aptio Setup - AMI	
SATA Configuration	Enable/Disable SATA Device.
SATA Controller(s)	[Enabled]
SATA Mode Selection	[AHCI]
Serial ATA Port 4	Empty
Software Preserve	Unknown
Port 4	[Enabled]
Hot Plug	[Disabled]
Configured as eSATA	Hot Plug supported
Serial ATA Port 5	Empty
Software Preserve	Unknown
Port 5	[Enabled]
Hot Plug	[Disabled]
Configured as eSATA	Hot Plug supported
Serial ATA Port 6	Empty
Software Preserve	Unknown
Port 6	[Enabled]
Hot Plug	[Disabled]
Configured as eSATA	Hot Plug supported
Serial ATA Port 7	Empty
Software Preserve	Unknown
Port 7	[Enabled]
Hot Plug	[Disabled]
Configured as eSATA	Hot Plug supported
++: Select Screen !!: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Version 2.22.1297 Copyright (C) 2025 AMI	

Advanced Aptio Setup - AMI	
PCH-IO Configuration	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the
▶ SATA Configuration	
J18 USB 3.0 Control	[Enabled]

BIOS Setting	Description
SATA Configuration	SATA device options settings.
SATA Controller(s)	Enable / Disable SATA Device.
SATA Mode Selection	Determines how SATA controller(s) operate.
Port #	Enable or Disable SATA Port.
Hot Plug	Designates the port as Hot Pluggable.
J18 USB 3.0 Control	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plugged into the connector will not be detected by BIOS or OS.

4.4.6 PCH-FW Configuration



4.4.7 Trusted Computing



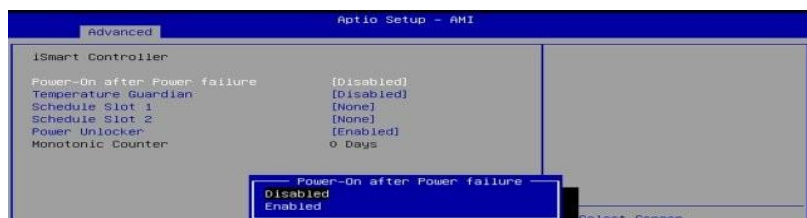
BIOS Setting	Description
Security Device Support	Enable / Disable BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.
SHA256/384 PCR Bank	Enable / Disable PCR Bank.
Pending operation	Schedule an operation for the security device. Note: Your computer will reboot during restart in order to change state of security device.
Platform Hierarchy	Enable / Disable platform hierarchy.
Storage Hierarchy	Enable / Disable storage hierarchy.
Endorsement Hierarchy	Enable / Disable endorsement hierarchy.
Physical Presence Spec Version	Select to tell O.S. to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.
Device Select	TPM 1.2 will restrict support to TPM 1.2 devices. TPM 2.0 will restrict support to TPM 2.0 devices. Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

4.4.8 ACPI Settings



BIOS Setting	Description
Enable Hibernation	Enable / Disable the system ability to hibernate (OS/S4 Sleep State). This option may not be effective with some OS.
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when SUSPEND button is pressed.

4.4.9 iSmart Controller

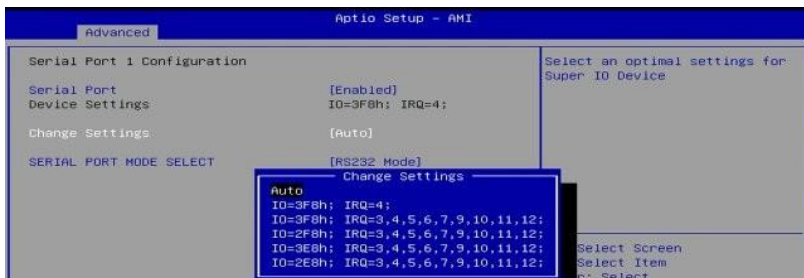


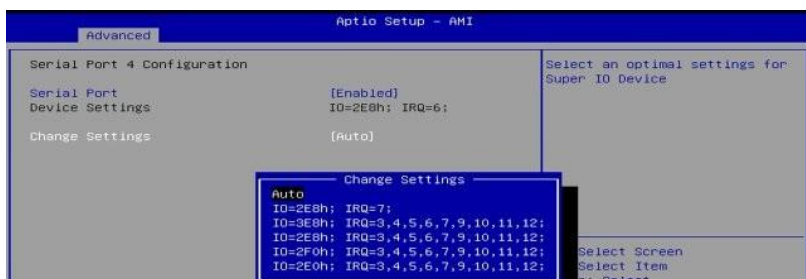
BIOS Setting	Description
Power-On after Power Failure	Option: Enabled/Disabled.
Temperature Guardian	Option: Enabled/Disabled.
Schedule Slot 1/2	Set up the hour/minute for system power on (None/Power On//Power On/Off)
Power Unlocker	iSmart will monitor the system power status. If it is unable to boot within 6 seconds when the system is shut down and the power button is pressed, it will activate the recovery process. iSmart controller will perform the RTC clear sequence and then trigger the power button to turn on the system.

4.4.10 F81964 Super IO Configuration

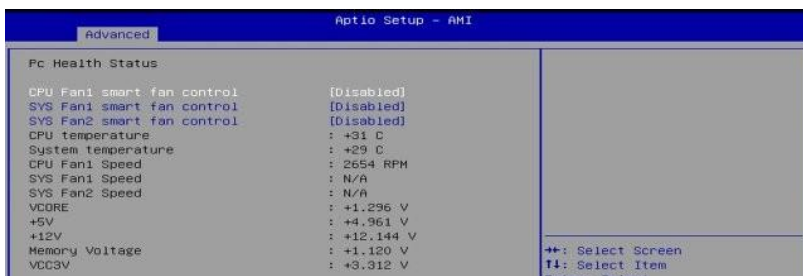


BIOS Setting	Description
F81964 Serial Ports Configuration	Sets parameters of serial ports. Enable / Disable the serial port and select an optimal setting for the Super IO device.





4.4.11 Hardware Monitor



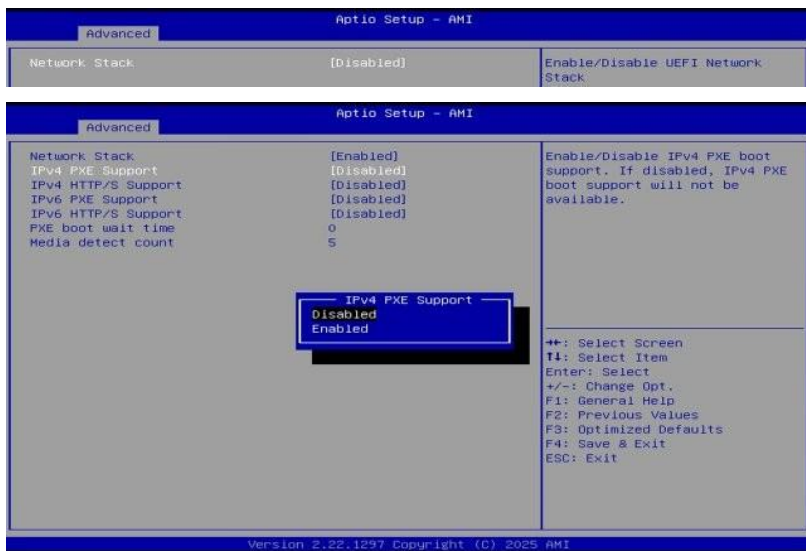
BIOS Setting	Description
CPU Smart Fan Control	Enable / Disable smart fan control.
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.4.12 USB Configuration



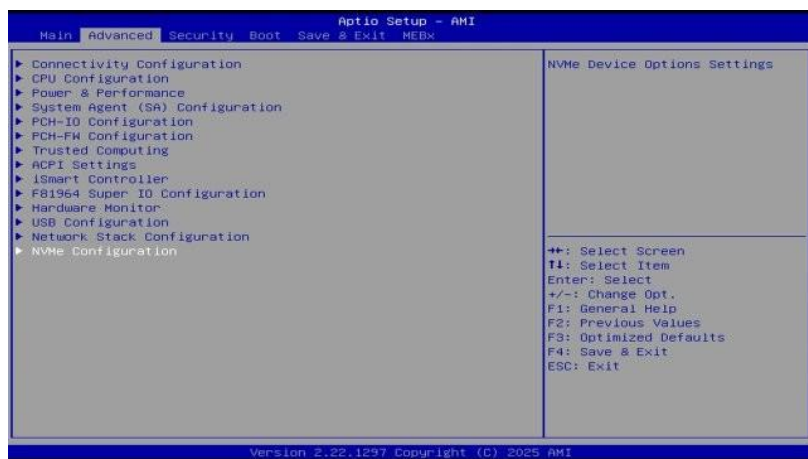
BIOS Setting	Description
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enable / Disable the support for USB mass storage driver.
USB transfer time-out	The time-out value (1 / 5 10 / 20 secs) for Control, Bulk, and Interrupt transfers.
Device reset time-out	Gives seconds (10 / 20 / 30 / 40 secs) to delay execution of Start Unit command to USB mass storage device.
Device power-up delay	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port it is 100ms, for a Hub port the delay is taken from Hub descriptor.

4.4.13 Network Stack Configuration



BIOS Setting	Description
Network Stack	Enable/Disable UEFI Network Stack
IPv4 PXE Support	If disabled, IPv4 PXE boot support will not be available.
IPv4 HTTP Support	If disabled, IPv4 HTTP boot support will not be available.
IPv6 PXE Support	If disabled, IPv6 PXE boot support will not be available.
IPv6 HTTP Support	If disabled, IPv6 HTTP boot support will not be available.
PXE boot wait time	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value
Media detect count	Number of times the presence of media will be checked. Use either +/- numeric keys to set the value.

4.4.14 NVMe Configuration



4.5 Security Settings



BIOS Setting	Description
Setup Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
Secure Boot	Secure Boot feature is Active if Secure Boot is enabled. Platform Key(PK) is enrolled and the system is in user mode. The mode change requires platform reset.
Secure Boot Mode	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full authentication.

4.6 Boot Settings



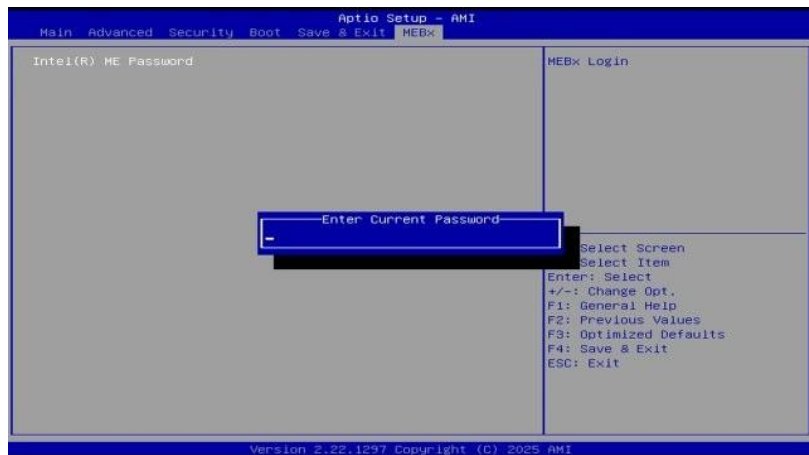
BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	Selects the keyboard NumLock state.
Quiet Boot	Enable / Disable Quiet Boot option.
FIXED BOOT ORDER Priorities	Sets the system boot order.

4.7 Save & Exit Settings



BIOS Setting	Description
Save Changes and Exit	Exits system setup after saving the changes.
Discard Changes and Exit	Exits system setup without saving any changes.
Save Changes and Reset	Resets the system after saving the changes.
Discard Changes and Reset	Resets system setup without saving any changes.
Save Changes	Saves changes done so far to any of the setup options.
Discard Changes	Discards changes done so far to any of the setup options.
Restore Defaults	Restores / Loads defaults values for all the setup options.
Save as User Defaults	Saves the changes done so far as User Defaults.
Restore User Defaults	Restores the user defaults to all the setup options.
Launch EFI Shell from filesystem device	Attempts to launch EFI shell application (Shell.efi) from one of the available filesystem devices.

4.8 MEBx



Appendix

This section provides the I/O Port Address Map, Interrupt Request Lines (IRQ) and the sample code of watchdog timer configuration.

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
0x00000A00-0x00000A0F	Motherboard resources
0x00000A10-0x00000A1F	Motherboard resources
0x0000002E-0x0000002F	Motherboard resources
0x0000004E-0x0000004F	Motherboard resources
0x00000061-0x00000061	Motherboard resources
0x00000063-0x00000063	Motherboard resources
0x00000065-0x00000065	Motherboard resources
0x00000067-0x00000067	Motherboard resources
0x00000070-0x00000070	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000092-0x00000092	Motherboard resources
0x000000B2-0x000000B3	Motherboard resources
0x00000680-0x0000069F	Motherboard resources
0x0000164E-0x0000164F	Motherboard resources
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x00008C00-0x00008CFE	Motherboard resources
0x00001854-0x00001857	Motherboard resources
0x00000000-0x00000CF7	PCI Express Root Complex
0x00009000-0x0000FFFF	PCI Express Root Complex

Address	Device Description
0x00002000-0x00008BFF	PCI Express Root Complex
0x00002000-0x00008BFF	Motherboard resources
0x00000020-0x00000021	Programmable interrupt controller
0x00000024-0x00000025	Programmable interrupt controller
0x00000028-0x00000029	Programmable interrupt controller
0x0000002C-0x0000002D	Programmable interrupt controller
0x00000030-0x00000031	Programmable interrupt controller
0x00000034-0x00000035	Programmable interrupt controller
0x00000038-0x00000039	Programmable interrupt controller
0x0000003C-0x0000003D	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x000000A4-0x000000A5	Programmable interrupt controller
0x000000A8-0x000000A9	Programmable interrupt controller
0x000000AC-0x000000AD	Programmable interrupt controller
0x000000B0-0x000000B1	Programmable interrupt controller
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00003000-0x00003FFF	PCI Express Root Port
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00005000-0x0000501F	SM Bus Controller
0x00005050-0x00005057	Standard SATA AHCI Controller
0x00005040-0x00005043	Standard SATA AHCI Controller
0x00005020-0x0000503F	Standard SATA AHCI Controller
0x00004000-0x00004FFF	PCI Express Root Port
0x00008BF8-0x00008BFF	Intel(R) Active Management Technology - SOL (COM34)

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ 4294967293	PCI Express Root Port
IRQ 0	System timer
IRQ 4294967278-82	Intel(R) Ethernet Controller I226-V #2
IRQ 4294967292	PCI Express Root Port
IRQ 16	High Definition Audio Controller
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 6	Communications Port (COM4)
IRQ 4294967283-87	Intel(R) Ethernet Controller I226-LM #2
IRQ 4294967290	PCI Express Root Port
IRQ 4294967294	PCI Express Root Port
IRQ 55-204	Microsoft ACPI-Compliant System
IRQ 256-511	Microsoft ACPI-Compliant System
IRQ 4294967277	Intel(R) Graphics
IRQ 4294967276	Intel(R) Management Engine Interface #1
IRQ 1	Standard PS/2 Keyboard
IRQ 12	Microsoft PS/2 Mouse
IRQ 4294967288	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967289	Standard SATA AHCI Controller
IRQ 4294967291	PCI Express Root Port
IRQ 19	Intel(R) Active Management Technology - SOL (COM34)

C. Watchdog Timer Configuration

The Watchdog Timer (WDT) is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven.

Under normal circumstance, you will need to restart the WDT at regular intervals before the timer counts to zero.

Sample Code:

```
//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "F81964.H"
//-----

int main (int argc, char *argv[]);
void EnableWDT(int);
void DisableWDT(void);
//-----

int main (int argc, char *argv[])
{
    unsigned char bBuf;
    unsigned char bTime;
    char **endptr;

    char SIO;

    printf("Fintek 81964 watch dog program\n");
    SIO = Init_F81964();
    if (SIO == 0)
    {
        printf("Can not detect Fintek 81964, program abort.\n");
        return(1);
    }
    if (SIO == 0)

    if (argc != 2)
    {
        printf("Parameter incorrect!!\n");
        return (1);
    }
}
```

```

bTime = strtol(argv[1], endptr, 10);
printf("System will reset after %d seconds\n", bTime);

if (bTime)
{
    EnableWDT(bTime);
}
else
{
    DisableWDT();
}
return 0;
}

//-----
void EnableWDT(int interval)
{
    unsigned char bBuf;

    bBuf = Get_F81964_Reg(0x2B);
    bBuf &= (~0x20);
    Set_F81964_Reg(0x2B, bBuf);           //Enable WDTO

    Set_F81964_LD(0x07);                 //switch to logic device 7
    Set_F81964_Reg(0x30, 0x01);         //enable timer

    bBuf = Get_F81964_Reg(0xF5);
    bBuf &= (~0x0F);
    bBuf |= 0x52;
    Set_F81964_Reg(0xF5, bBuf);         //count mode is second

    Set_F81964_Reg(0xF6, interval);     //set timer

    bBuf = Get_F81964_Reg(0xFA);
    bBuf |= 0x01;
    Set_F81964_Reg(0xFA, bBuf);         //enable WDTO output

    bBuf = Get_F81964_Reg(0xF5);
    bBuf |= 0x20;
    Set_F81964_Reg(0xF5, bBuf);         //start counting
}

//-----
void DisableWDT(void)
{
    unsigned char bBuf;

    Set_F81964_LD(0x07);                 //switch to logic device 7

    bBuf = Get_F81964_Reg(0xFA);
    bBuf &= ~0x01;
    Set_F81964_Reg(0xFA, bBuf);         //disable WDTO output

    bBuf = Get_F81964_Reg(0xF5);
    bBuf &= ~0x20;
    bBuf |= 0x40;
    Set_F81964_Reg(0xF5, bBuf);         //disable WDT
}

//-----

```

```

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#include "F81964.H"
#include <dos.h>
//-----
unsigned int F81964_BASE;
void Unlock_F81964 (void);
void Lock_F81964 (void);
//-----
unsigned int Init_F81964(void)
{
    unsigned int result;
    unsigned char ucDid;

    F81964_BASE = 0x4E;
    result = F81964_BASE;

    ucDid = Get_F81964_Reg(0x20);
    if (ucDid == 0x07) //Fintek 81964
    {
        goto Init_Finish;
    }

    F81964_BASE = 0x2E;
    result = F81964_BASE;

    ucDid = Get_F81964_Reg(0x20);
    if (ucDid == 0x07) //Fintek 81964
    {
        goto Init_Finish;
    }

    F81964_BASE = 0x00;
    result = F81964_BASE;

Init_Finish:
    return (result);
}
//-----
void Unlock_F81964 (void)
{
    outputb(F81964_INDEX_PORT, F81964_UNLOCK);
    outputb(F81964_INDEX_PORT, F81964_UNLOCK);
}
//-----
void Lock_F81964 (void)
{
    outputb(F81964_INDEX_PORT, F81964_LOCK);
}
//-----
void Set_F81964_LD( unsigned char LD)
{
    Unlock_F81964();
    outputb(F81964_INDEX_PORT, F81964_REG_LD);
    outputb(F81964_DATA_PORT, LD);
}

```

```

        Lock_F81964();
    }
//-----
void Set_F81964_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_F81964();
    outputb(F81964_INDEX_PORT, REG);
    outputb(F81964_DATA_PORT, DATA);
    Lock_F81964();
}
//-----

unsigned char Get_F81964_Reg(unsigned char REG)
{
    unsigned char Result;
    Unlock_F81964();
    outputb(F81964_INDEX_PORT, REG);
    Result = inputb(F81964_DATA_PORT);
    Lock_F81964();
    return Result;
}
//-----

//-----
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//-----
#ifndef F81964_H
#define F81964_H                1
//-----
#define F81964_INDEX_PORT      (F81964_BASE)
#define F81964_DATA_PORT      (F81964_BASE+1)
//-----
#define F81964_REG_LD          0x07
//-----
#define F81964_UNLOCK          0x87
#define F81964_LOCK            0xAA
//-----
unsigned int Init_F81964(void);
void Set_F81964_LD( unsigned char);
void Set_F81964_Reg( unsigned char,
unsigned char); unsigned char
Get_F81964_Reg( unsigned char);
//-----
#endif // F81964_H

```

D. Onboard Connector Types

Function	Connector	Type
Digital I/O Connector	J5	E-CALL_0196-01-200-100
Front Panel Settings	J21	E-CALL 0126-01-203-200
ATX Power	J22	HAOGUO 01-0018-03
ATX 12V Power	ATX_12V_2X1	HAOGUO 01-0018-02
CPU Fan Power	CPU_FAN1	Techbest W2-03I104132S1WT(A)-L
System Fan Power	SYS_FAN1, SYS_FAN2	Techbest W2-03I104132S1WT(A)-L

E. MBB1005AF USB Power Control Bit Mapping.

PDPC (Peripheral Device Power Control) allows users to turn off the external power and restart it via software, enabling the external device to recover and ensuring the system remains operational. Here are the bit-mapping for software SDK.

Function	Connector	Software Mapping
USB 3.2	CN2	bit_0