IB838 Series

Intel® Core™ i3 N-series
3.5" Disk-Size SBC

User's Manual

Version 1.0b
(January 2025)

Compliance

CE

This product has passed CE Class B tests for environmental specifications and limits. This product is in accordance with the directives of the European Union (EU). In a domestic environment, this product may cause radio interference in which case users may be required to take adequate measures.

FC

This product has been tested and found to comply with the limits for a Class B 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 manufacturer's instructions, 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 of for 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 is compliant with the current RoHS restrictions and prohibits use of the following substances in concentrations exceeding 0.1% by weight (1000 ppm) except for cadmium, limited to 0.01% by weight (100 ppm).

- Lead (Pb)
- Mercury (Hg)
- Cadmium (Cd)
- Hexavalent chromium (Cr6+)
- Polybrominated biphenyls (PBB)
- Polybrominated diphenyl ether (PBDE)

Important Safety Information

Environmental conditions:

- Use this product in environments with ambient temperatures between 0˚C and 60˚C.
- Do not leave this product in an environment where the storage temperature may be below -20° C or above 80° C. To prevent from damages, the product must be used in a controlled environment.

Care for your IBASE products:

- Before cleaning the PCB, unplug all cables and remove the battery.
- Clean the PCB with a circuit board cleaner or degreaser, or use cotton swabs and alcohol.
- 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 top of this product.

Anti-static precautions

- Wear an anti-static wrist strap to avoid electrostatic discharge.
- Place the PCB on an anti-static kit or mat.
- Hold the edges of PCB when handling.
- Touch the edges of non-metallic components of the product instead of the surface of the PCB.
- Ground yourself by touching a grounded conductor or a grounded bit of metal frequently to discharge any static.

CAUTION

There is 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, HOWEVER, THAT FAIL DUE TO MISUSE, ACCIDENT, IMPROPER INSTALLATION OR UNAUTHORIZED REPAIR SHALL BE TREATED AS OUT OF WARRANTY AND CUSTOMERS SHALL BE BILLED 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
   - The error messages in text or in screenshots if there is any
   - The arrangement of the peripherals
   - Software in use (such as OS and application software, including the version numbers)
3. If repair service is required, you can download the RMA form at http://www.ibase.com.tw/english/Supports/RMAService/. Fill out the form and contact your distributor or sales representative.

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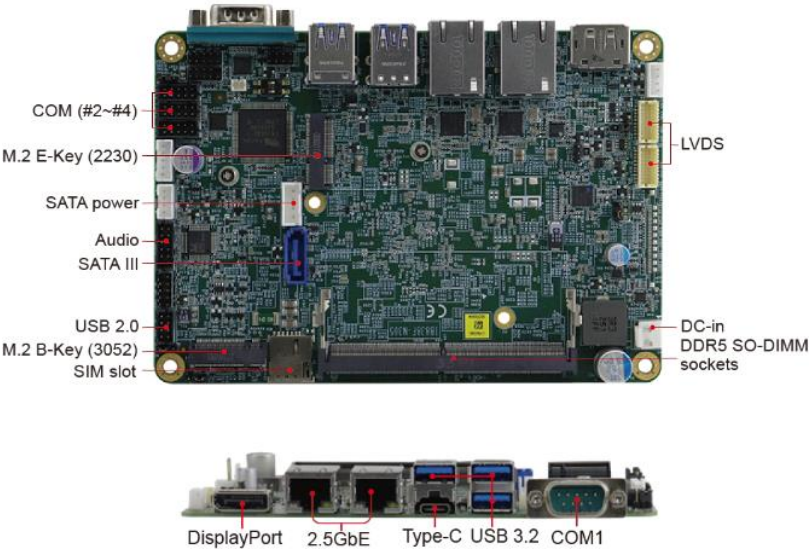
Chapter 1
General Information

The information provided in this chapter includes:

- Features
- Packing List
- Optional Accessories
- Specifications
- Block Diagram
- Board Pictures
- Board Dimensions

1.1 Introduction

IB838 integrates the Intel® Core™ i3 N-series Processor, offering unrivaled power and versatility for industrial applications. Key features include a DDR5 SO-DIMM socket with 16GB capacity and IBECC capability. A set of connectivity options covers Type-C & DP++ and eDP or LVDS support, two Intel® PCI-E 2.5G LAN, 2x USB 2.0, 4x USB 3.2, 4x COM ports, and 1x SATA III interface. It also supports essential features such as fTPM, Watchdog timer, and Digital I/O, enhancing security and functionality.



IB838

1.2 Features

- Intel® Core™ i3 N-series Processor
- 1x DDR5 SO-DIMM, Max. 16GB, supports IBECC*
- Supports Type-C & DP++ and eDP or LVDS
- 2x Intel® PCI-E 2.5G LAN
- 2x USB 2.0, 4x USB 3.2 (1x Type-C + 3x Type-A), 4x COM, 1x SATA III
- 2x M.2 socket (E-key + B-key)
- Supports fTPM, Watchdog timer, Digital I/O

* *For Linux only.*

1.3 Packing List

Your IB838 package should include the items listed below. If any of the items below is missing, contact the distributor or dealer from whom you purchased the product.

- IB838 SBC x 1
- Disk x 1
  (including chipset drivers and flash memory utility)
- This User's Manual x 1

1.4 Optional Accessories

IBASE provides the following optional accessories:

- Cable Kit (IB76A-2)

  Including:
  DC-In power cable (PW592) x 1
  COM ports cable (PK1H) x 1
  SATA & HDD power cable (SATA-53A) x 1
  USB 2.0 cable (USB29) x 1

- Audio cable (Audio-18)
- M.2 (B-Key) PCIe extension 2242/3042 to 2252/3052

  Bracket (H06Z01M201010000AP)
  Screw (H0220351112200A00)

- Heat spreader (HSIB838-1)
- Heat sink (HSIB838-A)

1.5 Specifications

Model Name	Description
IB838F-N305	3.5" Intel® Core i3-N305 SoC onboard, 2x 2.5GbE, DisplayPort + Type-C + LVDS, 4x COM, 2x M.2 (E-key+Bkey), 1x SATA III, fTPM, DC-in (9V~36V)
IB838FE-N305	3.5" Intel® Core i3-N305 SoC onboard, 2x 2.5GbE, DisplayPort + Type-C + eDP, 4x COM, 2x M.2 (E-key+Bkey), 1x SATA III, fTPM, DC-in (9V~36V)
IB838F-N50	3.5" Intel® N50 SoC onboard, 2x 2.5GbE, DisplayPort + Type-C + LVDS, 4x COM, 2x M.2 (E-key+B-key), 1x SATA III, fTPM, DC-in (9V~36V)
IB838FE-N50	3.5" Intel® N50 SoC onboard, 2x 2.5GbE, DisplayPort + Type-C + eDP, 4x COM, 2x M.2 (E-key+B-key), 1x SATA III, fTPM, DC-in (9V~36V)

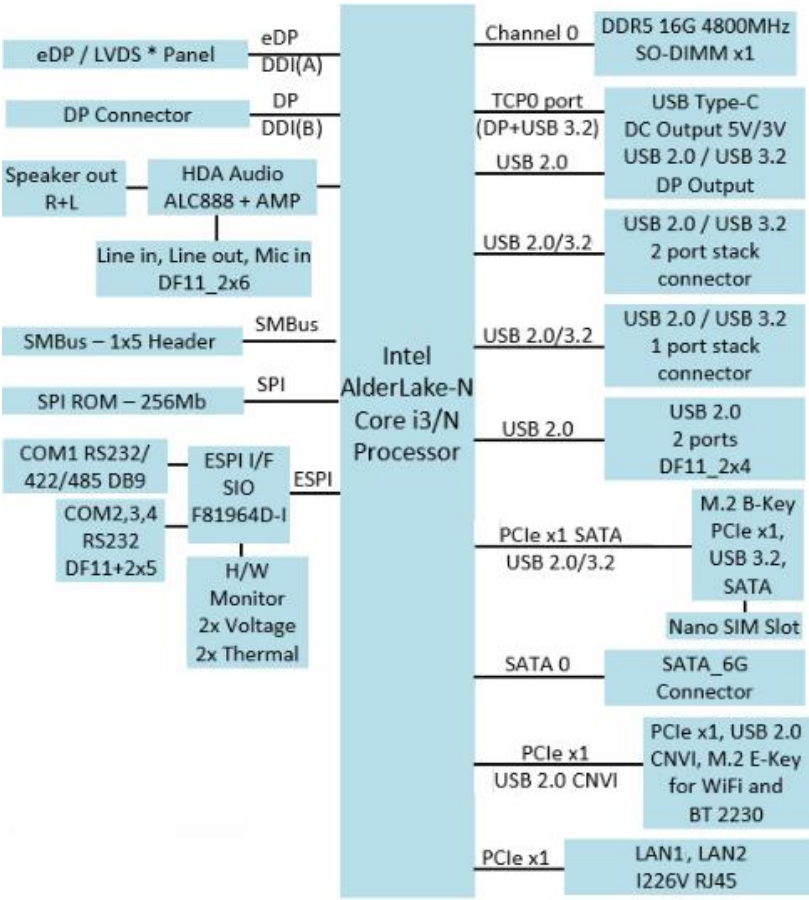
Specifications	
Form Factor	3.5” disk-size SBC
CPU	Intel® Core™ i3 N-series Processor
Memory	1x DDR5 SO-DIMM, Max. 16GB
Graphics	Intel® SoC integrated Gen12 graphics
Ethernet	2x Intel® I226V LAN
BIOS	AMI BIOS
H/W Monitor	Yes
Watchdog Timer	Yes (256 segments, 0, 1, 2…255 sec / min)
Super I/O	Fintek F81964D-I
Audio Codec & Controller	Intel® Core™ i3 Processor N-series & Intel® Processor N-series built-in HD audio + ALC888S codec
Serial Port	1x RS232/422/485 (Jumper-less selection) + 3x RS232
USB 2.0	2x USB 2.0 via (pin header)
USB 3.X	1x Type-C+ 3x Type-A
Serial ATA	1x SATA III
Digital IO	4-In & 4-Out

TPM	fTPM
Power	+9V~+36V DC-in
Others	EuP/ErP

Environment	
Temperature	• Operation: 0 ~ 60 °C (32 ~ 140 °F) • Storage: -20 ~ 80 °C (-4 ~ 176 °F)
Relative Humidity	10% ~ 90 % (non-condensing)

All specifications are subject to change without prior notice.

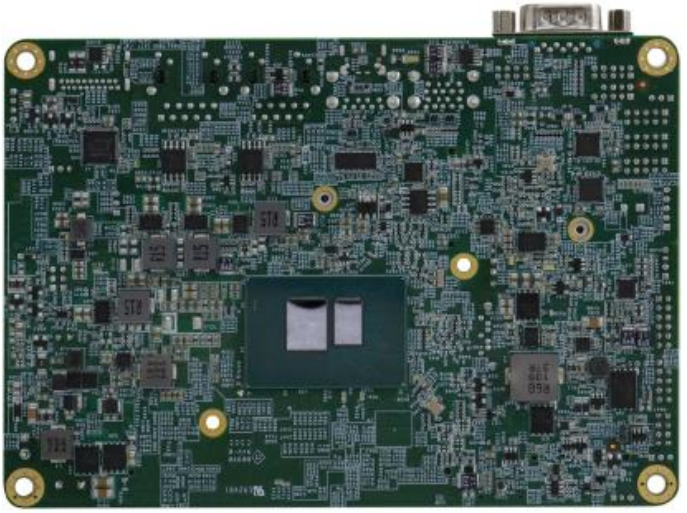
1.6 Block Diagram



1.7 Board Pictures

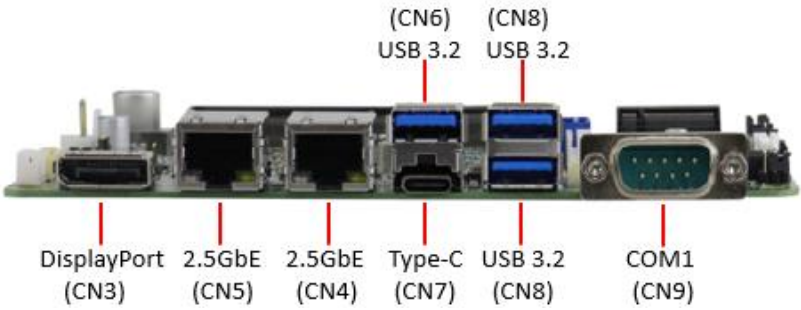
Top View

Bottom View

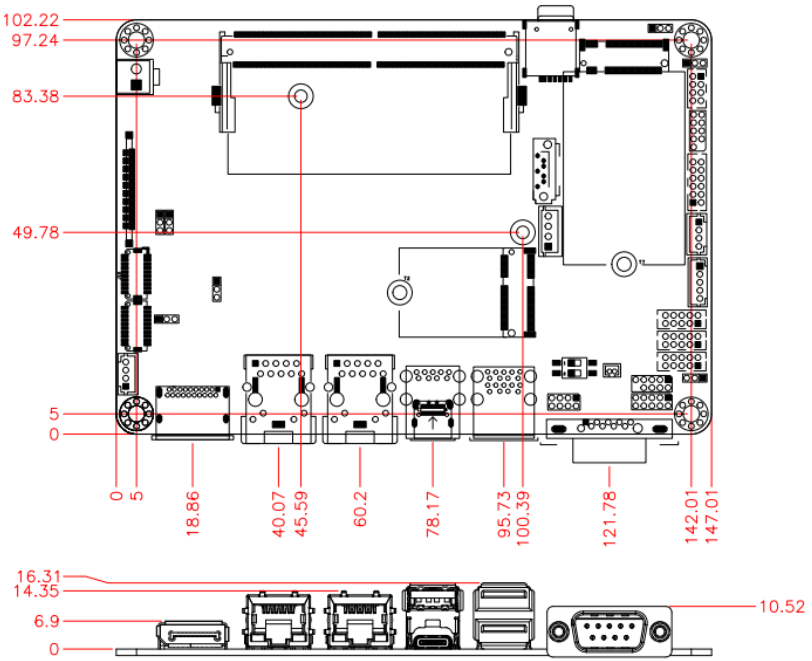


* The photos are for reference only. Some minor components may differ.

I/O View


(CN6)
USB 3.2
(CN8)
USB 3.2
DisplayPort
(CN3)
2.5GbE
(CN5)
2.5GbE
(CN4)
Type-C
(CN7)
USB 3.2
(CN8)
COM1
(CN9)

1.8 Dimensions



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Chapter 2
Hardware Configuration

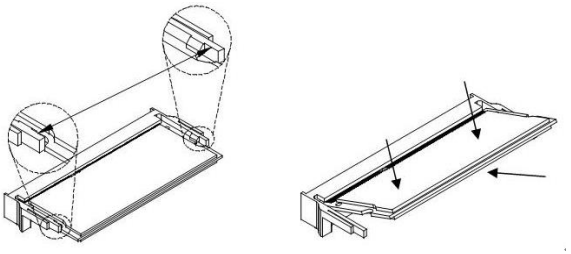
This section provides information on jumper settings and connectors on the IB838 in order to set up a workable system. On top of that, you will also need to install crucial pieces such as the CPU and the memory before using the product. The topics covered are:

- Essential installations before you begin
- Jumper and connector locations
- Jumper settings and information of connectors

2.1 Essential Installations

2.1.1 Installing the Memory

The IB838 series supports one DDR5 memory socket. To install the modules, locate the memory slot on the board and perform the following steps:



1. Align the key of the memory module with that on the memory slot and insert the module slantwise.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot.

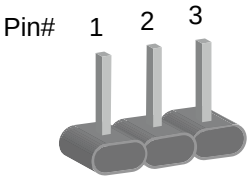
To remove the module, press the clips outwards with both hands, and the module will pop-up.

2.2 Setting the Jumpers

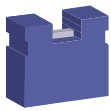
Set up and configure your IB838 by using jumpers for various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your use.

2.2.1 How to Set Jumpers

Jumpers are short-length conductors consisting of several metal pins with a non-conductive base mounted on the circuit board. Jumper caps are used to have the functions and features enabled or disabled. If a jumper has 3 pins, you can connect either PIN1 to PIN2 or PIN2 to PIN3 by shorting.

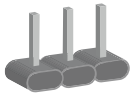
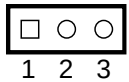
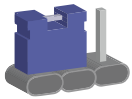
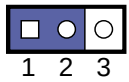
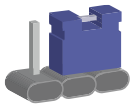
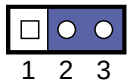


A 3-pin jumper



A jumper cap

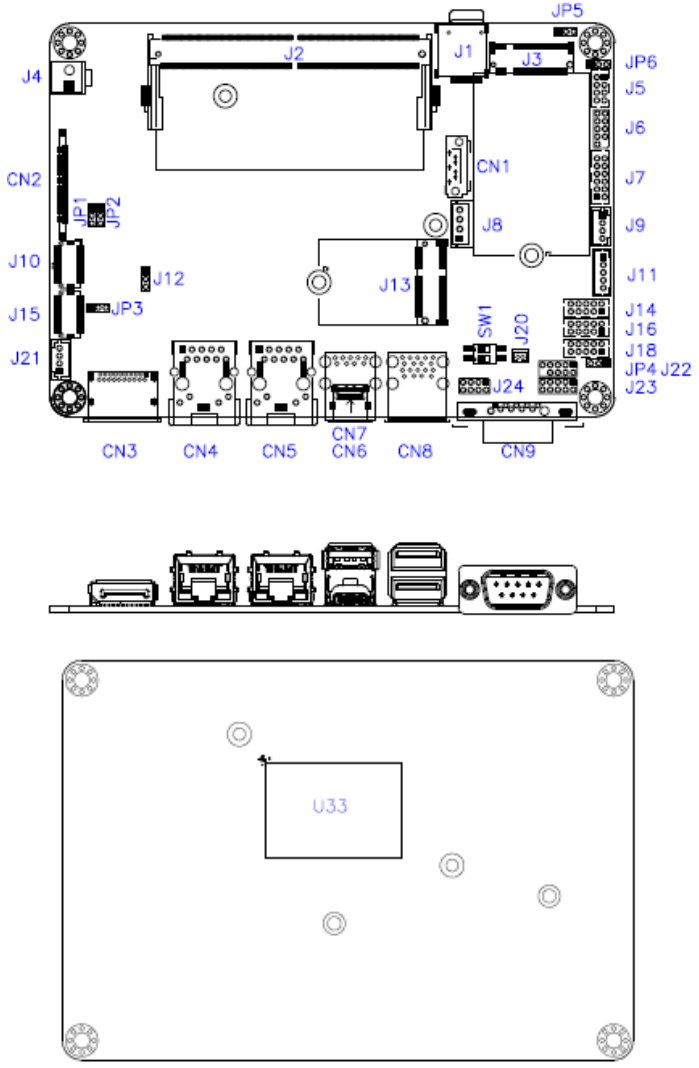
Refer to the illustration below to set jumpers.

Pin closed	Jumper	Setting
Open		
1-2		
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

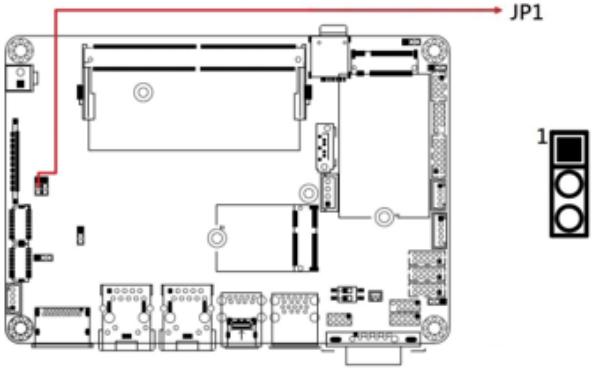


IB838

2.4 Jumpers Quick Reference

Function	Jumper
eDP Panel Power Selection	JP1
LVDS Panel Brightness Selection	JP2
LVDS Panel Power Selection	JP3
AT / ATX Selection	JP4
M.2 B-key / Sierra Module Selection	JP5
Sierra Module Interface Selection	JP6
Clear CMOS Data	SW1
Clear ME Register	SW1

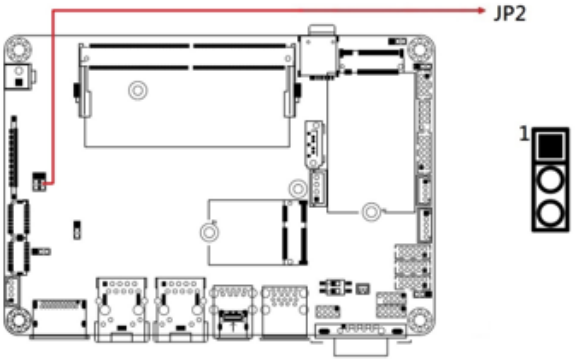
2.4.1 eDP Panel Power Selection (JP1)



Function	Pin closed	Setting
3.3V (default)	1-2	1
5V	2-3	1

Note: This is for setting Pin1~Pin5 voltage of CN2.

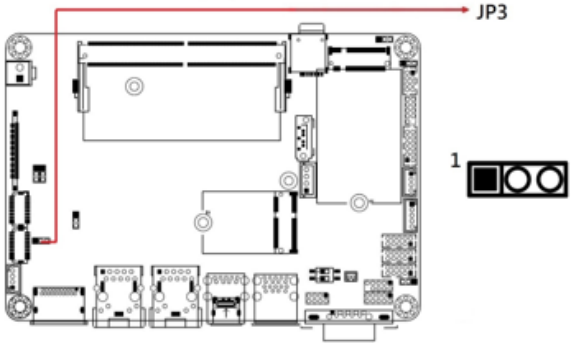
2.4.2 LVDS Panel Brightness Selection (JP2)



Function	Pin closed	Setting
3.3V (default)	1-2	1
5V	2-3	1

Note: This is for setting Pin3 voltage of J21.

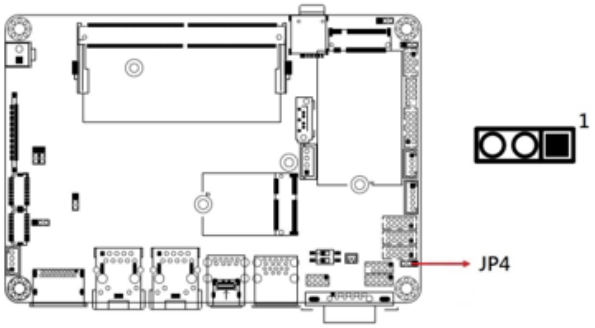
2.4.3 LVDS Panel Power Selection (JP3)



Function	Pin closed	Setting
3.3V (default)	1-2	1
5V	2-3	1

Note: This is for setting Pin19~Pin20 voltage of J10, J15.

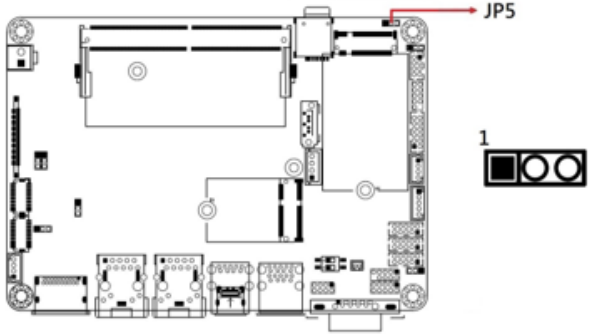
2.4.4 AT / ATX Selection (JP4)



Function	Pin closed	Setting
ATX	1-2	1
AT	2-3	1

Note: AT: Auto power on; ATX: Manual power on

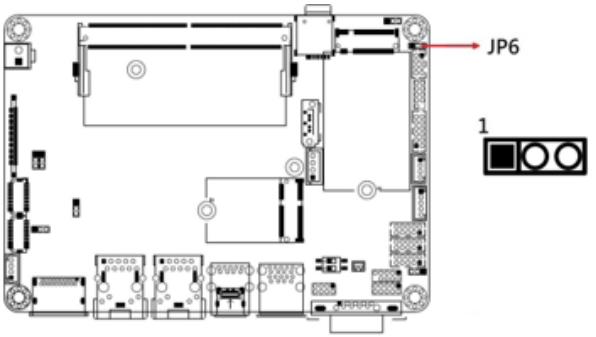
2.4.5 M.2 B-key / Sierra Module Selection (JP5)



Function	Pin closed	Setting
M.2 B-key (default)	1-2	1
Sierra Module	2-3	1

Note: The setting is via J3.

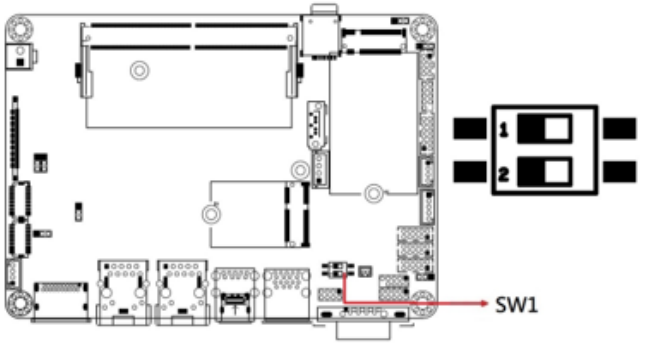
2.4.6 Sierra Module Interface Selection (JP6)



Function	Pin closed	Setting
USB	1-2	1
PCIE (default)	2-3	1

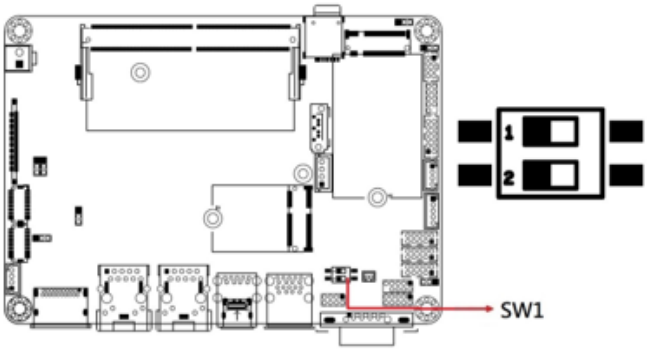
Note: The setting is via J3.

2.4.7 Clear CMOS Data (SW1)



Function	Setting
Normal (default)	P1-OFF
Clear CMOS	P1-ON

2.4.8 Clear ME Register (SW1)

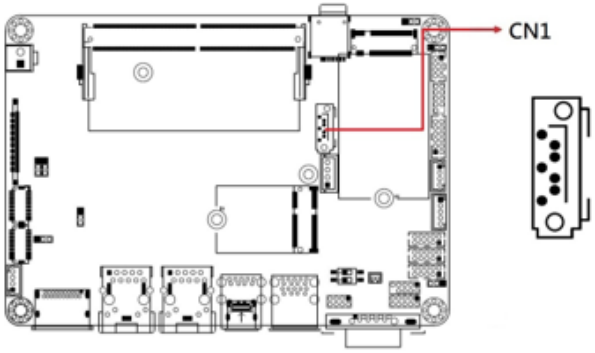


Function	Setting
Normal (default)	P2-OFF
Clear ME Register	P2-ON

2.5 Connectors Quick Reference

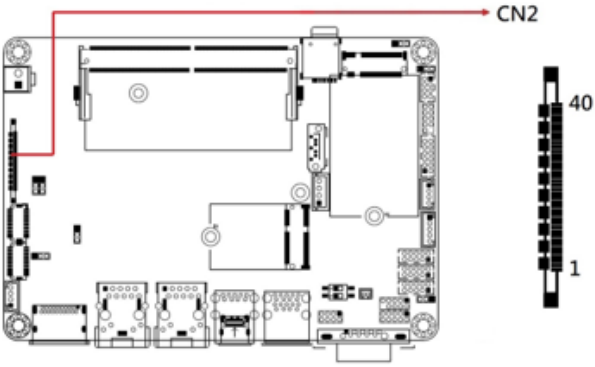
Function	Connector
SATA Connectors	CN1
eDP Connector	CN2
DP Connectors	CN3
LAN Connectors	CN4, CN5
USB 3.2 Connector	CN6
Type-C Connector	CN7
USB 3.2 Stack Connector	CN8
COM1 RS-232/422/485 Serial Port	CN9
Nano SIM Card Slot	J1
DDR5 SO-DIMM Connector	J2
M.2 B-Key 3052 Connector	J3
DC Power Input Connector	J4
USB 2.0 Connector	J5
SPI Flash Tool Connector	J6
Audio Connector	J7
SATA HDD Power Connector	J8
Speaker Out Connector	J9
LVDS Connectors	J10, J15
SMBUS Connector	J11
Power JTAG Connector	J12
M.2 E-Key 2230 Connector	J13
COM2, COM3, COM4 RS-232 Ports	J18, J16, J14
RTC Battery Connector	J20
LVDS Backlight Connector	J21
80 Port Debug Tool Connector	J22
Digital I/O Connector	J23
Front Panel Connector	J24

2.5.1 SATA Connectors (CN1)



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

2.5.2 eDP Connector (CN2)



Remarks: KEL_SSL00-40S

Note: Use JP1 to set Pin1~ Pin5 voltage; Total current: 1A

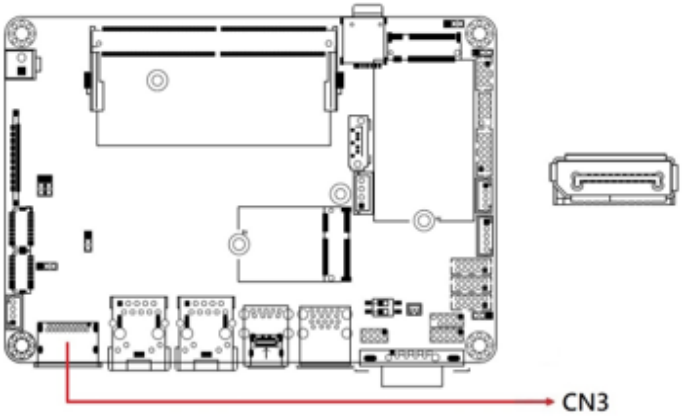
Pin27, Pin36 Total current: 1A

Pin28, Pin35 Total current: 1A

Pin31 Total current: 0.5A

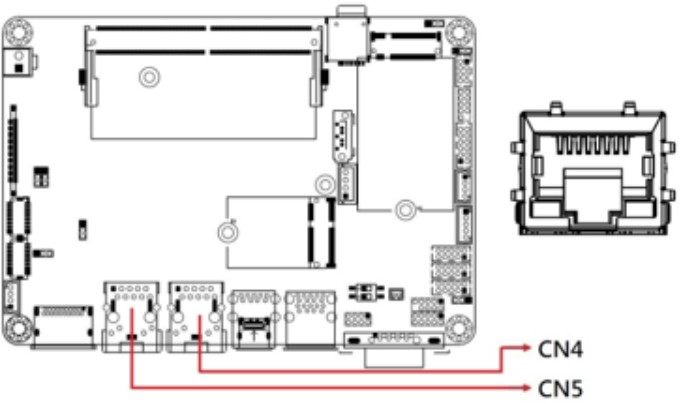
Pin	Assignment	Pin	Assignment
1	eDP Vcc	21	TXN0
2	eDP Vcc	22	TXP1
3	eDP Vcc	23	Ground
4	eDP Vcc	24	AUXP
5	eDP Vcc	25	AUXN
6	Ground	26	NC
7	Ground	27	+3.3V
8	Ground	28	EDP BKLT (+12V)
9	Ground	29	NC
10	Hot Plug detect	30	Ground
11	Ground	31	+5V
12	TXN3	32	NC
13	TXP3	33	Back Light Control
14	Ground	34	Back Light Enable
15	TXN2	35	EDP BKLT (+12V)
16	TXP2	36	+3.3V
17	Ground	37	Ground
18	TXN1	38	NC
19	TXP1	39	NC
20	Ground	40	NC

2.5.3 DP Connectors (CN3)

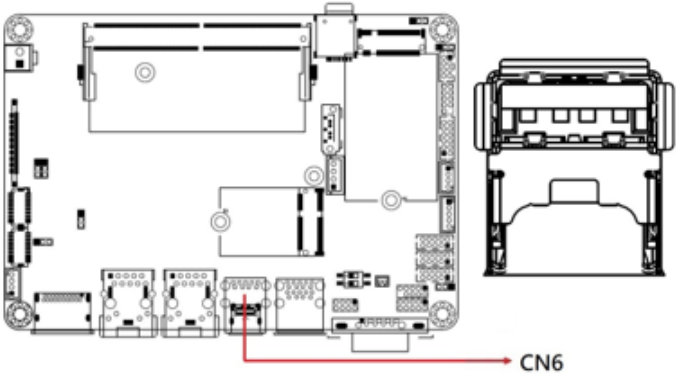


Pin	Assignment	Pin	Assignment
1	LAN0_P	11	GND
2	GND	12	LAN3_N
3	LAN0_N	13	CONFIG
4	LAN1_P	14	GND
5	GND	15	AUXP
6	LAN1_N	16	GND
7	LAN2_P	17	AUXN
8	GND	18	Hot Plug
9	LAN2_N	19	GND
10	LAN3_P	20	+3.3V/0.5A

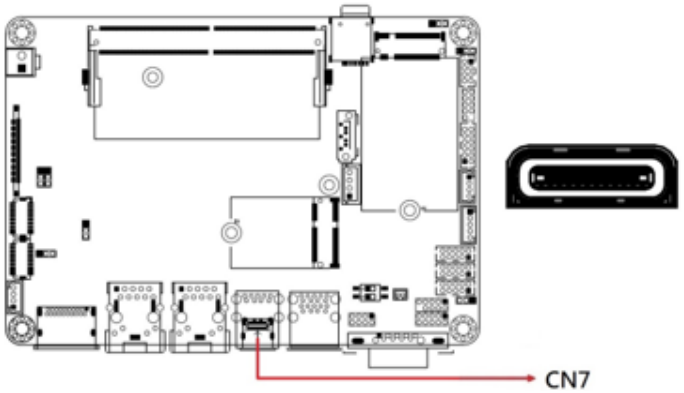
2.5.4 LAN Connectors (CN4, CN5)



2.5.5 USB 3.2 Connector (CN6)

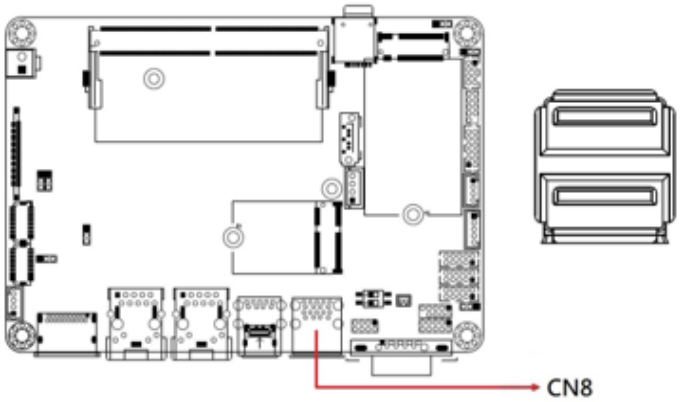


2.5.6 Type-C Connector (CN7)

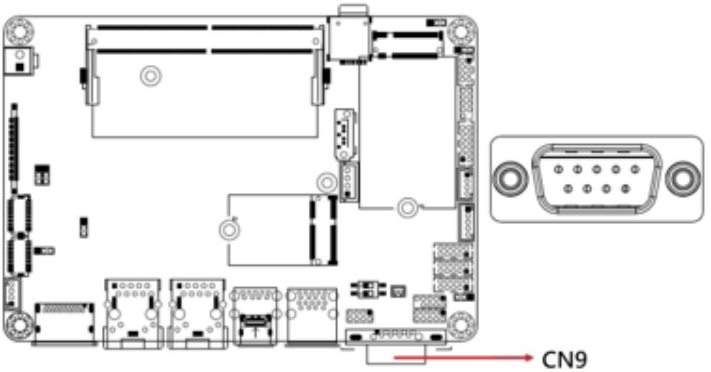


Note: DP, USB 3.2, DC Output: +5V/3A

2.5.7 USB 3.2 Stack Connector (CN8)



2.5.8 COM1 RS-232/422/485 Serial Port (CN9)

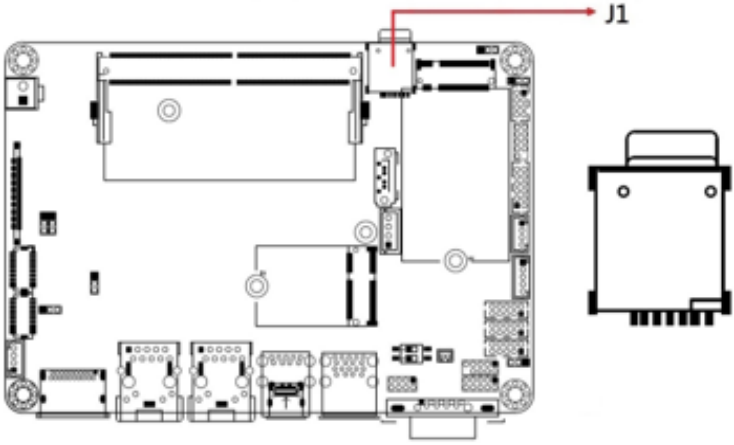


**COM1 port is jumper-less and configurable in BIOS.*

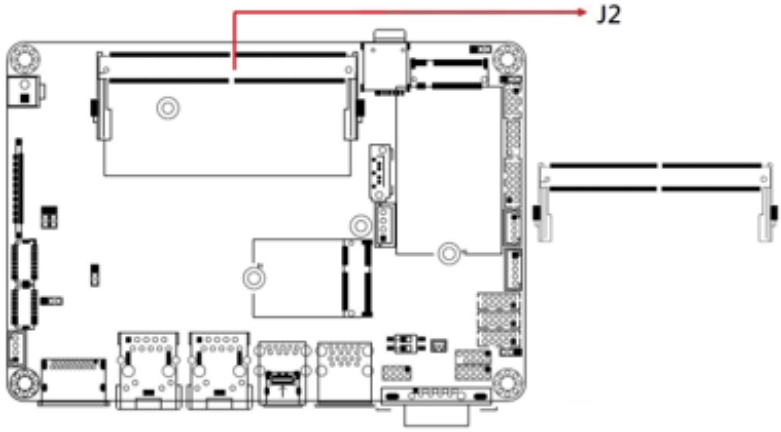
Pin	Assignment	Pin	Assignment
1	DCD, Data carrier detect	2	RXD, Receive data
3	TXD, Transmit data	4	DTR, Data terminal ready
5	Ground	6	DSR, Data set ready
7	RTS, Request to send	8	CTS, Clear to send
9	RI, Ring indicator		

Pin	Assignment		
	RS-232 (default)	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

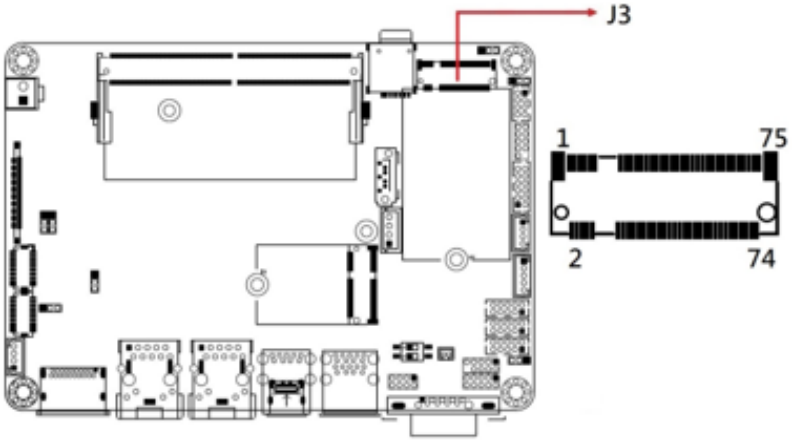
2.5.9 Nano SIM Card Slot (J1)



2.5.10 DDR5 SO-DIMM Connector (J2)

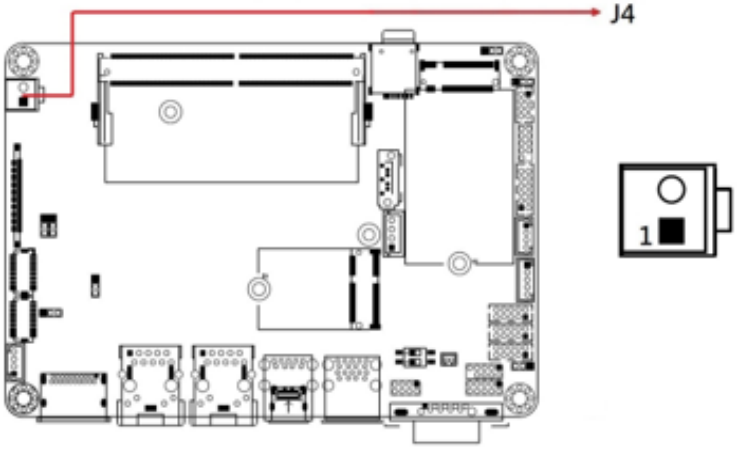


2.5.11 M.2 B-Key 3052 Connector (J3)



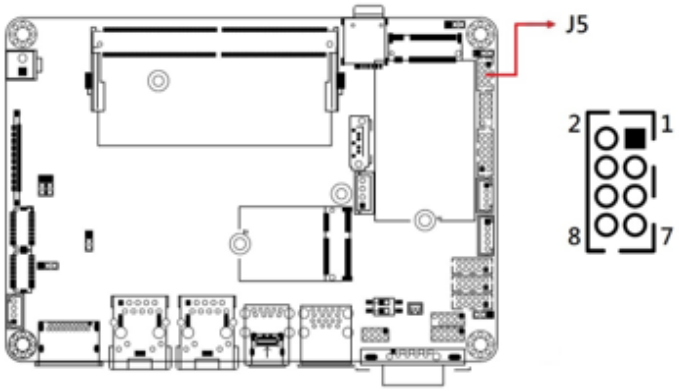
With sierra LTE card, USB/PCIE I/F is configurable by JP5, JP6.

2.5.12 DC Power Input Connector (J4)



Pin	Assignment
1	+9V ~ +36V
2	Ground

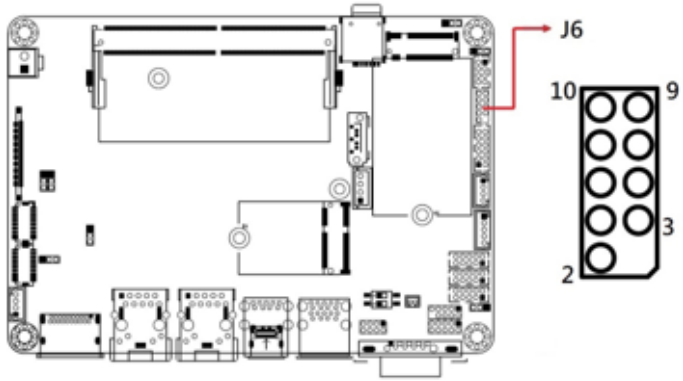
2.5.13 USB 2.0 Connector (J5)



Remarks: HK_DF11-8S-PA66H

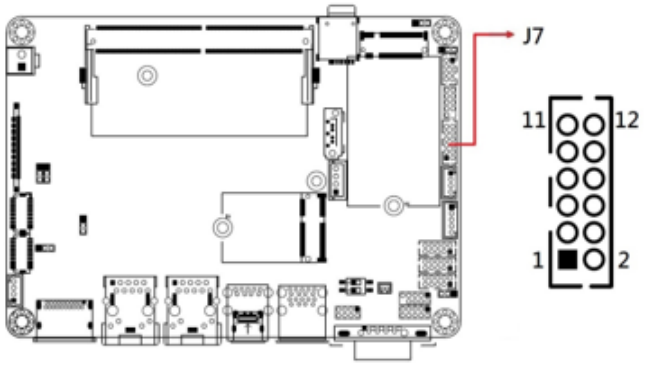
Pin	Assignment	Pin	Assignment
1	+5V/0.5A	2	Ground
3	Data-	4	Data+
5	Data+	6	Data-
7	Ground	8	+5V/0.5A

2.5.14 SPI Flash Tool Connector (J6)



Remarks: Factory use only.

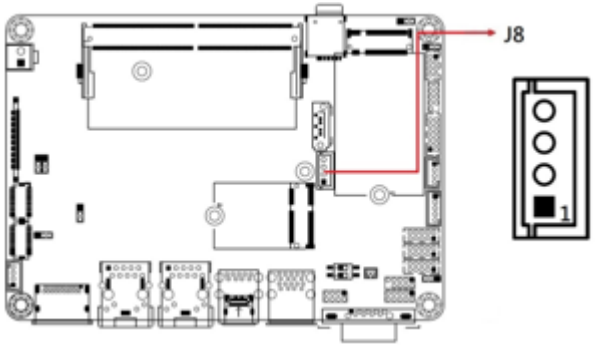
2.5.15 Audio Connector (J7)



Remarks: HK_DF11-12S-PA66H

Pin	Assignment	Pin	Assignment
1	Lineout_L	2	Lineout_R
3	JD_FRONT	4	Ground
5	LINEIN_L	6	Linein_R
7	JD_LINEIN	8	Ground
9	MIC_L	10	MIC-R
11	JD_MIC1	12	Ground

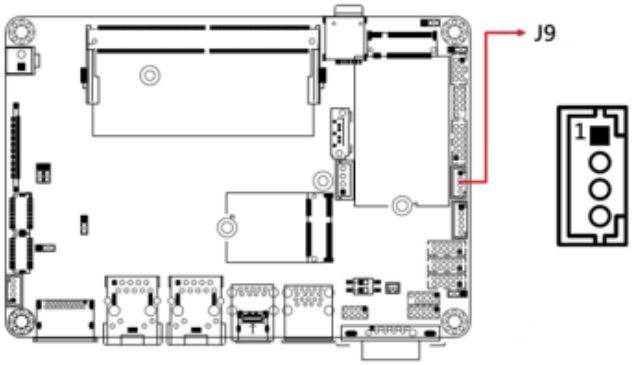
2.5.16 SATA HDD Power Connector (J8)



Remarks: E-CALL 0110-071-040

Pin	Assignment	Pin	Assignment
1	+5V/1A	3	Ground
2	Ground	4	+12V/1A

2.5.17 Speaker Out Connector (J9)



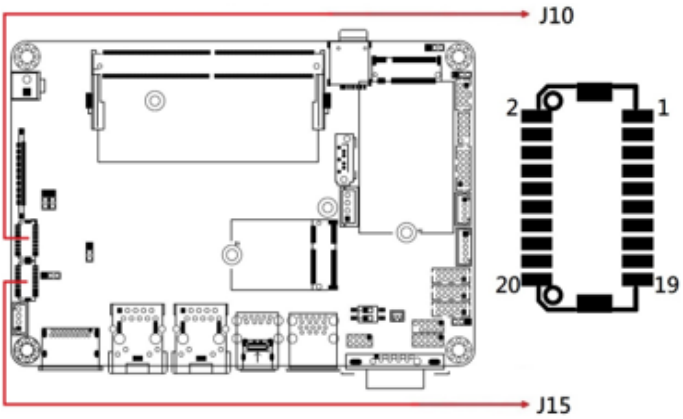
Remarks: E-CALL_0110-161-040

Pin	Assignment	Pin	Assignment
1	SPK_L+	3	SPK_R-
2	SPK_L-	4	SPK_R+

Remarks: 2.1 W/Ch Into 4 Ω at 5 V
1.4 W/Ch Into 8 Ω at 5 V

2.5.18 LVDS Connectors (J10, J15)

** J10:Channel-A, J15:Channel-B

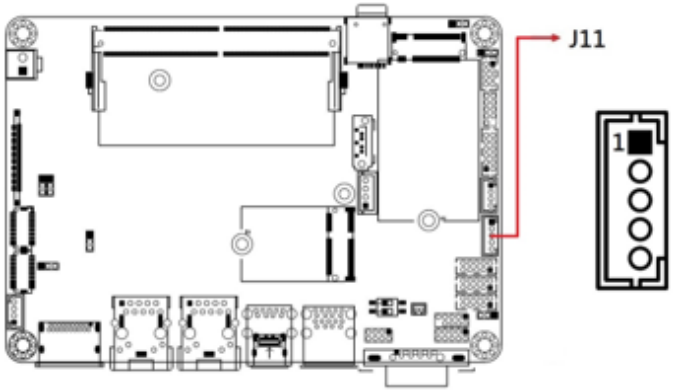


Remarks: HIROSE_DF20G-20DP-1V(56)

Note: Use JP3 to set Pin19~Pin20 voltage.Total current: 1A

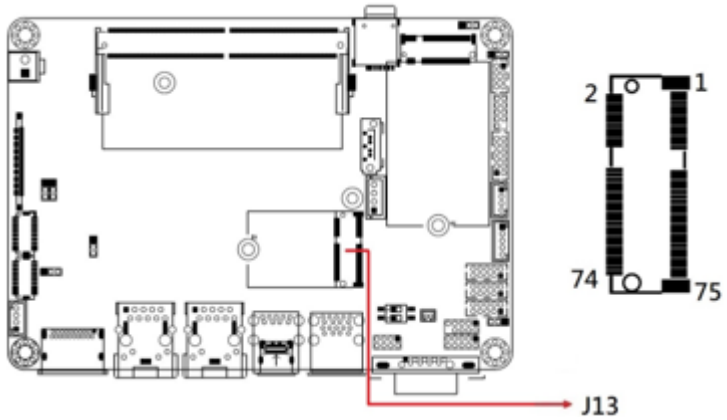
Pin	Assignment	Pin	Assignment
1	TX0P	2	TX0N
3	Ground	4	Ground
5	TX1P	6	TX1N
7	Ground	8	Ground
9	TX2P	10	TX2N
11	Ground	12	Ground
13	CLKP	14	CLKN
15	Ground	16	Ground
17	TX3P	18	TX3N
19	Power	20	Power

2.5.19 SMBUS Connector (J11)



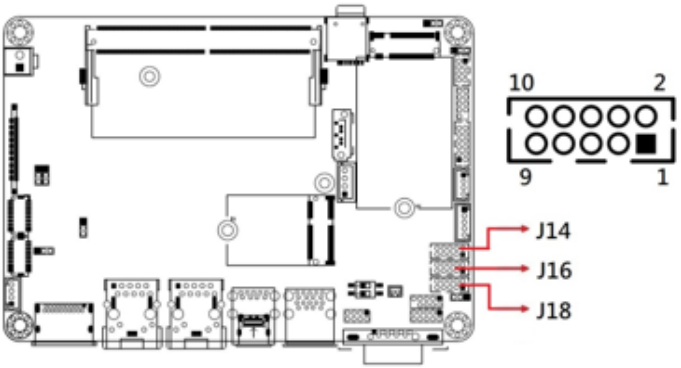
Pin	Assignment	Pin	Assignment
1	PLT_RST#	4	SMB_DATA
2	GPIO	5	SMB_CLK-
3	Ground		

2.5.20 M.2 E-Key 2230 Connector (J13)



**Supports CNVI Card*

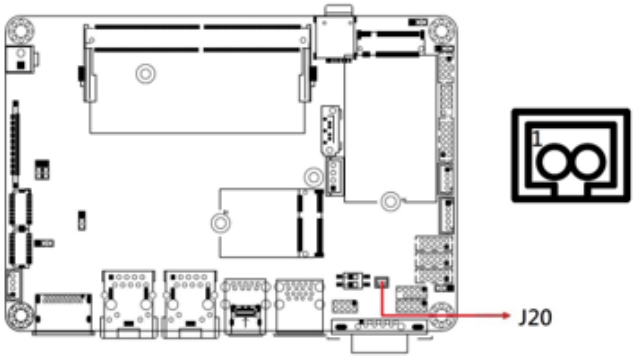
2.5.21 COM2, COM3, COM4 RS-232 Ports (J18, J16, J14)



Remarks: HK_DF11-10S-PA66H

Pin	Assignment	Pin	Assignment
1	DCD, Data carrier detect	2	RXD, Receive data
3	TXD, Transmit data	4	DTR, Data terminal ready
5	Ground	6	DSR, Data set ready
7	RTS, Request to send	8	CTS, Clear to send
9	RI, Ring indicator	10	Not Used

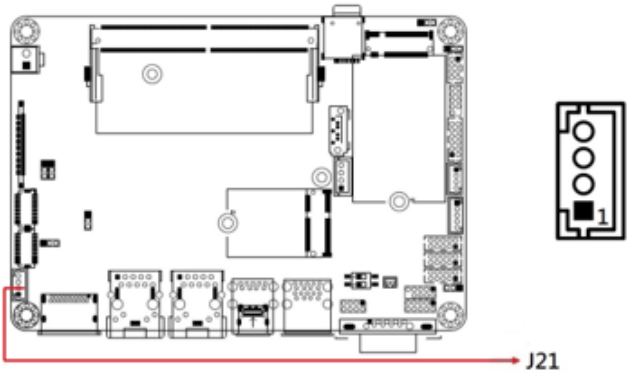
2.5.22 RTC Battery Connector (J20)



Note: Coin battery with cable.

Pin	Assignment
1	+3V
2	Ground

2.5.23 LVDS Backlight Connector (J21)

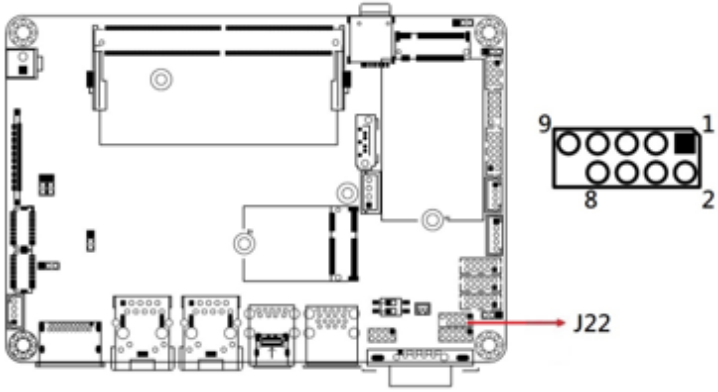


Remarks: E-CALL_0110-161-040

Note: Use JP2 to set Pin3 voltage.

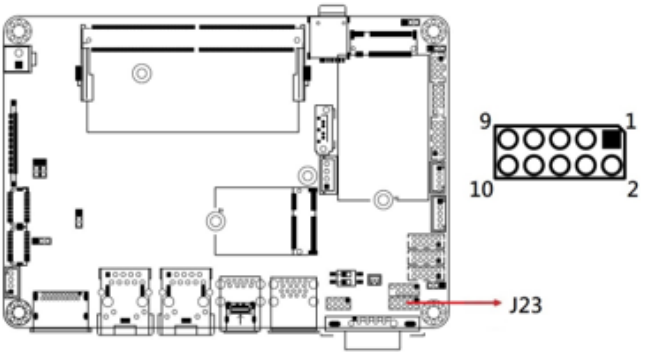
Pin	Assignment	Pin	Assignment
1	+12V/1.5A	3	Brightness Control
2	Backlight Enable	4	Ground

2.5.24 80 Port Debug Tool Connector (J22)



Remarks: Factory use only.

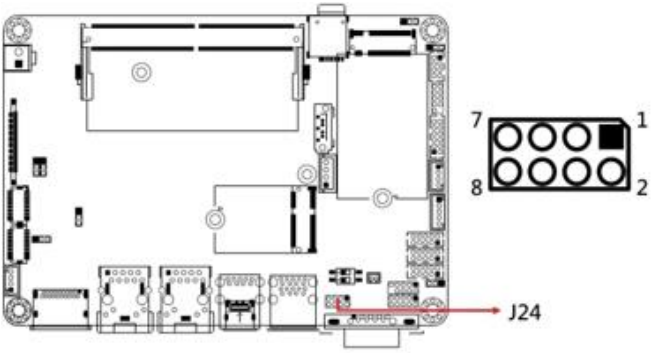
2.5.25 Digital I/O Connector (J23)



Remarks: E-CALL_0196-01-200-100

Pin	Assignment	Pin	Assignment
1	Ground	2	+5V/0.5A
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	IN3	8	IN1
9	IN2	10	IN0

2.5.26 Front Panel Setting Connector (J24)



Remarks: E-CALL_0126-01-203-080

Pin	Assignment	Pin	Assignment
1	PWR_BTN-	2	PWR_BTN+
3	HDD_LED+, 3.3V	4	HDD Active
5	Ground	6	Reset
7	POWER_LED+, 5V	8	Ground

Chapter 3
Drivers Installation

This chapter introduces installation of the following drivers:

- Intel® Chipset Software Installation Utility
- Intel® Graphics Drivers
- Realtek HD Audio Driver
- Intel® LAN Drivers
- Intel® ME Drivers
- Intel® Serial IO Drivers

3.1 Introduction

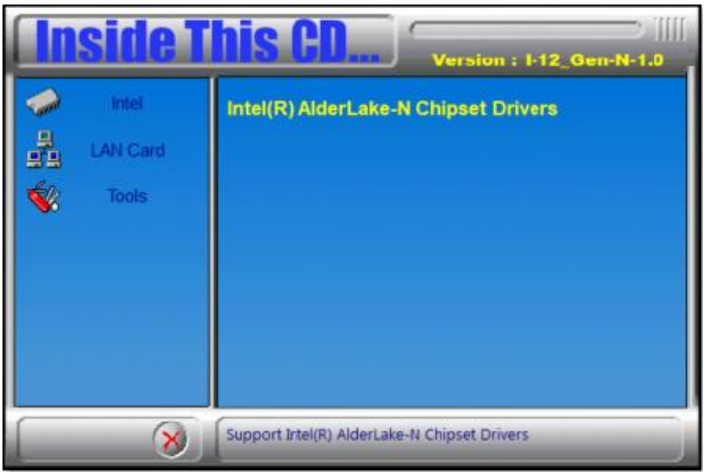
This section describes the installation procedures for software and drivers. The software and drivers are included with the motherboard. If you find anything missing, please contact the distributor where you made the purchase. The contents of this section include the following:

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

3.2 Intel® Chipset Software Installation Utility

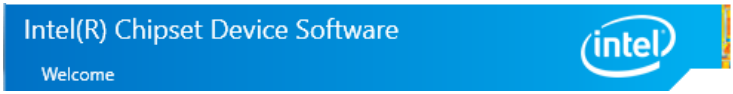
The Intel® Chipset drivers should be installed first before the software drivers to install INF files for Plug & Play function for Intel chipset components. Follow the instructions below to complete the installation.

1. Run the drivers disk. Click **Intel** on the left pane and then **Intel(R) AlderLake-N Chipset Drivers** on the right pane.



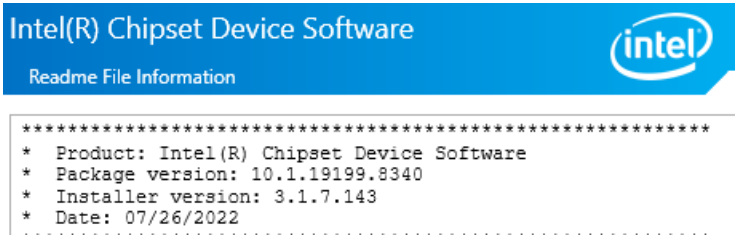
2. Click **Intel(R) Chipset Software Installation Utility**.

3. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next** to continue.



4. Accept the software license agreement and proceed with the installation process.

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

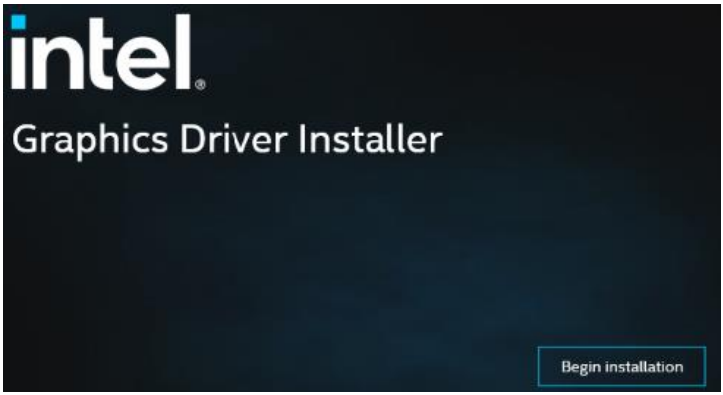


6. After completing the installation, click **Finish** to complete the setup process.

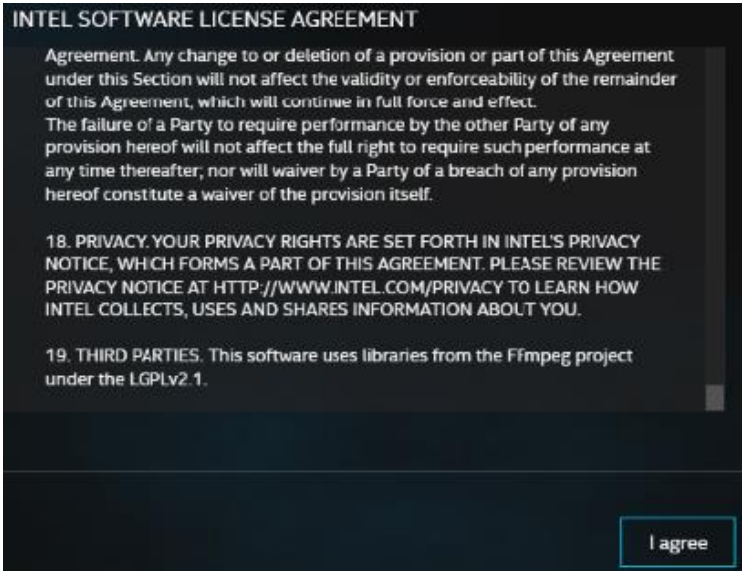
3.3 VGA Driver Installation

1. Run the drivers disk. Click **Intel** on the left pane and then **Intel(R) AlderLake-N Chipset Drivers** on the right pane.
2. Click **Intel(R) HD Graphics Driver**.

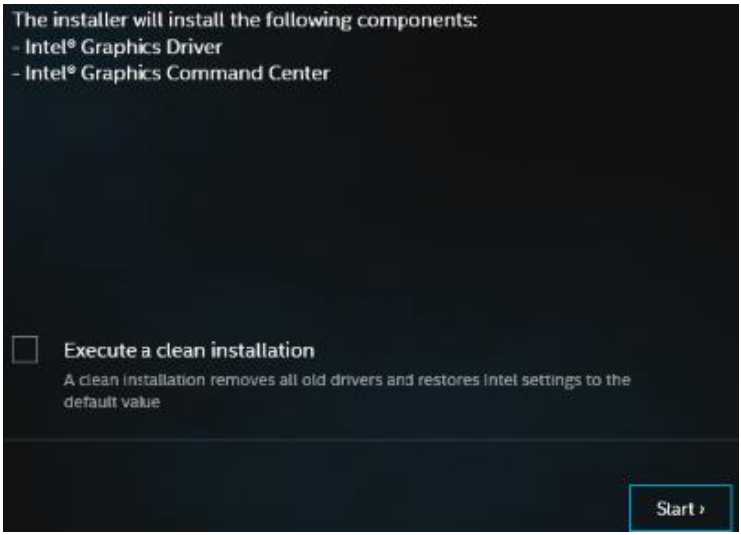
3. Click **Begin installation**.



4. Click **I agree** to accept the license agreement.

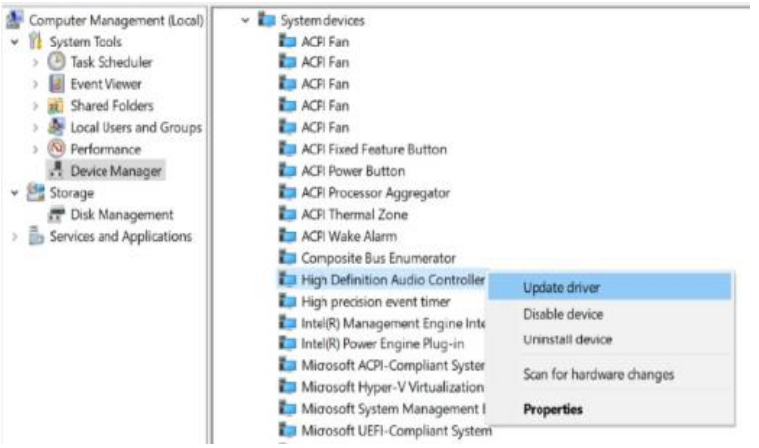


5. On the next screen, click **Start and** then click **Finish** when installation has been completed.

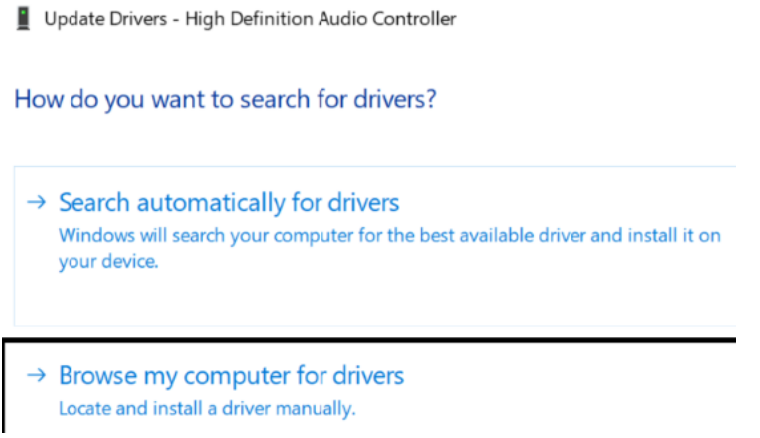


3.4 HD Audio Driver Installation

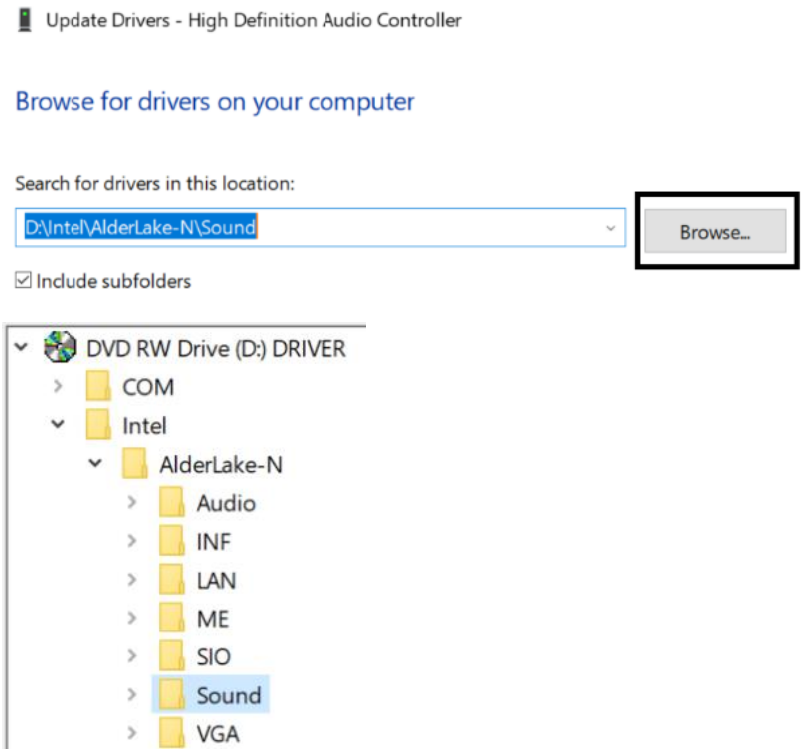
1. To complete the audio driver installation, go to the system's Device Manager to **Update driver** of the **High Definition Audio Controller**.



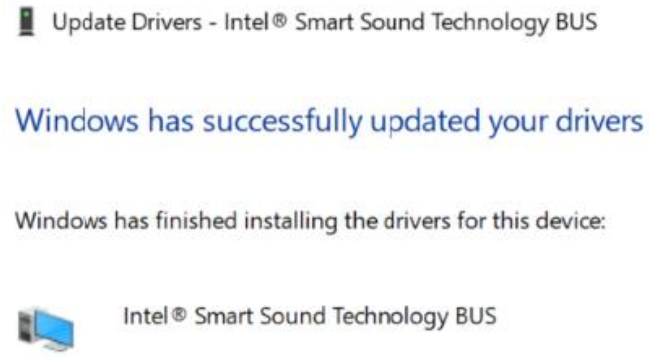
2. Locate and install the driver manually.



3. Go to the subfolder shown below and click **Next**.



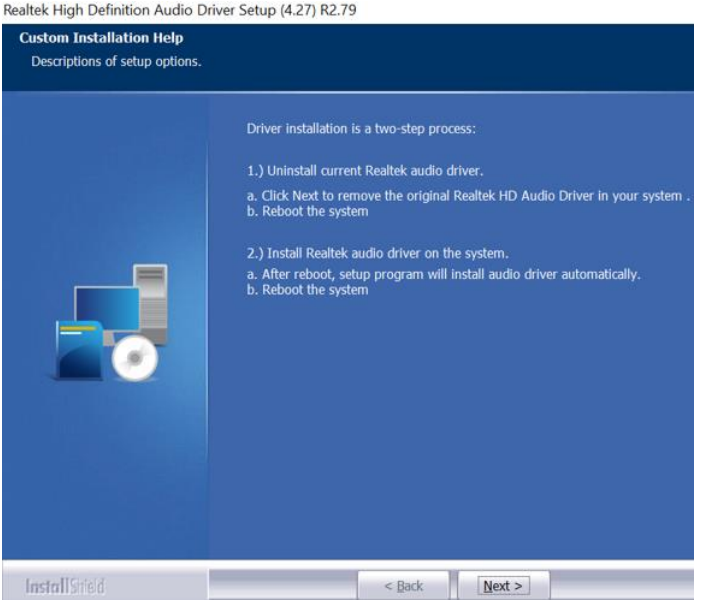
4. Windows has finished installing the drivers. Click **Close**.



5. Run the drivers disk. Click **Intel** on the left pane and then **Intel(R) AlderLake-N Chipset Drivers** on the right pane.
6. Click **Realtek High Definition Audio Driver**.

7. On the *Welcome* screen of the InstallShield Wizard, click **Next**.

8. On the next screen, click **Next**.

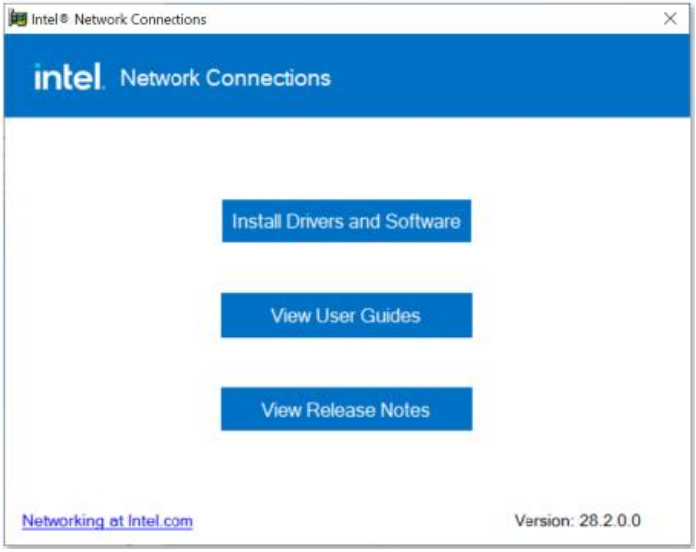


9. On the next screen, click **Finish**.

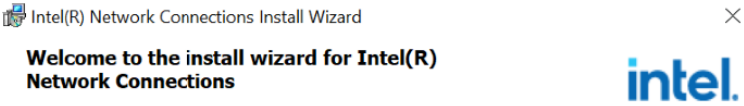
3.5 LAN Driver Installation

1. Run the drivers disk. Click **Intel** on the left pane and then **Intel(R) AlderLake-N Chipset Drivers** on the right pane.
2. Click **Intel(R) PRO LAN Network Drivers**..

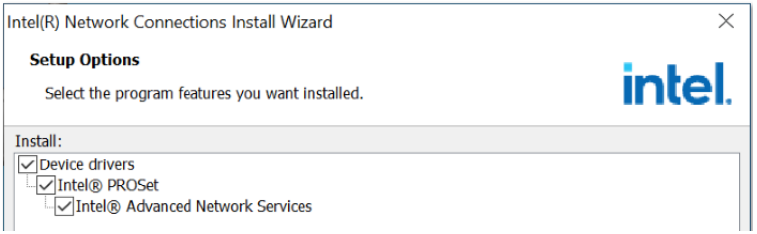
3. On the Network Connections screen, click **Install Drivers and Software**.



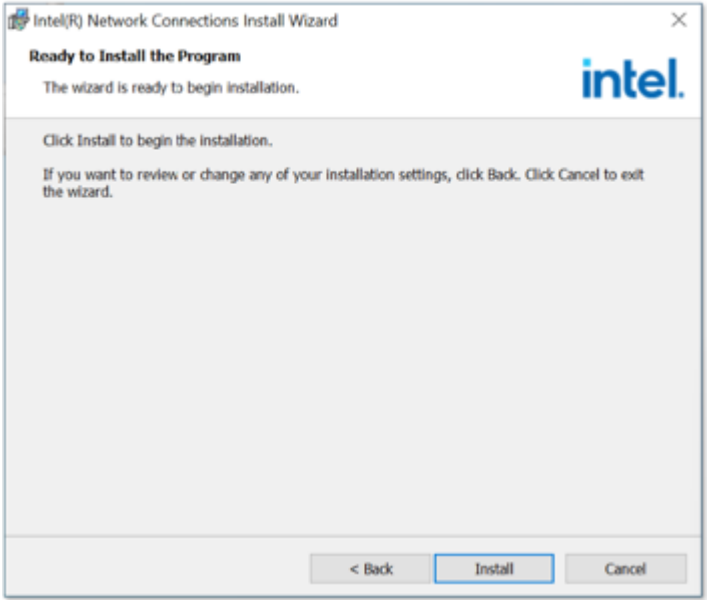
4. When the *Welcome* screen appears, click **Next**.



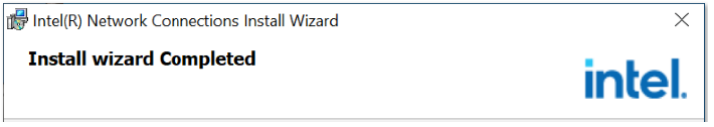
5. On the next screen, accept the license agreement and click **Next**.
6. On the *Setup Options* screen, click **Next** to continue.



7. On the *Ready to Install the Program* screen, click **Install**.



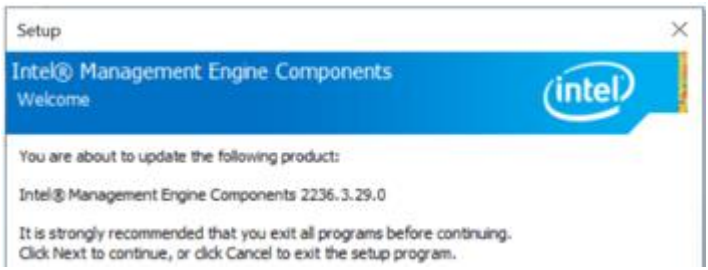
8. When the Install wizard has completed the installation, click **Finish**.



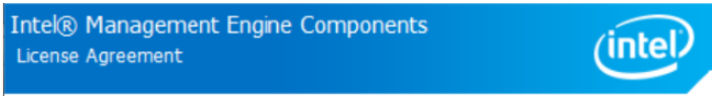
3.6 Intel® Management Engine Drivers Installation

1. Run the drivers disk. Click **Intel** on the left pane and then **Intel(R) AlderLake-N Chipset Drivers** on the right pane.
2. Click **Intel(R) ME 15.x Drivers**.

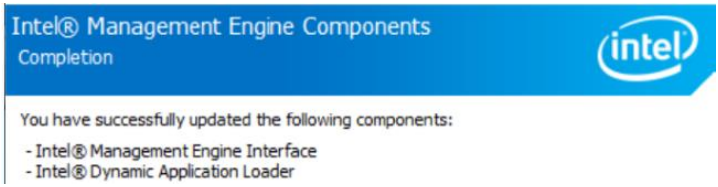
3. When the *Welcome* screen appears, click **Next**.



4. Accept the license agreement and click **Next**.



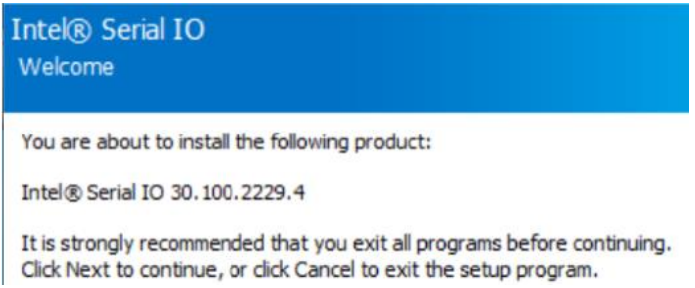
5. After Intel Management Engine Components have been successfully installed, click **Finish**.



3.7 Intel(R) Serial IO Drivers Installation

1. Run the drivers disk. Click **Intel** on the left pane and then **Intel(R) AlderLake-N Chipset Drivers** on the right pane.
2. Click **Intel(R) Serial IO Drivers Installation**.

3. In the Welcome screen, click **Next**.



4. In the next screen, accept the license agreement and click **Next**.
5. In the Readme File Information screen, click **Next**.
6. In the Confirmation screen, click **Next**.

7. When installation has been completed, click **Finish**.

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, serial ports and parallel 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. Press the <Del> key immediately allows you to enter the Setup utility. If you are a little bit late pressing the <Del> 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
```

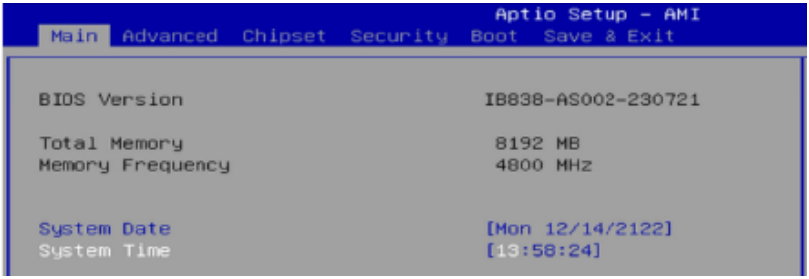
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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.

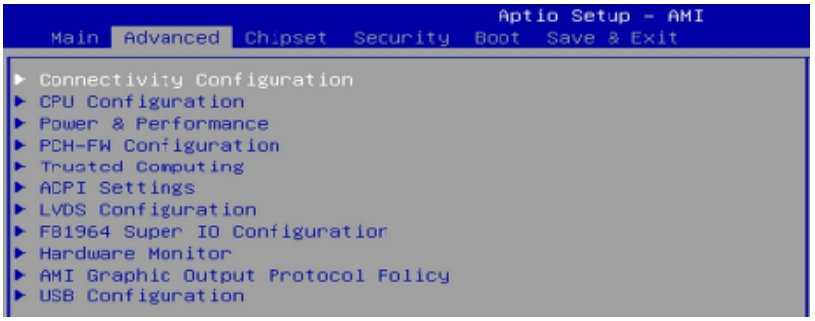
4.3 Main Settings



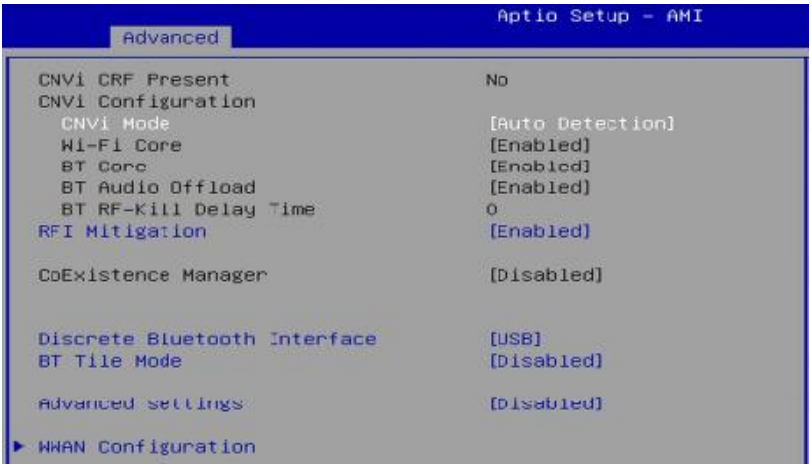
BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the date elements.
System Time	Set the time. Use the <Tab> key to switch between the time elements.

4.4 Advanced Settings

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

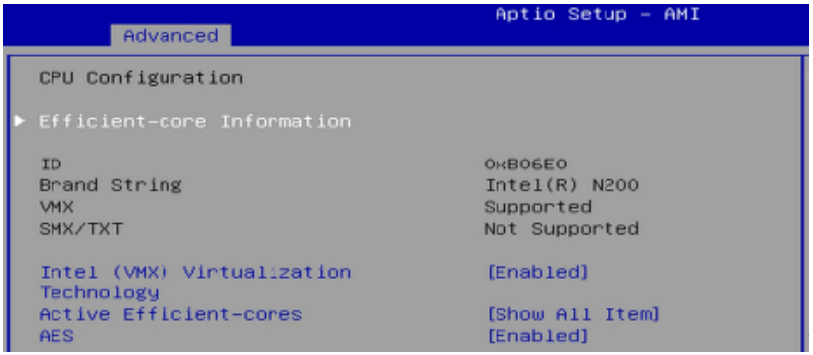


4.4.1 Connectivity Configuration

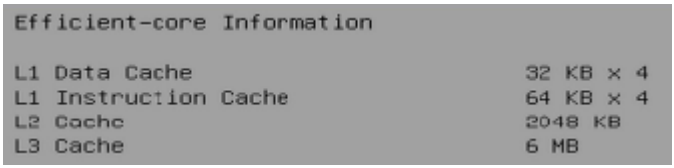


BIOS Setting	Description
CNVI Mode	This option configures Connectivity. ***Auto Detection*** – means that if Discrete solution is discovered it will be enabled by default. Otherwise Integrated solution (CNVi) will be enabled; ***Disable Integrated*** – disables Integrated Solution.
RFI Mitigation	This is an option intended to enable/disable DDR-RFIM feature for Connectivity. This feature may result in temporary slowdown of the DDR speed.
Discrete Bluetooth Interface	Serial IO UART0 needs to be enabled to select BT interface.
BT Tile Mode	Options: Enabled/Disabled
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

4.4.2 CPU Configuration



BIOS Setting	Description
Efficient-core Information	Displays the E-core Information.
Intel (VMX) Virtualization Technology	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Efficient-cores	Number of E-cores to enable in each processor package. Note: Number of cores and E-cores are looked at together. When both are (o,o), Pcode will enable all cores.
AES	Enable/Disable AES (Advanced Encryption Standard)



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
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.

4.4.4 PCH-FW Configuration

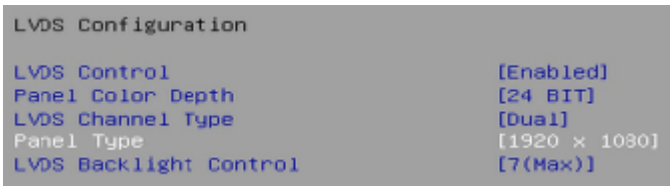
4.4.5 Trusted Computing

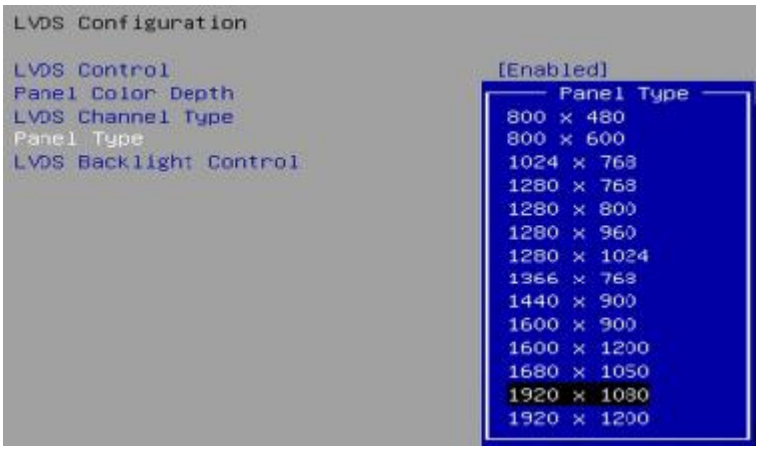
BIOS Setting	Description
Security Device Support	Enables / Disables BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.
SHA256 PCR Bank	Options: Enabled / Disabled
SHA384 PCR Bank	Options: Enabled / Disabled
SM3_256 PCR Bank	Options: Enabled / Disabled
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	Enables / Disables platform hierarchy.
Storage Hierarchy	Enables / Disables storage hierarchy.
Endorsement Hierarchy	Enables / Disables 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.

4.4.6 ACPI Settings

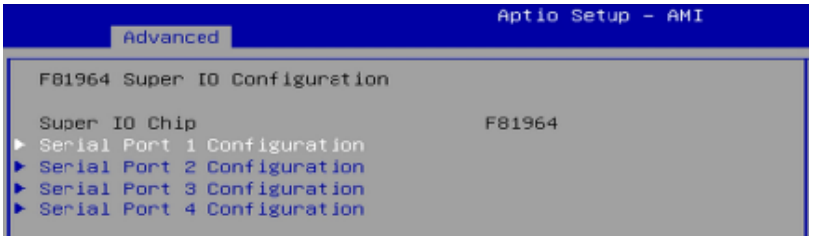
BIOS Setting	Description
Enable Hibernation	Enables / Disables the system ability to hibernate (OS/S4 Sleep State). This option may be not effective with some OS.
ACPI Sleep State	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.

4.4.7 LVDS Configuration



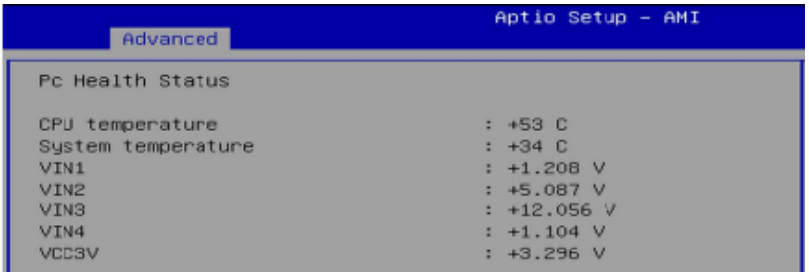


4.4.8 F81964 Super IO Configuration



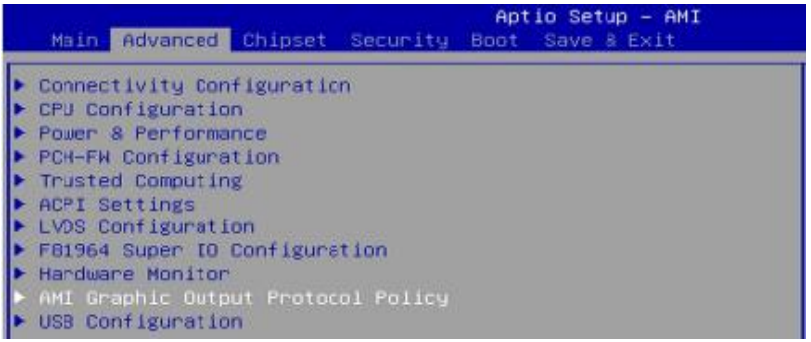
BIOS Setting	Description
Serial Port 1 Configuration	Sets parameters of Serial Port 1 (COMA).
Serial Port	Enable / Disable the serial port.
Change Settings	Select an optimal setting for the Super IO device. Options are: IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
Serial Port Mode Select	Options are: RS232, RS485, RS422
Serial Port 2 Configuration	Sets parameters of Serial Port 2 (COMB).
Serial Port	Enable / Disable the serial port.
Change Settings	Select an optimal setting for the Super IO device. Options are: IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
Serial Port 3 Configuration	Sets parameters of Serial Port 3 (COM).
Serial Port	Enable / Disable the serial port.
Change Settings	Select an optimal setting for the Super IO device. Options are: IO=3E8h; IRQ=7; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
Serial Port 4 Configuration	Sets parameters of Serial Port 4 (COMD).
Serial Port	Enable / Disable the serial port.
Change Settings	Select an optimal setting for the Super IO device. Options are: IO=2E8h; IRQ=7; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
Standby Power on S5 (Eup)	Enable – provide the standby power for devices. Disable – shutdown the standby power.

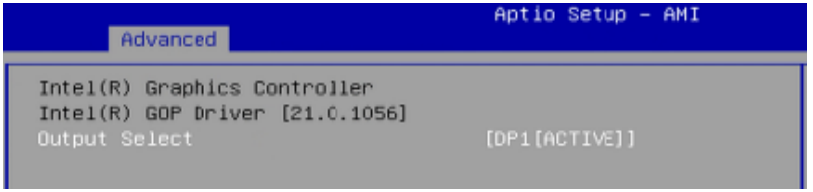
4.4.9 Hardware Monitor



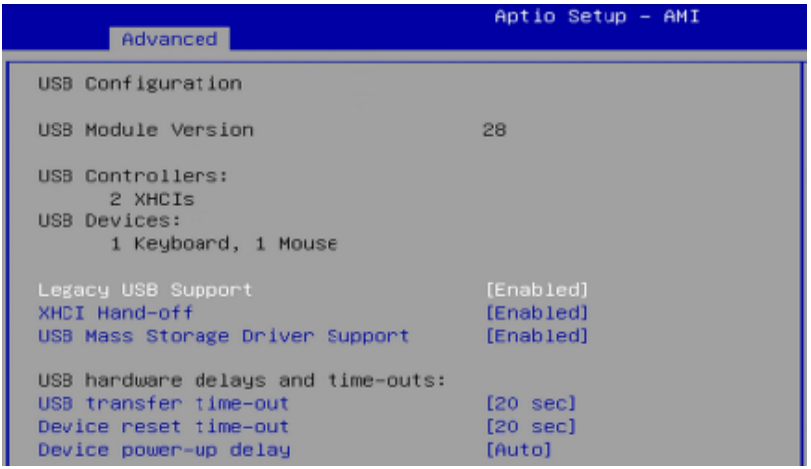
BIOS Setting	Description
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.4.10 AMI Graphic Output Protocol Policy





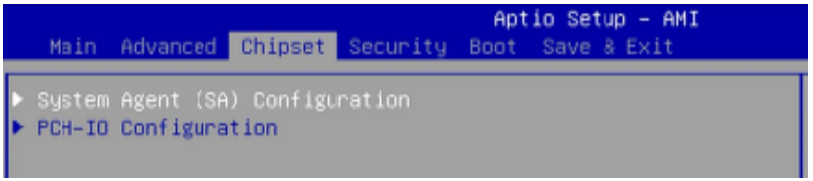
4.4.11 USB Configuration



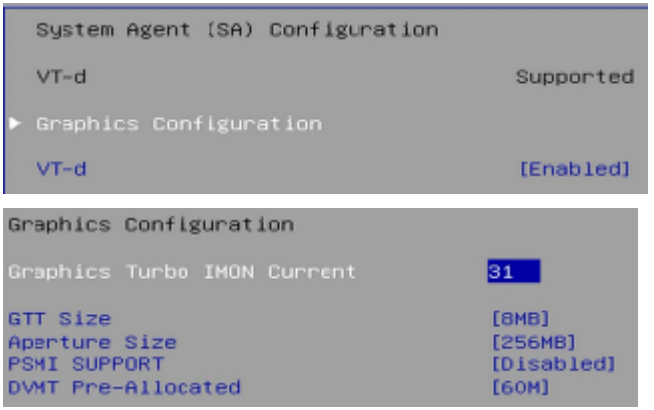
BIOS Setting	Description
Legacy USB Support	• **Enabled** enables Legacy USB support. • **Auto** disables legacy support if there is no USB device connected. • **Disabled** keeps USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.
USB Mass Storage Driver Support	Enables / Disables 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	USB mass storage device Start Unit command time-out
Device power-up delay	Max.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.

4.5 Chipset Settings

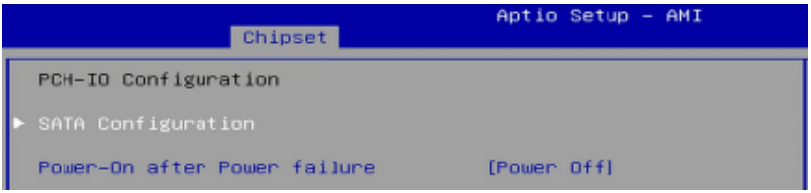
4.5.1 System Agent (SA) Configuration



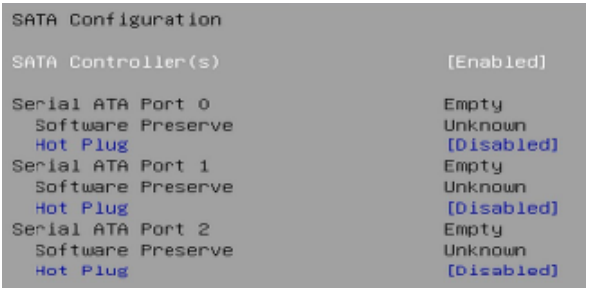
4.5.1.1. Graphics Configuration:



4.5.2 PCH-IO Configuration



4.5.2.1 SATA Configuration:

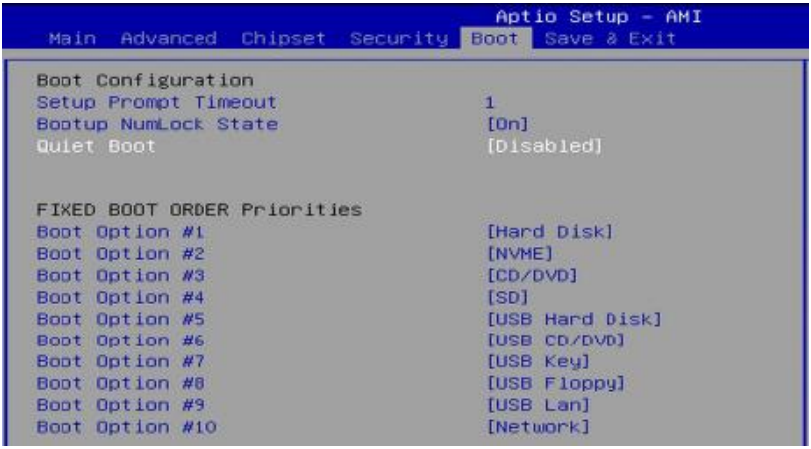


BIOS Setting	Description
SATA and RST Configuration	SATA device options and settings
SATA Controller(s)	Enables / Disables the Serial ATA.
SATA Mode Selection	Selects IDE or AHCI Mode.
Serial ATA Port 0~2	Enables / Disables Serial Port 0 ~ 2.
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.
Power-On After Power failure	Specify what state to go to when power is re-applied after a power failure (G3 state)

4.6 Security Settings

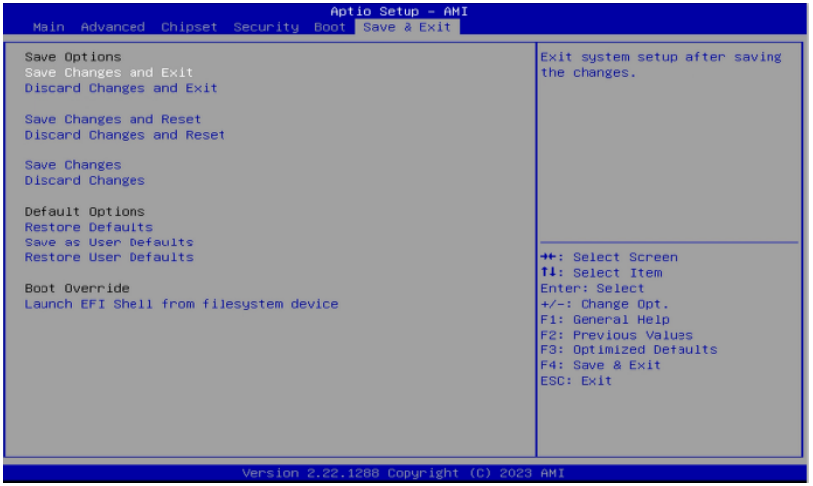
BIOS Setting	Description
Setup Administrator Password	Sets an administrator password for the setup utility.
User Password	Sets a user password.
Secure Boot	Secure Boot feature is Active if Secure Boot is enabled. Platform Key(PK) is enrolled and the system is in user mode. The mode change requires platform 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

4.7 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	Enables / Disables Quiet Boot option.
FIXED BOOT ORDER Priorities	Sets the system boot order.

4.8 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.

Appendix

This section provides the mapping addresses of peripheral devices 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
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
0x00001854-0x00001857	Motherboard resources
0x000003F8-0x000003FF	Communications Port (COM1)
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x0000EFA0-0x0000EFBF	SMBus - 54A3
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

Address	Device Description
0x000000B4-0x000000B5	Programmable interrupt controller
0x000000B8-0x000000B9	Programmable interrupt controller
0x000000BC-0x000000BD	Programmable interrupt controller
0x000004D0-0x000004D1	Programmable interrupt controller
0x00003000-0x0000303F	Intel(R) UHD Graphics
0x00000000-0x00000CF7	PCI Express Root Complex
0x00000D00-0x0000FFFF	PCI Express Root Complex
0x00003090-0x00003097	Standard SATA AHCI Controller
0x00003080-0x00003083	Standard SATA AHCI Controller
0x00003060-0x0000307F	Standard SATA AHCI Controller
0x00000040-0x00000043	System timer
0x00000050-0x00000053	System timer
0x00002000-0x000020FE	Motherboard resources
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard

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 4294967291	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967294	PCI Express Root Port #7 - 54BE
IRQ 4294967278	Intel(R) Management Engine Interface #1
IRQ 4294967285~89	Intel(R) Ethernet Controller I226-V #6
IRQ 4294967280~84	Intel(R) Ethernet Controller I226-V #7
IRQ 4	Communications Port (COM1)
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 6	Communications Port (COM4)
IRQ 19	High Definition Audio Controller
IRQ 4294967279	Intel(R) UHD Graphics
IRQ 16	Intel(R) Serial IO UART Host Controller - 54A8
IRQ 55~204	Microsoft ACPI-Compliant System
IRQ 256~511	Microsoft ACPI-Compliant System
IRQ 4294967292	Standard SATA AHCI Controller
IRQ 4294967290	Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 0	System timer
IRQ 14	Intel(R) Serial IO GPIO Host Controller - INTC1057
IRQ 1	Standard PS/2 Keyboard
IRQ 12	Microsoft PS/2 Mouse
IRQ 4294967293	PCI Express Root Port #9 - 54B0
IRQ 4294967291	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967294	PCI Express Root Port #7 - 54BE
IRQ 4294967278	Intel(R) Management Engine Interface #1

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
}
//-----------------------------------------------------------------------


//-----------------------------------------------------------------------
//
```

```
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// 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)
{
        outportb(F81964_INDEX_PORT, F81964_UNLOCK);
        outportb(F81964_INDEX_PORT, F81964_UNLOCK);
}
//---------------------------------------------------------------------------
void Lock_F81964 (void)
{
        outportb(F81964_INDEX_PORT, F81964_LOCK);
}
//---------------------------------------------------------------------------
void Set_F81964_LD( unsigned char LD)
{
        Unlock_F81964();
        outportb(F81964_INDEX_PORT, F81964_REG_LD);
        outportb(F81964_DATA_PORT, LD);
        Lock_F81964();
}
```

```
//---------------------------------------------------------------------------
void Set_F81964_Reg( unsigned char REG, unsigned char DATA)
{
                Unlock_F81964();
                outportb(F81964_INDEX_PORT, REG);
                outportb(F81964_DATA_PORT, DATA);
                Lock_F81964();
}
//---------------------------------------------------------------------------
unsigned char Get_F81964_Reg(unsigned char REG)
{
                unsigned char Result;
                Unlock_F81964();
                outportb(F81964_INDEX_PORT, REG);
                Result = inportb(F81964_DATA_PORT);
                Lock_F81964();
                return Result;
}
//---------------------------------------------------------------------------
```

```
//---------------------------------------------------------------------------
//
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// 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 Reference Types

Function	Connector	Onboard Type	Compatible Mating Type
Audio	**J7**	**Hao Guo Xing Ye DF11-12S-PA66H**	**Hirose DF11-12DS-2C**
SATA HDD Power	J8	E-CALL 0110-071-040	JST XHP-4
Front Panel Setting	J24	E-CALL 2.0 mm-pitch pin header (Female)	Dupont 2.0 mm-pitch (Female)
USB 2.0	J5	Hao Guo Xing Ye DF11-8S-PA66H	Hirose DF11-8DS-2C
COM2 Serial Port	J19	Hao Guo Xing Ye DF11-10S-PA66H	Hirose DF11-10DS-2C
DC Power Input	J24	Hao Guo Xing Ye WAFER396-2S-WV	JST VHR-2N
Digital I/O	J23	Dupont 2.00 mm-pitch pin header (Male)	Dupont 2.00 mm-pitch (Female)
LCD Backlight	J21	E-CALL 0110-161-040	JST PHR-4.
LVDS	J10, J15	Hirose DF20G-20DP-1V	Hirose DF20A-20DS-1C
eDP	CN2	KEL SSL00-40S	KEL SSL20-40S

E. USB Power Control Mapping

Function	Connector	Software Mapping
USB	**CN8**	**Bit_5**