USER'S MANUAL

eBOX640A Series

Embedded System

User's Manual

AXIOMTEK

www.axiomtek.com

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Safety Precautions

Before getting started, please read the following important safety precautions.

1. The eBOX640A does not come with an operating system which must be loaded first before installation of any software into the computer.
2. Be sure to ground yourself to prevent static charge when installing any internal components. Use a wrist grounding strap and place all electronic components in any static-shielded devices. Most electronic components are sensitive to static electrical charge.
3. Disconnect the power cord from the eBOX640A prior to making any installation. Be sure both the system and all external devices are turned OFF. Sudden surge of power could ruin sensitive components. Make sure the eBOX640A is properly grounded.
4. Make sure the voltage of the power source is correct before connecting it to any power outlet.
5. Turn Off system power before cleaning. Clean the system using a cloth only. Do not spray any liquid cleaner directly onto the screen.
6. Do not leave equipment in an uncontrolled environment where the storage temperature is below -40℃ or above 80℃ as it may damage the equipment.
7. Do not open the system's back cover. If opening the cover for maintenance is a must, only a trained technician is allowed to do so. Integrated circuits on computer boards are sensitive to static electricity. To avoid damaging chips from electrostatic discharge, observe the following precautions:
   - Before handling a board or integrated circuit, touch an unpainted portion of the system unit chassis for a few seconds. This will help discharge any static electricity on the human body.
   - When handling boards and components, wear a wrist grounding strap available from most electronic component stores.
8. Warning!! Caution with touch! eBOX640A will become extremely hot when it's on.

Classification

1. Degree of production against electric shock: not classified
2. Degree of protection against ingress of dust: IP40
3. Equipment not suitable for use in the presence of a flammable anesthetic mixture with air, oxygen or nitrous oxide.
4. Mode of operation: Continuous

General Cleaning Tips

Please keep the following precautions in mind while understanding the details fully before and during any cleaning of the computer and any components within.

A piece of dry cloth is ideal to clean the device.

1. Be cautious of any tiny removable components when using a vacuum cleaner to absorb dirt on the floor.
2. Turn the system off before cleaning up the computer or any components within.
3. Avoid dropping any components inside the computer or getting circuit board damp or wet.
4. For cleaning, be cautious of all kinds of cleaning solvents or chemicals which may cause allergy to certain individuals.
5. Keep foods, drinks or cigarettes away from the computer.

Cleaning Tools:

Although many companies have created products to help improve the process of cleaning computer and peripherals, users can also use house hold items accordingly for cleaning. Listed below are items available for cleaning computer or computer peripherals.

Pay special attention to components requiring designated products for cleaning as mentioned below.

- Cloth: A piece of cloth is the best tool to use when rubbing up a component. Although paper towels or tissues can be used on most hardware as well, it is recommended to use a piece of cloth.
- Water or rubbing alcohol: A piece of cloth may be somewhat moistened with water or rubbing alcohol before being rubbed on the computer. Unknown solvents may be harmful to plastic parts.
- Absorb dust, dirt, hair, cigarette and other particles outside of a computer can be one of the best methods of cleaning a computer. Over time these items may restrict the airflow in a computer and cause circuitry to corrode.
- Cotton swabs: Cotton swabs moistened with rubbing alcohol or water are applicable to reach areas in a keyboard, mouse and other areas.
- Foam swabs: If possible, it is better to use lint free swabs such as foam swabs.

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【Note】：*It is strongly recommended that the customer should shut down the system before starting to clean any single components.*

Please follow the steps below:

1. Close all application programs;
2. Close operating software;
3. Turn off power switch;
4. Remove all devices;
5. Pull out the power cable.

Scrap Computer Recycling

Please inform the nearest Axiomtek distributor as soon as possible for suitable solutions in case computers require maintenance or repair; or for recycling in case computers are out of order.

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Windows 8.1, Windows 10, Linux and other brand names and trademarks are the properties and registered brands of their respective owners.

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SECTION 1
INTRODUCTION

This section contains general information and detailed specifications of the eBOX640A. Section 1 includes the following sections:

- General Description
- System Specifications
- Dimensions
- I/O Outlets
- Packing List
- Model List

1.1 General Description

The eBOX640A is an embedded system that is powered by LGA1700 12th gen Intel® Core™ i7/i5/i3 processors (Alder Lake) to support Windows 10, Windows 11 and Linux, suitable for the most endurable operation. It is designed with full feature I/O, two 260-pin unbuffered SO-DIMM sockets for one channel DDR4-3200/2666/2400 MHz memory, and enhanced system dependability through built-in Watchdog Timer.

- **Features**
  - LGA1700 12th gen Intel® Core™ i7/i5/i3, 35W TDP
  - Intel® UHD Graphics 770 by Intel® Xe Architecture with up to 32 graphics
  - 8-CH TTL DIO
  - 2 HDMI for dual display outputs
  - -10˚C to +50˚C wide operating temperatures
  - 19VDC power input w/power protection

- **Reliable and Stable Design**
  The embedded system supports LGA1700 12th gen Intel® Core™ i7/i5/i3 processors (TDP up to 35W), with high flexibility and multi-functional design to provide the best solution for any industrial field applications.

- **Embedded O.S. Supported**
  The eBOX640A supports Windows 10, Windows 11 and Linux.

- **Various Storage devices supported**
  For storage device, the eBOX640A supports one 2.5" SATA storage drive bay.

1.2 System Specifications

1.2.1 CPU

- **CPU**
  - LGA1700 12th gen Intel® Core™ i7/i5/i3 or Celeron® processor (TDP up to 35W)
- **Chipset**
  - Intel® H610
- **BIOS**
  - American Megatrends Inc. UEFI (Unified Extensible Firmware Interface) BIOS.
- **System Memory**
  - Two 260-pin unbuffered DDR4-3200/2666/2400 MHz SO-DIMM sockets, max. up to 64GB

1.2.2 I/O System

- **Ethernet**
  - LAN1: 2500/1000/100/10 Mbps Gigabit/Fast Ethernet; supports Wake-on-LAN, PXE with Intel® I225-V
  - LAN2: 1000/100/10 Mbps Gigabit/Fast Ethernet; supports Wake-on-LAN, PXE with Intel® I219-V

- **Serial Ports**
  - 1 x RS-232/422/485 9-pin D-Sub male connector (COM1) (select by BIOS)
  - 3 x RS-232 9-pin D-Sub male connector (COM2-4)

- **USB Ports**
  - 2 x USB 3.2 Gen 1
  - 2 x USB 2.0

- **Display**
  - 2 x HDMI 1.4b with resolution max. up to 4096x2160 @24Hz.

- **DIO Ports**
  - 1 x 8-CH DIO (4-in/4-out)

- **Audio**
  - 1 x Line out

Flexible I/O Window

- Default : 2 x DB9 half cut bracket

- **Switch**
  - 1 x Power switch
  - 1 x Reset switch connector
  - 1 x ATX/AT quick switch
  - 1 x Remote switch connector

- **Indicators**
  - 1 x Green for system power
  - 1 x Orange LED for HDD active

- **Storage**
  - 1 x 2.5" SATA HDD drive bay (up to 15 mm height)

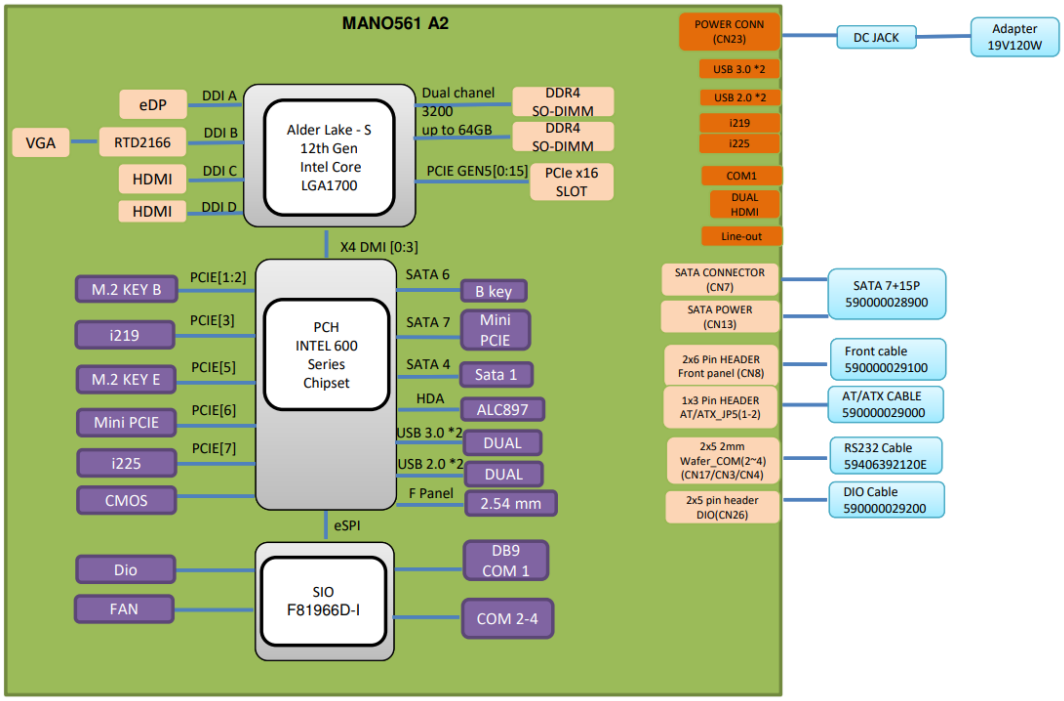
- **Expansions**
  - 1 x M.2 Key B 2242 (PCIe x2 signal) (for storage only)
  - 1 x M.2 Key E 2230 (PCIe x1 & USB signal)(for Wi-Fi, Bluetooth)
  - 1 x Full-size PCI Express Mini Card slot (PCIe x1 & USB 2.0 signal)

- **Antenna**
  - 3 x SMA-type antenna connector

- **TPM**
  - Onboard TPM 2.0 (TPM IC: SLB9670)

1.2.3 System Specification

- **System Block diagram**



- **Watchdog Timer**
  - 1~255 seconds or minutes; up to 255 levels.
- **Power Supply**
  - Input : 19V DC
- **Operation Temperature**
  - -10°C to +50°C (14°F to 122°F) (with W.T. SSD/DRAM)
- **Humidity**
  - 10% ~ 90% (non-condensation)
- **Vibration Endurance**
  - IEC 60068-2-64 (w/SSD: 3Grms STD, random, 5 - 500 Hz, 1 hr/axis)
- **Shock Vibration**
  - IEC 60068-2-27 (w/SSD: 50G, half sine, 11 ms duration)
- **Weight**
  - 3 kg (6.61 lb) without package
  - 3.6 kg (7.94 lb) with package
- **Dimensions**
  - 195 mm (7.67") (W) x 210.6 mm (8.27") (D) x 80 mm (3.14") (H)

1.2.4 Driver CD Content

Please download the following eBOX640A drivers from the Axiomtek official website.

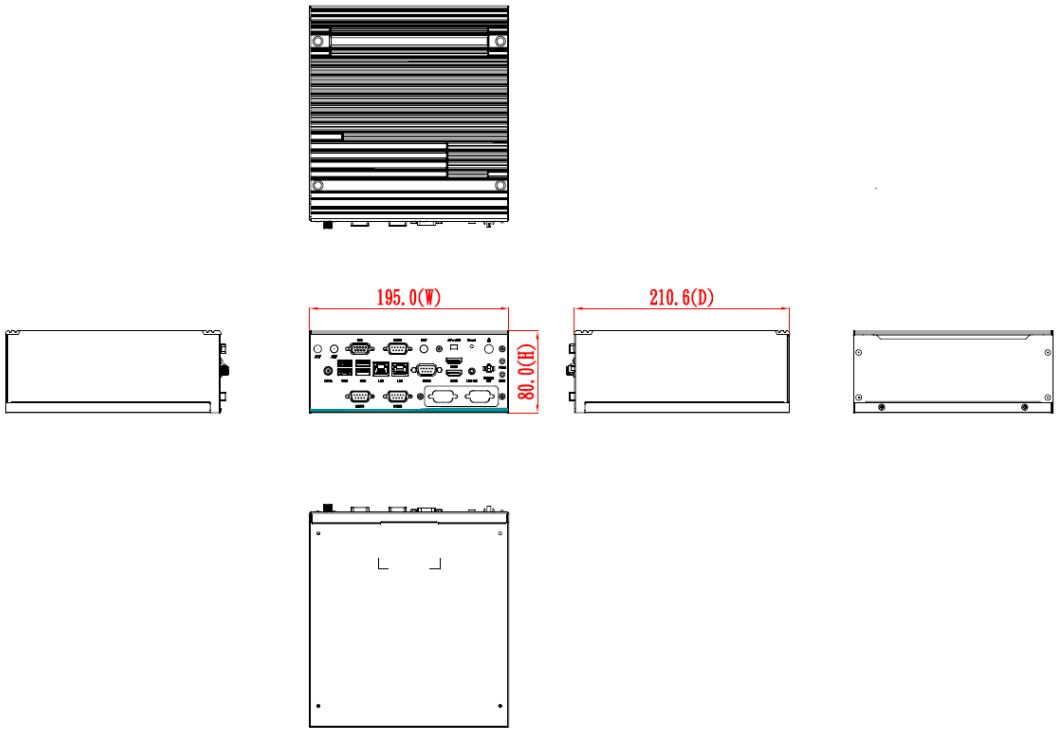
- **Chipset**
- **Ethernet**
- **Graphic**
- **USB 3.2**
- **Intel® ME**
- **HD Audio**

【Note】 ***All specifications and images are subject to change without notice.***

1.3 Dimensions

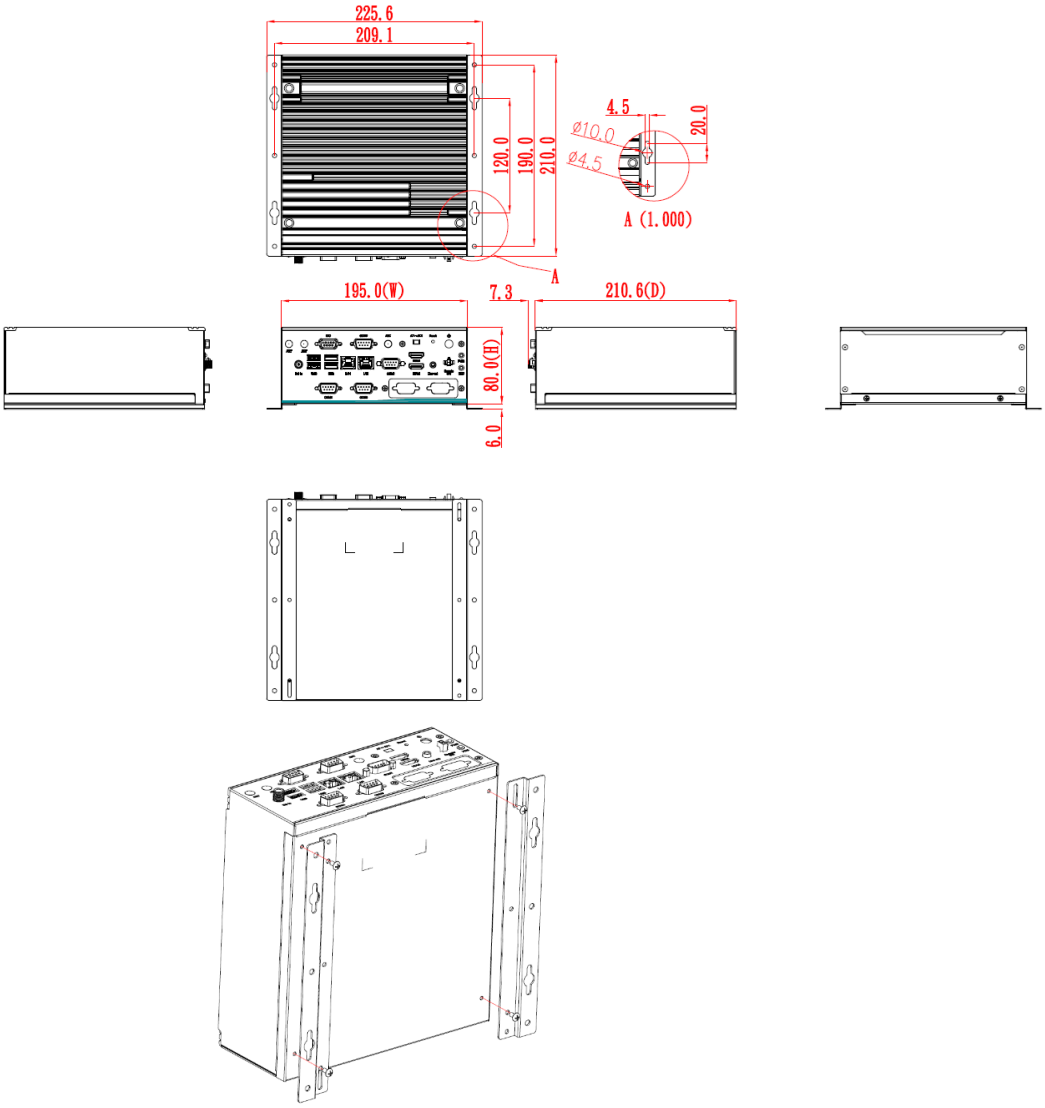
The following diagrams show dimensions and outlines of the eBOX640A.

1.3.1 System Dimensions

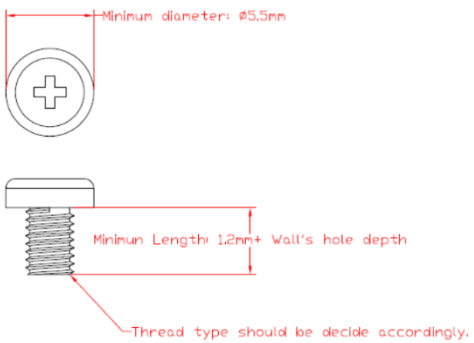


1.3.2 Wall mount Bracket Dimensions

Users can get 6pcs truss head M3*6L screws for fixing the wall mount kit from the accessories box.

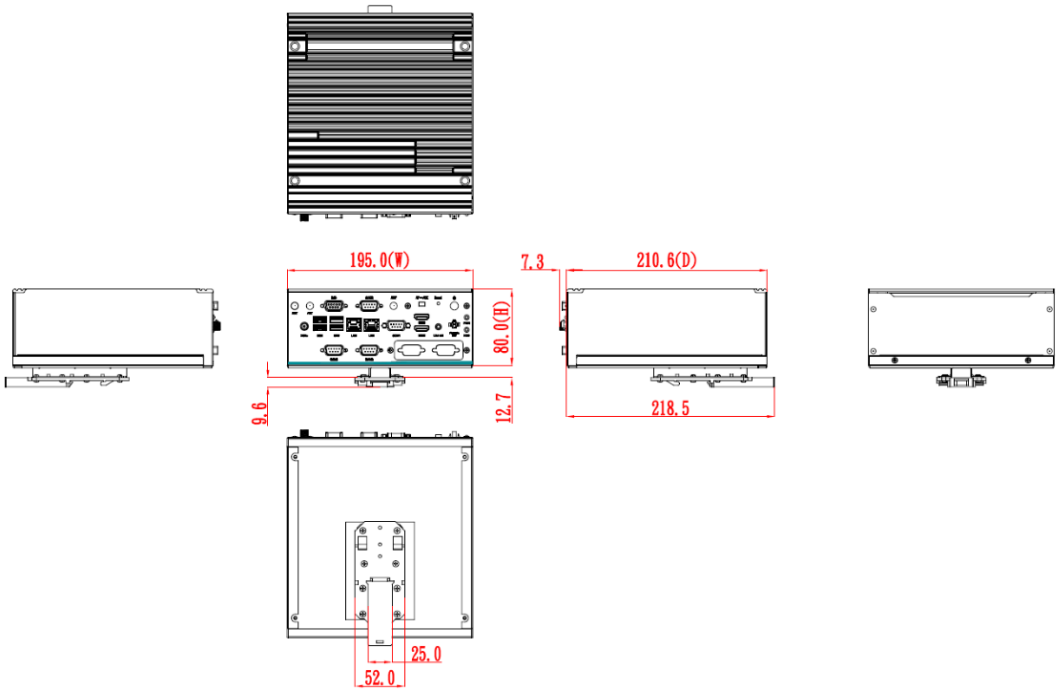


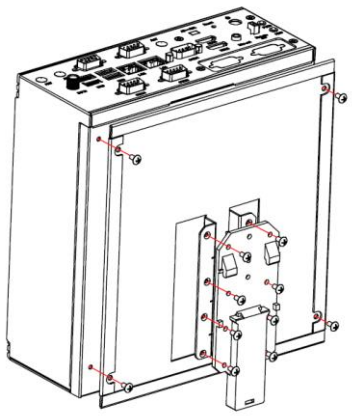
Note: If users install the screws in drywall, use the hollow wall anchors to ensure that unit does not pull away from the wall due to prolonged strain between the cable and power connector.



1.3.3 Din Rail Bracket Dimensions

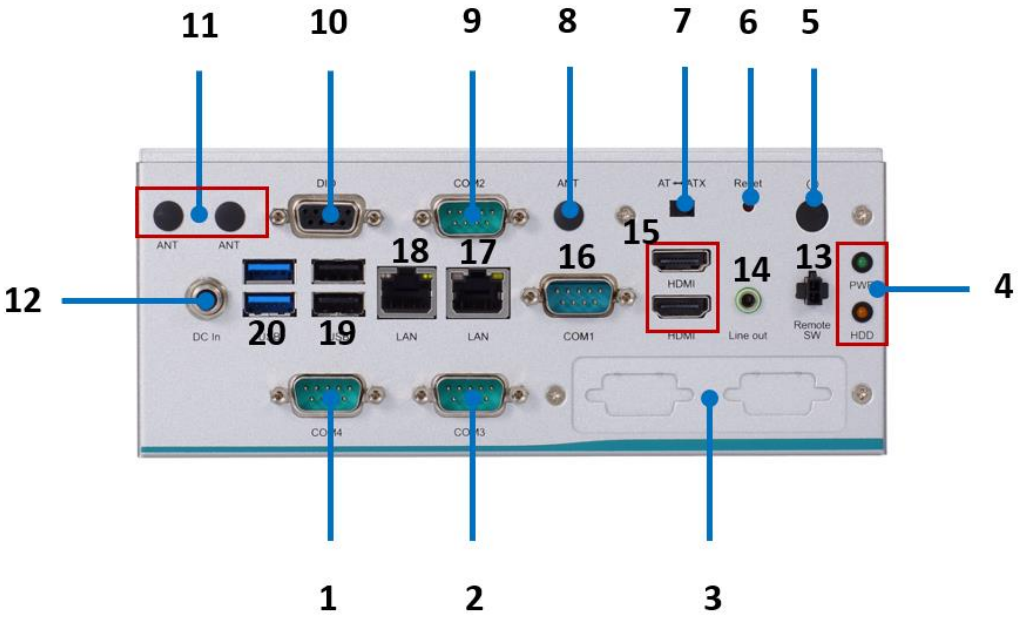
Users can get 6pcs truss head M3*6L screws for fixing the wall mount kit from the accessory box.





1.4 I/O Outlets

The following figures show I/O outlets on the front of the eBOX640A.



- **Front View**

1	COM 4 (RS232)	11	2 x Antenna opening hole
2	COM 3 (RS232)	12	DC Jack power input
3	Flexible IO Window (default : 2 x DB9 half cut bracket)	13	Remote Switch connector
4	LEDs	14	1 x Line out
5	Power button	15	2 x HDMI port
6	Rest switch connector	16	COM 1 (RS232/422/485)
7	AT/ATX quick switch	17	LAN 1 (i225-V)
8	1 x Antenna opening hole	18	LAN 2 (i219-V)
9	COM 2 (RS232)	19	2 x USB 2.0
10	8-CH DIO Port	20	2 x USB 3.0

1.5 Packing List

The eBOX640A comes with the following bundle package:

- **eBOX640A system unit x 1**
- **Screws pack x 1**
- **Foot pad x 4**
- **HDD bracket x 1**
- **DRAM Thermal pad x 1**

1.6 Model List

eBOX640A-ALD-S	Fanless Embedded System with LGA1700 12th generation Intel® Core™ i7/i5/i3 or Celeron® processor, Intel® H610, 4 COM, 2 LANs,2 HDMI, 4 USB, 8-CH DIO and 19VDC

Please contact Axiomtek's distributors immediately in case any abovementioned items are missing.

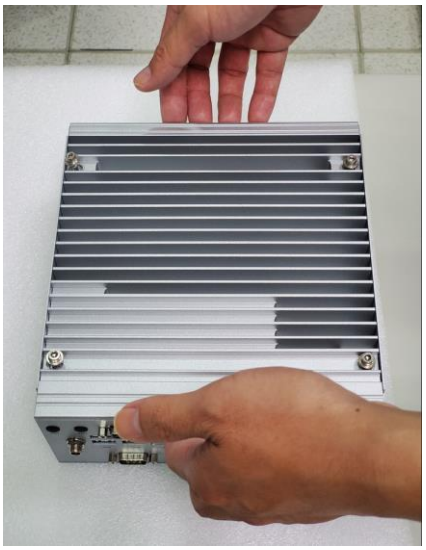
SECTION 2
HARDWARE INSTALLATION

The eBOX640A is convenient for your various hardware configurations, such as HDD (Hard Disk Drive), SSD (Solid State Drive), Long-DIMM or PCI Express Mini Card modules. Section 2 will show how to install the hardware.

2.1 Installation of the CPU Processor

Step 1 Turn off the system and unplug the power cord.
Step 2 Locate the four screws on the top heatsink used to fasten the heatsink to the chassis.

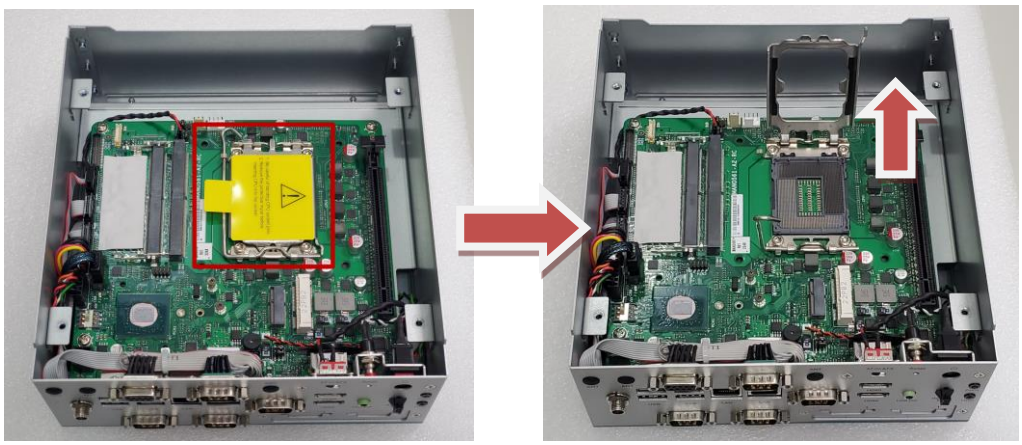
Step 3 Loosen these screws and lift the top heatsink up.



Step 4 Remove the warning label and disengage load lever.

- Disengage the load lever by pushing its hook down and then pulling it slightly outward.
- Rotate the load lever to the open position at approximately 135°.
- Rotate the load plate to the open position at approximately 150°.

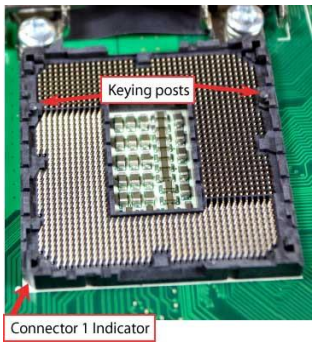
【Note】 ***Apply pressure to corner with the right-hand thumb when opening or closing the load lever - otherwise the lever will bounce back (as a mouse trap does) causing bent contacts.***

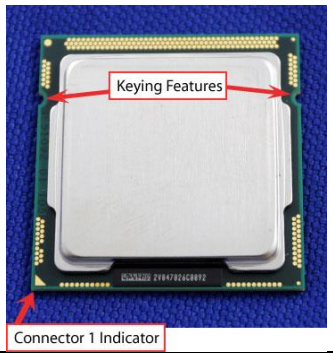


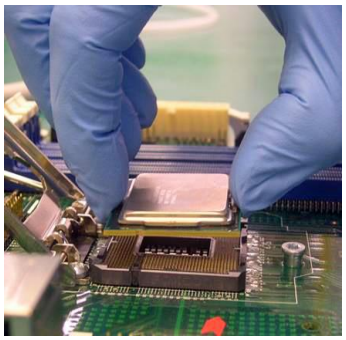
Step 5 Installation steps of the CPU processor

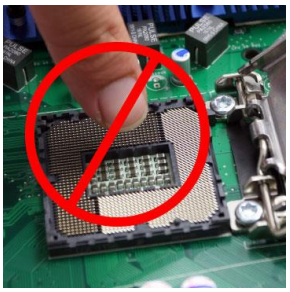
- Lift the processor package from shipping media by grasping the substrate edges.

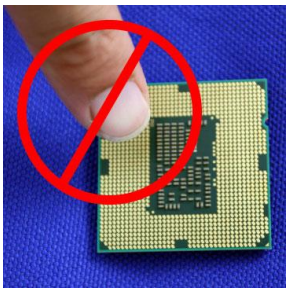
- Scan the processor package gold pads for any presence of foreign material.
- Locate connection 1 indicator on the processor which aligns with connection 1 indicator chamfer on the socket, and notice processor keying features that line up with posts along socket walls.
- Grasp the processor with the thumb and index finger along the top and bottom edges. The socket will have cutouts for your fingers to fit into.
- Carefully place the processor into the socket body vertically.







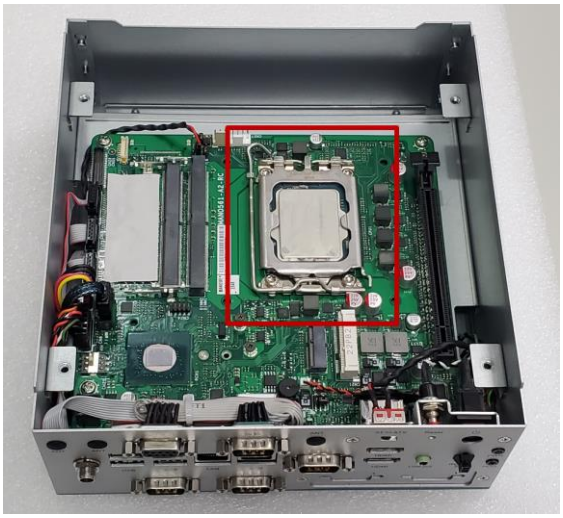




【Note】 ***Never touch the fragile socket contacts to avoid damage and do not touch the processor's sensitive contacts at any time during installation.***

Step 6 Installation steps of the CPU processor

Align pins of the CPU with pin holes of the socket. Be careful of the CPU's orientation that users need to align the arrow mark on the CPU with the arrow key on the socket.



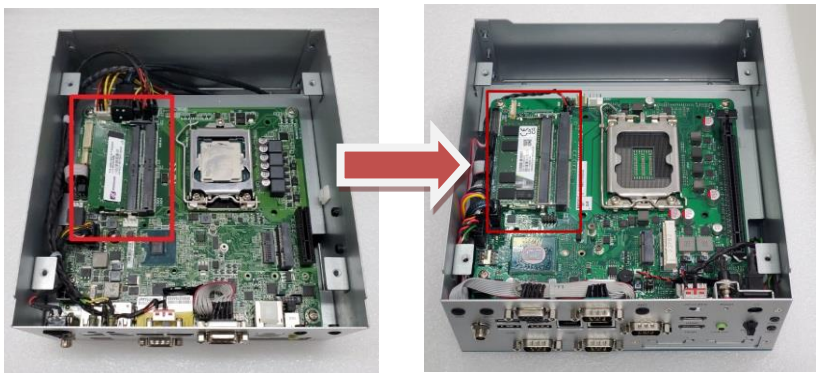
Step 7 Put the top heatsink and fasten all screws back onto the system.

2.2 Installation of SO-DIMM Memory

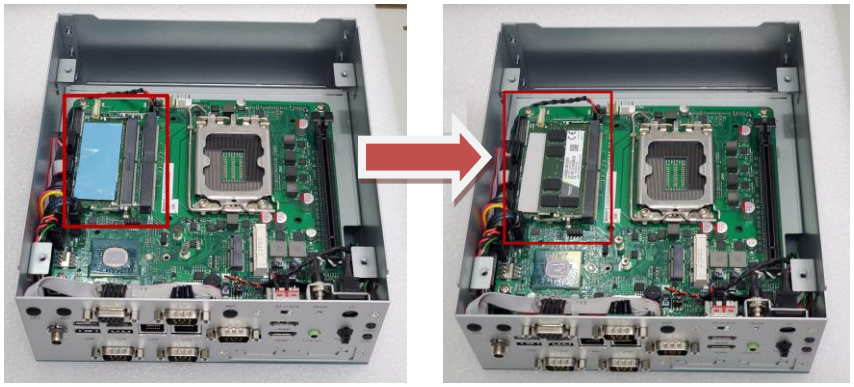
Step 1 Turn off the system and unplug the power cord.

Step 2 Locate the four screws on the top heatsink used to fasten the heatsink to the chassis.

Step 3 Locate the memory module, insert the gold colored contact into the socket, and push the module down until it is locked in place by the two end latches.



Step 4 If users need insert 2nd DRAM, please place the thermal pad in top of the 1st DRAM socket before, and then insert the gold colored contact into the socket, and push the module down until it is locked in place by the two end latches.



Step 5 Put the top heatsink and fasten four screws back onto the system.

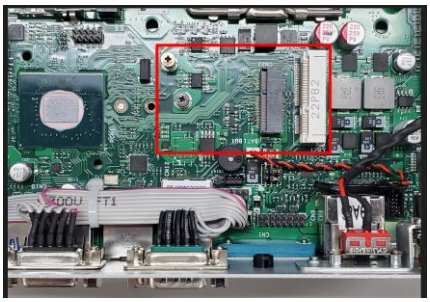
2.3 Installation of M.2 Key E / PCI-Express Mini Card

Step 1 Turn off the system and unplug the power cord.

Step 2 Locate the four screws on the top heatsink used to fasten the heatsink to the chassis.

Step 3 Locate the PCI Express Mini Card slot within the red line marked or M.2 key E slot as the bule line marked.

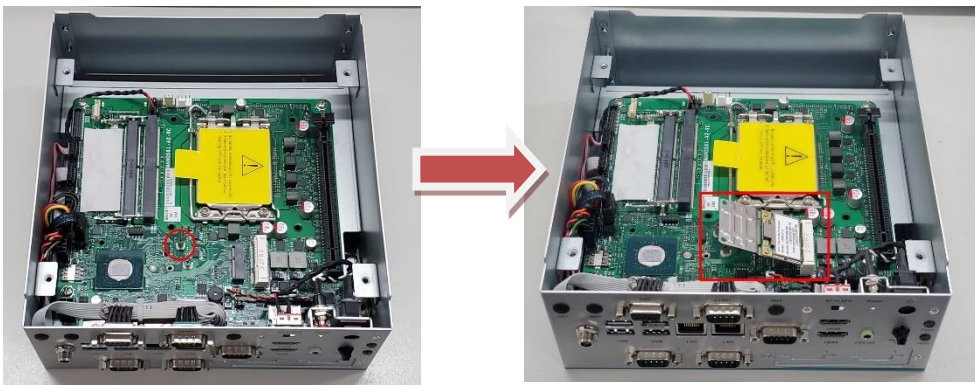
PCIe mini card slot



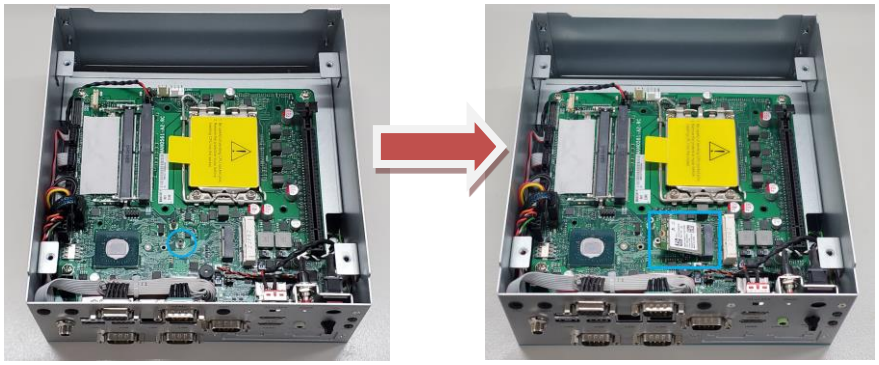
M.2 Key E mini card slot

Step 4 Remove the mini card screw first, and insert a mini PCIe module into the sockets and then fasten screw.

PCIe mini card slot (full-size)



M.2 Key E slot (2230)

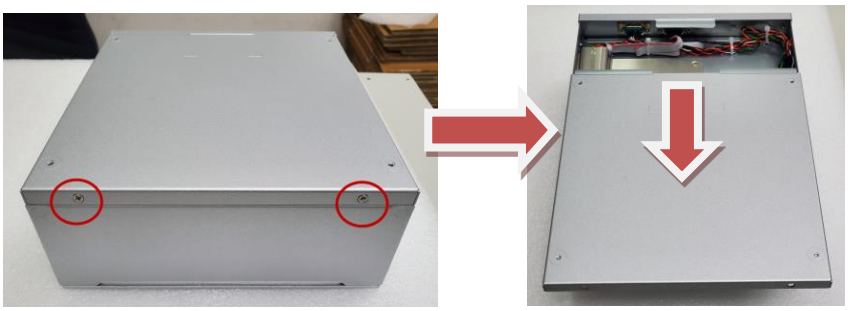


Step 5 Assemble the bottom cover back and fasten all screws.

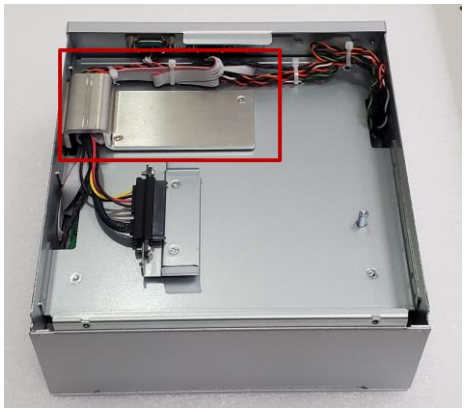
2.4 Installation of the M.2 Key B Mini Card (only for storage)

Step 1 **Turn off the system, and unplug the power cord.**

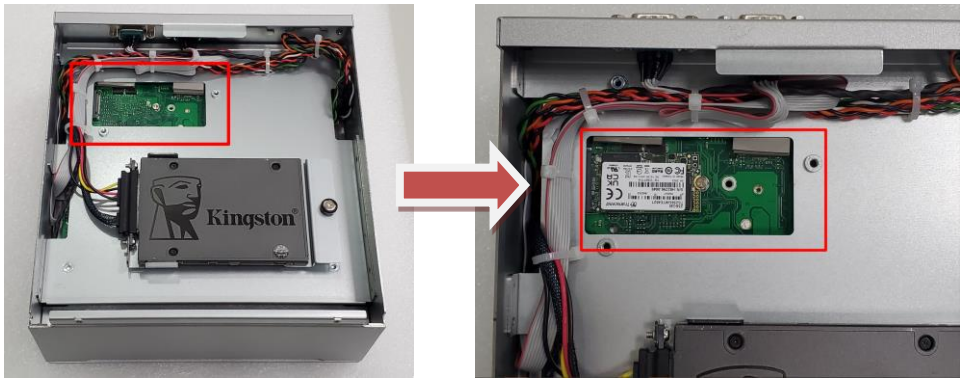
Step 2 **Turn the system upside down to locate the two screws at the rear side, and then loosen the two screws.**



Step 3 **Locate the M.2 Express Mini Card slot within the red line marked.**



Step 4 **Remove the mini card thermal bracket first, and then slide the M.2 mini Card into the slot with caution, and fasten the screw of the M.2 mini Card.**

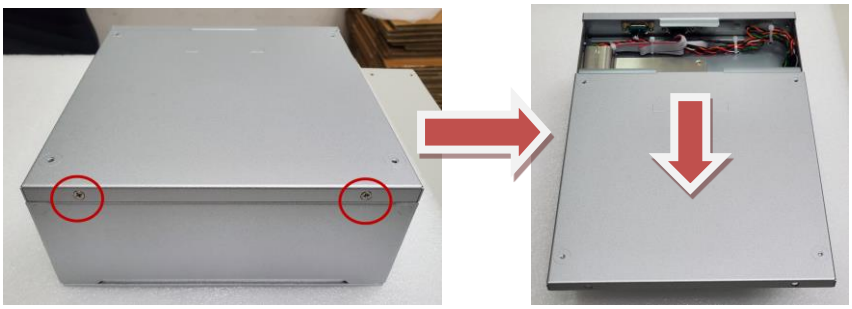


Step 5 **Assemble the bottom cover back and fasten all screws.**

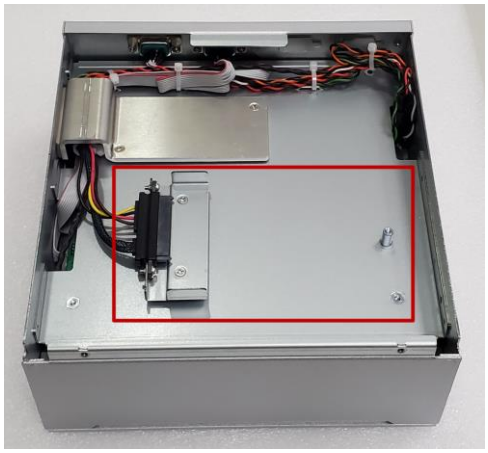
2.5 Installation of the 2.5" SATA Device

Step 1 **Turn off the system, and unplug the power adaptor.**

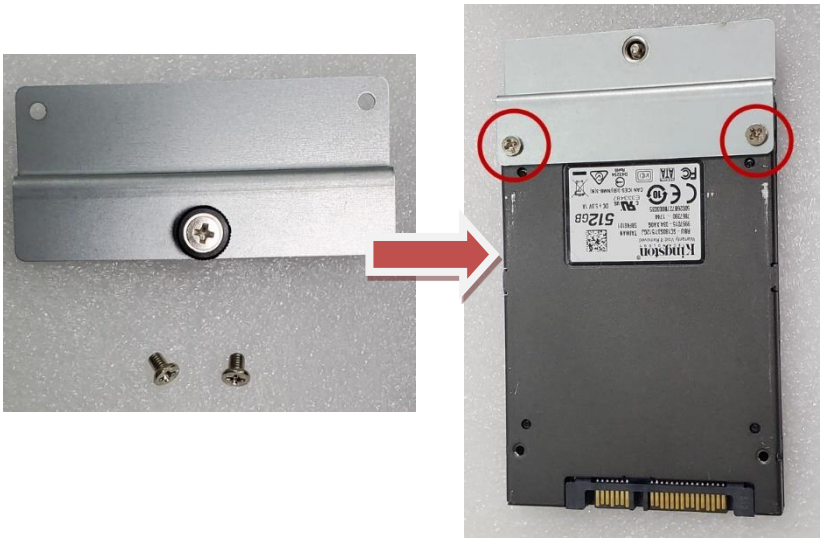
Step 2 **Turn the system upside down to locate the two screws at the rear side, and then loosen the two screws.**



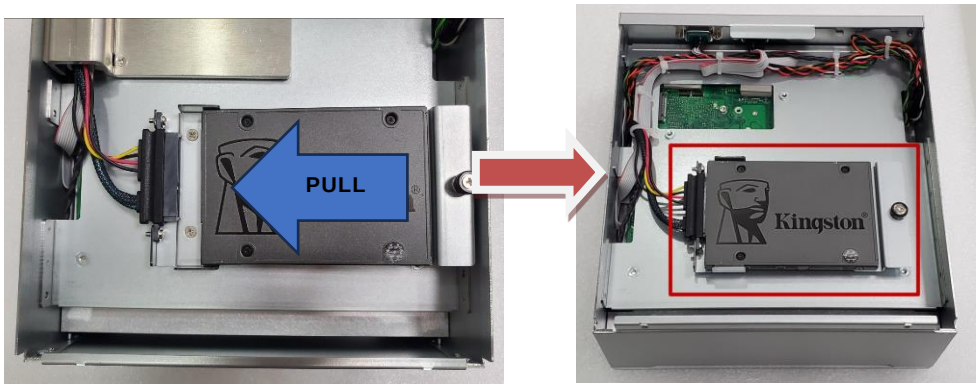
Step 3 **Locate the SSD/HDD drive bay within the red line marked.**



Step 4 **Please prepare the following HDD bracket and screws to assemble SSD/HDD and then fasten two screws to fix SSD/HDD.**



Step 5 Connect the SSD/HDD directly and make sure the insertion is complete.

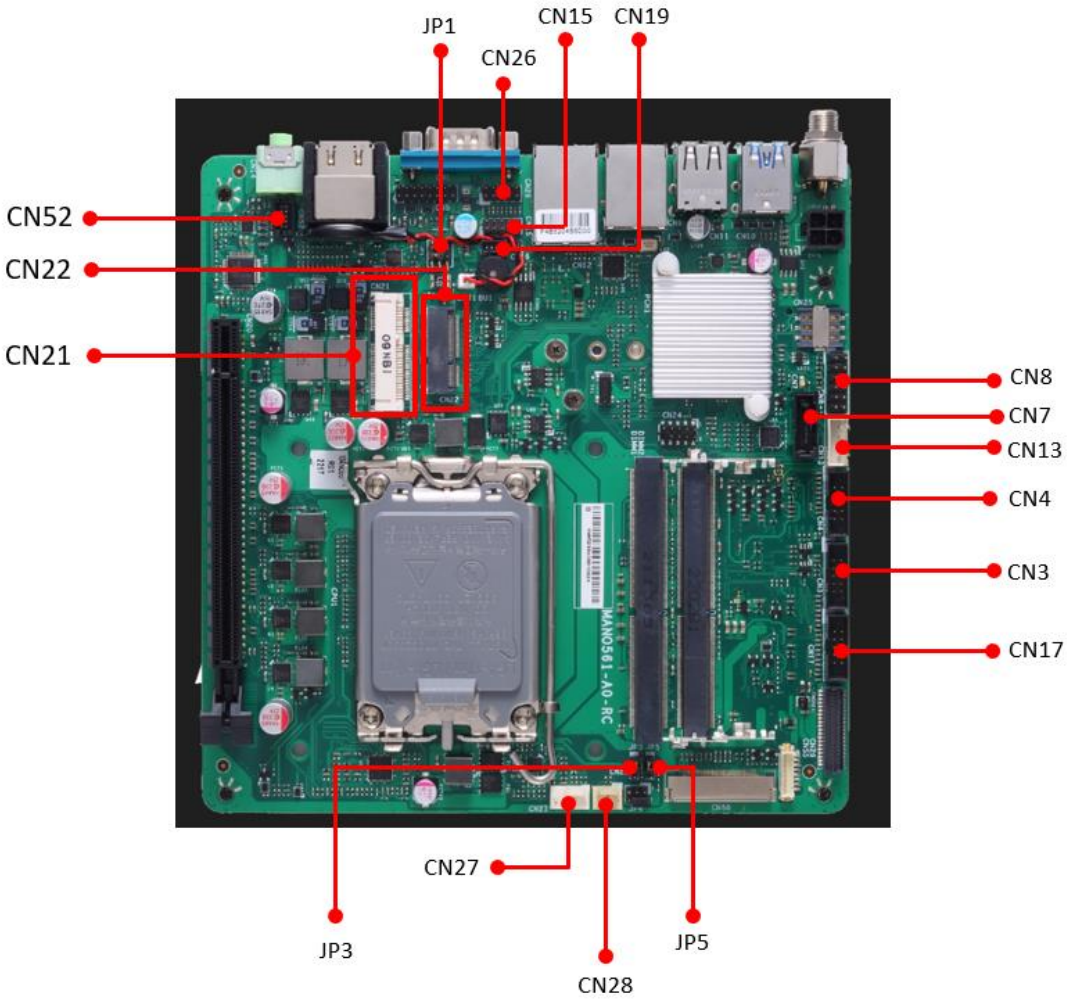


SECTION 3
JUMPER & CONNECTOR SETTINGS

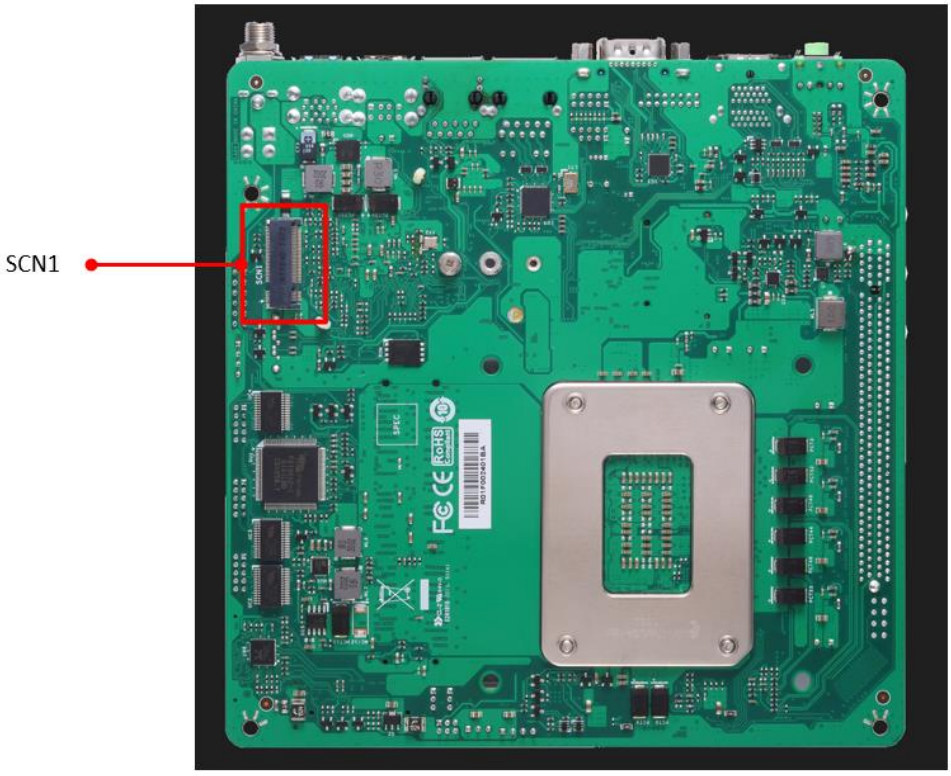
Proper jumper settings configure the eBOX640A to meet various application needs.-Hereby all jumpers settings along with their default settings are listed for devices onboard.

3.1 Locations of Jumpers & Connectors

MANO561 Top Side



MANO561 Bottom Side



【Note】 ***It is strongly recommended that any unmentioned jumper settings should not be modified without instructions by Axiomtek FAEs.***

Any modifications without instructions might cause system failure.

3.2 Summary of Jumper Settings

Proper jumper settings configure the eBOX640A to meet various application purposes. A table of all jumpers and their default settings is listed below.

MANO561

Jumper	Description	Setting
JP1	COM Data/Power Select Default: RS-232 Data	3-5 Close 4-6 Close
JP3	Clear CMOS Default: Normal Operation	1-2 Close
JP5	AT/ATX Power Mode Select Default: ATX Mode	1-2 Close

【Note】 ***How to setup Jumpers***

That a cap on a jumper is to "close" the jumper, whereas that off a jumper is to "open" the jumper.

[Open]

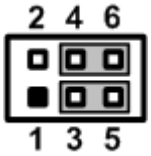
[Closed]

[Pin1-2 Closed]

3.2.1 COM2 Data/Power Select (JP1)

This is a 3x2-pin (pitch=2.00mm) jumper. The COM1 port has +5V power capability on DCD and +12V on RI by setting JP1.

Functions	Settings
Power: Set COM1 pin 1 to +5V	1-3 close
Data: Set COM1 pin 1 to DCD (Default)	3-5 close
Power: Set COM1 pin 9 to +12V	2-4 close
Data: Set COM1 pin 9 to RI (Default)	4-6 close



3.2.2 Clear CMOS (JP3)

This jumper allows you to clear the Real Time Clock (RTC) RAM in CMOS. You can clear the CMOS memory of date, time, and system setup parameters by erasing the CMOS RTC RAM data. The onboard button cell battery powers the RAM data in CMOS, which includes system setup information such as system passwords.

To erase the RTC RAM:

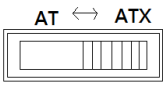
1. Turn OFF the computer and unplug the power cord.
2. Remove the onboard battery.
3. Move the jumper clip from pins 1-2 (default) to pins 2-3. Keep the clip-on pins 2-3 for about 5~10 seconds, then move the clip back to pins 1-2.
4. Re-install the battery.
5. Plug the power cord and turn ON the computer.
6. Hold down the <Del> key during the boot process and enter BIOS setup to re-enter data.

Functions	Settings
Normal operation (Default)	1-2 close
Clear CMOS	2-3 close

3.2.3 AT/ATX Power Mode Select (JP5)

Use this Quick-SW to select AT or ATX power mode.

Function	Setting
ATX mode (Default)	1-2 close
AT mode	2-3 close



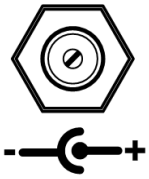
3.3 Connectors

Connectors connect the board with other parts of the system. Loose or improper connection might cause problems. Make sure all connectors are properly and firmly connected. Here is a table summarizing all connectors on the **eBOX640A** series.

External Connectors		**Sections**
DC Jack Power Connector	(CN23)	3.3.1
USB 2.0 Stack connector	(CN11)	3.3.2
USB 3.2 Connector	(CN10)	3.3.3
Ethernet Connector	(CN9,CN12)	3.3.4
COM1 D-Sub Connector	(CN1)	3.3.5
COM2 D-Sub Connector	(CN17, CN3, CN4)	3.3.6
Audio Jack Connector	(CN14)	3.3.7
HDMI 1.4b Connector	(CN6)	3.3.8
Digital I/O Connector	(CN26)	3.3.9
Internal Connectors		**Sections**
FAN headers (optional)	(CN27, CN28)	3.3.10
SATA power Connector	(CN13)	3.3.11
SATA 3.0 Connector	(CN7)	3.3.12
M.2 Key E Socket	(CN22)	3.3.13
Full Size Mini Card slot	(CN21)	3.3.14
Front Panel Connector	(CN8)	3.3.15
M.2 Key B Socket	(SCN1)	3.3.16

3.3.1 DC Jack Power Connector (CN23)

The CN23 is a DC jack with screw supporting 19VDC power input connector. Firmly insert at least 120W adapter into this connector. Loose connection may cause system instability and make sure all components/devices are properly installed before connecting.

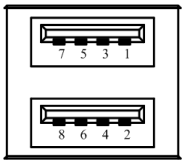


【Note】 *Screw metric thread size: M8.0x0.75.*

3.3.2 USB 2.0 Stack Port (CN11)

The motherboard comes with one stacked Universal Serial Bus (compliant with USB 2.0) connector on the rear I/O for installing USB peripherals such as keyboard, mouse, scanner, etc.

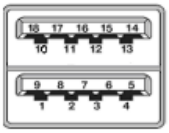
Pins	Signals	Pins	Signals
1	USB_PWR	2	USB_PWR
3	USB#5_D-	4	USB#6_D-
5	USB#5_D+	6	USB#6_D+
7	GND	8	GND



3.3.3 USB 3.2 Stack Port (CN10)

The motherboard comes with one stacked Universal Serial Bus (compliant with USB 3.2 GEN1) connector on the rear I/O for installing USB peripherals such as a keyboard, mouse, scanner, etc.

Pins	Signals	Pins	Signal
1	USB_PWR	10	USB_PWR
2	USB#1_D-	11	USB#2_D-
3	USB#1_D+	12	USB#2_D+
4	GND	13	GND
5	SSRX1-	14	SSRX2-
6	SSRX1+	15	SSRX2+
7	GND	16	GND
8	SSTX1-	17	SSTX2-
9	SSTX1+	18	SSTX2+



3.3.4 Ethernet Connector (CN9 & CN12)

The motherboard comes with two high performance plug and play Ethernet interfaces (RJ-45) which are fully compliant with the IEEE 802.3 standard. Connection can be established by plugging one end of the Ethernet cable into this RJ-45 connector and the other end to a 1000/100/10-Base-T hub.

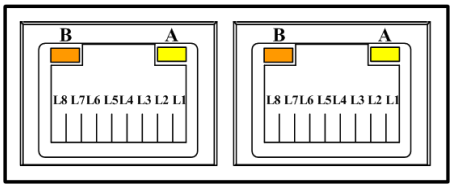
The motherboard supports two Ethernet ports (CN9, CN12): two RJ45 connectors with

CN12 (LAN 1) : Intel® i225-V controller support 10/100/1000/2500Mbps.

CN9 (LAN 2): Intel® i219-V controller support 10/100/1000 Mbps.

Pins	LAN Signals	Pins	LAN Signals
L1	Tx+ (Data transmission positive)	L2	Tx- (Data transmission negative)
L3	Rx+ (Data reception positive)	L4	RJ-1 (For 1000 Base-T only)
L5	RJ-1 (For 1000 Base-T only)	L6	Rx- (Data reception negative)
L7	RJ-1 (For 1000 Base-T only)	L8	RJ-1 (For 1000 Base-T only)
A	Speed LED LAN1: Intel® i219-V OFF: 10Mbps data rate Green: 100Mbps data rate Orange: 1Gbps data rate LAN2: Intel® i225-V OFF: 10/100Mbps data rate Green: 1Gbps data rate Orange: 2.5Gbps data rate	B	Active LED(Yellow) OFF: No link Blinking: Link established; data activity detected

CN9 CN12



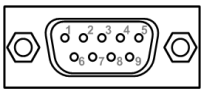
※ Note : CN9/CN12 supports Wake-on-LAN

3.3.5 COM1 D-Sub Connector (CN1)

The CN1 is a 9-pin D-Sub connector for COM1 (RS-232/422/485) serial port interfaces. The pin assignments of RS-232/422/485 are listed in table below. Baud Rate: 9600~115200.

COM1:

Pin	RS-232 (3T/5R)	RS-422 (1T/1R Full Duplex)	RS-485 (1T/1R TX Enable Low Active)
1	COM1C_DCD [*]	TX (-)	Data (-)
2	COM1C_RXD	TX (+)	Data (+)
3	COM1C_TXD	RX (+)	NC
4	COM1C_DTR	RX (-)	NC
5	GND	GND	GND
6	COM1C_DSR	NC	NC
7	COM1C_RTS	NC	NC
8	COM1C_CTS	NC	NC
9	COM1C_RI [*]	NC	NC



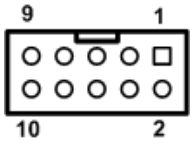
COM1

3.3.6 COM2/3/4 D-Sub Connector (CN17, CN3, CN4)

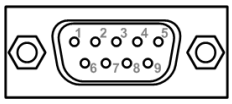
The motherboard comes with two 2x5-pin (pitch=2.00mm) headers for system COM3~COM4. Baud Rate: 9600~115200

Pin	Signal	Pin	Signal
1	DCD	2	DSR
3	RX	4	RTS
5	TX	6	CTS
7	DTR	8	RI
9	GND	10	NC

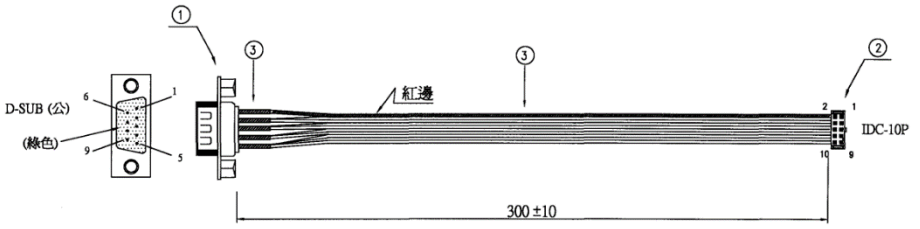
header



DB9 connector (COM2/3/4)



DB9 Connector COM1~4 PIN Define



顏色	紅	灰	灰	灰	灰	灰	灰	灰	灰
D-SUB(公)	1	6	2	7	3	8	4	9	5
IDC-10P	1	2	3	4	5	6	7	8	9

3.3.7 Audio Jack (CN14)

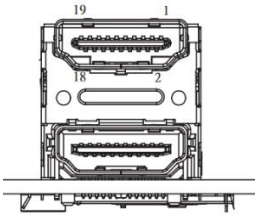
The motherboard provides HD audio jack for line-out on the rear I/O. Install audio driver, and then attach audio devices to CN14.

Pin Color	Signals
Green	Line-out

3.3.8 HDMI 1.4b Connector (CN6)

The HDMI (High-Definition Multimedia Interface) is a compact digital interface which can transmit high-definition video and high-resolution audio over a single cable.

Pins	Signals	Pins	Signals
1	HDMI OUT_DATA2+	2	GND
3	HDMI OUT_DATA2-	4	HDMI OUT_DATA1+
5	GND	6	HDMI OUT_DATA1-
7	HDMI OUT_DATA0+	8	GND
9	HDMI OUT_DATA0-	10	HDMI OUT_CLK+
11	GND	12	HDMI OUT_CLK-
13	NC	14	NC
15	HDMI OUT_SCL	16	HDMI OUT_SDA
17	GND	18	+5V
19	HDMI_HPDET		

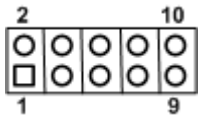


3.3.9 Digital I/O Connector (CN26)

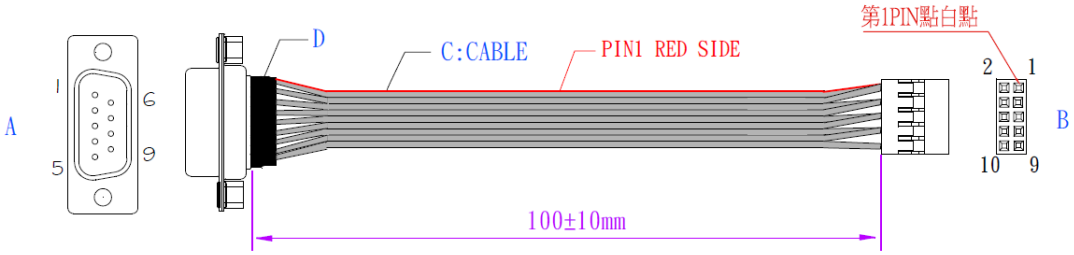
The CN26 is a 2x5-pin (pitch=2.00mm) connector for digital I/O interface.

You may use software programming to control these digital signals, please refer to Appendix B.

Pins	Signals
1	5V
2	DO0
3	DI0
4	DO1
5	DI1
6	DO2
7	DI2
8	DO3
9	DI3
10	GND



DB9 Connector PIN Define:



PIN DEFINE: DI DO

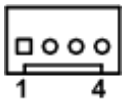
A	1	2	3	4	5	6	7	8	9
B	3	5	7	9	2	4	6	8	10
COLOR	紅	灰	灰	灰	灰	灰	灰	灰	灰

3.3.10 FAN headers (CN27, CN28)(optional)

The motherboard has two fan headers. The fan cable and connector may be different according to the fan manufacturer. Connect the fan cable to the connector while matching the black wire to pin#1.

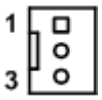
CN27: CPU fan header, 4-pin (pitch=2.54mm)

Pin	Signal
1	Ground
2	FANPVOUT
3	FAN_TACH
4	FANPWMOUT



CN28: System fan header, 3-pin (pitch=2.54mm)

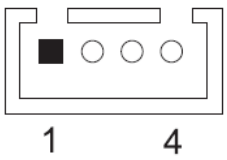
Pin	Signal
1	Ground
2	FANPVOUT
3	FAN_TACH



3.3.11 SATA Power Connector (CN13)

The CN51 is a 4-pin (pitch=2.54mm) connector for DC +12V and +5V power output.

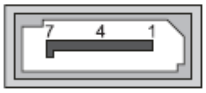
Pin	Signal
1	+5V
2	GND
3	GND
4	+12V



3.3.12 SATA 3.0 Connector (CN7)

This connector supports the thin Serial ATA cable for primary internal storage device.

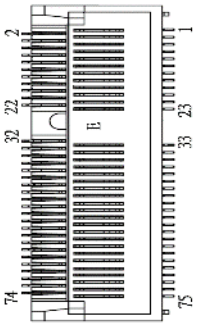
Pins	Signals
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND



3.3.13 M.2 Key E Socket (CN22)

The system comes with one M.2 Key E socket (PCIe & USB signal) (for Wi-Fi & Bluetooth).

Pins	Signals	Pins	Signals
1	GND	2	+3.3V_SBY
3	USB_D+	4	+3.3V_SBY
5	USB_D-	6	NC
7	GND	8	M.2_BT_PCMCLK
9	CNVI_WGR_DATA1_D-	10	M.2_BT_PCMRST
11	CNVI_WGR_DATA1_D+	12	M.2_BT_PCMIN
13	GND	14	M.2_BT_PCMOUT
15	CNVI_WGR_DATA0_D-	16	NC
17	CNVI_WGR_DATA0_D+	18	GND
19	GND	20	UART_BT_WAKE-
21	CNVI_WGR_CLK_D-	22	CNVI_BRI_RSP
23	CNVI_WGR_CLK_D+	24	**Key E**
25	**Key E**	26	
27		28	
29		30	
31		32	CNVI_RGI_DT
33	GND	34	CNVI_RGI_RSP
35	PCIE_TX_+	36	CNVI_BRI_DT
37	PCIE_TX_-	38	CL_RST
39	GND	40	CL_DATA
41	PCIE_RX_+	42	CL_CLK
43	PCIE_RX_-	44	CNVI_GNSS_PA_BLANKING
45	GND	46	CNVI_MFUART_TXD
47	CLK_PCIE_+	48	CNVI_MFUART_RXD
49	CLK_PCIE_-	50	SUSCLK (+3.3V Level)
51	GND	52	PERST# (+3.3V Level)
53	CLKREQ0#	54	BT_RF_KILL
55	PEWAKE0#	56	WIFI_RF_KILL
57	GND	58	NC
59	CNVI_WT_DATA1_D-	60	NC
61	CNVI_WT_DATA1_D+	62	NC
63	GND	64	GND

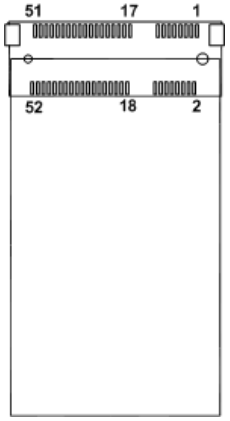


65	CNVI_WT_DATA0_D-	66	NC
67	CNVI_WT_DATA0_D+	68	NC
69	GND	70	NC
71	CNVI_WT_CLK_D-	72	+3.3V_SBY
73	CNVI_WT_CLK_D+	74	+3.3V_SBY
75	GND		

3.3.14 Express Mini Card slot (CN21)

The CN21 complies with PCI-Express Mini Card Spec. V1.2.

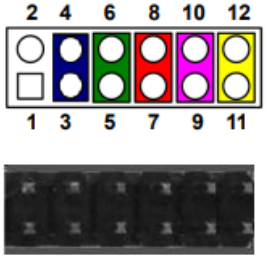
Pins	Signals	Pins	Signals
1	WAKE#	2	+3.3VAUX
3	NC	4	GND
5	NC	6	+1.5V
7	CLKREQ#	8	UIM_PWR/NC
9	GND	10	UIM_DAT/NC
11	REFCLK-	12	UIM_CLK/NC
13	REFCLK+	14	UIM_REST/NC
15	GND	16	UIM_VPP/NC
17	NC	18	GND
19	NC	20	NC
21	GND	22	PERST#
23	PCIE_RX_D-	24	+3.3VAUX
25	PCIE_RX_D+	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PCIE_TX_D-	32	SMB_DATA
33	PCIE_TX_D+	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3VAUX	40	GND
41	+3.3VAUX	42	NC
43	GND	44	NC
45	NC	46	NC
47	NC	48	+1.5V
49	NC	50	GND
51	NC	52	+3.3VAUX



3.3.15 Front Panel Connector (CN8)

The CN8 is a 2x6-pin (pitch=2.54mm) header. It includes Power-on, Reset, HDD LED and Power LED connections, allowing user to connect the PC case's front panel switch functions.

Pins	Signals	Pins	Signals
1	BUZZER-	2	BUZZER+
3	EXT SPK-	4	EXT SPK+
5	PWRLED	6	PWRLED+
7	PWRSW-	8	PWRSW+
9	HW RST-	10	HW RST+
11	HDDLED-	12	HDDLED+



Power LED

Pin 5 connects cathode (-) of LED and pin 6 connects anode (+) of LED. The power LED lights up when the system is powered on.

External Speaker and Internal Buzzer

Pin 1, 2, 3 and 4 connect the case-mounted speaker unit or internal buzzer. While connecting the board to an internal buzzer, please set pin 1 and 2 closed; while connecting to an external speaker, you need to set pins 3 and 4 opened and connect the speaker cable to pin 3(-) and pin 4(+).

Power On/Off Button

Pin 7 and 8 connect the power button on front panel to the board, which allows users to turn on or off power supply.

System Reset Switch

Pin 9 and 10 connect the case-mounted reset switch that reboots your computer without turning off the power switch. It is a better way to reboot your system for a longer life of system power supply.

HDD Activity LED

This connection is linked to hard drive activity LED on the control panel. LED flashes when HDD is being accessed. Pin 11 and 12 connect the hard disk drive to the front panel HDD LED, pin 11 is assigned as cathode (-) and pin 12 is assigned as anode (+)

3.3.16 M.2 Key B Socket (SCN1)

The SCN1 is a M.2 Key B (2242) connector. It is supports the M.2 storage module via PCIe x2

Pin	Signal	Pin	Signal
1	CONFIG_3	2	+3.3V_SBY
3	GND	4	+3.3V_SBY
5	GND	6	Full Card PWR OFF
7	USB_D+	8	NC
9	USB_D-	10	M2_DAS
11	GND	12	**Key B**
13	**Key B**	14	
15		16	
17		18	
19		20	NC
21	CONFIG_0	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	PCIE1_RX-/USB3_RX-	30	UIM_RST
31	PCIE1_RX+/USB3_RX+	32	UIM_CLK
33	GND	34	UIM_DATA
35	PCIE1_TX-/USB3_TX-	36	UIM_PWR
37	PCIE1_TX+/USB3_TX+	38	DEVSLP
39	GND	40	NC
41	PCIE0_RX-/SATA1_RX+	42	NC
43	PCIE0_RX+/SATA1_RX-	44	NC
45	GND	46	NC
47	PCIE0_TX-/SATA1_TX-	48	NC
49	PCIE0_TX+/SATA1_RX+	50	PERST#
51	GND	52	CLKREQ#
53	PCIE_CLK_N	54	PEWAKE#
55	PCIE_CLK_P	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	SIM_DET
67	M2_WWAN_RST_N	68	SUSCLK
69	CONFIG1	70	+3.3V_DUAL
71	GND	72	+3.3V_DUAL
73	GND	74	+3.3V_DUAL
75	CONFIG2		

SECTION 4
BIOS SETUP UTILITY

This section provides users with detailed description how to set up basic system configuration through the BIOS setup utility.

4.1 Starting

To enter the setup screens, follow the steps below:

1. Turn on the computer and press the <Del> key immediately.
2. After press the <Del> key, the main BIOS setup menu displays. Users can access to other setup screens, such as the Advanced and Chipset menus, from the main BIOS setup menu.

It is strongly recommended that users should avoid changing the chipset's defaults. Both AMI and system manufacturer have carefully set up these defaults that provide the best performance and reliability.

4.2 Navigation Keys

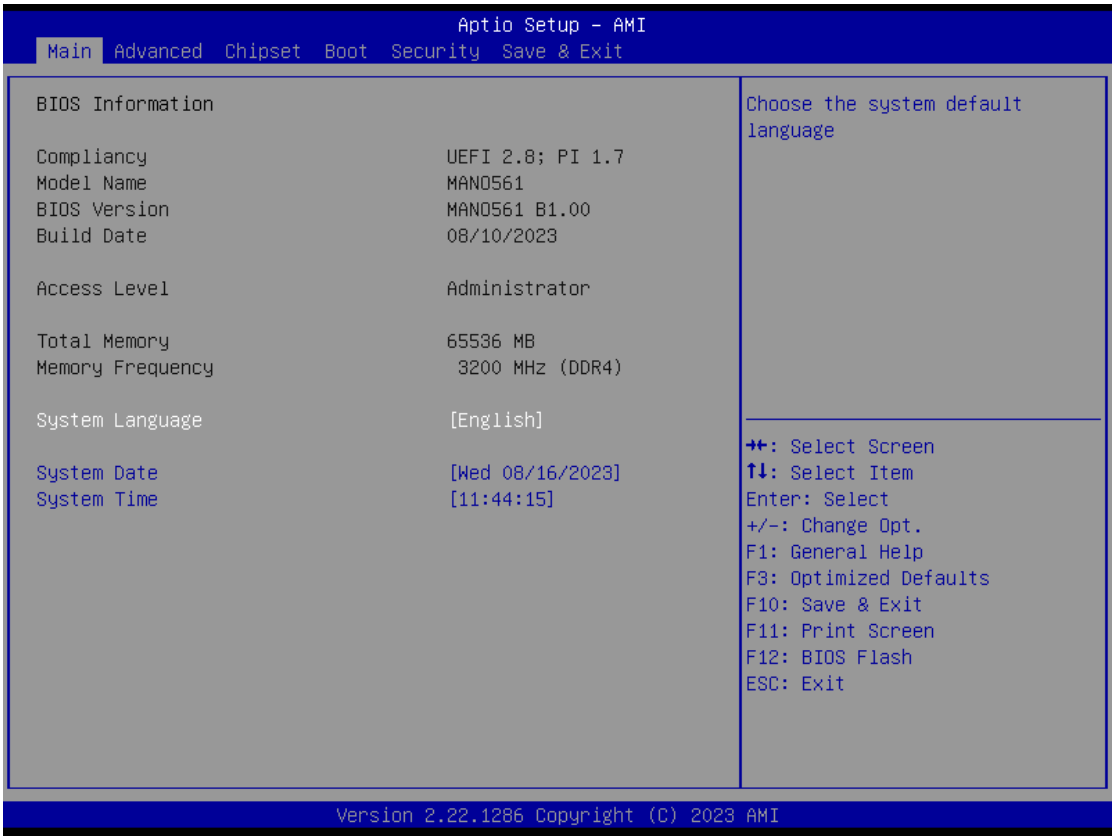
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F2>, <Enter>, <ESC>, <Arrow> keys, and so on.

【Note】 ***Some of the navigation keys differ from one screen to another.***

Hot Keys	Description
→← **Left/Right**	The Left and Right <Arrow> keys allow users to select a setup screen.
↑↓ **Up/Down**	The Up and Down <Arrow> keys allow users to select a setup screen or sub-screen.
+– Plus/Minus	The Plus and Minus <Arrow> keys allow users to change the field value of a particular setup item.
Tab	The <Tab> key allows users to select setup fields.
F1	The <F1> key allows users to display the General Help screen.
F2	The <F2> key allows users to Load Previous Values.
F3	The <F3> key allows users to Load Optimized Defaults.
F4	The <F4> key allows users to save any changes they made and exit the Setup. Press the <F4> key to save any changes.
Esc	The <Esc> key allows users to discard any changes they made and exit the Setup. Press the <Esc> key to exit the setup without saving any changes.
Enter	The <Enter> key allows users to display or change the setup option listed for a particular setup item. The <Enter> key can also allow users to display the setup sub- screens.

4.3 Main Menu

The Main Menu screen is the first screen users see when entering the setup utility. Users can always return to the Main setup screen by selecting the Main tab. System Time/Date can be set up as described below. The Main BIOS setup screen is also shown below.



BIOS Information
Display the auto-detected BIOS detail information.

System Date/Time
Use this option to change the system time and date. Highlight System Time or System Date using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

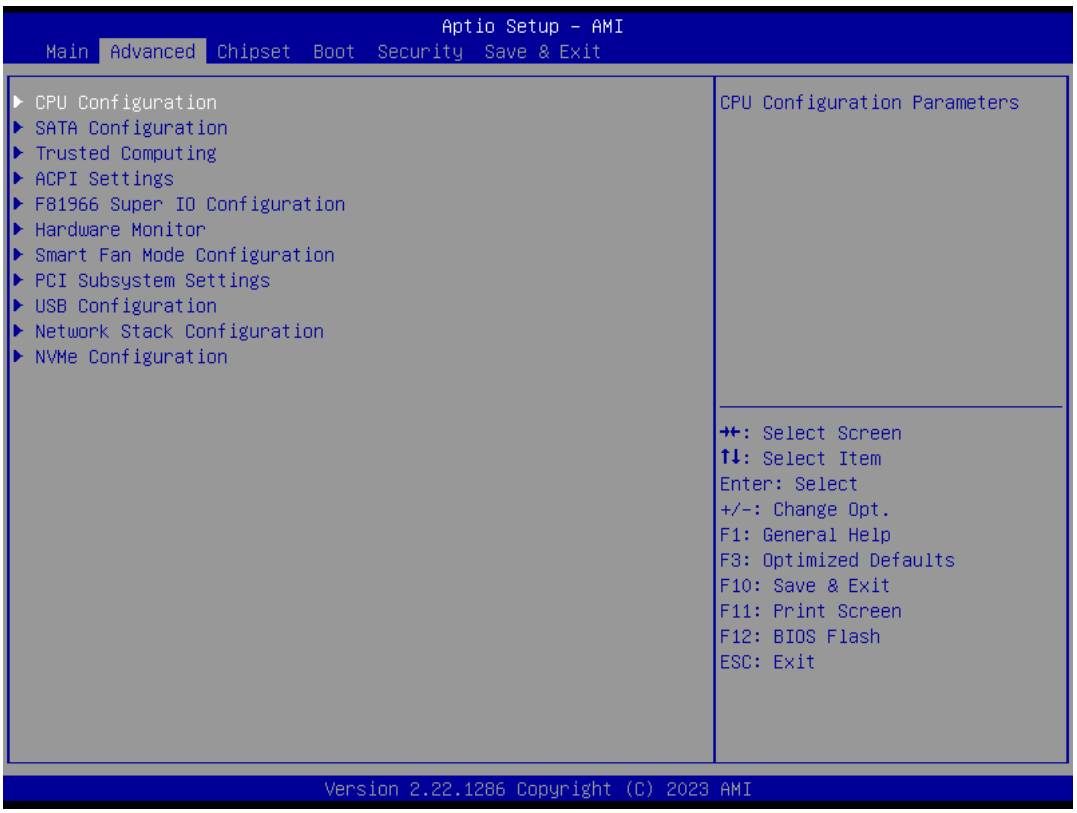
Access Level
Display the access level of current user.

4.4 Advanced Menu

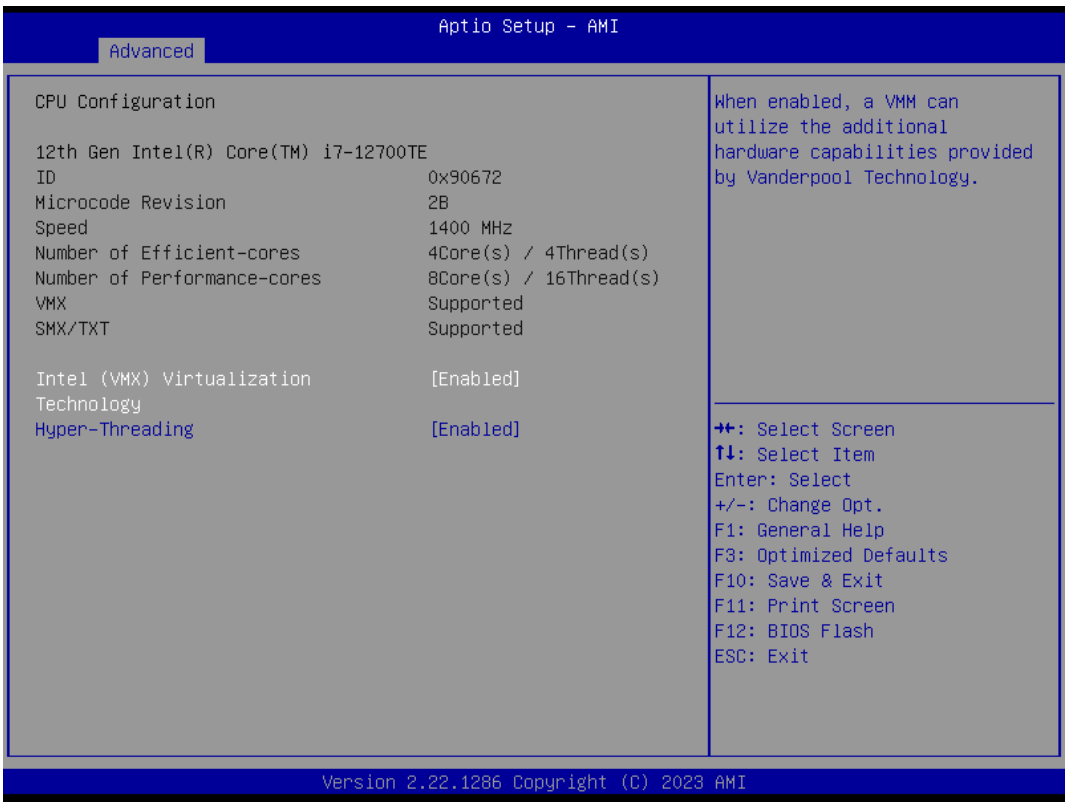
The Advanced menu also allows users to set configuration of the CPU and other system devices. You can select any of the items in the left frame of the screen to go to the sub menus:

- ▶ CPU Configuration
- ▶ SATA Configuration
- ▶ Trusted Computing
- ▶ ACPI Settings
- ▶ F81966 Super IO Configuration
- ▶ Hardware Monitor
- ▶ Smart Fan Mode Configuration (optional for system)
- ▶ PCI Subsystem Setting
- ▶ USB Configuration
- ▶ Network Stack Configuration
- ▶ NVMe Configuration

For items marked with "▶", please press <Enter> for more options.



- **CPU Configuration**
  This screen shows CPU information.



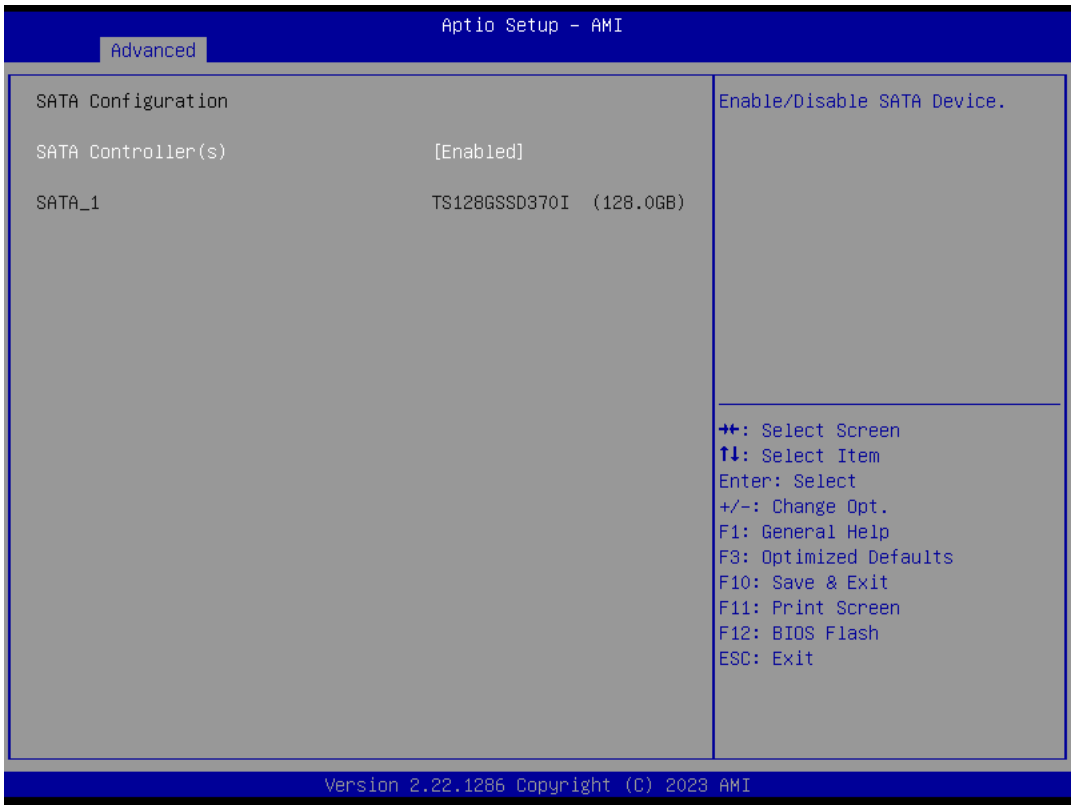
Intel (VMX) Virtualization Technology

Enable or disable Intel Virtualization Technology. When enabled, a VMM (Virtual Machine Mode) can utilize the additional hardware capabilities. It allows a platform to run multiple operating systems and applications independently, hence enabling a single computer system to work as several virtual systems.

Hyper-Threading

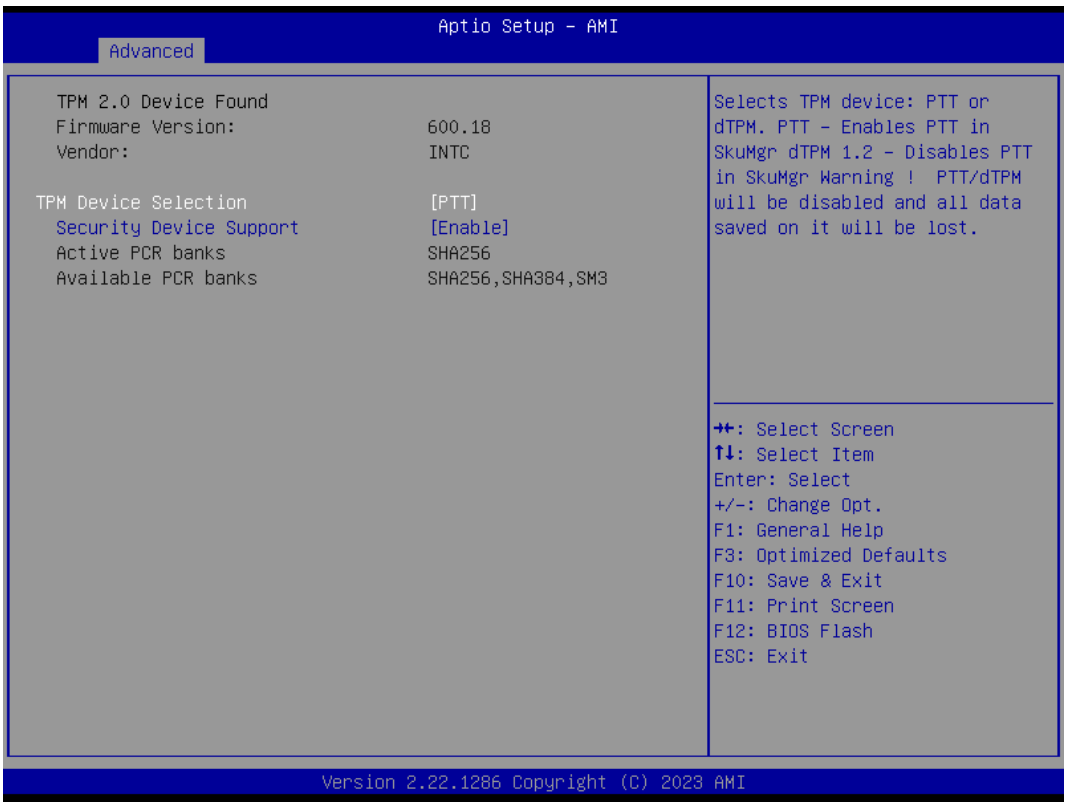
Enable or disable Hyper-Threading Technology. When enabled, it allows a single physical processor to multitask as multiple logical processors. When disabled, only one thread per enabled core is enabled.

- **SATA Configuration**
  During system boot up, BIOS automatically detects the presence of SATA devices. In the SATA Configuration menu, you can see all currently installed SATA device(s).



SATA Controller(s)
Enable or disable the SATA Controller feature.

- **Trusted Computing**
  This screen provides function for specifying the TPM2.0 settings.



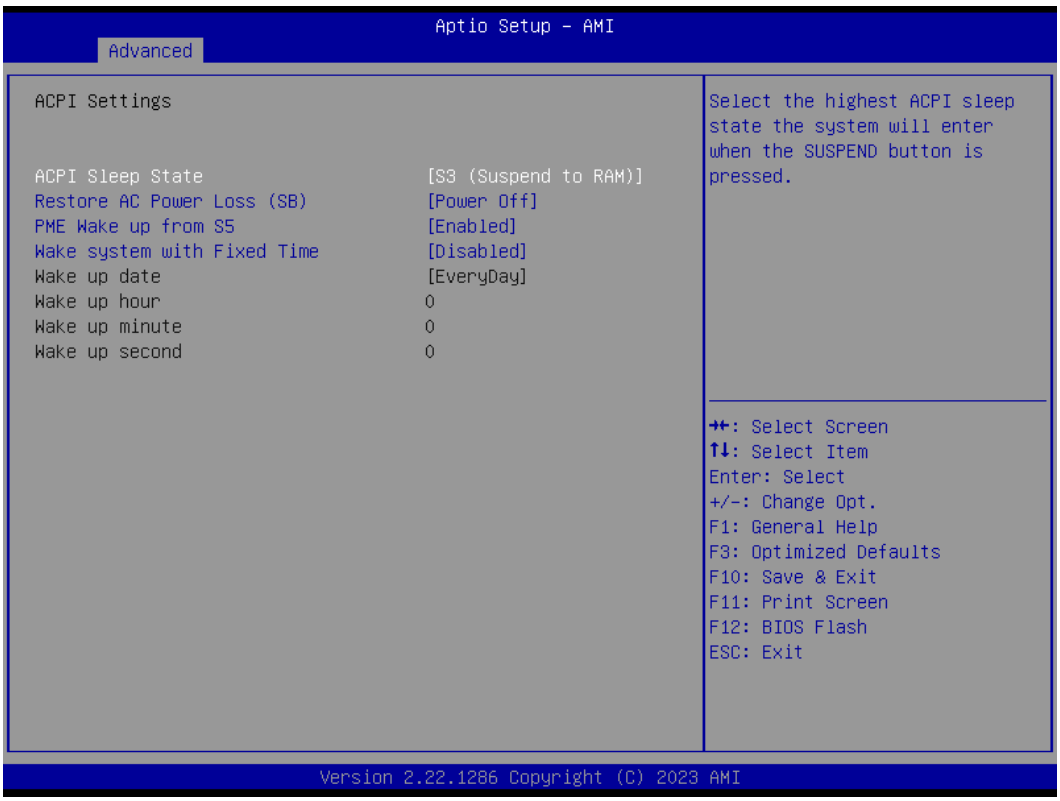
TPM Device Selection

Select TPM device:
- PTT: Intel® built-in TPM. Enables PTT in SkuMgr.
- dTPM: External extended Infineon's TPM. Disables PTT in SkuMgr.

Security Device Support

Enable or disable BIOS support for security device. OS will not show security device. TCG EFI protocol and INT1A interface will not be available.

- **ACPI Settings**



ACPI Sleep State

When the suspend button is pressed, the ACPI (Advanced Configuration and Power Interface) sleep state is S3 (Suspend to RAM).

Restore AC Power Loss

Decide the state of system when power is re-applied after a power failure.
- Power Off: Keep the power off until the power button is pressed.
- Power On: Restore power to the computer.

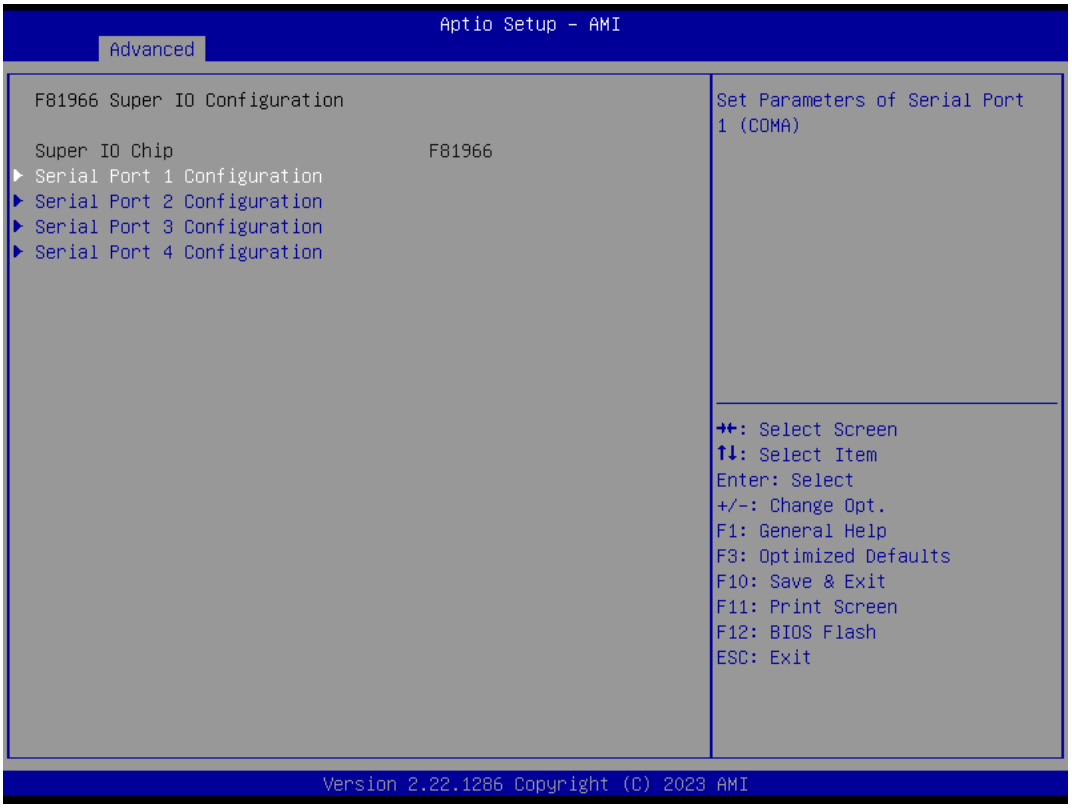
PME Wake up from S5

Enable system to wake from S5 using PME event.

Wake System with Fixed Time

Enable or disable system wake on alarm event. When enabled, system will wake on the hr: min:sec specified.

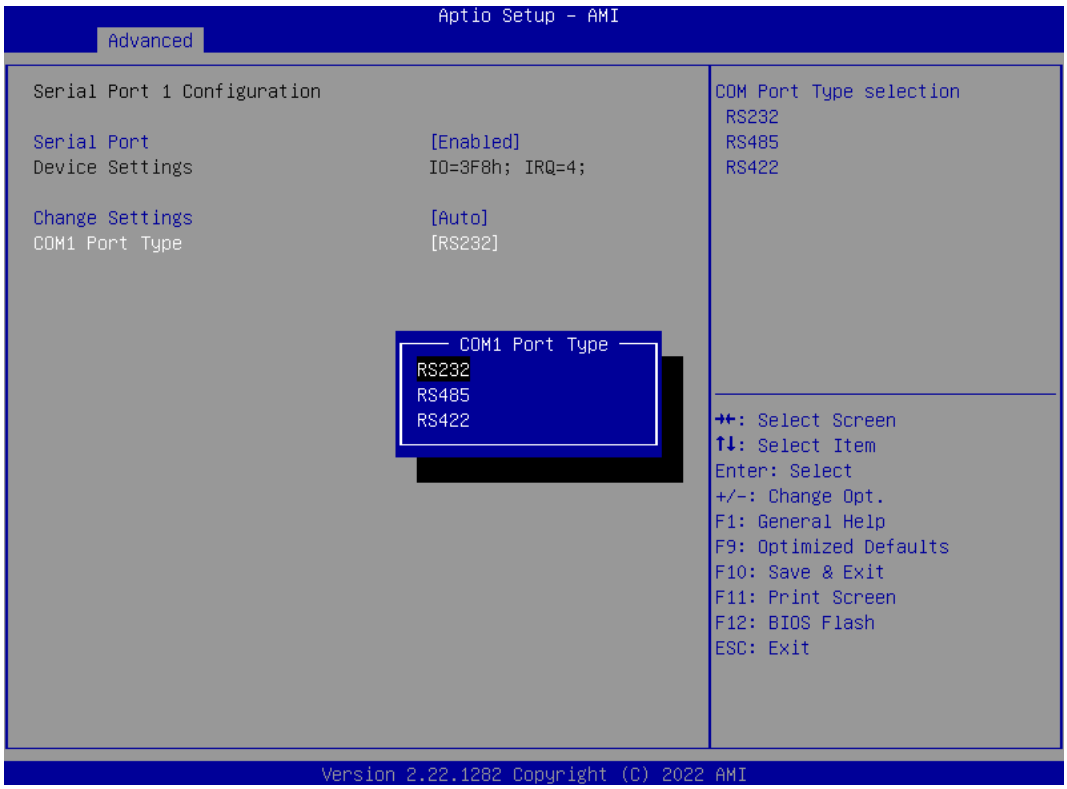
- **F81966 Super IO Configuration**
  You can use this screen to select options for the Super IO Configuration and change the value of the selected option. A description of the selected item appears on the right side of the screen. For items marked with "►", please press <Enter> for more options.



Serial Port 1~4 Configuration

Use these items to set parameters related to serial port 1~4.

- **Serial Port 1 Configuration**



Serial Port

Enable or disable serial port 1.

Change Settings

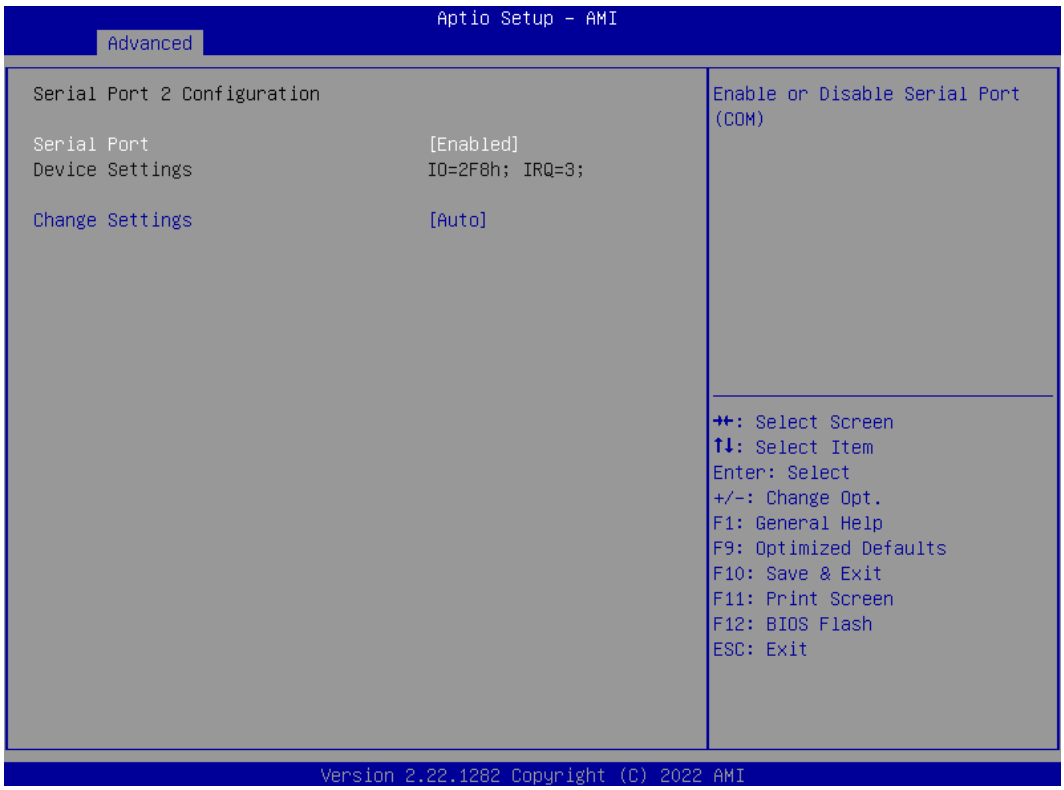
Select an optimal setting for Super IO device.

- Auto
- IO=3F8h, IRQ=4;
- IO=3F8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2F8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=3E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

COM1 Port Type

Select RS-232/422/485 mode for serial port 1.

- **Serial Port 2~4 Configuration**



Serial Port

Enable or disable serial port 2~4.

Change Settings

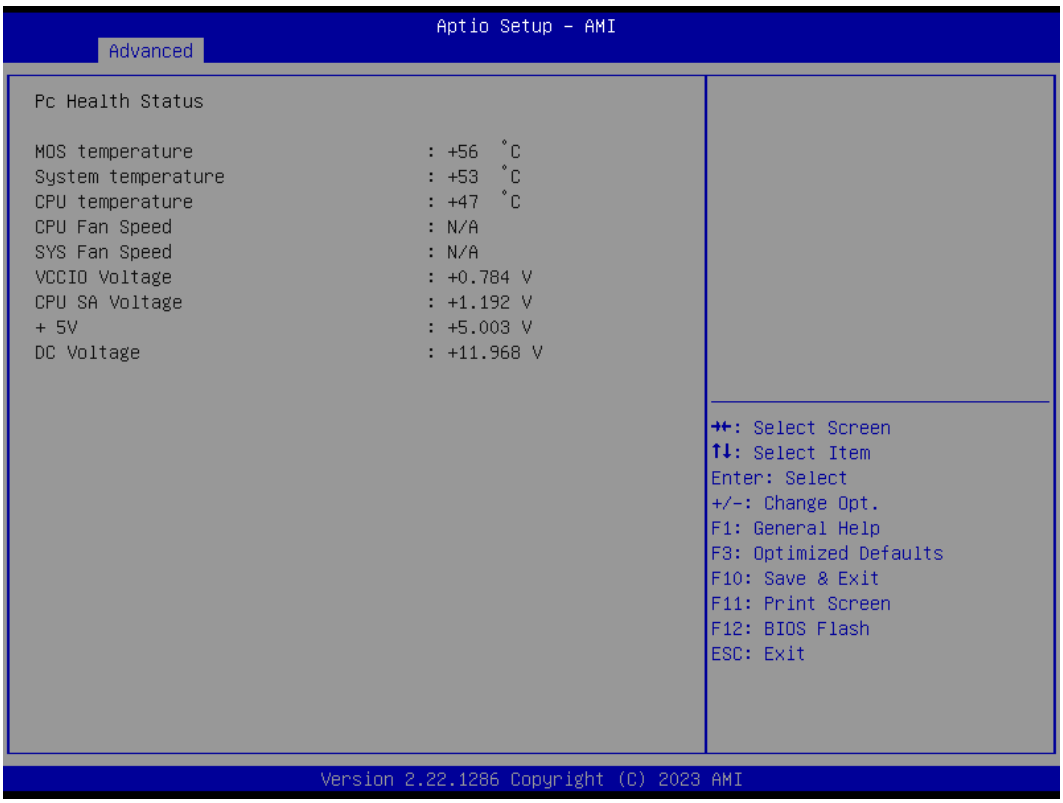
Select an optimal setting for Super IO device.

For serial port 2:
- Auto
- IO=2F8h, IRQ=3;
- IO=3F8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2F8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=3E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

For serial port 3:
- Auto
- IO=3E8h, IRQ=7;
- IO=3E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2F0h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2E0h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

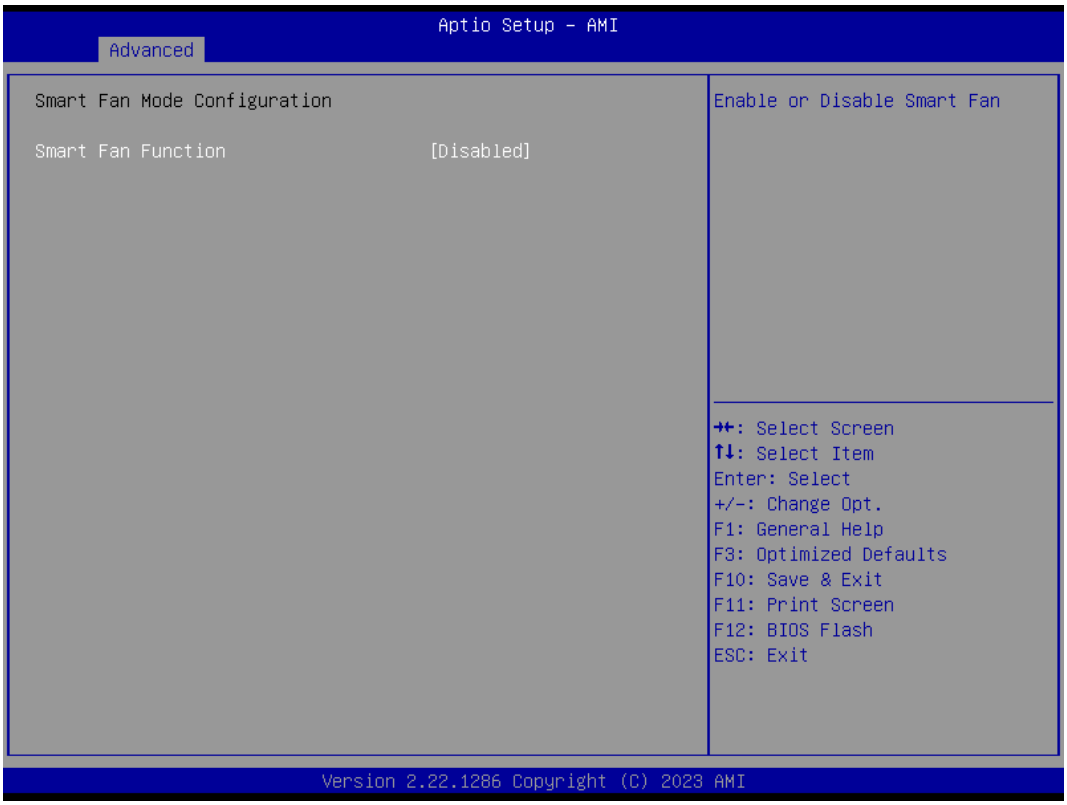
For serial port 4:
- Auto
- IO=2E8h, IRQ=7;
- IO=3E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2E8h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2F0h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;
- IO=2E0h, IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;

- **Hardware Monitor**
  This screen monitors hardware health status.



This screen displays the temperature of system and CPU, cooling fans speed in RPM and system voltages (VCCIO, CPU SA, +5V and +12V).

- **Smart Fan Mode Configuration**
  This screen allows you to configure Smart Fan mode. You can use Smart Fan function to control CN60 and CN61.



Smart Fan Function

Enable or disable Smart Fan.

Fan 1 Smart Fan Control

Select Smart Fan operating mode. Auto RPM Mode: The fan speed is controlled automatically according to temperature and RPM.

Temperature 1-4

Auto fan speed control. Fan speed will follow different temperature by different RPM 1~100.

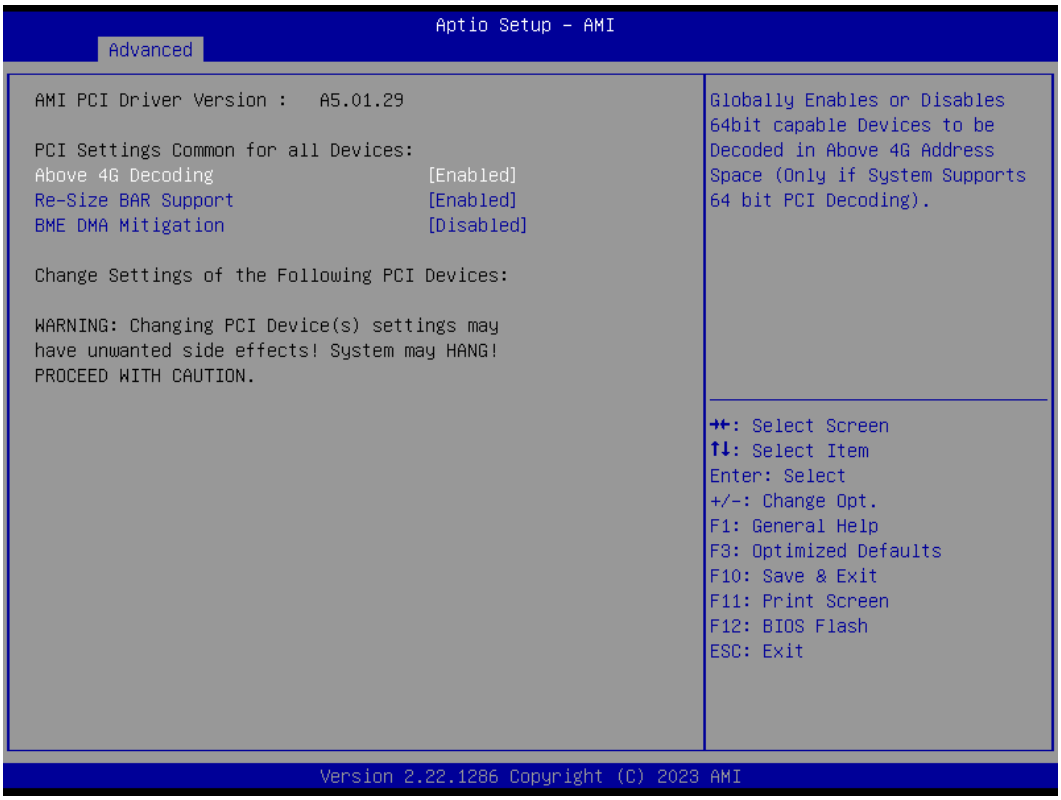
Full Speed RPM

Set fan full speed RPM.

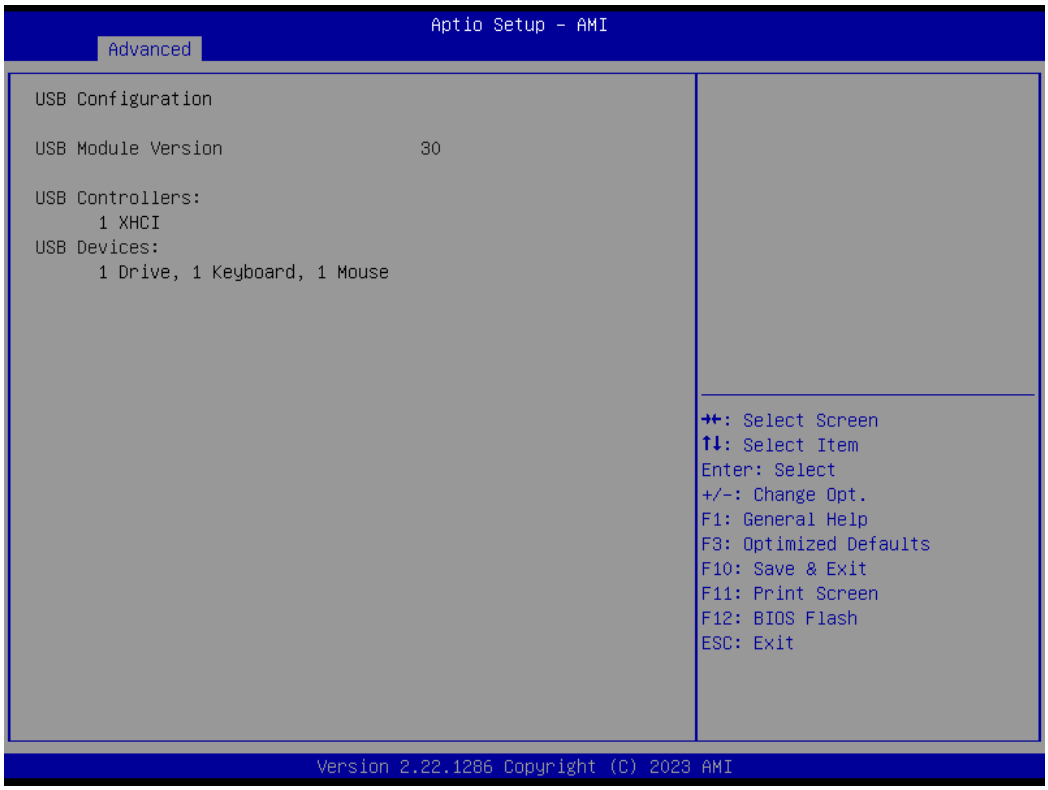
RPM Percentage 1-4

Auto fan speed control. Fan speed will follow different temperature by different RPM 1~100.

- **PCI Subsystem Setting**
  This screen allows you to set PCI Subsystem mode.



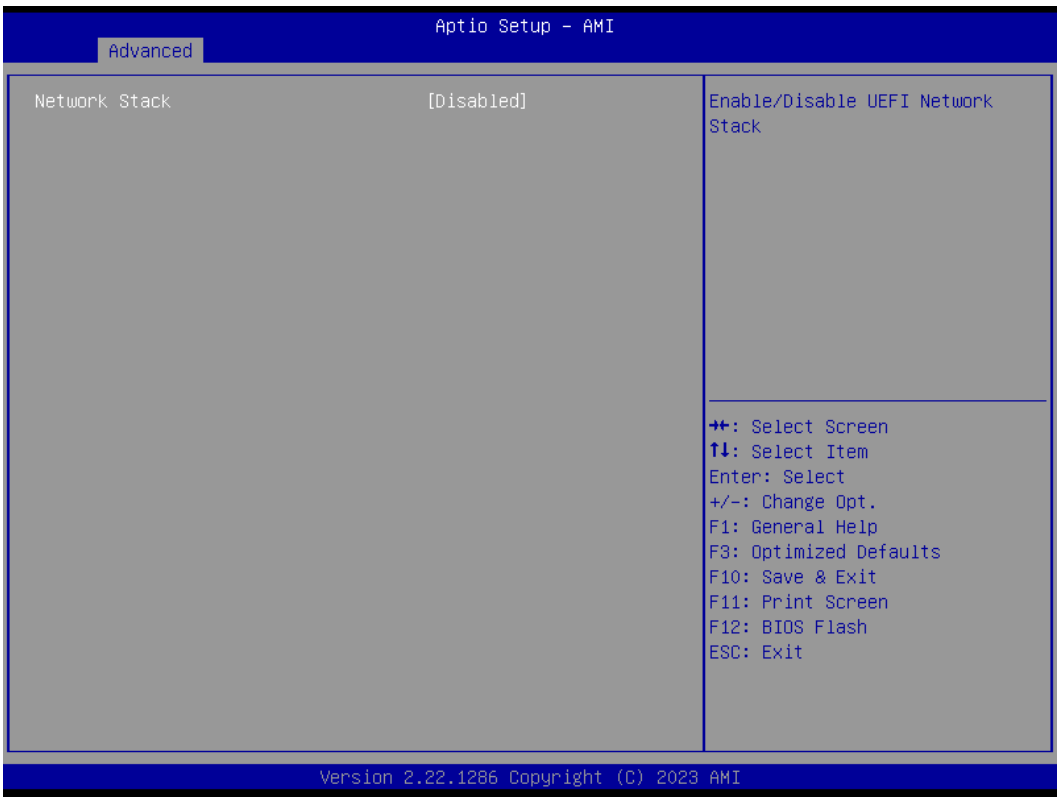
- **USB Configuration**
  This screen shows USB configuration.



USB Devices

Display all detected USB devices.

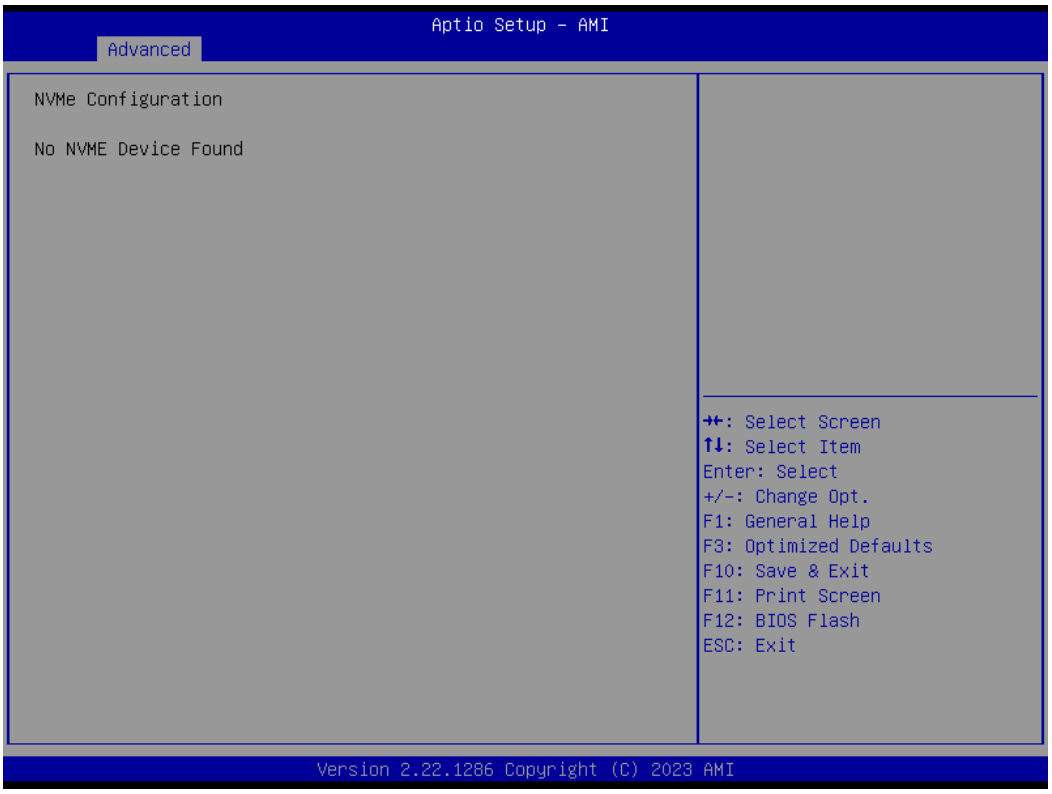
- **Network Stack Configuration**



Network Stack

Enable or disable UEFI Network Stack.

- **NVMe Configuration**
  This screen shows NVMe device information.

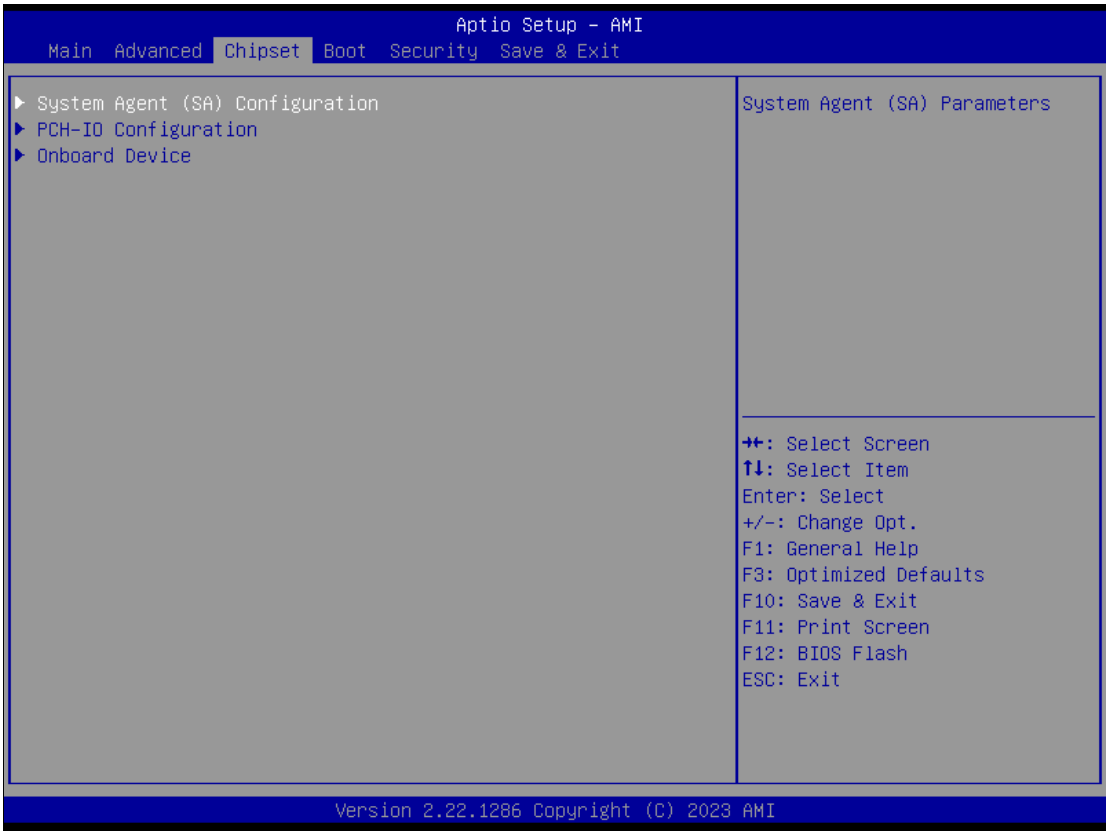


4.5 Chipset Menu

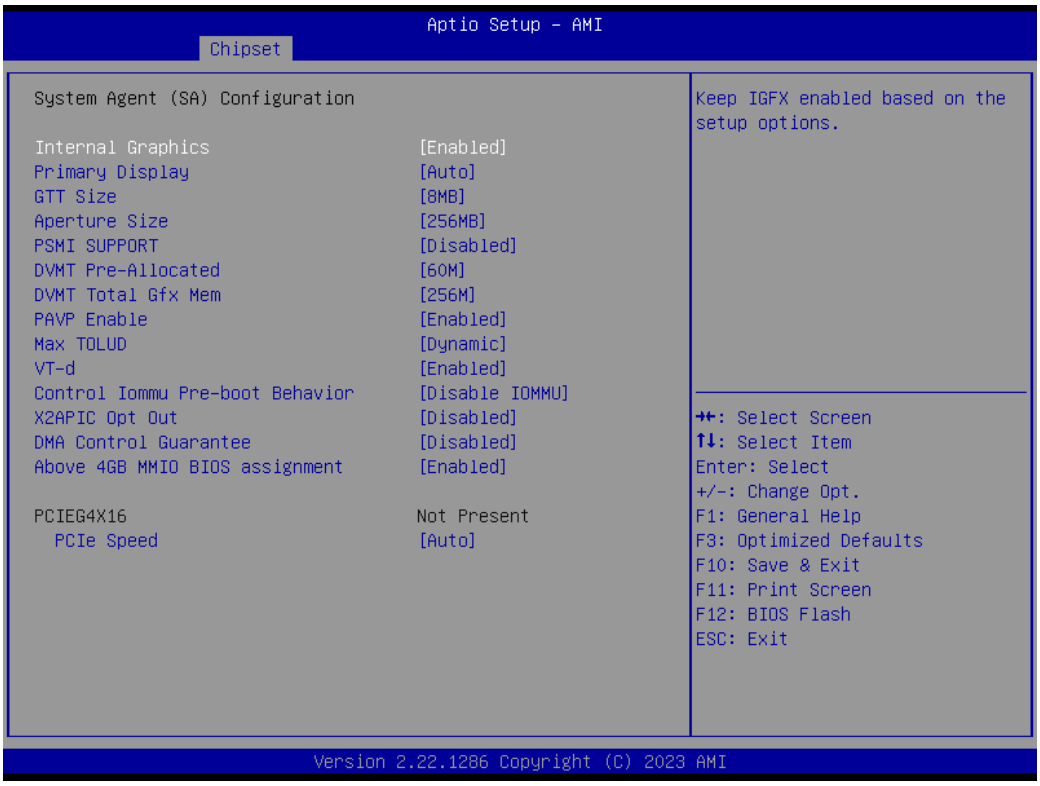
The Chipset menu allows users to change the advanced chipset settings. Users can select any of the items in the left frame of the screen to go to the sub menus:

- ► System Agent (SA) Configuration
- ► PCH-IO Configuration
- ► Onboard Device

For items marked with "►", please press <Enter> for more options.



- **System Agent (SA) Configuration**

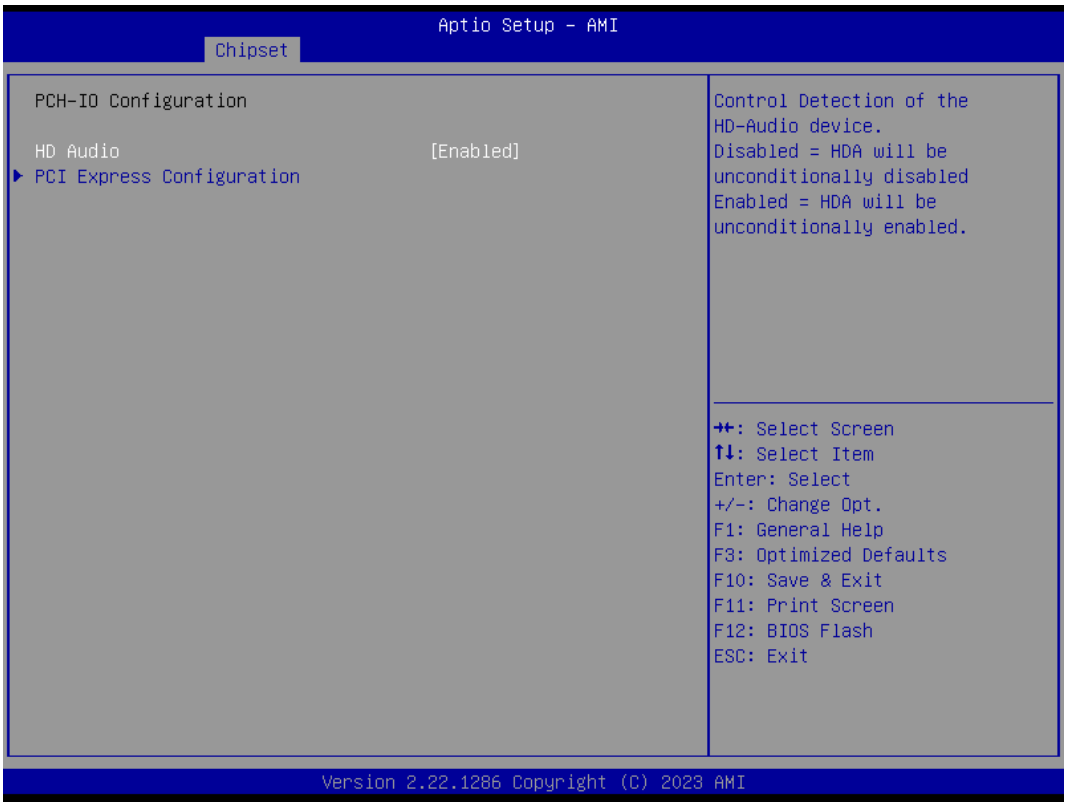


VT-d
Check to enable VT-d function on MCH.

Above 4GB MMIO BIOS assignment
Enable/Disable above 4GB Memory Mapped IO BIOS assignment \n\n. This is enabled automatically when Aperture Size is set to 2048MB.

- **PCH-IO Configuration**

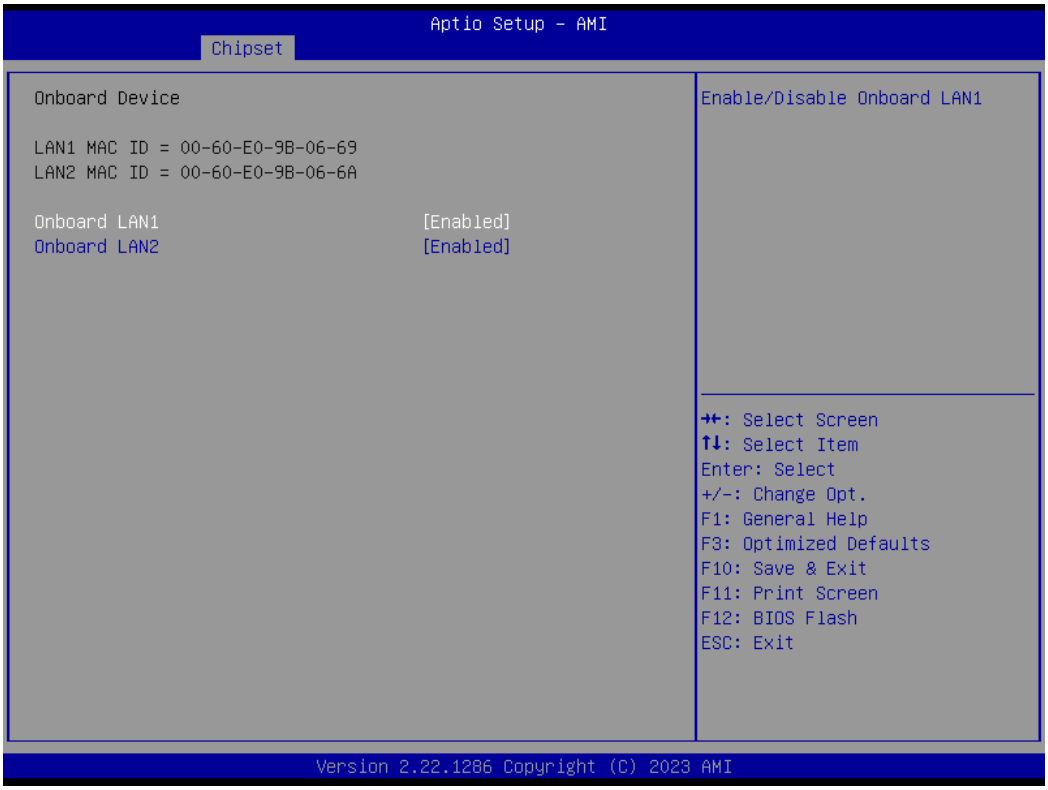
This screen allows you to set PCH parameters.



HD Audio

Control detection of the HD Audio device.
- Disabled: HDA will be unconditionally disabled.
- Enabled: HDA will be unconditionally enabled.
- Auto: HDA will be enabled if present, disabled otherwise.

- **Onboard Device**



Onboard LAN 1/2

Enable or disable onboard LAN 1/2.

4.6 Security Menu

The Security menu allows users to change the security settings for the system.

Administrator Password

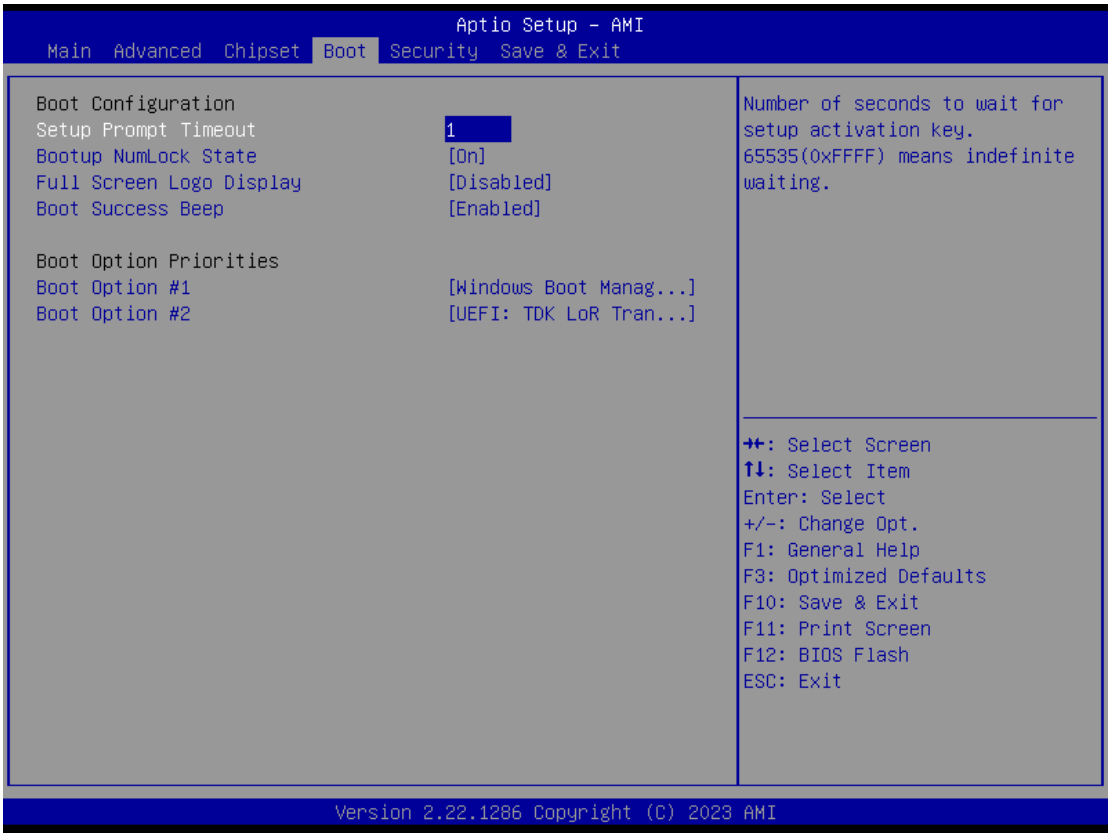
This item indicates whether an administrator password has been set (installed or uninstalled).

User Password

This item indicates whether a user password has been set (installed or uninstalled).

4.7 Boot Menu

The Boot menu allows users to change boot options of the system.



Setup Prompt Timeout
Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.

Bootup NumLock State
Use this item to select the power-on state for the keyboard NumLock.

Full Screen Logo Display.

Enable or disable full screen logo display feature.

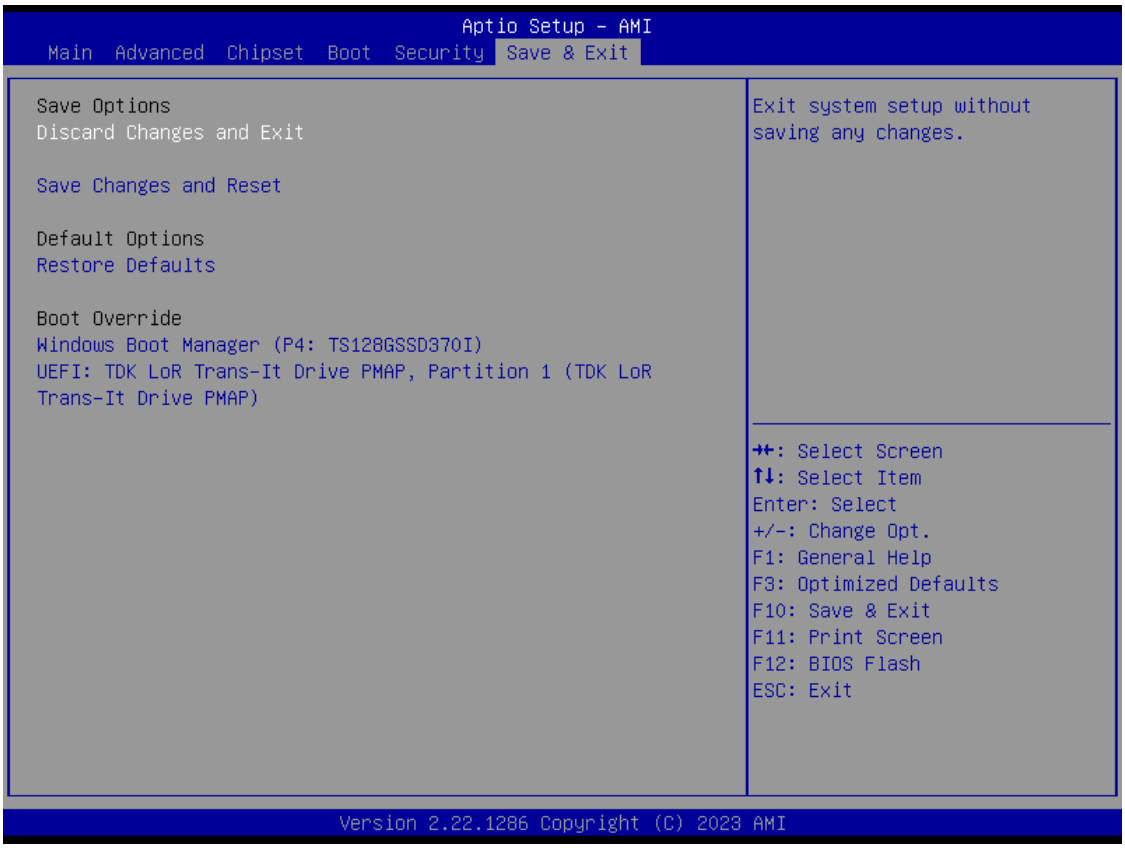
Boot Success Beep

Enable or disable beep sound after successful boot.

Boot Option Priorities
These are settings for boot priority. Specify the boot device priority sequence from the available devices.

4.8 Save & Exit Menu

The Save & Exit menu allows users to load system configuration with optimal or fail-safe default values.



Discard Changes and Exit
Select this option to quit Setup without making any permanent changes to the system configurations and return to Main Menu. Select Discard Changes and Exit from the Save & Exit menu and press <Enter>. Select Yes to discard changes and exit.

Save Changes and Reset
When completed the system configuration changes, select this option to leave Setup and reboot the computer so the new system configurations take effect. Select Save Changes and Reset from the Save & Exit menu and press <Enter>. Select Yes to save changes and reset.

Restore Defaults
It automatically sets all Setup options to a complete set of default settings when users select this option. Select Restore Defaults from the Save & Exit menu and press <Enter>.

Boot Override
Select a drive to immediately boot that device regardless of the current boot order.

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APPENDIX A
WATCHDOG TIMER

A.1 About Watchdog Timer

Software stability is major issue in most application. Some embedded systems are not watched by human for 24 hours. It is usually too slow to wait for someone to reboot when computer hangs. The systems need to be able to reset automatically when things go wrong. The watchdog timer gives us solution.

The watchdog timer is a counter that triggers a system reset when it counts down to zero from a preset value. The software starts counter with an initial value and must reset it periodically. If the counter ever reaches zero which means the software has crashed, the system will reboot.

A.2 Sample Program

```
#include "stdafx.h"
#include <windows.h>
#include <stdio.h>
#include <tchar.h>
#include <stdlib.h>

#ifdef _DEBUG
#define new DEBUG_NEW
#endif

#pragma comment (lib, "User32.lib" )



#define  IDT_TIMER  WM_USER + 200
#define _CRT_SECURE_NO_WARNINGS 1
#define setbit(value,x) (value |=(1<<x))
#define clrbit(value,x) (value &=~(1<<x))

HINSTANCE hinstLibDLL = NULL;
LONG WDTDATA = 0;

typedef ULONG(*LPFNDLLGETIOSPACE)(ULONG);
LPFNDLLGETIOSPACE lpFnDll_Get_IO;
typedef void(*LPFNDLLSETIOSPACE)(ULONG, ULONG);
```

```
LPFNDLLSETIOSPACE lpFnDll_Set_IO;

int _tmain(int argc, _TCHAR* argv[])
{

	int unit = 0;
	int WDTtimer = 0;
	if (hinstLibDLL == NULL)
	{
		hinstLibDLL = LoadLibrary(TEXT("diodll.dll"));
		if (hinstLibDLL == NULL)
		{
			//MessageBox("Load diodll dll error", "", MB_OK);
		}
	}
	if (hinstLibDLL)
	{
		lpFnDll_Get_IO = (LPFNDLLGETIOSPACE)GetProcAddress(GetModuleHandle("diodll.dll"), "GetIoSpaceByte");
		lpFnDll_Set_IO = (LPFNDLLSETIOSPACE)GetProcAddress(GetModuleHandle("diodll.dll"), "SetIoSpaceByte");

	}
	printf("Input Watch Dog Timer type, 1:Second ; 2:Minute :");
	scanf("%d",&unit);
	printf("\nInput Timer to countdown:");
	scanf("%d", &WDTtimer);
	printf("Start to countdown...");

	//==Enter MB Pnp Mode==
	lpFnDll_Set_IO(0x2e, 0x87);
	lpFnDll_Set_IO(0x2e, 0x87);
	lpFnDll_Set_IO(0x2e, 0x07);
	lpFnDll_Set_IO(0x2f, 0x07); //SET LDN 07
	//set LDN07 FA 10 to 11
	lpFnDll_Set_IO(0x2e, 0xFA);
	WDTDATA = lpFnDll_Get_IO(0x2f);
	WDTDATA = setbit(WDTDATA, 0);
```

```
        lpFnDll_Set_IO(0x2f, WDTDATA);

        if (unit == 1)
        {

                lpFnDll_Set_IO(0x2e, 0xF6);
                lpFnDll_Set_IO(0x2f, WDTtimer);


                //start watchdog counting
                lpFnDll_Set_IO(0x2e, 0xF5);
                WDTDATA = lpFnDll_Get_IO(0x2f);
                WDTDATA = setbit(WDTDATA, 5);
                lpFnDll_Set_IO(0x2f, WDTDATA);

        }
        else if (unit == 2)
        {
                //set  WDT Timer
                lpFnDll_Set_IO(0x2e, 0xF6);
                lpFnDll_Set_IO(0x2f, WDTtimer);
                //set watchdog time unit to min
                lpFnDll_Set_IO(0x2e, 0xF5);
                WDTDATA = lpFnDll_Get_IO(0x2f);
                WDTDATA = setbit(WDTDATA, 3);
                lpFnDll_Set_IO(0x2f, WDTDATA);
                //start watchdog counting
                lpFnDll_Set_IO(0x2e, 0xF5);
                WDTDATA = lpFnDll_Get_IO(0x2f);
                WDTDATA = setbit(WDTDATA, 5);
                lpFnDll_Set_IO(0x2f, WDTDATA);
        }

        system("pause");

        return 0;
}
```

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APPENDIX B
Digital I/O

B.1 About Digital I/O

The onboard digital I/O has 8 bits. Each bit can be set to function as input or output by software programming. In default, all pins are pulled high with +5V level (according to main power). The BIOS default settings are 4 inputs and 4 outputs.

B.2 Sample Program

```
#include "stdafx.h"

#ifdef _DEBUG
#define new DEBUG_NEW
#endif

#include <windows.h>
#include <stdio.h>
#include <tchar.h>
#include <stdlib.h>

#pragma comment (lib, "User32.lib" )



#define  IDT_TIMER  WM_USER + 200
#define _CRT_SECURE_NO_WARNINGS 1
#define setbit(value,x) (value |=(1<<x))
#define clrbit(value,x) (value &=~(1<<x))
#define GPIO_HIGH 1
#define GPIO_LOW 0

HINSTANCE hinstLibDLL = NULL;



LONG u8AHData = 0;
LONG u88HData = 0;
LONG u89HData = 0;
```

```
static int DI0status = 1;
static int DI1status = 1;
static int DI2status = 1;
static int DI3status = 1;

typedef ULONG(*LPFNDLLGETIOSPACE)(ULONG);
LPFNDLLGETIOSPACE lpFnDll_Get_IO;
typedef void(*LPFNDLLSETIOSPACE)(ULONG, ULONG);
LPFNDLLSETIOSPACE lpFnDll_Set_IO;

int _tmain(int argc, _TCHAR* argv[])
{

	if (hinstLibDLL == NULL)
	{
		hinstLibDLL = LoadLibrary(TEXT("diodll.dll"));
		if (hinstLibDLL == NULL)
		{
			//MessageBox("Load diodll dll error", "", MB_OK);
		}
	}
	if (hinstLibDLL)
	{
		lpFnDll_Get_IO = (LPFNDLLGETIOSPACE)GetProcAddress(GetModuleHandle("diodll.dll"), "GetIoSpaceByte");
		lpFnDll_Set_IO = (LPFNDLLSETIOSPACE)GetProcAddress(GetModuleHandle("diodll.dll"), "SetIoSpaceByte");

	}
	/*
	printf("Input Watch Dog Timer type, 1:Second ; 2:Minute :");
	scanf("%d",&unit);
	printf("\nInput Timer to countdown:");
	scanf("%d", &WDTtimer);
	printf("Start to countdown...");
	*/
	//==Enter MB Pnp Mode==
```

```
lpFnDll_Set_IO(0x2e, 0x87);
lpFnDll_Set_IO(0x2e, 0x87);
//LDN 06
lpFnDll_Set_IO(0x2e, 0x07);
lpFnDll_Set_IO(0x2f, 0x06);
//set LDN06 88h =OF
//88h <0> = 1 GPIO80 DO0 output mode set 1 or input mode set 0
lpFnDll_Set_IO(0x2e, 0x88);
u88HData = lpFnDll_Get_IO(0x2f);
u88HData = setbit(u88HData, 0);
lpFnDll_Set_IO(0x2f, u88HData);
// 88h <1> =1 GPIO81 DO1 output mode set 1 or input mode set 0
lpFnDll_Set_IO(0x2e, 0x88);
u88HData = lpFnDll_Get_IO(0x2f);
u88HData = setbit(u88HData, 1);
lpFnDll_Set_IO(0x2f, u88HData);
// 88h <2> =1 GPIO82 DO2 output mode set 1 or input mode set 0
lpFnDll_Set_IO(0x2e, 0x88);
u88HData = lpFnDll_Get_IO(0x2f);
u88HData = setbit(u88HData, 2);
lpFnDll_Set_IO(0x2f, u88HData);
// 88h <3> =1 GPIO83 DO3 output mode set 1 or input mode set 0
lpFnDll_Set_IO(0x2e, 0x88);
u88HData = lpFnDll_Get_IO(0x2f);
u88HData = setbit(u88HData, 3);
lpFnDll_Set_IO(0x2f, u88HData);

//set 89 FF-F0
// 89 <0> = 0  set GPIO 80 outputs 0 when in output mode
lpFnDll_Set_IO(0x2e, 0x89);
u89HData = lpFnDll_Get_IO(0x2f);
u89HData = clrbit(u89HData, 0);
lpFnDll_Set_IO(0x2f, u89HData);

// 89 <1> = 0
lpFnDll_Set_IO(0x2e, 0x89);
u89HData = lpFnDll_Get_IO(0x2f);
```

```
u89HData = clrbit(u89HData, 1);
lpFnDll_Set_IO(0x2f, u89HData);

//89 <2> = 0
lpFnDll_Set_IO(0x2e, 0x89);
u89HData = lpFnDll_Get_IO(0x2f);
u89HData = clrbit(u89HData, 2);
lpFnDll_Set_IO(0x2f, u89HData);

//89 <3> = 0
lpFnDll_Set_IO(0x2e, 0x89);
u89HData = lpFnDll_Get_IO(0x2f);
u89HData = clrbit(u89HData, 3);
lpFnDll_Set_IO(0x2f, u89HData);


while (1)
{
        //Get GPIO 8x Status
        lpFnDll_Set_IO(0x2e, 0x8A);
        u8AHData = lpFnDll_Get_IO(0x2f);
        lpFnDll_Set_IO(0x2f, u8AHData);
        if (0x10 & u8AHData) //GPIO84 DI0 status
        {
                DI0status = GPIO_HIGH;
        }
        else
        {
                DI0status = GPIO_LOW;
        }
        if (0x20 & u8AHData) //GPIO85 DI1 status
        {
                DI1status = GPIO_HIGH;
        }
        else
        {
                DI1status = GPIO_LOW;
```

```
                }
                if (0x40 & u8AHData) //GPIO86 DI2 status
                {
                        DI2status = GPIO_HIGH;
                }
                else
                {
                        DI2status = GPIO_LOW;
                }
                if (0x80 & u8AHData) //GPIO87 DI3 status
                {
                        DI3status = GPIO_HIGH;
                }
                else
                {
                        DI3status = GPIO_LOW;
                }
                if ((DI0status == GPIO_LOW && DI1status == GPIO_LOW) && (DI2status
== GPIO_LOW && DI3status == GPIO_LOW))
                {
                        printf("All DINPUT status Low\n");
                }
                else if((DI0status == GPIO_HIGH && DI1status == GPIO_HIGH) &&
(DI2status == GPIO_HIGH && DI3status == GPIO_HIGH))
                {
                        printf("All DINPUT status High\n");
                }
                Sleep(1000);

        }
        system("pause");
        return 0;
}
```