

EHL253

4" SBC
User's Manual

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Trademarks

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FCC and DOC Statement on Class B

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

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

Notice:

1. The changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.
2. Shielded interface cables must be used in order to comply with the emission limits.

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About this Manual

This manual can be downloaded from the website.

The manual is subject to change and update without notice, and may be based on editions that do not resemble your actual products. Please visit our website or contact our sales representatives for the latest editions.

Warranty

1. Warranty does not cover damages or failures that occur from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.
2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.
3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.
4. We will not be liable for any indirect, special, incidental or consequential damages to the product that has been modified or altered.

Static Electricity Precautions

It is quite easy to inadvertently damage your PC, system board, components or devices even before installing them in your system unit. Static electrical discharge can damage computer components without causing any signs of physical damage. You must take extra care in handling them to ensure against electrostatic build-up.

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.
2. Wear an antistatic wrist strap.
3. Do all preparation work on a static-free surface.
4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.
5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.



Important:

Electrostatic discharge (ESD) can damage your processor, disk drive and other components. Perform the upgrade instruction procedures described at an ESD workstation only. If such a station is not available, you can provide some ESD protection by wearing an antistatic wrist strap and attaching it to a metal part of the system chassis. If a wrist strap is unavailable, establish and maintain contact with the system chassis throughout any procedures requiring ESD protection.

Safety Measures

- To avoid damage to the system, use the correct AC input voltage range.
- To reduce the risk of electric shock, unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

About the Package

The package contains the following items. If any of these items are missing or damaged, please contact your dealer or sales representative for assistance.

- 1 EHL253 board
- 1 COM port cable
- 1 SATA data with 4pin power cable
- 1 Heat sink
- 1 VGA cable
- 1 DC cable

The board and accessories in the package may not come similar to the information listed above. This may differ in accordance with the sales region or models in which it was sold. For more information about the standard package in your region, please contact your dealer or sales representative.

Before Using the System Board

When installing the system board in a new system, you will need at least the following internal components.

- Memory module
- Storage device such as a hard disk drive.
- Power supply

External system peripherals may also be required for navigation and display, including at least a keyboard, a mouse and a video display monitor.

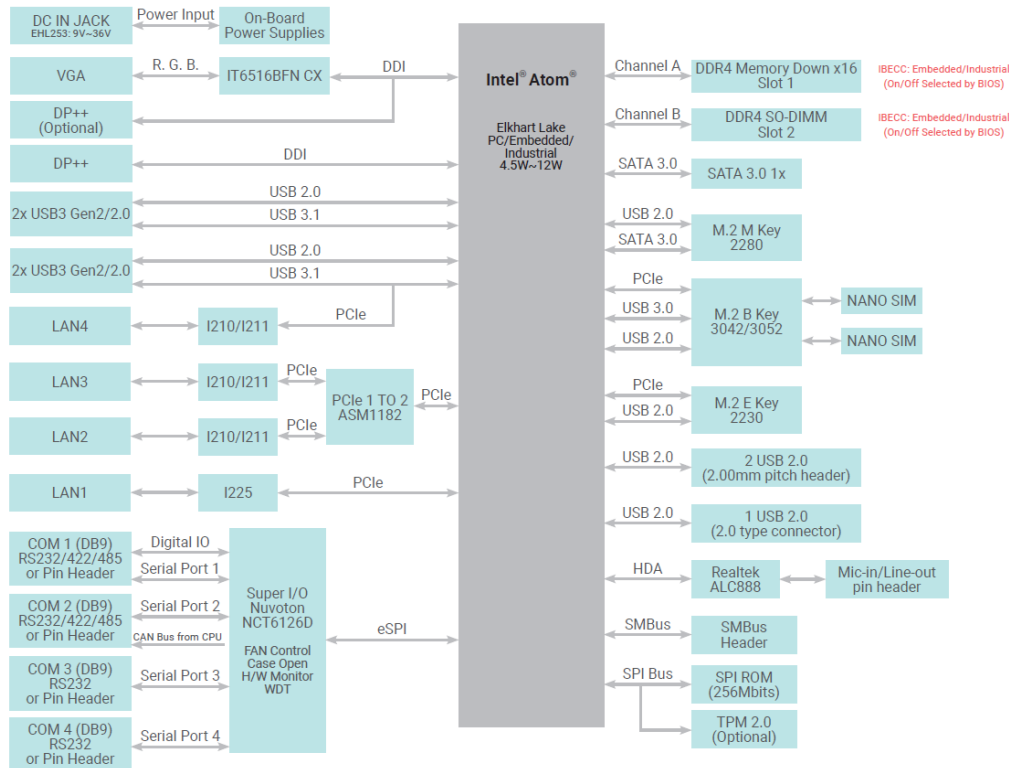
Chapter 1 - Introduction

► Specifications

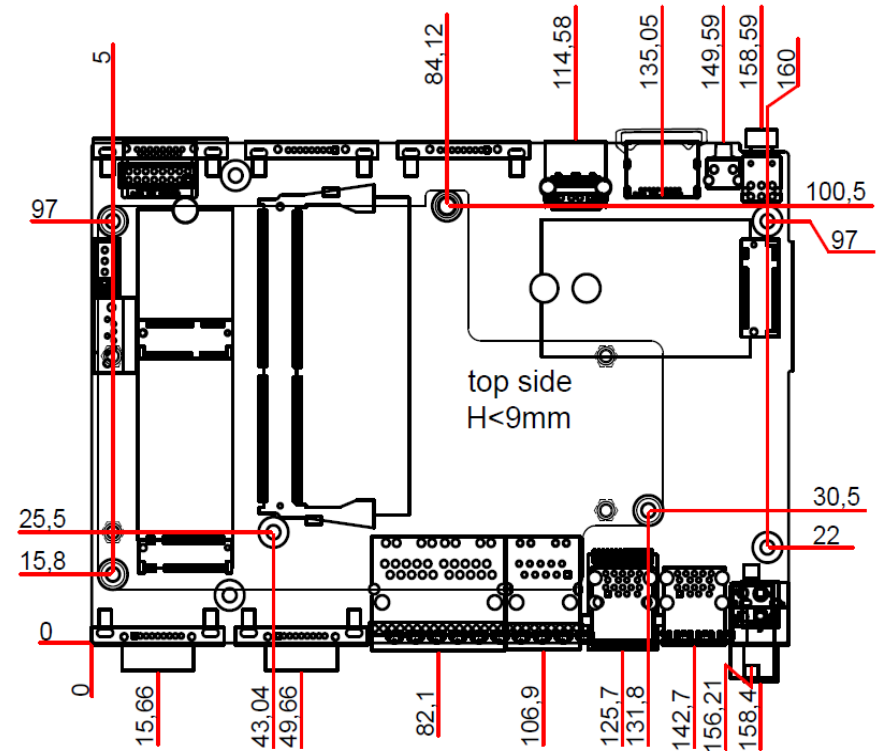
SYSTEM	Processor	Intel Atom Elkhart Lake Industrial Intel® Atom® x6425RE 4 cores, 1.9 GHz, TDP 12W Embedded Intel® Atom® x6211E 2 cores, 1.3 to 3.0 GHz, TDP 6.5W Intel® Atom® x6413E 4 cores, 1.5 to 3.0 GHz, TDP 9W Intel® Atom® x6425E 4 cores, 2.0 to 3.0 GHz, TDP 12W PC Client Intel® Celeron® J6412 4 cores, 2.0 to 2.6 GHz, TDP 10W Intel® Celeron® J6413 4 cores, 1.8 to 3.0 GHz, TDP 10W
	Memory	4GB/8GB DDR4 Memory onboard One 260 pin DDR4 SODIMM up to 3200MHz Total Memory up to 32GB (in-band ECC support in embedded/industrial SKU)
	BIOS	AMI SPI 256Mbit (supports UEFI boot only)
	GRAPHICS	Controller
	Feature	OpenGL 4.5, DirectX 12, Open CL 1.2, Vulkan 1.1 HW Decode: AVC/H.264, MPEG2, VC1/WMV9, JPEG/MJPEG, HEVC/H.265, VP8, VP9 HW Encode: AVC/H.264, JPEG/MJPEG, HEVC/H.265, VP9
	Display	1 x VGA (Support via VGA cable) 1 x DP++
STORAGE	Internal	SATA III
	eMMC	16GB/32GB (Available upon request)
EXPANSION	Interface	1 x M.2 2280 (SATA) 1 x M.2 2230 (USB/PCIe) 1 x M.2 3042/3052 (USB 3.0/PCIe) with dual SIM
AUDIO	Audio Codec	Realtek ALC888

ETHERNET	Controller	2 or 3 x Intel® Ethernet Controller I210/I211 GbE LAN 1 x Intel® Ethernet 2.5GbE LAN
FRONT I/O	Ethernet	2 or 3 x GbE (RJ-45) (configuration options) 1 x 2.5GbE TSN RJ45
	Serial	2 x RS232/422/485
	USB	2 or 4 x USB 3.1 (configuration options)
	DIO	8-bit DIO (jumper switch to COM)
INTERNAL I/O	Serial	2 x RS232
	USB	2 x USB 2.0 (Pin header) 1 x USB 2.0 (Vertical)
	Display	1 x VGA
	Audio	1 x Audio (Line Out and Mic in)
	SATA	1 x SATA 3.0 1 x 5V SATA Power (support SATA HDD LED via front panel)
	Front Panel	1 x front panel (power button/reset button, power LED, HDD act LED)
	SMBus	1 x SMBus
REAR I/O	Display	1 x DP++
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
SECURITY	TPM	TPM 2.0 (Available Upon Request)
POWER	Type	Wide Range 9~36VDC
	Connector	DC Jack (or vertical type 4pin connector)
	RTC Battery	CR2032 Coin Cell
OS SUPPORT	Microsoft	Windows 10 IoT Enterprise LTSC 2019 RS5
	Linux	Linux
ENVIRONMENT	Temperature	Operating: 0 to 80°C (PC Client SKU) Operating: -40 to 80°C (Embedded SKU) Storage: -40 to 85°C
	Humidity	Operating: 5 to 90% RH Storage: 5 to 90% RH
MECHANISM	Dimensions	4" SBC Form Factor
	Height	165mm (6.5") x 115mm (4.53")
STANDARDS AND CERTIFICATIONS	Certifications	CE, FCC Class B (TBD in later stage)

► Block Diagram

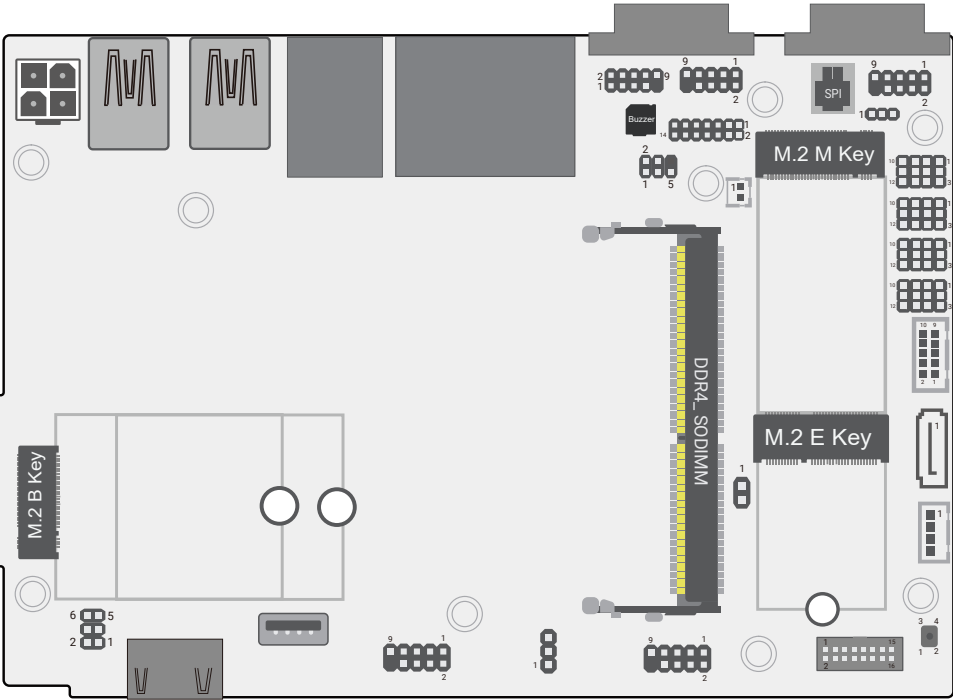


► Dimension



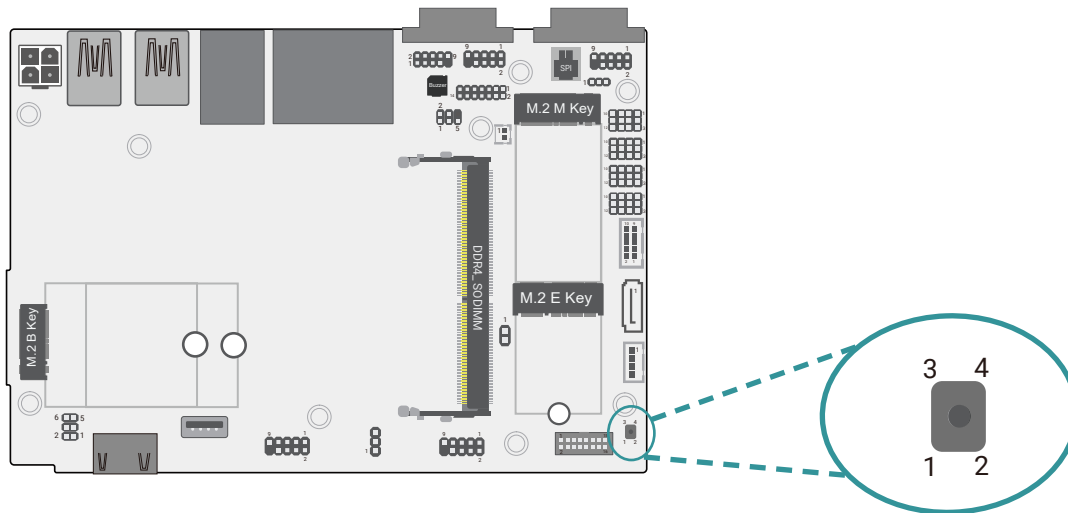
Chapter 2 - Hardware Installation

► Board Layout



- 1 DC-In
- 2 USB3.1
- 3 USB3.1
- 4 2.5G LAN
- 5 LAN
- 6 COM1
- 7 COM2
- 8 USB2.0
- 9 eSPI Header (Debug)
- 10 COM1 (Option)
- 11 SMBUS
- 12 RTC Battery
- 13 COM2 (Option)
- 14 CAN BUS Termination
- 15 Case Open
- 16 COM2/CAN BUS Select
- 17 COM2/CAN BUS Select
- 18 COM1/DIO Select
- 19 COM1/DIO Select
- 20 Front Audio
- 21 SATA0
- 22 SATA Power
- 23 Front Panel
- 24 DP++
- 25 Vertical USB
- 26 COM3
- 27 System Fan
- 28 COM4
- 29 VGA
- 30 Clear Cmos

► CLEAR CMOS Data



If any anomaly of the followings is encountered –

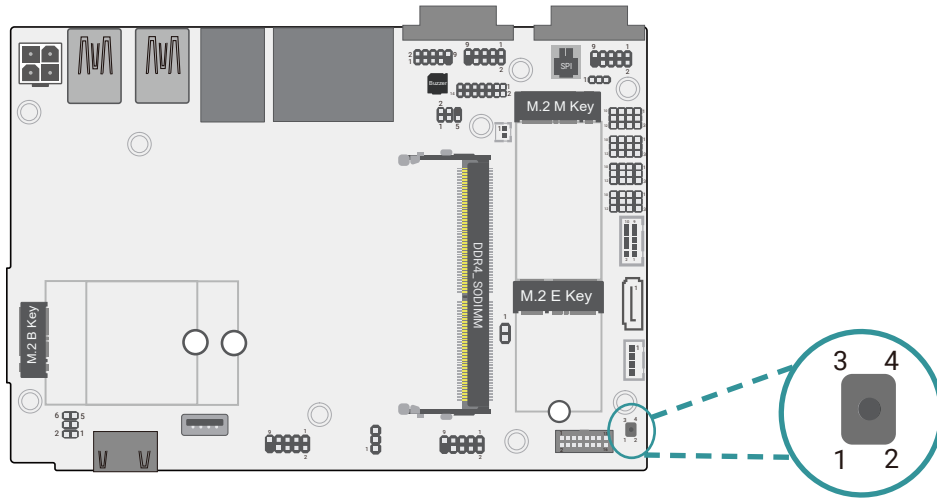
- a) CMOS data is corrupted;
- b) you forgot the supervisor or user password;
- c) failure to start the system due to BIOS mis-configuration

– it is suggested that the system be reconfigured with default values stored in the ROM BIOS. To load the default values stored in the ROM BIOS, please follow the steps below.

1. Power-off the system and unplug the power cord.
2. Press the switch button.
3. Plug the power cord and power-on the system.

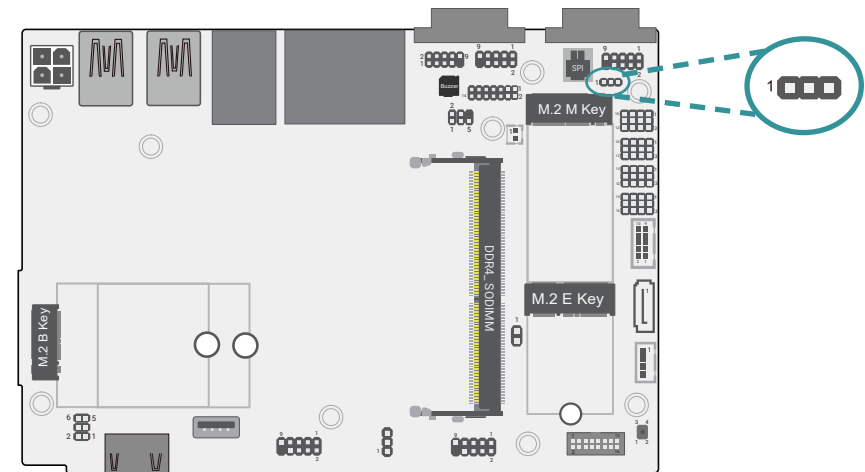
► **Jumper Settings**

Clear CMOS (SW4)



- 1-2 Open: Normal (default)
- 1-2 Short: Clear CMOS Data

CAN BUS Termination (JP13)



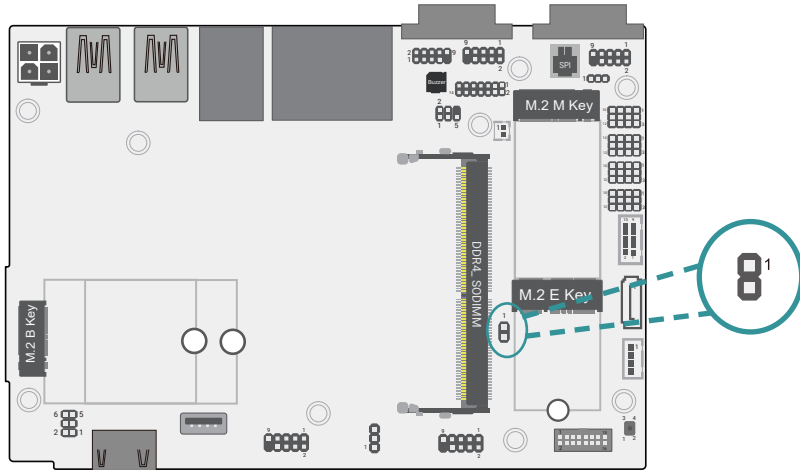
- 1-2 On: Middle of the bus (default)



- 2-3 On: End of the bus

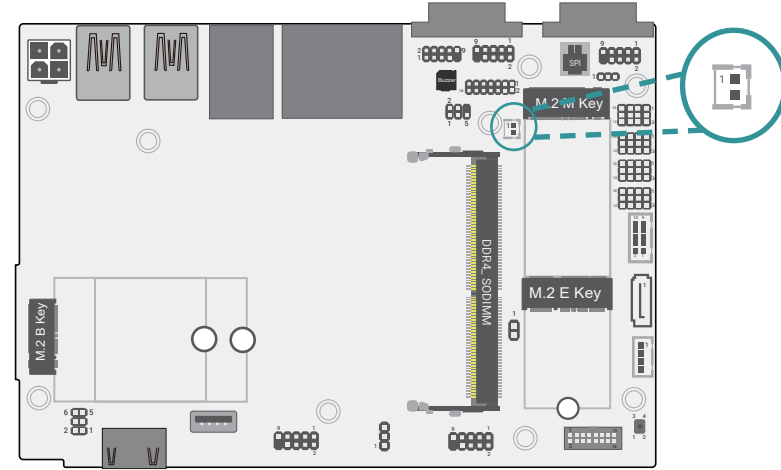
► **Pin Assignment**

Case Open (J6)



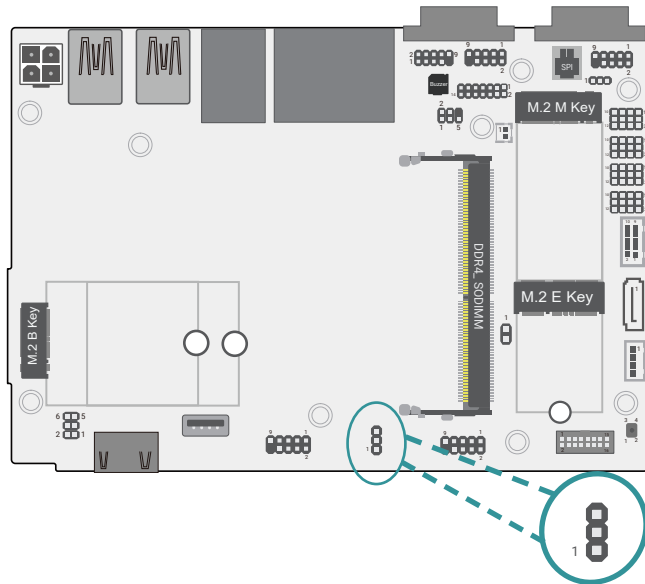
Pin	Assignment
1	Case Open-
2	GND

RTC Battery (J20)



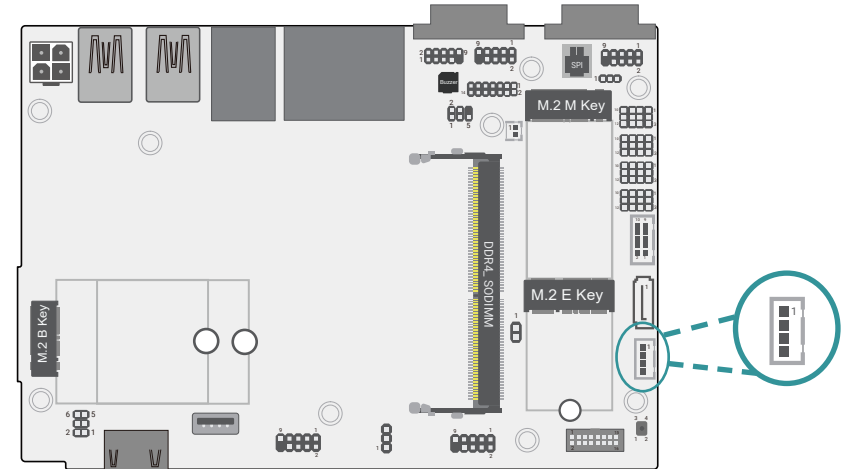
Pin	Assignment
1	V_BAT
2	GND

System Fan (J8)



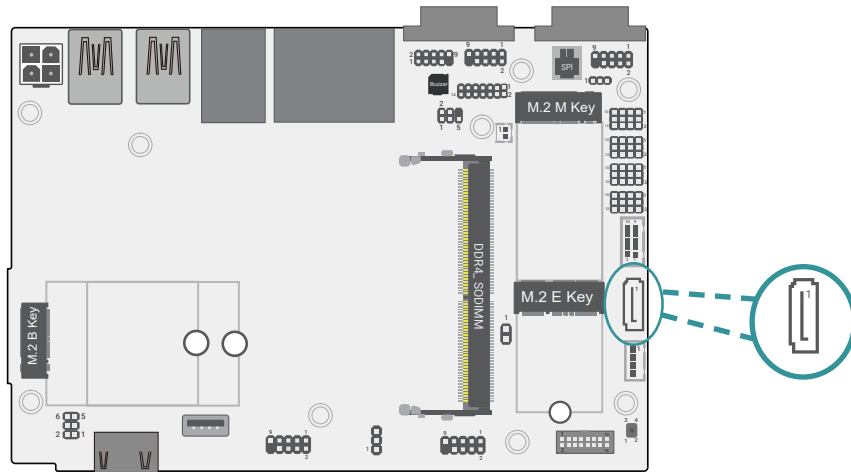
Pin	Assignment
1	GND
2	PWM
3	TACH

SATA Power (CN8)



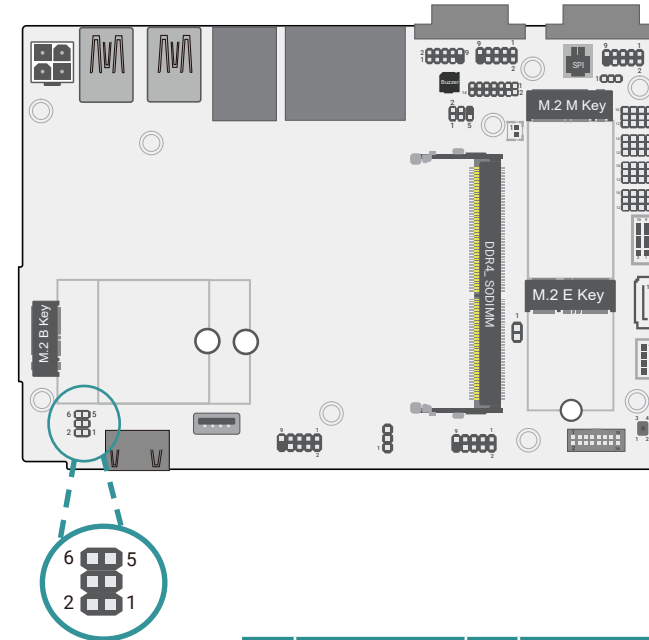
Pin	Assignment
1	12V
2	GND
3	GND
4	5V

SATA0 (J2)



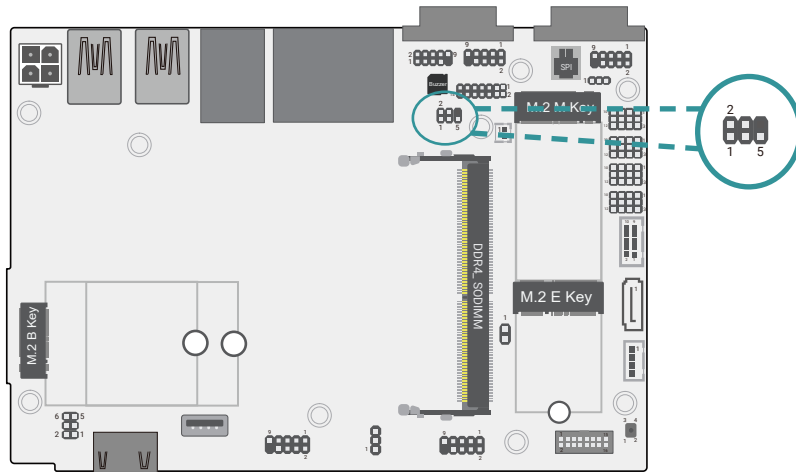
Pin	Assignment
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

Front Panel (JP12)



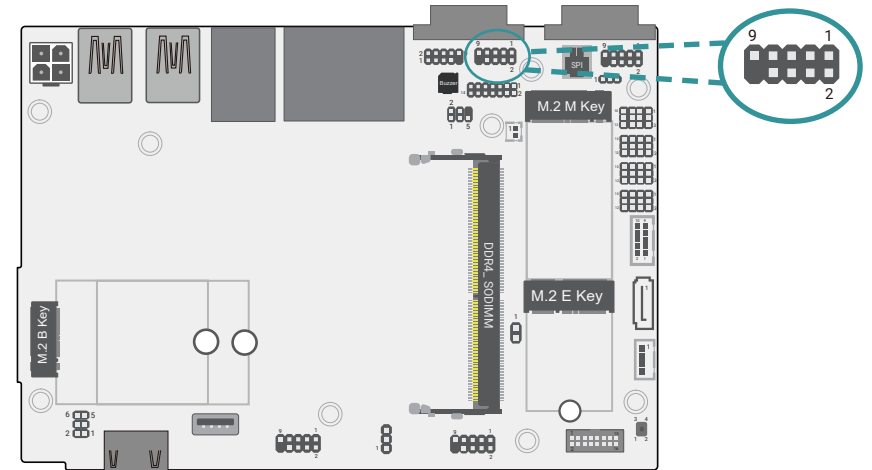
Pin	Assignment	Pin	Assignment
1	PWR_BTN0	2	V_SUS_LED
3	GND	4	SUS_LED#
5	SYS_RST0	6	HD_LED#

SMbus (J14)



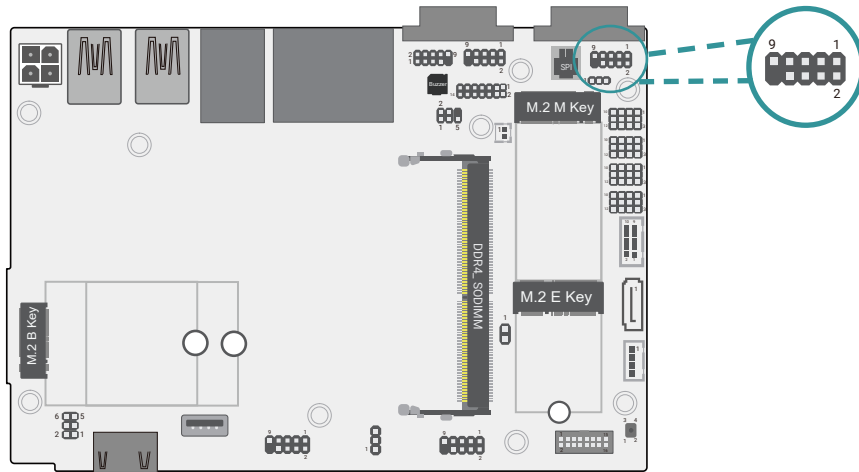
Pin	Assignment	Pin	Assignment
1	3V3SB	2	GND
3	SMB_CLK	4	SMB_DATA
5	SMB_ALERT#	6	----

COM1 *option (TSJ1)



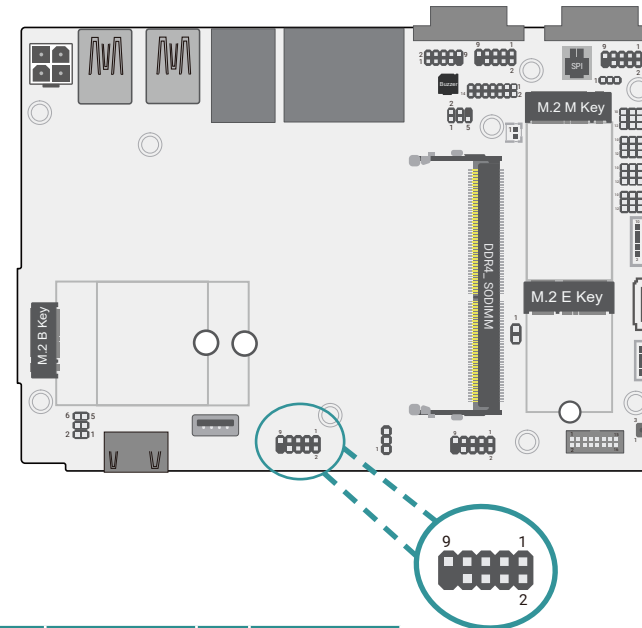
Pin	Assignment	Pin	Assignment
1	X_MDCD1-	2	X_MSIN1- COM
3	X_MSO1- COM	4	X_MDTR1- COM
5	GND	6	X_MDSR1-
7	X_MRST1-	8	X_MCTS1-
9	X_MRI1-	10	----

COM2 *option (TSJ7)



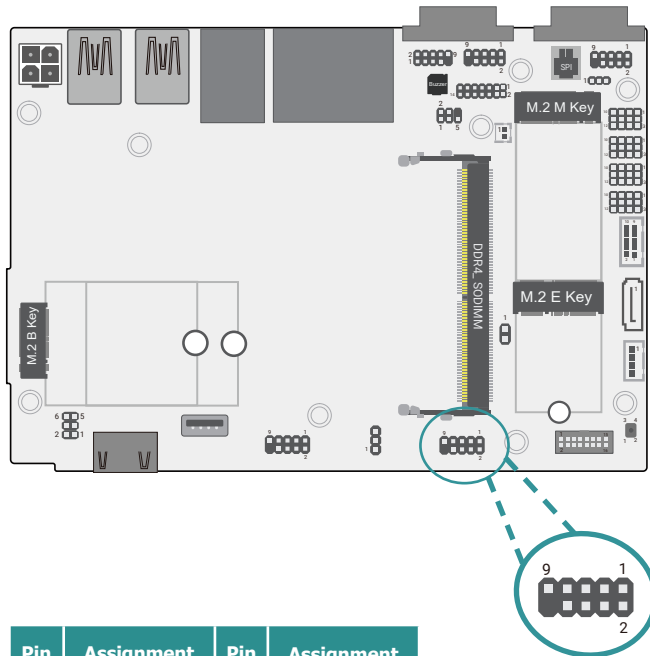
Pin	Assignment	Pin	Assignment
1	X_MD CD2-	2	X_MSIN2- COM
3	X_MS O2- COM	4	X_MDTR2- COM
5	GND	6	X_MDSR2-
7	X_MR TS2-	8	X_MCT S2-
9	X_MR I2-	10	----

COM3 (TSJ3)



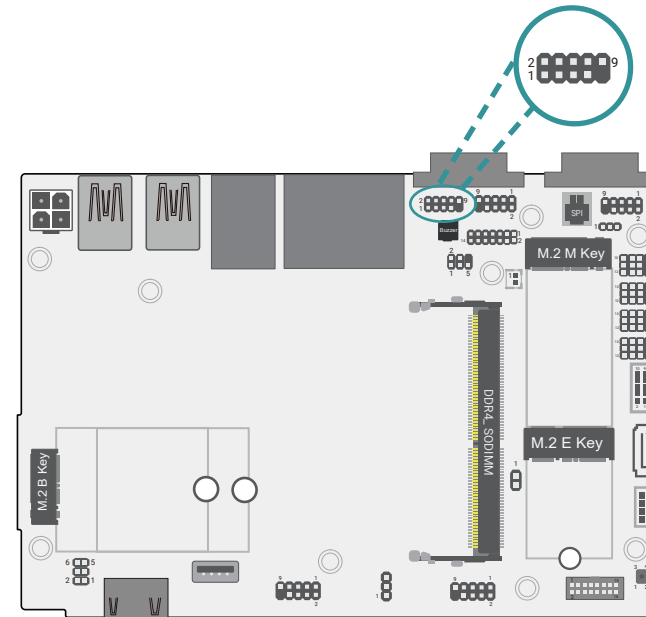
Pin	Assignment	Pin	Assignment
1	MD CD3-	2	MSIN3-
3	MS O3-	4	MDTR3-
5	GND	6	MDSR3-
7	MR TS3-	8	MCT S3-
9	MR I3-	10	----

COM4 (TSJ4)



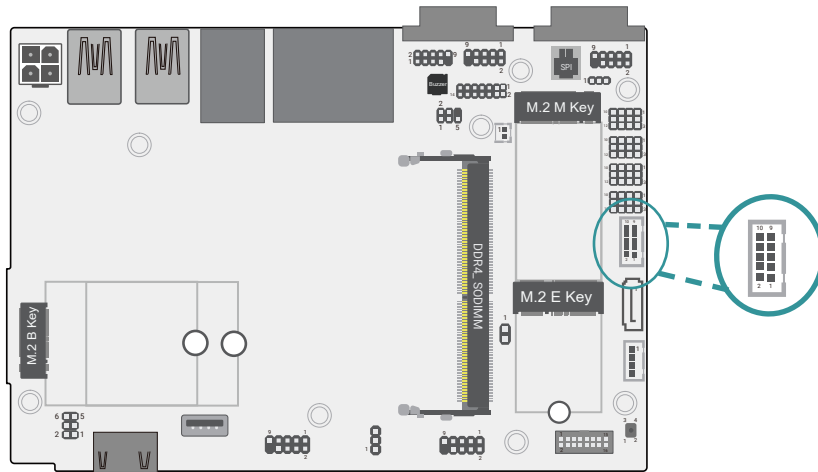
Pin	Assignment	Pin	Assignment
1	MDCD4-	2	MSIN4-
3	MSO4-	4	MDTR4-
5	GND	6	MDSR4-
7	MRTS4-	8	MCTS4-
9	MRI4-	10	----

USB2.0 (UBJ1)



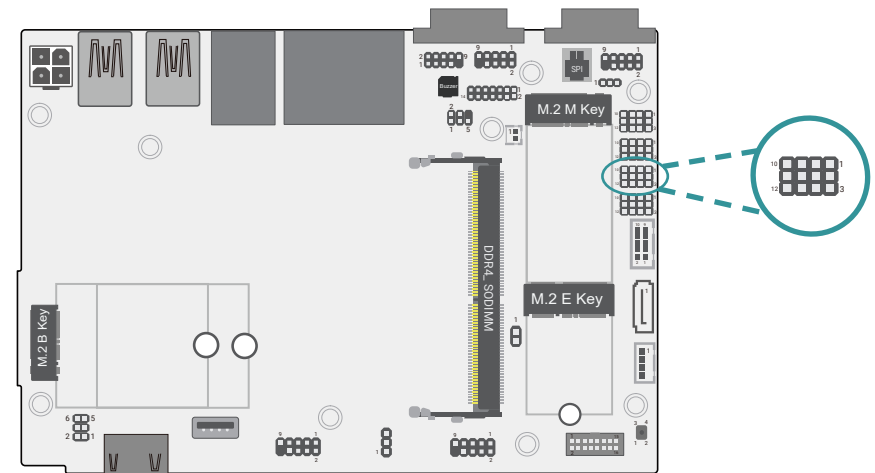
Pin	Assignment	Pin	Assignment
1	5V	2	5V
3	USB2_7_N	4	USB2_8_N
5	USB2_7_P	6	USB2_8_P
7	GND	8	GND
9	----	10	NC

Front Audio (AUJ1)



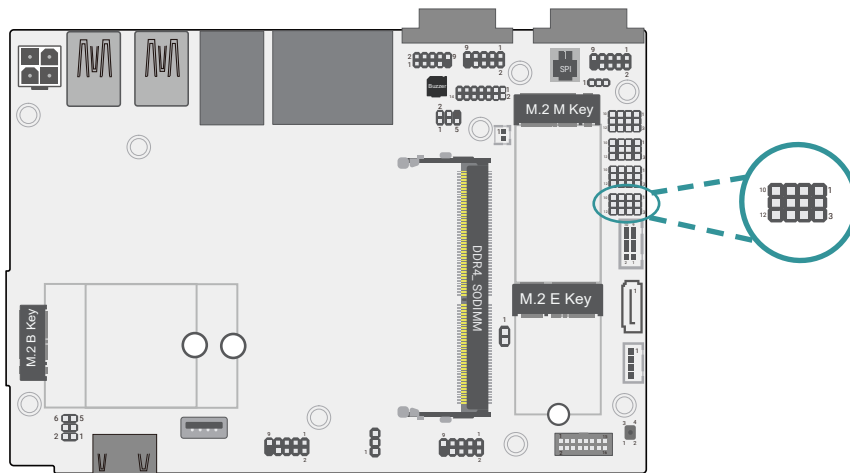
Pin	Assignment	Pin	Assignment
1	MIC2_L	2	GND
3	MIC2_R	4	NC
5	LINE2_R	6	MIC2-JD
7	A_GND	8	NC
9	LINE2_L	10	LINE2_JD

COM1/DIO BUS Select (JP8)



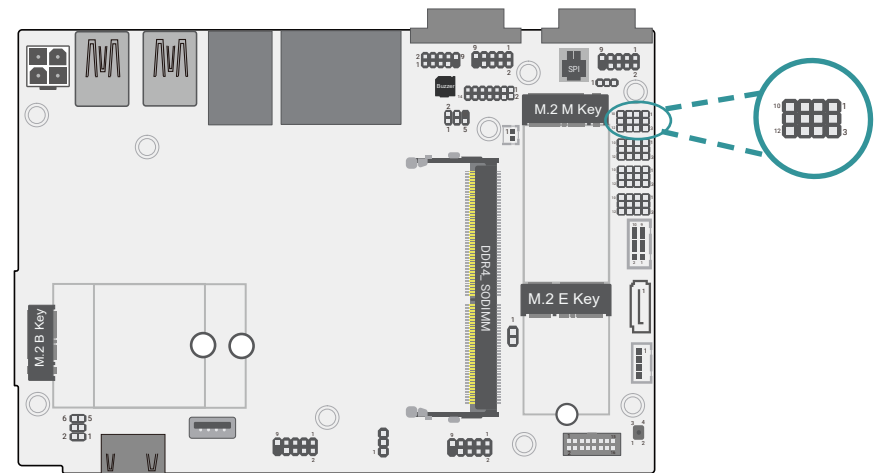
Pin	Assignment	Pin	Assignment	Pin	Assignment
1	MDCD1-	2	X_MDCD1-	3	D_IOA0
4	MSIN1- COM	5	X_MSIN1- COM	6	D_IOA1
7	MSO1- COM	8	X_MS01- COM	9	D_IOA2
10	MDTR1- COM	11	X_MDTR1- COM	12	D_IOA3

COM1/DIO BUS Select (JP9)



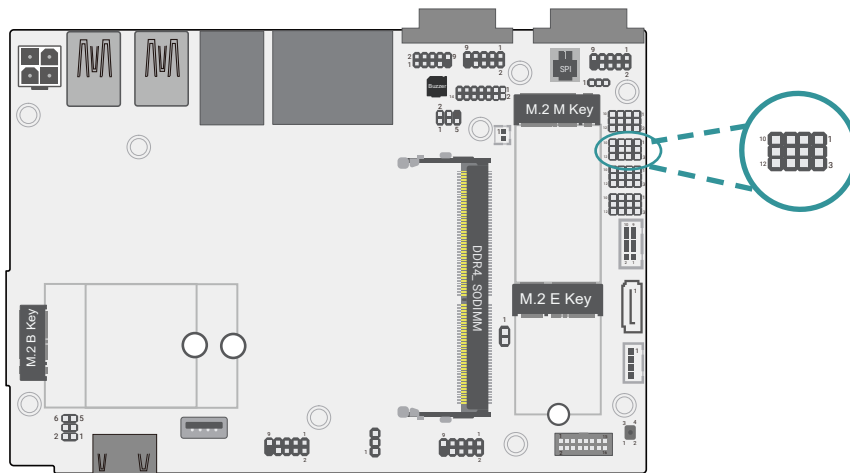
Pin	Assignment	Pin	Assignment	Pin	Assignment
1	MDSR1-	2	X_MDSR1-	3	D_IOA6
4	MRTS1-	5	X_MRTS1-	6	D_IOA7
7	MCTS1-	8	X_MCTS1-	9	D_IOA4
10	MRI1-	11	X_MRI1-	12	D_IOA5

COM2/CAN BUS Select (JP10)



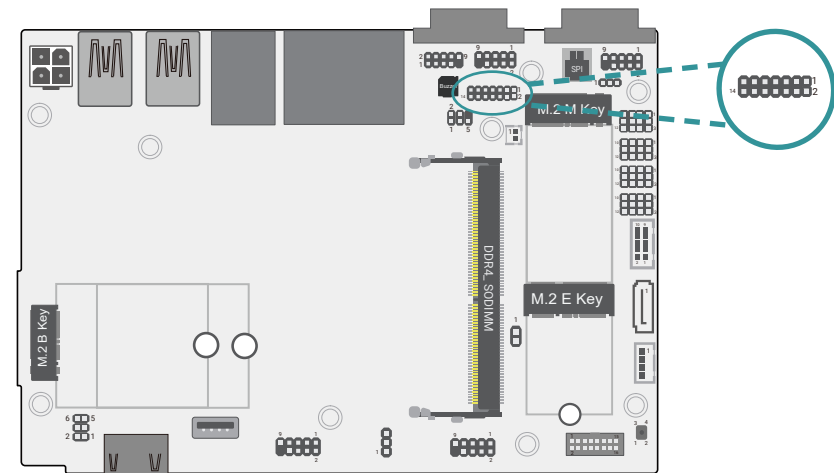
Pin	Assignment	Pin	Assignment	Pin	Assignment
1	MDCD2-	2	X_MDCD2-	3	NC
4	MSIN2- COM	5	X_MSIN2- COM	6	CAN0_L
7	MSO2- COM	8	X_MS02- COM	9	SOUT5
10	MDTR2- COM	11	X_MDTR2- COM	12	SIN5

COM2/CAN BUS Select (JP11)



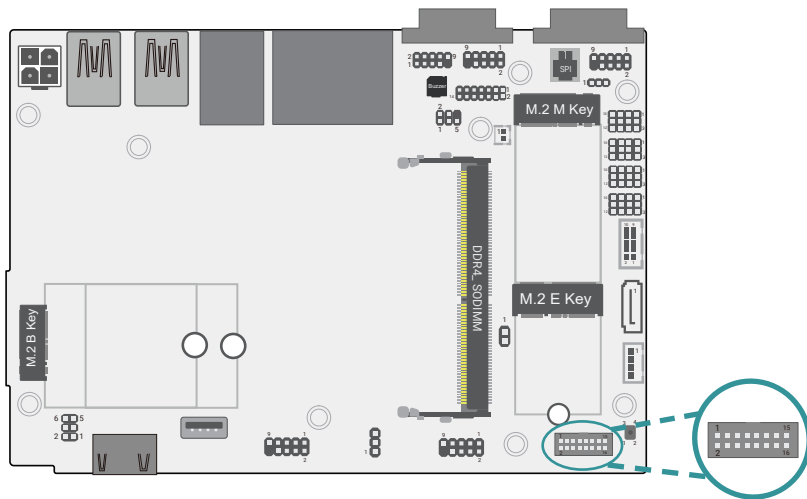
Pin	Assignment	Pin	Assignment	Pin	Assignment
1	MDSR2-	2	X_MDSR2-	3	NC
4	MRTS2-	5	X_MRTS2-	6	CAN0_H
7	MCTS2-	8	X_MCTS2-	9	NC
10	MRI2-	11	X_MRI2-	12	NC

eSPI *Debug (J3)



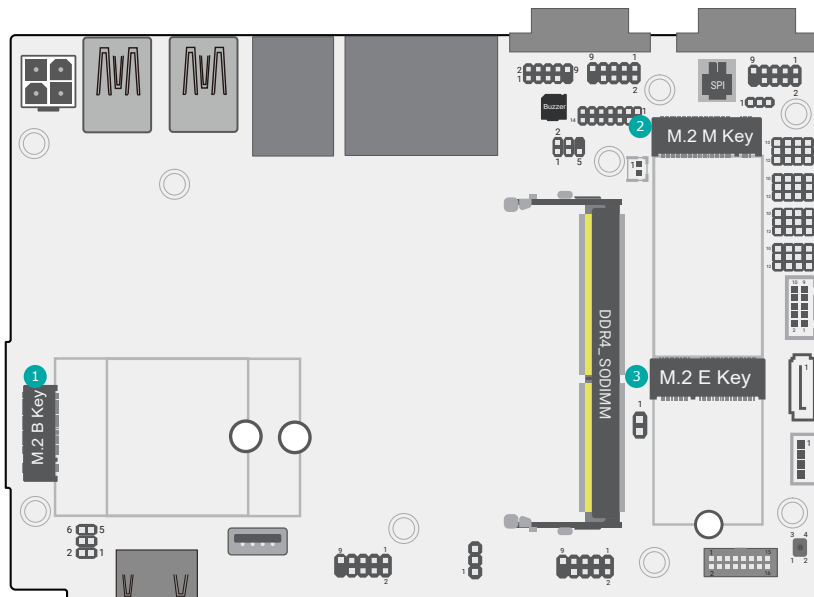
Pin	Assignment	Pin	Assignment
1	3V3SB	2	ESPI_CLK
3	ESPI_RST#	4	GND
5	ESPI_ALERT#	6	GND
7	ESPI_IO0	8	---
9	ESPI_IO1	10	ESPI_CS
11	ESPI_IO2	12	3V3SB
13	ESPI_IO3	14	3V3SB

VGA (J27)



Pin	Assignment	Pin	Assignment
1	VGA_RED	2	VGA_GRE
3	VGA_BLE	4	NC
5	GND	6	GND
7	GND	8	GND
9	V_VDO_5V	10	GND
11	NC	12	VGA_SDA_5V
13	V_HSYNC	14	V_VSYNC
15	VGA_SCL_5V	16	NC

► **Expansion Slots**

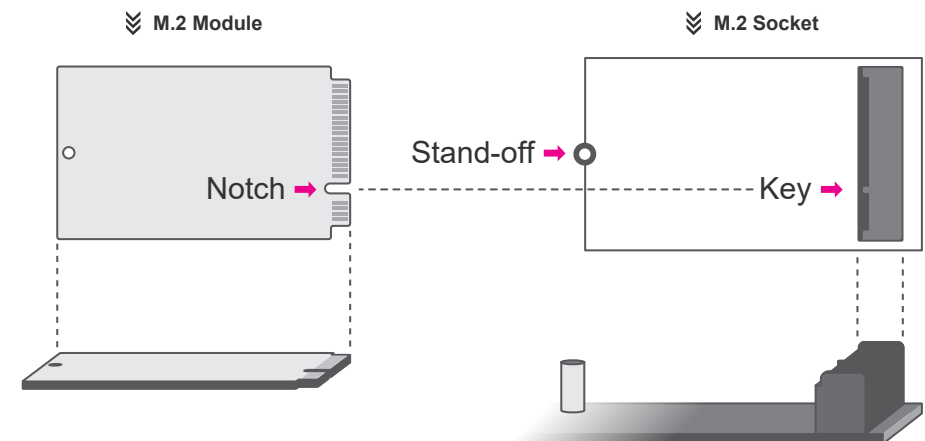


- 1 M.2 B-Key
- 2 M.2 M-Key
- 3 M.2 E-Key

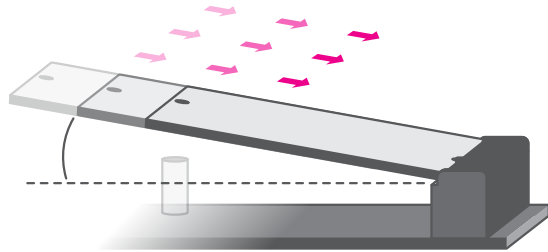
Installing the M.2 Module

Before installing the M.2 module into the M.2 socket, please make sure that the following safety cautions are well-attended.

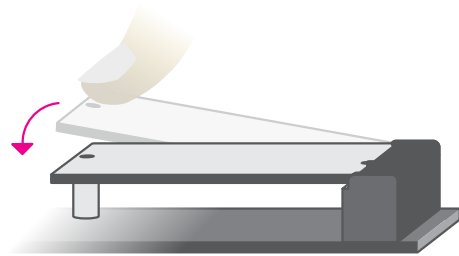
1. Make sure the PC and all other peripheral devices connected to it has been powered down.
2. Disconnect all power cords and cables.
3. Locate the M.2 socket on the system board
4. Make sure the notch on card is aligned to the key on the socket.
5. Make sure the standoff screw is removed from the standoff.



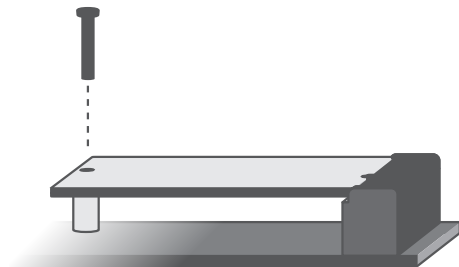
Please follow the steps below to install the card into the socket.



Step 1:
Insert the card into the socket at an angle while making sure the notch and key are perfectly aligned.



Step 2:
Press the end of the card far from the socket down until against the stand-off.



Step 3:
Screw tight the card onto the stand-off with a screw driver and a stand-off screw until the gap between the card and the stand-off closes up. The card should be lying parallel to the board when it's correctly mounted.

Chapter 3 - BIOS Settings

► Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board.

The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

It is possible that the CMOS battery will fail causing CMOS data loss. If this happens, you need to install a new CMOS battery and reconfigure the BIOS settings.



Note:

The BIOS is constantly updated to improve the performance of the system board; therefore the BIOS screens in this chapter may not appear the same as the actual one. These screens are for reference purpose only.

Default Configuration

Most of the configuration settings are either predefined according to the Load Optimal Defaults settings which are stored in the BIOS or are automatically detected and configured without requiring any actions. There are a few settings that you may need to change depending on your system configuration.

Entering the BIOS Setup Utility

The BIOS Setup Utility can only be operated from the keyboard and all commands are keyboard commands. The commands are available at the right side of each setup screen.

The BIOS Setup Utility does not require an operating system to run. After you power up the system, the BIOS message appears on the screen and the memory count begins. After the memory test, the message "Press DEL to run setup" will appear on the screen. If the message disappears before you respond, restart the system or press the "Reset" button. You may also restart the system by pressing the <Ctrl> <Alt> and keys simultaneously.

Legends

Keys	Function
Right / Left arrow	Move the highlight left or right to select a menu
Up / Down arrow	Move the highlight up or down between submenus or fields
<Enter>	Enter the highlighted submenu
+ (plus key)/F6	Scroll forward through the values or options of the highlighted field
- (minus key)/F5	Scroll backward through the values or options of the highlighted field
<F1>	Display general help
<F2>	Display previous values
<F9>	Optimized defaults
<F10>	Save and Exit
<Esc>	Return to previous menu

Scroll Bar

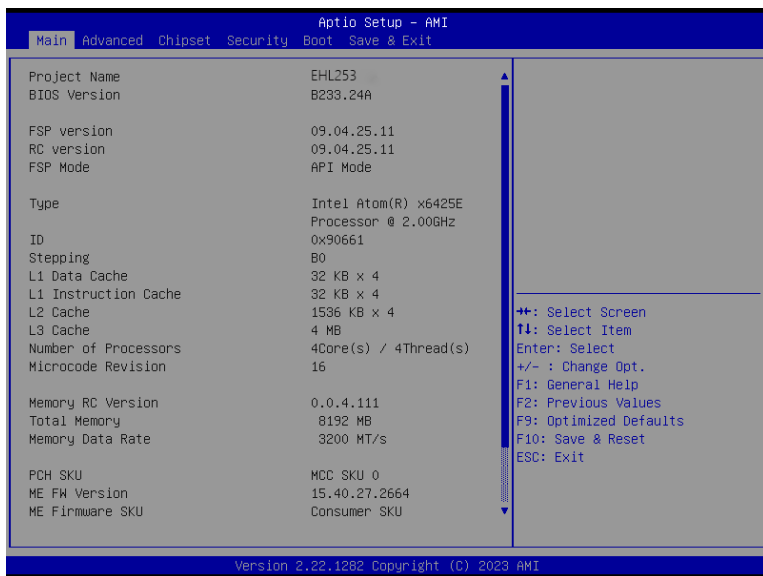
When a scroll bar appears to the right of the setup screen, it indicates that there are more available fields not shown on the screen. Use the up and down arrow keys to scroll through all the available fields.

Submenu

When "►" appears on the left of a particular field, it indicates that a submenu which contains additional options are available for that field. To display the submenu, move the highlight to that field and press <Enter>.

► Main

The Main menu is the first screen that you will see when you enter the BIOS Setup Utility.



System Date


The date format is <month>, <date>, <year>. Press "Tab" to switch to the next field and press "-" or "+" to modify the value.

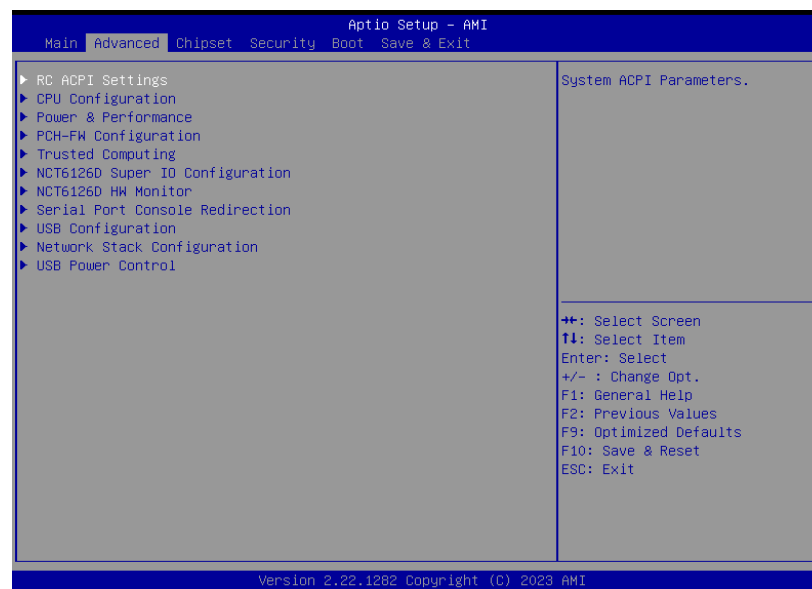
System Time

The time format is <hour>, <minute>, <second>. The time is based on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00. Hour displays hours from 00 to 23. Minute displays minutes from 00 to 59. Second displays seconds from 00 to 59.

► Advanced

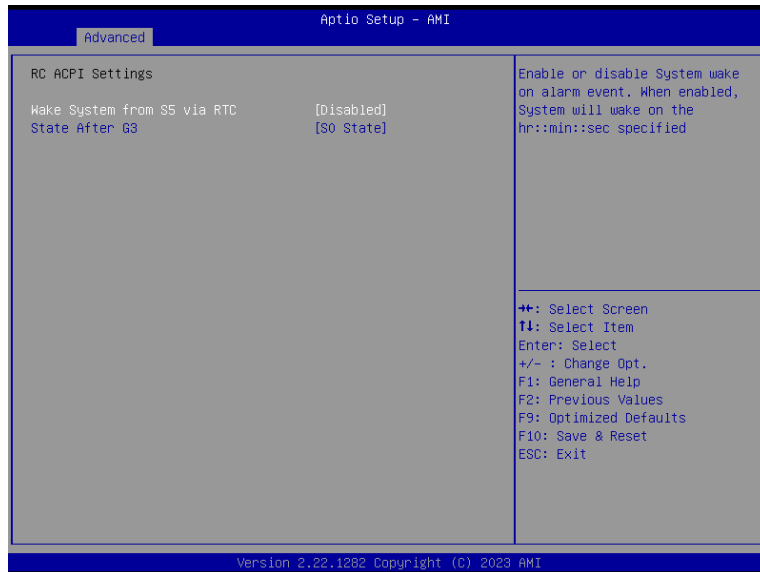
The Advanced menu allows you to configure your system for basic operation. Some entries are defaults required by the system board, while others, if enabled, will improve the performance of your system or let you set some features according to your preference.

 **Important:**
Setting incorrect field values may cause the system to malfunction.



► Advanced

RC ACPI Configuration



Wake system from S5 via RTC

When Enabled, the system will automatically power up at a designated time every day. Once it's switched to [Enabled], please set up the time of day — hour, minute, and second — for the system to wake up.

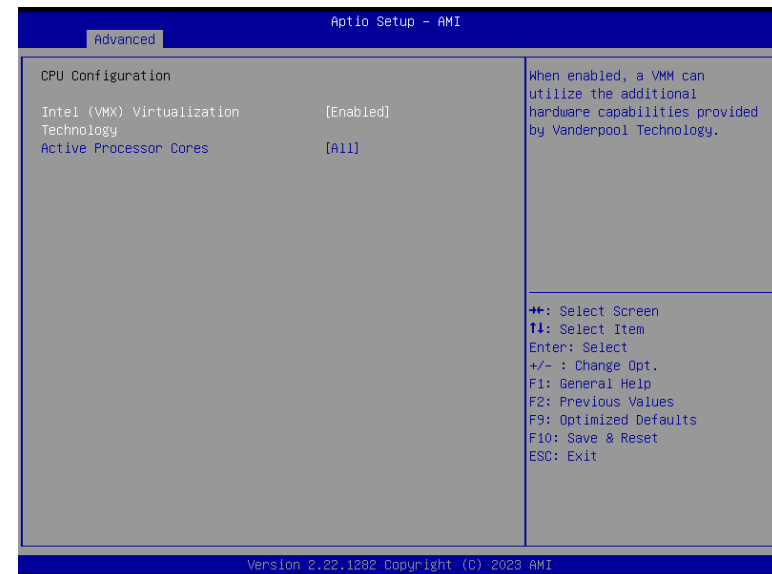
State After G3

Select between S0 State, and S5 State. This field is used to specify what state the system is set to return to when power is re-applied after a power failure (G3 state).

- S0 State** The system automatically powers on after power failure.
- S5 State** The system enter soft-off state after power failure. Power-on signal input is required to power up the system.
- Last State** The system returns to the last state right before power failure.

► Advanced

CPU Configuration



Intel (VMX) Virtualization Technology

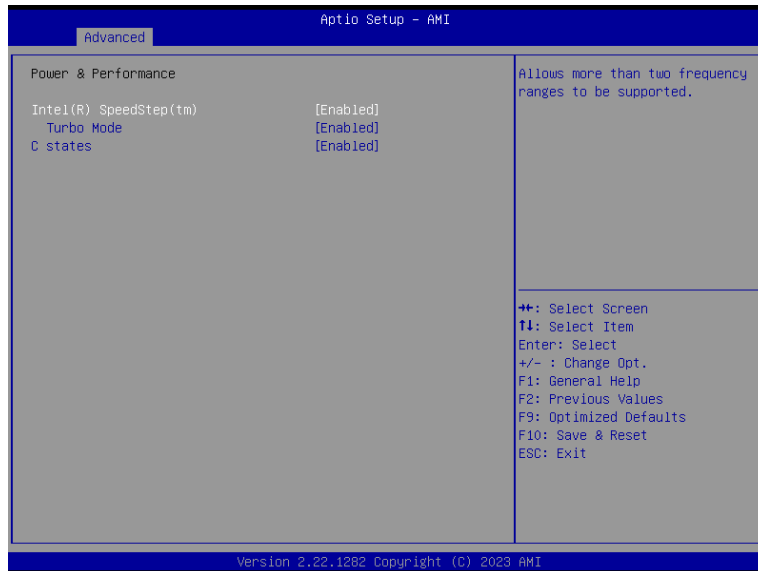
When this field is set to Enabled, the VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Active Processor Cores

Select number of cores to enable in each processor package: all or 1.

► Advanced

Power & Performance



Intel (R) SpeedStep(tm)

This field is used to enable or disable the Intel SpeedStep® Technology, which helps optimize the balance between system's power consumption and performance. After it is enabled in the BIOS, EIST features can then be enabled via the operating system's power management.

Turbo Mode

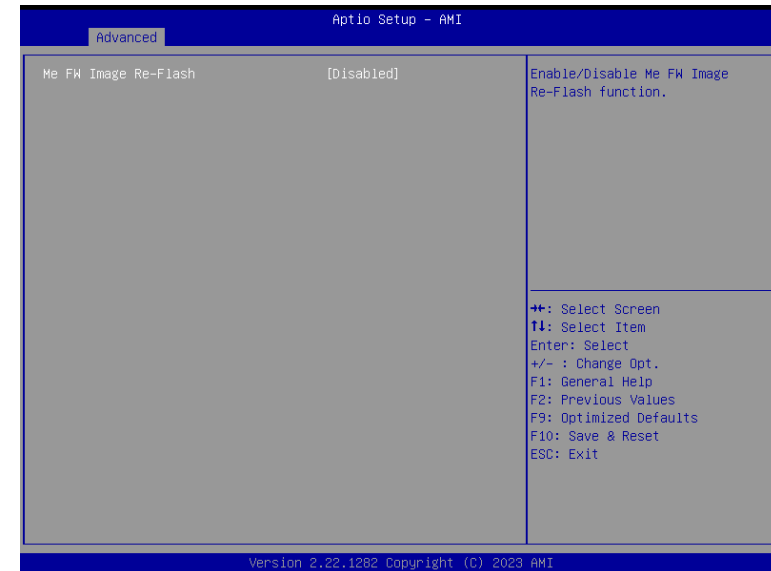
Enable or disable turbo mode of the processor. This field will only be displayed when EIST is enabled.

C states

Enable or disable CPU Power Management. It allows CPU to enter "C states" when it's idle and nothing is executing.

► Advanced

PCH-FW Configuration



ME FW Image Re-Flash

Enable/Disable Me FW Image Re-Flash function.

▶ Advanced

Trusted Computing



Security Device Support

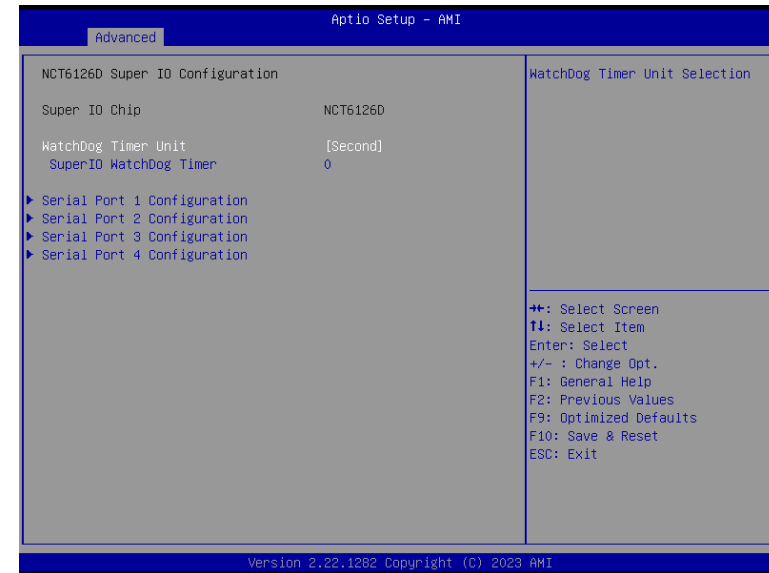
This field is used to enable or disable BIOS support for the security device such as an TPM 2.0 to achieve hardware-level security via cryptographic keys.

Pending operation

To clear the existing TPM encryption, select "TPM Clear" and restart the system. This field is not available when "Security Device Support" is disabled.

▶ Advanced

NCT6126D Super IO Configuration



WatchDog Timer Unit

Select WatchDog Timer Unit – Second or Minute.

SuperIO WatchDog Timer

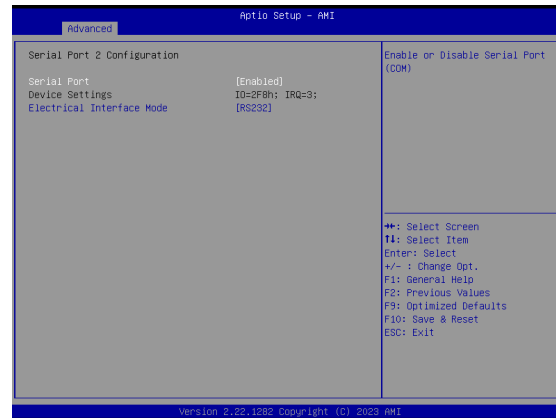
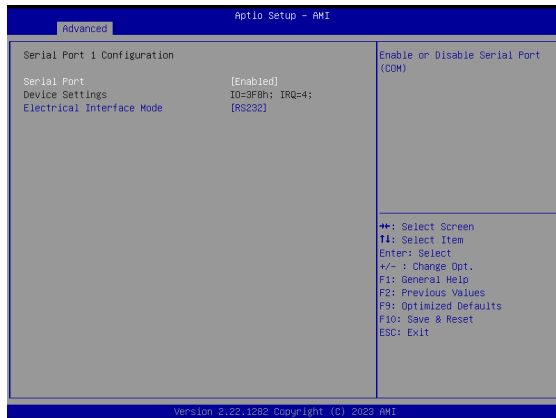
Set SuperIO WatchDog Timer Timeout value. The range is from 0 (disabled) to 255.



Note:
The sub-menus are detailed in following sections.

▶ Advanced

NCT6126D Super IO Configuration ▶ Serial Port 1,2 Configuration



Serial Port

Enable or disable serial port.

Electrical Interface Mode

Choose mode between RS232 / RS485 / RS422

▶ Advanced

NCT6126D Super IO Configuration ▶ Serial Port 3,4 Configuration

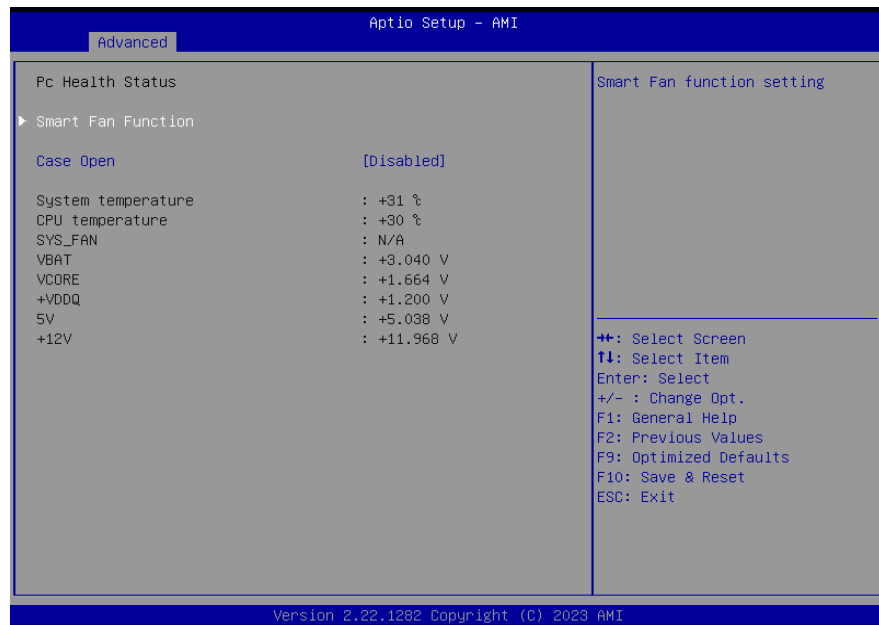


Serial Port

Enable or disable serial port.

▶ Advanced

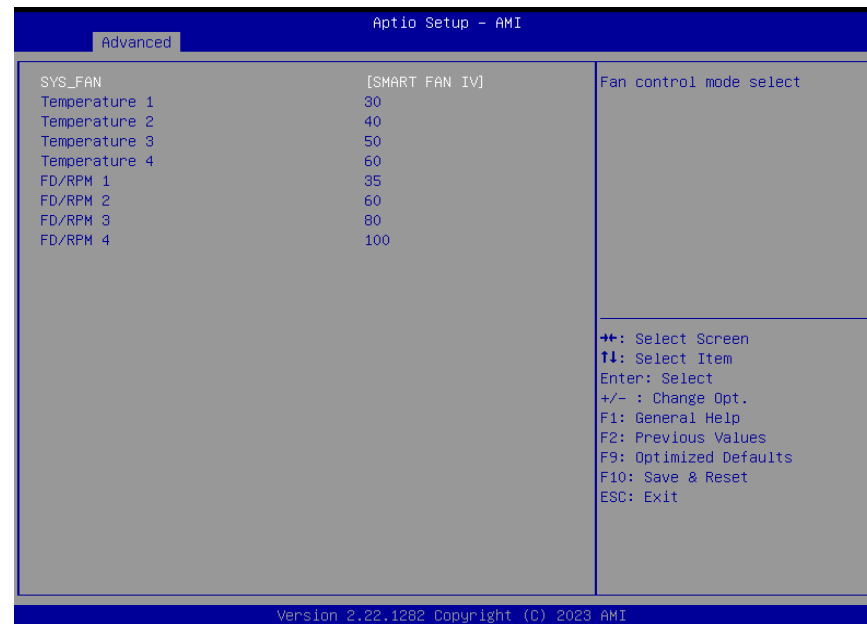
NCT6126D HW Monitor



This section displays the system's health information, i.e. voltage readings, CPU and system temperatures, and fan speed readings

▶ Advanced

NCT6126D HW Monitor ▶ Smart FAN Function



Smart Fan is a fan speed moderation strategy dependent on the current system temperature. When the system temperature goes higher than the Boundary setting, the fan speed will be turned up to the setting of the Fan Speed Count that bears the same index as the Boundary field.

SYS Fan = [SMART FAN IV], [Manual mode]

Fan control mode select

Temperature 1 to 4

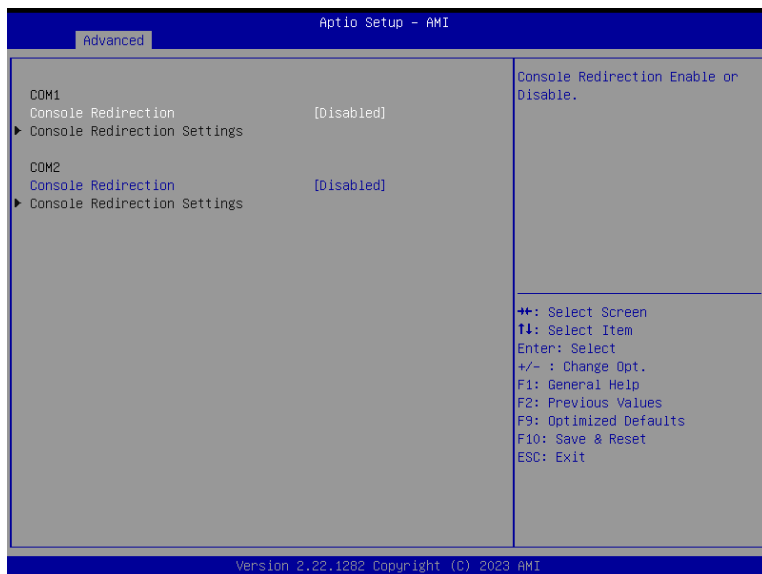
The value of temperature.

FD/RPM 1 to 4

The value of Fan Duty/RPM when temperature is T1.

▶ Advanced

Serial Port Console Redirection



Console Redirection

Console Redirection Enable or Disable.

Console Redirection Settings

See following pages.

▶ Advanced

Serial Port Console Redirection ▶ Console Redirection Settings



Configure the serial settings of the current COM port.

Terminal Type

Select terminal type: VT100, VT100+, VT-UTF8 or ANSI.

Bits per second

Select serial port transmission speed: 9600, 19200, 38400, 57600 or 115200.

Data Bits

Select data bits: 7 bits or 8 bits.

Parity

Select parity bits: None, Even, Odd, Mark or Space.

Stop Bits

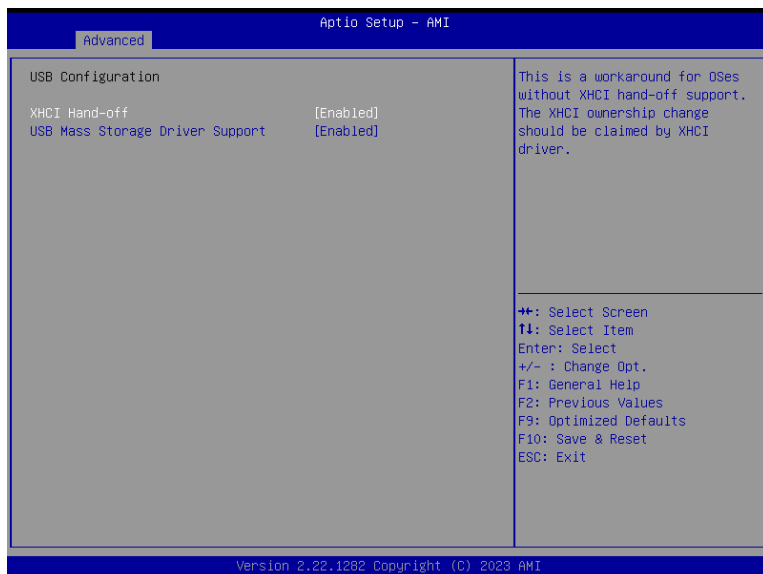
Select stop bits: 1 bit or 2 bits.

Flow Control

Select flow control type: None or RTS/CTS.

▶ Advanced

USB Configuration



XHCI Hand-off

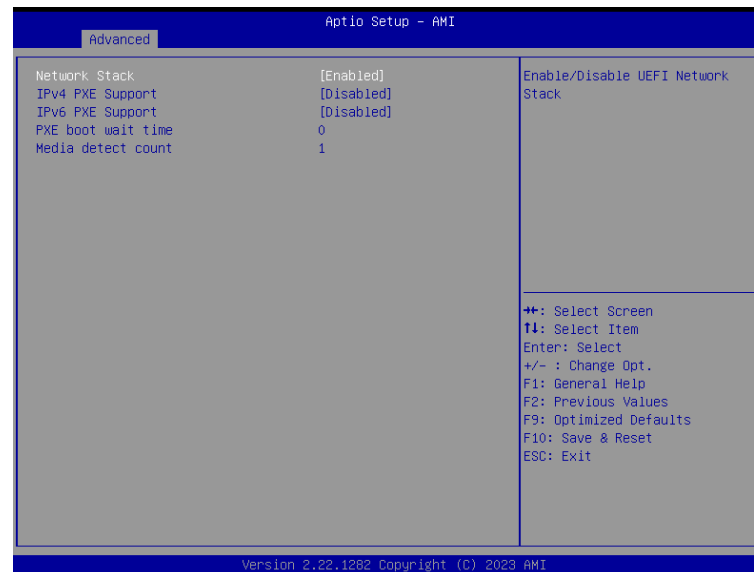
Enable or disable XHCI Hand-off.

USB Mass Storage Driver Support

Enable or disable USB Mass Storage Driver Support.

▶ Advanced

Network Stack Configuration



Network Stack

Enable or disable (Default) UEFI network stack. The following fields will appear when this field is enabled.

Ipv4 PXE Support Enable or disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.

Ipv6 PXE Support

Enable or disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.

PXE boot wait time

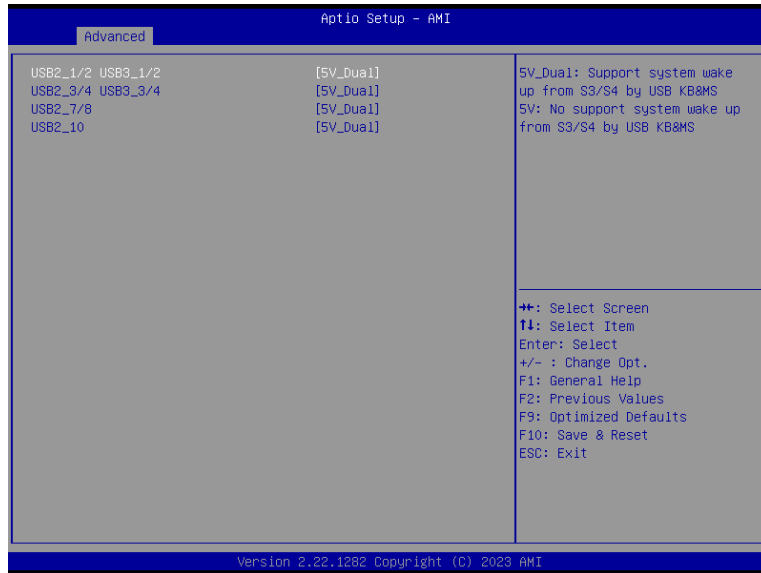
Set the wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

Media detect count

Set the number of times the presence of media will be checked. Use either +/- or numeric keys to set the value.

▶ Advanced

USB Power Control

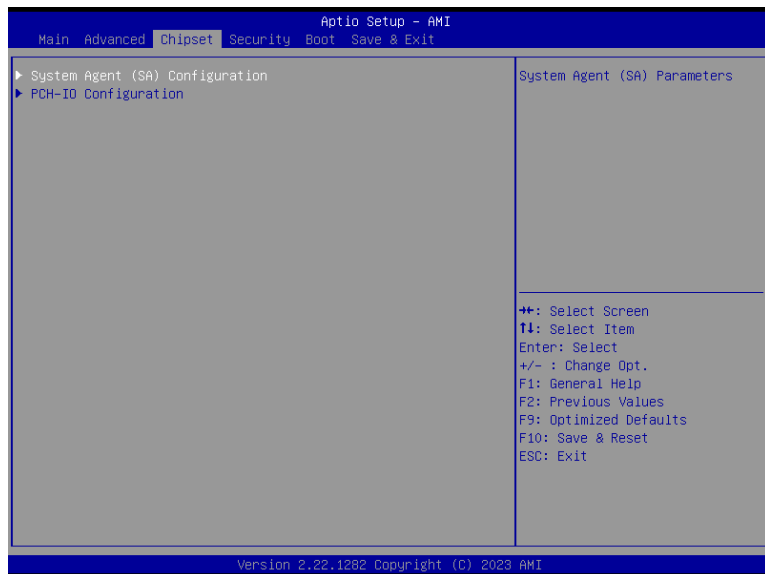


USB Power

5V_Dual: Support system wake from S3/S4 by USB KB&MS

5V: No Support system wake from S3/S4 by USB KB&MS

► Chipset



► Chipset

Graphics Configuration



Primary Display

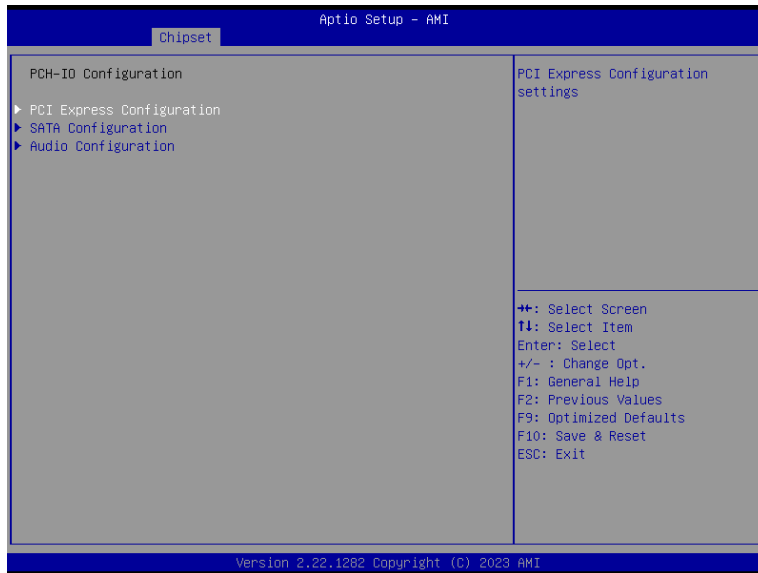
Select which of IGFX/PEG/PCI Graphics device to be the primary display.

Internal Graphics

Keep IGFX "Enabled" or "Disabled" based on the setup options, or select "Auto" for auto-detection.

► Chipset

PCH-IO Configuration



PCI Express Configuration

PCI Express Configuration Settings

SATA Configuration

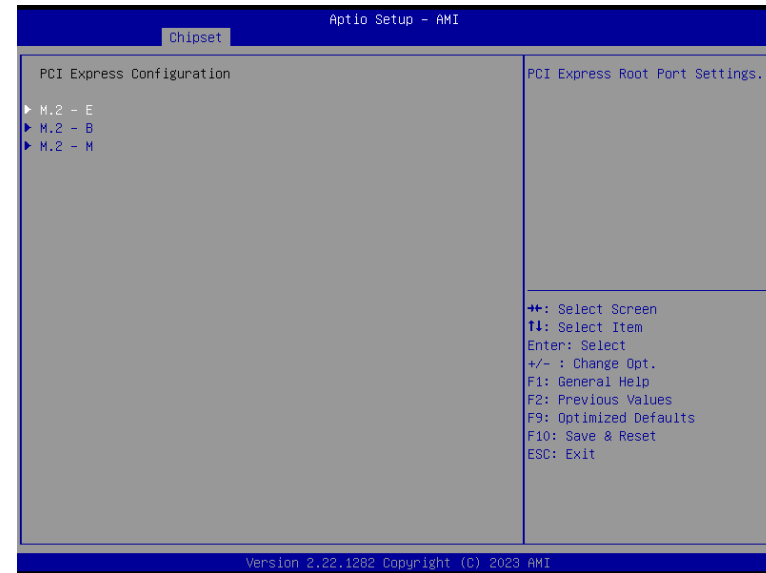
SATA Device Options Settings

Audio Configuration

Audio Subsystem Configuration Settings

► Chipset

PCH-IO Configuration ► **PCI Express Configuration**



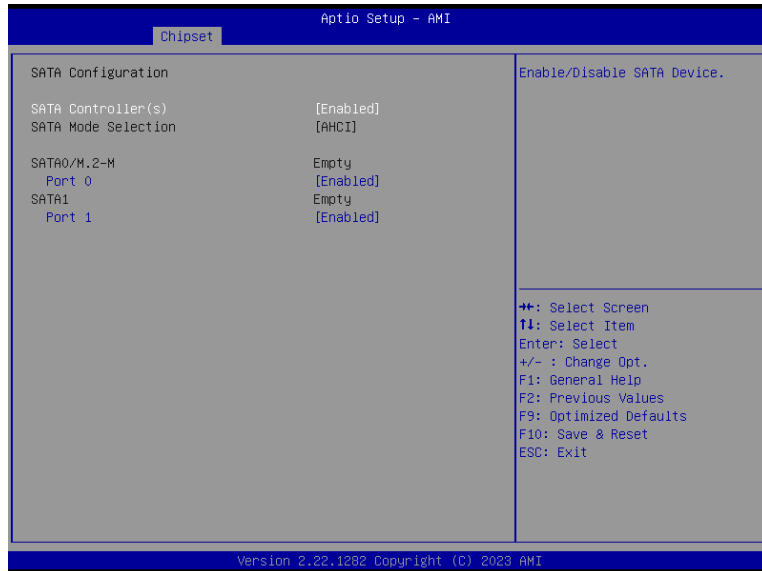
Select one of the PCI Express channels and press enter to configure the following settings.

M.2-E, M.2-M, M.2-B

Control the PCI Express Root Port.

► Chipset

PCH-IO Configuration ► SATA Configuration



SATA Controller(s)

This field is used to enable or disable the Serial ATA controller.

SATA Mode Selection

The mode selection determines how the SATA controller(s) operates.

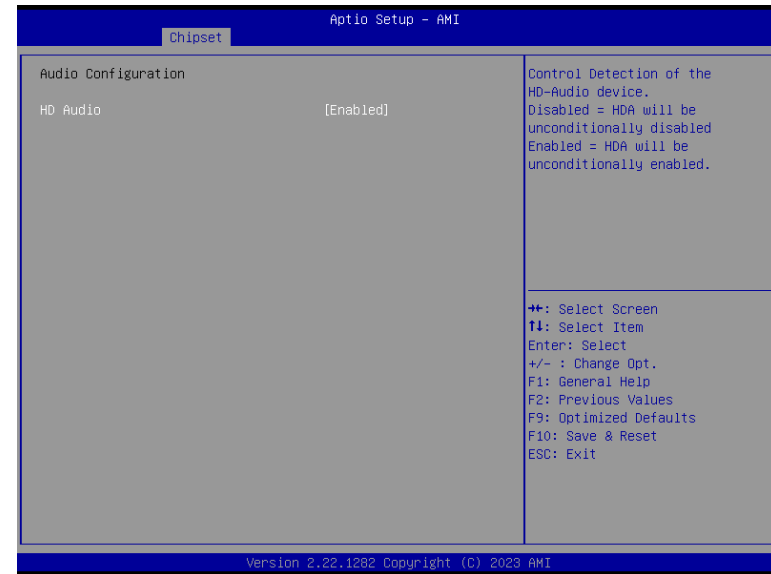
- **AHCI** This option allows the Serial ATA controller(s) to use AHCI (Advanced Host Controller Interface).
- **Intel RST Premium With Intel Optane System Acceleration** This option allows you to create RAID or Intel Rapid Storage configuration along with Intel® Optane™ system acceleration on Serial ATA devices.

Ports and Hot Plug

Enable or disable the Serial ATA port and its hot plug function.

► Chipset

PCH-IO Configuration ► Audio Configuration

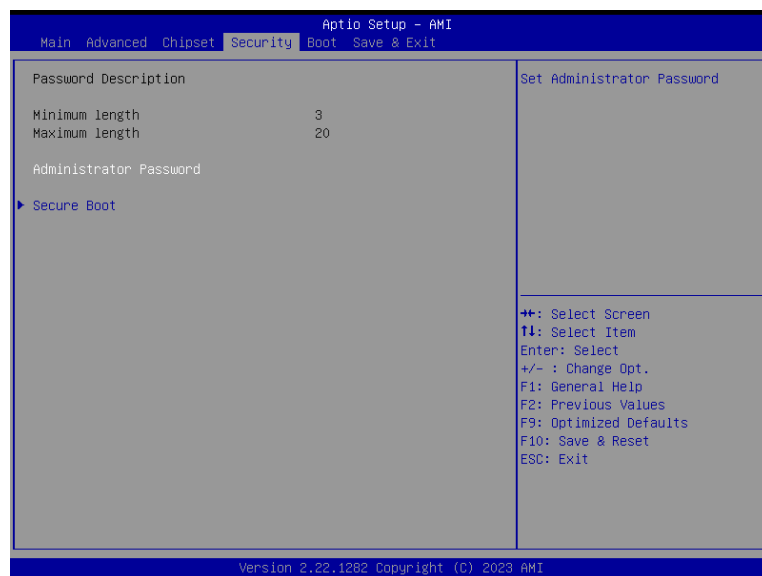


Audio Configuraion

Control the detection of the HD Audio device.

- Disabled** HDA will be unconditionally disabled.
- Enabled** HDA will be unconditionally enabled.

► Security



Administrator Password

Set the administrator password. To clear the password, input nothing and press enter when a new password is asked. Administrator Password will be required when entering the BIOS.

► Security

Secure Boot



Secure Boot

Secure Boot feature is Active if secure Boot is Enabled, Platform Key (PK) is enrolled and the system is in user mode. The mode change requires platform reset.

Secure Boot Mode

Select the secure boot mode – Standard or Custom. When set to Custom, the following fields will be configurable for the user to manually modify the key database.

Restore Factory Keys

Force system to User Mode. Load OEM-defined factory defaults of keys and databases onto the Secure Boot. Press Enter and a prompt will show up for you to confirm.

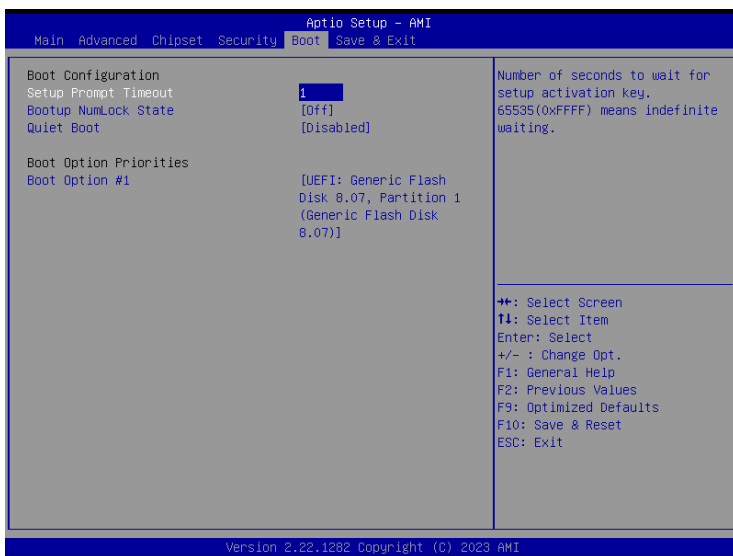
Reset To Setup Mode

Clear the database from the NVRAM, including all the keys and signatures installed in the Key Management menu. Press Enter and a prompt will show up for you to confirm.

Key Management

Enables expert users to modify Secure Boot Policy variables without full authentication.

► Boot



Setup Prompt Timeout

Set the number of seconds to wait for the setup activation key. 65535 (0xFFFF) denotes indefinite waiting.

Bootup NumLock State

Select the keyboard NumLock state: On or Off.

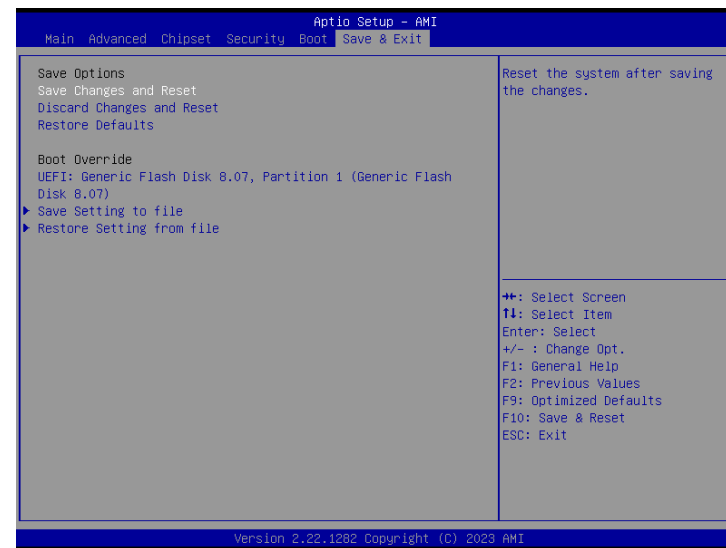
Quiet Boot

This section is used to enable or disable quiet boot option.

Boot Option Priorities

Rearrange the system boot order of available boot devices.

► Save & Exit



Save Changes and Reset

To save the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system after saving all changes made.

Discard Changes and Reset

To discard the changes, select this field and then press <Enter>. A dialog box will appear. Select Yes to reset the system setup without saving any changes.

Restore Defaults

To restore and load the optimized default values, select this field and then press <Enter>. A dialog box will appear. Select Yes to restore the default values of all the setup options.

Boot Override

Move the cursor to an available boot device and press Enter, and then the system will immediately boot from the selected boot device. The Boot Override function will only be effective for the current boot. The "Boot Option Priorities" configured in the Boot menu will not be changed.

► **Save Setting to file**

Select this option to save BIOS configuration settings to a USB flash device.

► **Restore Setting from file**

This field will appear only when a USB flash device is detected. Select this field to restore setting from the USB flash device.

► Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files and specific instructions about how to update BIOS with the flash utility.

► Notice: BIOS SPI ROM

1. The Intel® Management Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.
2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.
3. If you do not follow the methods above, the Intel® Management Engine will not be updated and will cease to be effective.



Note:

- a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
- b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.
- c. After updating unique MAC Address from manufacturing, NVM will be protected immediately after power cycle. Users cannot update NVM or MAC address.