IPPC-W215

Industrial Panel PC with Intel® N150 / Core™ 3 N355 Processor

User's Manual

Version 1.0
(November 2026)

iBASE

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Compliance

CE

This product has passed CE compliance testing and conforms to applicable EU directives. In a residential environment, this device may cause radio interference. Users may need to take corrective measures.

FC

This product complies with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. It generates, uses, and can radiate radio frequency energy. Improper installation or use may cause harmful interference to radio communications.

WEEE



This product must not be disposed of as household waste, in accordance with the EU directive on Waste Electrical and Electronic Equipment (WEEE - 2012/19/EU). Follow local regulations for electronic waste disposal or return it to a designated recycling facility.

Battery Safety

CAUTION: Do not expose the battery to fire, excessive heat, crushing, or cutting. Risk of explosion or leakage. Replace only with manufacturer-approved type. Dispose of used batteries per local regulations.

ATTENTION (FR): Ne pas exposer la batterie au feu, à une chaleur excessive, à l'écrasement ou à la coupe. Risque d'explosion ou de fuite. Remplacer uniquement par un type approuvé. Mettre au rebut conformément à la réglementation locale.

RoHS Compliance



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

Environmental conditions:

- Place the device on a stable, horizontal surface to prevent it from falling and causing damage.
- Ensure there is sufficient space around the device for proper ventilation.
- Operate the product in environments with ambient temperatures as listed in the product specifications.

Caring for your IBASE products:

- Turn off the device and unplug all cables before cleaning to avoid residual electrical current.
- Clean the chassis with a cloth and neutral cleaning agents or diluted alcohol, then dry it with another clean cloth.
- Use a computer vacuum cleaner to remove dust, especially from air vents and slots, to prevent clogging.



WARNING

Attention during use:

- Do not use this product near water.
- Avoid spilling water or other liquids on the device.
- Do not place heavy objects on top of the device.
- Only use the type of power specified on the label. If unsure, consult your distributor or local power company.
- Ensure the correct voltage is applied to the device.
- Do not walk on or place objects on the power cord.
- If using an extension cord, ensure the total ampere rating of the connected devices does not exceed the cord's capacity.
- Do not touch the heat sink while the system is running.



CAUTION! Hot surface, Do not touch.

Avoid Disassembly

Disassembling, repairing, or modifying the device is discouraged, as it may pose hazards, cause damage to the device, or lead to injury or property damage. Unauthorized disassembly, repair, or modification may void the warranty.



CAUTION

Replace the battery only with the same or equivalent type recommended by the manufacturer.

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, memory, storage device, 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 product information and a detailed description of 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)

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Chapter 1
General Information

The information provided in this chapter includes:

- Introduction
- Features
- Specifications
- Product View
- Dimensions

1.1 Introduction

The IPPC-W215 is a 21.5-inch fanless rugged panel PC for production monitoring, industrial HMI, and equipment control. Powered by Intel® N150 or Intel® Core™ 3 N355 processors, the system combines intuitive touchscreen operation, extensive connectivity, and versatile mounting options to simplify industrial integration.

The IPPC-W215 features a Full HD 1920 x 1080 projected capacitive touchscreen with support for 10-point touch and operation with gloves. Wide 178-degree viewing angles ensure clear visibility from different positions, while an optional 500-nit display enhances readability in brighter environments. Its flat front panel provides IP66 protection against dust and water ingress, and the fanless design eliminates cooling-fan maintenance for dependable operation in industrial settings.

Equipped with dual 2.5GbE ports, six USB Type-A ports, and USB-C supporting 60W Power Delivery and DisplayPort Alternate Mode, the IPPC-W215 connects readily to industrial networks and peripherals. HDMI and USB-C enable additional displays, while serial and digital I/O support equipment integration. The system accommodates up to 16GB DDR5 memory and provides M.2 expansion for storage and optional Wi-Fi/Bluetooth or 4G/5G connectivity with a Nano SIM slot. Hardware-based dTPM 2.0 security, a wide 9–36V DC input, and VESA, side, or optional panel mounting offer further integration flexibility, complemented by compatibility with standard 6 mm T-slot and V-slot grooves.

1.2 Features

- Intel® N150 or Core™ 3-N355 Processors
- Supports up to 16GB DDR5 SO-DIMM memory
- 21.5" flat LCD panel with projected capacitive touchscreen
- Compliance with 6mm T and V-Slot™ Standard Groove
- IP66 Front Panel Waterproof Design
- USB Type-C PD 60W (5V/9V/12V/15V/20V_Max 3A) and DP Alternate mode
- Supports 2x COM ports and 4 optional powered COM ports
- 7x USB (2x USB 3.2 + 4x USB 2.0 + USB-C), 4x DI, 4x DO
- Supports M.2 sockets for Wi-Fi / BT and 4G/5G communication with a Nano SIM slot
- Supports hardware TPM2.0 security
- Wide Range Power Input +9V ~ 36V DC-in

1.3 Packing List

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

- IPPC-W215 series Panel PC
- Manuals & Driver download instructions
- DC-IN Dinkle bare wire converter
- POWER SW Dinkle bare wire converter
- DIO Dinkle bare wire converter
- 10 × M5 T-Nuts for T/V-slot mounting

1.4 Specifications

IPPC-W215 Specifications	
Display	21.5 inch 1920x1080 panel with Projected Capacitive Touch
	250 or 500 nits Brightness, 1000:1 Contrast Ratio
Processor	Intel® N150 Processor (Quad-Core @ 3.6GHz) Intel® Core™ 3 N355 Processor (Eight-Core @ 3.9GHz)
Mainboard	MBP-210 + IDP-210
Memory	1x DDR5-4800 SO-DIMM, Max. 16GB
Rear Panel External I/O	• 1x HDMI • 2x RJ45 2.5G Ethernet ports • 2x USB 3.2 ports, 1x USB 3.2(Type-C), 4x USB 2.0 ports • 1x RS232/422/485 ports for COM 1 • 1x RS232 ports for COM2 • 1x Combo Audio (Line-out/ Mic-in) • 1x 2-pin DC-in terminal block for 9V-36V • 2x Antenna hole • Optional Power COM for #3~#6
Front Panel External I/O	• 1x power button with LED • 1x Nano SIM card slot with cover • Optional Power COM for #3~#6 • 2x Antenna hole
Left and Right Panel External I/O	• 1x 4-in & 4-out GPIO • 1x Remote Power Switch • 2x Antenna hole
Expansion Slots	• 1x 2280 M.2 M+B-Key socket (PCI-E + SATA) • 1x 2230 M.2 E-Key socket (USB 2.0 + PCI-E) • 1x 3052 M.2 B-Key socket (USB 3.2 + PCI-E + SATA)
Storage	• Supports PCIe/SATA SSD storage via the 2280 M.2 M+B-Key socket
Construction	Aluminum + SGCC
Color	Dark Gray Front Bezel, Light Gray Rear Chassis
Mounting	• VESA mounting (75x75mm or 100x100mm) • Side Mount via T-Slot nut • Optional Panel Mounting KIT

Dimensions	539.8mm(W) x 331.26mm(H) x 75mm(D)
Weight	7.3 kg
Supported O.S.	Windows 10, Windows 11, and Ubuntu Linux
Certification	CE/ FCC Class B/ LVD

Environment	
Operating Temperature	- 10°C~45°C
Storage Temperature	- 20°C~60°C
Relative Humidity	5~90% @ 45°C, (non-condensing)
Vibration	• Operating: 0.5Grms / 5~500Hz • Non-operating: 1Grms / 5~500Hz
Shock	• Operating: 30G/11 ms Duration • Non-operating: 40G/11 ms Duration

All specifications are subject to change without prior notice.

Note: The product performance relies on the system functioning as a whole. The level of CPU/APU/GPU processor, the interaction among the processor and the memory and storage bandwidth, or the functionality of the digital signage application software may affect the product performance.

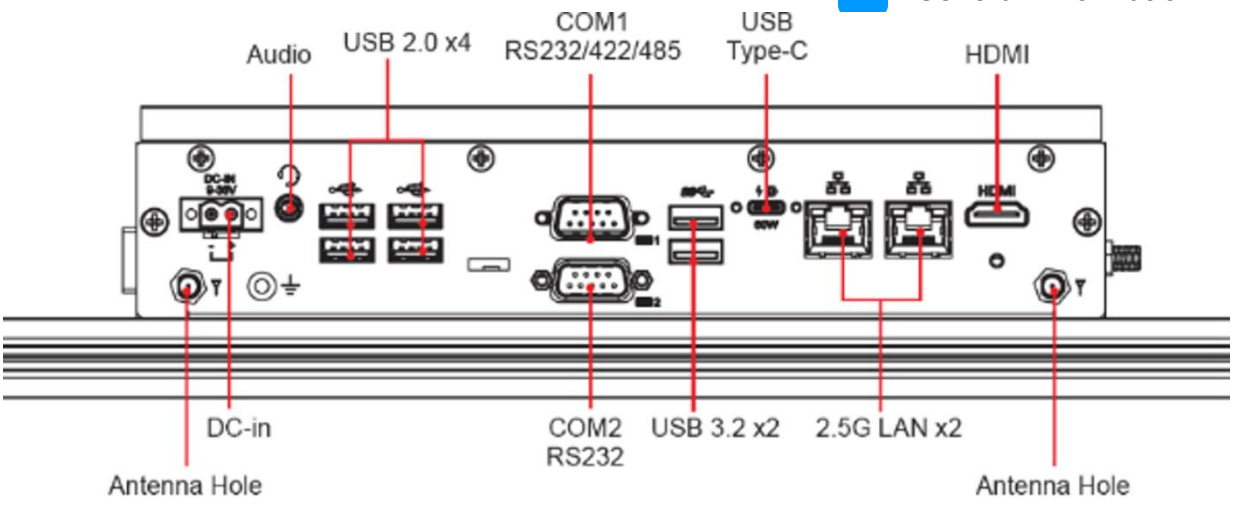
1.5 Product View



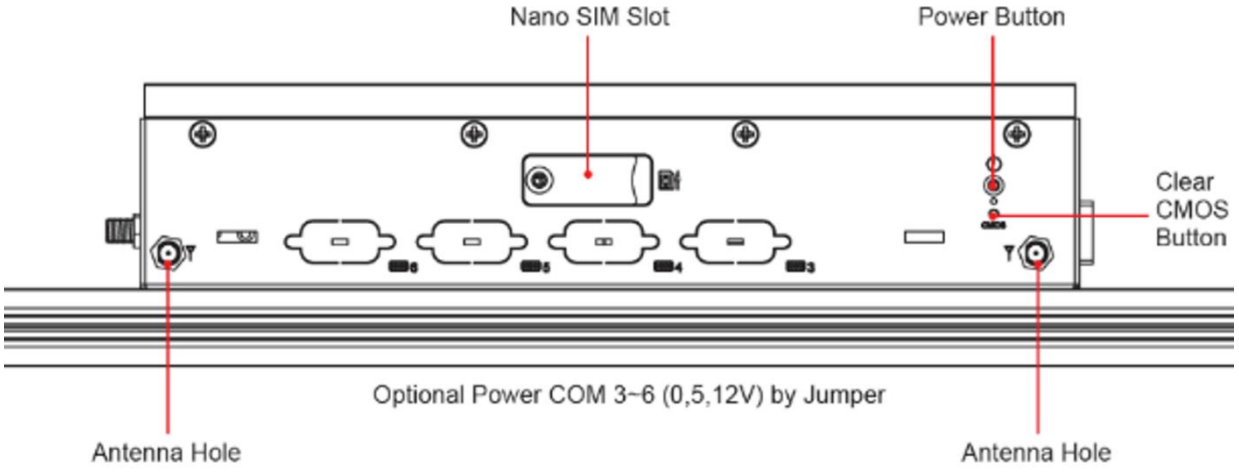




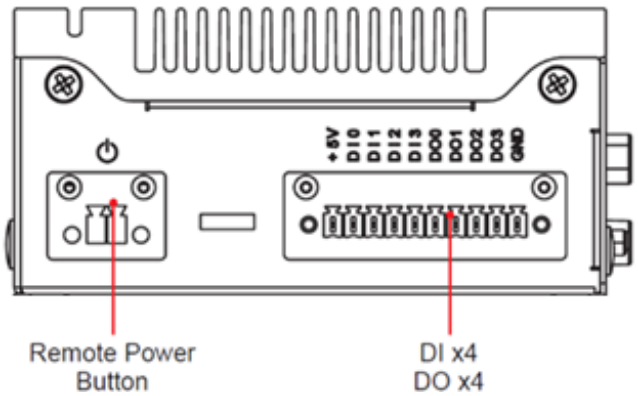




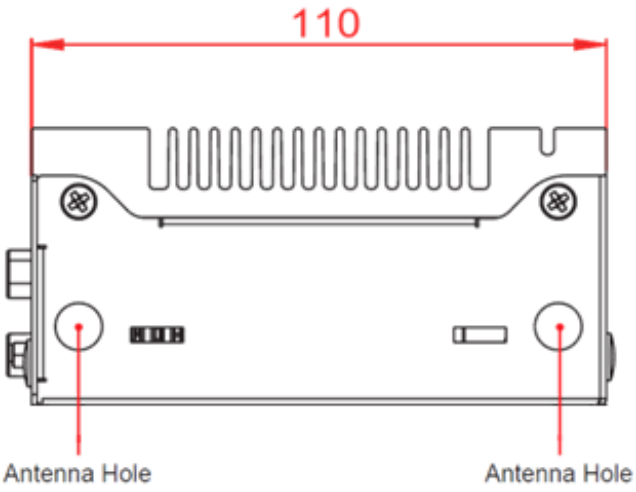
Rear External I/O



Front External I/O



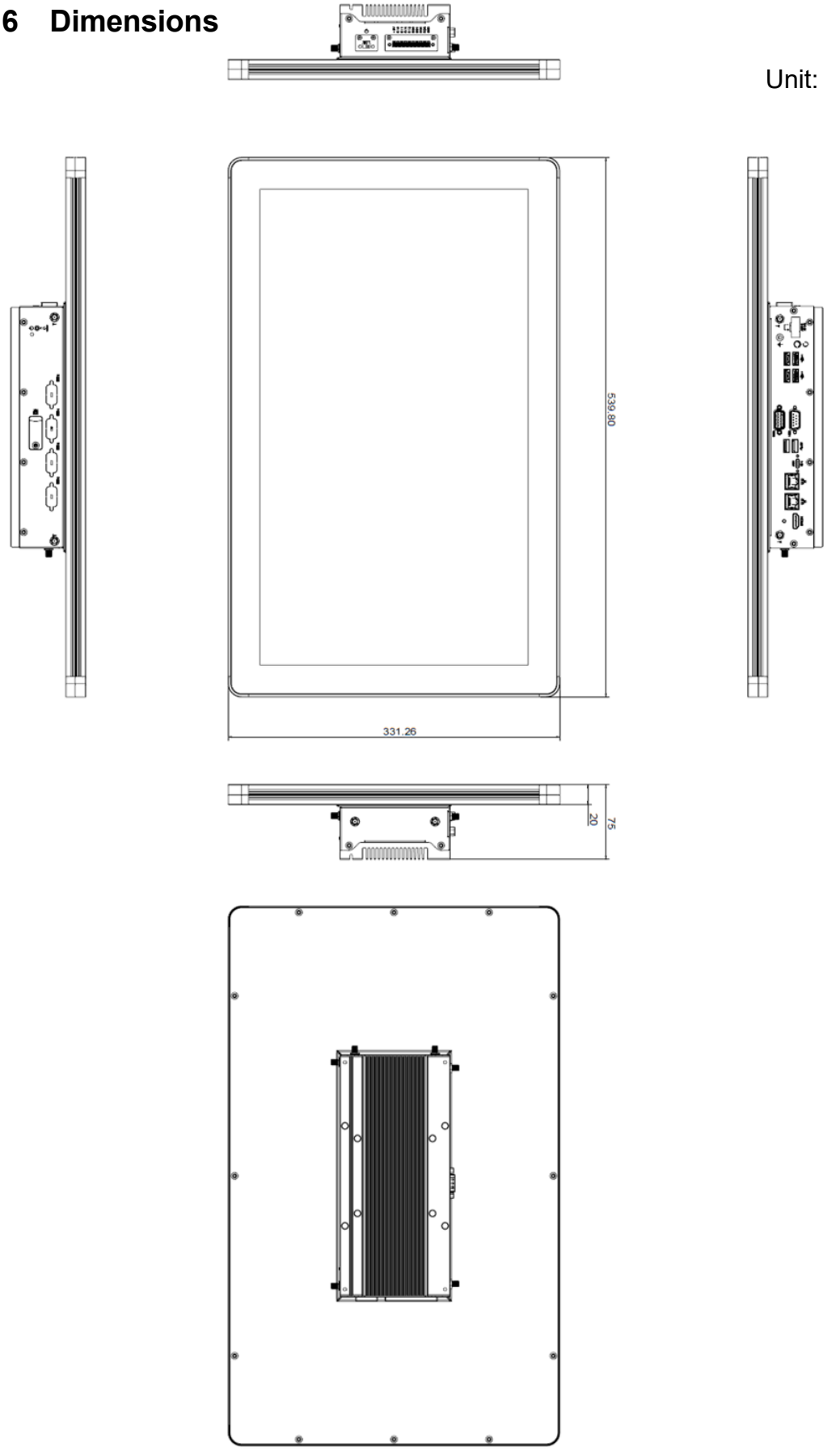
Right Side External I/O



Left Side External I/O

1.6 Dimensions

Unit: mm



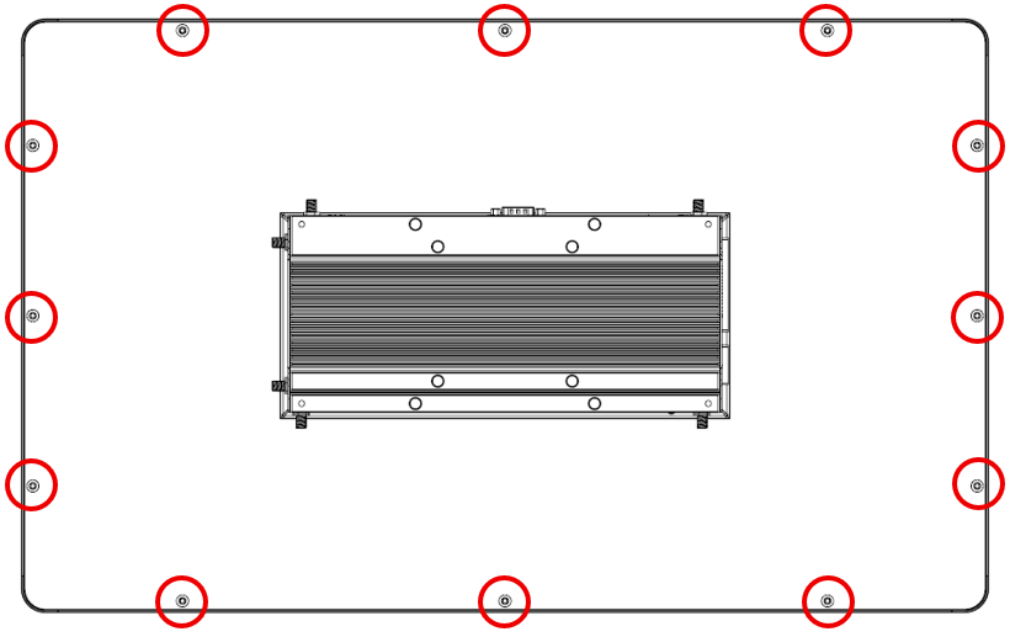
Chapter 2
Hardware Configuration

The information provided in this chapter includes:

- Installations
- Information and locations of connectors

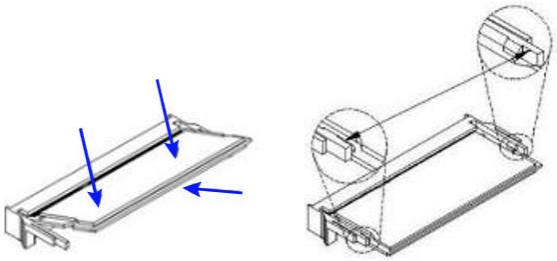
2.1 Installations

Turn your product upside down and take away the device bottom cover by removing 12 screws as indicated below for the installation or replacement of the memory module, M.2 SSD or WLAN card. After installations, secure the device bottom cover back.



2.1.1 Memory Installation / Replacement

If you need to install or replace a memory module, follow the instructions below for installation after you disassemble the device cover.



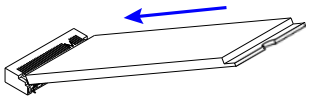
1. Align the key of the memory module with that on the memory slot and insert the module slantwise.
2. Gently push the module in an upright position until the clips of the slot close to hold the module in place when the module touches the bottom of the slot. To remove the module, press the clips outwards with both hands, and the module will pop up.

2.1.2 M.2 Cards Installation / Replacement

After removing the bottom cover, follow the instructions below.

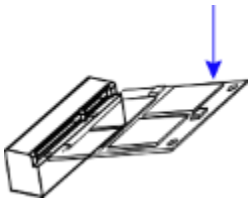
1. Locate the M.2 slot, align the key of the card to the interface, and insert the card slantwise.

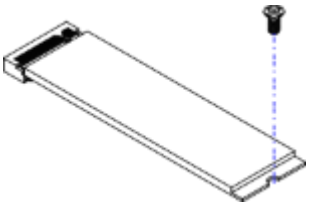
M.2 card:



2. Push the card down and fix it with the supplied flat head screws for the M.2 card.

M.2 card:

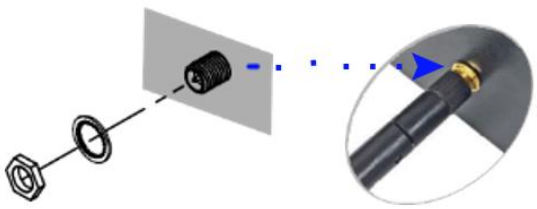




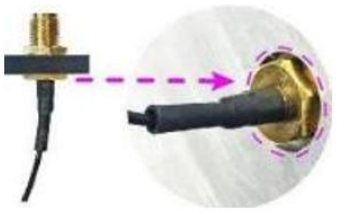
2.1.3 WiFi / 5G / 4G Antenna Installation

Thread the WiFi / 5G / 4G antenna extension cable through an antenna hole of the front I/O cover and fasten the antenna as shown below. Then apply adhesive to the edge of the hex nut behind the front I/O cover to prevent the extension cable from falling if the cable becomes loose.

1. Thread and fasten the hex nut and the washer. Then install the antenna.



2. Apply adhesive around here.



Info: The diameter of the nut is around 6.35 mm (0.25”-36UNC).

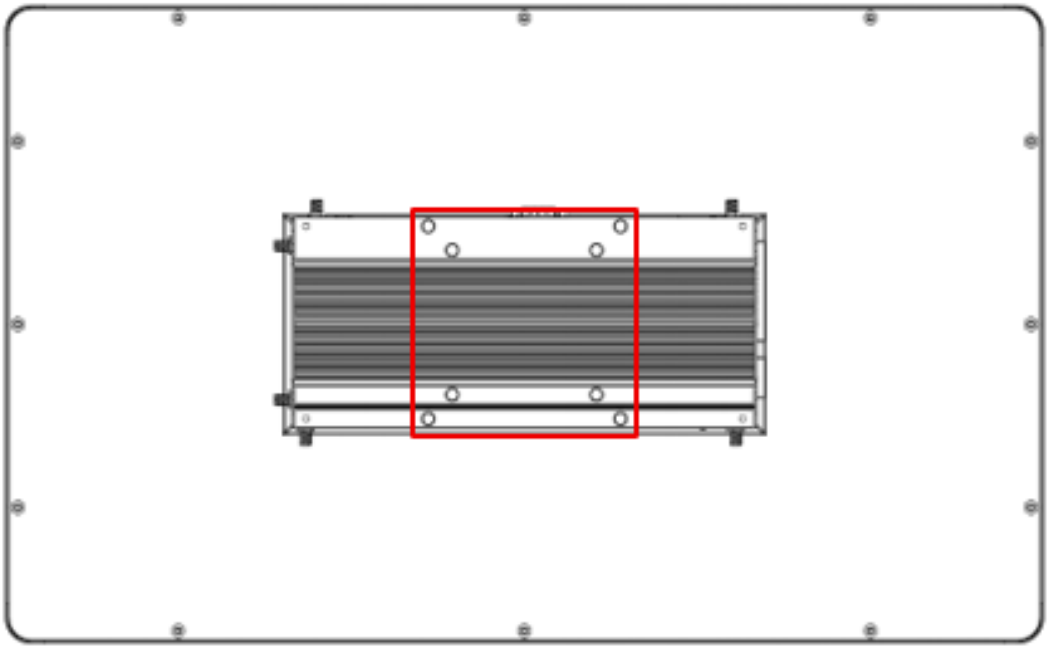
2.1.4 Mounting Installation

Requirements

Before mounting the system, ensure that you have enough room for power and signal cable routing, and have good ventilation for the power adaptor. The method of mounting must be able to support the weight of the device plus the weight of the suspending cables to be attached to the system. Use the following methods for mounting your system:

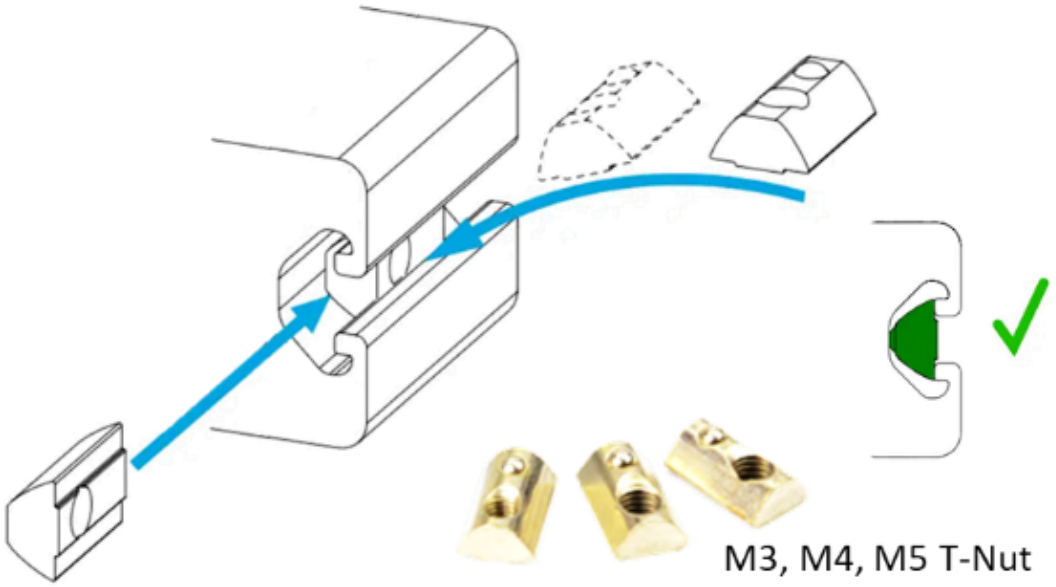
2.1.4.1. VESA Mounting Installation

1. Attach the 75x75mm or 100x100mm VESA mounting KIT bracket to your product, and secure with the supplied M4x4 screws.

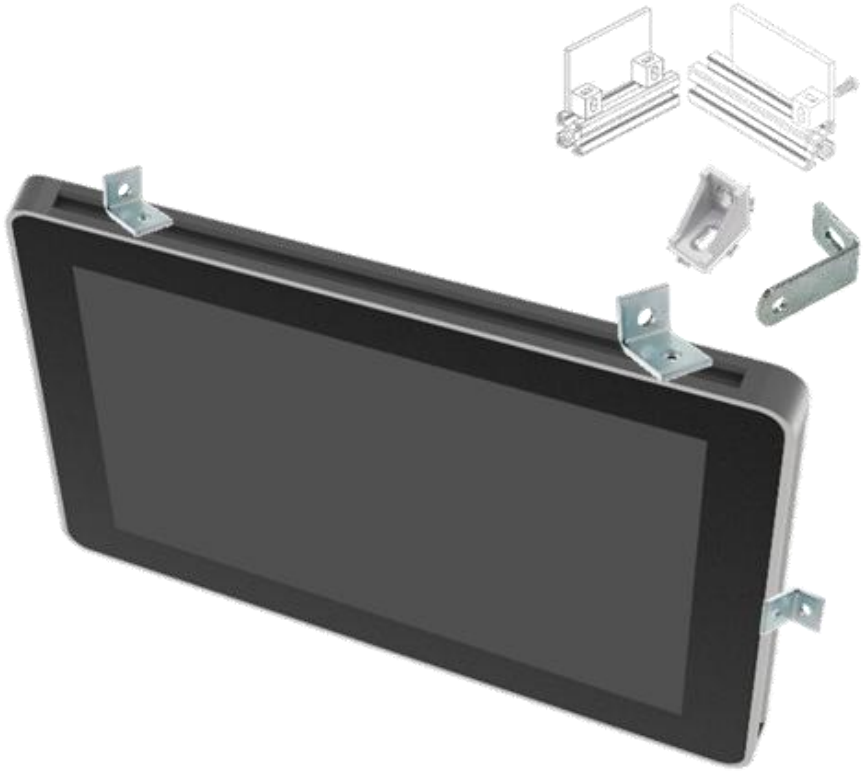


2.1.4.2. Side Mounting Installation

1. Attach the T-Nut around the product's bottom side, and secure with the supplied 4 screws.

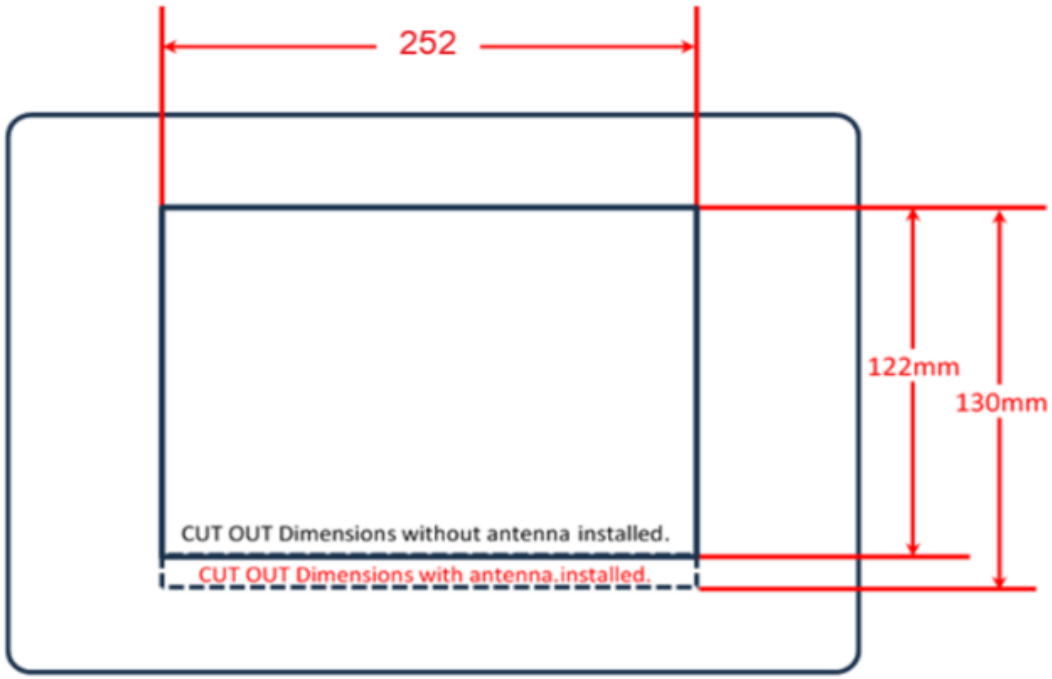


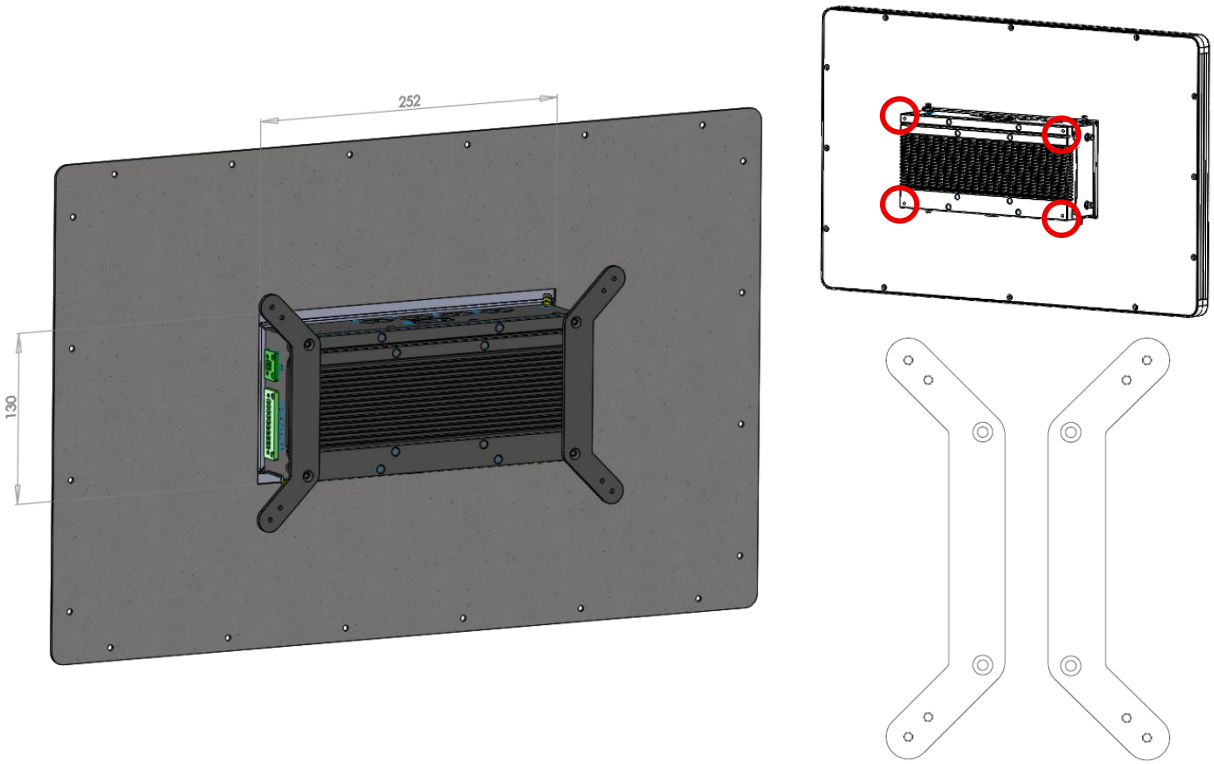
2. Use the T-slot bracket to screw up the target object in place.



2.1.4.3. Panel Mounting Installation (Bar Type)

Panel Cutout Dimensions → 252mm x 122~130mm



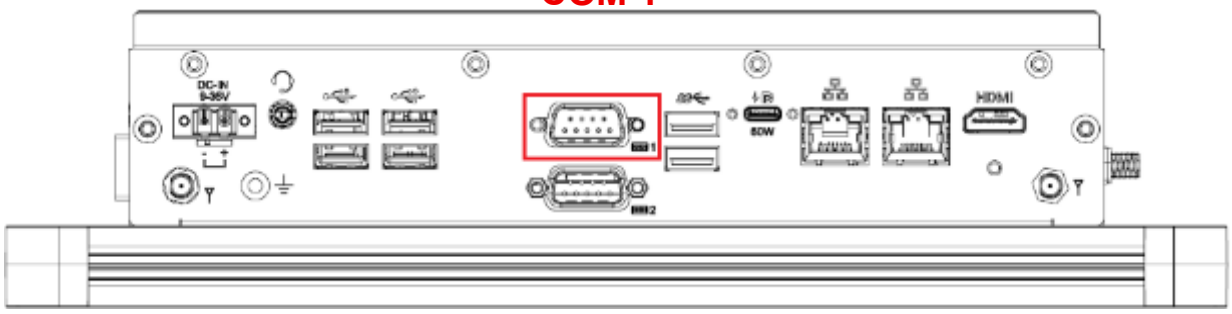


Remarks: When there is panel mounting, COM2 is not available due to mechanical constraints that prevent physical installation.

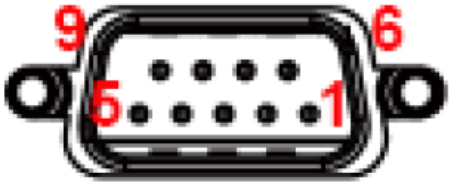
2.1.5 Pinout for COM Ports, DC-In Power Connector & Line-Out Jack

2.1.5.1. COM1 RS232/422/485 Ports

COM 1

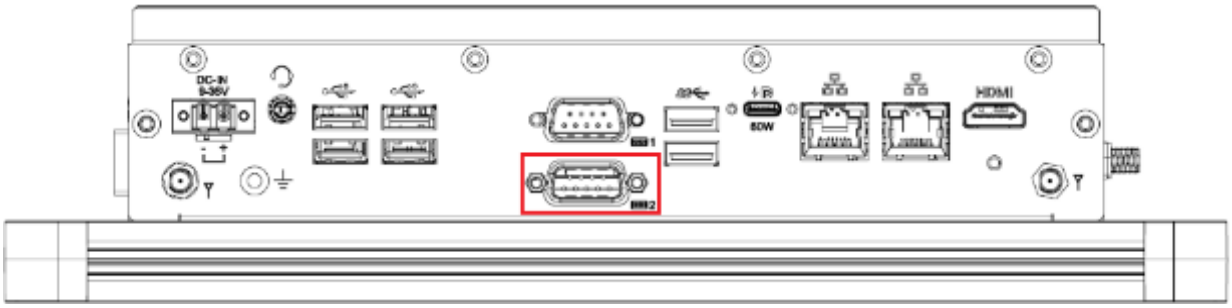


COM1 ports are jumper-less and configurable in BIOS.



Pin	Assignment		
	RS-232	RS-422	RS-485
1	DCD, Data carrier detect	TX-	DATA-
2	RXD, Receive data	TX+	DATA+
3	TXD, Transmit data	RX+	NC
4	DTR, Data terminal ready	RX-	NC
5	Ground	Ground	Ground
6	DSR, Data set ready	NC	NC
7	RTS, Request to send	NC	NC
8	CTS, Clear to send	NC	NC
9	RI, Ring indicator	NC	NC

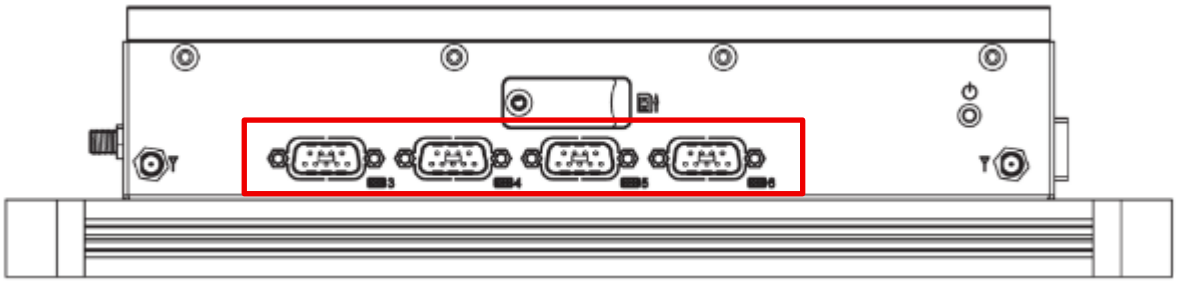
COM 2 (RS232 only)



2.1.5.2. Optional COM 3~6 Port with Power (0, 5V , 12V)

RS-232

Pin	Assignment			
	RS-232	Jumper Open	1,2 Short	2,3 Short
1	DCD, Data carrier detect	DSR	DSR	DSR
2	RXD, Receive data	Ground	Ground	Ground
3	TXD, Transmit data	Ground	Ground	Ground
4	DTR, Data terminal ready	TX	TX	TX
5	Ground	RX	RX	RX
6	DSR, Data set ready	DCD	DCD	DCD
7	RTS, Request to send	DTR	DTR	DTR
8	CTS, Clear to send	CTS	CTS	CTS
9	RI, Ring indicator	0V	12V	5V

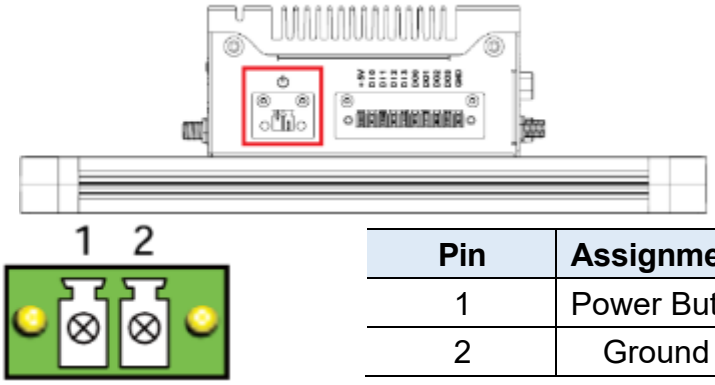


2.1.5.3. DC-In Power Connector (2-pin terminal block)



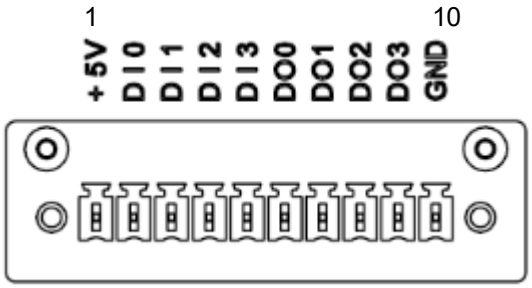
Pin	Assignment	Pin	Assignment
-	Power Ground	GND	Screw Type Case Ground
+	9V ~ 36V		

2.1.5.4. Remote Control Connector (2-pin terminal block)



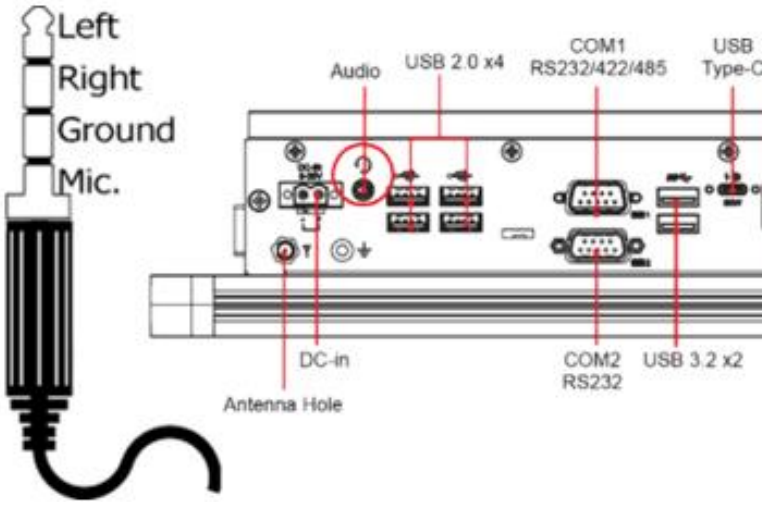
Pin	Assignment
1	Power Button
2	Ground

2.1.5.5. 4-In & 4-Out GPIO Connector (10-pin terminal block)



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

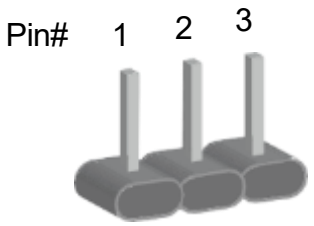
2.1.5.6. Audio Line-Out Jack



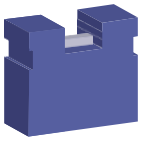
2.2 Setting the Jumpers

Use jumpers to configure your device's settings and features for specific applications. If you are unsure about the correct configuration, consult your supplier.

A jumper is a set of metal pins mounted on the circuit board, with a plastic cap used to connect two pins. Placing the jumper cap on specific pins enables or disables certain features. On a 3-pin jumper, you can short either pins 1–2 or pins 2–3 to select different settings.

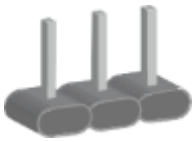
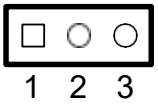
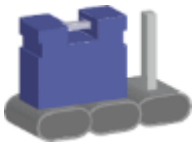
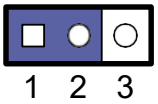
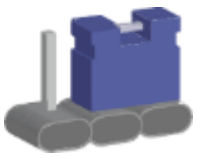
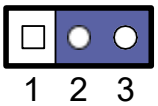


A 3-pin jumper



A jumper cap

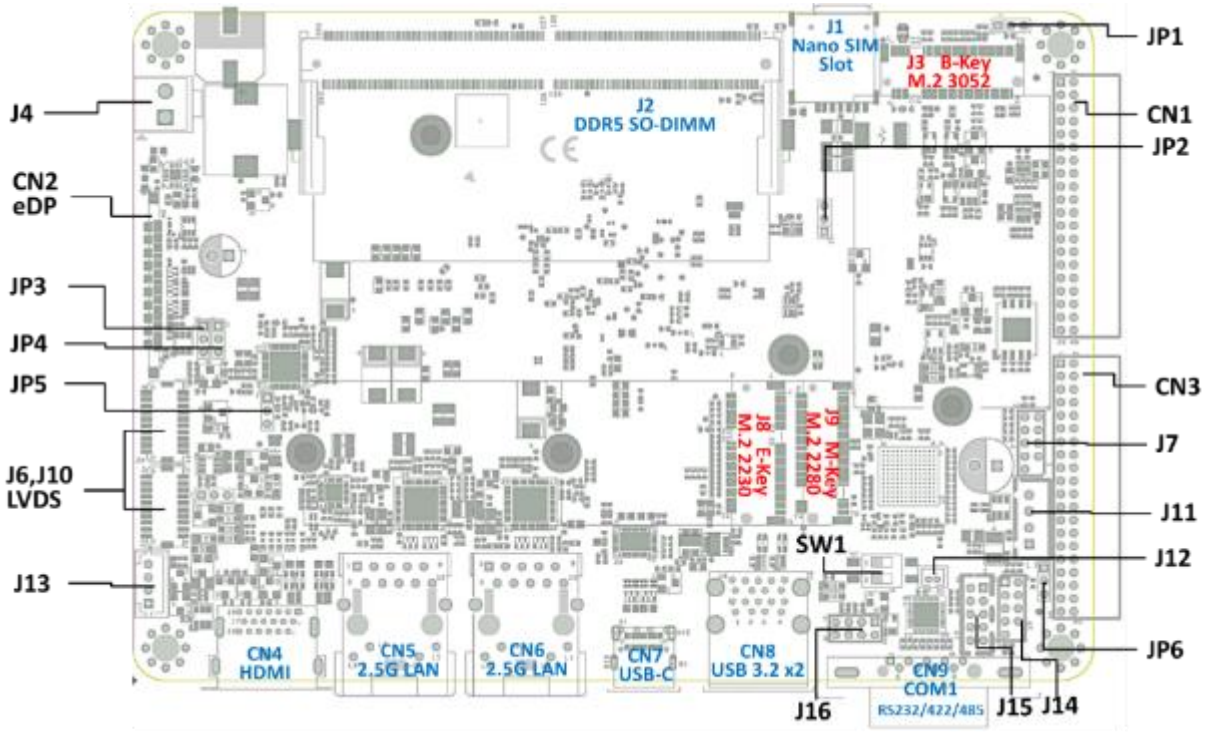
Refer to the illustration below to set jumpers.

Pin closed	Oblique view	Illustration
Open		
1-2		
2-3		

When two pins of a jumper are encased in a jumper cap, this jumper is **closed** (on). When a jumper cap is removed from two jumper pins, this jumper is **open** (off).

2.3 Motherboard Jumper & Connector Locations

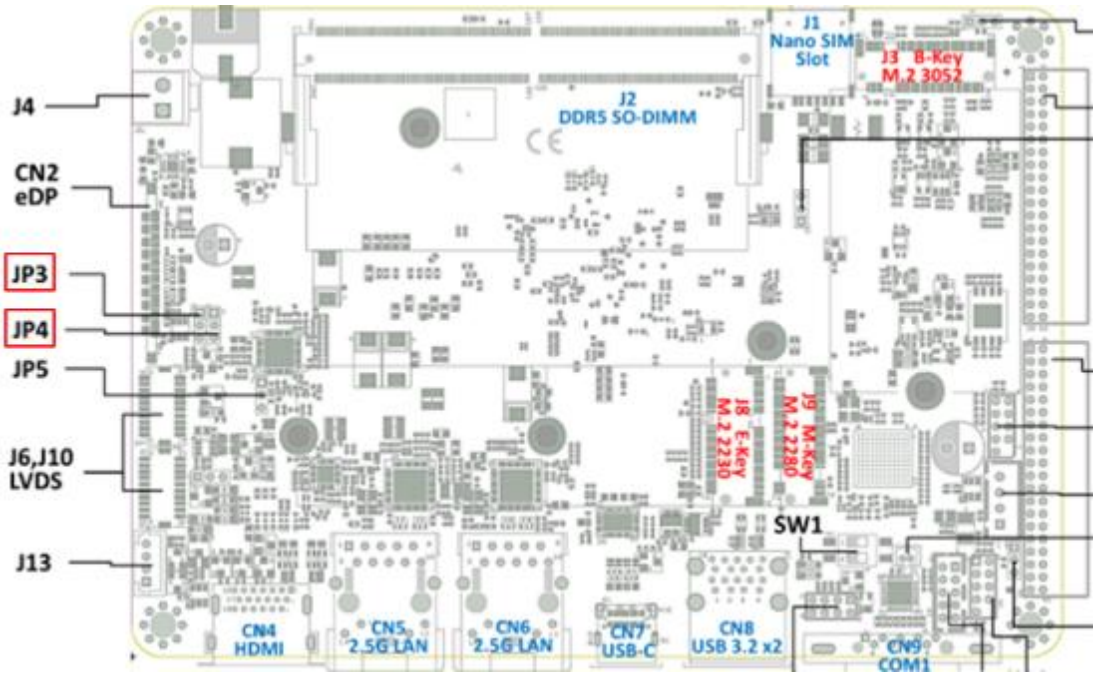
MBP-210 Motherboard



2.4 Jumpers Quick Reference

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

2.4.1 JP3: eDP Panel Power Selection



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

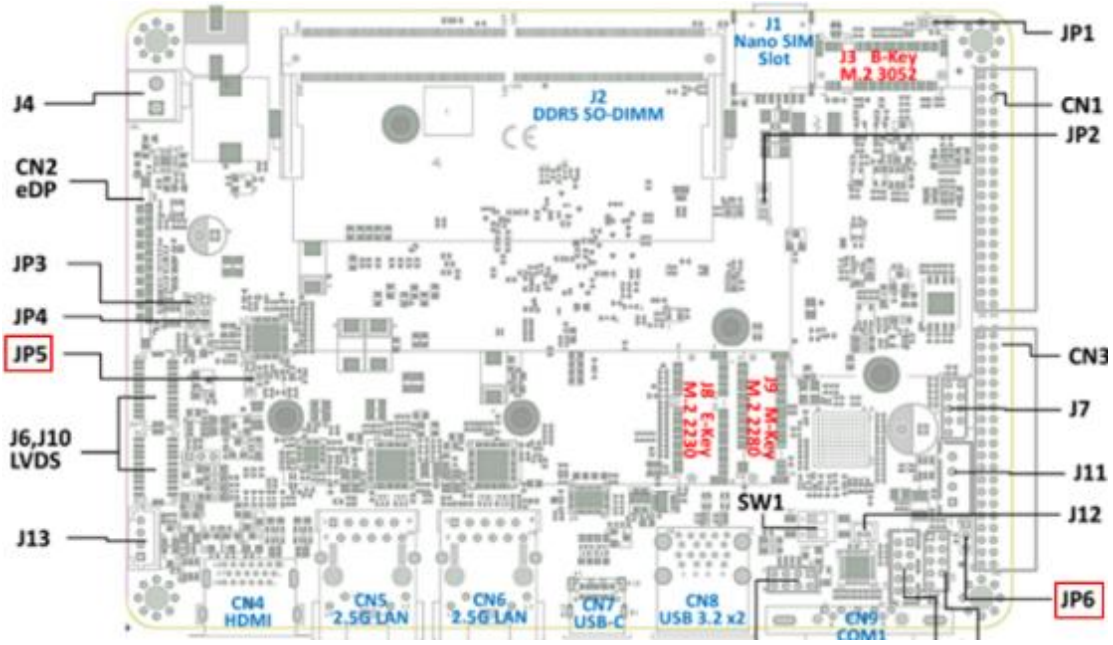
Note: This is for setting Pin1~Pin5 voltage of CN2.

2.4.2 JP4: LVDS Panel Brightness Selection

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

Note: This is for setting Pin3 voltage of J13.

2.4.3 JP5: LVDS Panel Power Selection



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

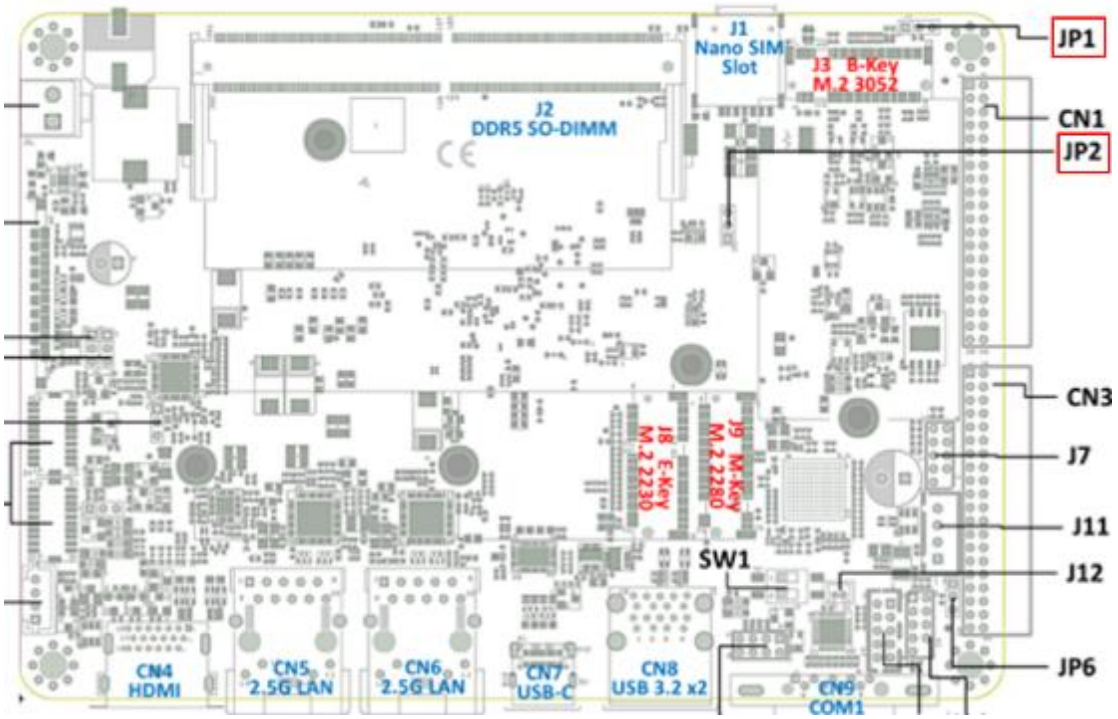
Note: This is for setting Pin19~Pin20 voltage of J6, J10

2.4.4 JP6: AT / ATX Selection

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

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

2.4.5 JP1: M.2 B-key / Sierra Module Selection



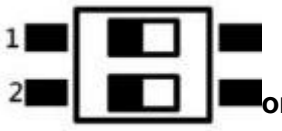
Function	Pin closed	Setting
M.2 B-key (default)	1-2	1
Sierra Module	2-3	1

Note: The setting is via J3.

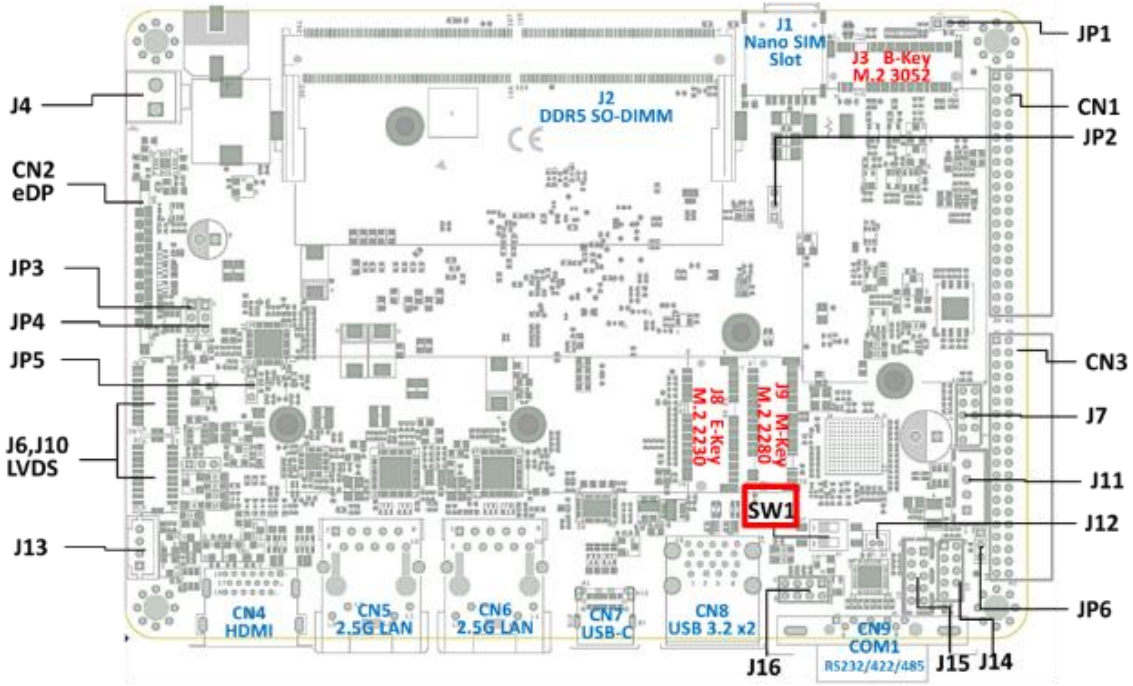
2.4.6 JP2: Sierra Module Interface Selection

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

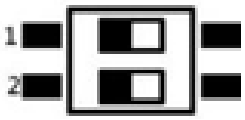
Note: The setting is via J3.



onfiguration

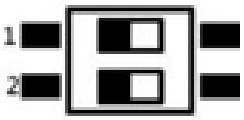


2.4.7 SW1: Clear ME Register



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

2.4.8 SW1: Clear CMOS Data

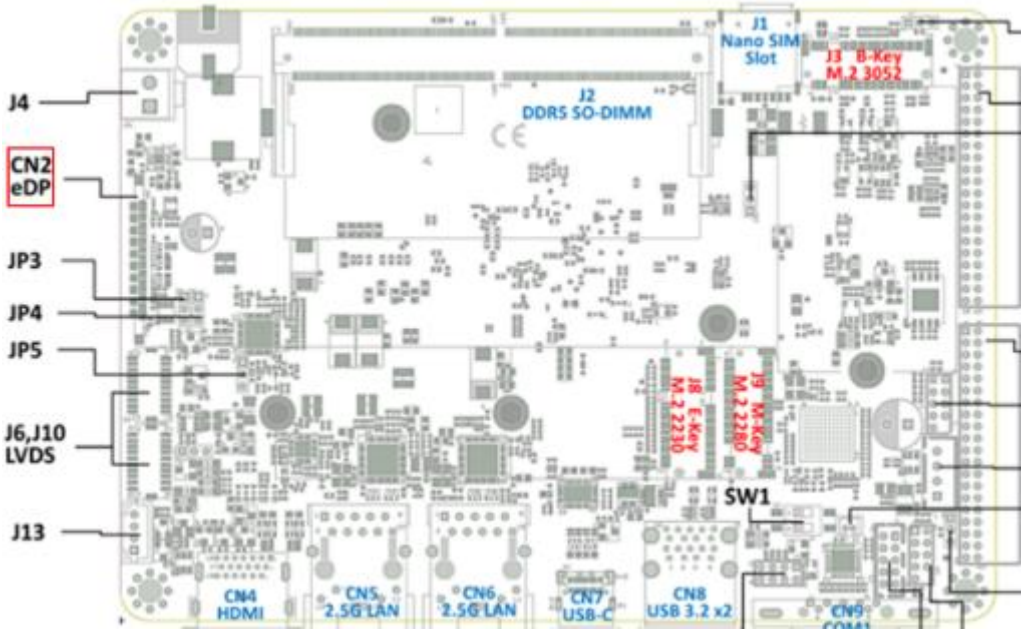


Function	Setting
Normal (default)	P1-OFF
Clear CMOS	P1-ON

2.5 Connectors Quick Reference

Function	Connector
40 PIN IO-1	CN1
eDP Connector	CN2
40 PIN IO-2	CN3
HDMI Connectors	CN4
LAN1, LAN2 Connector	CN5, 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
LVDS Connectors	J6, J10
SPI Flash Tool Connector	J7
M.2 E-Key 2230 Connector	J8
M.2 M-Key 2280 Connector	J9
USB 2.0 Connector	J11
RTC Battery Connector	J12
LVDS Backlight Connector	J13
COM2 RS-232 Ports	J15
80 Port Debug Tool Connector	J14
Front Panel Connector	J16

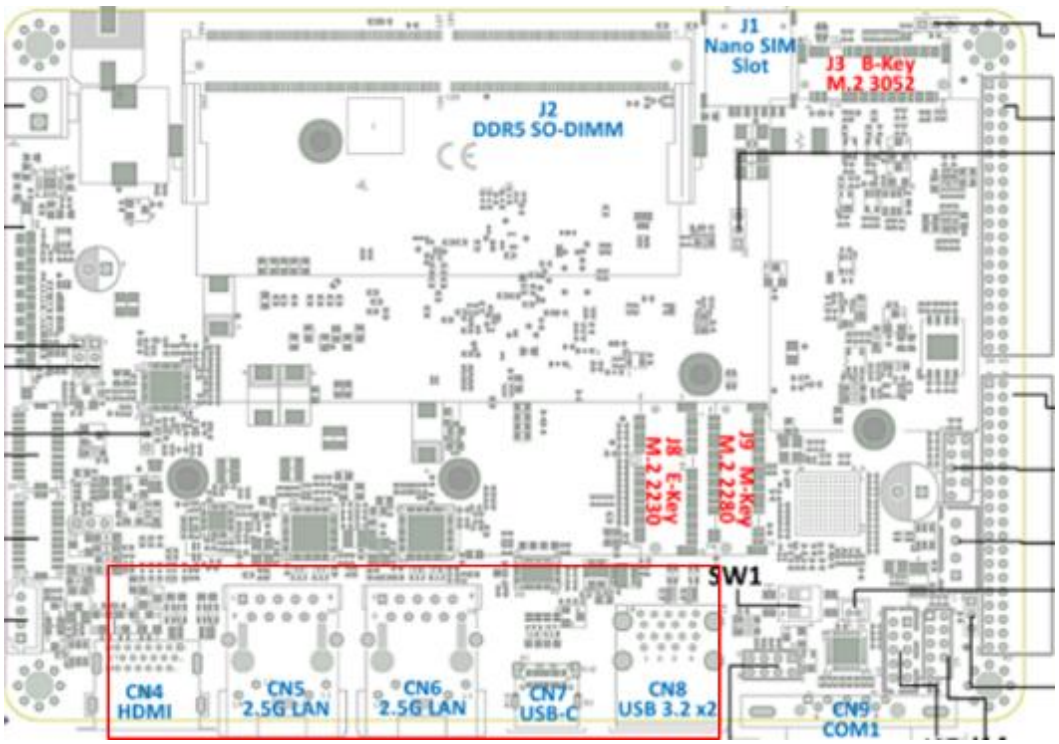
2.5.1 CN2: eDP Connector



Remarks: KEL_SSL00-40S

Note: Use JP3 to set Pin1~ Pin5 voltage; Total current: 1A
Pin27, Pin36 Total current: 1A
Pin28, Pin35 Total current: 1A
Pin31 Total current: 0.5A

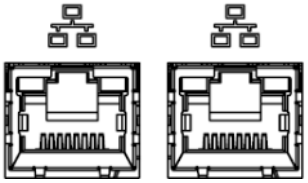
Pin	Assignment	Pin	Assignment
1	eDP Vcc	21	TXN0
2	eDP Vcc	22	TXP0
3	eDP Vcc	23	Ground
4	eDP Vcc	24	AUXP
5	eDP Vcc	25	AUXN
6	Ground	26	NC
7	Ground	27	+3.3V
8	Ground	28	EDP BKLT (+12V)
9	Ground	29	NC
10	Hot Plug detect	30	Ground
11	Ground	31	+5V
12	TXN3	32	NC
13	TXP3	33	Back Light Control
14	Ground	34	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



2.5.2 CN4: HDMI Connector



2.5.3 CN5, CN6: LAN Connectors



2.5.4 CN7: Type-C Connector



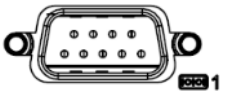
USB Type-C Support PD 60W (5V/9V/12V/15V/20V_Max 3A) and Alternate mode.

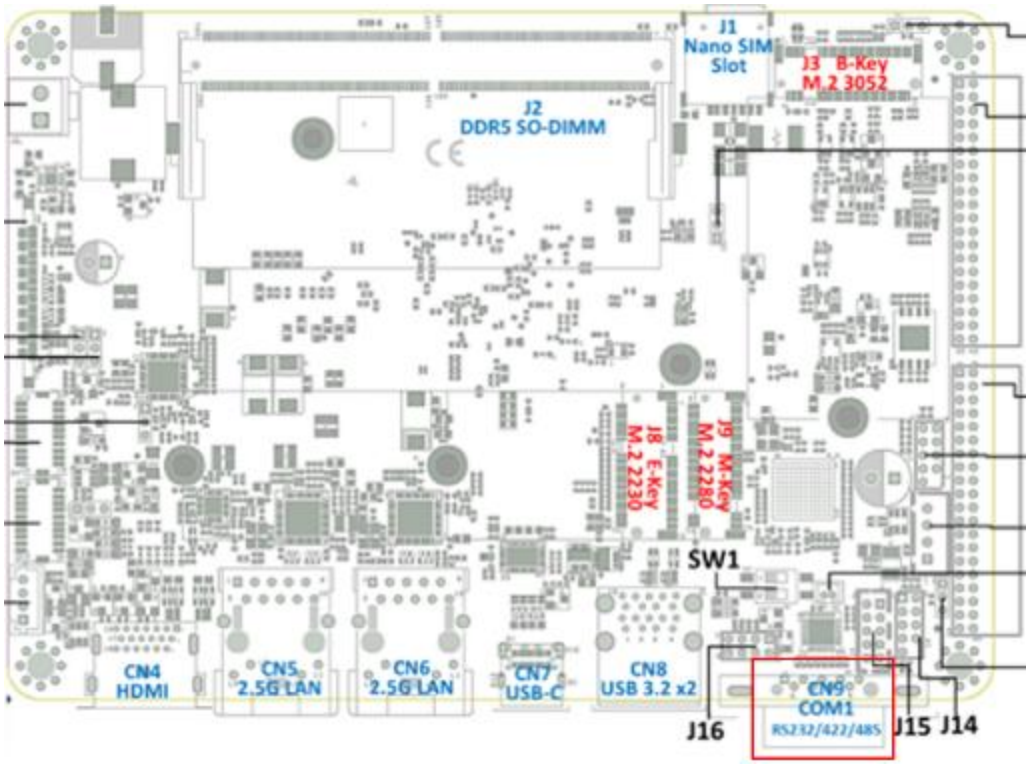
Note : IPPC-W215 have IDP-210 installed. To support PD 60W, IDP-210 is required.

2.5.5 CN8: USB 3.2 Connectors



2.5.6 CN9: COM1 RS-232/422/485 Serial Port



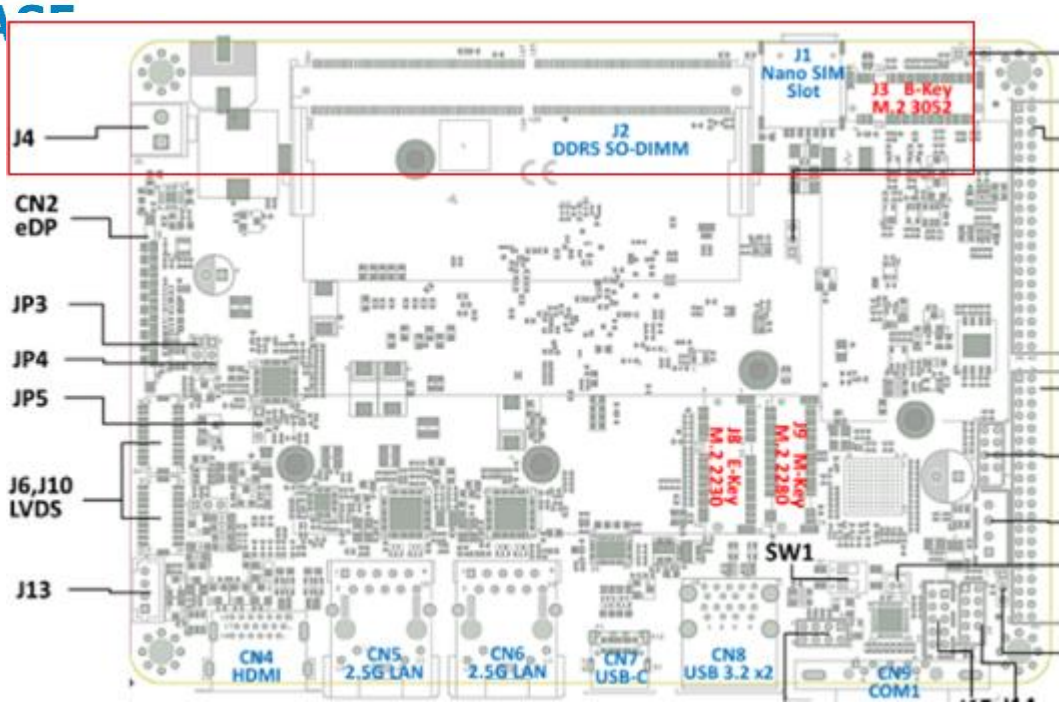


*COM1 ports are jumper-less and configurable in BIOS.



Pin	Assignment		
	RS-232	RS-422	RS-485
1	DCD, Data carrier detect	TX-	DATA-
2	RXD, Receive data	TX+	DATA+
3	TXD, Transmit data	RX+	NC
4	DTR, Data terminal ready	RX-	NC
5	Ground	Ground	Ground
6	DSR, Data set ready	NC	NC
7	RTS, Request to send	NC	NC
8	CTS, Clear to send	NC	NC
9	RI, Ring indicator	NC	NC

Note: Refer to page 16 for external COM pinouts or page 33 for daughterboard pinouts.



2.5.7 J1: Nano SIM Card Slo



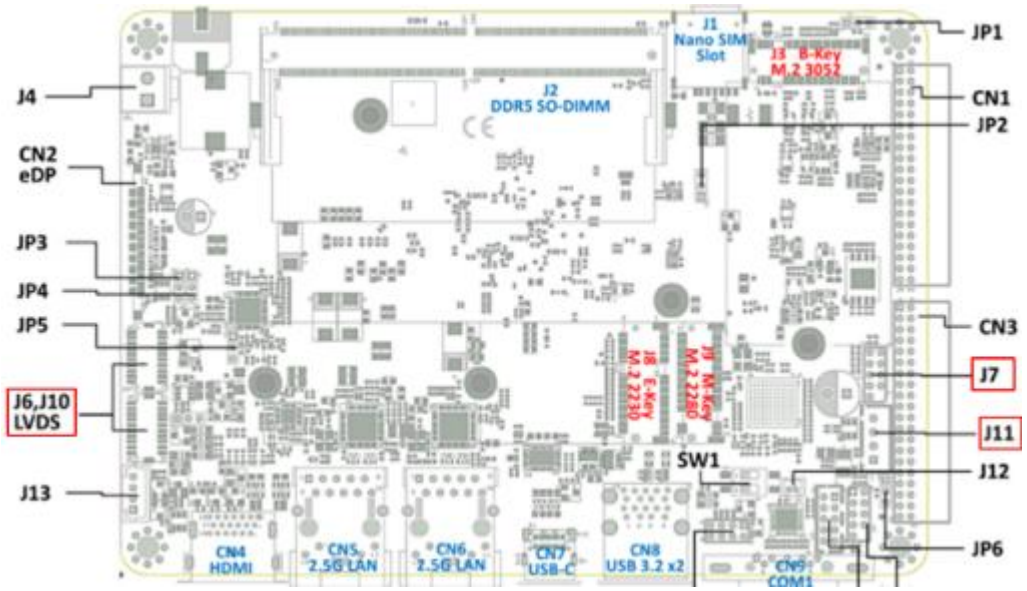
2.5.8 J2: DDR5 SO-DIMM Connector

2.5.9 J3: M.2 B-Key 3052 Connector

With Sierra LTE card, USB/PCIE I/F is configurable by JP1, JP2.

2.5.10 J4: DC Power Input Connector

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



2.5.11 J7: SPI Flash Tool Connector

Remarks: Factory use only.

2.5.12 J6, J10: LVDS Connectors

** J6: Channel-A, J10:Channel-B

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

Note: Use JP5 to set Pin19~Pin20 voltage.Total current: 1A

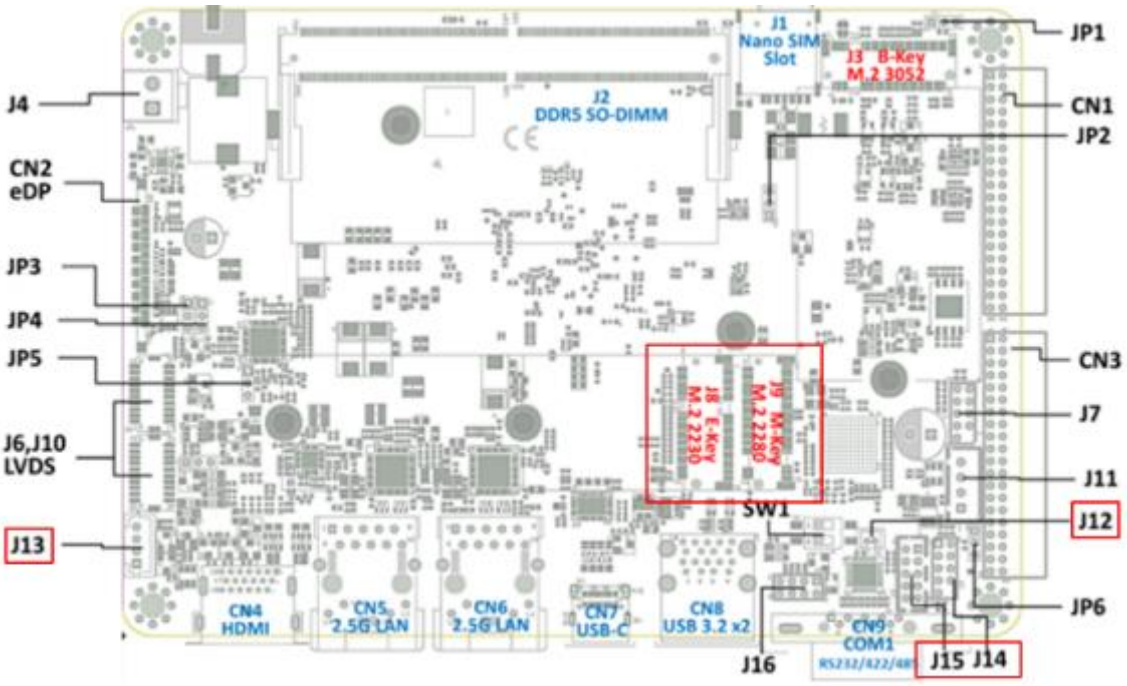
Pin	Assignment	Pin	Assignment
1	TX0P	2	TX0N
3	Ground	4	Ground
5	TX1P	6	TX1N
7	Ground	8	Ground
9	TX2P	10	TX2N
11	Ground	12	Ground
13	CLKP	14	CLKN
15	Ground	16	Ground
17	TX3P	18	TX3N
19	Power	20	Power

2.5.13 J11: USB 2.0 Connector

Remarks: TECHBEST_01026041001-L

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





2.5.14 J8: M.2 E-Key 2230 Connector

**Supports CNVI Card*

2.5.15 J9: M.2 M-Key 2280 Connector

2.5.16 RTC Battery Connector (J12)

Note: Coin battery with cable.

Pin	Assignment
1	+3V
2	Ground

2.5.17 J13: LVDS Backlight Connector

Remarks: E-CALL_0110-161-040

Note: Use JP4 to set Pin3 voltage.

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

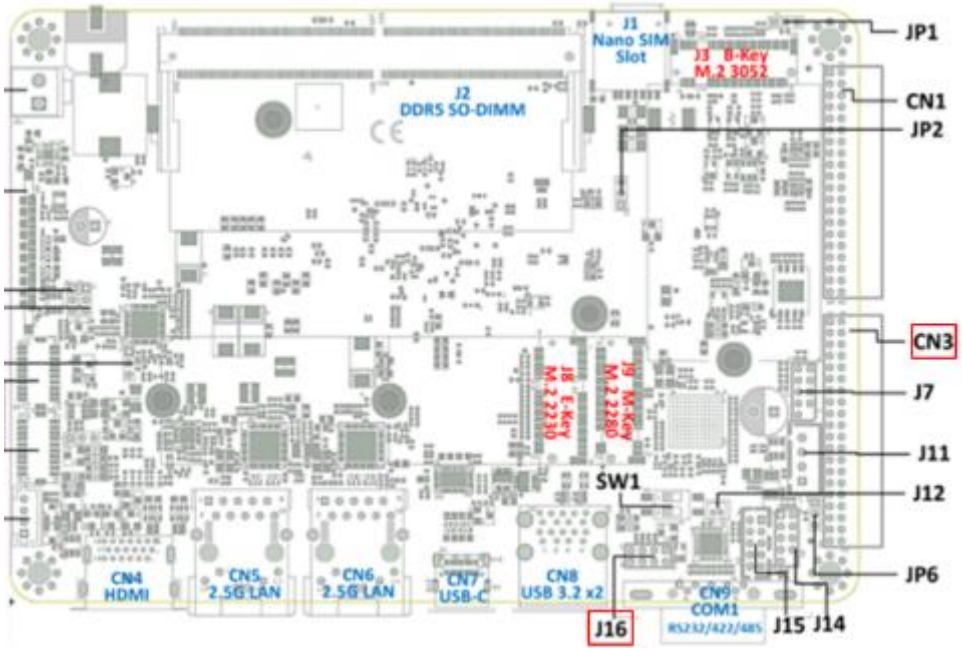
2.5.18 J14: 80 Port Debug Tool Connector

Remarks: Factory use only.

2.5.19 J15: COM2 Serial Port

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



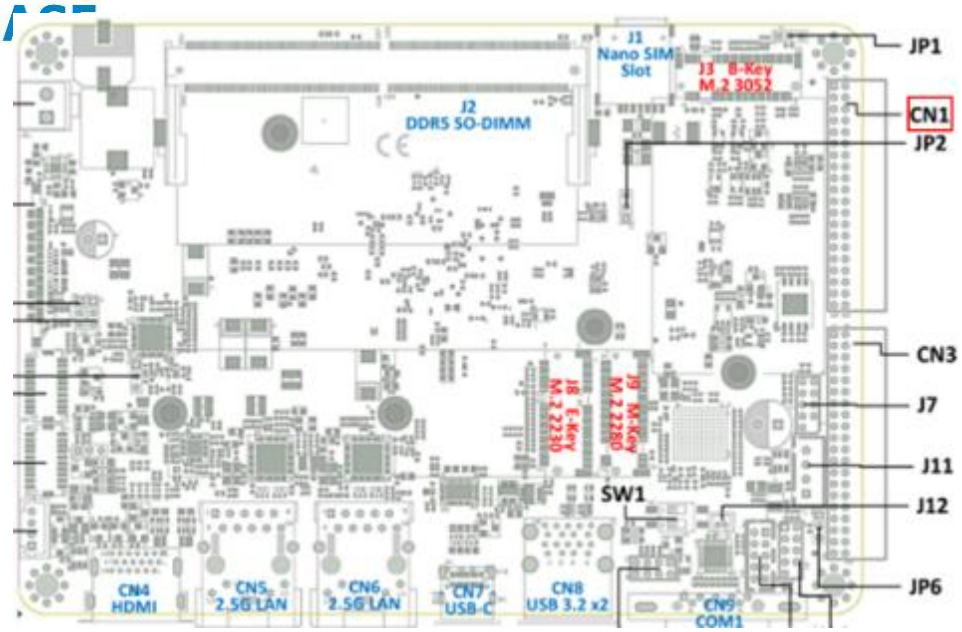
2.5.20 J16:Front Panel Setting Connector

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

2.5.21 CN3: 40 Pin IO Signal TO IDP-210

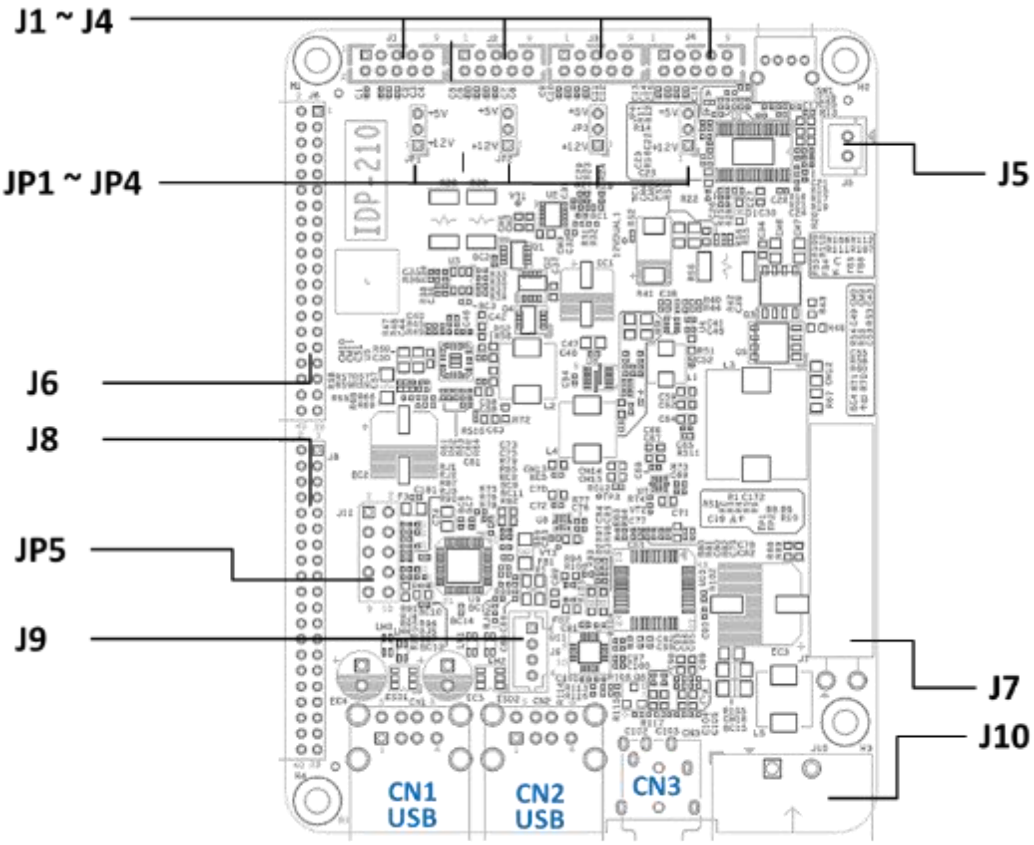
Pin	Assignment	Pin	Assignment
1	CTS3	2	DSR3
3	DTR5	4	CTS4
5	DSR6	6	DCD5
7	DTR6	8	SOUT6
9	RTS6	10	CTS6
11	CTS5	12	SIN6
13	GND	14	DOUT2
15	DOUT1	16	DOUT3
17	DOUT0	18	DIN3
19	RTC_RST#	20	DIN1
21	DIN2	22	DIN0
23	DCD6	24	DSR5
25	SIN4	26	SOUT4
27	DCD4	28	RTS5
29	SOUT5	30	DSR4
31	RTS4	32	SIN3
33	RTS3	34	DCD3
35	DTR3	36	SOUT3
37	DTR4	38	SIN5
39	GND	40	GND



2.5.22 CN1: 40 Pin IO Signal to IDP-210

Pin	Assignment	Pin	Assignment
1	DC_IN	2	DC_IN
3	DC_IN	4	DC_IN
5	DC_IN	6	DC_IN
7	DC_IN	8	DC_IN
9	DC_IN	10	DC_IN
11	12VDUAL_EN	12	DC_IN
13	PD_SDA	14	GND
15	PD_SCL	16	GND
17	PS_ON#	18	TYPE_C_OUT
19	GND	20	TYPE_C_OUT
21	GND	22	TYPE_C_OUT
23	TYPE_C_VBUS	24	PWR_BTN#
25	TYPE_C_VBUS	26	GND
27	TYPE_C_VBUS	28	GND
29	TYPE_C_VBUS	30	GND
31	HDA_SDOUT	32	HDA_RST#
33	HDA_SYNC	34	HDA_BIT_CLK
35	HDA_SDIN0	36	DPS_EN
37	GND	38	GND
39	USB+	40	USB-

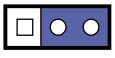
2.6 IDP-210 Daughter Board



2.6.1 IDP-210 : J1, J2, J3, J4: COM3, COM4, COM5, COM6 RS-232 Serial Ports

Pin	Assignment	Pin	Assignment
1	DSR, Data set ready	6	DCD, Data carrier detect
2	Ground	7	DTR, Data terminal ready
3	Ground	8	CTS, Clear to send
4	TX, Transmit	9	RTS, Request to send
5	RX, Receive	10	RI, Ring Indicator

2.6.2 IDP-210 : JP4, JP3, JP2, JP1: COM3, COM4, COM5, COM6 RI Power Selection

Function	Pin closed	Setting
12V	1-2	1 
5V	2-3	1 

2.6.3 IDP-210 : (J5),SW1: Power Button

Pin	Assigment
1	SHDN#
2	Ground

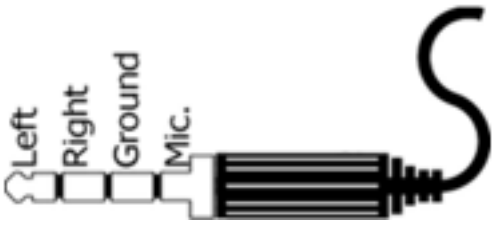
2.6.4 IDP-210 : JP5: Digital I/O Connector

Pin	Assignment	Pin	Assignment
1	Ground	2	+5V/0.5A
3	OUT3	4	OUT1
5	OUT2	6	OUT0
7	OUT4	8	IN4
9	IN3	10	IN1
11	IN2	12	IN0

2.6.5 IDP-210 : J10, J7: DC_IN Connector (2-pin terminal block)

Pin	Signal Name	Pin	Signal Name
1	9V~36V	2	Ground

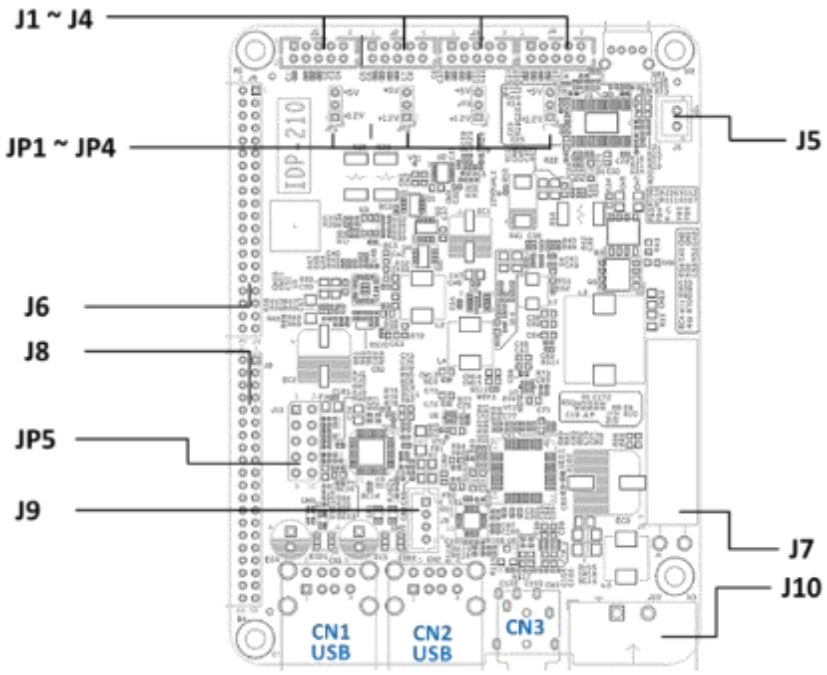
2.6.6 IDP-210 : CN3: Audio Combo (Line-Out / Mic)



2.6.7 IDP-210 : J9: Speaker Out Connector

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

2.6.8 IDP-210 : CN1, CN2: USB 2.0 Stack Connector



2.6.9 IDP-210 : J6 : 40 Pin IO Signal From MBP-210

Pin	Assignment	Pin	Assignment
1	CTS3	2	DSR3
3	DTR5	4	CTS4
5	DSR6	6	DCD5
7	DTR6	8	SOUT6
9	RTS6	10	CTS6
11	CTS5	12	SIN6
13	GND	14	DOUT2
15	DOUT1	16	DOUT3
17	DOUT0	18	DIN3
19	RTC_RST#	20	DIN1
21	DIN2	22	DIN0
23	DCD6	24	DSR5
25	SIN4	26	SOUT4
27	DCD4	28	RTS5
29	SOUT5	30	DSR4
31	RTS4	32	SIN3
33	RTS3	34	DCD3
35	DTR3	36	SOUT3
37	DTR4	38	SIN5
39	GND	40	GND

2.6.10 IDP-210 : J8: 40 Pin IO Signal From MBP-210

Pin	Assignment	Pin	Assignment
1	DC_IN	2	DC_IN
3	DC_IN	4	DC_IN
5	DC_IN	6	DC_IN
7	DC_IN	8	DC_IN
9	DC_IN	10	DC_IN
11	12VDUAL_EN	12	DC_IN
13	PD_SDA	14	GND
15	PD_SCL	16	GND
17	PS_ON#	18	TYPE_C_OUT
19	GND	20	TYPE_C_OUT
21	GND	22	TYPE_C_OUT
23	TYPE_C_VBUS	24	PWR_BTN#
25	TYPE_C_VBUS	26	GND
27	TYPE_C_VBUS	28	GND
29	TYPE_C_VBUS	30	GND
31	HDA_SDOUT	32	HDA_RST#
33	HDA_SYNC	34	HDA_BIT_CLK
35	HDA_SDIN0	36	DPS_EN
37	GND	38	GND
39	USB+	40	USB-

Chapter 3
Driver Installation

The information provided in this chapter includes:

- Intel® Chipset Software Installation Utility
- Graphics Driver Installation
- HD Audio Drivers Installation
- Intel® ME Drivers Installation
- Intel® Serial I/O Drivers Installation
- LAN Driver Installation

Download Link:
https://drive.google.com/drive/folders/1PN30Iq0dLtG9jffwqcpj-Z6p61F01p62

3.1 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 the chipset components. Follow the instructions below to complete the installation.

1. **Click Intel and then Intel(R) Alder-N/Amston/Twin Lake Chipset Drivers**.



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

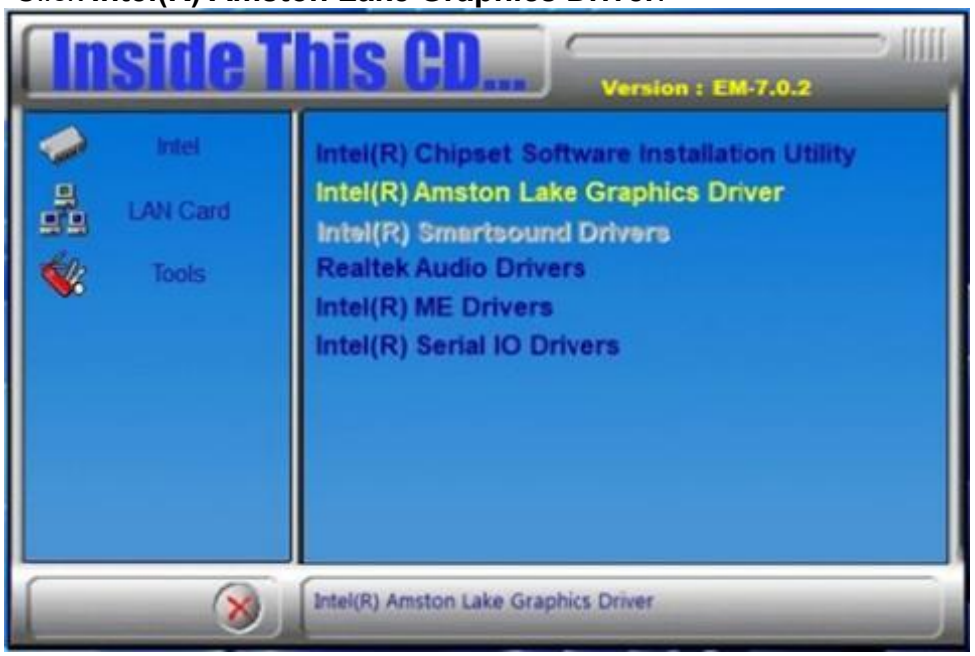


3. When the *Welcome* screen to the Intel® Chipset Device Software appears, click **Next**.
4. Accept the terms of the software license agreement. Click **Next**.
5. On the *Readme File Information* screen, click **Install** and then **Next**.
6. When the driver is completely installed, click **Finish**.

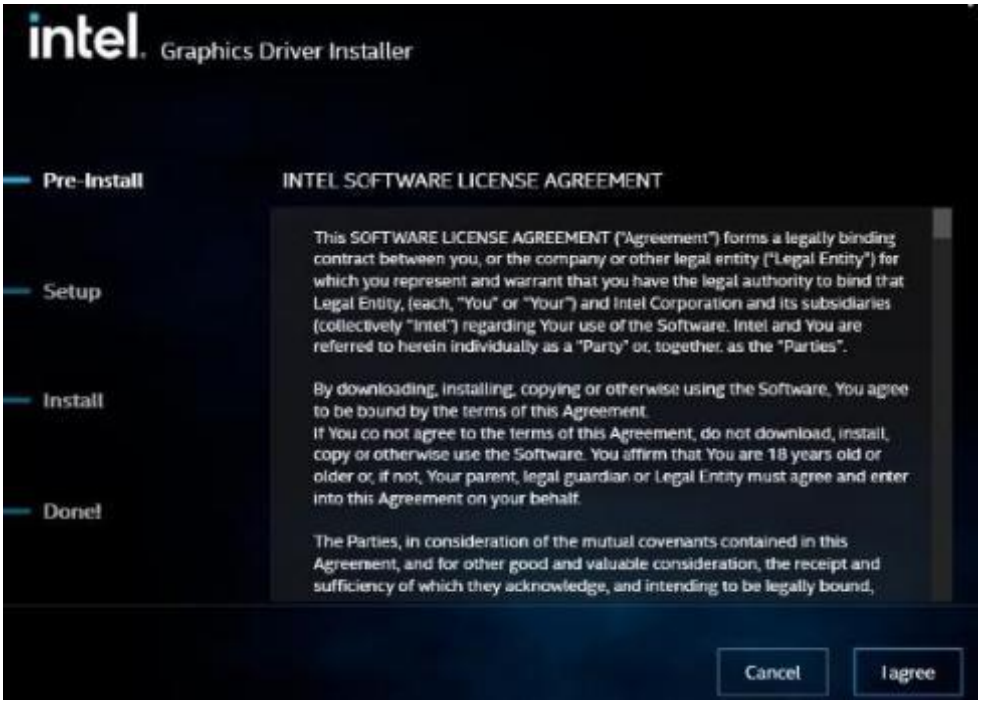


3.2 Graphics Driver Installation

1. Click **Intel** and then **Intel(R) Alder-N/Amston/Twin Lake Chipset Drivers**.
2. Click **Intel(R) Amston Lake Graphics Driver**.



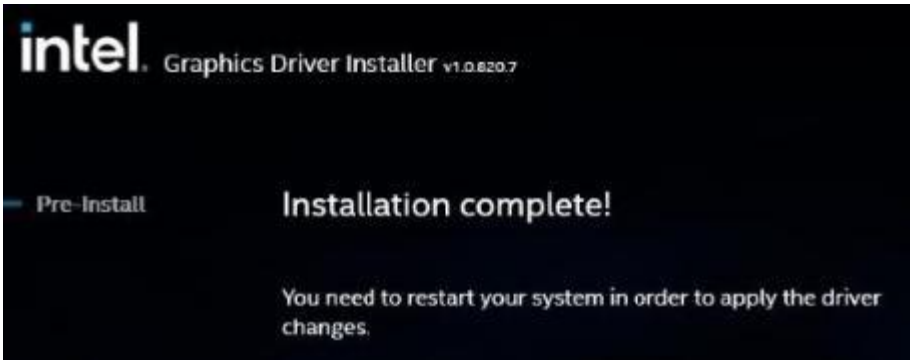
3. In the *Intel Software License Agreement* screen, click **I agree**.



4. Click **Start** for the Installer to install the components shown below.



5. You need to restart your system in order to apply the driver changes. Click **Finish**.



3.3 Realtek HD Audio Driver Installation

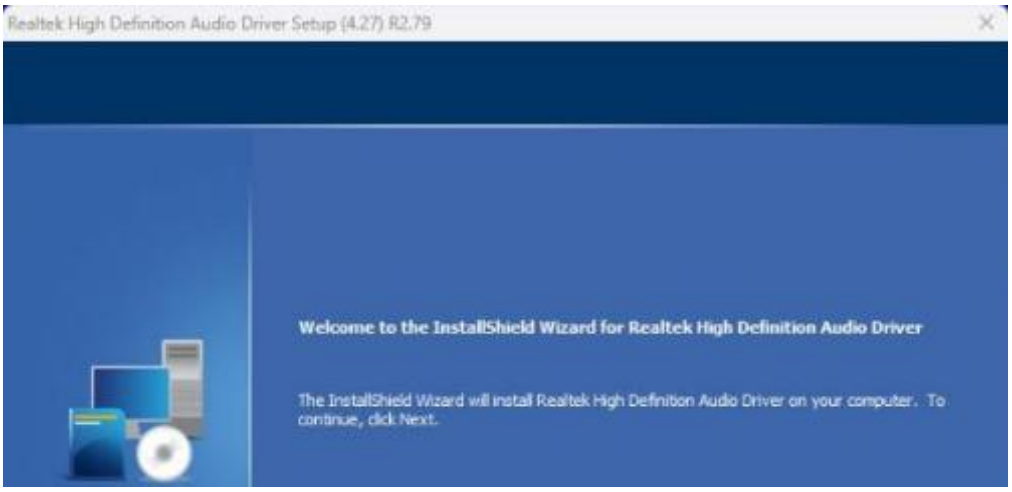
1. Click **Intel** and then **Intel(R) Alder-N/Amston/Twin Lake Chipset Drivers**.
2. Click **Realtek Audio Drivers**.



3. Click **Realtek High Definition Audio Driver**.



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



5. After installation has been completed, restart the computer for changes to take effect..

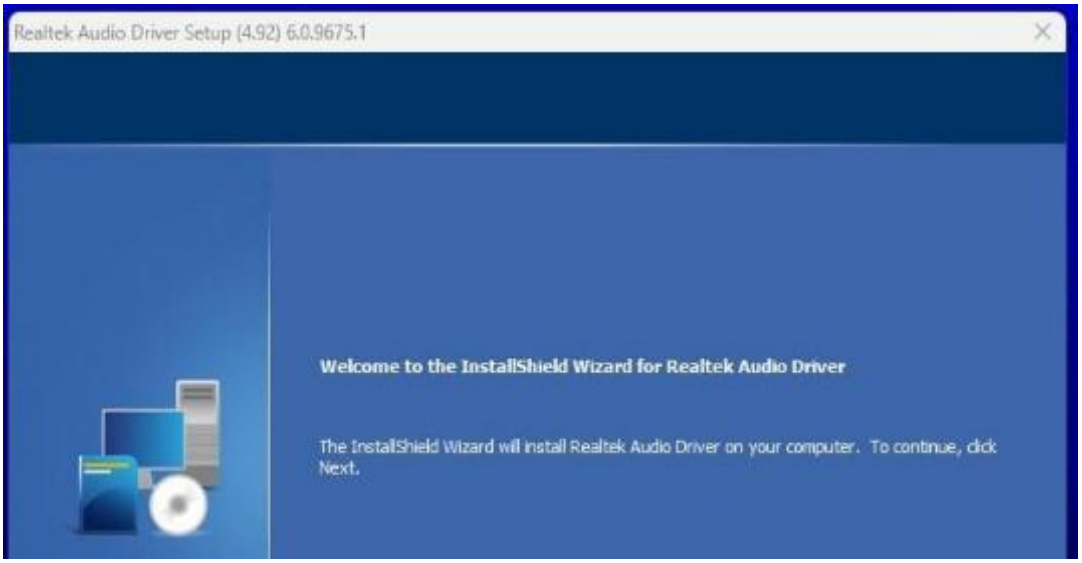


3.4 Realtek Audio DCH Drivers Installation

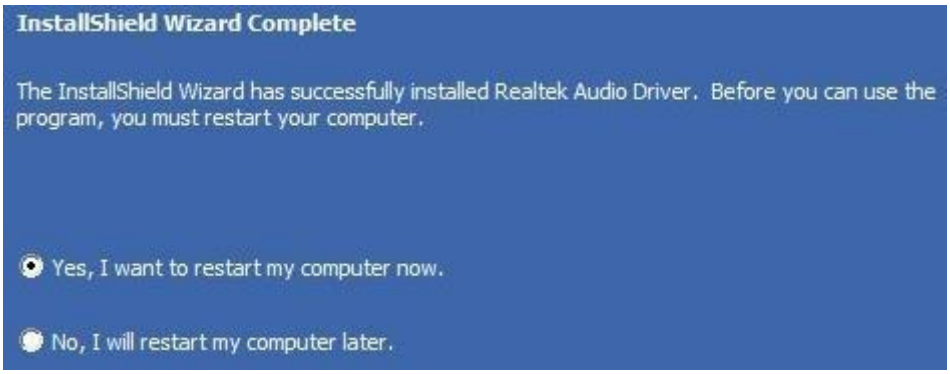
1. Click **Intel** and then **Intel(R) Alder-N/Amston/Twin Lake Chipset Drivers**.
2. Click **Realtek Audio DCH Drivers**.



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



4. After installation has been completed, restart the computer.



3.5 Intel (R) ME Drivers Installation

1. Click **Intel** and then **Intel(R) Alder-N/Amston/Twin Lake Chipset Drivers**.
2. Click **Intel(R) ME Drivers**.



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



4. Click **Next** to accept the destination folder or click **Change** to choose another destination folder.
5. Click **Finish** when you have installed the ME components.



3.6 Intel® Serial IO Drivers Installation

1. Click **Intel** and then **Intel(R) Alder-N/Amston/Twin Lake Chipset Drivers**.
2. Click **Intel(R) Serial IO Drivers.**



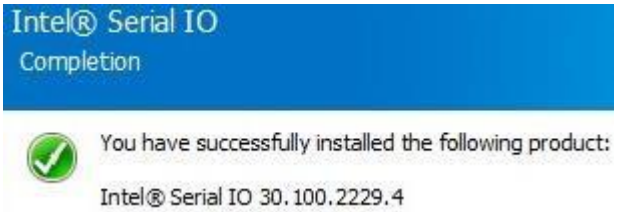
3. When the *Welcome* screen appears, click **Next** to continue.



4. Accept the terms of the license agreement and click **Next**.
5. On the *Readme File Information* screen, click **Next**.
6. On the *Confirmation* screen, click **Next**.



7. On the *Completion* screen, click **Finish**.



3.7 LAN Drivers Installation

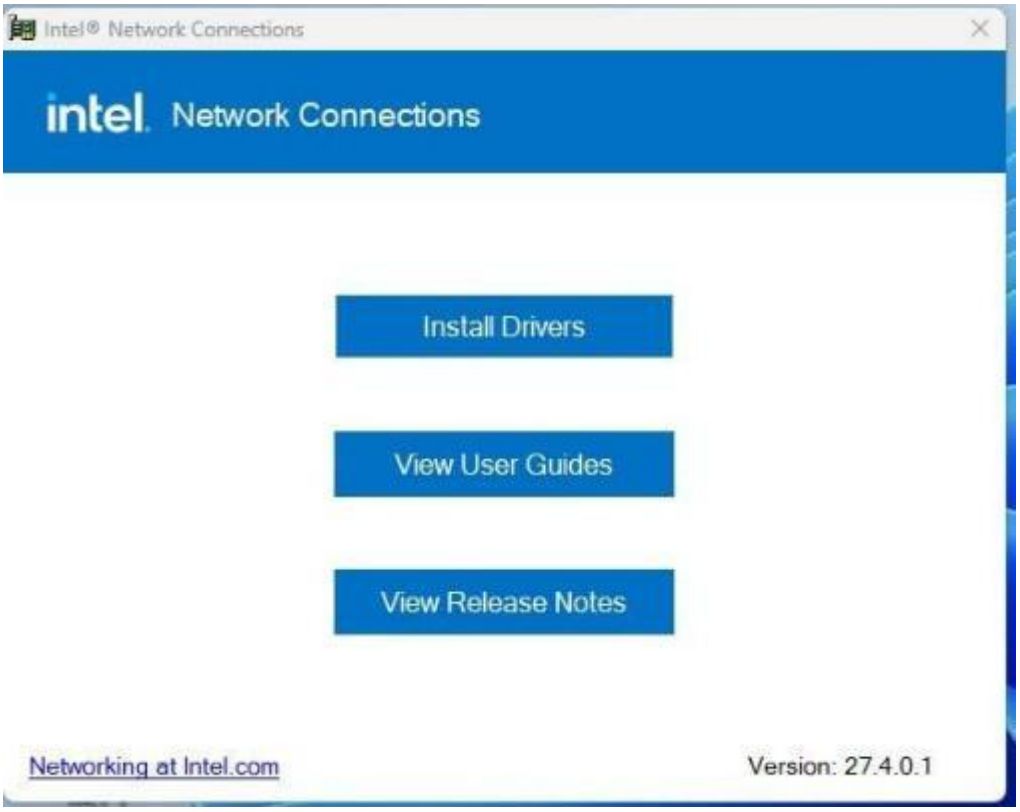
1. Click **LAN Card** on the left and then **Intel LAN Controller Drivers**.



2. Click **Intel(R) I22x 2.5G Network Drivers**.



3. Click **Install Drivers**.



4. After the drivers have been successfully installed, click **Close**.

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. 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
```

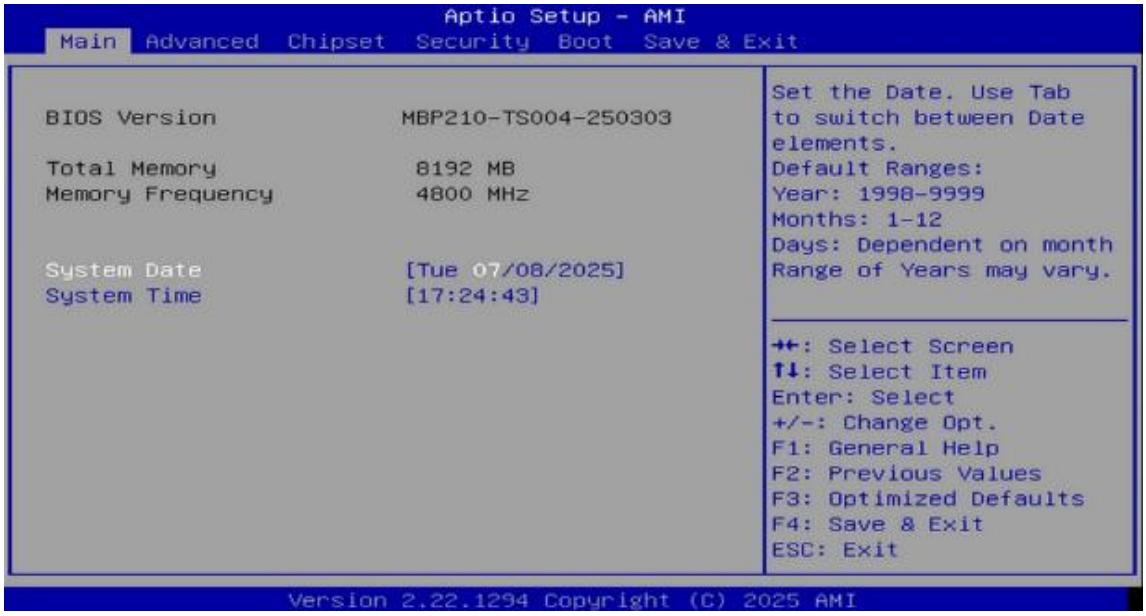
In general, press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help, and <Esc> to quit.

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.

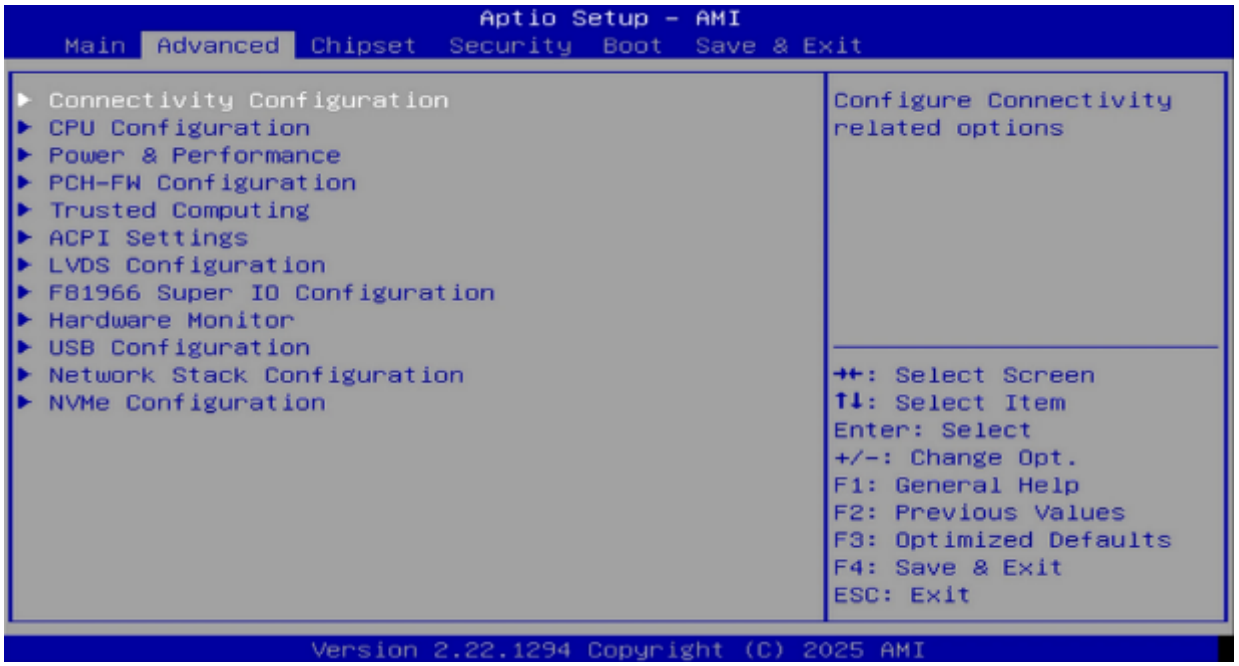
4.3 Main Settings



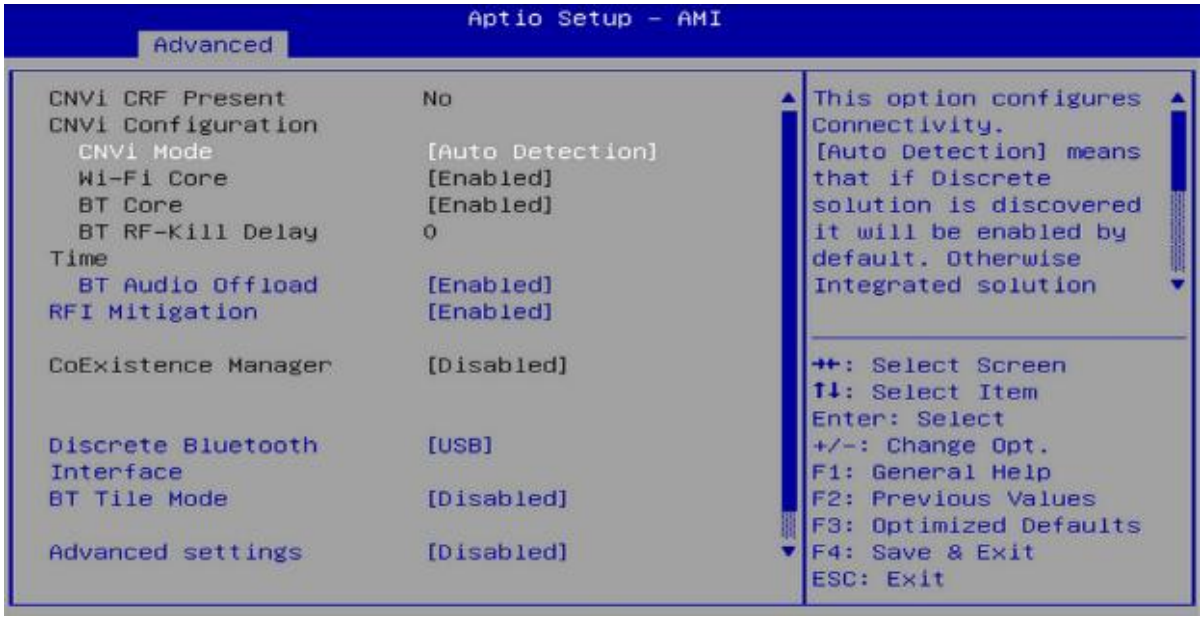
BIOS Setting	Description
System Date	Sets the date. Use the <Tab> key to switch between the date elements.
System Time	Set the time. Use the <Tab> key to switch between the time elements.

4.4 Advanced Settings

This section allows you to configure, improve your system and to set up some system features according to your preference.

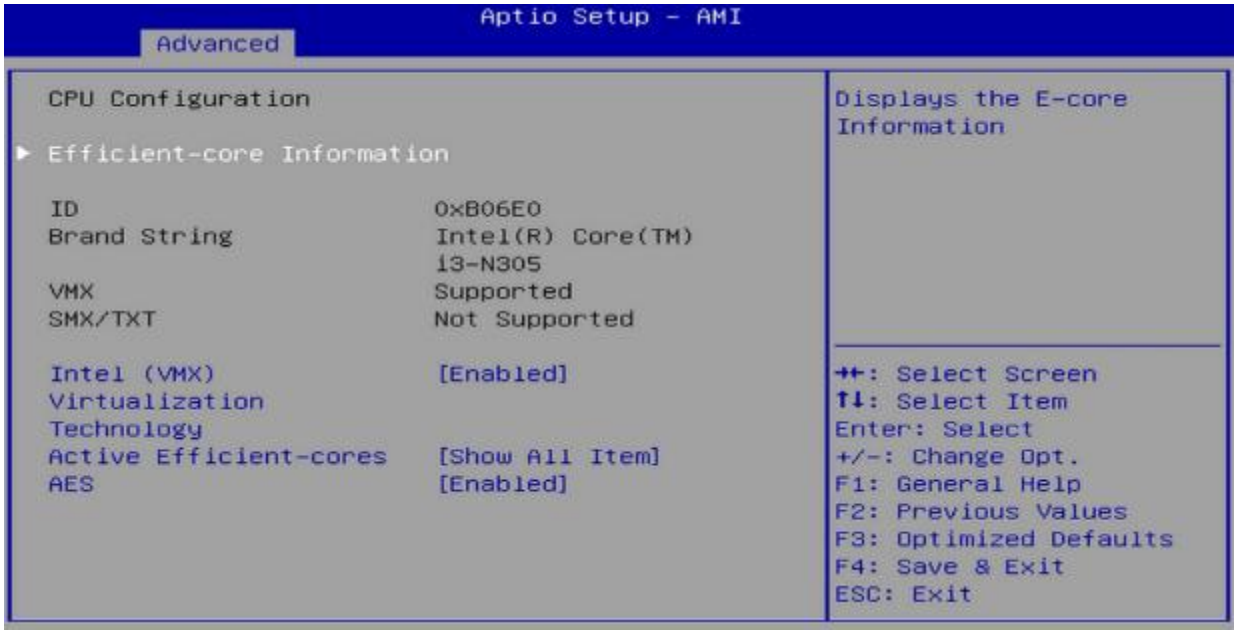


4.4.1 Connectivity Configuration



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)

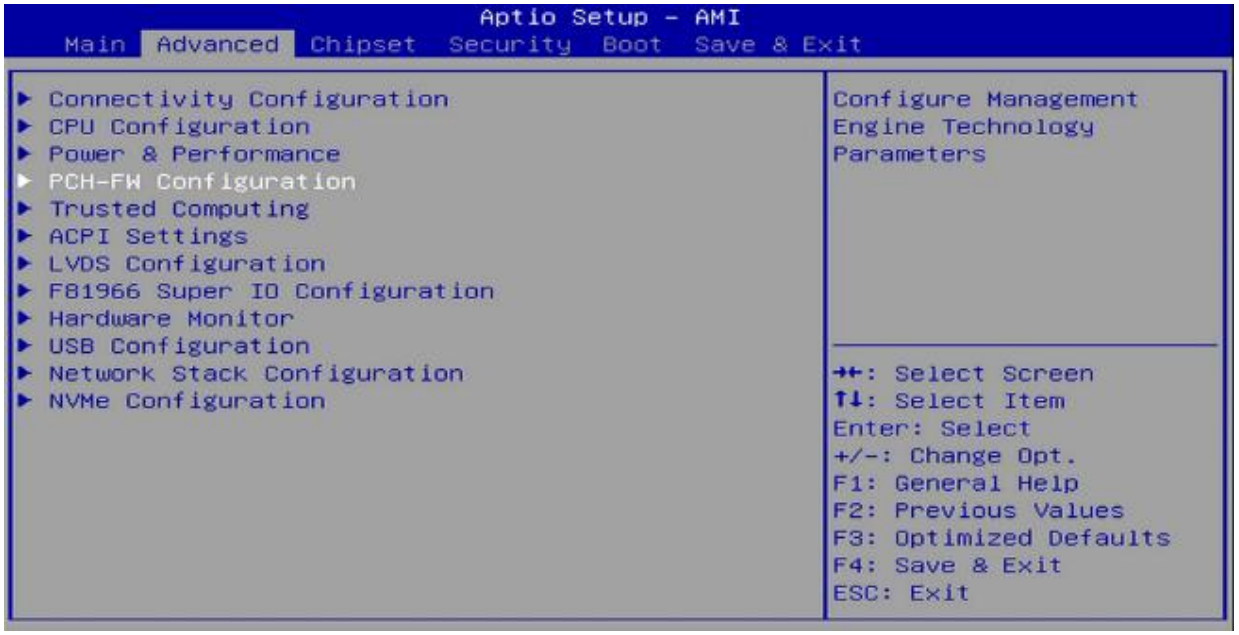
4.4.3 Power & Performance

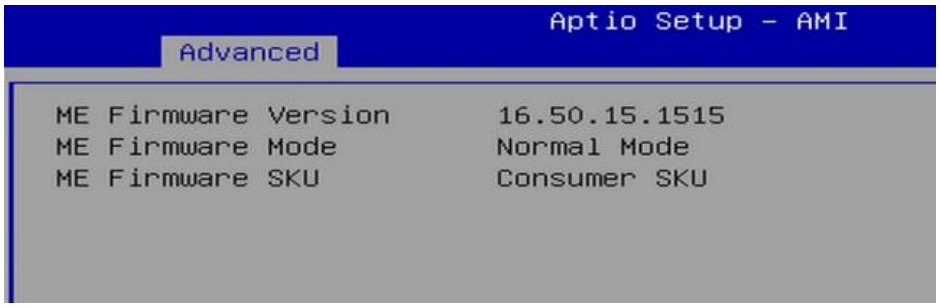




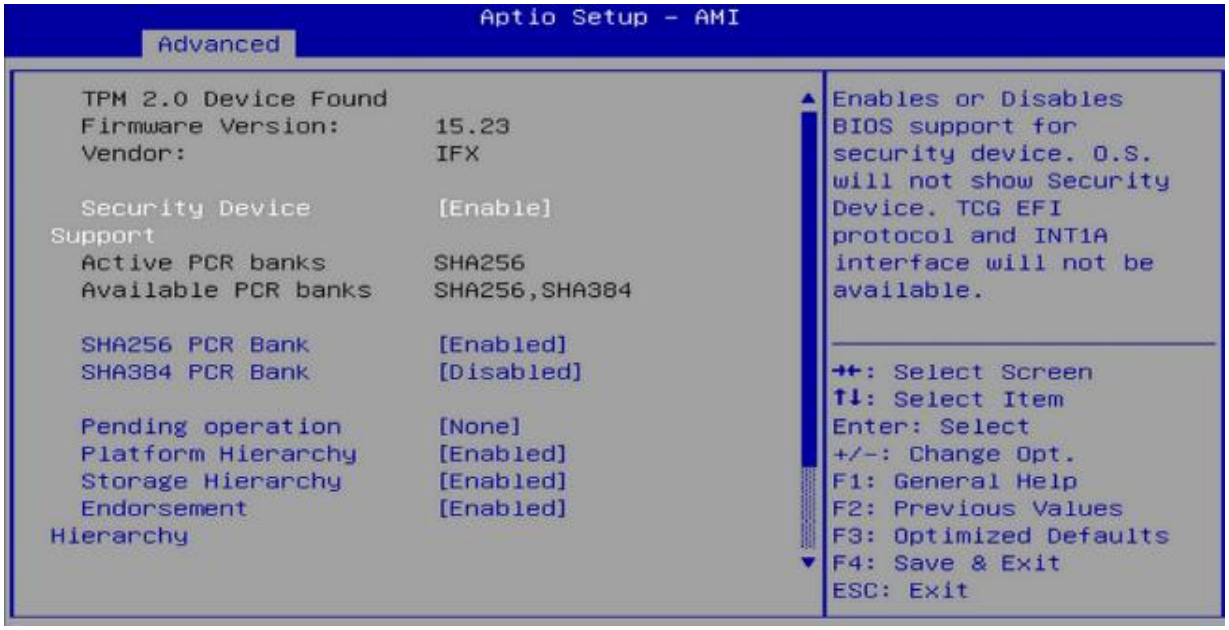
BIOS Setting	Description
CPU – Power Management Control	CPU – Power Management Control Options
Intel Speedstep	Allows more than two frequency ranges to be supported
Intel Speed Shift Technology	Enable/Disable Intel Speed Shift Technology support. Enabling will expose the CPPC v2 interface to allow for hardware controlled P- states.

4.4.4 PCH-FW Configuration



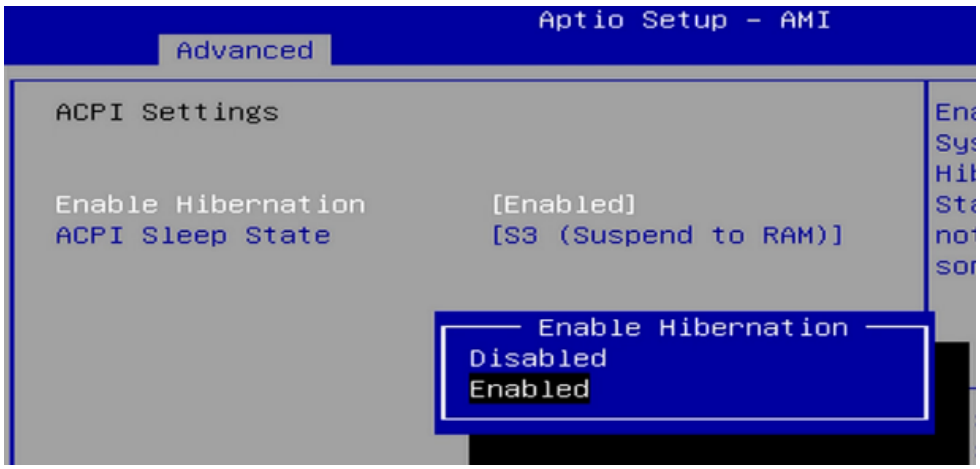


4.4.5 Trusted Computing



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
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.

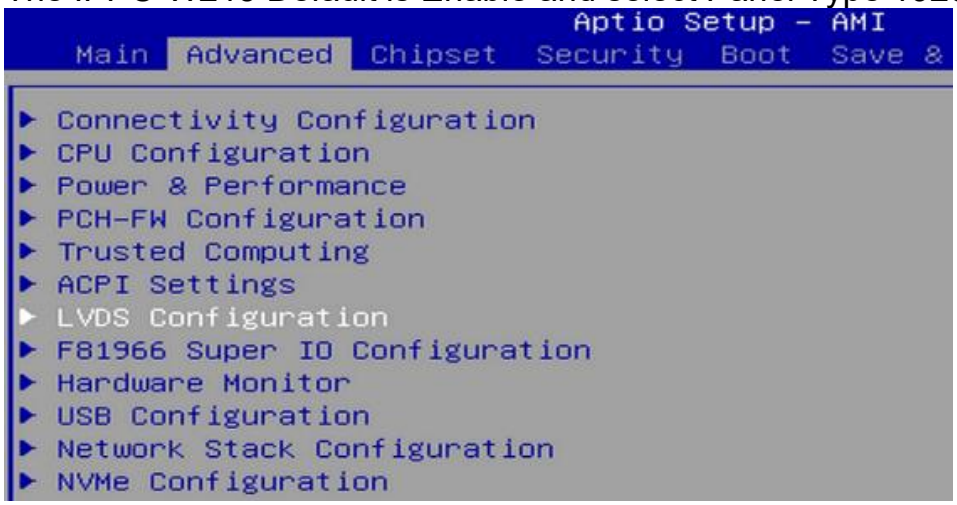
4.4.6 ACPI Settings



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.

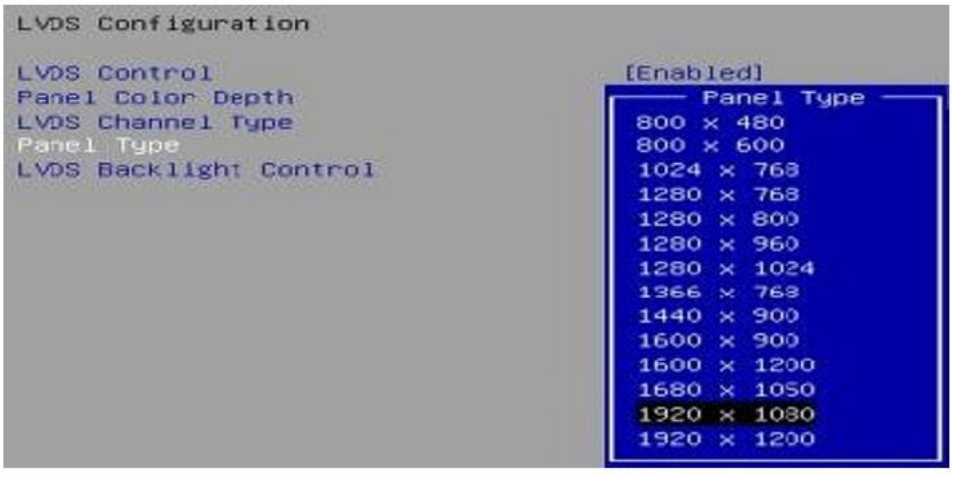
4.4.7 LVDS Configuration

The IPPC-W215 Default is Enable and select Panel Type 1920x1080.

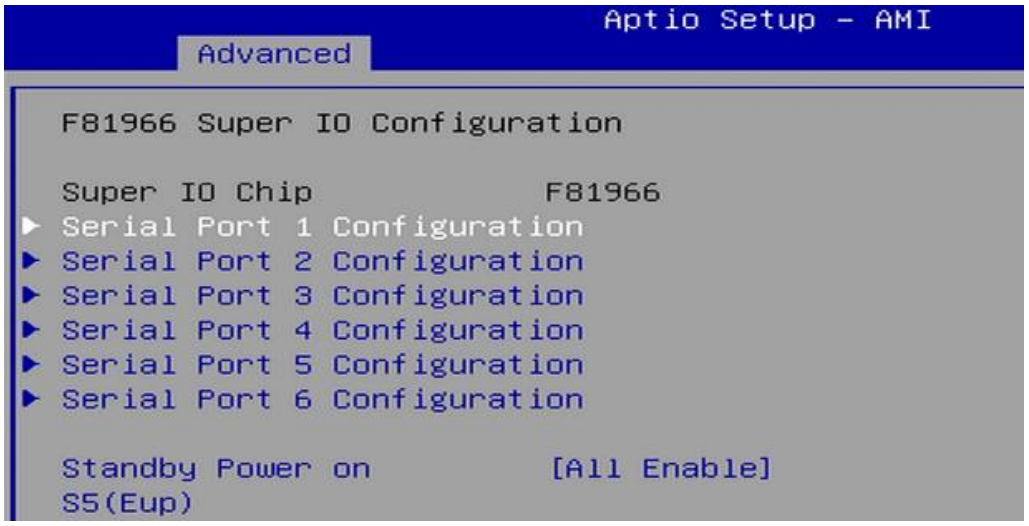


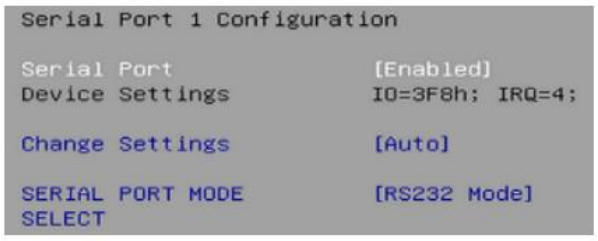






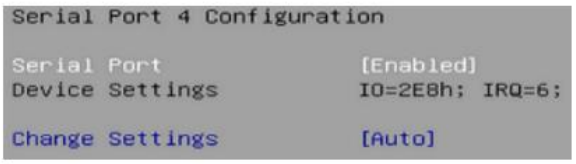
4.4.8 F81966 Super IO Configuration

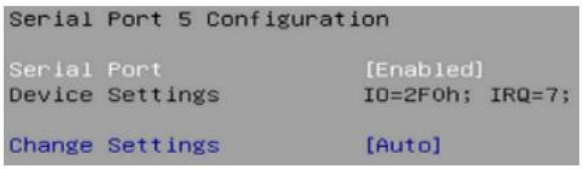








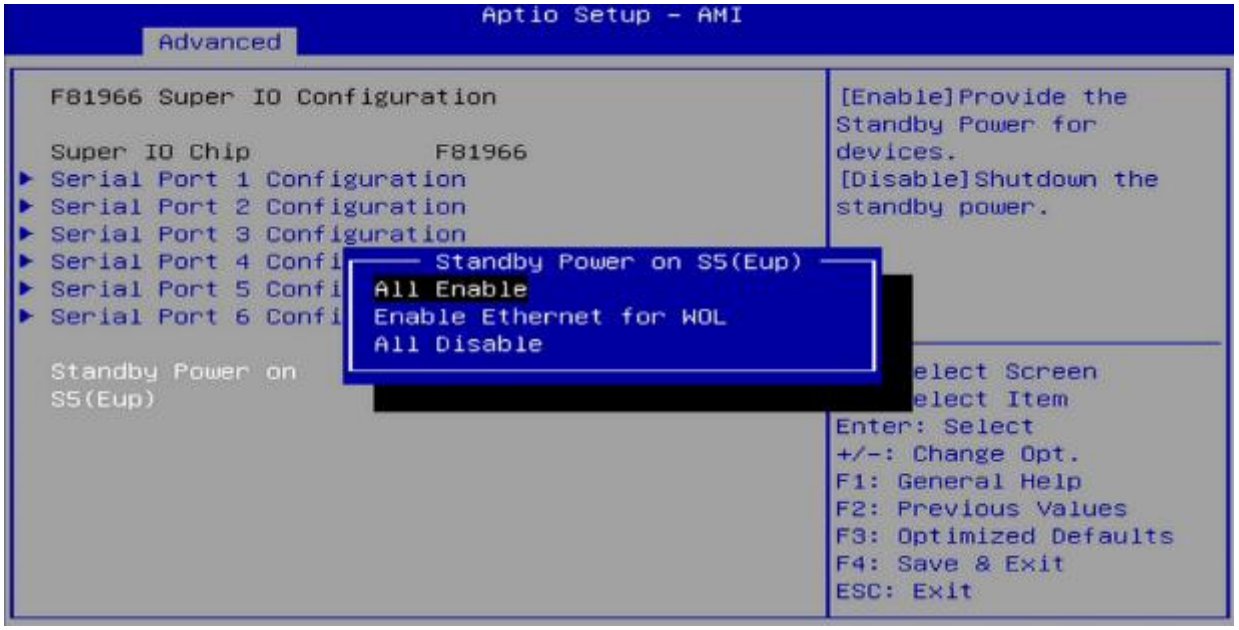




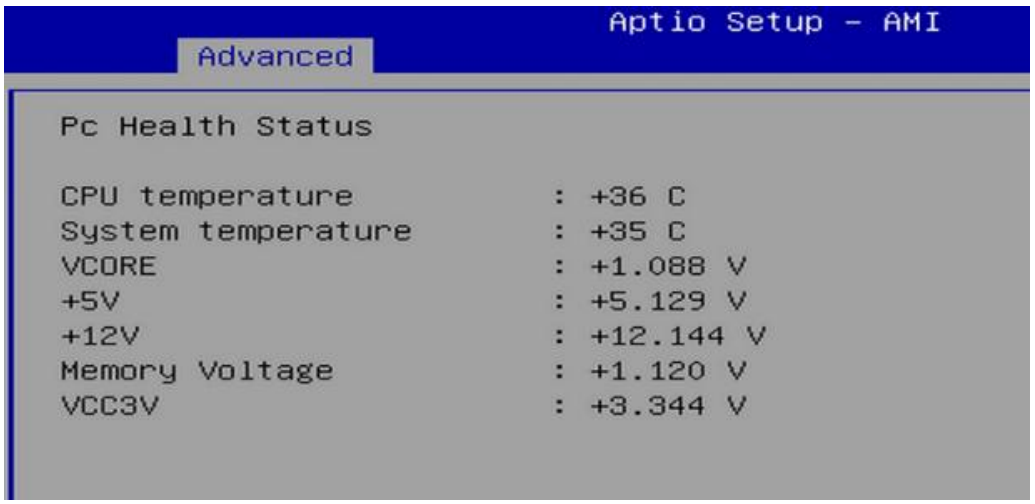


BIOS Setting	Description
Serial Port Configuration	Sets parameters of Serial Port 1/2/3/4
Standby Power on S5 (Eup)	Enable – provide the standby power for devices. Disable – shutdown the standby power.

4.4.9 Standby Power on S5(Eup)

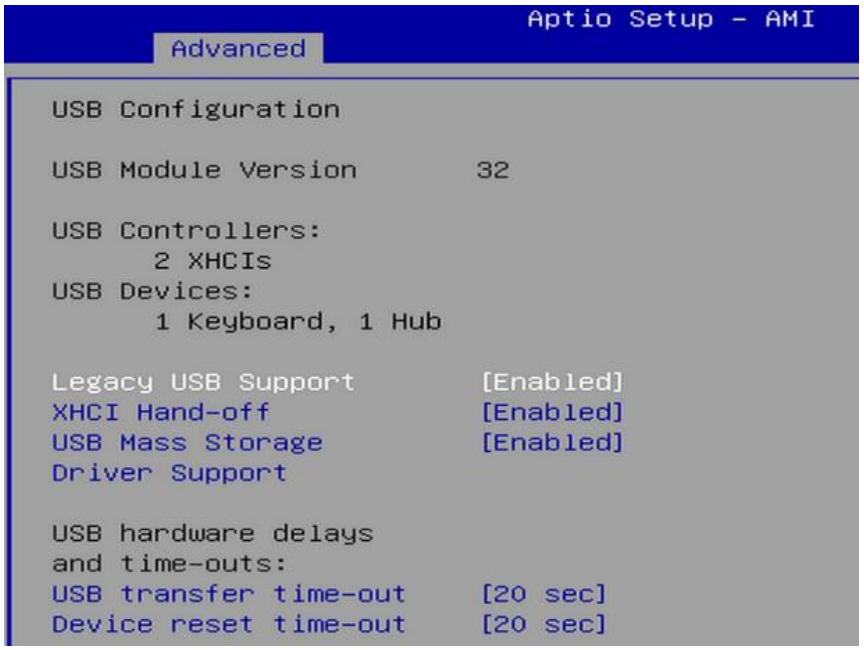


4.4.10 Hardware Monitor



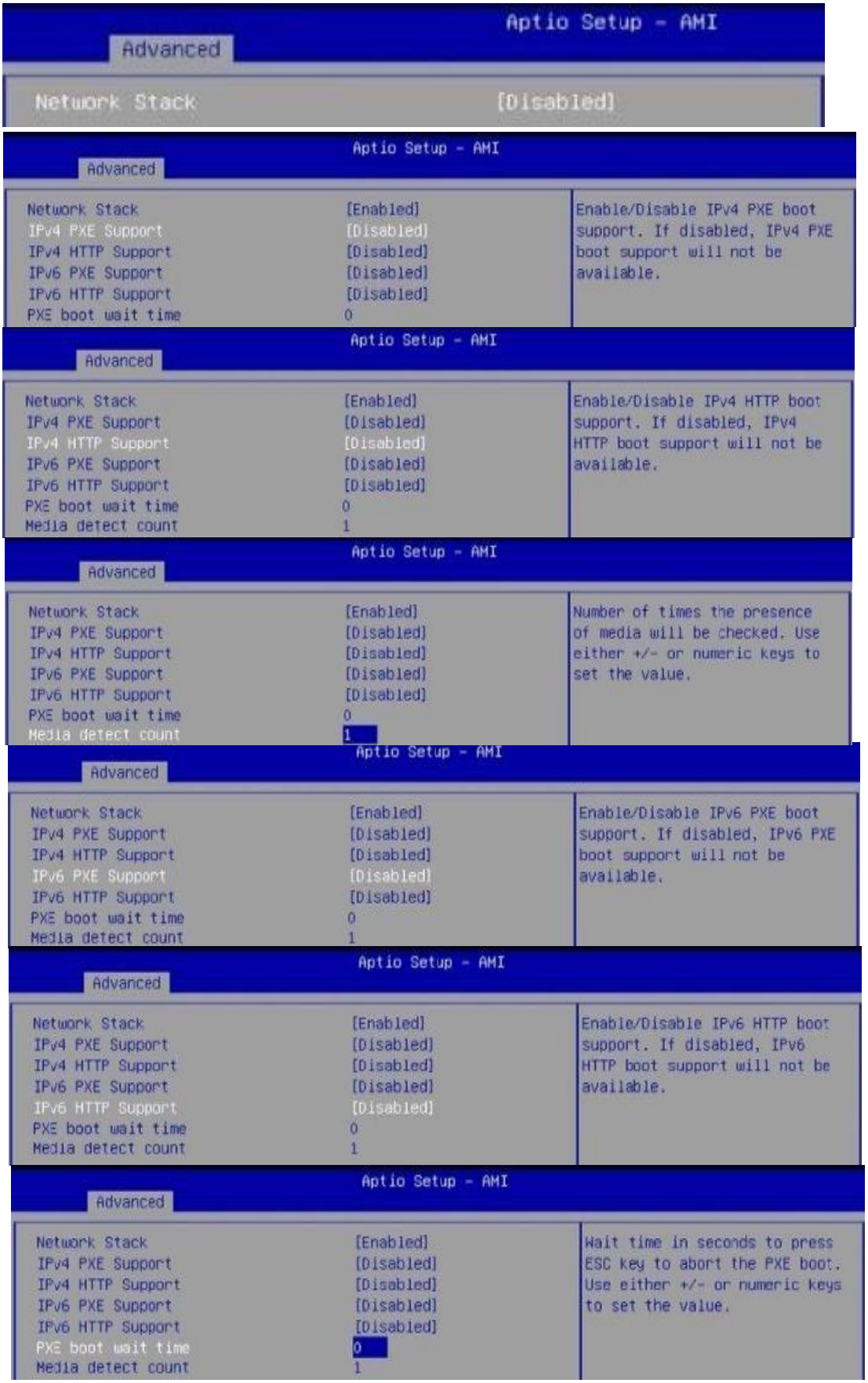
BIOS Setting	Description
Temperatures / Voltages	These fields are the parameters of the hardware monitoring function feature of the motherboard. The values are read-only values as monitored by the system and show the PC health status.

4.4.11 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.

4.4.12 Network Stack Configuration



4.4.13 NVME Configuration





4.5 Chipset Settings



BIOS Setting	Description
System Agent (SA) Configuration	System Agent (SA) parameters
PCH-IO Configuration	PCH parameters

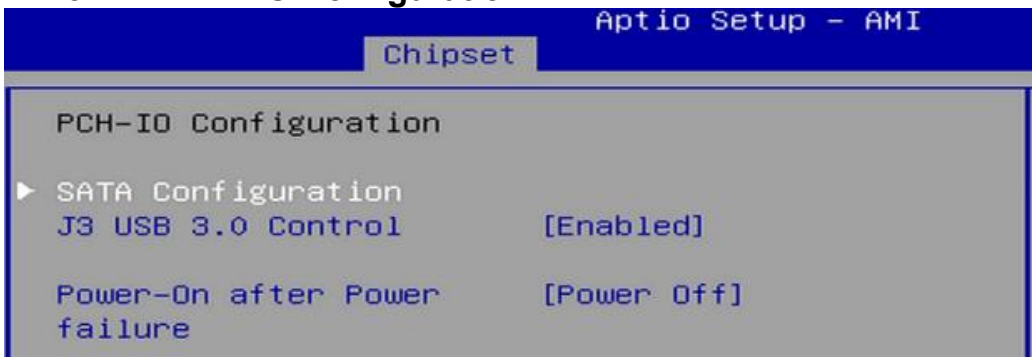
4.5.1 Graphics Configuration



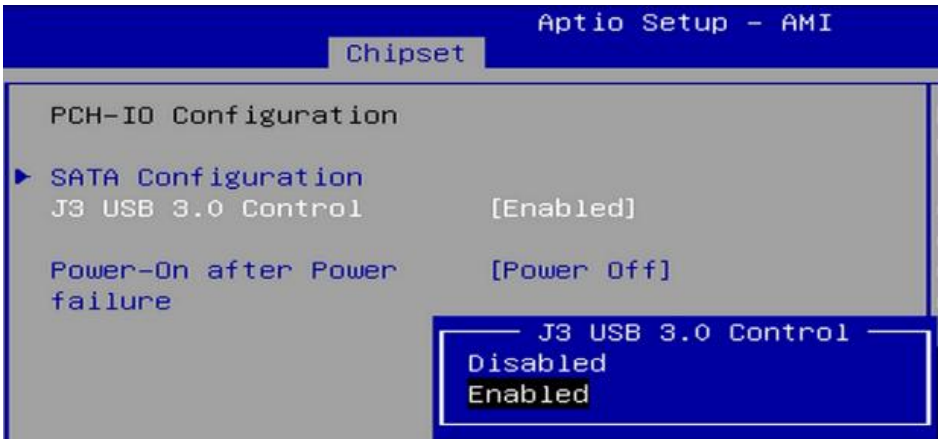


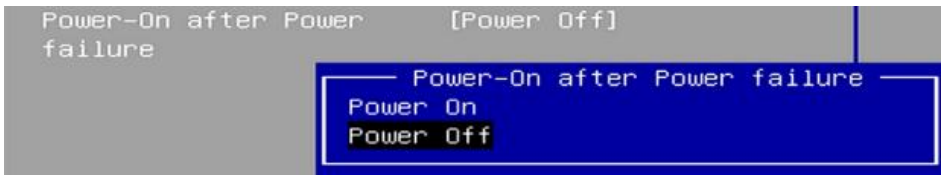
BIOS Setting	Description
Graphics Turbo IMON Current	Graphics turbo IMON current values supported (14-31)
GTT Size	Sets the GTT size as 2 MB, 4 MB, or 8 MB.
Aperture Size	Select the aperture size. Note: Above 4 GB MMIO BIOS assignment is automatically enabled when selecting 2048 MB aperture. To use this feature, disable CSM support.
PSMI Support	PSMI Enable/Disable
DVMT Pre-Allocated	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device
Graphics Configuration	VT-d capability

4.5.2 PCH-IO Configuration



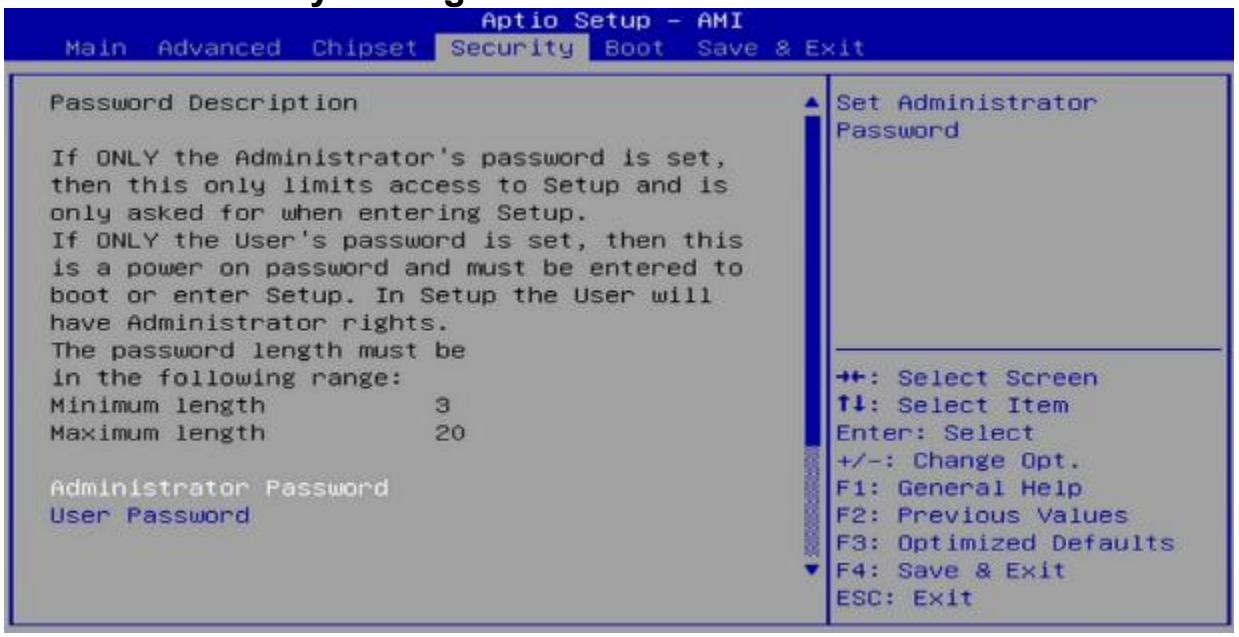
J3 USB 3.0 Control



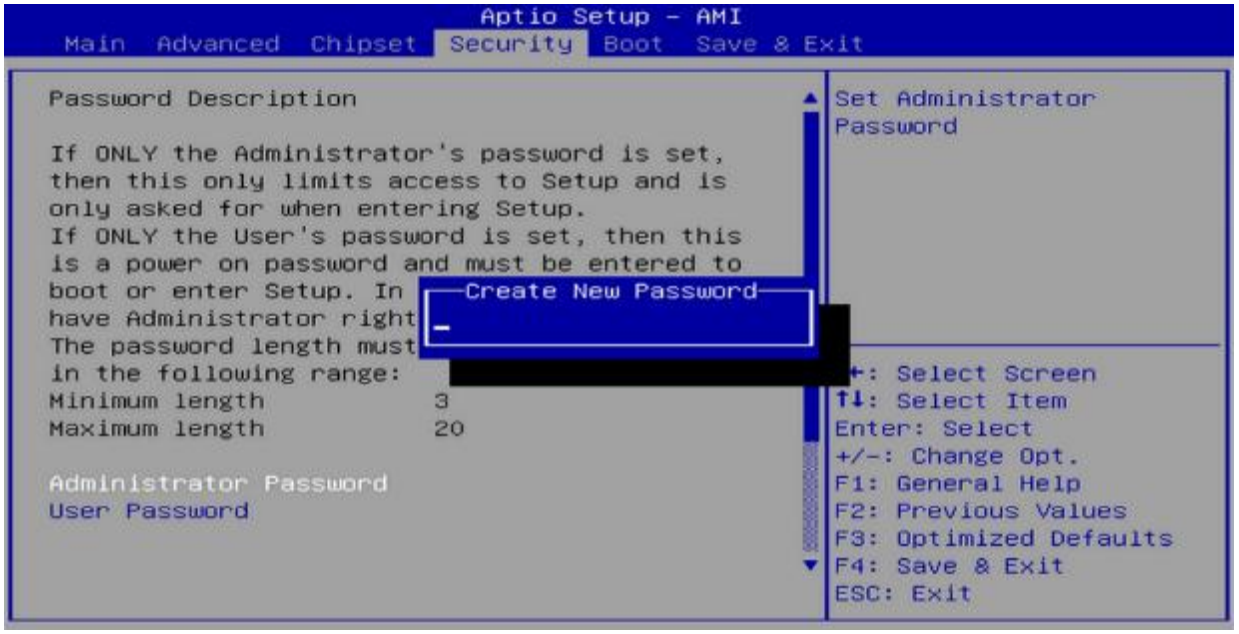


BIOS Setting	Description
SATA and RST Configuration	SATA device options and settings
SATA Controller(s)	Enables / Disables the Serial ATA.
SATA Mode Selection	Selects IDE or AHCI Mode.
Serial ATA Port 0~2	Enables / Disables Serial Port 0 ~ 2.
SATA Ports Hot Plug	Enables / Disables SATA Ports HotPlug.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

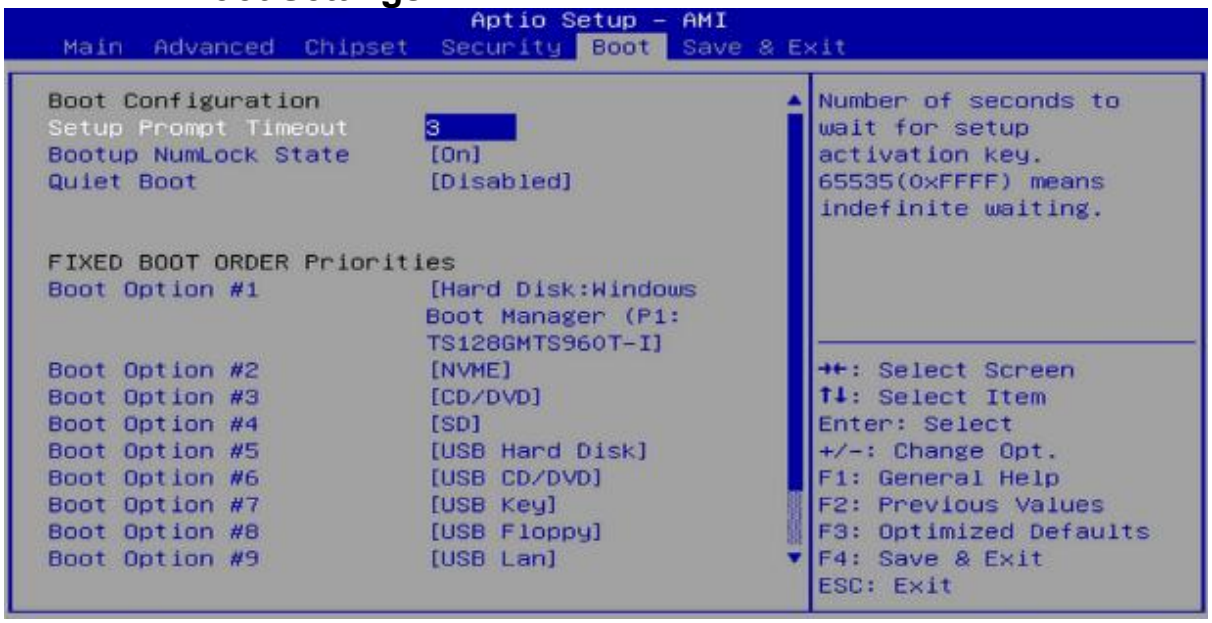
4.6 Security Settings



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.

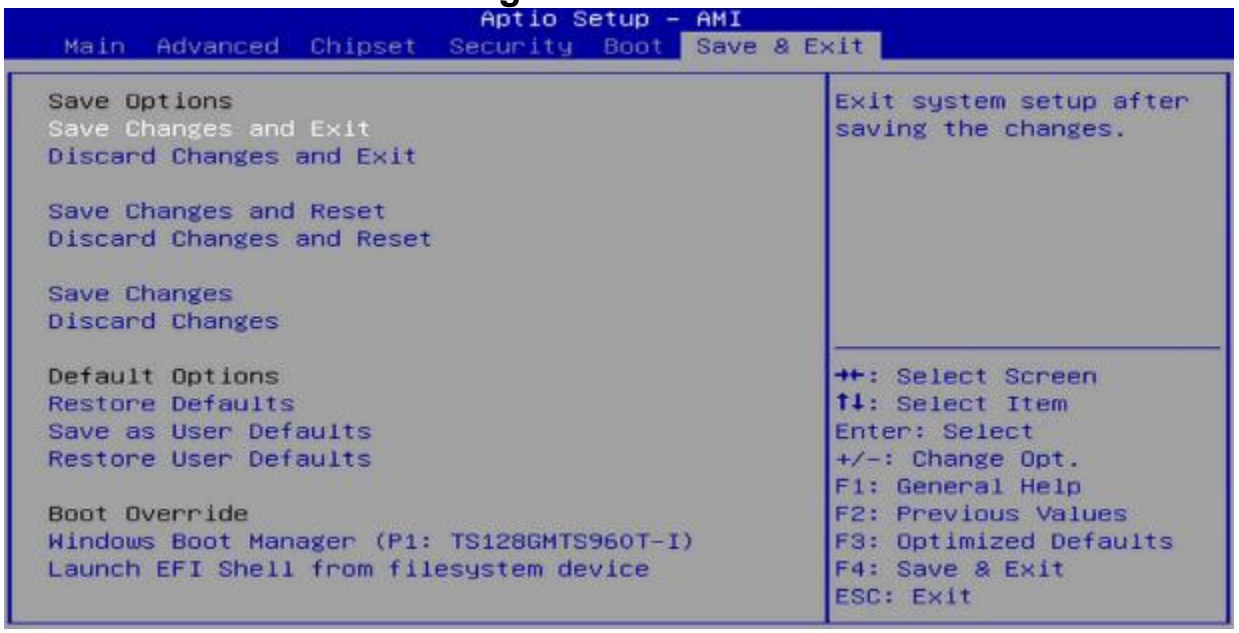


4.7 Boot Settings



BIOS Setting	Description
Setup Prompt Timeout	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup Num Lock State	Turns on/off the keyboard Num Lock state.
Quiet Boot	Enables / Disables Quiet Boot option.
FIXED BOOT ORDER PRIORITY	Sets the system boot order
UEFI Hard Disk Drive BBS Priorities	Specifies the boot device priority sequence from available UEFI hard disk drives.

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.

- I/O Port Address Map
- Interrupt Request Lines (IRQ)
- 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
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)
0x0000EFA0-0x0000EFBF	SMBus - 54A3
0x00003000-0x0000303F	Intel(R) UHD Graphics
0x00001854-0x00001857	Motherboard resources
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
0x00002000-0x000020FE	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
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 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 5	Communications Port (COM3)
IRQ 10	Communications Port (COM4)
IRQ 12	Microsoft PS/2 Mouse
IRQ 14	Intel(R) Serial IO GPIO Host Controller - INTC1057
IRQ 16	Intel(R) Serial IO UART Host Controller - 54A8
IRQ 19	High Definition Audio Controller
IRQ 55 ~ IRQ 204	Microsoft ACPI-Compliant System
IRQ 256 ~ IRQ 511	Microsoft ACPI-Compliant System
IRQ 4294967280	Intel(R) Management Engine Interface #1
IRQ 4294967281~85	Intel(R) Ethernet Controller I226-IT
IRQ 4294967293	Intel(R) UHD Graphics
IRQ 4294967286~90	Intel(R) Ethernet Controller I226-IT #2
IRQ 4294967291	Intel(R) USB 3.10 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967292	Intel(R) USB 3.20 eXtensible Host Controller - 1.20 (Microsoft)
IRQ 4294967294	Standard SATA AHCI Controller

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 the 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 81866 watch dog program\n");
        SIO = Init_F81964();
        if (SIO == 0)
        {
                printf("Can not detect Fintek 81866, 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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// 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 81866
        {       goto Init_Finish; }

        F81964_BASE = 0x2E;
        result = F81964_BASE;

        ucDid = Get_F81964_Reg(0x20);
        if (ucDid == 0x07)                      //Fintek 81866
        {       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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// 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
```