

USER'S MANUAL

CT-DAL01 Series

3.5" Industrial Single Board Computer
with Intel ADL-N Processors

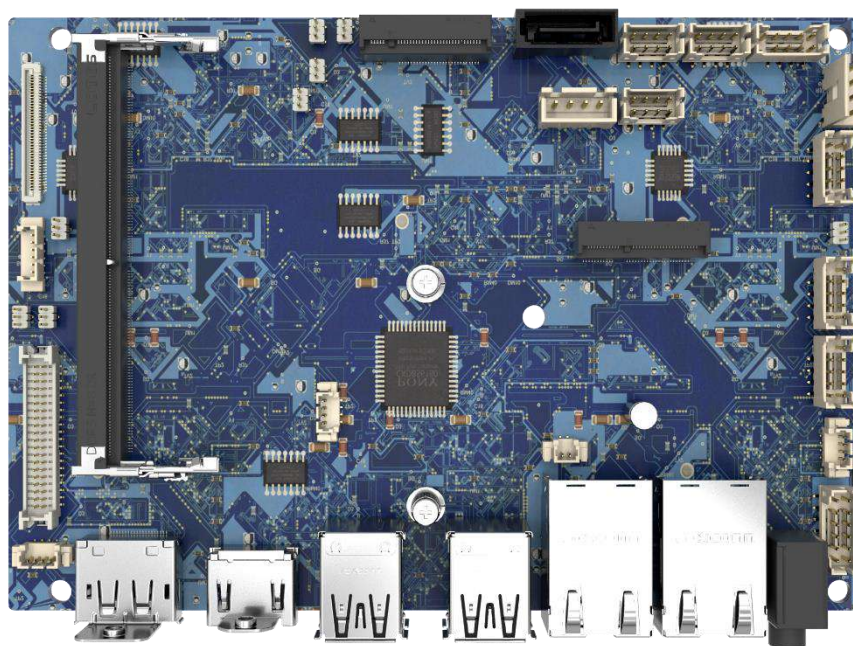


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Prefaces

Revision

Revision	Description	Date
1.0	Manual Released	2024/1/23

Disclaimer

All specifications and information in this User's Manual are believed to be accurate and up to date. Premio Inc. does not guarantee that the contents herein are complete, true, accurate or non-misleading. The information in this document is subject to change without notice and does not represent a commitment on the part of Premio Inc.

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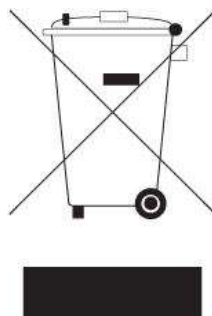
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Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. Please recycle to minimize pollution and ensure environment protection.



Regulatory Notices

FCC-A Radio Frequency Interference Statement

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

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.

NOTE

- The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
- Shield interface cables and AC power cord, if any, must be used in order to comply with the emission limits.

FCC Conditions

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

- This device may not cause harmful interference.
- This device must accept any interference received, including interference that may cause undesired operation.

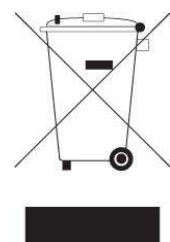
CE Conformity

Hereby, Premio Inc. declares that this device is in compliance with the essential safety requirements and other relevant provisions set out in the European Directive.



WEEE Statement

Under the European Union ("EU") Directive on Waste Electrical and Electronic Equipment, Directive 2012/19/EU, products of "electrical and electronic equipment" cannot be discarded as municipal waste anymore and manufacturers of covered electronic equipment will be obligated to take back such products at the end of their useful life.



Battery Information

Please take special precautions if this product comes with a battery.

- Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer.
- Avoid disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, which can result in an explosion.
- Avoid leaving a battery in an extremely high temperature or extremely low air pressure environment that can result in an explosion or the leakage of flammable liquid or gas.
- Do not ingest battery. If the coin/button cell battery is swallowed, it can cause severe internal burns and can lead to death. Keep new and used batteries away from children.

European Union:



Batteries, battery packs, and accumulators should not be disposed of as unsorted household waste. Please use the public collection system to return, recycle, or treat them in compliance with the local regulations.

BSMI:



For better environmental protection, waste batteries should be collected separately for recycling or special disposal.

California, USA:



The button cell battery may contain perchlorate material and requires special handling when recycled or disposed of in California.

For further information please visit:

<http://www.dtsc.ca.gov/hazardouswaste/perchlorate/>

Chemical Substances Information

In compliance with chemical substances regulations, such as the EU REACH Regulation (Regulation EC No. 1907/2006 of the European Parliament and the Council), Premio provides the information of chemical substances in products at:

<https://premioinc.com/>

Environmental Policy

- The product has been designed to enable proper reuse of parts and recycling and should not be thrown away at its end of life.
- Users should contact the local authorized point of collection for recycling and disposing of their end-of-life products.
- Visit the Premio website and locate a nearby distributor for further recycling information.
- Users may also reach us at Premio for information regarding proper Disposal, Take-back, Recycling, and Disassembly of Premio products.



Green Product Features

- Reduced energy consumption during use and stand-by
- Limited use of substances harmful to the environment and health
- Easily dismantled and recycled
- Reduced use of natural resources by encouraging recycling
- Extended product lifetime through easy upgrades
- Reduced solid waste production through take-back policy

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Technical Support

If a problem arises with your product and no solution can be obtained from the user's manual, please contact your place of purchase or local distributor. Alternatively, please visit <https://premioinc.com/>

Safety Information

Before installing and using the equipment, please read the following precautions:

- The components included in this package are prone to damage from electrostatic discharge (ESD). Please adhere to the following instructions to ensure successful computer assembly.
- Ensure that all components are securely connected. Loose connections may cause the computer to not recognize a component or fail to start.
- Hold the motherboard by the edges to avoid touching sensitive components.
- It is recommended to wear an electrostatic discharge (ESD) wrist strap when handling the motherboard to prevent electrostatic damage. If an ESD wrist strap is not available, discharge yourself of static electricity by touching another metal object before handling the motherboard.
- Store the motherboard in an electrostatic shielding container or on an anti-static pad whenever the motherboard is not installed.
- Before turning on the computer, ensure that there are no loose screws or metal components on the motherboard or anywhere within the computer case.
- Do not boot the computer before installation is completed. This could cause permanent damage to the components as well as injury to the user.
- If you need help during any installation step, please consult a certified computer technician.
- Always turn off the power supply and unplug the power cord from the power outlet before installing or removing any computer component.
- Keep this user guide for future reference.
- Keep this motherboard away from humidity.
- Make sure that your electrical outlet provides the same voltage as is indicated on the PSU, before connecting the PSU to the electrical outlet.
- Place the power cord such a way that people can not step on it. Do not place anything over the power cord.
- All cautions and warnings on the motherboard should be noted.
- If any of the following situations arises, get the motherboard checked by service personnel:
 - Liquid has penetrated into the computer.
 - The motherboard has been exposed to moisture.
 - The motherboard does not work well or you can not get it work according to user guide.
 - The motherboard has been dropped and damaged.
 - The motherboard has obvious sign of breakage.
- Do not leave this motherboard in an environment above 60°C (140°F), it may damage the motherboard

Technical Support and Assistance

1. Visit the Premio Inc website at www.premioinc.com where you can find the latest information about the product.
2. Contact your distributor, our technical support team or sales representative for technical support if you need additional assistance. Please have following information ready before you call:
 - Model name and serial number
 - Description of your peripheral attachments
 - Description of your software (operating system, version, application software, etc.)
 - A complete description of the problem
 - The exact wording of any error messages

Conventions Used in this Manual



WARNING

This indication alerts operators to an operation that, if not strictly observed, may result in severe injury.



CAUTION

This indication alerts operators to an operation that, if not strictly observed, may result in safety hazards to personnel or damage to equipment.



NOTE

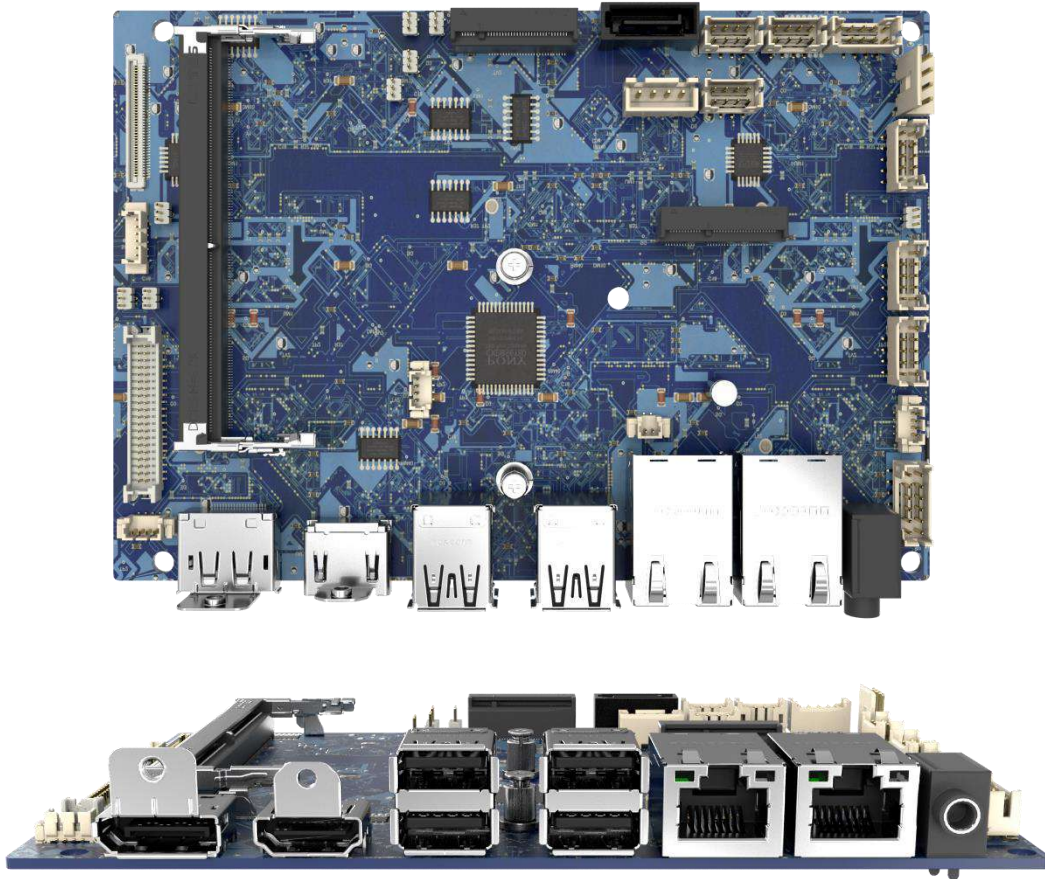
This indication provides additional information to complete a task easily.

Chapter 1

Product Introductions

1.1 Overview

3.5" SBC with Intel® Alder Lake-N for Fanless, Ultra Low-Power, Wide Voltage Range & High-Performance Solution



Key Features

- Intel® Alder Lake-N PC Client & Embedded Series SoC
- DDR5 4800 MHz SODIMM Slot up to 16GB
- Triple independent displays: DP, HDMI, LVDS, eDP
- 2 2.5 GbE LAN with RJ-45
- 1 M.2 B Key, 1 M.2 E Key Slot
- SATA 3.0 for storage
- 2 USB 3.2 Gen 2, 2 USB 3.2 Gen 1, 6 USB 2.0, 2 COM (1 RS-485), GPIO, Audio, Amplifier-6W
- Wide Voltage DC-IN 9~36V

1.2 Hardware Specification

Model	
Processor	<ul style="list-style-type: none"> • 12th Gen Intel® IoTG Alder Lake-N Processor N97, QC, 12W • 12th Gen Intel® IoTG Alder Lake-N Processor N200, QC, 6W • 12th Gen Intel® IoTG Alder Lake-N Core i3-N305, OC, 9W up to 15W • 12th Gen Intel® IoTG Alder Lake-N Atom x7425E, QC, 12W
Chipset	Within processor
Memory	1 x DDR5 SO-DIMM slot (262-pin) - Single Channel DDR5, Non-ECC - Up to 4800 MT/s - Up to 16GB
Network	2 x Intel® I225-V 2.5GbE LAN
Expansion Slots	<ul style="list-style-type: none"> • 1 x M.2 E Key slot (2230) - Supports PCIe x1 & USB 2.0 signal - Supports Intel® AX210 Wi-Fi 6E & BT-5.2 • 1 x M.2 B Key slot (2242/ 2280/ 3042)* - Supports PCIe x1 signal - Supports B+M Key PCIe x1 module
Storage	<ul style="list-style-type: none"> • 1 x SATA 3.0 6Gb/s port - Support AHCI mode • 1 x M.2 B Key slot (2242/ 2280/ 3042)* - Supports SATA 3.0 signal - Supports B+M Key SATA 3.0 SSD
Audio	Realtek® ALC897 High Definition Audio Codec
Graphics	<ul style="list-style-type: none"> • 1 x DP 1.4a up to 4096x2304 @60Hz • 1 x HDMI™ 1.4b up to 3840x2160 @30Hz • 1 x LVDS up to 1920x1200 @60Hz - 18/24-bit dual channel • 1 x eDP 1.4b up to 1920x1080 @60 Hz • 3 independent display supported in OS - DP - HDMI™ - LVDS - eDP

There is only "one" M.2 B Key Slot on board, which is marked as M2_B1.

Power	1 x 9V~36V DC-in power connector*
Rear I/O	<ul style="list-style-type: none"> • 1 x Line-out jack • 2 x 2.5 GbE RJ-45 LAN ports • 2 x Dual Stacked USB 3.2 Type-A ports <ul style="list-style-type: none"> - 2 x USB 3.2 Gen 2 Type-A ports (Bottom layer, 10 Gbps) - 2 x USB 3.2 Gen 1 Type-A ports (Top layer, 5 Gbps) • 1 x DisplayPort (1.4a) • 1 x HDMI™ connector (1.4b)
Onboard Connector	<ul style="list-style-type: none"> • 1 x DC-in power connector (4-pin) • 1 x SATA power connector (4-pin, 5V/ 12V) • 1 x Front audio header (Headphone, Mic-in, Line-in) • 1 x Audio amplifier header • 1 x LVDS Inverter box header • 1 x LVDS wafer connector • 1 x eDP connector • 1 x PWM system fan box header • 1 x Front panel connector (Power switch, Reset switch, Power LED, HDD LED for M.2 B key) • 2 x COM port box headers • 1 x GPIO (DIO) connector • 1 x SMBus box header • 3 x USB 2.0 box headers • 1 x CMOS battery header
Onboard Jumper	<ul style="list-style-type: none"> • 1 x COM1 power select jumper (0V/ 5V/ 12V) • 1 x Clear CMOS jumper • 1 x CSE jumper • 1 x AT/ ATX mode select jumper • 1 x LVDS power select jumper (3V/ 5V) • 1 x eDP power select jumper (3V/ 5V) • 1 x LVDS Inverter power select jumper (5V/ 12V)
Form factor	<ul style="list-style-type: none"> • 3.5" SBC (Single Board Computer) - 146mm(L) x 102mm(W) x 1.6mm(T)

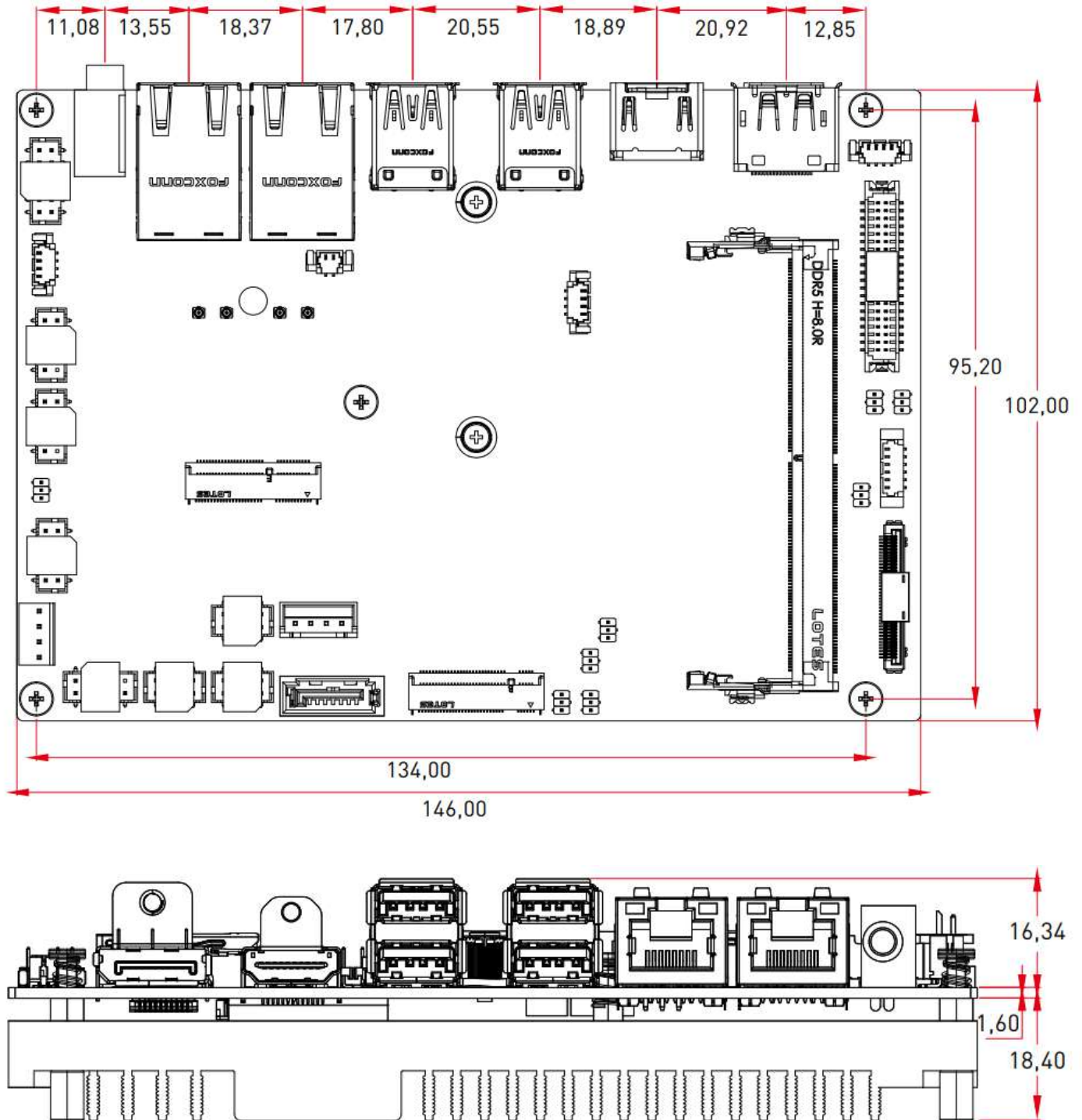
*The power adapter you use should provide at least 90W.

OS Support	<ul style="list-style-type: none">• Windows 10 IoT Enterprise LTSC (64-bit, 21H2)• Windows 11 IoT Enterprise (64-bit, 22H2, pre-scan)• Linux Kernel 5.xx Ubuntu 22.04.1 LTS (64-bit) (by request)
Certification	CE, FCC Class A
Environment	<ul style="list-style-type: none">• Operating Temperature: -10 ~ 60°C• Storage Temperature: -20 ~ 80°C• Operating Humidity: 10 ~ 90%, non-condensing• Storage Humidity: 10 ~ 90%, non-condensing

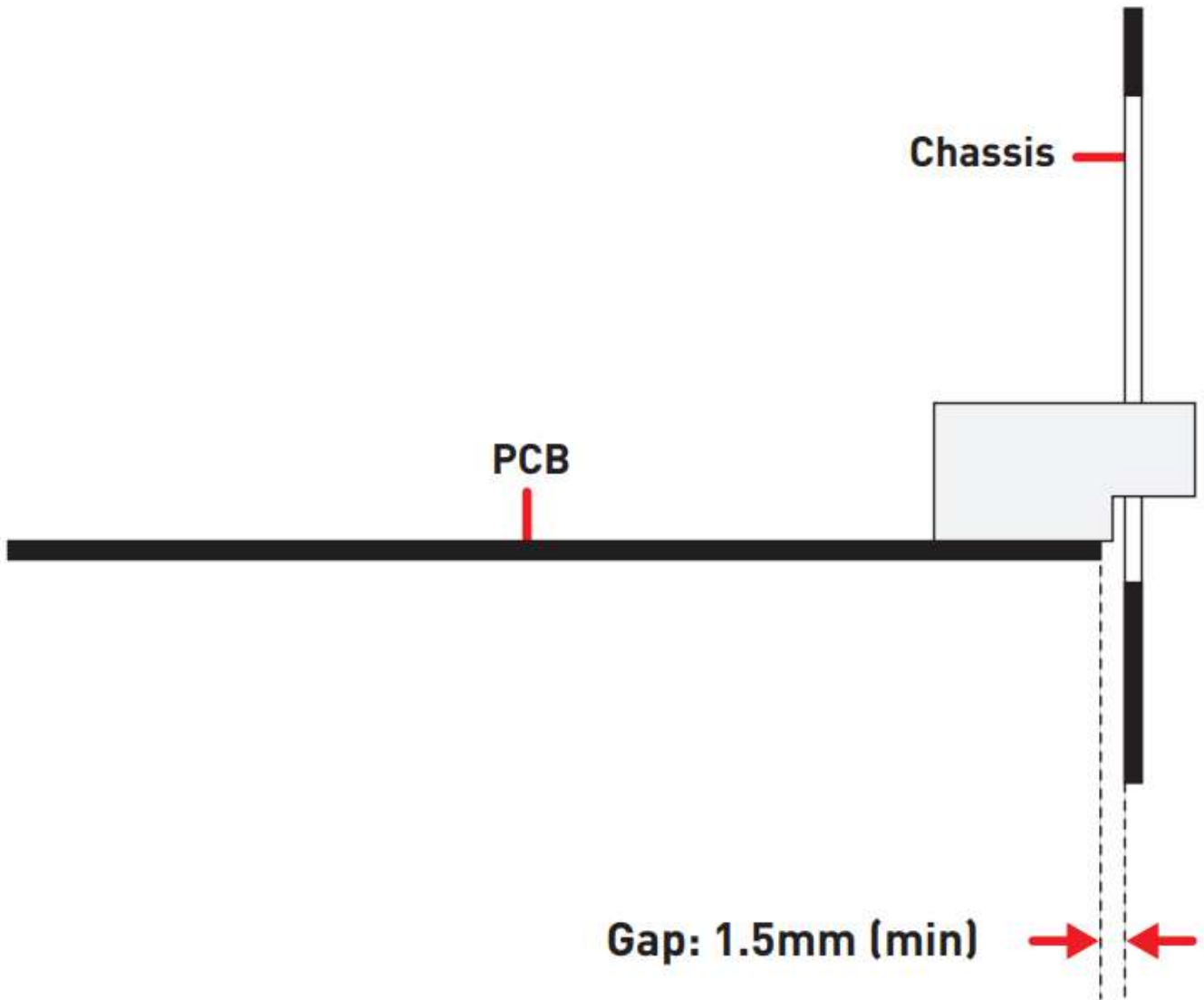
1.3 ME Overview

Board Dimension

Unit of measurement: mm



Suggested Chassis I/O Gap Dimension

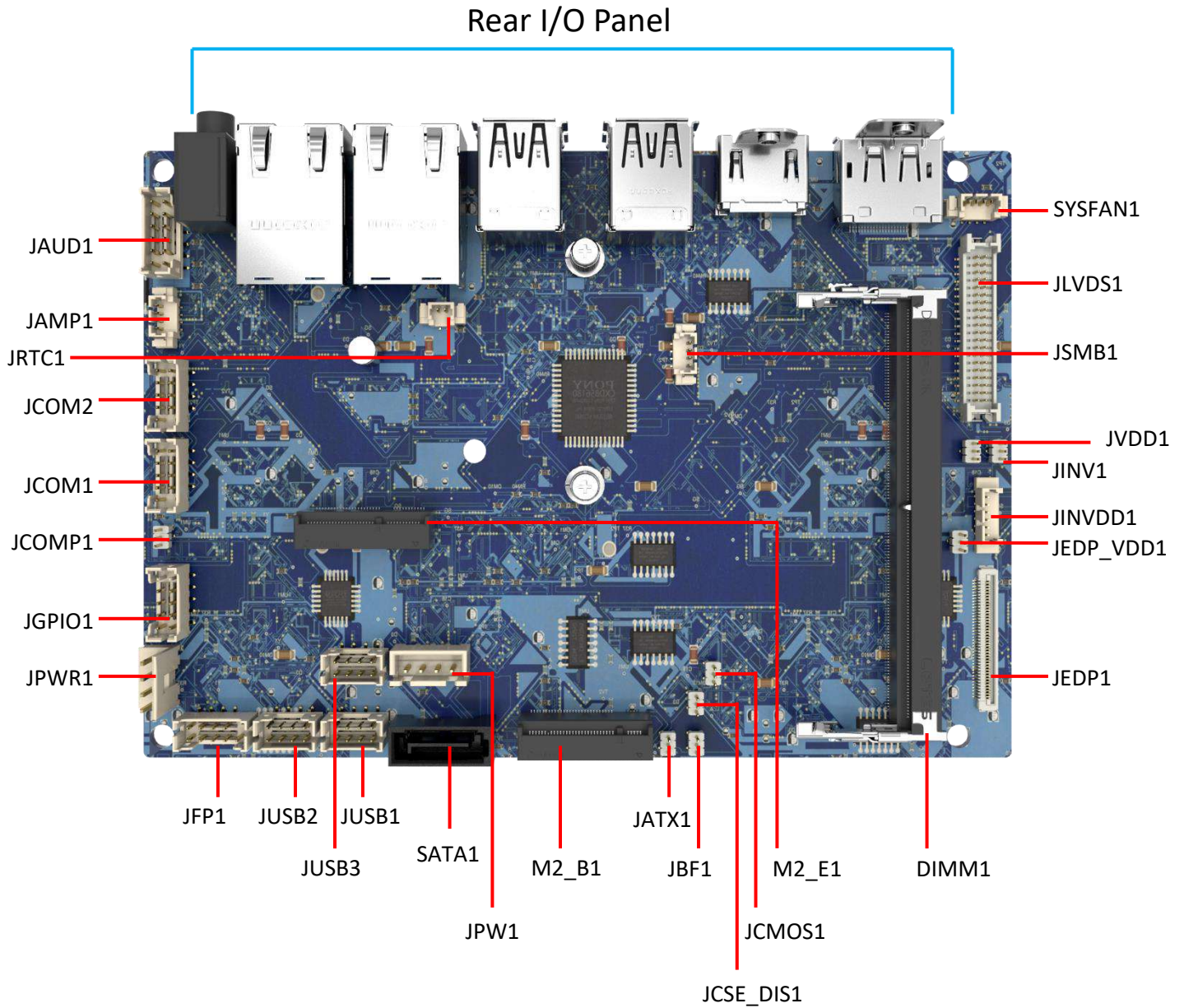


Chapter 2

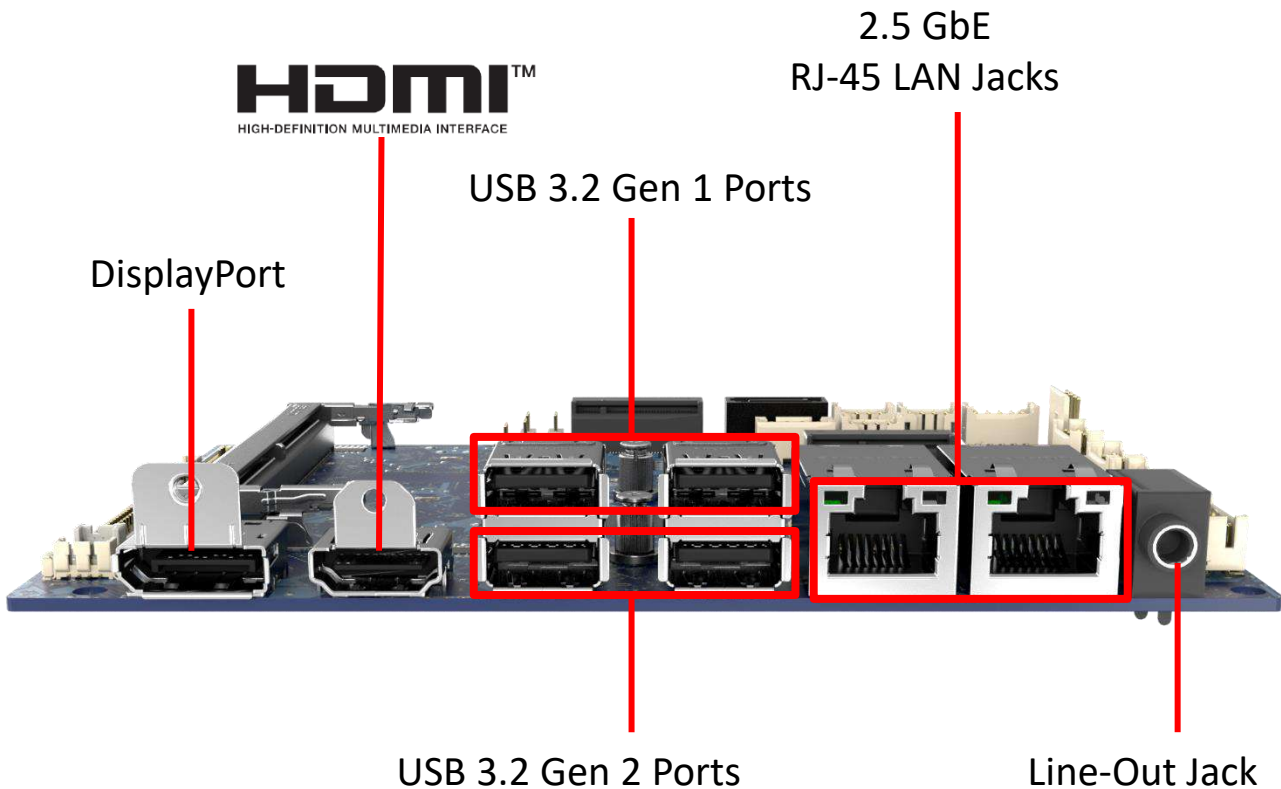
Switches and Connectors

2.1 Motherboard Overview

2.1.1 Top View



2.1.2 Rear I/O Panel



DisplayPort

DisplayPort is a digital display interface standard. This connector is used to connect a monitor with DisplayPort inputs.

HDMI™ Connector

The High-Definition Multimedia Interface (HDMI™) is an all-digital audio/ video interface capable of transmitting uncompressed streams. HDMI™ supports all TV format, including standard, enhanced, or high-definition video, plus multi-channel digital audio on a single cable.

USB 3.2 Gen 2 Port

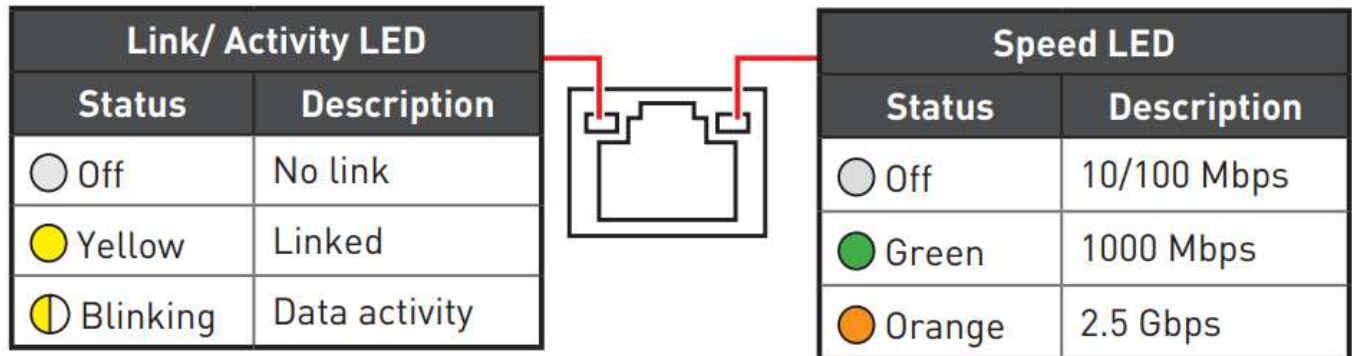
USB 3.2 Gen 2, the SuperSpeed USB 10Gbps, delivers high-speed data transfer for various devices, such as storage devices, hard drives, video cameras, etc.

USB 3.2 Gen 1 Port

The USB (Universal Serial Bus) port is for attaching USB devices such as keyboards, mouse, or other USB-compatible devices. USB 3.2 Gen 1 supports data transfer rates up to **5 Gbps**.

GbE RJ-45 LAN Jack

The standard single RJ45 LAN jack is provided for connection to the Local Area Network (LAN). You can connect a network cable to it.



Important

High-speed devices are recommended for USB 3.2 ports whereas low-speed devices, such as mouse or keyboard, are suggested to be plugged into the USB 2.0 ports

Line-Out Jack

This connector is provided for headphones or speakers.

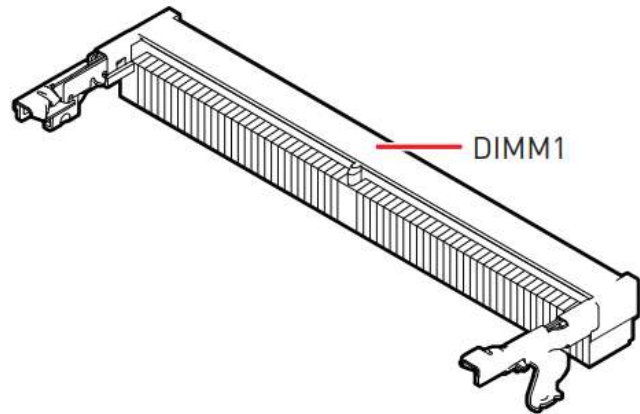
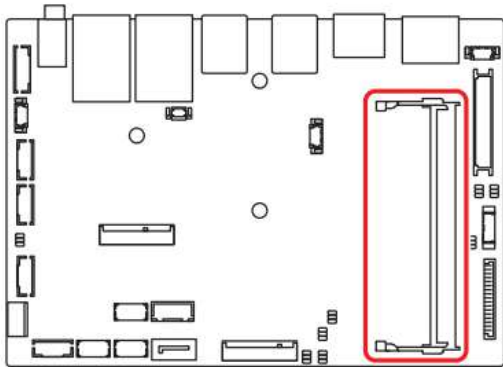
2.2 Component Contents

Component	
Memory	DIMM1: DDR5 SO-DIMM Slot
Storage	<ul style="list-style-type: none"> • SATA1: SATA 3.0 6Gb/s Port • M2_B1: M.2 Slot (B Key, 2242, 3042, 2280)
Expansion Slots	<ul style="list-style-type: none"> • M2_B1: M.2 Slot (B Key, 2242, 3042, 2280) • M2_E1: M.2 Slot (E Key, 2230)
Connectors Power Connectors	<ul style="list-style-type: none"> • JPWR1: 4-Pin DC-In Main Power Connector • JPW1: 4-Pin SATA Power Connector
Audio Connectors	<ul style="list-style-type: none"> • JAUD1: Front Audio Header • JAMP1: Audio Amplifier Header
Graphics Connectors	<ul style="list-style-type: none"> • JLVDS1: LVDS Wafer Connector • JINVDD1: LVDS Inverter Box Header • JEDP1: eDP Connector
Other Connectors	<ul style="list-style-type: none"> • SYSFAN1: PWM System Fan Box Header • JFP1: Front Panel Connector • JCOM1, JCOM2: COM Port Box Headers • JGPIO1: GPIO (DIO) Box Header • JUSB1~3: USB 2.0 Box Headers • JSMB1: SMBus Box Header • JRTC1: CMOS Battery Header • Replacing CMOS battery
Jumpers	

2.3 Memory

DIMM1: DDR5 SO-DIMM Slot

The SO-DIMM slots is intended for memory modules.



Installing DDR5 Memory

1. Locate the SO-DIMM slot. Align the notch on the DIMM with the key on the slot and insert the DIMM into the slot.
2. Push the DIMM gently downwards until the slot levers click and lock the DIMM in place.
3. To uninstall the DIMM, flip the slot levers outwards and the DIMM will be released instantly.

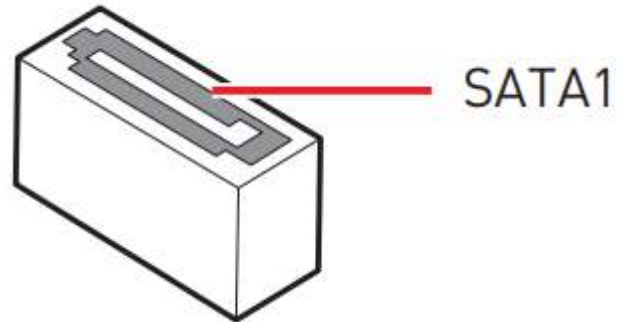
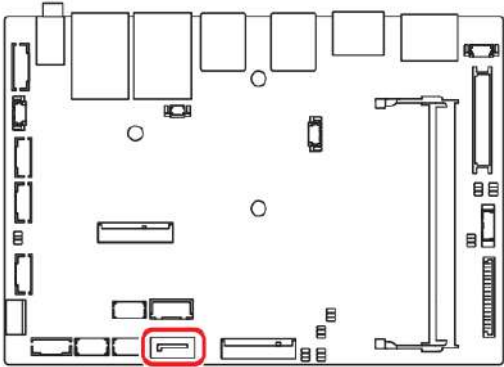
Important

- *You can barely see the golden finger if the DIMM is properly inserted in the DIMM slot.*
- *To ensure system stability for Dual channel mode, memory modules must be of the same type, number and density.*

2.4 Storage

SATA1: SATA 3.0 6Gb/s Port

This connector is SATA 6Gb/s interface port, it can connect to one SATA device.

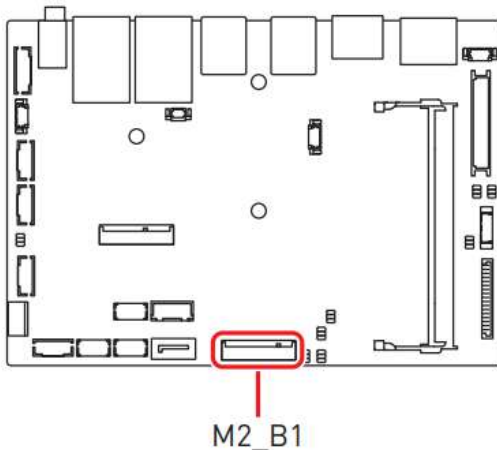


Important

- This SATA port supports hot plug.
- Please do not fold the SATA cable at a 90-degree angle. Data loss may result during transmission otherwise.
- SATA cables have identical plugs on either sides of the cable. However, it is recommended that the flat connector be connected to the motherboard for space saving purposes.

M2_B1: M.2 Slot (B Key, 2242, 3042, 2280)

Please install the solid-state drive (SSD) into the M.2 slot as shown below.

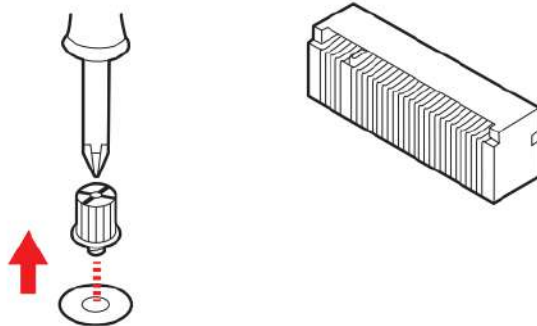


Feature

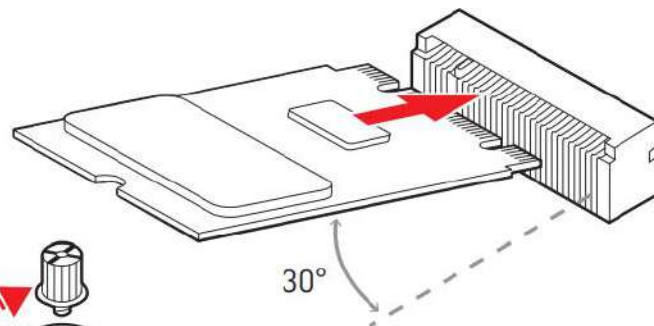
- Supports SATA 3.0 signal.
- Supports B+M Key SATA 3.0 SSD.

Installing M.2 SSD

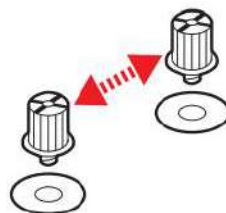
1. Loosen the M.2 riser screw from the motherboard.



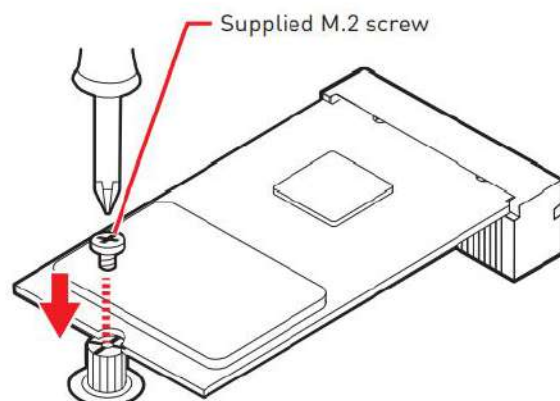
2. Set the M.2 riser screw to the appropriate location based on the length of your M.2 SSD.



3. Insert your M.2 SSD into the M.2 slot at a 30-degree angle.



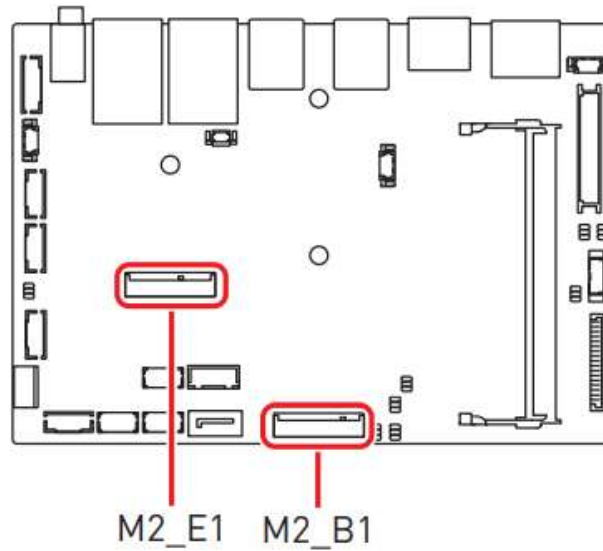
4. Secure the M.2 SSD in place with the supplied M.2 screw.



2.5 Expansion Slots

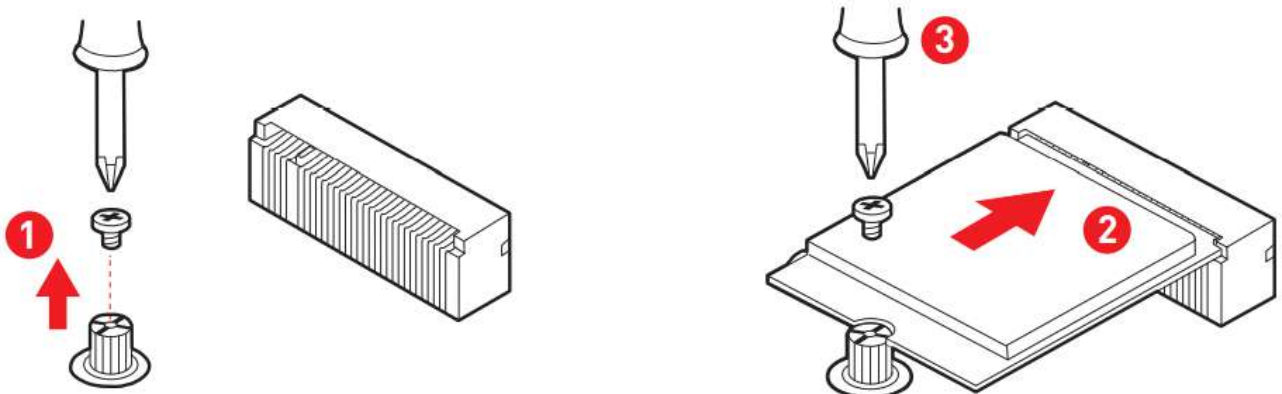
DIMM1: DDR5 SO DIMM Slot

The SO-DIMM slots is intended for memory modules.



M2_B1: M.2 Slot (B Key, 2242, 3042, 2280)

Please install the module card into the M.2 slot as shown below.

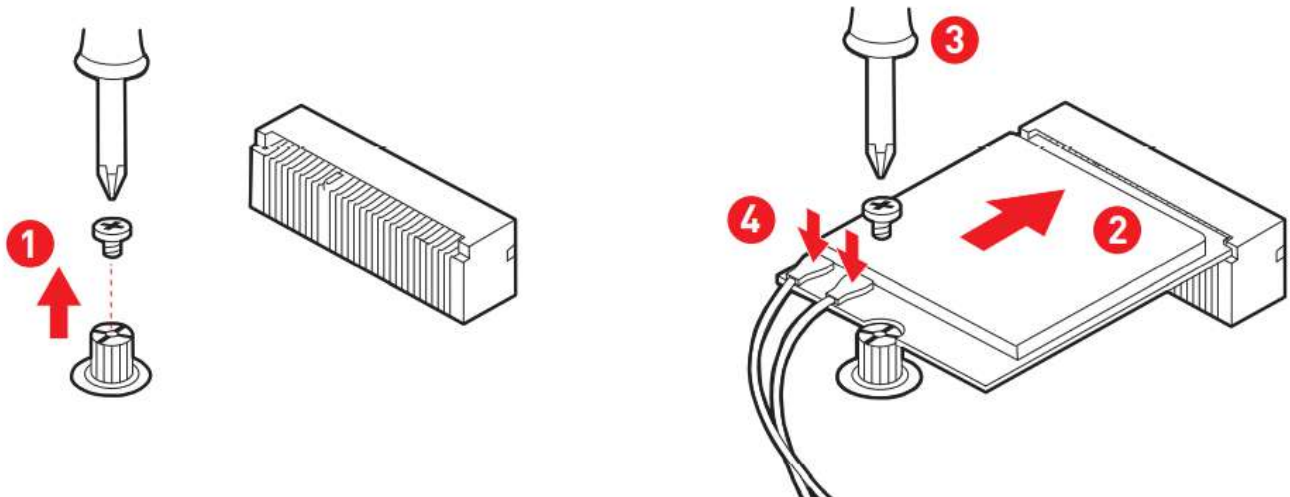


Feature

- Supports PCIe x1 signal.
- Supports B+M key PCIe x1 module.

M2_E1: M.2 Slot (E Key, 2230)

Please install the Wi-Fi/ Bluetooth card into the M.2 slot as shown below.



Feature

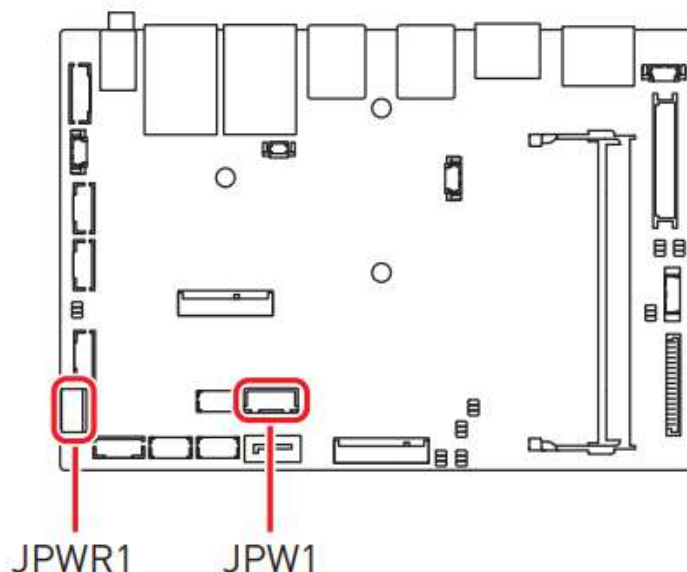
- Supports PCIe x1 & USB 2.0 signal.
- Supports Intel® Wi-Fi 6E AX210 + BT 5.2 wireless card.

Important

When adding or removing expansion cards, make sure that you unplug the power supply first. Meanwhile, read the documentation for the expansion card to configure any necessary hardware or software settings for the expansion card, such as jumpers, switches or BIOS configuration.

2.6 Connectors

Power Connectors



JPWR1: 4-Pin DC-In Main Power Connector

This connector allows you to connect a power supply.

	1	DC-IN	2	DC-IN
	3	GND	4	GND

JPW1: 4-Pin SATA Power Connector

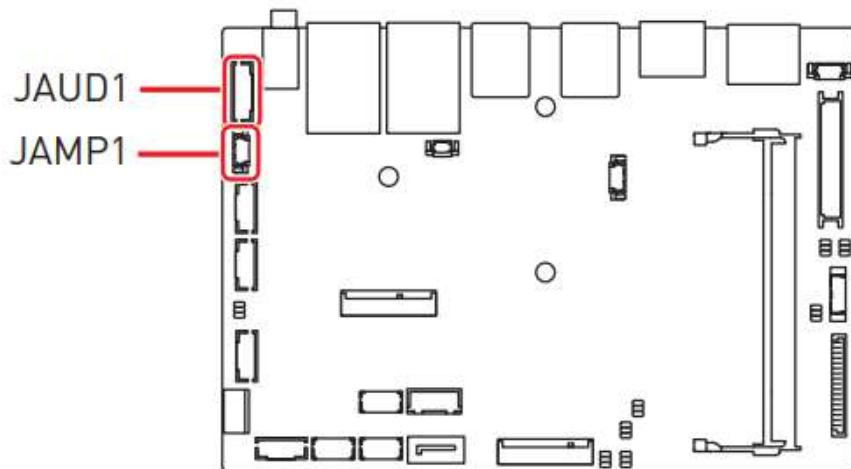
This connector is used to provide power to SATA devices.

	1	5V	2	GND
	3	GND	4	12V

Important

Make sure that all the power cables are securely connected to a proper power supply to ensure stable operation of the system.

2.7 Audio Connectors



JAUD1: Front Audio Header

This connector allows you to connect front panel audio.

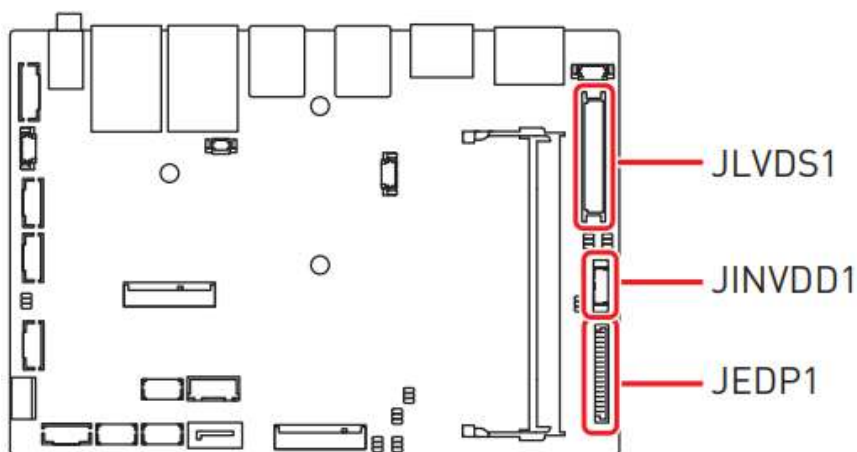
	1	LINE_IN_RA	2	MIC1_RA
	3	LINE_IN_LA	4	MIC1_LA
	5	LOUT_RA	6	MIC1_JD
	7	LOUT_LA	8	LINE_IN_JD
	9	FRONT_JD	10	GND
	11	GND	12	GND

JAMP1: Audio Amplifier Header

The connector is used to connect audio amplifiers to enhance audio performance.

	1	AMP_L-	2	AMP_L+
	3	AMP_R-	4	AMP_R+

2.8 Graphics Connectors



JLVDS1: LVDS Wafer Connector

This connector is designed for use with LVDS interface flat panels. When connecting your flat panel to this connector, be sure to check the panel datasheet to ensure that you set the LVDS power select jumper (JVDD1) to the appropriate power voltage.

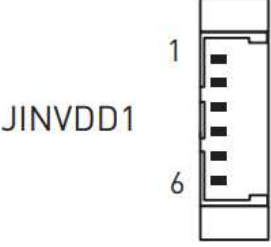
	1	12V	2	12V
	3	LCD_VDD	4	12V
	5	LCD_VDD	6	LCD_VDD
	7	DDC_CLK	8	DDC_DATA
	9	L_BKLT_CTRL#	10	LCDEN
	11	INV_ON	12	LVDS_DETECT#_C
	13	LVDSA_DATA1	14	LVDSA_DATA0
	15	LVDSA_DATA#1	16	LVDSA_DATA#0
	17	GND	18	GND
	19	LVDSA_DATA3	20	LVDSA_DATA2
	21	LVDSA_DATA#3	22	LVDSA_DATA#2
	23	GND	24	GND
	25	LVDSB_DATA1	26	LVDSB_DATA0
	27	LVDSB_DATA#1	28	LVDSB_DATA#0
	29	GND	30	GND
	31	LVDSB_DATA3	32	LVDSB_DATA2
	33	LVDSB_DATA#3	34	LVDSB_DATA#2
	35	GND	36	GND
	37	LVDSB_CLK	38	LVDSA_CLK
	39	LVDSB_CLK#	40	LVDSA_CLK#

Important

Pin 12 is a detect pin. When using a customized LVDS cable, pin 12 should be a signal ground with a low impedance. Otherwise, LVDS will not function.

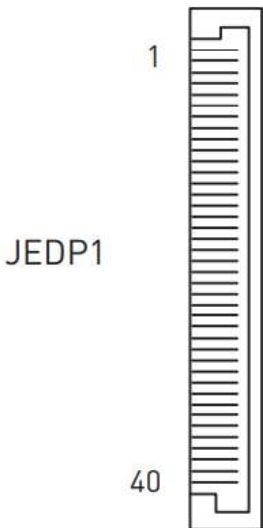
JINVDD1: LVDS Inverter Box Header

The connector is provided for LCD backlight options, be sure to check the panel datasheet to ensure that you set the LVDS Inverter Power Select Jumper (JINV1) to the appropriate power voltage (5V/12V).

 <p>JINVDD1</p>	1	5V/12V	2	5V/12V
	3	BKLT_EN	4	BKLT_CTRL
	5	GND	6	GND

JEDP1: eDP Connector

This connector is designed for use with eDP interface flat panels. When connecting your flat panel to this connector, be sure to check the panel datasheet to ensure that you set the eDP power select jumper (JEDP_VDD1) to the appropriate power voltage.

 <p>JEDP1</p>	1	LCD_VDD1	2	LCD_VDD1
	3	LCD_VDD1	4	LCD_VDD1
	5	LCD_VDD1	6	VCC3
	7	SMB_CLK	8	SMB_DATA
	9	GND	10	HPD
	11	N/C	12	N/C
	13	GND	14	DPC_LINE3_DN
	15	DPC_LINE3_DP	16	GND
	17	DPC_LINE2_DN	18	DPC_LINE2_DP
	19	GND	20	DPC_LINE1_DN
	21	DPC_LINE1_DP	22	GND
	23	DPC_LINE0_DN	24	DPC_LINE0_DP
	25	GND	26	DSP_DDPC_AUXP
	27	DSP_DDPC_AUXN	28	GND
	29	VCC3	30	GND
	31	+12V	32	GND
	33	GND	34	VCC5
	35	GND	36	BKLTCTL
	37	BKLT_EN	38	+12V
	39	VCC3	40	GND

2.9 Other Connectors

SYSFAN1: PWM System Fan Box Header

The fan power connector supports system cooling fans with +12V. When connecting the wire to the connectors, always note that the red wire is the positive and should be connected to the +12V; the black wire is Ground and should be connected to GND.

SYSFAN1		1	GND	2	FAN POWER
		3	FAN SENSE	4	FAN_PWM

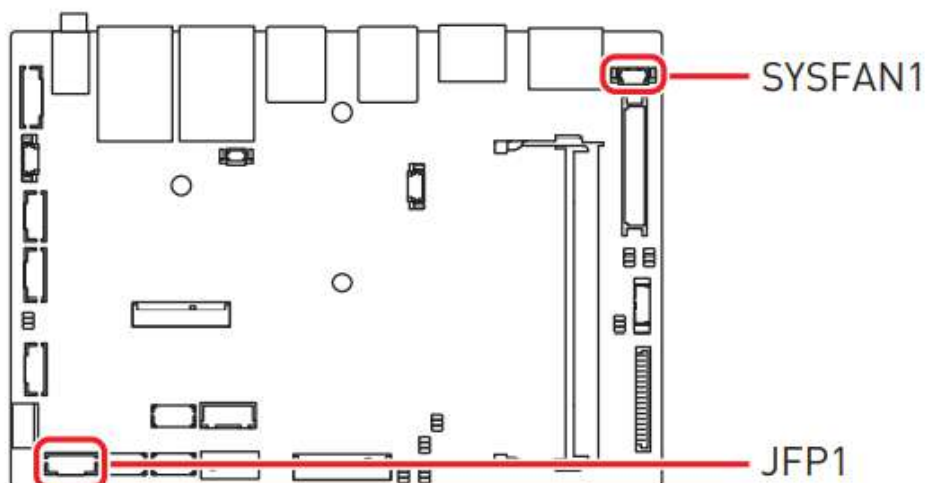
Important

Please refer to the recommended CPU fans at processor's official website or consult the vendors for proper CPU cooling fan.

JFP1: Front Panel Connector

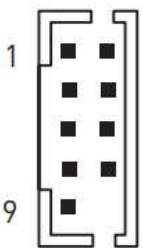
This front-panel connector is provided for electrical connection to the front panel switches & LEDs and is compliant with Intel Front Panel I/O Connectivity Design Guide.

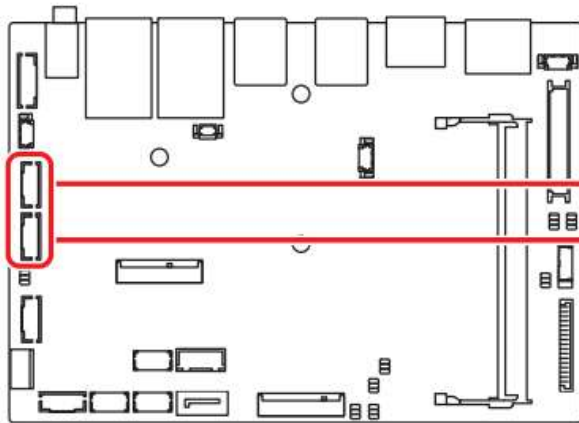
JFP1		1	HDD LED+	2	POWER LED
		3	HDD LED-	4	SUS LED
		5	GND	6	POWER SWITCH+
		7	RESET SWITCH+	8	POWER SWITCH-
		9	NC	10	No pin



JCOM1, JCOM2: COM Port Box Headers

This connector is a 16550A high speed communications port that sends/ receives 16 bytes FIFOs. You can attach a serial device to it.

 <p>JCOM1 JCOM2</p>	1	DCD#	2	SIN
	3	SOUT	4	DTR
	5	GND	6	DSR#
	7	RTS	8	CTS#
	9	VCC_COM (JCOM1) NC (JCOM2)	10	No pin



- JCOM1
 - Supports RS-232/ 422/ 485
 - With 0V/ 5V/ 12V
- JCOM2
 - Supports RS-232

RS232

PIN	SIGNAL	DESCRIPTION
1	NDCD	Data Carrier Detect
2	NSIN	Signal In
3	NSOUT	Signal Out
4	NDTR	Data Terminal Ready
5	GND	Signal Ground
6	NDSR	Data Set Ready
7	NRTS	Request To Send
8	NCTS	Clear To Send
9	VCC_COM/ NC	VCC_COM/ No Connection
10	No Pin	No Pin

RS422

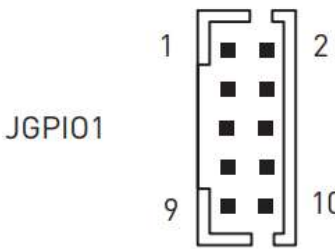
PIN	SIGNAL	DESCRIPTION
1	422 TXD-	Transmit Data, Negative
2	422 TXD+	Receive Data, Positive
3	422 RXD+	Transmit Data, Positive
4	422 RXD-	Receive Data, Negative
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection
10	NC	No Connection

RS485

PIN	SIGNAL	DESCRIPTION
1	TXD-	Transmit Data, Negative
2	TXD+	Transmit Data, Positive
3	NC	No Connection
4	NC	No Connection
5	GND	Signal Ground
6	NC	No Connection
7	NC	No Connection
8	NC	No Connection
9	NC	No Connection
10	NC	No Connection

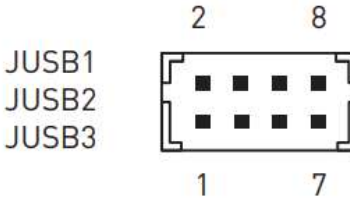
JGPIO1: GPIO (DIO) Box Header

This connector is provided for the General-Purpose Input/Output (GPIO) peripheral module.

	1	GND	2	VCC5
	3	GP00	4	GPIO
	5	GP01	6	GP11
	7	GP02	8	GP12
	9	GP03	10	GP13

JUSB1~3: USB 2.0 Box Headers

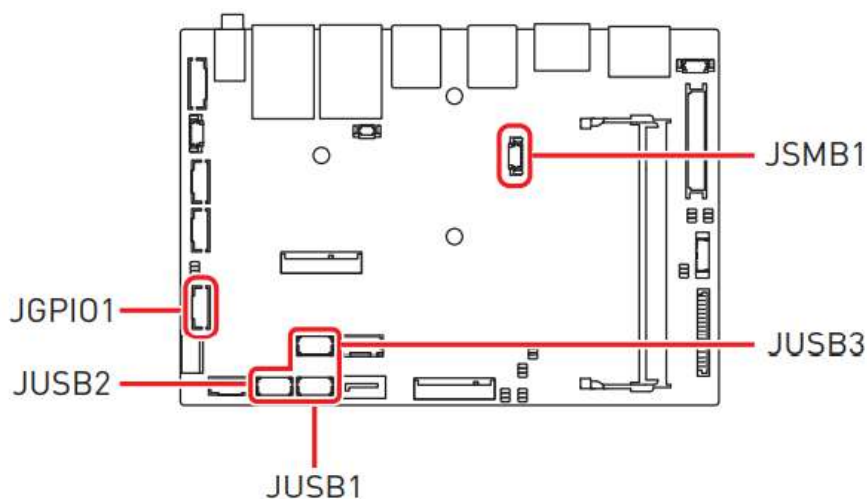
These connectors are ideal for connecting USB devices such as keyboard, mouse, or other USB-compatible devices.

	1	5V	2	GND
	3	USB_0-	4	USB_1+
	5	USB_0+	6	USB_1-
	7	GND	8	5V

JSMB1: SMBus Box Header

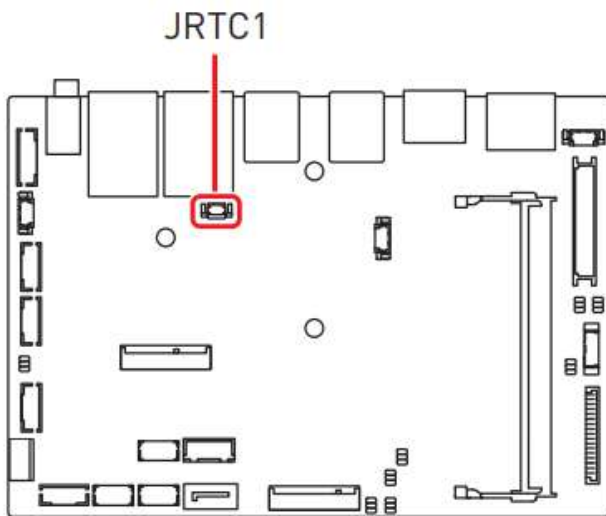
This connector, known as I2C, is for users to connect System Management Bus (SMBus) interface.

	1	5VSB	2	SMBCLK
	3	SMBDATA	4	GND



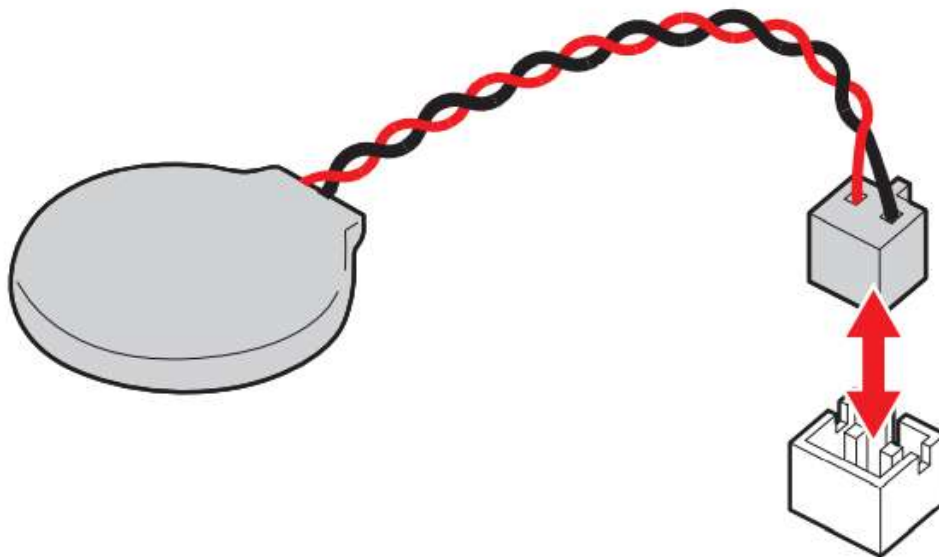
JRTC1: CMOS Battery Header

If the CMOS battery is out of charge, the time in the BIOS will be reset and the data of system configuration will be lost. In this case, you need to replace the CMOS battery.



Replacing CMOS battery

1. Unplug the battery wire from the JRTC1 connector and remove the battery.
2. Connect the new CR2032 battery with wire to the JRTC1 connector.



WARNING

KEEP OUT OF REACH OF CHILDREN

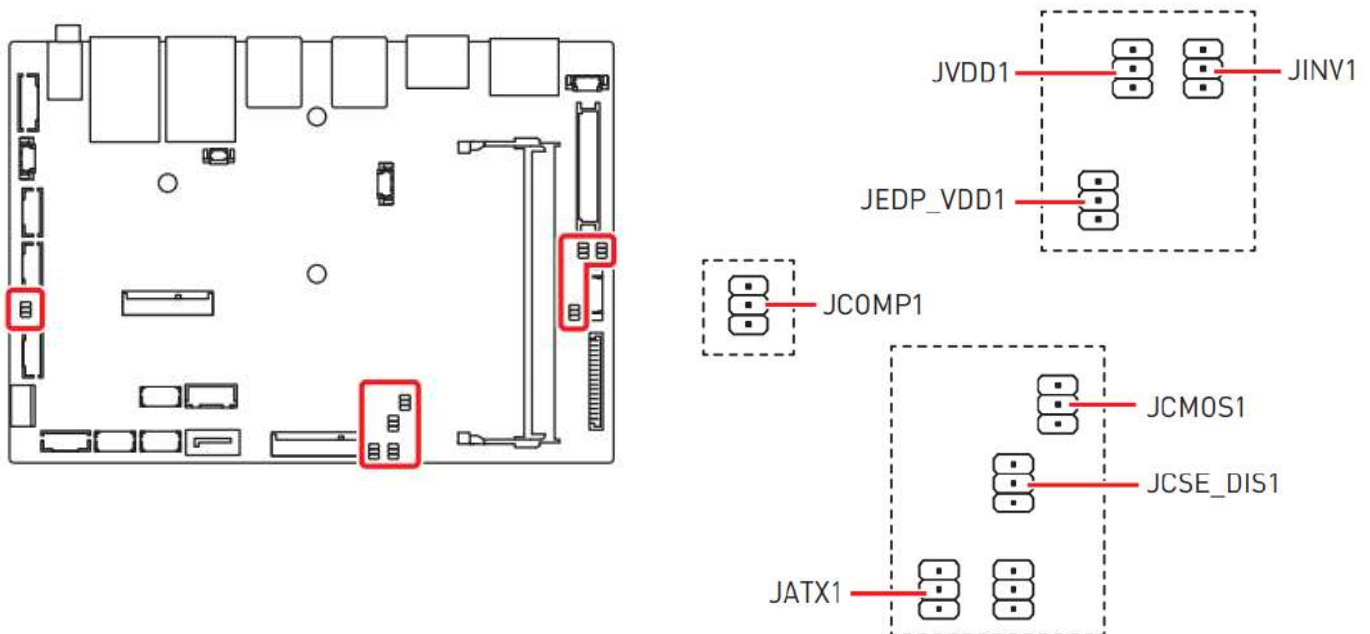
- Swallowing can lead to chemical burns, perforation of soft tissue, can death.
- Severe burns can occur within 2 hours of ingestion.
- If you think batteries might have been swallowed or placed inside any part of the body, seek immediate medical attention.

2.10 Jumpers





Important

Avoid adjusting jumpers when the system is on; it will damage the motherboard.



Jumper Name	Default Setting	Description
JCOMP1		COM Power Select Jumper
		1-2: 5V Power (Default) 2-3: 12V Power
JCMOS1		Clear CMOS Jumper
		1-2: Normal (Default) 2-3: Clear CMOS
JCSE_DIS1		CSE Jumper
		1-2: Normal (Default) 2-3: ME disable
JATX1		AT/ ATX Mode Select Jumper
		1-2: ATX (Default) 2-3: AT
JVDD1		LVDS Power Select Jumper
		1-2: 3V (Default) 2-3: 5V

Jumper Name	Default Setting	Description
JINV1	1 	LVDS Inverter Power Select Jumper
		1-2: 5V (Default) 2-3: 12V
JEDP_VDD1	1 	eDP Power Select Jumper
		1-2: 5V 2-3: 3V (Default)

Chapter 3

BIOS Setup

3.1 BIOS Setup

This chapter provides information on the BIOS Setup program and allows users to configure the system for optimal use.

Users may need to run the Setup program when:

- An error message appears on the screen at system startup and requests users to run SETUP.
- Users want to change the default settings for customized features.

Important

- *Please note that BIOS update assumes technician-level experience.*
- *As the system BIOS is under continuous update for better system performance, the illustrations in this chapter should be held for reference only.*

Entering Setup

Power on the computer and the system will start POST (Power On Self Test) process. When the message below appears on the screen, press or <F2> key to enter Setup, <F11> key to Boot Menu, <F12> key to PXE Boot .

Press or <F2> to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning it OFF and On or pressing the RESET button. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys.

Important

The items under each BIOS category described in this chapter are under continuous update for better system performance. Therefore, the description may be slightly different from the latest BIOS and should be held for reference only.

Control Keys	
<→> <←>	Select Screen
<↑> <↓>	Select Item
<Enter>	Select
+ -	Change Value
<F1>	General Help
<F7>	Previous Values
<F9>	Optimized Defaults
<F10>	Save & Reset*
<F12>	Screenshot capture
<K>	Scroll help area upwards
<M>	Scroll help area downwards

* When you press <F10>, a confirmation window appears and it provides the modification information. Select between **Yes** or **No** to confirm your choice.

Getting Help

Upon entering setup, you will see the Main Menu.

Main Menu

The main menu lists the setup functions you can make changes to. You can use the **arrow keys (↑↓)** to select the item. The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Sub-Menu

If you find a right pointer symbol appears to the left of certain fields that means a sub-menu can be launched from this field. A sub-menu contains additional options for a field parameter. You can use **arrow keys (↑↓)** to highlight the field and press <Enter> to call up the sub-menu. Then you can use the **control keys** to enter values and move from field to field within a sub-menu. If you want to return to the main menu, just press the <Esc>.

General Help <F1>

The BIOS setup program provides a General Help screen. You can call up this screen from any menu by simply pressing <F1>. The Help screen lists the appropriate keys to use and the possible selections for the highlighted item. Press <Esc> to exit the Help screen.

3.2 BIOS Item Contents

Item
The Menu Bar
Main <ul style="list-style-type: none"> • System Date • System Time • SATA Mode Selection
Advanced <ul style="list-style-type: none"> • Full Screen Logo Display • Bootup NumLock State • CPU Configuration <ul style="list-style-type: none"> ▶ Intel Virtualization Technology ▶ Active Efficient-cores ▶ Intel(R) SpeedStep(TM) ▶ Intel(R) Speed Shift Technology ▶ C States • Super IO Configuration <ul style="list-style-type: none"> ▶ Serial Port 1/ 2 ▶ FIFO Mode ▶ Shared IRQ Mode ▶ Watch Dog Timer • H/W Monitor (PC Health Status) <ul style="list-style-type: none"> ▶ Thermal Shutdown • Smart Fan Configuration <ul style="list-style-type: none"> ▶ SYSFAN • PCI/PCIE Device Configuration <ul style="list-style-type: none"> ▶ Audio Controller • Network Stack Configuration <ul style="list-style-type: none"> ▶ Network Stack • GPIO Group Configuration <ul style="list-style-type: none"> ▶ GPO0 ~ GPO3 • PCIE ASPM settings <ul style="list-style-type: none"> ▶ M2_B1/ M2_E1
Boot <ul style="list-style-type: none"> • Boot Option #1-2
Security <ul style="list-style-type: none"> • Administrator Password • User Password • PCH-FW Configuration <ul style="list-style-type: none"> ▶ ME State ▶ Comms Hub Support ▶ JHI Support ▶ Core BIOS Done Message ▶ Firmware Update Configuration

- ▶ PTT Configuration
- ▶ ME Debug Configuration
- ▶ Anti-Rollback SVN Configuration

- **Trusted Computing**
 - ▶ Security Device Support
 - ▶ SHA256/ SHA384 PCR Bank
 - ▶ Pending Operation
 - ▶ Platform Hierarchy, Storage Hierarchy, Endorsement Hierarchy
 - ▶ Physical Presence Spec Version
 - ▶ TPM 2.0 Interface Type
 - ▶ PH Randomization
 - ▶ Device Select
- **Serial Port Console Redirection**
 - ▶ Console Redirection
 - ▶ Console Redirection Settings (COM1)
- **Secure Boot**
 - ▶ Secure Boot
 - ▶ Secure Boot Mode
 - ▶ Restore Factory Keys
 - ▶ Reset to setup Mode
 - ▶ Key Management

Chipset

- DVMT Total Gfx Mem
- LVDS Panel Type
- Backlight Control

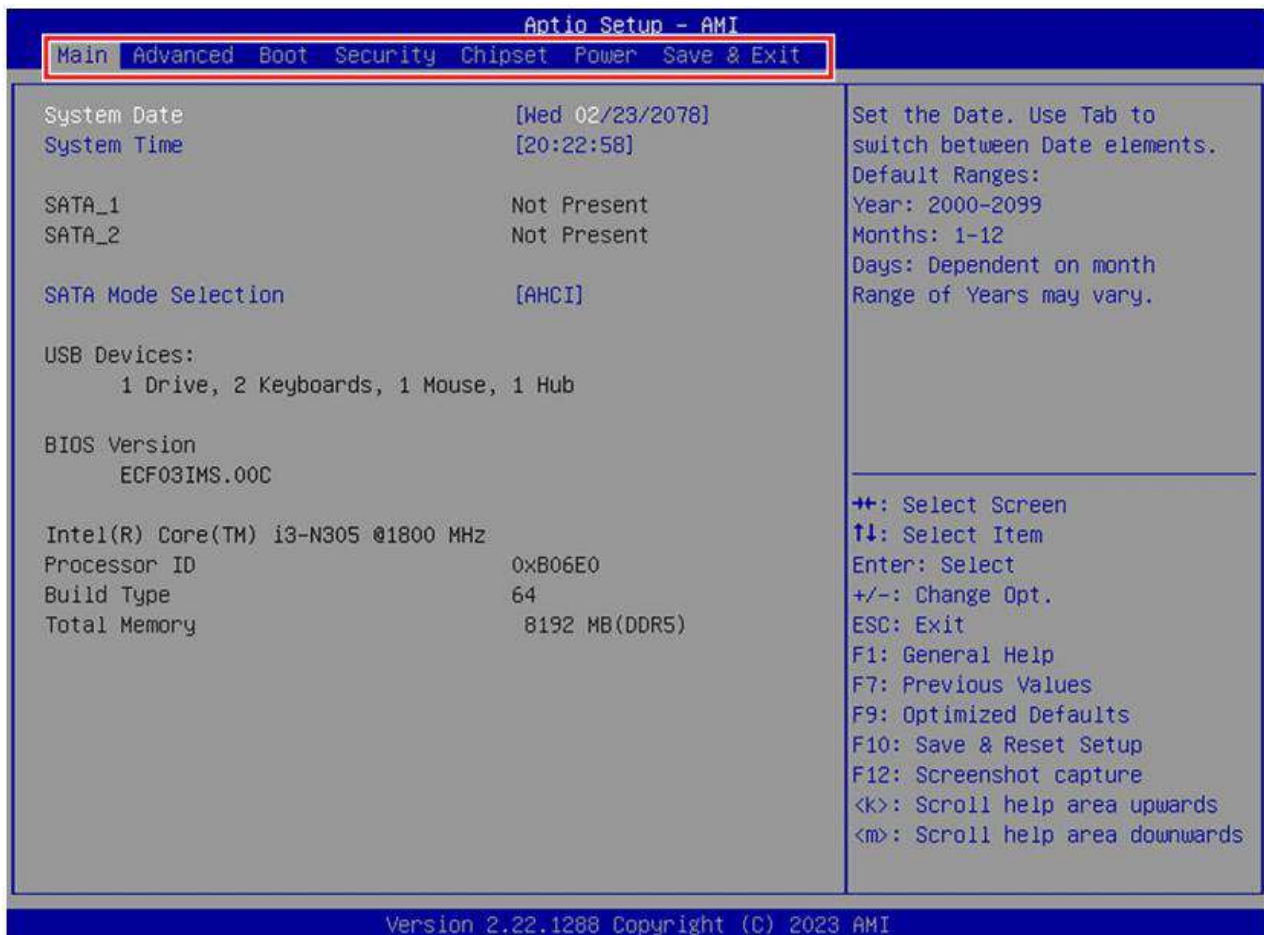
Power

- Restore AC Power Loss
- Deep Sleep Mode
- OnChip USB
- LAN/ PCIE PME
- RTC

Save & Exit

- Save Changes and Reset
- Discard Changes and Exit
- Discard Changes
- Load Optimized Defaults
- Save as User Defaults
- Restore User Defaults
- Launch EFI Shell from filesystem device

3.3 The Menu Bar



► Main

Use this menu for basic system configurations, such as time, date, etc.

► Advanced

Use this menu to set up the items of special enhanced features.

► Boot

Use this menu to specify the priority of boot devices.

► Security

Use this menu to set supervisor and user passwords.

► Chipset

This menu controls the advanced features of the on-board chipsets.

► Power

Use this menu to specify your settings for power management.

► Save & Exit

This menu allows you to load the BIOS default values or factory default settings into the BIOS and exit the BIOS setup utility with or without changes.

3.4 Main

The screenshot shows the BIOS Main menu with the following settings:

System Date	[Wed 02/23/2078]	Set the Date. Use Tab to switch between Date elements. Default Ranges: Year: 2000-2099 Months: 1-12 Days: Dependent on month Range of Years may vary.
System Time	[20:22:58]	
SATA_1	Not Present	
SATA_2	Not Present	
SATA Mode Selection	[AHCI]	
USB Devices:	1 Drive, 2 Keyboards, 1 Mouse, 1 Hub	
BIOS Version	ECF03IMS.00C	
Intel(R) Core(TM) i3-N305 @1800 MHz		
Processor ID	0x806E0	
Build Type	64	
Total Memory	8192 MB(DDR5)	

Legend:

- ↔: Select Screen
- ↑↓: Select Item
- Enter: Select
- +/-: Change Opt.
- ESC: Exit
- F1: General Help
- F7: Previous Values
- F9: Optimized Defaults
- F10: Save & Reset Setup
- F12: Screenshot capture
- <k>: Scroll help area upwards
- <m>: Scroll help area downwards

HDD Information

- **RAID (VMD) Disabled:** Display HDD information as plugging in status.
- **RAID (VMD) Enabled:** Display "Empty" only.
- *SATA_2 is for M.2 B key (SATA signal)

► System Date

This setting allows you to set the system date. Use <Tab> key to switch between date elements. Format: <Day> <Month> <Date> <Year>.

► System Time

This setting allows you to set the system time. Use <Tab> key to switch between time elements. Format: <Hour> <Minute> <Second>.

► SATA Mode Selection

This setting specifies SATA controller mode.

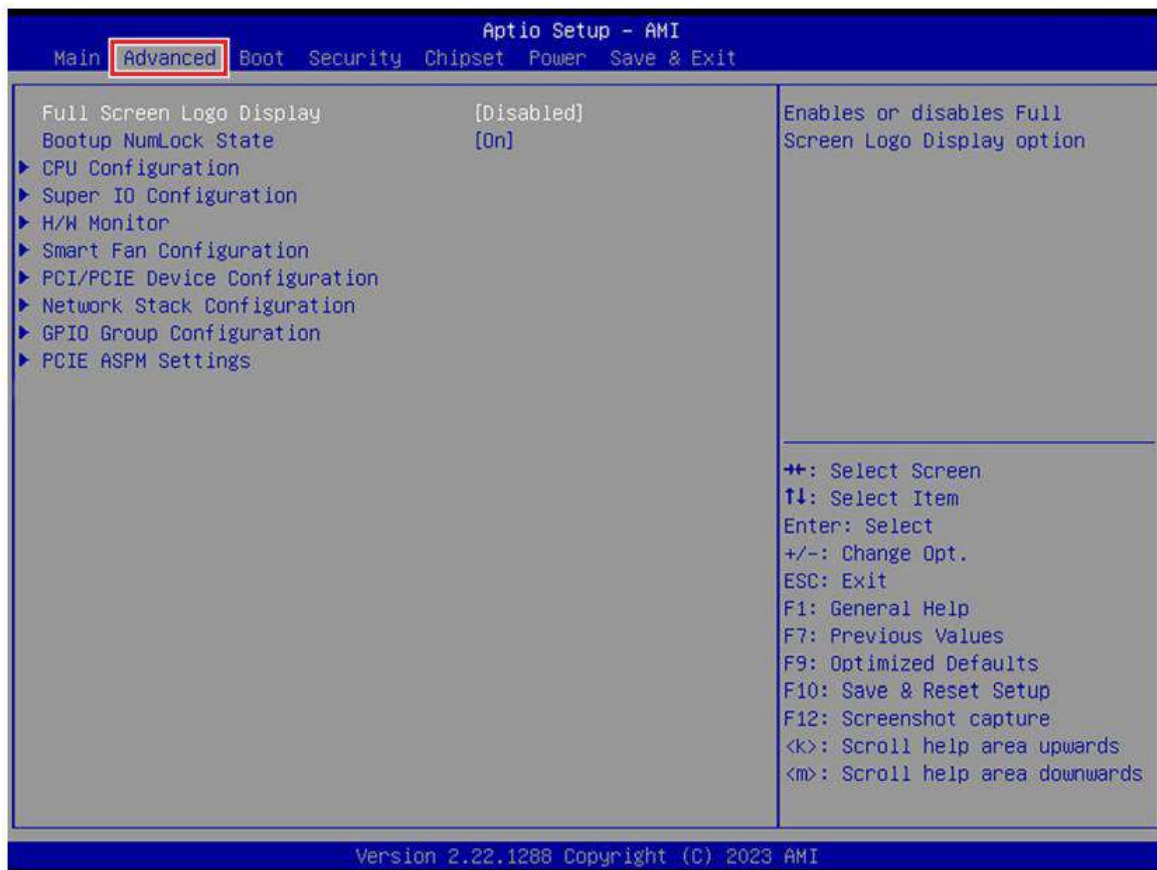
[AHCI]

AHCI (Advanced Host Controller Interface), is a technical standard for an interface that allows the software to communicate with Serial ATA (SATA) devices. It offers advanced SATA features such as Native Command Queuing (NCQ) and hot-plugging.

[RAID]

[RAID] RAID (Redundant Array of Independent Disks) is a virtual disk storage technology that combines multiple physical disks into one unit for data redundancy, performance improvement, or both.

3.5 Advanced



3.5.1 Full Screen Logo Display

This BIOS feature determines if the BIOS should hide the normal POST messages with the motherboard or system manufacturer's full-screen logo.

[Enabled]

BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.

[Disabled]

BIOS will display the normal POST messages, instead of the fullscreen logo.

Please note that enabling this BIOS feature often adds 2-3 seconds to the booting sequence. This delay ensures that the logo is displayed for a sufficient amount of time. Therefore, it is recommended to disable this BIOS feature for faster boot-up.

3.5.2 Bootup NumLock State

This setting is to set the state of the Num Lock key on the keyboard when the system is powered on.

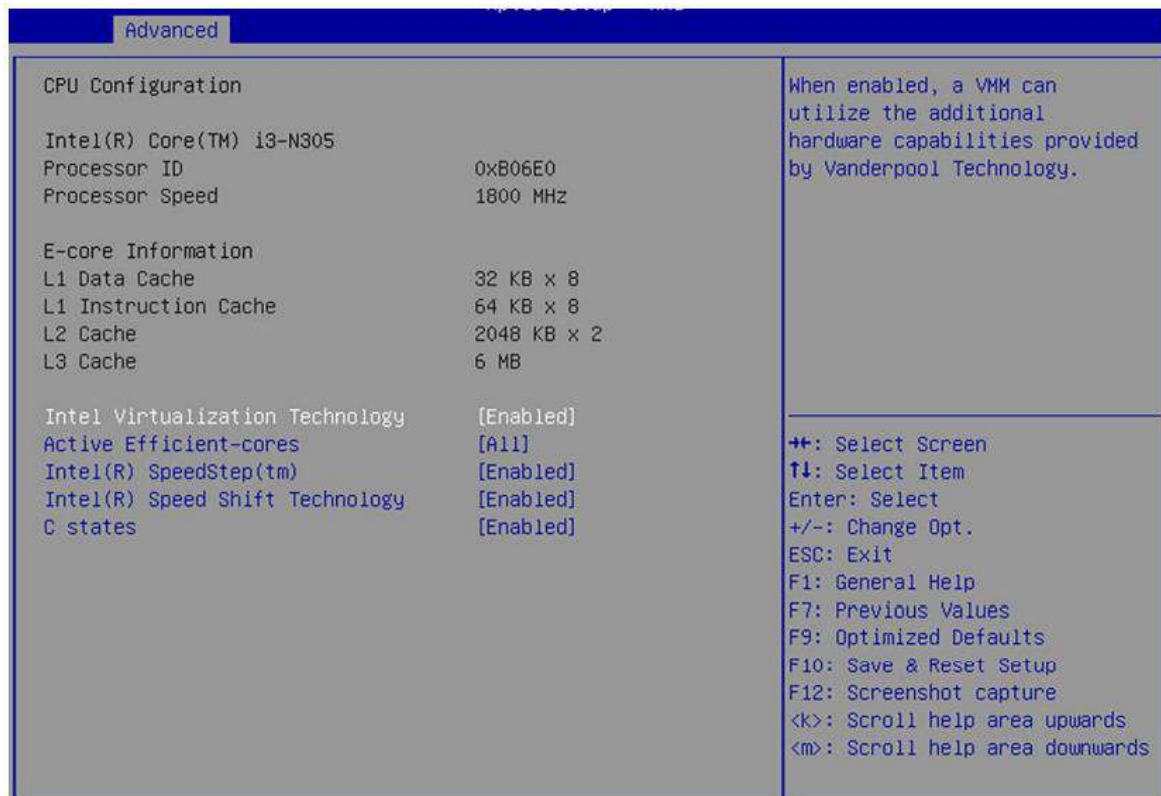
[On]

Turn on the Num Lock key when the system is powered on.

[Off]

Allow users to use the arrow keys on the numeric keypad.

3.5.3 CPU Configuration



► Intel Virtualization Technology

Enables or disables Intel Virtualization technology.

[Enabled]

Enables Intel Virtualization technology and allows a platform to run multiple operating systems in independent partitions. The system can function as multiple systems virtually.

[Disabled]

Disables this function.

► Active Efficient-cores

Select the number of active Efficient-cores (E-cores).

► Intel(R) SpeedStep(TM)

Enhanced Intel SpeedStep® Technology enables the OS to control and activate performance states (P-States) of the processor.

[Enabled]

When enabled, Intel SpeedStep® technology is activated. This technology allows the processor to manage its power consumption via performance state (P-State) transitions.

[Disabled]

Disables this function.

► Intel(R) Speed Shift Technology

Intel® Speed Shift Technology is an energy-efficient method that allows frequency control by hardware rather than the OS.

[Enabled]

When enabled, Intel® Speed Shift Technology is activated. The technology enables the management of processor power consumption via hardware performance state (P-State) transitions.

[Disabled]

Disable this function.

► C States

This setting controls the C-States (CPU Power states).

[Enabled]

Detects the idle state of system and reduce CPU power consumption accordingly.

[Disabled]

Disable this function.

3.5.4 Super IO Configuration



► Serial Port 1/ 2

This setting enables or disables the specified serial port.

» Change Settings

This setting is used to change the address & IRQ settings of the specified serial port.

» Mode Select

Select an operation mode for Serial Port 1/ 2.

► FIFO Mode

This setting controls the FIFO (First In First Out) data transfer mode.

► Shared IRQ Mode

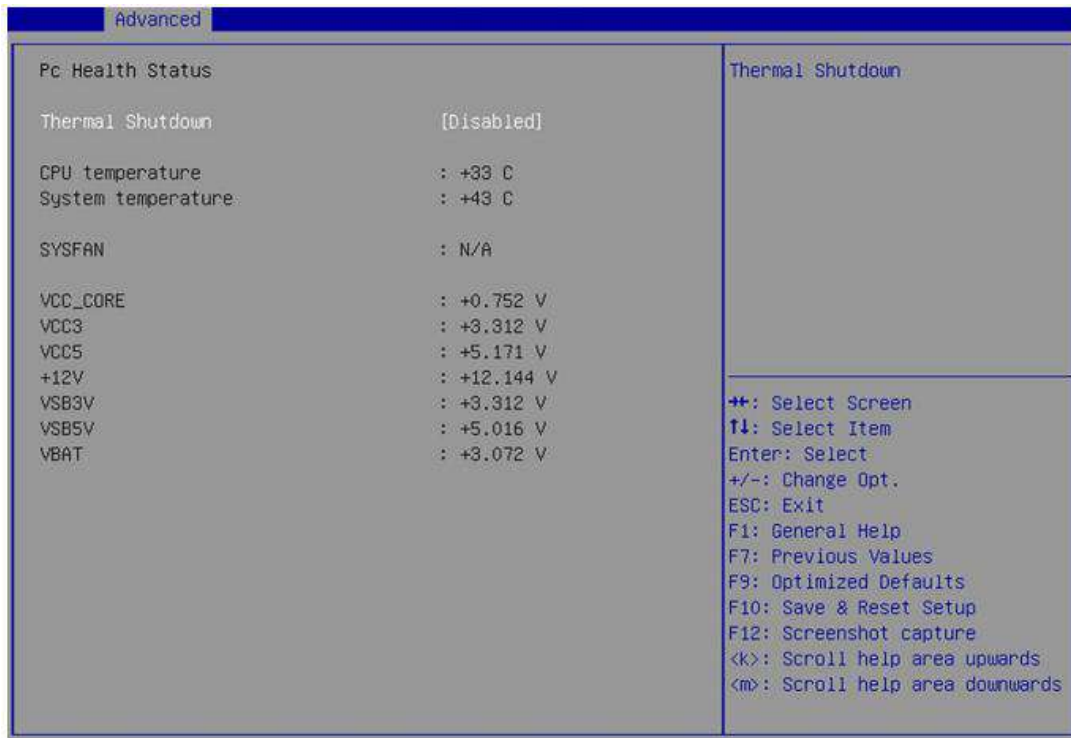
This setting provides the system with the ability to share interrupts among its serial ports.

► Watch Dog Timer

You can enable the system watchdog timer, a hardware timer that generates a reset when the software that it monitors does not respond as expected each time the watchdog polls it.

3.5.5 H/W Monitor (PC Health Status)

These items display the current status of all monitored hardware devices/components such as voltages, temperatures and all fans' speeds.



► Thermal Shutdown

This setting determines the behavior of the system when the CPU temperature reaches a predefined threshold.

[Enabled] Initiate an automatic shutdown of the system to protect from potential damage due to overheating.

[Disabled] Disable this function.

3.5.6 Smart Fan Configuration

These items display the current status of all monitored hardware devices/components such as voltages, temperatures and all fans' speeds.



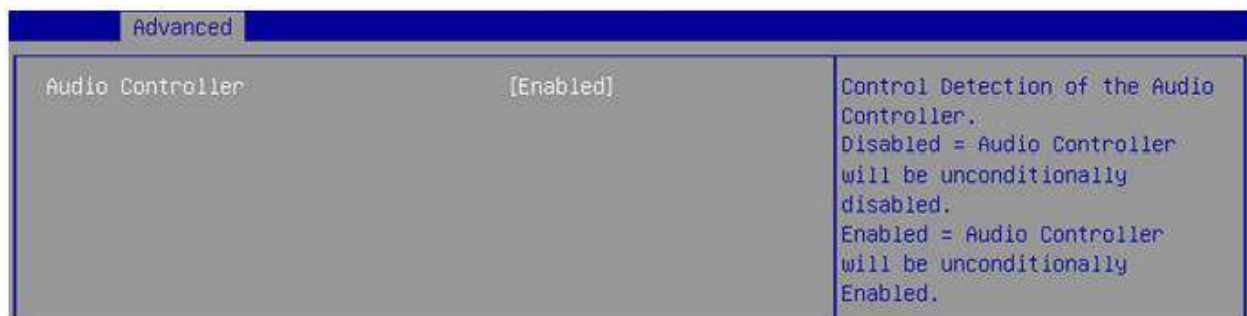
► SYSFAN

This setting enables or disables the Smart Fan function. Smart Fan is an excellent feature which will adjust the system fan speed automatically depending on the current system temperature, avoiding the overheating to damage your system. The following items will display when SYSFAN is enabled.

» Min. Speed (%)

The beginning speed of the System fan.

3.5.7 PCI/PCIE Device Configuration

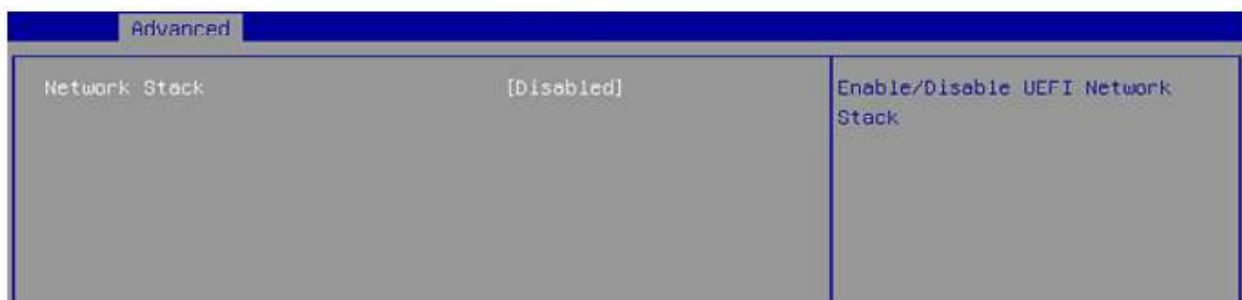


► Audio Controller

This setting enables or disables the detection of the onboard audio controller.

3.5.8 Network Stack Configuration

This menu provides Network Stack settings for users to enable network boot (PXE) from BIOS.



► Network Stack

This menu provides Network Stack settings for users to enable network boot (PXE) from BIOS. The following items will display when Network Stack is enabled.

» IPV4 PXE Support

Enables or disables IPv4 PXE boot support.

» IPV4 HTTP Support

Enables or disables Ipv4 HTTP Support.

» IPV6 PXE Support

Enables or disables Ipv6 PXE Support.

» IPV6 HTTP Support

Enables or disables Ipv6 HTTP Support.

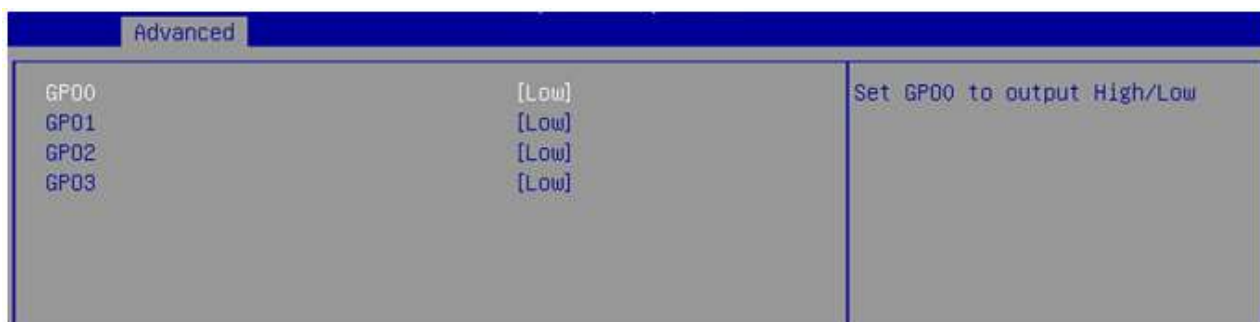
» PXE boot wait time

Use this option to specify the wait time to press the ESC key to abort the PXE boot. Press "+" or "-" on your keyboard to change the value. The default setting is 0.

» Media detect count

Use this option to specify the number of times media will be checked. Press "+" or "-" on your keyboard to change the value. The default setting is 1.

3.5.9 GPIO Group Configuration



► GPIO0 ~ GPIO3

These settings control the operation mode of the specified GPIO.

3.5.10 PCIE ASPM settings

This menu provide settings for PCIe ASPM (Active State Power Management) level for different installed devices.



► M2_B1/ M2_E1

Sets PCI Express ASPM (Active State Power Management) state for power saving.

[L0s]	initiate an automatic shutdown of the system to protect from potential damage due to overheating.
[L1]	Higher latency, lower power “standby” state (optional).
[L0sL1]	Activate both L0s and L1 support.
[Disabled]	Disable this function.

3.6 Boot



► Boot Option #1-2

This setting allows users to set the sequence of boot devices where BIOS attempts to load the disk operating system.

3.7 Security



3.7.1 Administrator Password


Administrator Password controls access to the BIOS Setup utility.

3.7.2 User Password

User Password controls access to the system at boot and to the BIOS Setup utility.

3.7.3 PCH-FW Configuration

This menu allows you to configure settings related to the PCH firmware.



The screenshot shows the BIOS Security menu with the following settings:

Setting	Value
ME Firmware Version	16.50.0.1146
ME Firmware Mode	Normal Mode
ME Firmware SKU	Consumer SKU
ME Firmware Status 1	0x90000255
ME Firmware Status 2	0x30850106
ME State	[Enabled]
Comms Hub Support	[Disabled]
JHI Support	[Disabled]
Core Bios Done Message	[Enabled]

Additional settings listed below:

- ▶ Firmware Update Configuration
- ▶ PTT Configuration
- ▶ ME Debug Configuration
- ▶ Anti-Rollback SVN Configuration

When Disabled ME will be put into ME Temporarily Disabled Mode.

Navigation keys:

- ↔: Select Screen
- ↑↓: Select Item
- Enter: Select
- +/-: Change Opt.
- ESC: Exit
- F10: Save and Exit

Firmware Information

ME Firmware Version	System Integrity Value
ME Firmware Mode	ME Firmware Status 1-2
ME Firmware SKU	

These settings show the firmware information of the Intel ME (Management Engine).

▶ ME State

This menu controls the Intel® Management Engine State (ME state) parameters, which provides various management and security capabilities. The following items will display when ME State is enabled.

▶ Comms Hub Support

Enables or disables the communications hub support.

▶ JHI Support

Enables or disables JHI Support. JHI stands for Intel® Dynamic Application Loader Host Interface Service (Intel® DAL HIS) and is the engineering name for this feature. Enabling JHI Support in the BIOS settings allows the system to utilize this interface for communication between trusted applications and hostbased applications.

▶ Core BIOS Done Message

Enables or disables Core BIOS Done Message sent to ME.

► Firmware Update Configuration

This menu will display when ME State is enabled.

Security		
Me FW Image Re-Flash	[Disabled]	Enable/Disable Me FW Image Re-Flash function.
Local FW Update	[Enabled]	

» ME FW Image Re-Flash

Enables or disables the ME Firmware Image Re-flashing.

» Local FW Update

Enables or disables the capability to perform a firmware update of the ME locally.

► PTT Configuration

Intel® Platform Trust Technology (PTT) is a platform functionality for credential storage and key management used by Microsoft Windows. This menu will display when ME State is enabled.

Security		
PTT Capability / State	1 / 0	Selects TPM device: PTT or dTPM. PTT - Enables PTT in SkuMgr dTPM 1.2 - Disables PTT in SkuMgr Warning ! PTT/dTPM will be disabled and all data saved on it will be lost.
TPM Device Selection	[dTPM]	

» TPM Device Selection

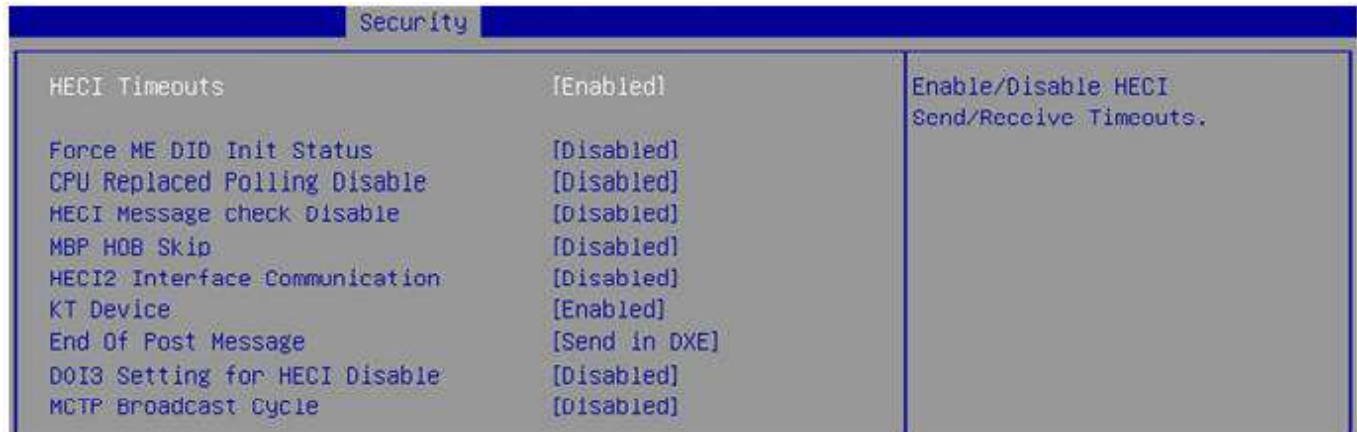
Select TPM (Trusted Platform Module) devices from PTT or dTPM (Discrete TPM).

[PTT] Enables PTT in SkuMgr.

[dTPM] Disables PTT in SkuMgr. Warning! PTT/ dTPM will be disabled and all data saved on it will be lost.

► ME Debug Configuration

This menu allows you to configure debug-related options for the Intel® Management Engine (ME). This menu will display when ME State is enabled.



» HECI Timeouts

This setting enables/ disables the HECI (Host Embedded Controller Interface) send/ receive timeouts.

» Force ME DID Init Status

Forces the ME Device ID (DID) initialization status value.

» CPU Replaced Polling Disable

Setting this option disables the CPU replacement polling loop.

» HECI Message Check Disable

This setting disables message check for BIOS boot path when sending messages.

» MBP HOB Skip

Setting this option will skip ME's Memory-Based Protection (MBP) HOB region.

» HECI2 Interface Communication

This setting Adds/ Removes HECI2 device from PCI space.

» KT Device

Enables or disables Key Transfer (KT) Device.

» End of Post Message

Enables or disables End of Post Message sent to ME.

» DOI3 Setting for HECI Disable

Setting this option disables setting DOI3 bit for all HECI devices.

» MCTP Broadcast Cycle

Enables or disables Management Component Transport Protocol (MCTP) Broadcast Cycle.

► Anti-Rollback SVN Configuration

Security		
Minimal Allowed Anti-Rollback SVN	0	When enabled, hardware-enforced Anti-Rollback mechanism is automatically activated: once ME FW was successfully run on a platform, FW with lower ARB-SVN will be blocked from execution
Executing Anti-Rollback SVN	1	
Automatic HW-Enforced Anti-Rollback SVN	[Disabled]	
Set HW-Enforced Anti-Rollback for Current SVN	[Disabled]	

» Automatic HW-Enforced Anti-Rollback SVN

Setting this item enabled will automatically activate the hardware-enforced antirollback protection based on the Secure Version Number (SVN). Once enabled, the hardware will enforce that only firmware updates with an SVN equal to or higher than the current SVN can be installed.

» Set HW-Enforced Anti-Rollback for Current SVN

Enable HW ERB mechanism for current ARB SVN value. FW with lower ARB-SVN will be blocked from execution. The value will be restored to disable after the command is sent. This item will display when Automatic HW-Enforced AntiRollback SVN is enabled.

3.7.4 Trusted Computing

Security		
TPM 2.0 Device Found		Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Firmware Version:	15.22	
Vendor:	IFX	
Security Device Support	[Enable]	
Active PCR banks	SHA256	
Available PCR banks	SHA256,SHA384	
SHA256 PCR Bank	[Enabled]	
SHA384 PCR Bank	[Disabled]	
Pending operation	[None]	
Platform Hierarchy	[Enabled]	
Storage Hierarchy	[Enabled]	++: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. ESC: Exit F1: General Help F7: Previous Values F9: Optimized Defaults F10: Save & Reset Setup F12: Screenshot capture <k>: Scroll help area upwards <m>: Scroll help area downwards
Endorsement Hierarchy	[Enabled]	
Physical Presence Spec Version	[1.3]	
TPM 2.0 InterfaceType	[TIS]	
PH Randomization	[Enabled]	
Device Select	[TPM 2.0]	

► Security Device Support

This item enables or disables BIOS support for security device. When set to [Disable], the OS will not show security device.

► SHA256/ SHA384 PCR Bank

These settings enables or disables the SHA256 PCR Bank and SHA384 PCR Bank.

► Pending Operation

When Security Device Support is set to [Enable], Pending Operation will appear.

It is advised that users should routinely back up their TPM secured data.

[TPM Clear] Clear all data secured by TPM.

[None] Discard the selection.

▶ Platform Hierarchy, Storage Hierarchy, Endorsement Hierarchy

These settings enables or disables the Platform Hierarchy, Storage Hierarchy and Endorsement Hierarchy.

▶ Physical Presence Spec Version

This settings show the Physical Presence Spec Version.

▶ TPM 2.0 Interface Type

This setting shows the TPM 2.0 Interface Type.

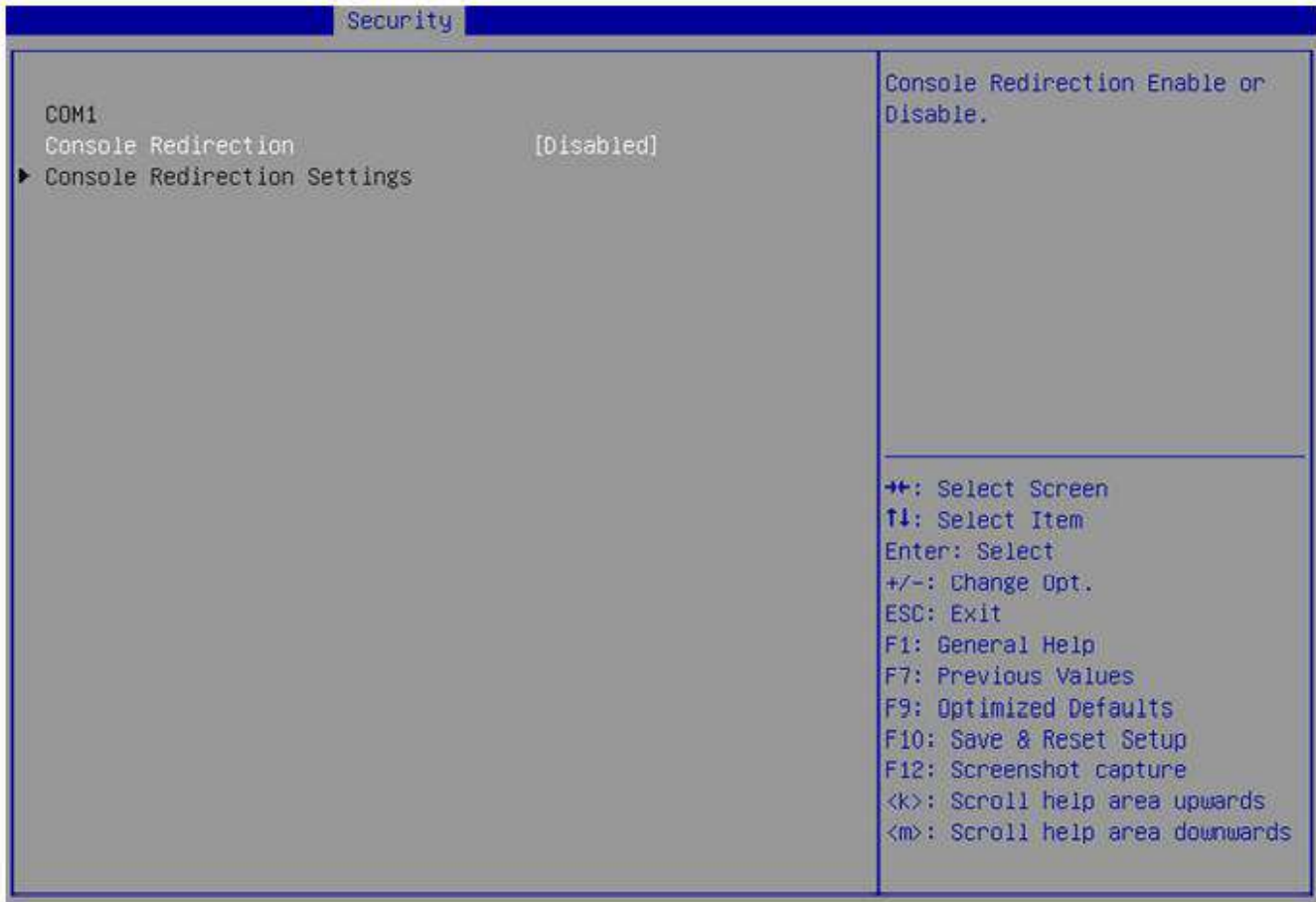
▶ PH Randomization

Enables or disables Platform Hierarchy (PH) Randomization.

▶ Device Select

Select your TPM device through this setting.

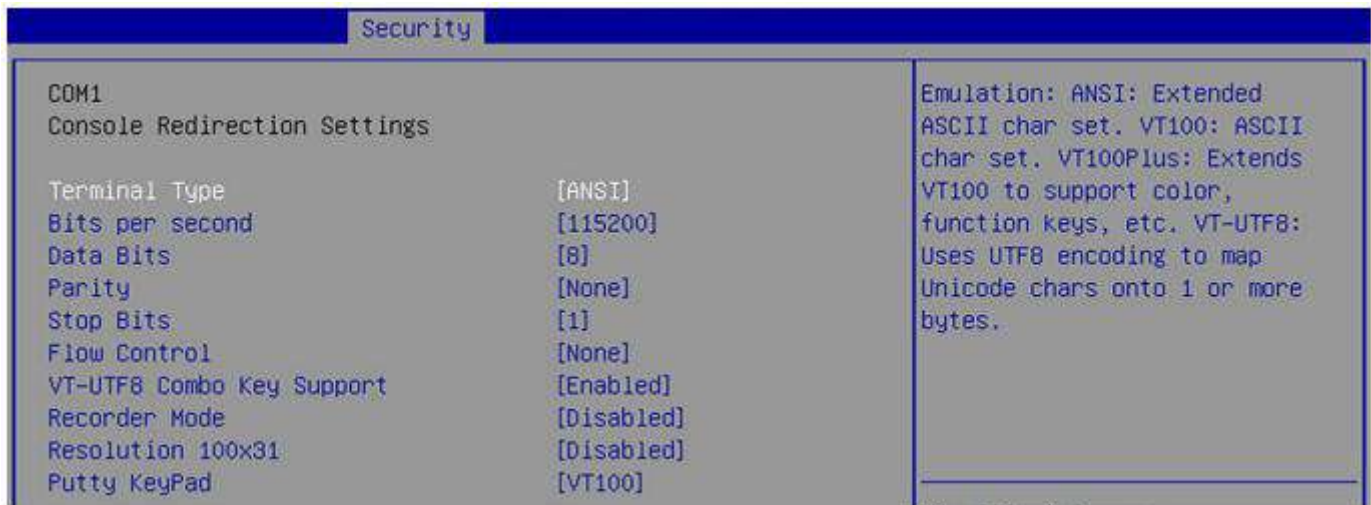
3.7.5 Serial Port Console Redirection



▶ Console Redirection

Console Redirection operates in host systems that do not have a monitor and keyboard attached. This setting enables or disables the operation of console redirection. When set to [Enabled], BIOS redirects and sends all contents that should be displayed on the screen to the serial COM port for display on the terminal screen. Besides, all data received from the serial port is interpreted as keystrokes from a local keyboard.

► Console Redirection Settings (COM1)



» Terminal Type

To operate the system's console redirection, you need a terminal supporting ANSI terminal protocol and a RS-232 null modem cable connected between the host system and terminal(s). You can select emulation for the terminal from this setting.

[ANSI]	Extended ASCII character set.
[VT100]	ASCII character set.
[VT100Plus]	Extends VT100 to support color, function keys, etc.
[VT-UTF8]	Uses UTF8 encoding to map Unicode characters onto one or more bytes.

» Bits per second, Data Bits, Parity, Stop Bits

These setting specifies the transfer rate (bits per second, data bits, parity, stop bits) of Console Redirection.

» Flow Control

Flow control is the process of managing the rate of data transmission between two nodes. It's the process of adjusting the flow of data from one device to another to ensure that the receiving device can handle all of the incoming data. This is particularly important where the sending device is capable of sending data much faster than the receiving device can receive it.

» VT-UTF8 Combo Key Support

This setting enables or disables the VT-UTF8 combination key support for ANSI/VT100 terminals.

» Recorder Mode, Resolution 100x31

These settings enables or disables the recorder mode and the resolution 100x31.

» Putty KeyPad

PuTTY is a terminal emulator for Windows. This setting controls the numeric keypad for use in PuTTY.

3.7.6 Secure Boot



▶ Secure Boot

Secure Boot function can be enabled only when the Platform Key (PK) is enrolled and running accordingly.

▶ Secure Boot Mode

[Standard]

The system will automatically load the secure keys from BIOS.

[Custom]

Allows user to configure the secure boot settings and manually load the secure keys.

▶ Restore Factory Keys

Allows you to restore all factory default keys. The settings will be applied after reboot or at the next reboot. This item appears when "Secure Boot Mode" sets to [Custom].

▶ Reset to setup Mode

Allows you to delete all the Secure Boot keys (PK,KEK,db,dbt,dbx). The settings will be applied after reboot or at the next reboot. This item appears when "Secure Boot Mode" sets to [Custom].

► Key Management

Press Enter key to enter the sub-menu. Manage the secure boot keys. This item appears when “Secure Boot Mode” sets to [Custom].



» Platform Key (PK):

The Platform Key (PK) can protect the firmware from any un-authenticated changes. The system will verify the PK before your system enters the OS. Platform Key (PK) is used for updating KEK.

» Set New Key

Sets a new PK to your system.

» Delete Key

Deletes the PK from your system.

» Key Exchange Keys (KEK):

Key Exchange Key (KEK) is used for updating DB or DBX.

» Set New Key

Sets a new KEK to your system.

» Append Key

Loads an additional KEK from storage devices to your system.

» Delete Key

Deletes the KEK from your system.

» Authorized Signatures (db) :

Authorized Signatures (db) lists the signatures that can be loaded.

» Set New Key

Sets a new db to your system.

» Append Key

Loads an additional db from storage devices to your system.

» Delete Key

Deletes the db from your system.

» Forbidden Signatures (dbx):

Forbidden Signatures (dbx) lists the forbidden signatures that are not trusted and cannot be loaded.

» Set New Key

Sets a new dbx to your system.

» Append Key

Loads an additional dbx from storage devices to your system.

» Delete Key

Deletes the dbx from your system.

» Authorized TimeStamps (dbt):

Authorized TimeStamps (dbt) lists the authentication signatures with authorization time stamps.

» Set New Key

Sets a new DBT to your system.

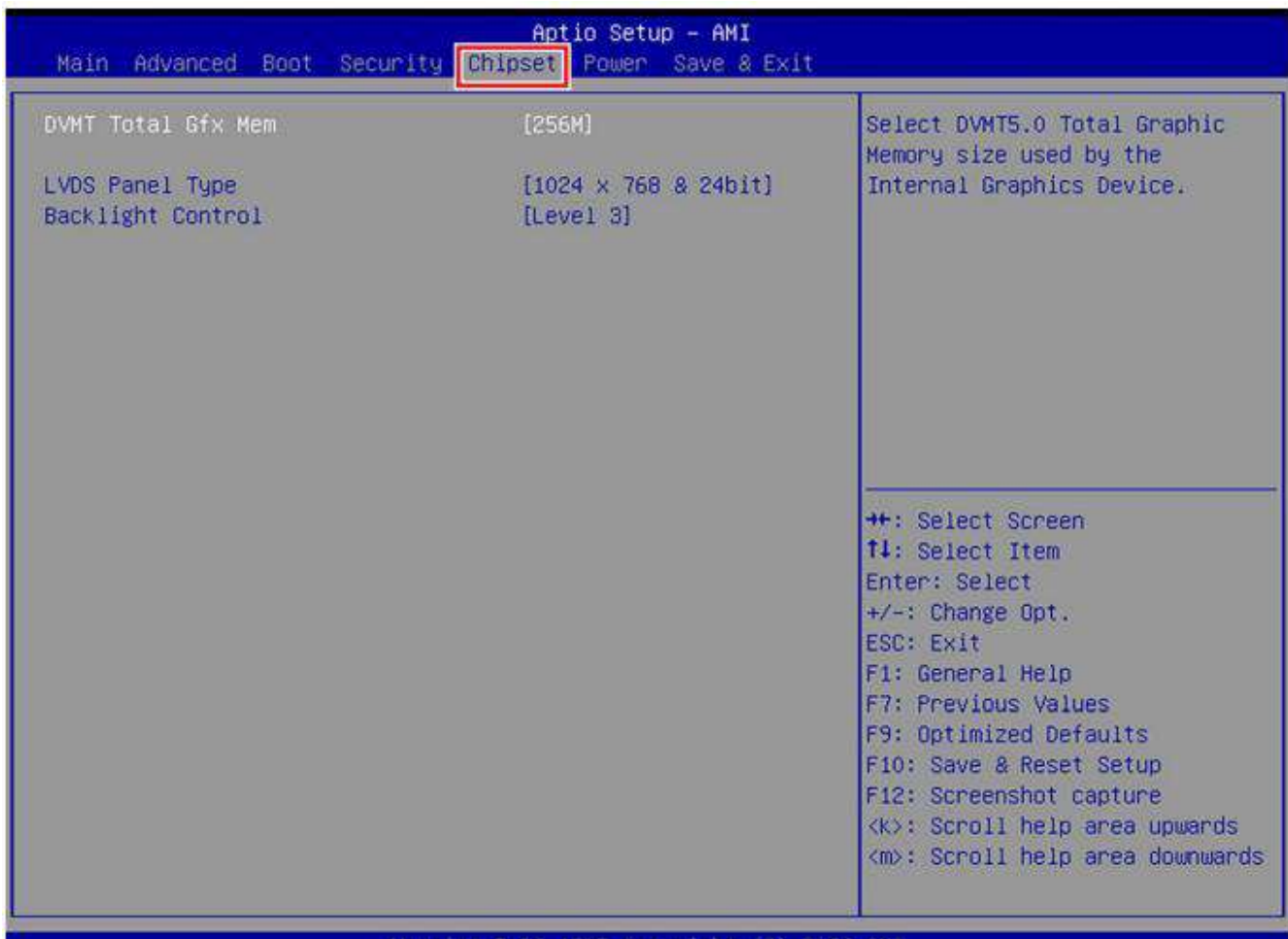
» Append Key

Loads an additional DBT from storage devices to your system.

» OsRecovery Singnatures (dbr):

Lists the available signatures for OS recovery.

3.8 Chipset



► DVMT Total Gfx Mem

This setting specifies the total graphics memory size for Dynamic Video Memory Technology (DVMT).

► LVDS Panel Type

This setting specifies the LVDS Panel's resolution and distribution formats.

► Backlight Control

This setting controls the intensity of the LED's backlight output. When lighting conditions are brighter, set it high for a clearer image and low when it is darker.

LED's backlight output	
[Level 1]	20%
[Level 2]	40%
[Level 3]	60%
[Level 4]	80%
[Level 5]	100%

3.9 Power



► Restore AC Power Loss

This setting specifies whether your system will reboot after a power failure or interrupt occurs. Available settings are:

- [Power Off]** Leaves the computer in the power off state.
- [Power On]** Leaves the computer in the power on state.
- [Last State]** Restores the system to the previous status before power failure or interrupt occurred.

► Deep Sleep Mode

The setting enables or disables the Deep S5 power saving mode. S5 is almost the same as G3 Mechanical Off, except that the PSU still supplies power, at a minimum, to the power button to allow return to S0. A full reboot is required. No previous content is retained. Other components may remain powered so the computer can “wake” on input from the keyboard, clock, modem, LAN, or USB device.

► OnChip USB

The item allows the activity of the OnChip USB device to wake up the system from S4/ S5 sleep state.

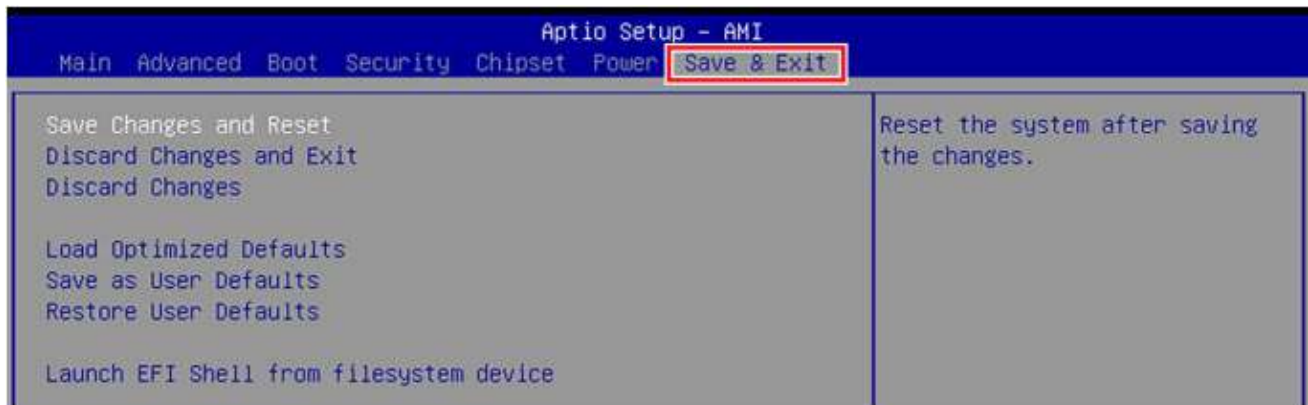
► LAN/ PCIE PME

Enables or disables the system to be awakened from the power saving modes when activity or input signal of Intel LAN device and onboard PCIE PME is detected.

► RTC

When [Enabled], you can set the date and time at which the RTC (real-time clock) alarm awakens the system from suspend mode.

3.10 Save & Exit



► Save Changes and Reset

Save changes to CMOS and reset the system.

► Discard Changes and Exit

Abandon all changes and exit the Setup Utility.

► Discard Changes

Abandon all changes.

► Load Optimized Defaults

Use this menu to load the default values set by the motherboard manufacturer specifically for optimal performance of the motherboard.

► Save as User Defaults

Save changes as the user's default profile.

► Restore User Defaults

Restore the user's default profile.

► Launch EFI Shell from filesystem device

This setting helps to launch the EFI Shell application from one of the available file system devices.

Appendix

GPIO & WDT

This appendix provides the sample codes of WDT (Watch Dog Timer) and GPIO (General Purpose Input/ Output).

GPIO WDT BKL SMBus Access Programmin

This chapter provides GPIO (General Purpose Input/ Output), WDT (Watch Dog Timer), LVDS Backlight and SMBus Access programming guide.

Abstract

In this section, code examples based on C programming language provided for customer interest. Inportb, Outportb, Inportl and Outportl are basic functions used for access IO ports and defined as following.

Inportb: Read a single 8-bit I/O port.

Outportb: Write a single byte to an 8-bit port.

Inportl: Reads a single 32-bit I/O port.

Outportl: Write a single long to a 32-bit port.

General Purpose IO

1. General Purposed IO – GPIO/DIO

The GPIO port configuration addresses are listed in the following table:

Name	IO Port	IO address	Name	IO Port	IO address
N_GPIO0	0xA10	Bit 0	N_GPO0	0xA10	Bit 4
N_GPIO1	0xA10	Bit 1	N_GPO1	0xA10	Bit 5
N_GPIO2	0xA10	Bit 2	N_GPO2	0xA10	Bit 6
N_GPIO3	0xA10	Bit 3	N_GPO3	0xA10	Bit 7

1.1 Set output value of GPO

1. Read the value from GPO port.
2. Set the value of GPO address.
3. Write the value back to GPO port.

Example: Set N_GPO0 output “high”

```
val = Inportb (0xA10); // Read value from N_GPO0 port.
val = val | (1<<4); // Set N_GPO0 address (bit 4) to 1 (output “high” ).
Outportb (0xA10, val); // Write back to N_GPO0 port.
```

Example: Set N_GPO1 output “low”

```
val = Inportb (0xA10); // Read value from N_GPO1 port.
val = val & (~(1<<5)); // Set N_GPO1 address (bit 5) to 0 (output “low” ).
Outportb (0xA10, val); // Write back to N_GPO1 port.
```

1.2 Read input value from GPI

1. Read the value from GPI port.
2. Get the value of GPI address.

Example: Get N_GPI2 input value.

```
val = Inportb (0xA10); // Read value from N_GPI2 port.
val = val & (1<<2); // Read N_GPI2 address (bit 2).
if (val) printf (“Input of N_GPI2 is High”);
else printf (“Input of N_GPI2 is Low”);
```

Watchdog Timer

2. Watchdog Timer – WDT

The base address (WDT_BASE) of WDT configuration registers is 0xA10.

2.1 Set WDT Time Unit

```
val = Inportb (WDT_BASE + 0x05);    // Read current WDT setting
val = val | 0x08;                    // minute mode. val = val & 0xF7 if second mode
Outportb (WDT_BASE + 0x05, val);    // Write back WDT setting
```

2.2 Set WDT Time

```
Outportb (WDT_BASE + 0x06, Time);   // Write WDT time, value 1 to 255.
```

2.3 Enable WDT

```
val = Inportb (WDT_BASE + 0x0A);    // Read current WDT_PME setting
val = val | 0x01;                    // Enable WDT OUT: WDOUT_EN (bit 0) set to 1.
Outportb (WDT_BASE + 0x0A, val);    // Write back WDT setting.
val = Inportb (WDT_BASE + 0x05);    // Read current WDT setting
val = val | 0x20;                    // Enable WDT by set WD_EN (bit 5) to 1.
Outportb (WDT_BASE + 0x05, val);    // Write back WDT setting.
```

2.4 Disable WDT

```
val = Inportb (WDT_BASE + 0x05);    // Read current WDT setting
val = val & 0xDF;                    // Disable WDT by set WD_EN (bit 5) to 0.
Outportb (WDT_BASE + 0x05, val);    // Write back WDT setting.
```

2.5 Check WDT Reset Flag

If the system has been reset by WDT function, this flag will set to 1.

```
val = Inportb (WDT_BASE + 0x05);    // Read current WDT setting.
val = val & 0x40;                    // Check WDTMOUT_STS (bit 6).
if (val) printf ("timeout event occurred");
else printf ("timeout event not occurred");
```

2.6 Clear WDT Reset Flag

```
val = Inportb (WDT_BASE + 0x05);    // Read current WDT setting
val = val | 0x40;                    // Set 1 to WDTMOUT_STS (bit 6);
Outportb (WDT_BASE + 0x05, val);    // Write back WDT setting
```

LVDS Backlight Control

3. LVDS Backlight Control – BKL

The controller support LVDS backlight level control from 0(0%) to 255(100%), the default backlight level is 100%. It must be controlled by SMBus access. The details of SMBus access (SMBus_ReadByte, SMBus_WriteByte) are provided in this document.

3.1 Set the Level of LVDS Backlight

1. Write 0x0D into address 0x00 on SMBus device 0x42.
2. Write desired backlight level from 0(0%) to 255(100%) into address 0x35 on SMBus device 0x42.

Example 3: Set LVDS backlight level to “100%”

```
SMBus_WriteByte (0x42, 0x00, 0x0D)
```

```
SMBus_WriteByte (0x42, 0x35, 0xFF)
```

3.2 Read the Level of LVDS Backlight

4. Write 0x0D into address 0x00 on SMBus device 0x42.
5. Read current backlight level from address 0x35 on SMBus device 0x42.

Example 4: Get LVDS backlight level

```
SMBus_WriteByte(0x42, 0x00, 0x0D);
```

```
BKL_Value = SMBus_ReadByte(0x42, 0x35);
```


SMBus Access

4. SMBus Access

The base address of SMBus must know before access. The relevant bus and device information are as following.

```
#define IO_SC          0xCF8
#define IO_DA          0xCFC
#define PCIBASEADDRESS 0x80000000
#define PCI_BUS_NUM    0
#define PCI_DEV_NUM    31
#define PCI_FUN_NUM    4
```

4.1 Get SMBus Base Address

```
int SMBUS_BASE;
int DATA_ADDR = PCIBASEADDRESS + (PCI_BUS_NUM<<16) +
                 (PCI_DEV_NUM<<11) +
                 (PCI_FUN_NUM<<8);
```

```
Outportl (DATA_ADDR + 0x20, IO_SC);
SMBUS_BASE = Inportl (IO_DA) & 0xfffff0;
```

4.2 SMBus_ReadByte (char DEVID, char offset)

Read the value of OFFSET from SMBus device DEVID.

```
Outportb (LOWORD (SMBUS_BASE), 0xFE);
Outportb (LOWORD (SMBUS_BASE) + 0x04, DEVID + 1); //out Base + 04, (DEVID + 1)
Outportb (LOWORD (SMBUS_BASE) + 0x03, OFFSET); //out Base + 03, OFFSET
Outportb (LOWORD (SMBUS_BASE) + 0x02, 0x48); //out Base + 02, 48H
mdelay (20); //delay 20ms to let data ready
while ((Inportl (SMBUS_BASE) & 0x01) != 0); //wait SMBus ready
SMB_DATA = Inportb (LOWORD (SMBUS_BASE) + 0x05); //input Base + 05
```

4.3 SMBus_WriteByte (char DEVID, char offset, char DATA)

Write DATA to OFFSET on SMBus device DEVID.

```
Outportb (LOWORD (SMBUS_BASE), 0xFE);
Outportb (LOWORD (SMBUS_BASE) + 0x04, DEVID); //out Base + 04, (DEVID)
Outportb (LOWORD (SMBUS_BASE) + 0x03, OFFSET); //out Base + 03, OFFSET
Outportb (LOWORD (SMBUS_BASE) + 0x05, DATA); //out Base + 05, DATA
Outportb (LOWORD (SMBUS_BASE) + 0x02, 0x48); //out Base + 02, 48H
mdelay (20); //wait 20m
```

