

# ARCHMI-S-8XXB

7", 8", 10.1", 12.1", 12.1W", 15", 15.6", 17", 18.5", 19", 21.5", 23.8"

Intel Elkhart Lake

Fanless Industrial Panel PC

## User Manual

### Release Date

Mar. 2025

### Revision

V1.3

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# Revision History

Reversion	Date	Description
1.0	2024/09/11	Initiation
1.1	2024/11/13	Revised chapter 1.2 Certification description
1.2	2025/3/3	<ol style="list-style-type: none"><li>1. Added new model ARCHMI-S-824BP(H)</li><li>2. Added 1.5 Power Consumption</li><li>3. Updated 1.2 system CPU description</li><li>4. Deleted Serial Port 5 &amp; 6 Configuration</li></ol>
1.3	2025/3/28	Revised p.7,p.18,p.23 & p.36 Storage description

## Warning!

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This equipment generates uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions manual, it may cause interference to radio communications. It has been tested and found to comply with the limits for a Class A computing device pursuant to FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

Electric Shock Hazard – Do not operate the machine with its back cover removed. There are dangerous high voltages inside.

### Caution

**Risk of explosion if the battery is replaced with an incorrect type.**

**Batteries should be recycled where possible. Disposal of used batteries must be in accordance with local environmental regulations.**

### Disclaimer

**This information in this document is subject to change without notice. In no event shall Apex Technology Inc. be liable for damages of any kind, whether incidental or consequential, arising from either the use or misuse of information in this document or in any related materials.**

## Safety Precautions

Follow the messages below to prevent your systems from damage:

- ◆ Avoid your system from static electricity on all occasions.
- ◆ Prevent electric shock. Don't touch any components of this card when the card is power-on. Always disconnect power when the system is not in use.
- ◆ Disconnect power when you change any hardware devices. For instance, when you connect a jumper or install any cards, a surge of power may damage the electronic components or the whole system.

# Table of Contents

<b>Revision History</b> .....	<b>1</b>
<b>Warning!</b> .....	<b>2</b>
<b>Safety Precautions</b> .....	<b>3</b>
<b>Chapter 1 System Product</b> .....	<b>6</b>
1.1 Features .....	6
1.2 Specifications .....	6
1.3 Display.....	8
1.4 Mechanical.....	10
1.5 Power Consumption .....	10
1.6 Dimensions.....	11
1.7 Brief Description of ARCHMI-S-8XXB Series .....	17
1.8 Installation of Memory and Storage .....	18
1.9 VESA Mounting .....	19
1.10 Panel Mounting.....	20
<b>Chapter 2 Hardware</b> .....	<b>21</b>
2.1 Motherboard Specifications .....	21
2.2 Board Dimensions .....	23
2.3 Jumpers and Connectors Location.....	23
2.4 Jumpers Setting and Connectors .....	25
<b>Chapter 3 BIOS Setup Description</b> .....	<b>36</b>
3.1 Operations after POST Screen .....	36
3.2 BIOS SETUP UTILITY.....	36
3.3 Main Settings .....	37
3.4 Advanced Settings.....	38
3.5 Chipset Settings .....	53
3.6 Security Settings.....	89
3.7 Boot Settings.....	90
3.8 Save & Exit Settings.....	92
<b>Chapter 4 Installation of Drivers</b> .....	<b>94</b>
4.1 Intel Chipset .....	95
4.2 Intel® HD Graphics Chipset .....	97
4.3 Intel® HD Graphics Chipset .....	99
4.5 Intel® Management Engine Interface .....	101
4.6 Touch Screen Installation.....	103

# List of Figures

## **Figures**

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Figure 1: Dimensions of ARCHMI-S-807BP/BR(H).....	11
Figure 2: Dimensions of ARCHMI-S-808BP/BR(H).....	11
Figure 3: Dimensions of ARCHMI-S-810BP/BR(H).....	12
Figure 4: Dimensions of ARCHMI-S-812BP/BR(H).....	12
Figure 5: Dimensions of ARCHMI-S-812WBP/WBR(H).....	13
Figure 6: Dimensions of ARCHMI-S-815BP/BR(H).....	13
Figure 7: Dimensions of ARCHMI-S-816BP/BR(H).....	14
Figure 8: Dimensions of ARCHMI-S- 817BP/BR(H).....	14
Figure 9: Dimensions of ARCHMI-S-818BP/BR(H).....	15
Figure 10: Dimensions of ARCHMI-S-819BP/BR(H).....	15
Figure 11: Dimensions of ARCHMI-S-821BP/BR(H).....	16
Figure 12: Dimensions of ARCHMI-S-824BP(H).....	16
Figure 13: Front View of ARCHMI-S-816B.....	17
Figure 14: Rear View of ARCHMI-S-816B.....	17
Figure 15: ARCHMI-S-807B/808B VESA Mounting.....	19
Figure 16: ARCHMI-S-810B/812B/812WB/815B/816B/817B/818B/819B/821B/824B VESA Mounting.....	19
Figure 17: ARCHMI-S-8XXB VESA Mounting.....	20

## 1.1 Features

- Intel® Atom® Elkhart Lake x6000 series, and Celeron® N Processor(by project)
- 7" to 23.8" Industrial Compact Size Panel PC
- Support 1 x DDR4 3200MHz SO-DIMM, Up to 32G
- Power Input : 9-36V DC
- ARCHMI Series IP66 Compliant Aluminum Front Bezel
- Support Resistive touch screen(Model : R) and Projected Capacitive Multi-touch screen(Model : P)
- Support High Brightness LCD Version
- Support Auto-Dimming
- Fanless Design

## 1.2 Specifications

ARCHMI-S-8XXB Series	
<b>System</b>	
CPU	Intel Celeron® J6412 Processor,2.0GHz up to 2.60GHz,10W Intel® Atom™ x6425E Processor,2.0GHz up to 3.00GHz,12W (option)
Chipset	Integrated with SoC
BIOS	AMI UEFI BIOS
Memory	1 x DDR4 3200MHz SO-DIMM, up to 32G
Graphic	Intel® UHD Graphics for 10th Gen Intel® Processors
<b>IO Port (7", 8")</b>	
USB	2 x Type A USB 3.2
Serial	1 x DB9 Type RS-485/422/232(COM1, BIOS selection)
LAN	1 x RJ45 Type Intel I210AT 1GbE LAN 1 x RJ45 Type Intel I225LM/I226LM 2.5GbE LAN
Audio	1 x Line-out
Display	1 x DisplayPort 1.4 : Up to 4096 x 2160@60Hz
Power	1 x Terminal Block Type, 9-36Vdc Power input
<b>IO Port (10.1" ~ 21.5")</b>	
USB	2 x Type A USB 3.2, 2 x Type A USB 2.0
Serial	1 x DB9 Type RS-485/422/232(COM1, BIOS selection, RS-232 is default) 1 x DB9 Type RS-232
LAN	1 x RJ45 Type Intel I210AT 1GbE LAN 1 x RJ45 Type Intel I225LM/I226LM 2.5GbE LAN
Audio	1 x Line-out

Display	1 x DisplayPort 1.4 : Up to 4096 x 2160@60Hz
Power	1 x Terminal Block Type, 9-36Vdc Power input
<b>Storage Space</b>	
Storage	1 x M.2 M-Key 2242/2280 for SSD (SATAIII)
<b>Expansion</b>	
Expansion Slot	1 x Mini-PCIe slot (full size, PCIe3.0 x1, USB2.0),w/1 x micro SIM slot 1 x M.2 E-Key 2230 for WiFi/BT module (USB2.0, PCIe3.0x1)
<b>Others</b>	
TPM	Onboard TPM2.0 SPI I/F TPM IC
Watchdog Timer	1 ~ 255 sec (system)
Wake on LAN	Support WOL
<b>Antenna</b>	
Antenna	Provide 2 x External antenna holes
<b>Power</b>	
Power Input	1 x Terminal Block Type, 9-36Vdc Power input, Power on AT/ATX supported, default AT mode
<b>Mechanical</b>	
Mechanical Construction	Aluminum die-casting chassis
Mounting	Panel Mount VESA 75(7", 8") VESA 100(10.1"~23.8")
IP Rating	IP66 Front Bezel Design
<b>Operating System Support</b>	
OS Support	Windows 10 IoT Enterprise 2021 LTSC Windows 11 (21H2) or later Linux 18.04 or later
<b>Environmental</b>	
Operating Temperature	-20~60C(exclusive 21.5",23.8" above)
Storage Temperature	-30~70°C
Humidity	10 to 95% @ 40°C, non-condensing
Certification	CE / FCC Class A



# 1.3 Display

## 1.3.1 Standard LCD

	<b>ARCHMI-S-807BP/R</b>	<b>ARCHMI-S-808BP/R</b>	<b>ARCHMI-S-810BP/R</b>	<b>ARCHMI-S-812BP/R</b>	<b>ARCHMI-S-812WBP/R</b>
Display Type	7" TFT LCD	8" TFT LCD	10" TFT LCD	12.1" TFT LCD	12.1W" TFT LCD
Max. Resolution	800 x 480	800 x 600	1280 x 800	800 x 600 (SVGA) 1024 x 768 (XGA)	1280 x 800
Max. Color	262K	262K	16.7M	16.2M	16.7M
Luminance(cd/m <sup>2</sup> )	350	450	350	450 (SVGA) 500 (XGA)	400
Contrast Ratio	1000:1	500:1	800:1	1500:1 (SVGA) 1000 : 1 (XGA)	1200:1
Viewing angle(H/V)	160 /160	140 /130	170 / 170	178 / 178 178 / 178	170 / 170
MTBF(Hrs)	40,000	40,000	30,000	50,000 (SVGA) 30,000 (XGA)	50,000

	<b>ARCHMI-S-815BP/R</b>	<b>ARCHMI-S-816BP/R</b>	<b>ARCHMI-S-817BP/R</b>	<b>ARCHMI-S-818BP/R</b>	<b>ARCHMI-S-819BP/R</b>
Display Type	15" TFT LCD	15.6" TFT LCD	17" TFT LCD	18.5" TFT LCD	19" TFT LCD
Max. Resolution	1024 x 768	1920 x 1080	1280 x 1024	1920 x 1080	1280 x 1024
Max. Color	16.7M	16.7M	16.7M	16.7M	16.7M
Luminance(cd/m <sup>2</sup> )	350	500	350	350	350
Contrast Ratio	1000:1	1000:1	1000:1	1000:1	1000:1
Viewing angle(H/V)	170/170	178/178	160/140	178/178	170/160
MTBF(Hrs)	70,000/50,000	50,000	50,000	50,000	50,000

	<b>ARCHMI-S-821BP/R</b>	<b>ARCHMI-S-824BP</b>
Display Type	21.5" TFT LCD	23.8" TFT LCD
Max. Resolution	1920 x 1080	1920 x 1080
Max. Color	16.7M	16.7M
Luminance(cd/m <sup>2</sup> )	300	250
Contrast Ratio	1000:1	3000:1
Viewing angle(H/V)	178/178	178/178
MTBF(Hrs)	50,000	30,000

### 1.3.2 High Brightness LCD

	<b>ARCHMI-S-807BP/RH</b>	<b>ARCHMI-S-808BP/RH</b>	<b>ARCHMI-S-810BP/RH</b>	<b>ARCHMI-S-812BP/RH</b>	<b>ARCHMI-S-812WBP/RH</b>
Display Type	7" TFT LCD	8" TFT LCD	10" TFT LCD	12.1" TFT LCD	12.1W" TFT LCD
Max. Resolution	800 x 480	800 x 600	1280 x 800	800 x 600 (SVGA) 1024 x 768 (XGA)	1280 x 800
Max. Color	262K	16.2M	16.2M	16.7M (SVGA) 16.2M (XGA)	16.7M
Luminance(cd/m <sup>2</sup> )	1000				
Contrast Ratio	1000:1	1000:1	1300:1	1000:1	1000:1
Viewing angle(H/V)	160 /160	140 /120	170/ 170	176 / 176 (SVGA) 178 / 178 (XGA)	176 / 176
MTBF(Hrs)	40,000	50,000	50,000	50,000 (SVGA) 70,000 (XGA)	50,000

	<b>ARCHMI-S-815BP/RH</b>	<b>ARCHMI-S-816BP/RH</b>	<b>ARCHMI-S-817BP/RH</b>	<b>ARCHMI-S-818BP/RH</b>	<b>ARCHMI-S-819BP/RH</b>
Display Type	15" TFT LCD	15.6" TFT LCD	17" TFT LCD	18.5" TFT LCD	19" TFT LCD
Max. Resolution	1024 x 768	1920 x 1080	1280 x 1024	1920 x 1080	1280 x 1024
Max. Color	16.7M	16.7M	16.7M	16.7M	16.7M
Luminance(cd/m <sup>2</sup> )	1000				
Contrast Ratio	3000:1	1000:1	800:1	1000:1	1000:1
Viewing angle(H/V)	176/176	170/160	178/178	178/178	178/178
MTBF(Hrs)	50,000	50,000	30,000	30,000	30,000

	<b>ARCHMI-S-821BP/RH</b>	<b>ARCHMI-S-824BPH</b>
Display Type	21.5" TFT LCD	23.8" TFT LCD
Max. Resolution	1920 x 1080	1920 x 1080
Max. Color	16.7M	16.7M
Luminance(cd/m <sup>2</sup> )	1000	1000
Contrast Ratio	1000:1	1000:1
Viewing angle(H/V)	178/178	170/170
MTBF(Hrs)	50,000	50,000

All product specifications are subject to change without notice, \* identify as optional function

## 1.4 Mechanical

	ARCHMI-S-807BP/R(H)	ARCHMI-S-808BP/R(H)	ARCHMI-S-810BP/R(H)	ARCHMI-S-812BP/R(H)	ARCHMI-S-812WBP/R(H)
Mounting	VESA Mount 75 x 75 mm		VESA Mount 100 x 100 mm		
Dimensions(mm)	202x149x58	231.1x176.1x69	285x189x75	319x244.9x77	328x227x78
Net Weight(Kg)	1.35	2	2.7	3.3	3.2

	ARCHMI-S-815BP/R(H)	ARCHMI-S-816BP/R(H)	ARCHMI-S-817BP/R(H)	ARCHMI-S-818BP/R(H)	ARCHMI-S-819BP/R(H)
Mounting	VESA Mount 100 x 100				
Dimensions(mm)	410.2x310.2x78.7	412x277.5x78	439x348x82	499.6x314.6x82	468x380x82
Net Weight	5	4.2	6.3	6.7	7.8

	ARCHMI-S-821BP/R(H)	ARCHMI-S-824BP(H)
Mounting	VESA Mount 100 x 100	VESA Mount 100 x 100
Dimensions(mm)	557.3x362.3x82	640 x 395 x 88
Net Weight	7.4	9.44

## 1.5 Power Consumption

Max power consumption of each model under Window 10

Model	Max Power Consumption
ARCHMI-S-807B	31.82W
ARCHMI-S-808B	27.68W
ARCHMI-S-810B	27.13W
ARCHMI-S-812B	32.92W
ARCHMI-S-812WB	32.15W
ARCHMI-S-815B	36.05W
ARCHMI-S-816B	49.32W
ARCHMI-S-817B	52.24W
ARCHMI-S-818B	50W
ARCHMI-S-819B	38W
ARCHMI-S-821B	36.32W
ARCHMI-S-824B	43W

\* To record power consumed when system has full loading with external devices attached.

\* Power consumption may have 10% tolerance difference due to different MB, parts, test instrument, and so on.

\* We suggest to use the adapter that APLEX approved. If you would like to adopt your own power supply or adapter, please add another 20-30% from the above power consumption to make sure the system can work stable.

## 1.6 Dimensions

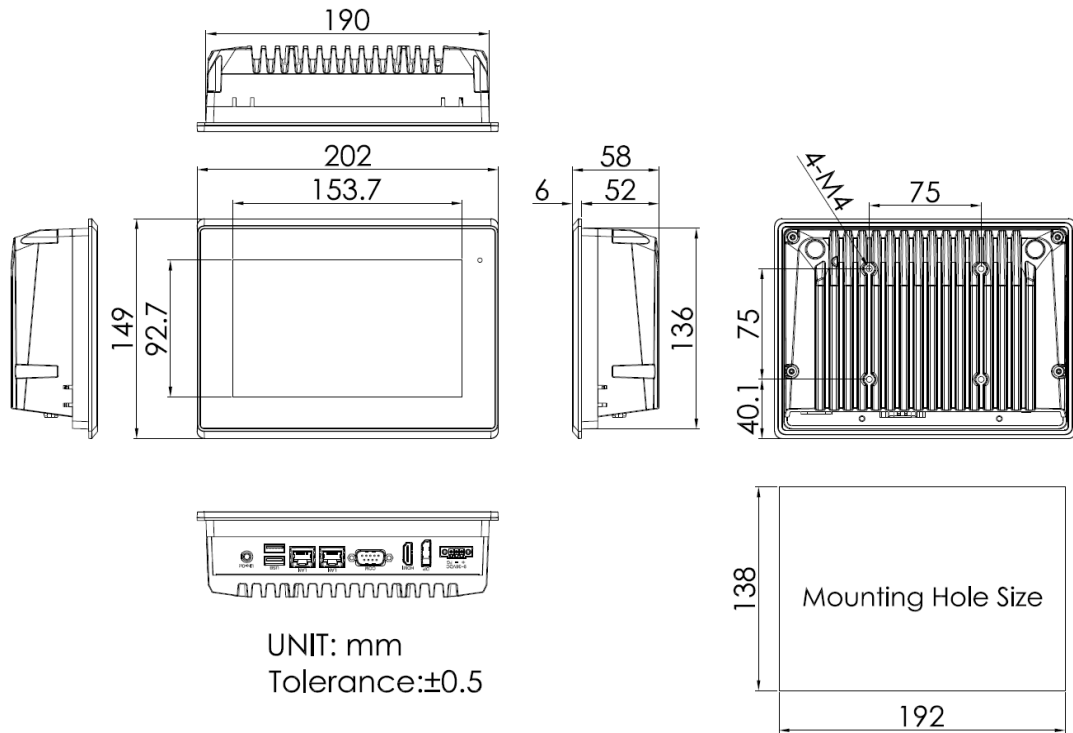


Figure 1 Dimensions of ARCHMI-S-807BP/R(H)

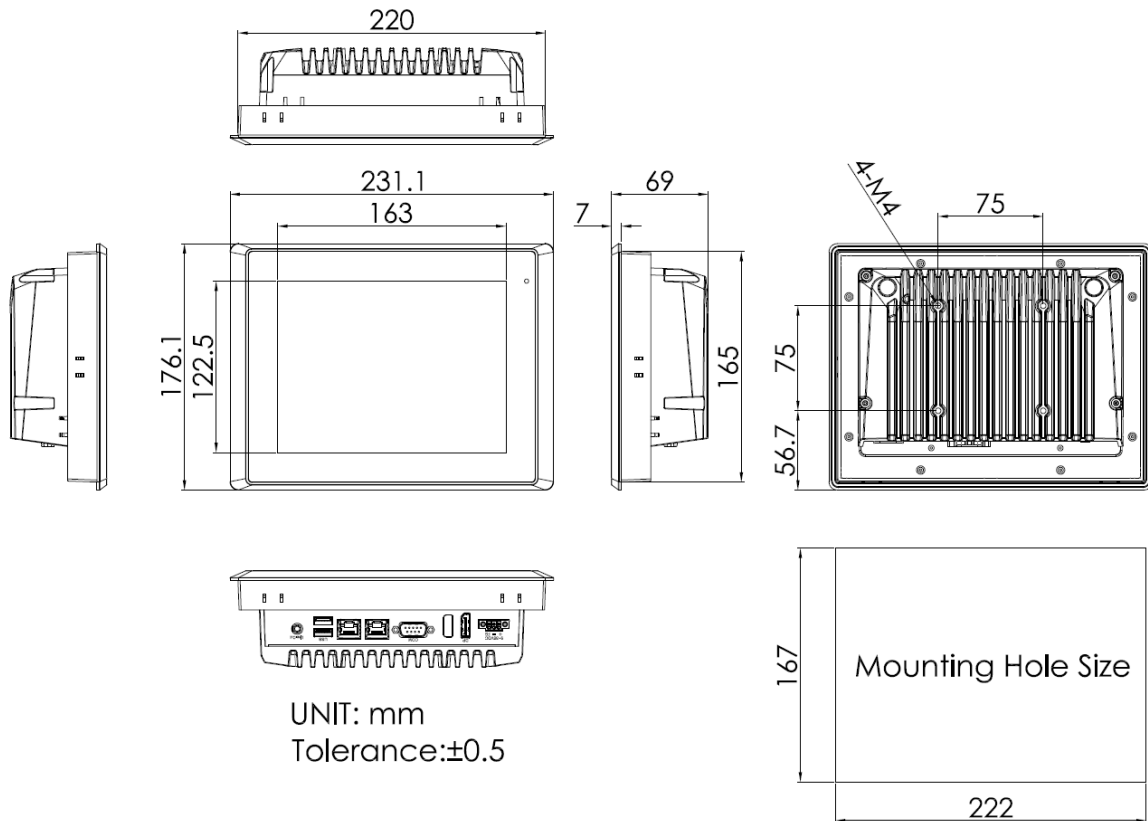


Figure 2 Dimensions of ARCHMI-S-808BP/R(H)

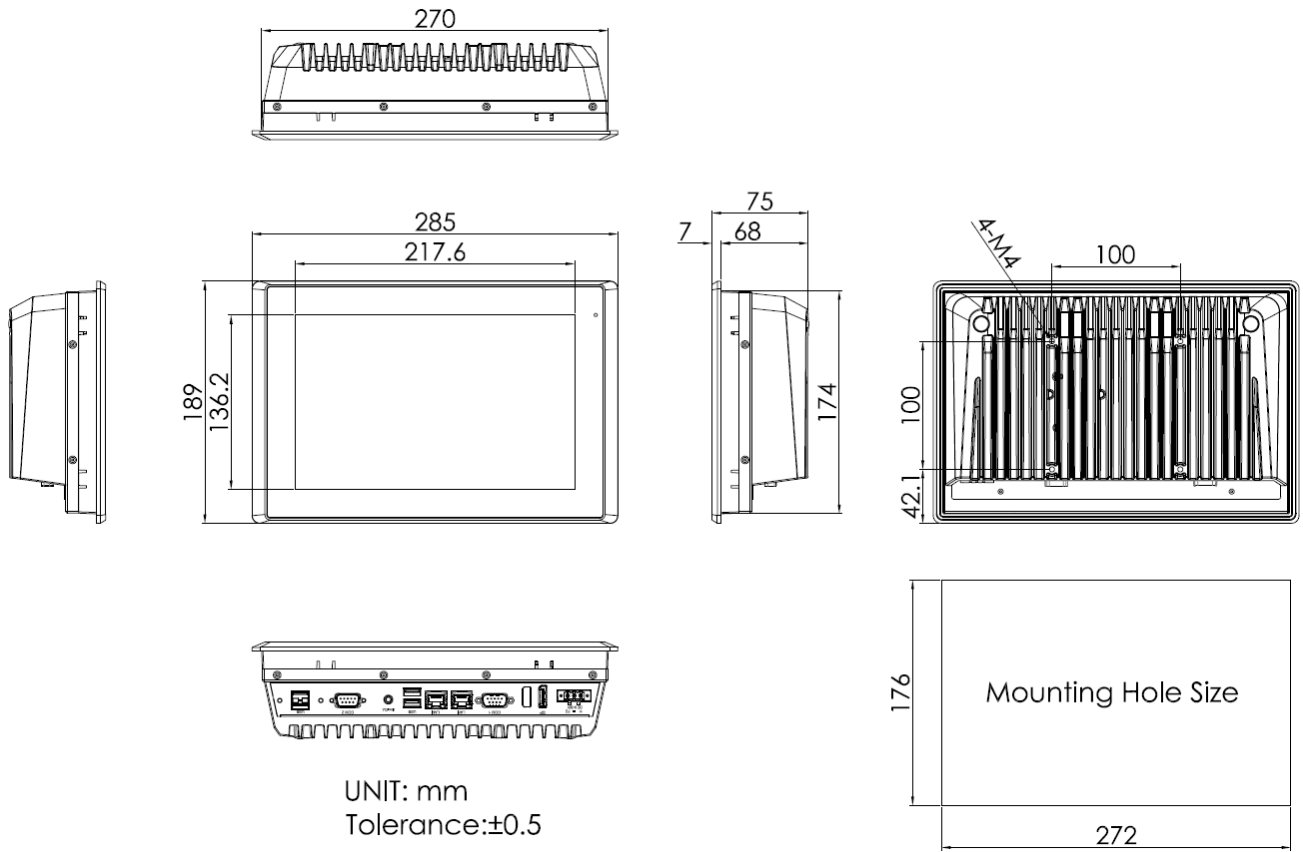


Figure 3 Dimensions of ARCHMI-S-810BP/R(H)

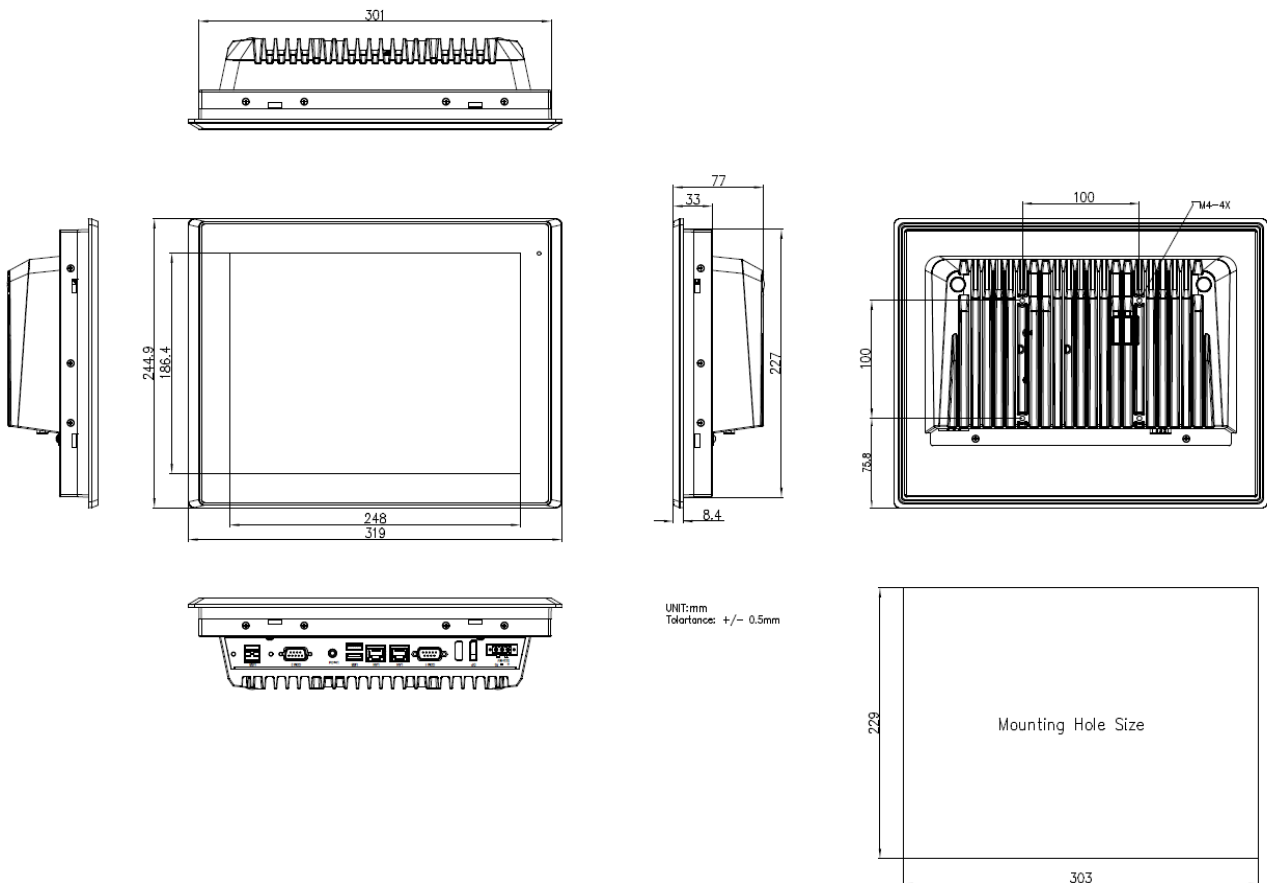


Figure 4 Dimensions of ARCHMI-S-812BP/R(H)

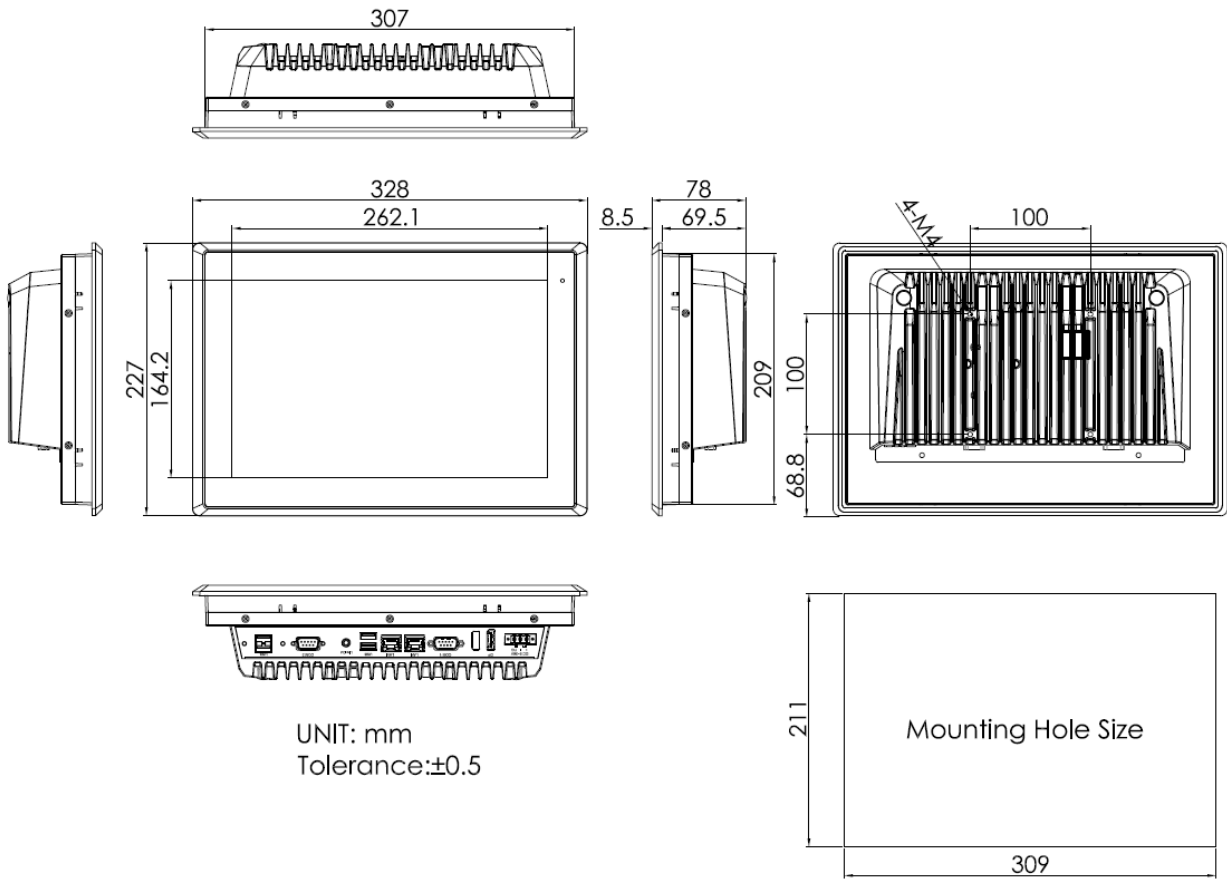


Figure 5 Dimensions of ARCHMI-S-812WBP/BR(H)

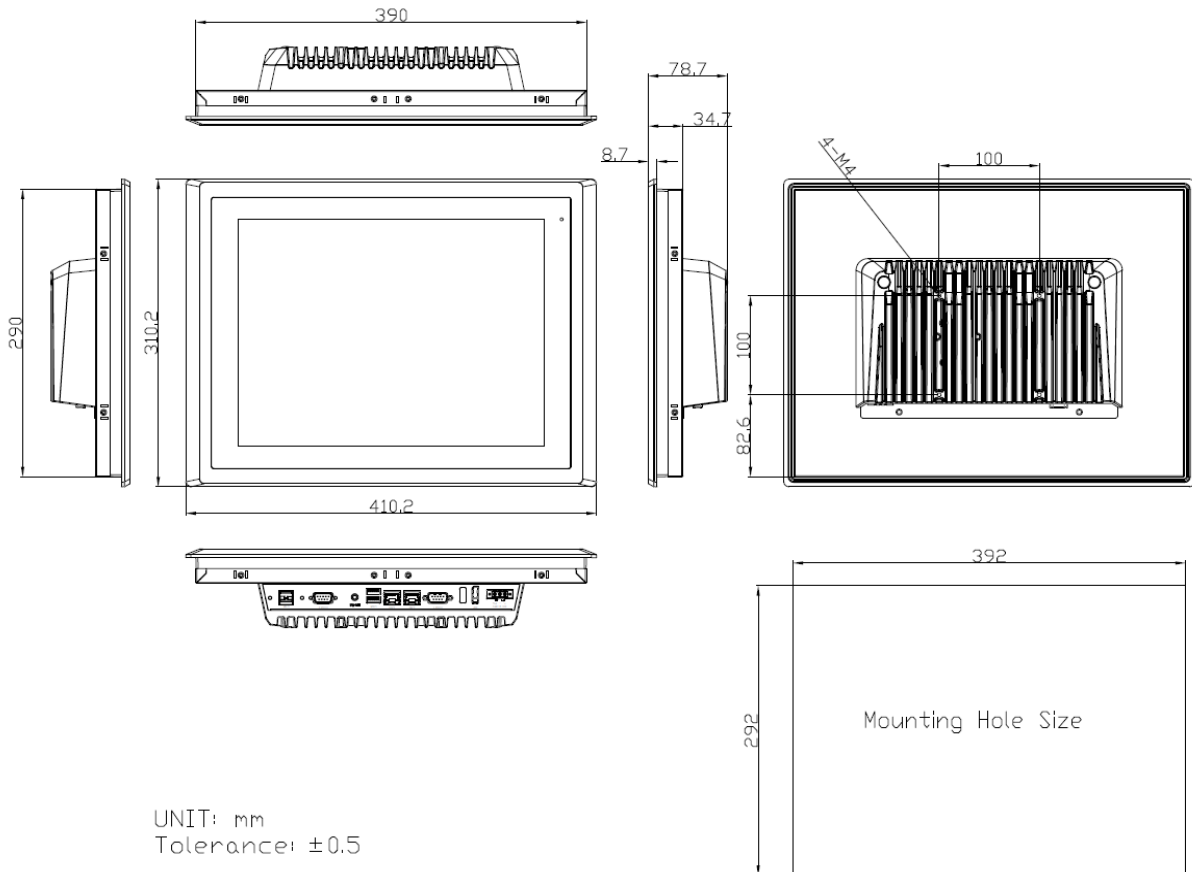


Figure 6 Dimensions of ARCHMI-S-815BP/BR(H)

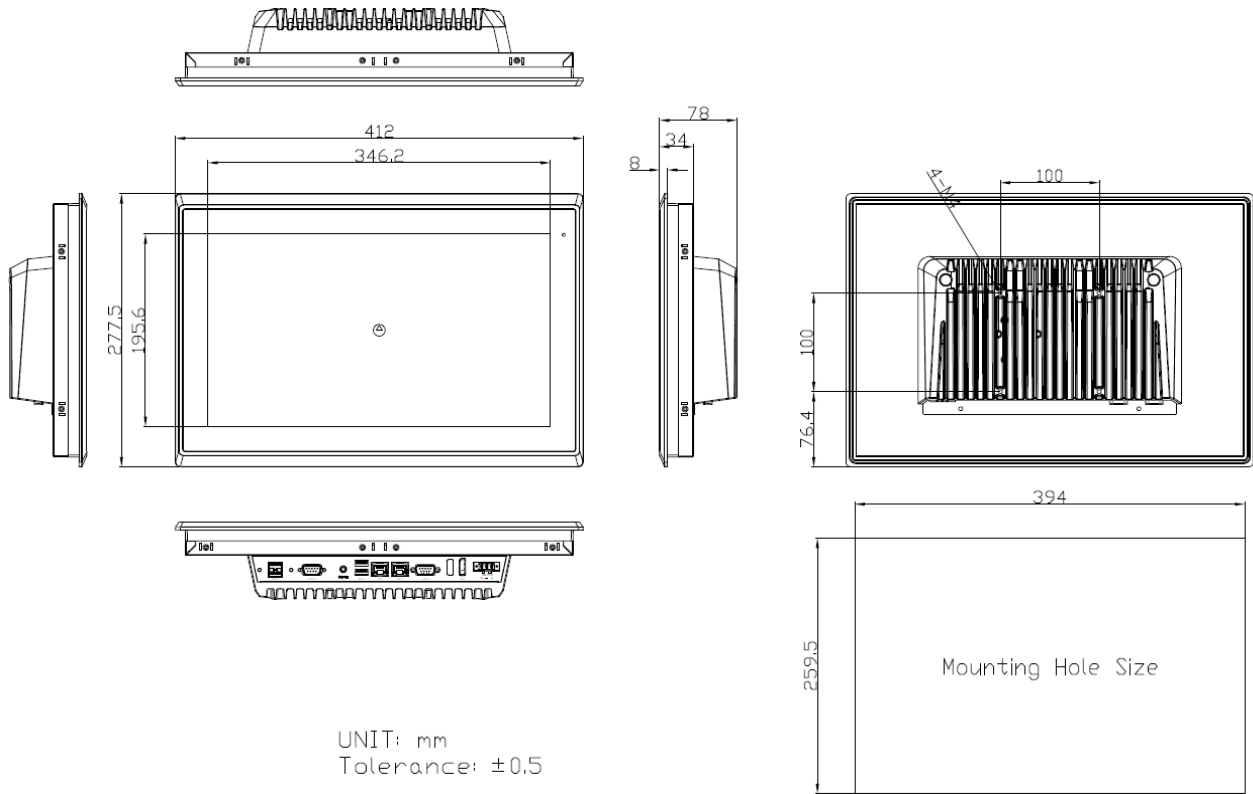


Figure 7 Dimensions of ARCHMI-S-816BP/R(H)

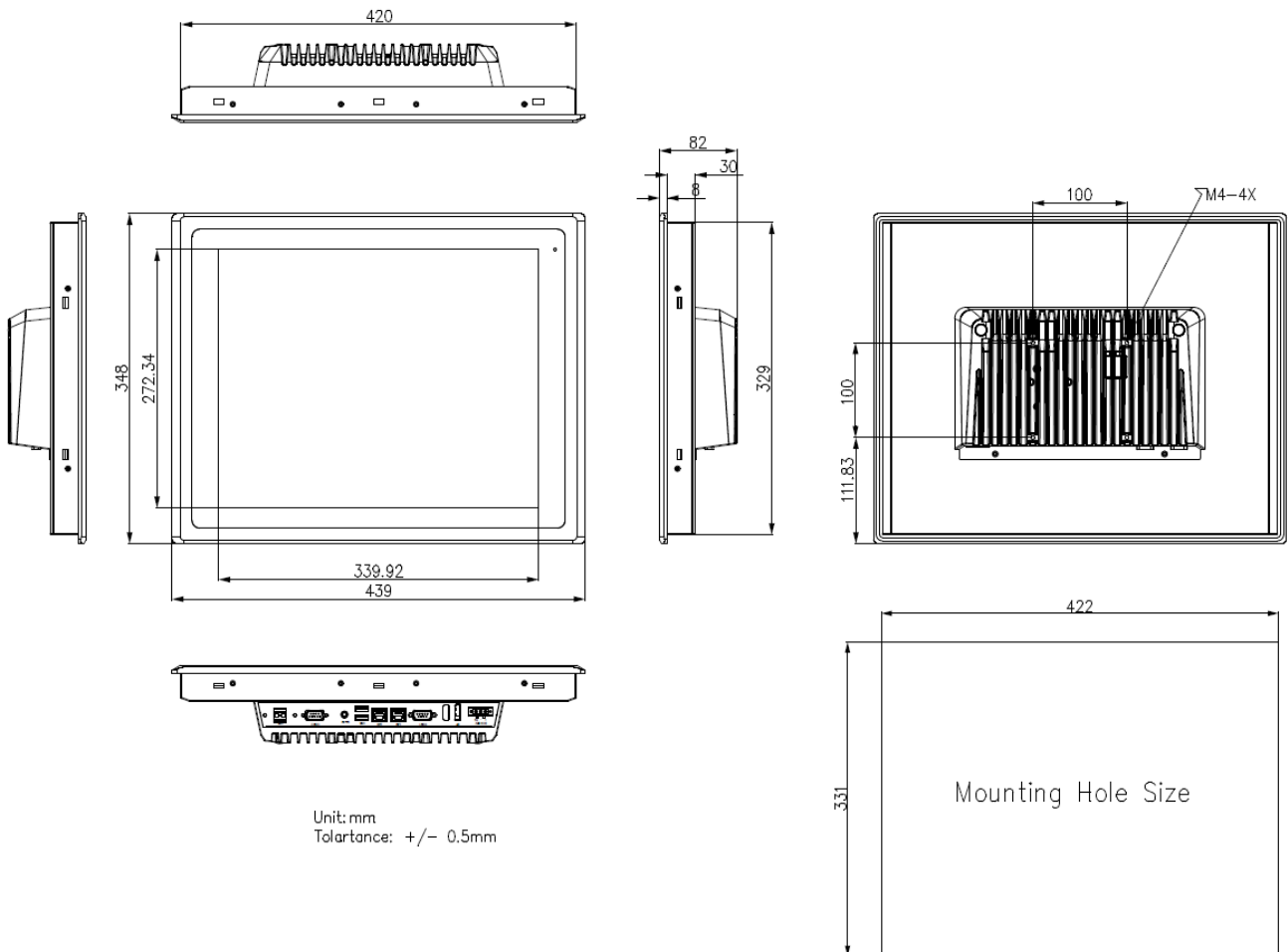


Figure 8 Dimensions of ARCHMI-S-817BP/R(H)

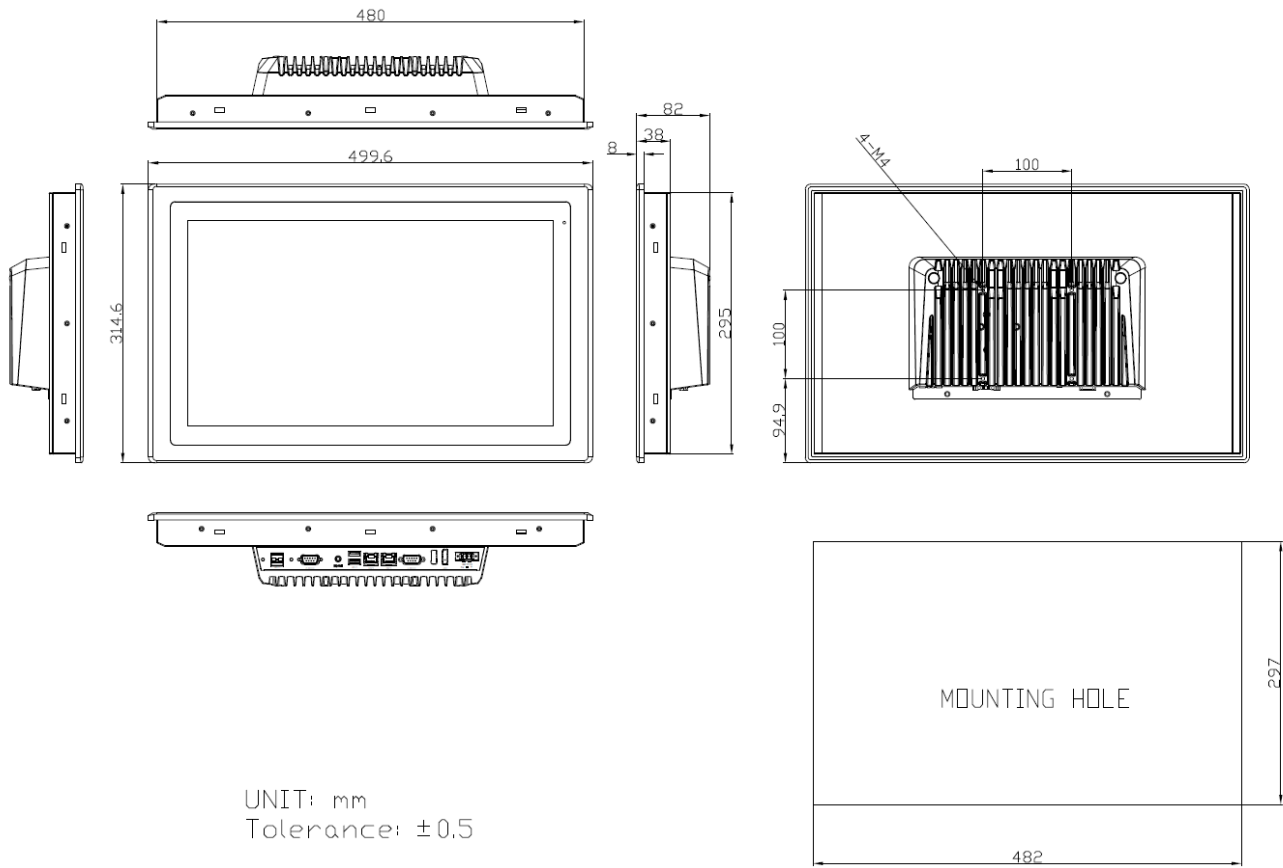


Figure 9 Dimensions of ARCHMI-S-818BP/R(H)

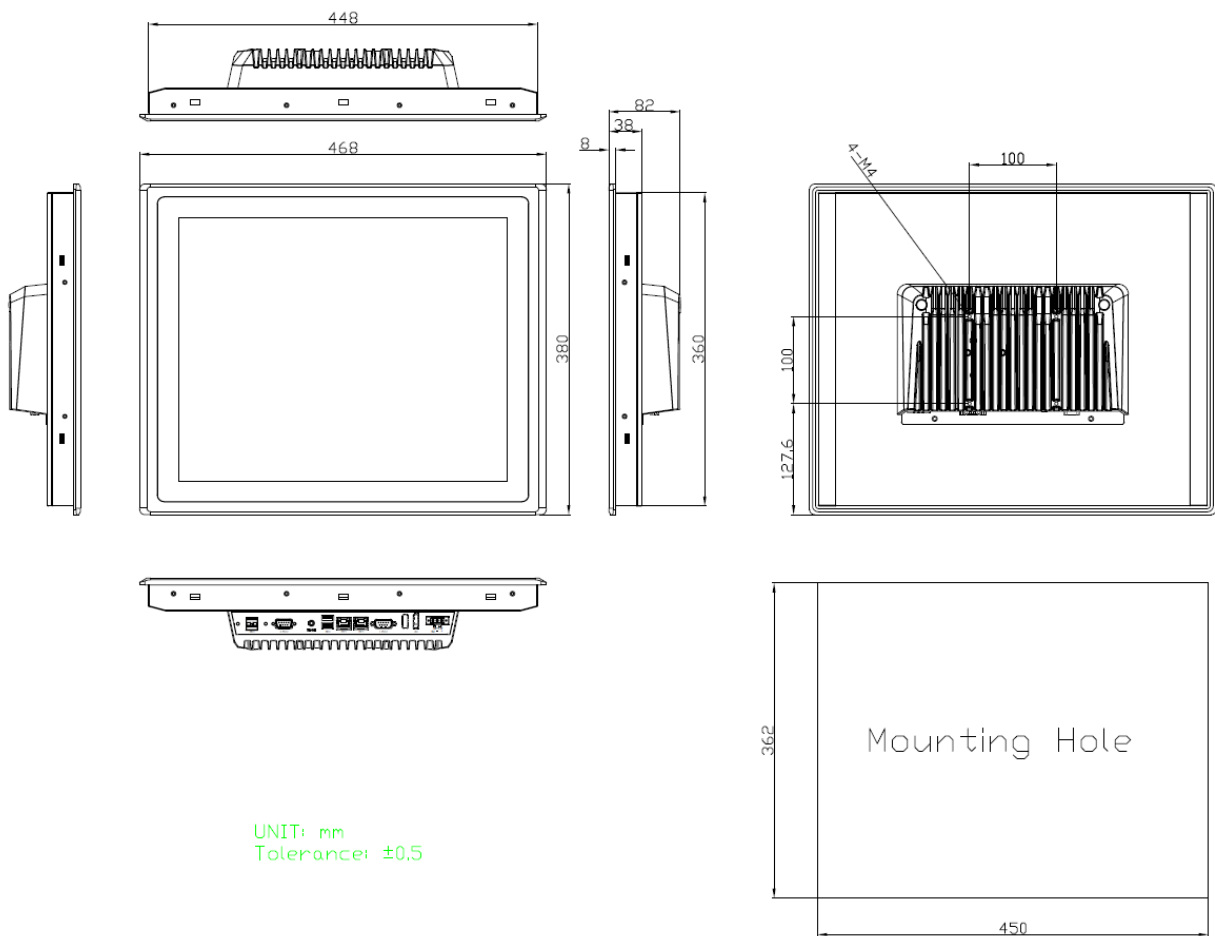


Figure 10 Dimensions of ARCHMI-S-819BP/R(H)



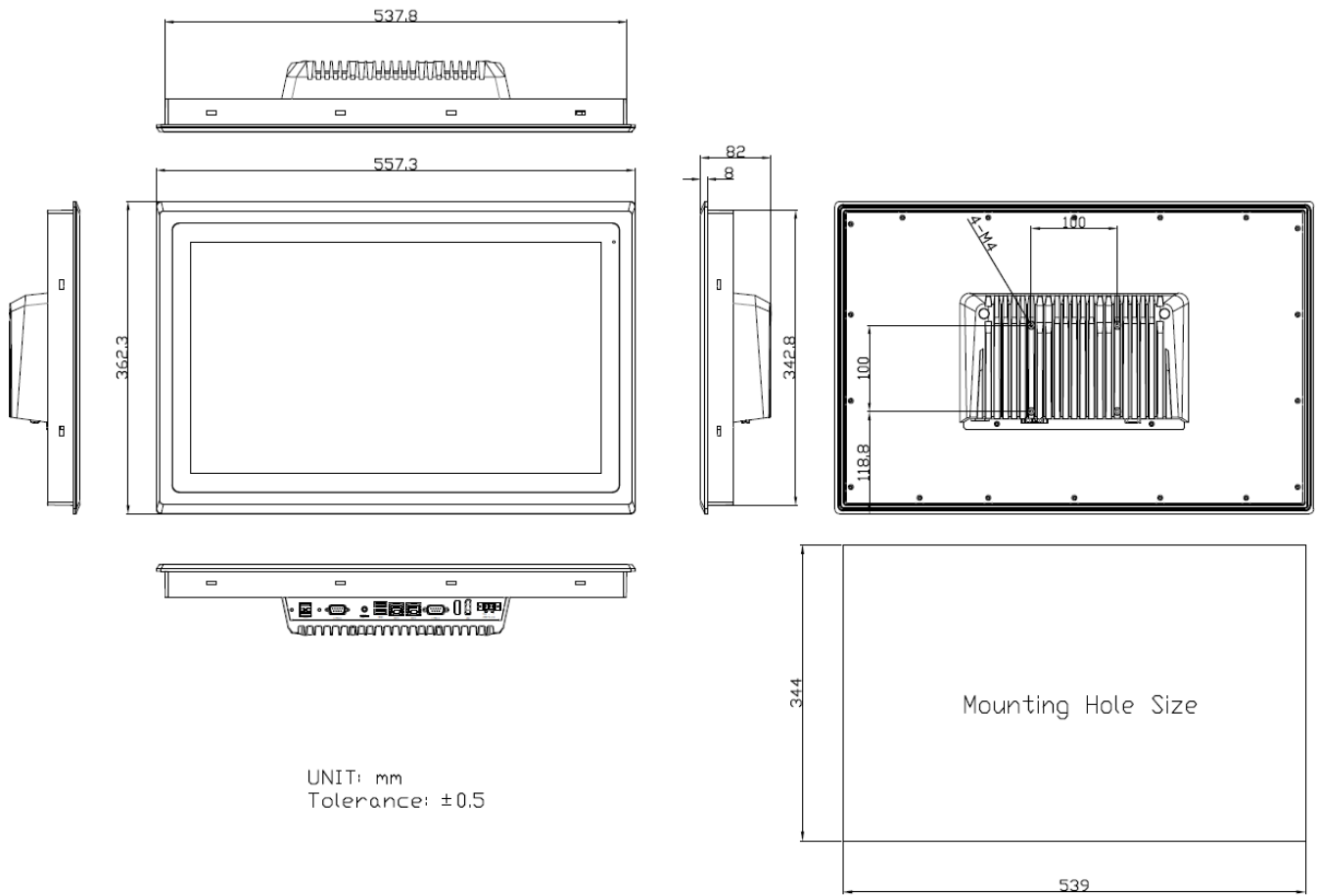


Figure 11 Dimensions of ARCHMI-S-821BP/R(H)

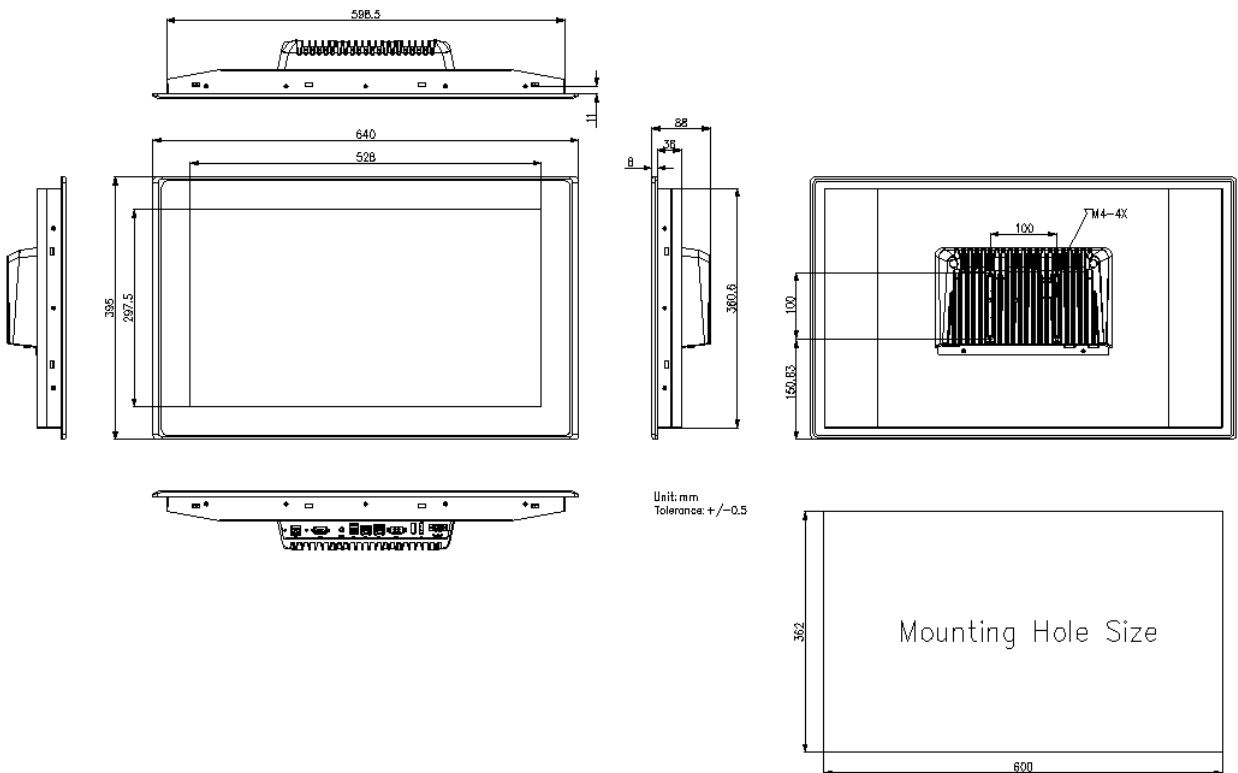


Figure 12 Dimensions of ARCHMI-S-824BP(H)

## 1.7 Brief Description of ARCHMI-S-8XXB Series

APLEX's ARCHMI-S-8XXB series products are a newly launched product line, ranging in size from 10.1" to 23.8". They feature a fanless, low-power, and compact design, making them suitable for use as HMI and control panels in smart production lines and self-service kiosks. With a protective aluminum enclosure, full-plane resistive touchscreen or projected capacitive multi-touchscreen technology, wireless capabilities, and multiple I/O options, the high-performance ARCHMI-S-8XXB series devices can also be integrated with a wide range of optional peripherals and accessories according to specific application requirements.

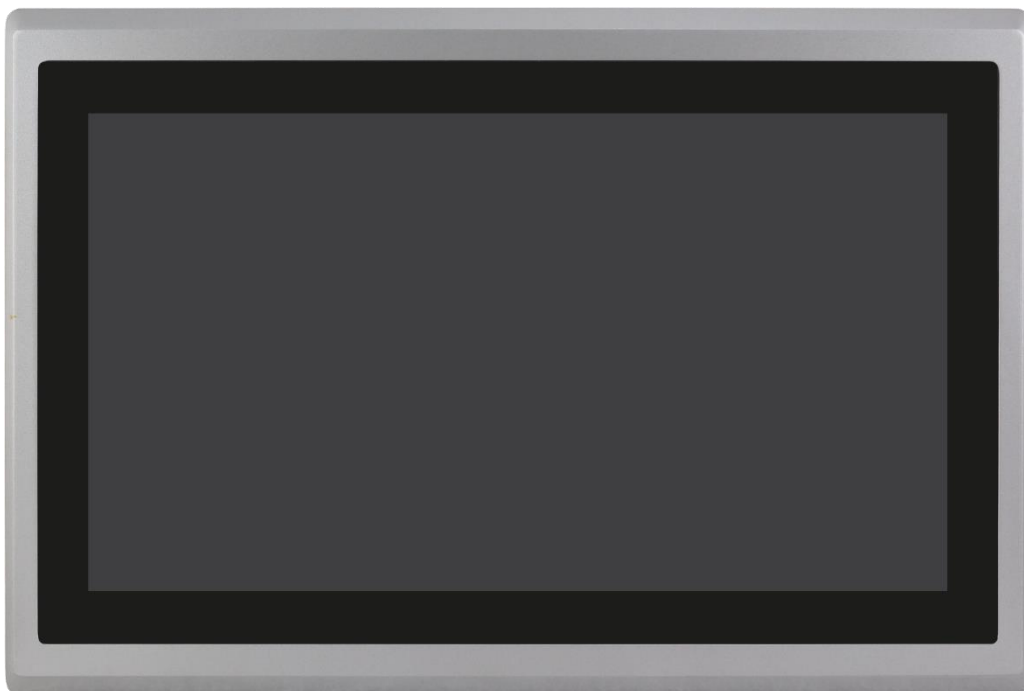


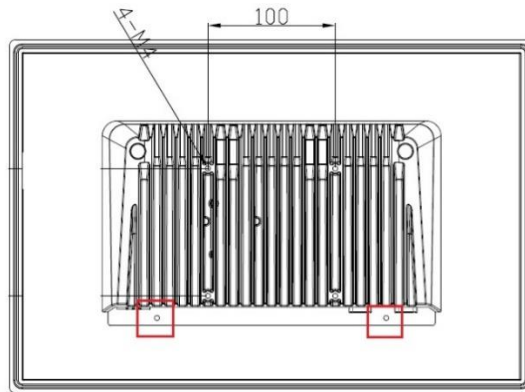
Figure 13 Front View of ARCHMI-S-816B



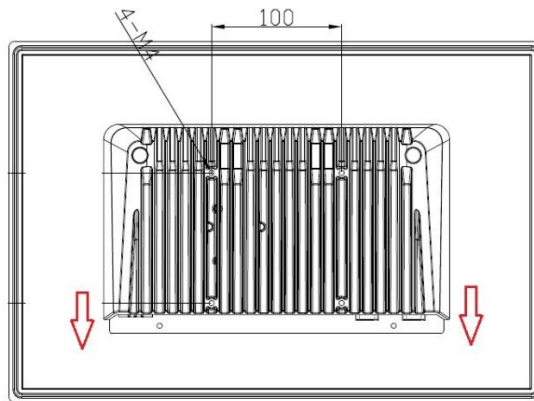
Figure 14 Rear View of ARCHMI-S-816B

## 1.8 Installation of Memory and Storage

Step 1 : Remove screws from the bottom side of back chassis.

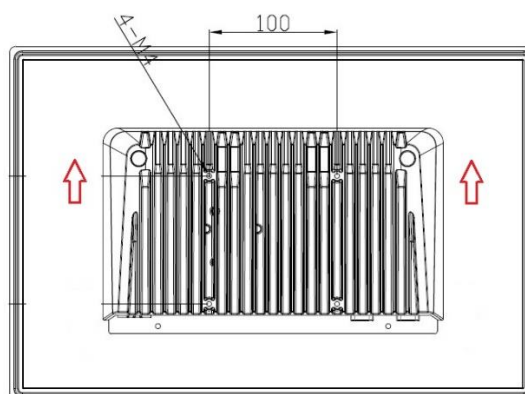


Step 2 : Push down back chassis from the system

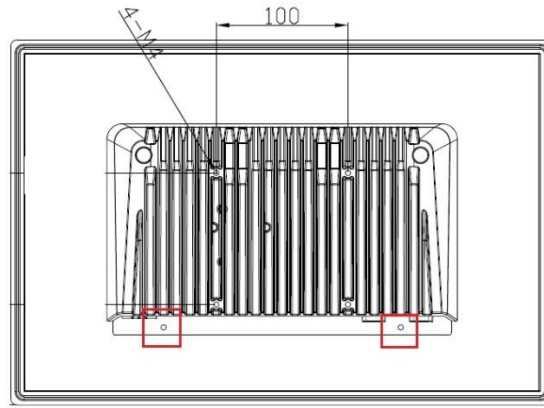


Step 3 : Install memory module on the motherboard.  
Install M.2 M-Key 2242/2280 for SSD (SATAIII) on motherboard.

Step 4 : Push the back cover latch into the back cover sliding rail.



Step 5 : Tighten the screws.



## 1.9 VESA Mounting

The ARCHMI-S-8XXB series support VESA 75/100 mount.

ARCHMI-S-807/808B : VESA 75, 4-m4 screw x 4 PCs

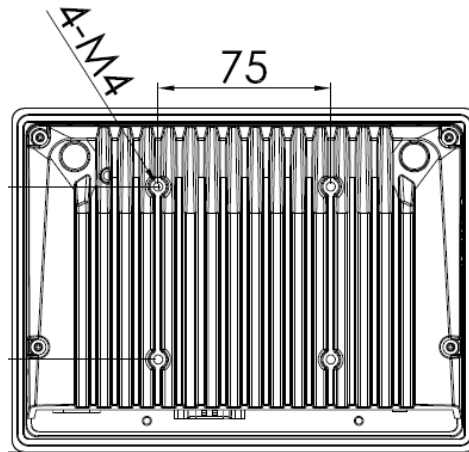


Figure 15 ARCHMI-S-807B/808B VESA Mounting

ARCHMI-S-810/812/812W/815/816/817/818/819/821B : VESA 100, 4-m4 screw x 4 PCs

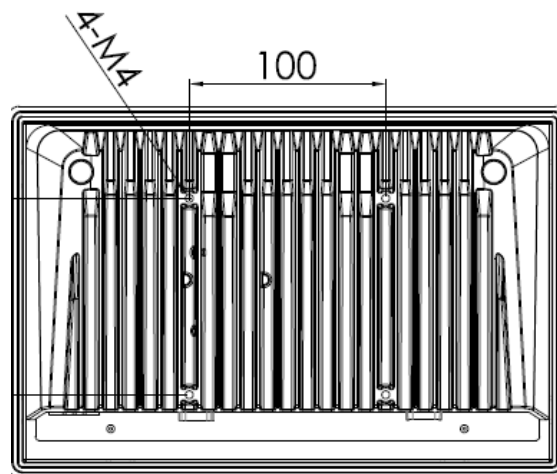


Figure 16 ARCHMI-S-810B/812B/812WB/815B/816B/817B/818B/819B/821B/824B VESA Mounting

## 1.10 Panel Mounting

There are mounting holes located along the four sides of the HMI. Position the ARCHMI-S panel pc against the panel mount and insert the mounting kit from the four sides and tighten them with screws.

Description	Qty	Unit
Panel mounting kit for 7"	4	PCS
Panel mounting kit for 8"	6	PCS
Panel mounting kit for 10.1" , 12.1" and 12.1"W	8	PCS
Panel mounting kit for 15" , 15.6" , 17" , 18.5" and 19"	10	PCS
Panel mounting kit for 21.5" and 23.8"	12	PCS

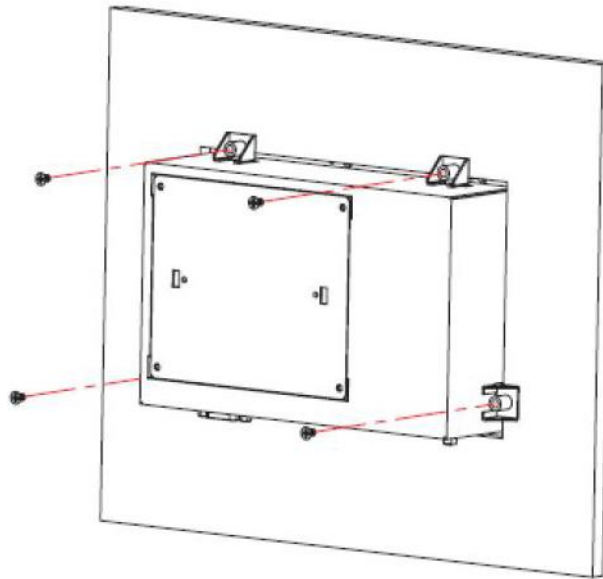


Figure 17 ARCHMI-S-8XXB PANEL Mounting

SBC-7127 is a 3.5" industrial motherboard developed on the basis of Intel Elkhart Lake, which provides abundant peripheral interfaces to meet the needs of different customers.

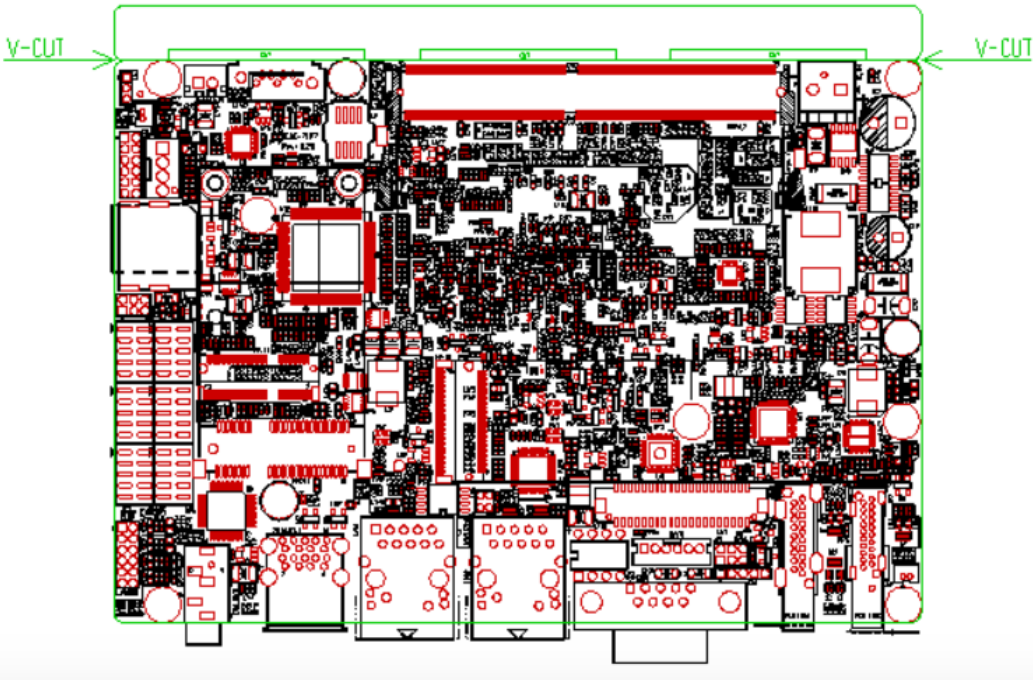
## 2.1 Motherboard Specifications

Specifications	
<b>Board Size</b>	146mm x 101.6mm
<b>CPU Support</b>	Intel Celeron J6412 Processor, 2.0GHz up to 2.60GHz, 10W Intel Atom x6425E Processor, 2.0GHz up to 3.00GHz, 12W (option)
<b>Chipset</b>	SOC
<b>Memory Support</b>	1x SO-DIMM (260pins), up to 32GB DDR4 3200MT/s
<b>Graphics</b>	Integrated Intel UHD Graphics 400/800 MHz (J6412) Integrated Intel UHD Graphics 500/750 MHz (x6425E)
<b>Display Mode</b>	1 x DisplayPort1.4, DP++ via DP Port 1 x HDMI1.4b via HDMI Port 1 x LVDS (18/24-bit dual LVDS)
<b>Support Resolution</b>	DP: support up to 4096 x 2160 @60Hz HDMI: support up to 3840x2160@30Hz LVDS: support up to 1920 x 1200
<b>Super I/O</b>	ITE IT8786E-I/HX
<b>BIOS</b>	AMI/UEFI BIOS
<b>Storage</b>	1 x SATAIII via 7pin SATA connector 1 x M.2 M-Key(SATA III), 2242/2280 for Storage
<b>Ethernet</b>	1 x 10/100/GbE LAN via intel® I210-AT controller (PXE/WoL) 1 x 10/100/1000/2.5GbE LAN via intel® I226-LM controller (PXE/WoL)
<b>USB</b>	2 x USB3.2 gen2/USB2.0, Type-A stack ports (USB3_1) 2 x USB2.0 via pitch 2.0mm 2x5pin header (USB1) 2 x USB2.0 via pitch 2.0mm 2x5pin header (USB2) 1 x USB2.0 for touch screen (CN3) 1x USB2.0 for MPCIE1 1x USB2.0 for M2_E1
<b>Serial</b>	1 x RS-232(default)/422/485, signals select via BIOS (COM1), pin9 RI(default)/5V/12V, select via JP1. (DB9, COM1) 1 x RS-232 via pitch 2.0mm 2x5pin header, pin9 RI(default)/5V/12V, select via JP2 (COM2)

	2 x 2wired RS485 via pitch 2.0mm 2x5pin header (COM3)
<b>GPIO</b>	8-bit digital I/O by Pin header (GPIO2) 4-bit digital Input 4-bit digital Output
<b>Audio</b>	Support Audio via Realtek ALC888S-VD2 HD audio codec 1x Line out via 3.5mm audio jack Support Line-in,Line-out,MIC by 2x6-pin header
<b>Expansion Slots</b>	1 x full-sized mini-PCI-express slot (MPCIE1) with micro SIM slot (SIM1) 1 x M.2 E-Key(PClex1,USB2.0),2230 for WIFI/BT module
<b>FAN</b>	1x 4pin fan connector
<b>Watchdog Timer</b>	Software programmable 1–255 level
<b>TPM</b>	Onboard TPM IC Infineon_SLB9670AQ2.0 Support fTPM, select via BIOS
<b>Switches and LED Indicators</b>	Power button/reset button/power LED/HDD LED/buzzer via pitch 2.0mm 2x5pin header (FP1)
<b>Battery</b>	Support 3V RTC Li-battery via 2pin wafer (BAT1)
<b>Power Management</b>	Wide range DC 9~36V±10% power input via 2pin terminal block
<b>Temperature</b>	Operating: -20°C to 70°C Storage: -40°C to 85°C
<b>Humidity</b>	10% - 90%, non-condensing, operating
<b>Certifications</b>	Meet CE/FCC class A UL RoHS2.0



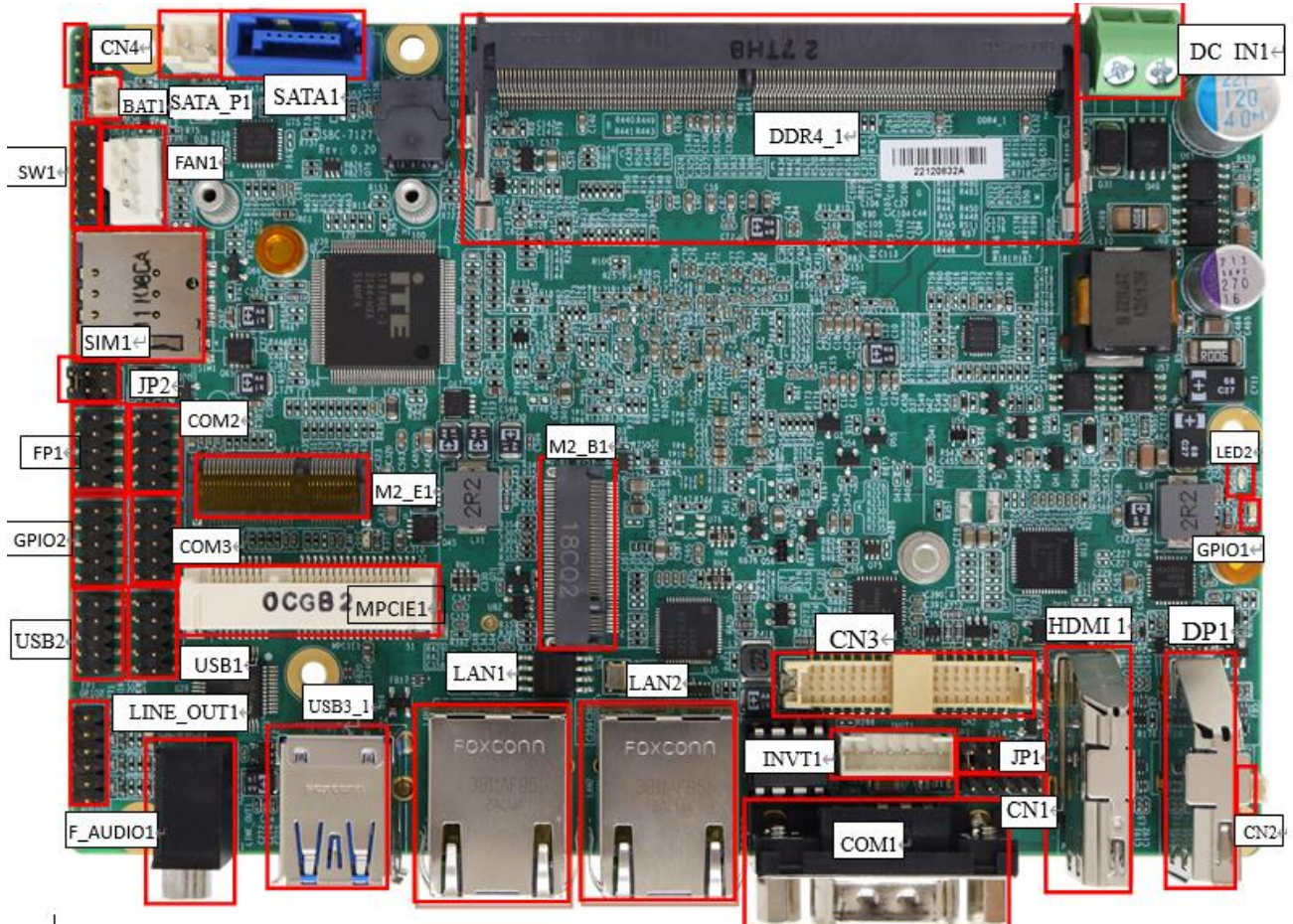
## 2.2 Board Dimensions



Dimensions: 146 x 101.6 (units :mm)

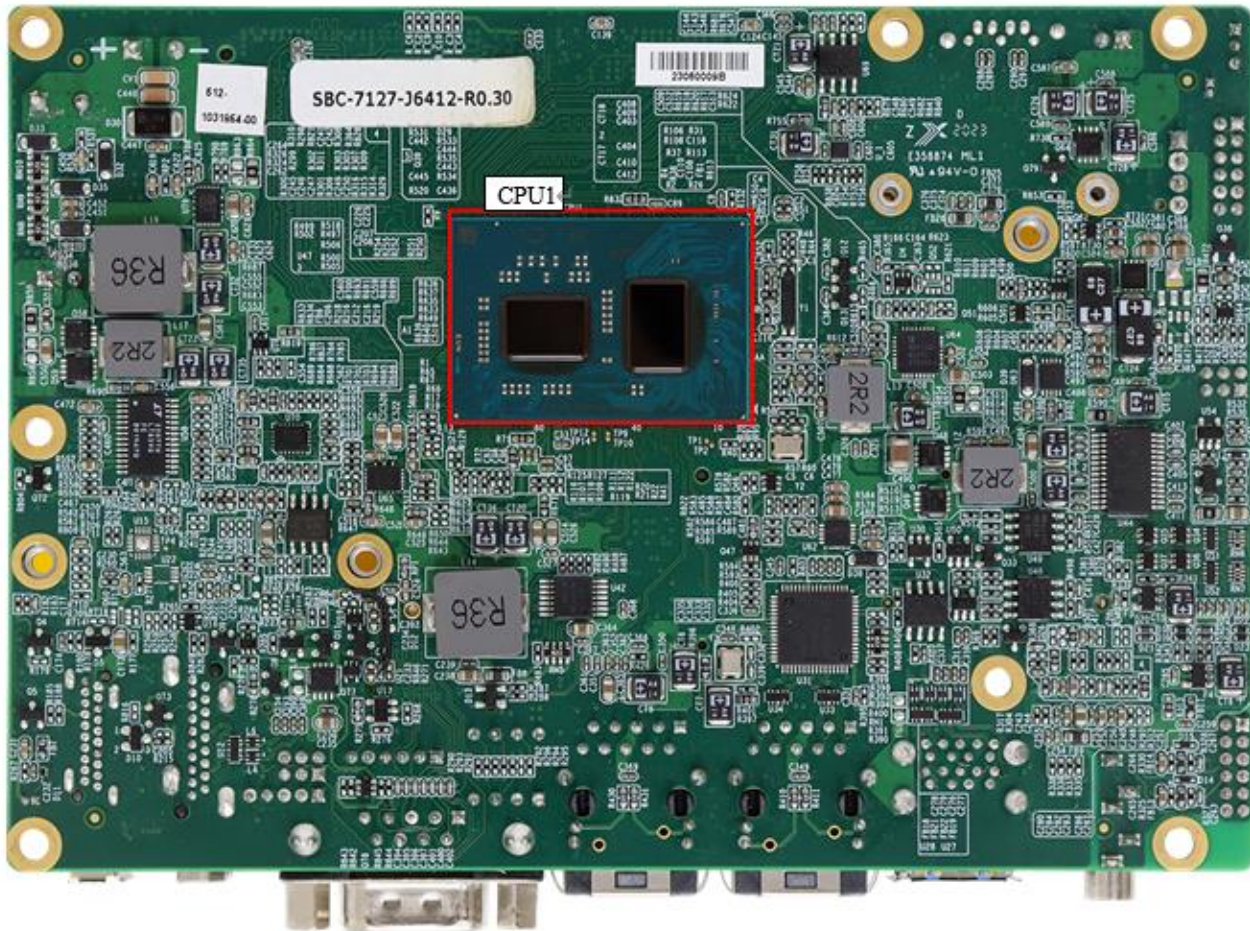
## 2.3 Jumpers and Connectors Location

Board Top

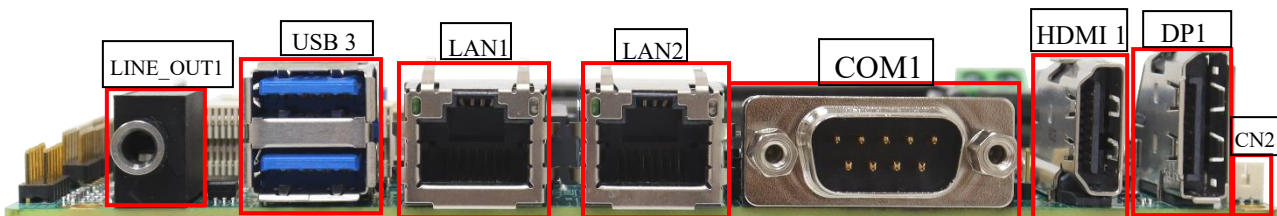




## Board Bottom



## External IO



## 2.4 Jumpers Setting and Connectors

### 1. CPU1:

(FCBGA1493) Onboard Intel Elkhart Lake SoC

Model	SoC				
	Number	PBF	Cores/ Threads	TDP	Remarks
SBC-7127-J6412	J6412	2.0~2.6GHz	4 / 4	10W	Default
SBC-7127-X6425E	X6425E	2.0~3.0GHz	4 / 4	12W	Option

### 2. DDR4\_1:

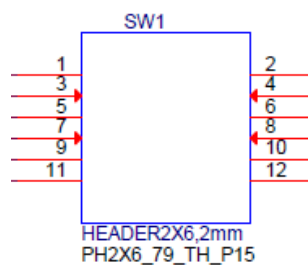
(SO-DIMM 260Pin slot) DDR4 memory socket, the socket is located at the top of the board and supports 260Pin 1.2V DDR4 SO-DIMM memory module up to 32GB.  
Max Memory Size (dependent on memory type).

### 3. BAT1:

(1.25mm Pitch 1x2 wafer Pin Header) 3.0V Li battery is embedded to provide power for CMOS.

Pin#	Signal Name
Pin1	VCC_RTC
Pin2	GND

### 4. SW1:



(2.00mm Pitch 2x6 Pin Header) Power mode and LVDS setting.

Switch	Open	Close
Pin1-2	PWRBTN-ON	Auto-PSON
Pin3-4	ATX Mode	AT Mode
Pin5-6	Normal	Close 1sec to Clear CMOS
Pin7-8	Normal	Write EDID
Pin9-10	LVDS Dual CH.	LVDS Single CH.
Pin11-12	LVDS 6 bit Signal	LVDS 8 bit Signal

CMOS clear switch, CMOS clear operation will permanently reset old BIOS settings to factory

defaults.

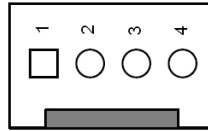


#### Procedures of CMOS clear:

- a) Turn off the system and unplug the power cord from the power outlet.
- b) To clear the CMOS settings, close Pin5-6 for 1 second
- c) Power on the system again.
- d) When entering the POST screen, press the <DEL> key to enter CMOS Setup Utility to load optimal defaults.
- e) After the above operations, save changes and exit BIOS Setup.

#### 5. FAN1:

(2.54mm Pitch 1x4 Pin Header) Fan connector, cooling fans can be connected directly for use. You may set the rotation condition of cooling fan in menu of BIOS CMOS Setup.



Pin#	Signal Name
1	GND
2	VCC(12V_S0)
3	CPU_FANTACH
4	CPU_FANPWM



Note:

Output power of cooling fan must be limited under 5W.

#### 6. DC\_IN1:

(5.08mm Pitch 1x2 Pin Connector) DC9~36V System power input connector.

Pin#	Power Input
Pin1	DC_IN+ (DC+9V~36V)
Pin2	DC_IN- (Ground)

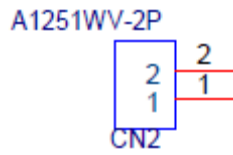
#### 7. CN1:

(2.00mm Pitch 1x4 Pin Header) For onboard MCU service.

Pin#	Signals
1	GND
2	nRST

3	TICECLK
4	TICECDAT

**8. CN2:**



(1.25mm Pitch 2-Pin Wafer) Connect to ambient light sensor to support auto light sensing function.

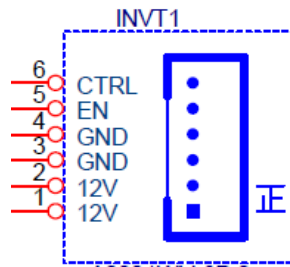
Pin#	Signals
1	ALS
2	MCU_PWR

**9. CN3:**

(1.25mm Pitch 2x20 Connector, DF13-40P) Support 18/24-bit LVDS interface LCM with USB2.0 signal for touch screen.

Function	Signal Name	Pin#		Signal Name	Function
DC12V	12V_S0	2	1	12V_S0	DC12V
LVDS Signals	BKLT_EN_OUT	4	3	BKLT_CTRL	LVDS Signals
	GND	6	5	GND	
	LVDS_VDD5	8	7	LVDS_VDD5	
	LVDS_VDD3	10	9	LVDS_VDD3	
	GND	12	11	GND	
	LA_D0_P	14	13	LA_D0_N	
	LA_D1_P	16	15	LA_D1_N	
	LA_D2_P	18	17	LA_D2_N	
	LA_D3_P	20	19	LA_D3_N	
	LA_CLKP	22	21	LA_CLKN	
	LB_D0_P	24	23	LB_D0_N	
	LB_D1_P	26	25	LB_D1_N	
	LB_D2_P	28	27	LB_D2_N	
	LB_D3_P	30	29	LB_D3_N	
	LB_CLKP	32	31	LB_CLKN	
USB3	GND	34	33	GND	USB3
	USB3_CN3_P	36	35	USB3_CN3_N	
	5V_S5	38	37	5V_S5	
Power LED+	PWR_LED+	40	39	GND	Power LED-

## 10. INVT1:



(2.0mm Pitch 1x8 wafer Pin Header) Provide backlight power & control for LVDS.

Pin#	Signal Name
1	12V_S0
2	12V_S0
3	GND
4	GND
5	BKLT_EN_OUT
6	BKLT_CTRL

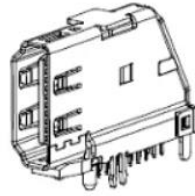
## 11. DP1:



(Vertical DP Connector) DisplayPort Interface connector.

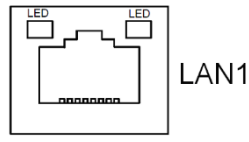
DisplayPort 1.4, DP++ support resolution up to 4096x2160@60Hz.

## 12. HDMI1:



(Vertical HDMI Connector) HDMI Interface connector.  
HDMI 1.4, Support resolution up to 3840x2160@30H.

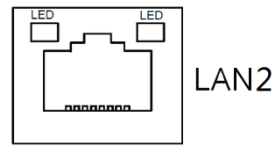
## 13. LAN1:



(RJ45 Connector) Provide 10/100/GbE LAN via Intel® I210-AT.

Status	Description
OFF	10Mbps
Yellow	100Mbps
Green	1Gbps

## 14. LAN2:



(RJ45 Connector) Provide 10/100/1000/2.5GbE LAN via Intel® I226-LM.

Status	Description
OFF	10M/100Mbps
Yellow	1000Mbps
Green	2.5 Gbps

## 15. LINE\_OUT1:



(Diameter 3.5mm Jack) Provide line-out via onboard Realtek ALC888S codec.

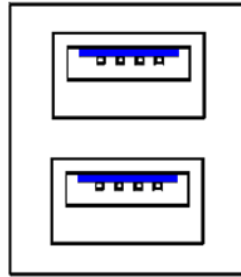
## 16. F\_AUDIO1:

(2.0mm Pitch 2x6 Pin Header) Provide line-in/line-out/mic-in via onboard Realtek ALC888S codec.

Signal Name	Pin#	Pin#	Signal Name
5V_S5	1	2	GND_AUD
LINE-OUT-L	3	4	LINE-OUT-R
FRONT_JD	5	6	LINE_JD
LINE-IN-L	7	8	LINE-IN-R
MIC-IN-L	9	10	MIC-IN-R
GND_AUD	11	12	MIC1_JD

**17. USB3\_1:**

(Double stack USB typeA) Rear USB3.2 connector, provides up to 2 USB3.2 gen2/USB2.0 ports, USB3.2 gen2 allows data transfers up to 10.0Gbps.



Each USB Type A Receptacle (2 Ports) Current limited value is **2.0A**.

If the external USB device current exceeds 2.0A, please separate connectors into different Receptacle.

**18. USB1:**

(2.0mm Pitch 2x5 Pin Header) Provide 2xUSB2.0 signals.

Signal Name	Pin#	Pin#	Signal Name
5V_USB56	1	2	5V_USB56
USB5_N	3	4	USB6_N
USB5_P	5	6	USB6_P
GND	7	8	GND
NC	9	10	NC

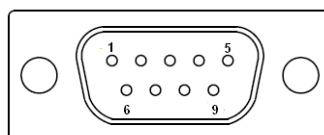
## 19. USB2:

(2.0mm Pitch 2x5 Pin Header) Provide 2xUSB2.0 signals.

Signal Name	Pin#	Pin#	Signal Name
5V_USB47	1	2	5V_USB47
USB4_N	3	4	USB7_N
USB4_P	5	6	USB7_P
GND	7	8	GND
GND	9	10	NC

## 20. COM1:

(DB9 connector) Provide serial RS232/422/485 via standard DB9 male connector. Default is set to RS232, RS422/485 can be selected via BIOS. Pin 9 RI/5V/12V select via JP1.



RS232 (Default):	
Pin#	Signal Name
1	DCD# (Data Carrier Detect)
2	RXD (Received Data)
3	TXD (Transmit Data)
4	DTR (Data Terminal Ready)
5	GND
6	DSR (Data Set Ready)
7	RTS (Request To Send)
8	CTS (Clear To Send)
9	JP1 select Setting (RI/5V/12V)
BIOS Setup : Serial Port 1 Configuration 【RS-232】	

RS422 (option):	
Pin#	Signal Name
1	422_TX-
2	422_TX+
3	422_RX+
4	422_RX-
5	GND
6	NC
7	NC



8	NC
9	NC
BIOS Setup : Serial Port 1 Configuration 【RS-422】	

RS485 (option):	
Pin#	Signal Name
1	485-
2	485+
3	NC
4	NC
5	GND
6	NC
7	NC
8	NC
9	NC
BIOS Setup : Serial Port 1 Configuration 【RS-485】	

**21. JP1:**

(2.0mm Pitch 2x3 Pin Header) For COM1 pin9 signal setting.

JP1 Pin#	Function
<b>Close 1-2</b>	<b>COM1 Pin9 RI (Ring Indicator, Default)</b>
Close 3-4	COM1 Pin9 = +5V
Close 5-6	COM1 Pin9 = +12V

**22. COM2:**

(2.0mm Pitch 2x5 Pin Header) Provide RS232, pin 9 RI/5V/12V select via JP2.

Signal Name	Pin#	Pin#	Signal Name
DCD	1	2	RXD
TXD	3	4	DTR
GND	5	6	DSR
RTS	7	8	CTS
RI/5V/12V via JP2	9	10	NC

**23. JP2:**

(2.0mm Pitch 2x3 Pin Header) For COM2 pin9 signal setting.

JP1 Pin#	Function
<b>Close 1-2</b>	<b>COM2 Pin9 RI (Ring Indicator, Default)</b>
Close 3-4	COM2 Pin9 = +5V
Close 5-6	COM2 Pin9 = +12V

**24. COM3:**

(2.0mm Pitch 2x5 Pin Header) Provide 2x2wired RS485(COM3/4).

Signal Name	Pin#	Pin#	Signal Name
COM3_485-	1	2	COM4_485-
COM3_485+	3	4	COM4_485+
GND	5	6	GND
NC	7	8	NC
NC	9	10	NC

**25. GPIO2:**

(2.0mm Pitch 2x5 Pin Header) Provide 8xGPIO(4xDI,4xDO) with 5V VCC.

Signal Name	Pin#	Pin#	Signal Name
5V_GPIO	1	2	GND
GPIO_IN1	3	4	GPIO_IN2
GPIO_IN3	5	6	GPIO_IN4
GPIO_OUT1	7	8	GPIO_OUT2
GPIO_OUT3	9	10	GPIO_OUT4

**26. FP1:**

(2.0mm Pitch 2x5 Pin Header) Provide power button/reset button/power LED/HDD LED/buzzer.

Signal Name	Pin#	Pin#	Signal Name
HDD LED+	1	2	Power LED+
HDD LED-	3	4	Power LED-
Reset Button-	5	6	Power Button+
Reset Button+	7	8	Power Button-
Buzzer+	9	10	Buzzer-

**27. M-PCIE1:**

(Socket 52Pin) Mini-PCI express socket, supports full-sized mini-PCIe cards with 1xSIM slot.

Function	Support	Remarks
PClex1 (PCIe 5)	●	
SMbus	●	
Micro SIM (SIM1)	●	
USB2.0 (USB8)	●	

**28. SIM1:**

(Micro-SIM Slot) Support micro SIM card for M\_PCIE1.

Pin#	Signal Name
1	NC
2	GND
3	SIMVCC
4	NC
5	SIM_RST
6	NC
7	SIM_IO
8	SIM_CLK

**29. M2\_B1:**

(M.2 M-Key Socket) Support 2242/2280 SATA III interface SSD.

**30. M2\_E1:**

(M.2 E-Key Socket) Provide USB2.0/PClex1, support E-key 2230 WiFi/BT expansion cards.  
Status LED is supported via WLAN1.

**31. SATA1:**

(SATA 7Pin) SATA connector provide SATA III signal for storages.

### 32. SATA\_P1:

(2.5mm Pitch 1x2 Wafer Pin Header) 5V power supply for SATA1 port device.

Pin#	Signal Name
1	5V_S0
2	GND



**Note:**

**Output current of the connector must not be above 1A.**

### 33. WLAN\_1/LED2/GPIO1:

WLAN\_1 : Green LED for M.2 E-key status.

LED2 : Green LED for power status.

GPIO1 : Red LED for MCU status.

### 3.1 Operations after POST Screen

After CMOS discharge or BIOS flashing operation. Press [Delete] key to enter CMOS Setup.

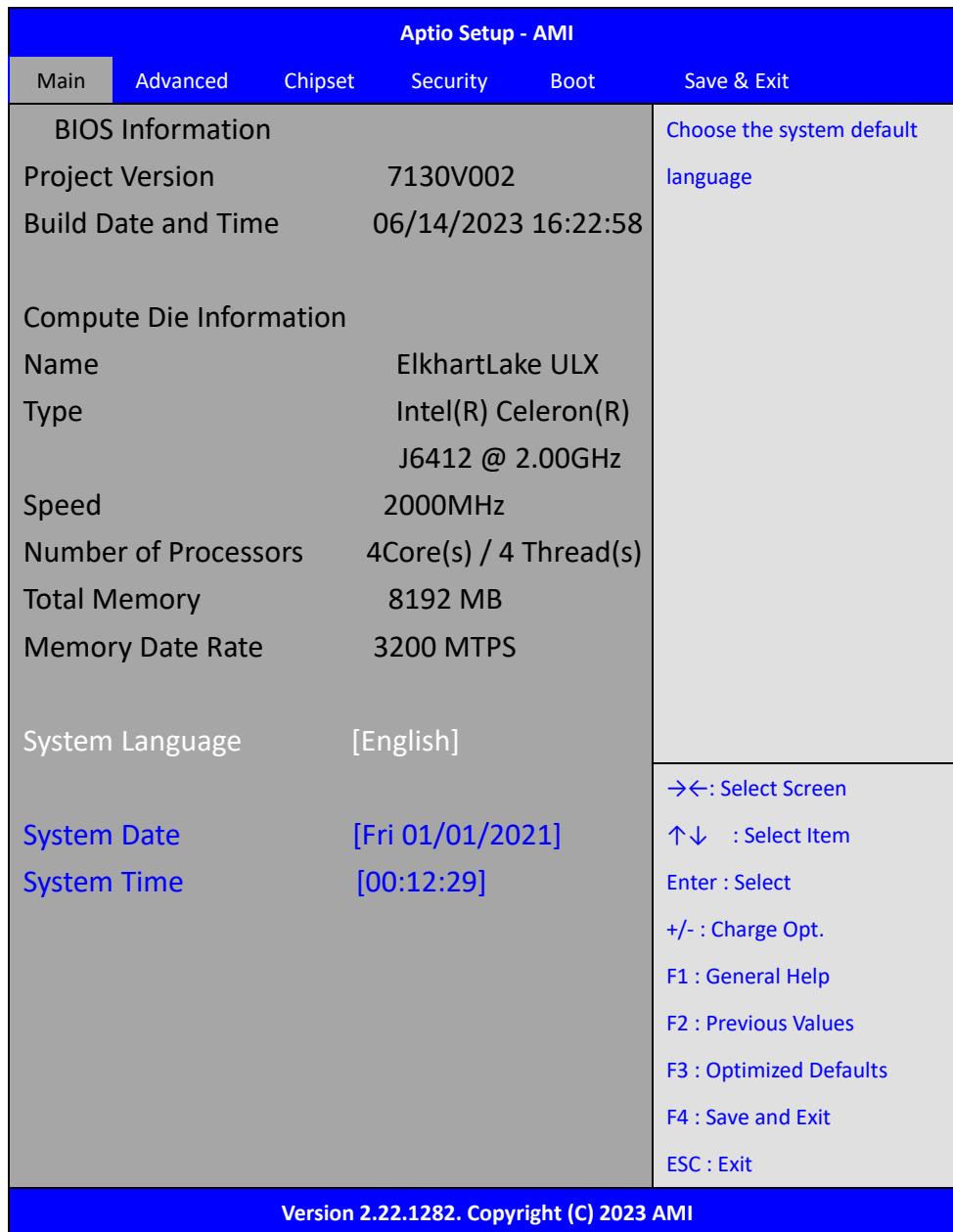


After optimizing and exiting CMOS Setup

### 3.2 BIOS SETUP UTILITY

Press [Delete] key to enter BIOS Setup utility during POST, and then a main menu containing system summary information will appear.

### 3.3 Main Settings



#### System Time:

Set the system time, the time format is:

Hour : 0 to 23

Minute : 0 to 59

Second : 0 to 59

#### System Date:

Set the system date, the date format is:

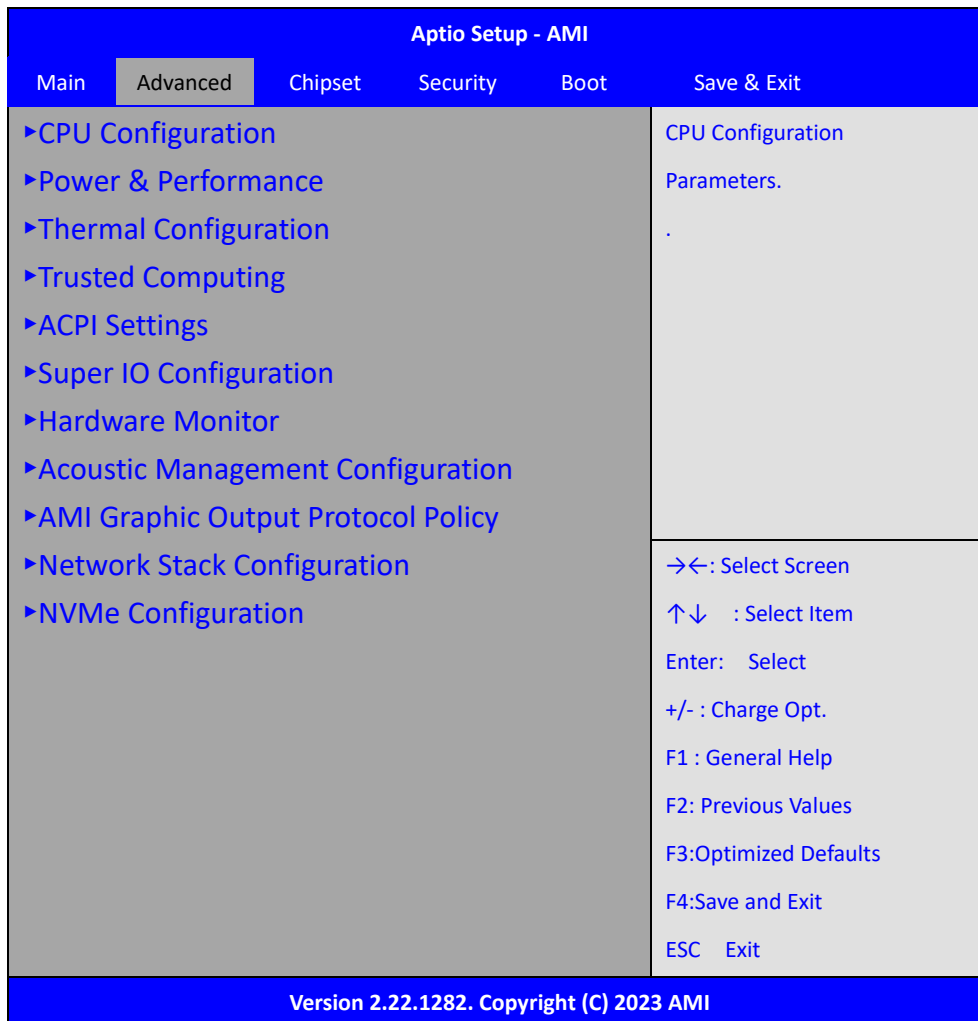
**Day:** Note that the 'Day' automatically changes when you set the date.

**Month:** 01 to 12

**Date:** 01 to 31

**Year:** 1998 to 2099

## 3.4 Advanced Settings



### 3.4.1 CPU Configuration

#### CPU Configuration

Type	Intel(R) Celeron(R) J6412 @ 2.00GHz
ID	0x90661
Speed	2000 MHz
L1 Data Cache	32 KB x 4
L1 Instruction Cache	32 KB x 4
L2 Cache	1536 KB x 4
L3 Cache	4 MB
L4 Cache	N/A
VMX	Supported
SMX/TXT	Not Supported

#### CPU Flex Ratio Override:

[Disabled]  
[Enabled]

CPU Flex Ratio Settings	20
Hardware Prefetcher:	[Disabled] [Enabled]
Intel (VNX) Virtualization Technology:	[Disabled] [Enabled]
PECI:	[Disabled] [Enabled]
Active Processor Cores:	[ALL] [1] [2] [3]
BIST:	[Disabled] [Enabled]
AP threads Idle Manner:	[HALT Loop] [MWAIT Loop] [RUN Loop]
AES:	[Disabled] [Enabled]
MachineCheck:	[Disabled] [Enabled]
MonitorMWait:	[Disabled] [Enabled]
CPU SMM Enhancement	
CPU SMM Enhancement	
SMM Use Delay Indication:	[Disabled] [Enabled]
SMM Use Block Indication:	[Disabled] [Enabled]
SMM Use SMM en-US Indication:	



[Disabled]

[Enabled]

#AC Split Lock:

[Enabled]

[Disabled]

### 3.4.2 Power & Performance

Power & Performance

CPU – Power Management Control

CPU – Power Management Control

P0 Fused Max Core Ratio N/A

P1 Fused Max Core Ratio N/A

P2 Fused Max Core Ratio N/A

P3 Fused Max Core Ratio N/A

Boot performance mode:

[Max Battery]

[Max Non-Turbo Performance]

[Turbo Performance]

Intel (R) SpeedStep(tm):

[Disabled]

[Enabled]

Race To Halt (RTH):

[Disabled]

[Enabled]

Intel (R) Speed Shift Technology:

[Disabled]

[Enabled]

HWP Autonomous EPP Grouping:

[Disabled]

[Enabled]

EPB override over PECl:

[Disabled]

[Enabled]

HWP Fast MSR Support:

[Disabled]

[Enabled]

HDC Control:

[Disabled]

[Enabled]

Turbo Mode:

[Disabled]

[Enabled]

View/Configure Turbo Options

Current Turbo Settings

Max Turbo Power Limit	4095.875
Min Turbo Power Limit	0.0
Package TDP Limit	10.0
Power Limit 1	10.0
Power Limit 2	20.0
1-core Turbo Ratio	26
2- core Turbo Ratio	26
3- core Turbo Ratio	26
4- core Turbo Ratio	26

Energy Efficient P-state:

[Disabled]

[Enabled]

Package Power Limit MSR Lock:

[Disabled]

[Enabled]

Power Limit 1 Override:

[Disabled]

[Enabled]

Power Limit 2 Override:

[Disabled]

[Enabled]

Power Limit 2	0
1-Core Ratio Limit Override	26
2-Core Ratio Limit Override	26
3-Core Ratio Limit Override	26
4-Core Ratio Limit Override	26

Energy Efficient Turbo:

[Disabled]

[Enabled]

CPU VR Settings

CPU VR Ssttings

PSYS Slope	0
PSYS Offset	0
PSYS Prefix:	

	[+]
	[-]
PSYS PMax Power	0
Acoustic Noise Settings	
Acoustic Noise Settings	
Acoustic Noise Mitigation:	
	[Disabled]
	[Enabled]
Vccln VR Domain	
Disable Fast PKG C State Ramp for Vccln Domain:	
	[FALSE]
	[TRUE]
Slow Slew Rate for Vccln Domain:	
	[Fast/2]
	[Fast/4]
	[Fast/8]
	[Fast/16]
Vccln VR Settings	
Vccln VR Domain	
VR Config Enable:	
	[Disabled]
	[Enabled]
AC Loadline	880
DC Loadline	860
PS Current Threshold1	0
PS Current Threshold2	0
PS Current Threshold3	0
PS3 Enable:	
	[Disabled]
	[Enabled]
PS4 Enable:	
	[Disabled]
	[Enabled]
IMON Slope	100
IMON Offset	1
IMON Prefix	[+]
VR Current Limit	90
TDC Enable:	
	[Disabled]
	[Enabled]

TDC Current Limit	112
TDC Time Window:	
	[1 ms]
	[2 ms]
	[3 ms]
	[4 ms]
	[5 ms]
	[6 ms]
	[7 ms]
	[8 ms]
	[9 ms]
	[10 ms]
TDC Lock:	
	[Disabled]
	[Enabled]
RFI Settings	
RFI Domain	
RFI Current Frequency	139.200MHz
RFI Frequency	0
RFI Spread Spectrum	15
Platform PL1 Enable:	
	[Disabled]
	[Enabled]
Platform PL2 Enable:	
	[Disabled]
	[Enabled]
Power Limit 4 Override:	
	[Disabled]
	[Enabled]
C states:	
	[Disabled]
	[Enabled]
Enhanced C-states:	
	[Disabled]
	[Enabled]
C-state Auto Demotion	[C1]
C-state Un-demotion	[C1]
Package C-State Demotion:	
	[Disabled]
	[Enabled]

Package C-State Un-demotion:	[Disabled]
	[Enabled]
CState Pre-Wake:	[Disabled]
	[Enabled]
IO MWAIT Redirection:	[Disabled]
	[Enabled]
Package C State Limit	[C3]
C6/C7 Short Latency Control(MSR 0x60B)	
Time Unit	[1024 ns]
Latency	0
C6/C7 Short Latency Control(MSR 0x60C)	
Time Unit	[1024 ns]
Latency	0
C8 Latency Control(MSR 0x633)	
Time Unit	[1024 ns]
Latency	0
C9 Latency Control(MSR 0x634)	
Time Unit	[1024 ns]
Latency	0
C10 Latency Control(MSR 0x635)	
Time Unit	[1024 ns]
Latency	0
Thermal Monitor:	[Disabled]
	[Enabled]
Interrupt Redirection Mode Selection:	[Fixed Priority]
	[Round robin]
	[Hash Vector]
	[No Change]
Timed MWAIT:	[Disabled]
	[Enabled]
Custom P-state Table	
Custom P-state Table	
Number of P states	0
EC Turbo Control Mode:	[Disabled]

Energy Performance Gain: [Enabled]

[Disabled]

[Enabled]

EPG DIMM Idd3N 26

EFG DIMM Idd3P 11

Power Limit 3 Settings

CPU Lock Configuration

CFG Lock:

[Disabled]

[Enabled]

Overclocking Lock:

[Disabled]

[Enabled]

### GT – Power Management Control

GT – Power Management Control

Maximum GT frequency:

[Default Max Frequency]

[100Mhz]

[150Mhz]

[200Mhz]

[250Mhz]]

[300Mhz]

[350Mhz]

[400Mhz]

[450Mhz]

[500Mhz]

[550Mhz]

[600Mhz]

[650Mhz]

[700Mhz]

[750Mhz]

[800Mhz]

[850Mhz]

[900Mhz]

[950Mhz]

[1000Mhz]

[1050Mhz]

[1100Mhz]

[1150Mhz]

[1200Mhz]

Disable Turbo GT frequency:

[Enabled]

[Disabled]

### 3.4.3 Thermal Configuration

Thermal Configuration

Enable All Thermal Functions:

[Disabled]

[Enabled]

#### CPU Thermal Configuration

Cpu Thermal Configuration

DTS SMM:

[Disabled]

[Enabled]

[Critical Temp Reporting(Out of

spec)]

Tcc Activation Offset

25

Tcc Offset Time Window:

[Disabled]

[5ms]

[10 ms]

[55 ms]

[156 ms]

[375 ms]

[500 ms]

[750 ms]

[1 sec]

[2 sec]

[3 sec]

[4 sec]

[5 sec]

[6 sec]

[7 sec]

[8 sec]

[10 sec]

[12 sec]

[14 sec]

[16 sec]

[20 sec]

[24 sec]

[28 sec]

[32 sec]

[40 sec]  
[48 sec]  
[56 sec]  
[64 sec]  
[80 sec]  
[96 sec]  
[112 sec]  
[128 sec]  
[160 sec]  
[192 sec]  
[224 sec]  
[256 sec]  
[320 sec]

Tcc Offset Clamp Enable:

[Disabled]  
[Enabled]

Tcc Offset Lock Enable:

[Disabled]  
[Enabled]

Bi-directional PROCHOT#:

[Disabled]  
[Enabled]

Disable PROCHOT# Output:

[Disabled]  
[Enabled]

Disable VR Thermal Alert:

[Disabled]  
[Enabled]

PROCHOT Response:

[Disabled]  
[Enabled]

PROCHOT Lock:

[Disabled]  
[Enabled]

ACPI T-States:

[Disabled]  
[Enabled]

### **Platform Thermal Configuration**

Platform Thermal Configuration

Critical Trip Point:



[15 C]  
[23 C]  
[31 C]  
[39 C]  
[47 C]  
[55 C]  
[63 C]  
[71 C]  
[79 C]  
[87 C]  
[95 C]  
[100 C]  
[103 C]  
[111 C]  
[119 C (POR)]  
[127 C]  
[130 C]

Active Trip Point 0:

[Disabled]  
[15 C]  
[23 C]  
[31 C]  
[39 C]  
[47 C]  
[55 C]  
[63 C]  
[71 C]  
[79 C]  
[87 C]  
[95 C]  
[103 C]  
[111C]  
[119 C (POR)]

Active Trip Point 0 Fan Speed: 100

Active Trip Point 1:

[Disabled]  
[15 C]  
[23 C]  
[31 C]  
[39 C]  
[47 C]  
[55 C]

	[63 C]
	[71 C]
	[79 C]
	[87 C]
	[95 C]
	[103 C]
	[111C]
	[119 C (POR)]
Active Trip Point 1 Fan Speed:	75
Passive Trip Point :	
	[Disabled]
	[15 C]
	[23 C]
	[31 C]
	[39 C]
	[47 C]
	[55 C]
	[63 C]
	[71 C]
	[79 C]
	[87 C]
	[95 C]
	[103 C]
	[111C]
	[119 C (POR)]
Passive TC1 Value	1
Passive TC2 Value	5
Passive TSP Value	10
Active Trip Points:	
	[Disabled]
	[Enabled]
Passive Trip Points:	
	[Disabled]
	[Enabled]
CriticalTrip Points:	
	[Disabled]
	[Enabled]
PCH Temp Read:	
	[Disabled]
	[Enabled]

CPU Energy Read: [Disabled]  
[Enabled]

CPU Temp Read: [Disabled]  
[Enabled]

Alert Enable Lock: [Disabled]  
[Enabled]

CPU Temp 72  
CPU Fan Speed 65

#### **DPTF Configuration**

DPTF Configuration

#### **Hardware Health Monitor**

Hardware Health Monitor

Thermal Sensor 1 Temp 0.0 C  
Thermal Sensor 2 Temp 0.0 C  
Thermal Sensor 3 Temp 0.0 C  
Thermal Sensor 4 Temp 0.0 C  
CPU Fan Speed 0 rpm

### **3.4.4 Trusted Computing**

Configuration

Security Device Support: [Disabled]  
[Enabled]

NO Security Device Found

### **3.4.5 ACPI Settings**

ACPI Settings

Enable Hibernation: [Disabled]  
[Enabled]

ACPI Sleep State: [Suspend]  
[S3 (Suspend to RAM)]

### **3.4.6 Super IO Configuration**

## Super IO Configuration

Super IO Chip	IT8786
<b>Serial Port 1 Configuration</b>	
Serial Port 1 Configuration	
Serial Port:	[Disabled] [Enabled]
Device Settings	IO=3F8h; IRQ=4;
Change Settings:	[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 Config:	[RS232 mode] [RS485 mode] [RS422 mode]
<b>Serial Port 2 Configuration</b>	
Serial Port 2 Configuration	
Serial Port:	[Disabled] [Enabled]
Device Settings	IO=2F8h; IRQ=4;
Change Settings:	[Auto] [IO=2F8h; IRQ=4] [IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12;] [IO=2F8h; IRQ=3,4,5,6,7,10,11,12;] [IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12;] [IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;]
<b>Serial Port 3 Configuration</b>	
Serial Port 3 Configuration	
Serial Port:	[Disabled] [Enabled]
Device Settings	IO=3E8h; IRQ=4;

Change Settings:

[Auto]

### Serial Port 4 Configuration

Serial Port 4 Configuration

Serial Port:

[Disabled]

[Enabled]

Device Settings

IO=2E8h; IRQ=4;

Change Settings:

[Auto]

## 3.4.7 Hardware Monitor

Pc Health Status

System temperature1	: +39 C
Fan1 Speed	: 6887 RPM
CPU_CORE_VIN	: +1.653 V
+1.2V	: +1.236 V
+12V	: +13.120 V
+5V	: +5.123 V

Smart Fan Function

### Fan 1 Setting

Fan 1 Setting

Smart Fan 1 Mode:

[Software Mode]

[Automatic Mode]

Fan 1 Type:

[PWM]

[RPM]

Temperature select:

[TMPIN1]

[TMPIN2]

[TMPIN3]

Fan off temperature limit:	0
Fan start temperature limit:	30
Fan full speed temperature limit:	90
Fan start PWM:	75
PWM SLOPE SETTING:	3
Temperature:	4

### 3.4.8 AMI Graphic Output Protocol Policy

Intel(R) Graphics Controller  
Intel(R) GOP Driver [18.0.1034]

Output Select:

[EDP1]

[DP1]

Brightness Setting

255

BIST Enable:

[Disabled]

[Enabled]

### 3.4.9 Network Stack Configuration

Network Stack:

[Disabled]

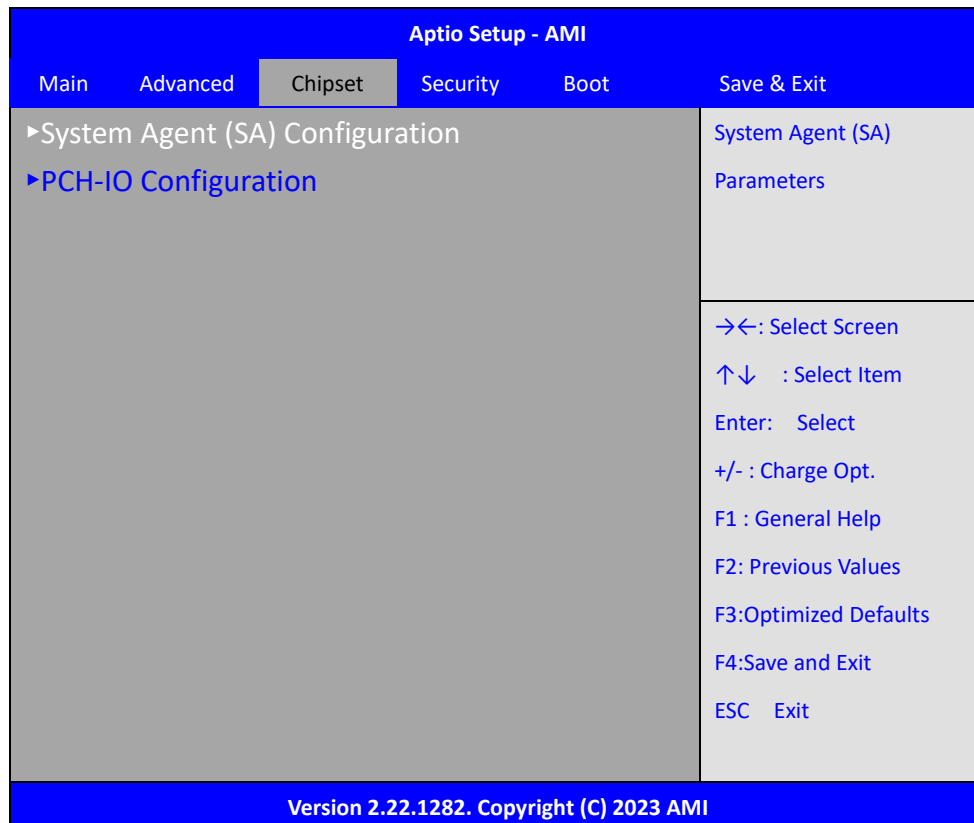
[Enabled]

### 3.4.10 NVMe Configuration

NVMe Configuration

No NVME Device Found

## 3.5 Chipset Settings



### 3.5.1 System Agent (SA) Configuration

#### System Agent (SA) Configuration

#### Memory Configuration

Memory Thermal Configuration

#### Memory Thermal Configuration

#### Memory Power and Thermal Throttling

Memory Power and Thermal Throttling

DDR PowerDown and idle counter:

[PCODE]

[BIOS]

FOR LPDDR Only: DDR PowerDown and  
Idle counter

[PCODE]

[BIOS]

REFRESH\_2X\_MODE:

[Disabled]

[1- Enabled for WARM or HOT]

[2- Enabled HOT only]

LPDDR Thermal Sensor:

[Disabled]

[Enabled]

SelfRefresh Enable:

[Disabled]

[Enabled]

SelfRefresh IdleTimer:

512

Throttler CKEMin Defeature:

[Enabled]

[Disabled]

Throttler CKKEMin Timer:

48

For LPDDR Only: Throttler CKEMin Defeature:

[Enabled]

[Disabled]

For LPDDR Only: Throttler CKEMin Timer: 64

#### Dram Power Meter

Dram Power Meter

Use user provided power weights,

## Sacle factor, and channel power

Floor values:

[Disabled]

[Enabled]

Energy Scale Factor	4
Idle Energy Ch0Dimm0	10
PowerDown Energy Ch0Dimm0	6
Activate Energy Ch0Dimm0	172
Read Energy Ch0Dimm0	212
Write Energy Ch0Dimm0	221
Idle Energy Ch0Dimm1	10
PowerDown Energy Ch0Dimm1	6
Activate Energy Ch0Dimm1	172
Read Energy Ch0Dimm1	212
Write Energy Ch0Dimm1	221
Idle Energy Ch1Dimm0	10
PowerDown Energy Ch1Dimm0	6
Activate Energy Ch1Dimm0	172
Read Energy Ch1Dimm0	212
Write Energy Ch1Dimm0	221
Idle Energy Ch1Dimm1	10
PowerDown Energy Ch1Dimm1	6
Activate Energy Ch1Dimm1	172
Read Energy Ch1Dimm1	212
Write Energy Ch1Dimm1	221

## Memory Thermal Reporting

Lock Thermal Management Registers:

[Disabled]

[Enabled]

Memory Thermal Reporting

Extern Therm Status:

[Disabled]

[Enabled]

Closed Loop Therm Manage:

[Disabled]

[Enabled]

Open Loop Therm Manage:

[Disabled]



[Enabled]

### Thermal Threshold Settings

Warm Threshold Ch0 Dimm0	255
Warm Threshold Ch0 Dimm1	255
Hot Threshold Ch0 Dimm0	255
Hot Threshold Ch0 Dimm1	255
Warm Threshold Ch1 Dimm0	255
Warm Threshold Ch1 Dimm1	255
Hot Threshold Ch1 Dimm0	255
Hot Threshold Ch1 Dimm1	255

### Thermal Throttle Budget Settings

Warm Budget Ch0 Dimm0	255
Warm Budget Ch0 Dimm1	255
Hot Budget Ch0 Dimm0	255
Hot Budget Ch0 Dimm1	255
Warm Budget Ch1 Dimm0	255
Warm Budget Ch1 Dimm1	255
Hot Budget Ch1 Dimm0	255
Hot Budget Ch1 Dimm1	255

## Memory RAPL

### Memory RAPL

Rap1 Power Floor Ch0	0
Rap1 Power Floor Ch1	0

### RAPL PL Lock:

[Disabled]

[Enabled]

### RAPL PL 1 enable:

[Disabled]

[Enabled]

RAPL PL 1 Power	0
RAPL PL 1 WindowX	0
RAPL PL 1 WindowY	0

### RAPL PL 2 enable:

[Disabled]

	[Enabled]
RAPL PL 2 Power	222
RAPL PL 2 WindowX	1
RAPL PL 2 WindowY	10
Memory Thermal Management:	
	[Disabled]
	[Enabled]
Memory Training Algorithms:	
Early Command Training:	
	[Disabled]
	[Enabled]
SenseAmp Offset Training:	
	[Disabled]
	[Enabled]
Early ReadMPR Timing Centering 2D:	
	[Disabled]
	[Enabled]
Read MPR Training:	
	[Disabled]
	[Enabled]
Receive Enable Training:	
	[Disabled]
	[Enabled]
Jedec Write Leveling:	
	[Disabled]
	[Enabled]
LPDDR4 Write DQ DQS Retraining:	
	[Disabled]
	[Enabled]
Early Write Time Centering 2D:	
	[Disabled]
	[Enabled]
Early Read Time Centering 2D:	
	[Disabled]
	[Enabled]
Write Timing Centering 1D:	
	[Disabled]
	[Enabled]
Write Voltage Centering 1D:	
	[Disabled]
	[Enabled]
Read Timing Centering 1D:	

	[Disabled]
	[Enabled]
Dimm ODT Training* :	
	[Disabled]
	[Enabled]
Max RTT_WR:	
	[ODT Off]
	[120 Ohms]
DIMM RON Training*:	
	[Disabled]
	[Enabled]
Write Drive Strength/Equalization 2D*:	
	[Disabled]
	[Enabled]
Write Slew Rate Training*:	
	[Disabled]
	[Enabled]
Read ODT Training*:	
	[Disabled]
	[Enabled]
Read Equalization Training*:	
	[Disabled]
	[Enabled]
Read Amplifier Training*:	
	[Disabled]
	[Enabled]
Write Timing Centering 2D:	
	[Disabled]
	[Enabled]
Read Timing Centering 2D:	
	[Disabled]
	[Enabled]
Command Voltage Centering:	
	[Disabled]
	[Enabled]
Write Voltage Centering 2D:	
	[Disabled]
	[Enabled]
Read Voltage Centering 2D:	
	[Disabled]
	[Enabled]
Late Command Training:	

	[Disabled]
	[Enabled]
Round Trip Latency:	[Disabled]
	[Enabled]
Turn Around Timing Training:	[Disabled]
	[Enabled]
Rank Margin Tool:	[Disabled]
	[Enabled]
Rank Margin Tool Per Bit:	[Disabled]
	[Enabled]
Margin Check Limit:	[Disabled]
	[L1]
	[L2]
	[Both]
Margin Limit Check L2:	100
Memory Test:	[Disabled]
	[Enabled]
DIMM SPD Alias Test:	[Disabled]
	[Enabled]
Receive Enable Centering 1D:	[Disabled]
	[Enabled]
Retrain Margin Check:	[Disabled]
	[Enabled]
Write Drive Strength Up/ Dn independently:	[Disabled]
	[Enabled]
Command Slew Rate Training:	[Disabled]
	[Enabled]
Command Drive Strength and Equalization:	[Disabled]

	[Enabled]
Command Normalization:	[Enabled]
	[Disabled]
	[Enabled]
Early DQ Write Drive Strength and Equalization Training:	[Disabled]
	[Enabled]
Read Voltage Centering 1D:	[Disabled]
	[Enabled]
Write TC0 Comp Training:	[Disabled]
	[Enabled]
Clock TC0 Comp Training:	[Disabled]
	[Enabled]
Dimm ODT CA Training:	[Disabled]
	[Enabled]
Write TC0 DqsTraining:	[Disabled]
	[Enabled]
Duty Cycle Correction:	[Disabled]
	[Enabled]
DQ DFE Training:	[Disabled]
	[Enabled]
Sense Amplifier Correction Training:	[Disabled]
	[Enabled]
<b>Memory Configuration</b>	
Memory RC Version	0.0.4.104
Memory Data Rate	3200 MTPS
Memory Timings (tCL-tRCD-tRP-tRAS)	22-22-22-52
Channel 0 Slot 0	Not Populated / Disabled
Channel 0 Slot 1	Not Populated / Disabled
Channel 1 Slot 0	Populated & Enabled
Size	8192 MB (DDR4)

Number of Ranks	1
Manufacturer	Samsung
Channel 1 Slot 1	Not Populated / Disabled

Memory ratio/reference clock  
Options moved to  
Overclock->Memory->Custom Profile  
Menu

MRC ULT Safe Config:

[Disabled]  
[Enabled]

Safe Mode Support:

[Disabled]  
[Enabled]

Maximum Memory Frequency:

[Auto]  
[1067]  
[1200]  
[1333]  
[1400]  
[1600]  
[1800]  
[1867]  
[2000]  
[2133]  
[2200]  
[2400]  
[2600]  
[2667]  
[2800]  
[2933]  
[3000]  
[3200]  
[3467]  
[3600]  
[3733]  
[4000]  
[4200]  
[4267]

HOB Buffer Size:

[Auto]  
[1B]

	[1KB]
	[Max (assuming 63KB total HOB size)]
Max TOLUD:	[Dynamic]
	[1 GB]
	[1.25 GB]
	[1.5 GB]
	[1.75 GB]
	[2 GB]
	[2.25 GB]
	[2.5 GB]
SA GV:	[Disabled]
	[Fixed Low]
	[Fixed Mid]
	[Fixed High]
	[Enabled]
DDR Speed Control:	[Auto]
	[Manual]
Retrain on Fast Fail:	[Disabled]
	[Enabled]
DDR4_1DPC:	[Disabled]
	[Enabled on DIMM0 only]
	[Enabled on DIMM1 only]
	[Enabled]
Enable RH Prevention:	[Disabled]
	[Enabled]
REFRESH_PANIC_WM:	9
REFRESH_HP_WM:	8
Exit On Failure (MRC):	[Disabled]
	[Enabled]
Enable/Disable IED (Intel Enhanced Debug):	[Enabled]
	[Disabled]
Ch Hash Support:	[Disabled]

	[Enabled]
Ch Hash Mask:	12492
Ch Hash Interleaved Bit:	[BIT6]
	[BIT7]
	[BIT8]
	[BIT9]
	[BIT10]
	[BIT11]
	[BIT12]
	[BIT13]
Extended Bank Hashing:	[Disabled]
	[Enabled]
Per Bank Refresh:	[Disabled]
	[Enabled]
Power Down Mode:	[Auto]
	[No Power Down]
	[APD]
	[PPD-DLLOff]
Page Close Idle Timeout:	[Enabled]
	[Disabled]
Memory Scrambler:	[Enabled]
	[Disabled]
Force ColdReset:	[Enabled]
	[Disabled]
Channel 0 DIMM Control:	[Enable both DIMMs]
	[Disable DIMM0]
	[Disable DIMM1]
	[Disable both DIMMs]
Channel 1 DIMM Control:	[Enable both DIMMs]
	[Disable DIMM0]
	[Disable DIMM1]
	[Disable both DIMMs]
Force Single Rank:	



	[Disabled]
	[Enabled]
Force Single Sub Channel:	[Disabled]
	[Enabled]
MRC TASK Debug Print Enable:	0
Memory Remap:	[Enabled]
	[Disabled]
Time Measure:	[Disabled]
	[Enabled]
DLL Weak Lock Support:	[Disabled]
	[Enabled]
Fast Boot:	[Disabled]
	[Enabled]
Train On Warm boot:	[Disabled]
	[Enabled]
Rank Margin Tool Per Task:	[Disabled]
	[Enabled]
Training Tracing:	[Disabled]
	[Enabled]
Lpddr Mem WL Set:	[Set A]
	[Set B]
BDAT Memory Test Type	[Rank Margin Tool Rank]
Rank Margin Tool Loop Count:	0
Low Supply for LPDDR4 Data:	[Disabled]
	[Enabled]
Low Supply for LPDDR4 Clock/Command/Control:	[Disabled]
	[Enabled]
Memory Test on Warm Boot:	[Disabled]
	[Enabled]

## Graphics Configuration

### Graphics Configuration

#### Primary Display:

[Auto]  
[IGFX]  
[PEG]  
[PCI]

#### External Gfx Card Primary Display Configuration

##### External Gfx Card Primary Display Configuration

#### Primary PCIE:

[Auto]  
[PCIE 1]  
[PCIE 2]  
[PCIE 3]  
[PCIE 4]  
[PCIE 5]  
[PCIE 6]  
[PCIE 7]  
[PCIE 8]  
[PCIE 9]  
[PCIE 10]  
[PCIE 11]  
[PCIE 12]  
[PCIE 13]  
[PCIE 14]  
[PCIE 15]  
[PCIE 16]  
[PCIE 17]  
[PCIE 18]  
[PCIE 19]

#### Internal Graphics:

[Auto]  
[Disabled]  
[Enabled]

#### GTT Size:

[2 MB]  
[4 MB]  
[8 MB]

#### Aperture Size:

	[128 MB]
	[256 MB]
	[512 MB]
	[1024 MB]
	[2048 MB]
PSMI SUPPORT:	[Disabled]
	[Enabled]
DVMT- Pre-Allocated:	[0M]
	[32M]
	[64M]
	[96M]
	[128M]
	[160M]
	[4M]
	[8M]
	[12M]
	[16M]
	[20M]
	[24M]
	[28M]
	[32M/F7]
	[36M]
	[40M]
	[44M]
	[48M]
	[52M]
	[56M]
	[60M]
DVMT Total Gfx Mem:	[128M]
	[256M]
	[MAX]
DISM Size:	[0GB]
	[1GB]
	[2GB]
	[3GB]
	[4GB]
	[5GB]
	[6GB]

	[7GB]
Intel Graphics Pei Display Peim:	[Enabled] [Disabled]
VDD Enable:	[Disabled] [Enabled]
Configure GT for use:	[Enabled] [Disabled]
PAVP Enable:	[Enabled] [Disabled]
Cdynmax Clamping Enable:	[Enabled] [Disabled]
Cd Clock Frequency:	[172.8 Mhz] [307.2 Mhz] [556.8 Mhz] [652.8 Mhz] [Max CdClock freq based on Reference C1k]
Skip Full CD Clock Init:	[Enabled] [Disabled]
VBT Select:	[eDP] [MIPI]
IUER Button Enable:	[Disabled] [Enabled]
<b>Intel(R) Ultrabook Event Support:</b> Intel(R) Ultrabook Event Support	
IUER Slate Enable:	[Disabled] [Enabled]
IUER Dock Enable:	[Disabled] [Enabled]
VT-d:	[Enabled]

[Disabled]  
[Enabled]

### 3.5.2 PCH-IO Configuration

#### PCH-IO Configuration

#### PCI Express Configuration

PCI Express Configuration

DMI Link ASPM Control:

[Disabled]  
[L0s]  
[L1]  
[L0sL1]  
[Auto]

PCIe Port assigned to LAN

Disabled

Port8xh Decode:

[Disabled]  
[Enabled]

Peer Memory write Enable:

[Disabled]  
[Enabled]

Compliance Test Mode:

[Disabled]  
[Enabled]

PCH PCI Express Clock Gating:

[Platform-POR]  
[Enabled]  
[Disabled]

PCIe function swap:

[Disabled]  
[Enabled]

PCIe EQ settings

PCIe EQ override:

[Disabled]  
[Enabled]

PCIe Express Root Port 1

PCIe Express Root Port 1:

[Disabled]  
[Enabled]

Connection Type:

[Built - in]

	[Slot]
ASPM:	[Disabled] [L0s] [L1] [L0sL1] [Auto]
L1 Substates:	[Disabled] [L1.1] [L1.1 & L1.2]
ACS:	[Disabled] [Enabled]
PTM:	[Disabled] [Enabled]
DPC:	[Disabled] [Enabled]
EDPC:	[Disabled] [Enabled]
URR:	[Disabled] [Enabled]
FER:	[Disabled] [Enabled]
NFER:	[Disabled] [Enabled]
CER:	[Disabled] [Enabled]
SEFE:	[Disabled] [Enabled]
SENFE:	[Disabled] [Enabled]
SECE:	[Disabled] [Enabled]

	[Disabled]
	[Enabled]
PME SCI:	
	[Disabled]
	[Enabled]
Hot Plug:	
	[Disabled]
	[Enabled]
Advanced Error Reporting:	
	[Disabled]
	[Enabled]
PCIe Speed:	
	[Auto]
	[Gen1]
	[Gen2]
	[Gen3]
Transmitter Half Swing:	
	[Disabled]
	[Enabled]
Detect Timeout:	0
Extra Bus Reserved:	0
Reserved Memory:	10
Reserved I/O:	4
PCH PCIe LTR Configuration	
LTR:	
	[Disabled]
	[Enabled]
Snoop Latency Override:	
	[Disabled]
	[Manual]
	[Auto]
Non Snoop Latency Override:	
	[Disabled]
	[Manual]
	[Auto]
Force LTR Override:	
	[Disabled]
	[Enabled]
LTR Lock:	
	[Disabled]
	[Enabled]

Extra options	
Detect Non-Compliance Device:	[Disabled] [Enabled]
Prefetchable Memory:	10
Reserved Memory	
Alignment:	1
Prefetchable Memory	
Alignment:	1
PCIe Express Root Port 2	
PCIe Express Root Port 2:	[Disabled] [Enabled]
Connection Type:	[Built - in] [Slot]
ASPM:	[Disabled] [L0s] [L1] [L0sL1] [Auto]
L1 Substates:	[Disabled] [L1.1] [L1.1 & L1.2]
ACS:	[Disabled] [Enabled]
PTM:	[Disabled] [Enabled]
DPC:	[Disabled] [Enabled]
EDPC:	[Disabled] [Enabled]
URR:	[Disabled] [Enabled]
FER:	



	[Disabled]
	[Enabled]
NFER:	
	[Disabled]
	[Enabled]
CER:	
	[Disabled]
	[Enabled]
SEFE:	
	[Disabled]
	[Enabled]
SENF:	
	[Disabled]
	[Enabled]
SECE:	
	[Disabled]
	[Enabled]
PME SCI:	
	[Disabled]
	[Enabled]
Hot Plug:	
	[Disabled]
	[Enabled]
Advanced Error Reporting:	
	[Disabled]
	[Enabled]
PCIe Speed:	
	[Auto]
	[Gen1]
	[Gen2]
	[Gen3]
Transmitter Half Swing:	
	[Disabled]
	[Enabled]
Detect Timeout:	0
Extra Bus Reserved:	0
Reserved Memory:	10
Reserved I/O:	4
PCH PCIe LTR Configuration	
LTR:	
	[Disabled]

	[Enabled]
Snoop Latency Override:	[Disabled]
	[Manual]
	[Auto]
Non Snoop Latency Override:	[Disabled]
	[Manual]
	[Auto]
Force LTR Override:	[Disabled]
	[Enabled]
LTR Lock:	[Disabled]
	[Enabled]
Extra options	
Detect Non-Compliance Device:	[Disabled]
	[Enabled]
Prefetchable Memory:	10
Reserved Memory	
Alignment:	1
Prefetchable Memory	
Alignment:	1
PCIe Express Root Port 3	
PCIe Express Root Port 3:	[Disabled]
	[Enabled]
Connection Type:	[Built - in]
	[Slot]
ASPM:	[Disabled]
	[L0s]
	[L1]
	[L0sL1]
	[Auto]
L1 Substates:	[Disabled]
	[L1.1]
	[L1.1 & L1.2]
ACS:	

	[Disabled]
	[Enabled]
PTM:	[Disabled]
	[Enabled]
DPC:	[Disabled]
	[Enabled]
EDPC:	[Disabled]
	[Enabled]
URR:	[Disabled]
	[Enabled]
FER:	[Disabled]
	[Enabled]
NFER:	[Disabled]
	[Enabled]
CER:	[Disabled]
	[Enabled]
SEFE:	[Disabled]
	[Enabled]
SENF:	[Disabled]
	[Enabled]
SECE:	[Disabled]
	[Enabled]
PME SCI:	[Disabled]
	[Enabled]
Hot Plug:	[Disabled]
	[Enabled]
Advanced Error Reporting:	[Disabled]
	[Enabled]
PCIe Speed:	

	[Auto]
	[Gen1]
	[Gen2]
	[Gen3]
Transmitter Half Swing:	
	[Disabled]
	[Enabled]
Detect Timeout:	0
Extra Bus Reserved:	0
Reserved Memory:	10
Reserved I/O:	4

PCH PCIe LTR Configuration

LTR:	
	[Disabled]
	[Enabled]
Snoop Latency Override:	
	[Disabled]
	[Manual]
	[Auto]
Non Snoop Latency Override:	
	[Disabled]
	[Manual]
	[Auto]
Force LTR Override:	
	[Disabled]
	[Enabled]
LTR Lock:	
	[Disabled]
	[Enabled]

Extra options

Detect Non-Compliance Device:	
	[Disabled]
	[Enabled]
Prefetchable Memory:	10
Reserved Memory	
Alignment:	1
Prefetchable Memory	
Alignment:	1

PCIe Express Root Port 4

PCIe Express Root Port 4:

	[Disabled]
	[Enabled]
Connection Type:	
	[Built - in]
	[Slot]
ASPM:	
	[Disabled]
	[L0s]
	[L1]
	[L0sL1]
	[Auto]
L1 Substates:	
	[Disabled]
	[L1.1]
	[L1.1 & L1.2]
ACS:	
	[Disabled]
	[Enabled]
PTM:	
	[Disabled]
	[Enabled]
DPC:	
	[Disabled]
	[Enabled]
EDPC:	
	[Disabled]
	[Enabled]
URR:	
	[Disabled]
	[Enabled]
FER:	
	[Disabled]
	[Enabled]
NFER:	
	[Disabled]
	[Enabled]
CER:	
	[Disabled]
	[Enabled]
SEFE:	
	[Disabled]
	[Enabled]

SENFE:	[Disabled]
	[Enabled]
SECE:	[Disabled]
	[Enabled]
PME SCI:	[Disabled]
	[Enabled]
Hot Plug:	[Disabled]
	[Enabled]
Advanced Error Reporting:	[Disabled]
	[Enabled]
PCIe Speed:	[Auto]
	[Gen1]
	[Gen2]
	[Gen3]
Transmitter Half Swing:	[Disabled]
	[Enabled]
Detect Timeout:	0
Extra Bus Reserved:	0
Reserved Memory:	10
Reserved I/O:	4
PCH PCIe LTR Configuration	
LTR:	[Disabled]
	[Enabled]
Snoop Latency Override:	[Disabled]
	[Manual]
	[Auto]
Non Snoop Latency Override:	[Disabled]
	[Manual]
	[Auto]
Force LTR Override:	[Disabled]
	[Enabled]

LTR Lock:	[Disabled]
	[Enabled]
Extra options	
Detect Non-Compliance Device:	[Disabled]
	[Enabled]
Prefetchable Memory:	10
Reserved Memory	
Alignment:	1
Prefetchable Memory	
Alignment:	1
	USB/SATA/UFS
PCI Express Root Port 5	
PCI Express Root Port 5:	[Disabled]
	[Enabled]
Connection Type:	[Built-in]
	[Slot]
ASPM:	[Disabled]
	[L0s]
	[L1]
	[L0sL1]
	[Auto]
L1 Substates:	[Disabled]
	[L1.1]
	[L1.1 & L1.2]
ACS:	[Disabled]
	[Enabled]
Multi-VC:	[Disabled]
	[Enabled]
VC to TC Mapping	
TC0:	VC0
TC1:	[VC0]
	[VC1]
TC2:	

	[VC0]
	[VC1]
TC3:	[VC0]
	[VC1]
TC4:	[VC0]
	[VC1]
TC5:	[VC0]
	[VC1]
TC6:	[VC0]
	[VC1]
TC7:	[VC0]
	[VC1]
PTM:	[Disabled]
	[Enabled]
DPC:	[Disabled]
	[Enabled]
EDPC:	[Disabled]
	[Enabled]
URR:	[Disabled]
	[Enabled]
FER:	[Disabled]
	[Enabled]
NFER:	[Disabled]
	[Enabled]
CER:	[Disabled]
	[Enabled]
SEFE:	[Disabled]
	[Enabled]
SENF:	[Disabled]
	[Enabled]



	[Disabled]
	[Enabled]
SECE:	
	[Disabled]
	[Enabled]
PME SCI:	
	[Disabled]
	[Enabled]
Hot Plug:	
	[Disabled]
	[Enabled]
Advanced Error Reporting:	
	[Disabled]
	[Enabled]
PCIe Speed:	
	[Auto]
	[Gen1]
	[Gen2]
	[Gen3]
Transmitter Half Swing:	
	[Disabled]
	[Enabled]
Detect Timeout:	0
Extra Bus Reserved:	0
Reserved Memory:	10
Reserved I/O:	4
PCH PCIe LTR Configuration	
LTR:	
	[Disabled]
	[Enabled]
Snoop Latency Override:	
	[Disabled]
	[Manual]
	[Auto]
Non Snoop Latency Override:	
	[Disabled]
	[Manual]
	[Auto]
Force LTR Override:	
	[Disabled]
	[Enabled]

LTR Lock:	[Disabled]
	[Enabled]
Extra options	
Detect Non-Compliance Device:	[Disabled]
	[Enabled]
Prefetchable Memory:	10
Reserved Memory	
Alignment:	1
Prefetchable Memory	
Alignment:	1
PCI Express Root Port 6	Lane configured as USB/SATA/UFS
PCI Express Root Port 7	
PCI Express Root Port 7:	[Disabled]
	[Enabled]
Connection Type:	[Built-in]
	[Slot]
ASPM:	[Disabled]
	[L0s]
	[L1]
	[L0sL1]
	[Auto]
L1 Substates:	[Disabled]
	[L1.1]
	[L1.1 & L1.2]
ACS:	[Disabled]
	[Enabled]
Multi-VC:	[Disabled]
	[Enabled]
VC to TC Mapping	
TC0:	VC0
TC1:	[VC0]
	[VC1]
TC2:	

	[VC0]
	[VC1]
TC3:	
	[VC0]
	[VC1]
TC4:	
	[VC0]
	[VC1]
TC5:	
	[VC0]
	[VC1]
TC6:	
	[VC0]
	[VC1]
TC7:	
	[VC0]
	[VC1]
PTM:	
	[Disabled]
	[Enabled]
DPC:	
	[Disabled]
	[Enabled]
EDPC:	
	[Disabled]
	[Enabled]
URR:	
	[Disabled]
	[Enabled]
FER:	
	[Disabled]
	[Enabled]
NFER:	
	[Disabled]
	[Enabled]
CER:	
	[Disabled]
	[Enabled]
SEFE:	
	[Disabled]
	[Enabled]
SENF:	
	[Disabled]
	[Enabled]

	[Disabled]
	[Enabled]
SECE:	
	[Disabled]
	[Enabled]
PME SCI:	
	[Disabled]
	[Enabled]
Hot Plug:	
	[Disabled]
	[Enabled]
Advanced Error Reporting:	
	[Disabled]
	[Enabled]
PCIe Speed:	
	[Auto]
	[Gen1]
	[Gen2]
	[Gen3]
Transmitter Half Swing:	
	[Disabled]
	[Enabled]
Detect Timeout:	0
Extra Bus Reserved:	0
Reserved Memory:	10
Reserved I/O:	4
PCH PCIe LTR Configuration	
LTR:	
	[Disabled]
	[Enabled]
Snoop Latency Override:	
	[Disabled]
	[Manual]
	[Auto]
Non Snoop Latency Override:	
	[Disabled]
	[Manual]
	[Auto]
Force LTR Override:	
	[Disabled]
	[Enabled]
LTR Lock:	

	[Disabled]
	[Enabled]
Extra options	
Detect Non-Compliance Device:	
	[Disabled]
	[Enabled]
Prefetchable Memory:	10
Reserved Memory	
Alignment:	1
Prefetchable Memory	
Alignment:	1
PCIE clocks	
Clock0 assignment:	
	[Platform-POR]
	[Enabled]
	[Disabled]
ClkReq for Clock0:	
	[Platform-POR]
	[Disabled]
Clock1 assignment:	
	[Platform-POR]
	[Enabled]
	[Disabled]
ClkReq for Clock1:	
	[Platform-POR]
	[Disabled]
Clock2 assignment:	
	[Platform-POR]
	[Enabled]
	[Disabled]
ClkReq for Clock2:	
	[Platform-POR]
	[Disabled]
Clock3 assignment:	
	[Platform-POR]
	[Enabled]
	[Disabled]
ClkReq for Clock3:	
	[Platform-POR]
	[Disabled]
Clock4 assignment:	

[Platform-POR]  
[Enabled]  
[Disabled]

ClkReq for Clock4:

[Platform-POR]  
[Disabled]

Clock5 assignment:

[Platform-POR]  
[Enabled]  
[Disabled]

ClkReq for Clock5:

[Platform-POR]  
[Disabled]

### **SATA Configuration**

SATA Configuration

SATA Controller(s):

[Enabled]  
[Disabled]

SATA Mode Selection:

AHCI

SATA Ports Multiplier:

[Enabled]  
[Disabled]

SATA Test Mode:

[Enabled]  
[Disabled]

### **Software Feature Mask Configuration**

Software Feature Mask Configuration

HDD Unlock:

[Disabled]  
[Enabled]

LED Locate:

[Disabled]  
[Enabled]

Aggressive LPM Support:

[Disabled]  
[Enabled]

Serial ATA Port 0

Empty

Software Preserve

unknown

Port 0:

[Disabled]  
[Enabled]

Hot Plug:	[Disabled]
	[Enabled]
Configured as eSATA External:	Hot Plug supported
	[Disabled]
	[Enabled]
Spin Up Device:	[Disabled]
	[Enabled]
SATA Device Type:	[Hard Disk Drive]
	[Solid State Drive]
Topology:	[Unknown]
	[ISATA]
	[Direct Connect]
	[Flex]
	[M2]
SATA Port 0 DevSlp:	[Disabled]
	[Enabled]
SATA Port 0 RxPolarity:	[Disabled]
	[Enabled]
DITO Configuration:	[Disabled]
	[Enabled]
DITO Value	625
DM Value	15
Serial ATA Port 1 Software Preserve	Empty unknown
Port 1:	[Disabled]
	[Enabled]
Hot Plug:	[Disabled]
	[Enabled]
Configured as eSATA External:	Hot Plug supported
	[Disabled]

	[Enabled]
Spin Up Device:	[Enabled]
	[Disabled]
	[Enabled]
SATA Device Type:	[Hard Disk Drive]
	[Solid State Drive]
Topology:	[Unknown]
	[ISATA]
	[Direct Connect]
	[Flex]
	[M2]
SATA Port 1 DevSlp:	[Disabled]
	[Enabled]
SATA Port 1 RxPolarity:	[Disabled]
	[Enabled]
DITO Configuration:	[Disabled]
	[Enabled]
DITO Value	625
DM Value	15
Serial ATA Port 2	Empty
Software Preserve	unknown
Port 2:	[Disabled]
	[Enabled]
Hot Plug:	[Disabled]
	[Enabled]
Configured as eSATA	Hot Plug supported
External:	[Disabled]
	[Enabled]
Spin Up Device:	[Disabled]
	[Enabled]
SATA Device Type:	[Hard Disk Drive]



	[Solid State Drive]
Topology:	[Unknown] [ISATA] [Direct Connect] [Flex] [M2]
SATA Port 2 DevSlp:	[Disabled] [Enabled]
SATA Port 2 RxPolarity:	[Disabled] [Enabled]
DITO Configuration:	[Disabled] [Enabled]
DITO Value	625
DM Value	15

### USB Configuration

USB Configuration	
XHCI Compliance Mode:	[Disabled] [Enabled]
xDCI Support:	[Disabled] [Enabled]
USB2 PHY Sus Well Power Gating:	[Disabled] [Enabled]
USB3 Link Speed Selection:	[GEN1] [GEN2]
USB PDO Programming:	[Disabled] [Enabled]
USB Overcurrent:	[Disabled] [Enabled]
USB Internal Pullup resistor:	[Disabled] [Enabled]

USB Overcurrent Lock:	[Disabled] [Enabled]
USB Port Disable Override:	[Disabled] [Select Per-Pin]
USB Device/HOST Mode Override:	[Disabled] [Select Per-Pin]
USB UCSI ACPI device:	[Disabled] [Enabled]
SCS Configuration	
eMMC 5.1 Controller:	[Disabled] [Enabled]
eMMC 5.1 HS400 Mode:	[Disabled] [Enabled]
Enable HS400 software tuning:	[Disabled] [Enabled]
Enable HS400 software tuning:	[33 0hm] [40 0hm] [50 0hm]
SDCard 3.0 Controller:	[Disabled] [Enabled]

## 3.6 Security Settings



<p><b>Password Description</b></p> <p>If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.</p> <p>If ONLY the User's password is set, then this Is a power on password and must be entered to Boot or enter Setup. In Setup the User will Have Administrator rights.</p> <p>The password length must be In the following range:</p> <p>Minimum length        3</p> <p>Maximum length        20</p> <p>Administrator Password</p> <p>User Password</p>	<p>Set Administrator Password</p>
	<p>→←: Select Screen</p> <p>↑↓ : Select Item</p> <p>Enter: Select</p> <p>+/- : Change Opt.</p> <p>F1 : General Help</p> <p>F2: Previous Values</p> <p>F3:Optimized Defaults</p> <p>F4:Save and Exit</p> <p>ESC Exit</p>
<p>Version 2.22.1282. Copyright (C) 2023 AMI</p>	

### 3.6.1 Administrator Password



### 3.6.2 User Password



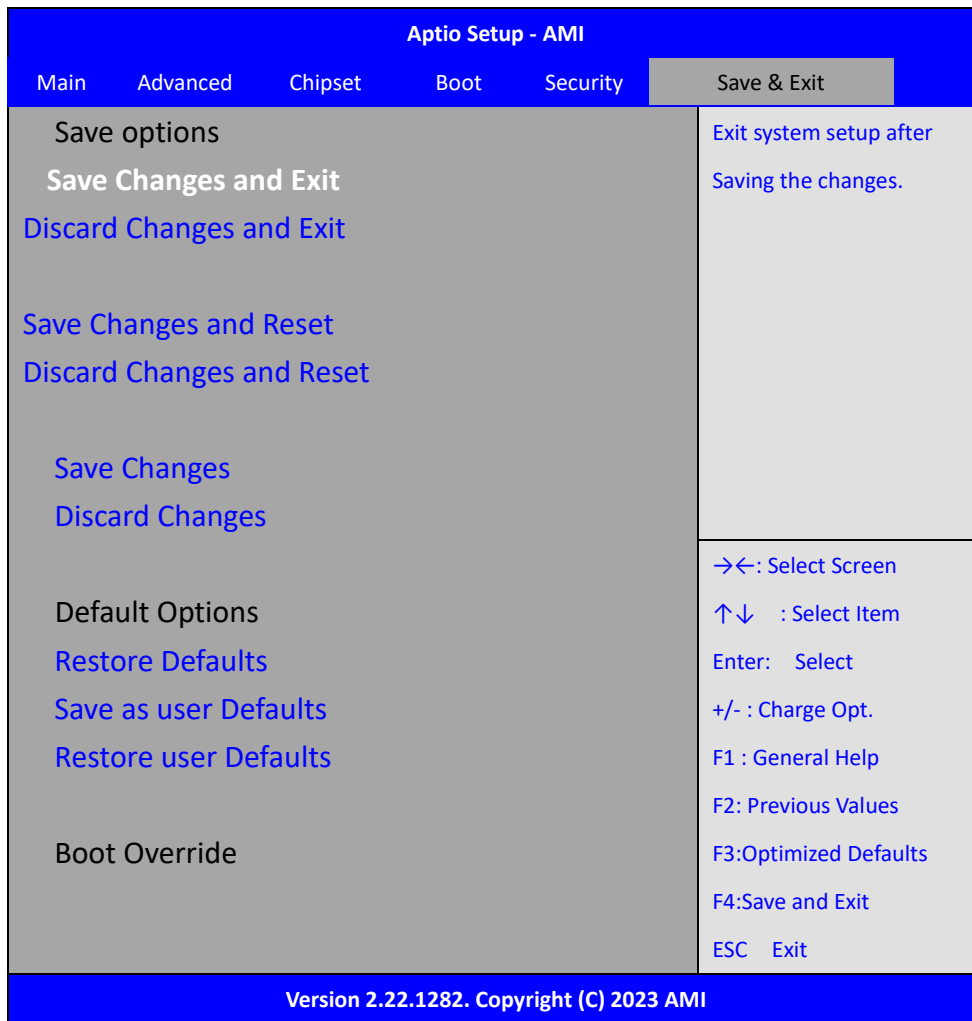
## 3.7 Boot Settings



<b>Boot Configuration</b>		Number of seconds toWait for Setup Activation key. 65535(0xFFFF)means Indefinite waiting.
Setup Prompt Timeout	1	
Bootup NumLock State	[Off]	
Quiet Boot	[Enabled]	
<b>Boot Option Priorities</b>		
Fast Boot	[Disabled]	
		→←: Select Screen ↑↓ : Select Item Enter: Select +/- : Change Opt. F1 : General Help F2: Previous Values F3:Optimized Defaults F4:Save and Exit ESC Exit
Version 2.22.1282. Copyright (C) 2023 AMI		

Setup Prompt Timeout	[1]
Bootup Numlock State:	[On]
	[off]
Quiet Boot:	[Disabled]
	[Enabled]
Fast Boot:	[Disabled]
	[Enabled]

## 3.8 Save & Exit Settings



### Save Changes and Exit

Save & Exit Setup save Configuration and exit ?

[Yes]

[No]

### Discard Changes and Exit

Exit Without Saving Quit without saving?

[Yes]

[No]

### Save Changes and Reset

Reset the system after Saving The changes?

[Yes]

[No]

### Discard Changes and Reset

Reset system setup without Saving any changes?

[Yes]

[No]

### Save Changes

Save Setup done so far to any of the setup options?

[Yes]

[No]

#### Discard Changes

Discard Changes done so far to any of the setup options?

[Yes]

[No]

#### Restore Defaults

Restore /Load Defaults values for all the setup options?

[Yes]

[No]

#### Save as user Defaults

Save the changes done so far as User Defaults?

[Yes]

[No]

#### Restore user Defaults

Restore the User Defaults to all the setup options?

[Yes]

[No]

# Chapter 4                      Installation of Drivers

This chapter describes the installation procedures for software and drivers under the windows 10. The software and drivers are included with the motherboard. The contents include Intel Chipset, Graphics chipset driver, Audio driver, LAN driver and Intel® management engine interface. The instructions are as below.

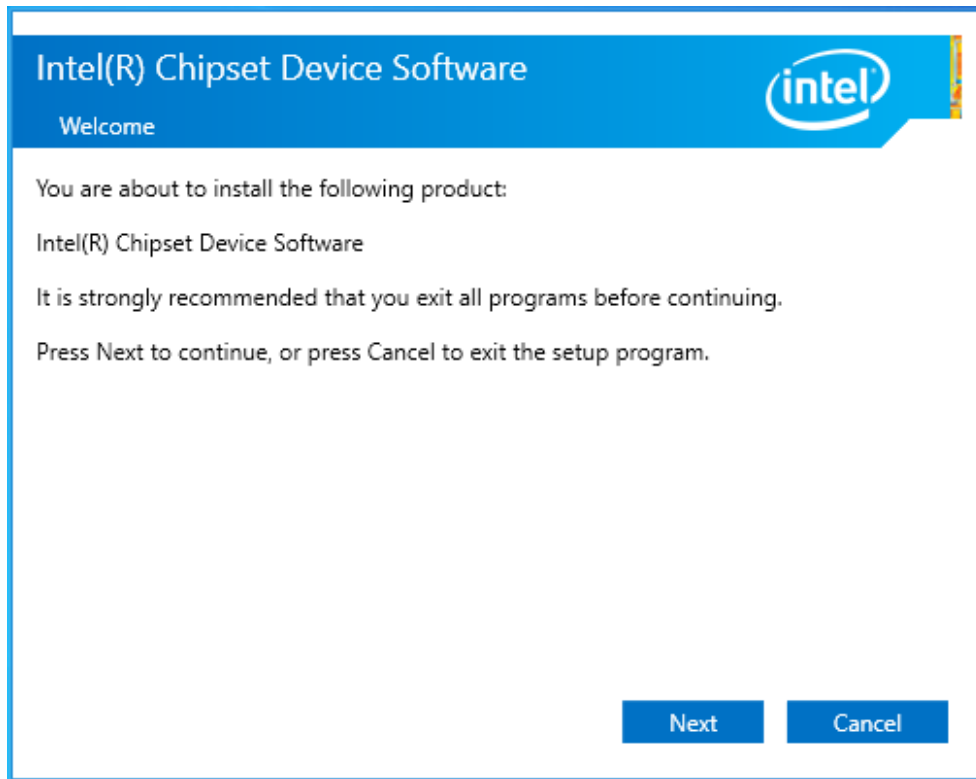
**Important Note:**

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

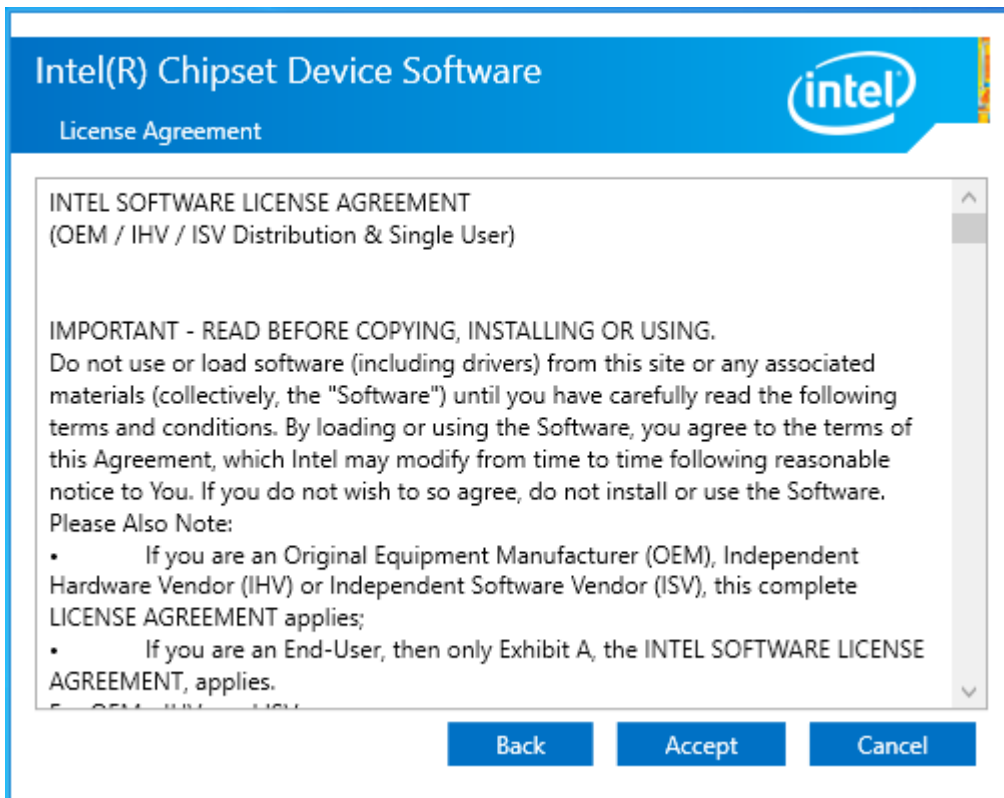
## 4.1 Intel Chipset

To install the Intel chipset driver, please follow the steps below.

Step 1. Here is welcome page. Please make sure you save and exit all programs before install. Click **Next**.

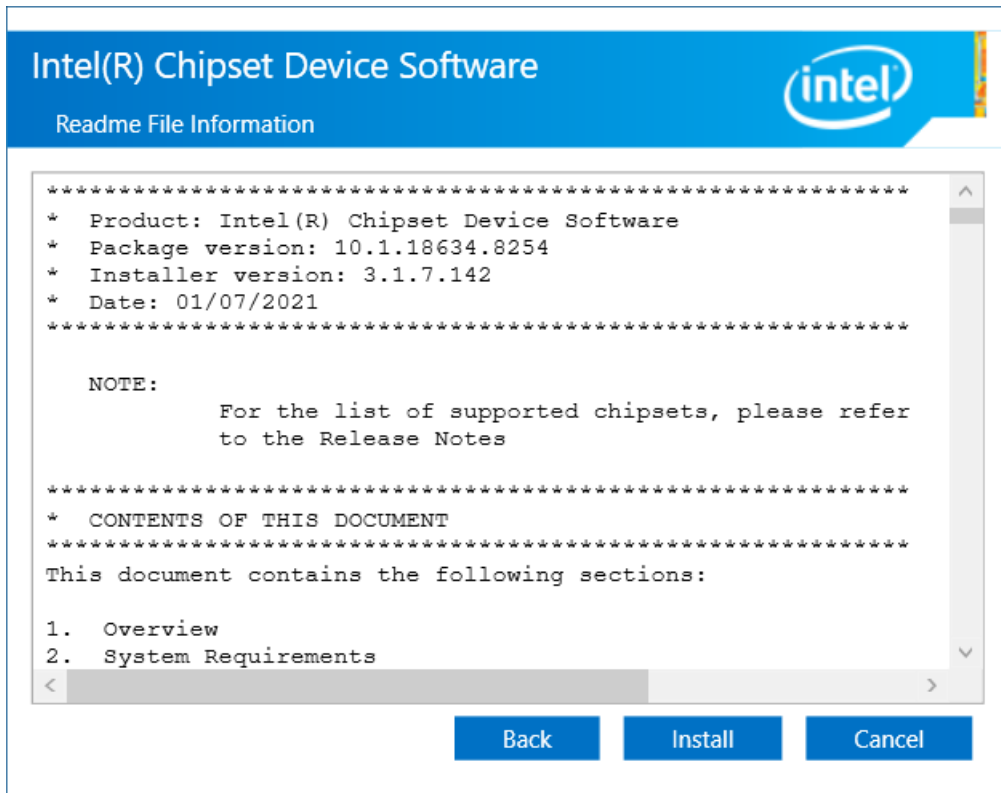


Step 2. Read the license agreement. Click **Accept** to accept all of the terms of the license agreement.

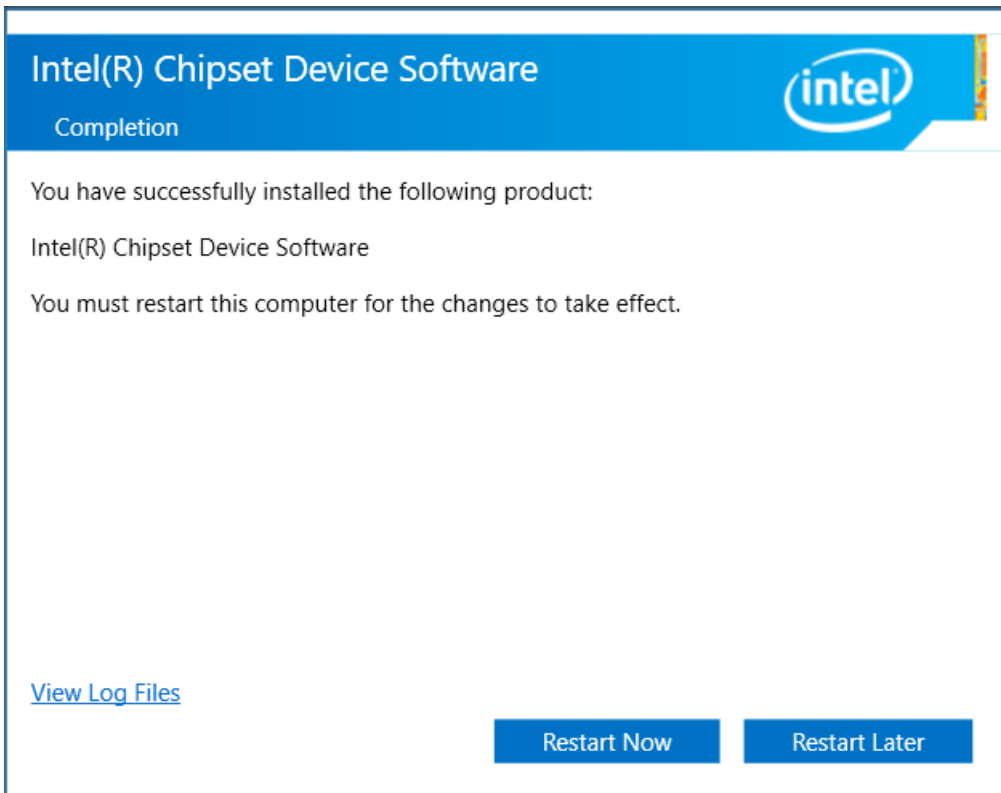




Step 3. Click **Install** to begin the installation.



Step 4. Select **Restart Now** to reboot your computer for the changes to take effect.



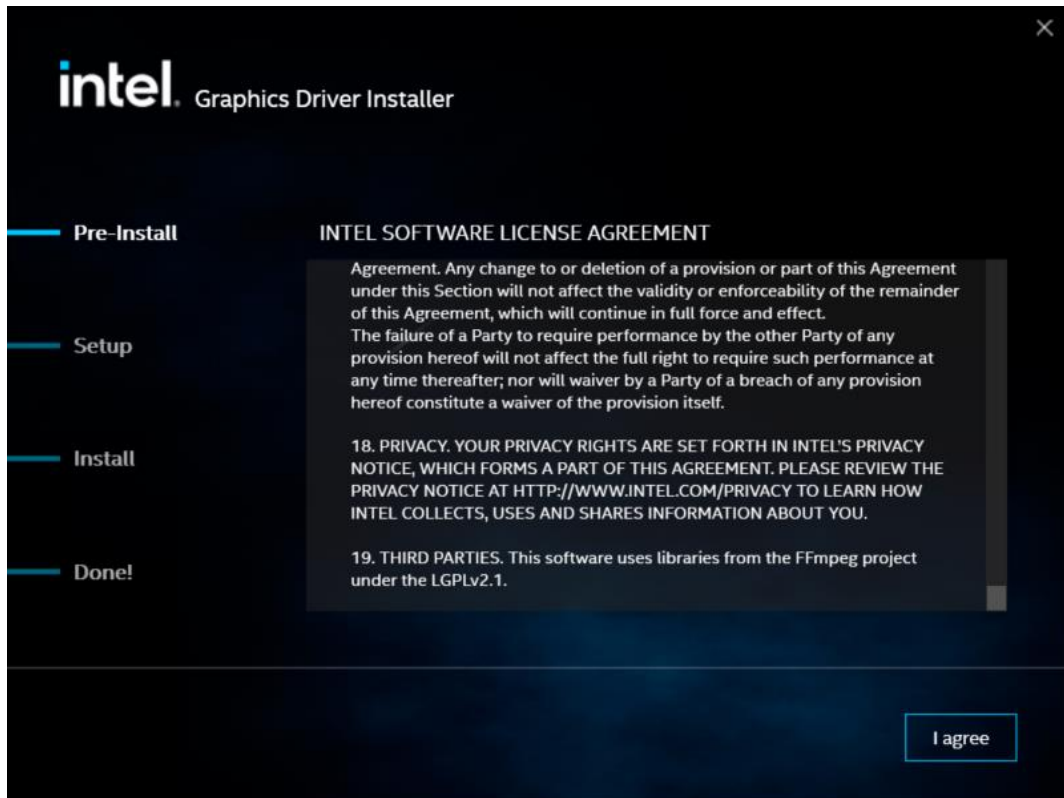
## 4.2 Intel® HD Graphics Chipset

To install the Intel® HD Graphics Chipset, please follow the steps below.

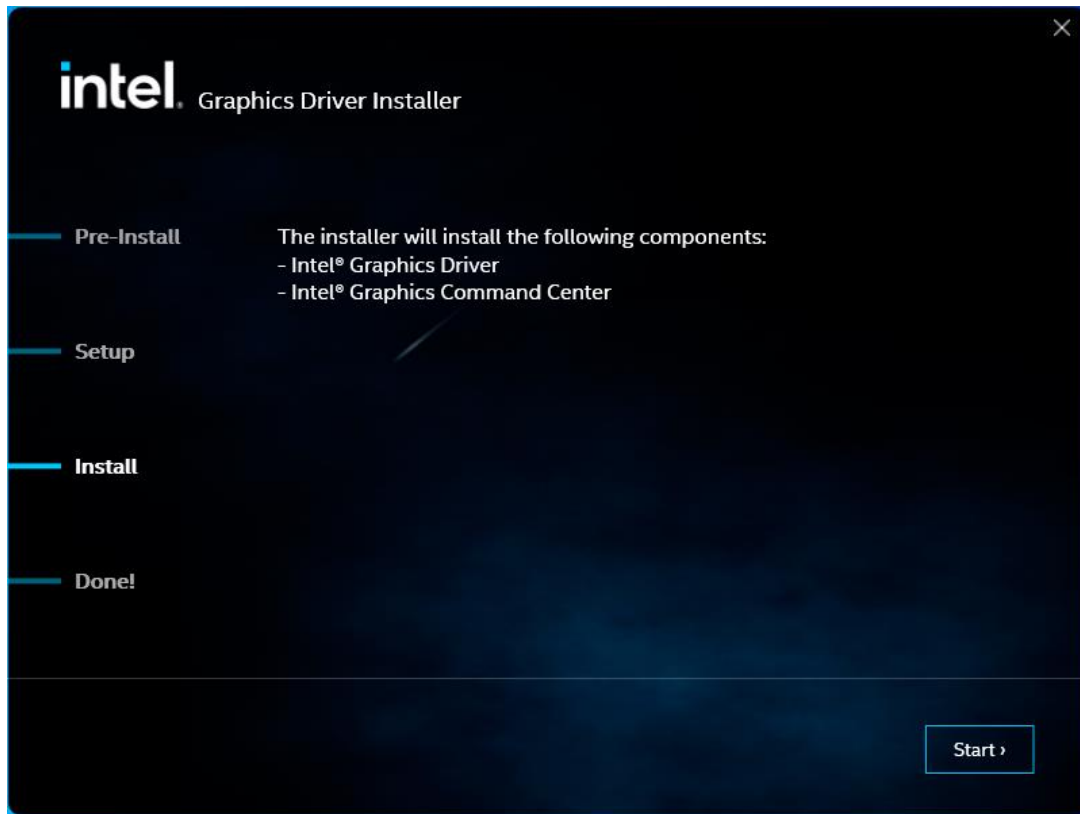
**Step 1.** Click **Begin installation**.



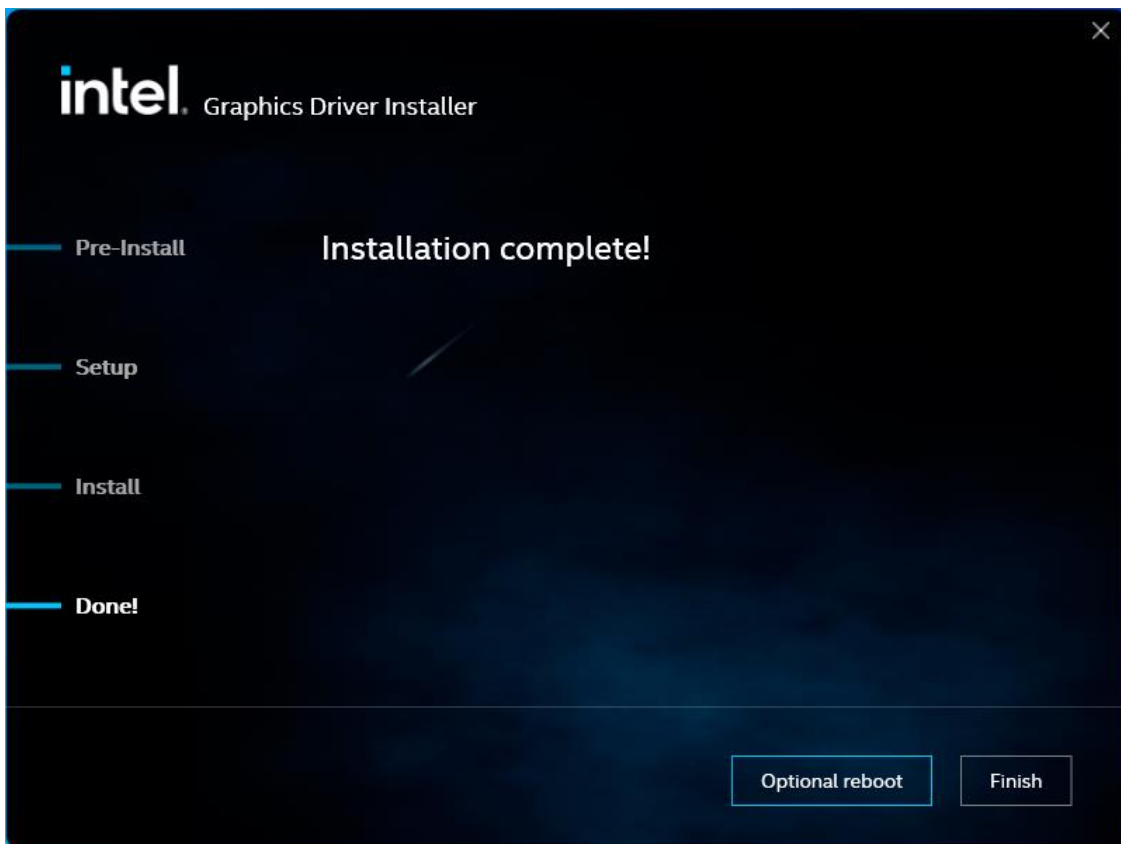
**Step 2.** Read the license agreement. Click **I agree** to accept all the terms of the license agreement.



**Step 3.** Choose **Install** function and Click **Start** to setup program.



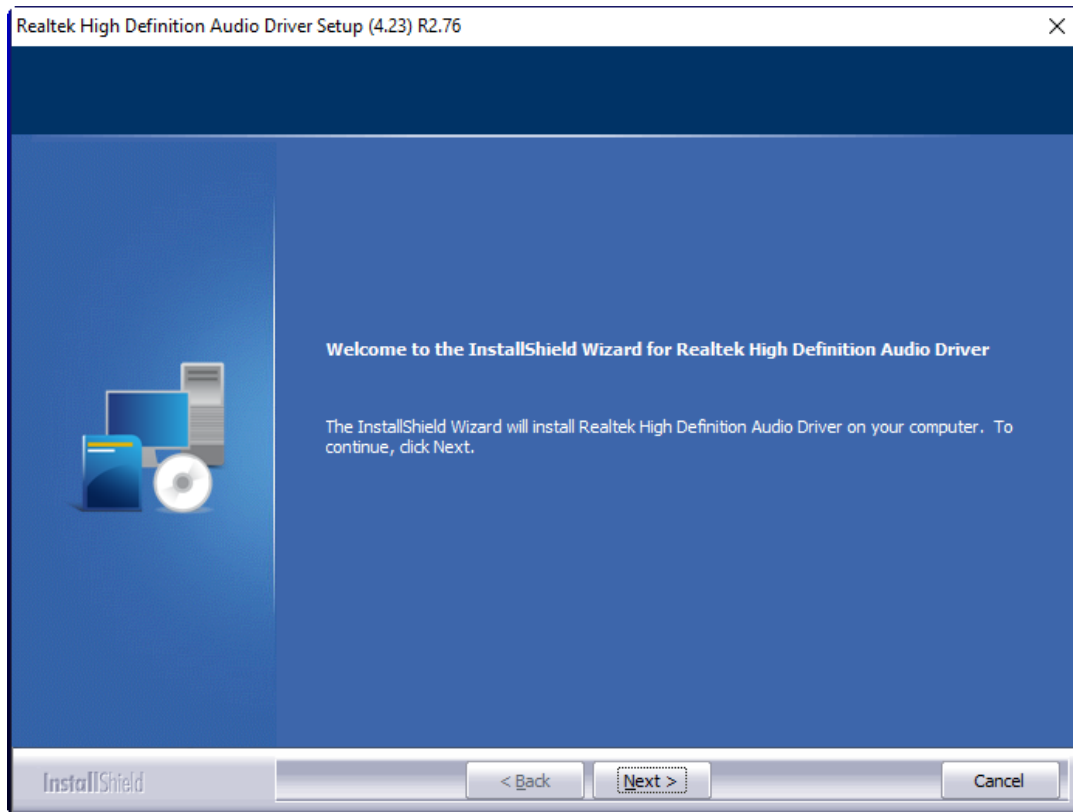
**Step 4.** Click **Finish** to complete installation.



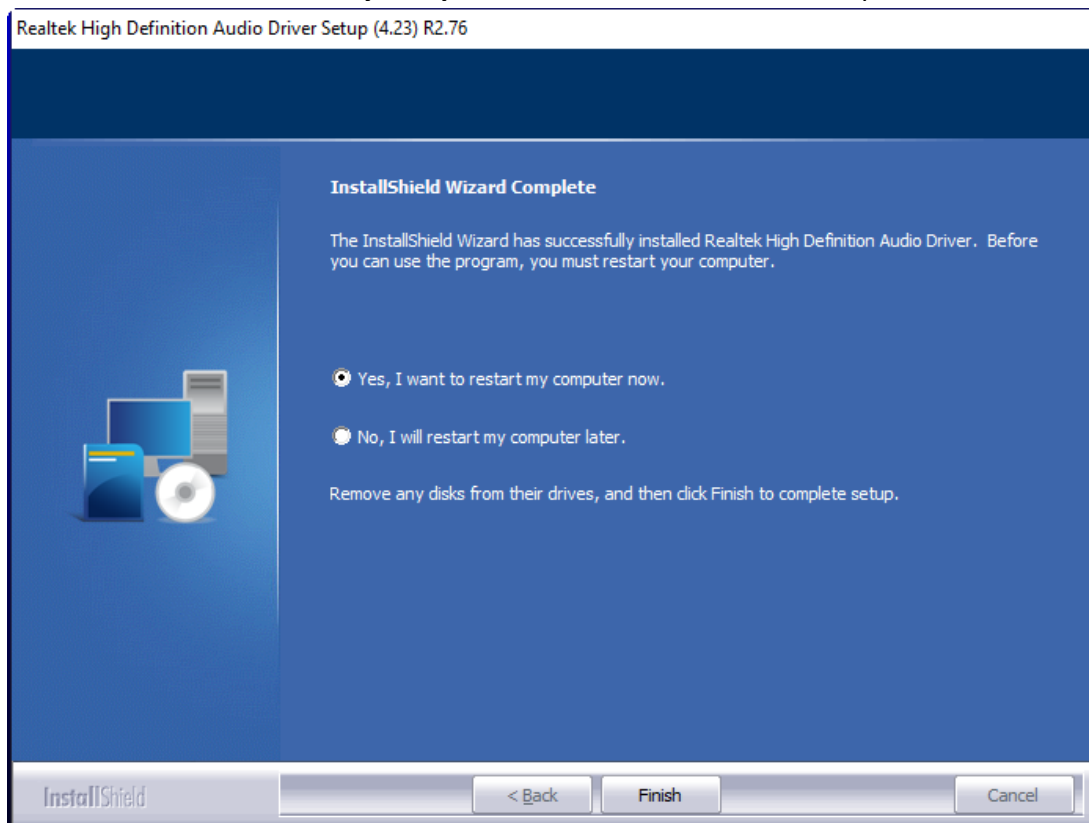
## 4.3 Intel® HD Graphics Chipset

To install the Realtek HD Audio Driver, please follow the steps below.

**Step 1.** Click **Next** to continue.



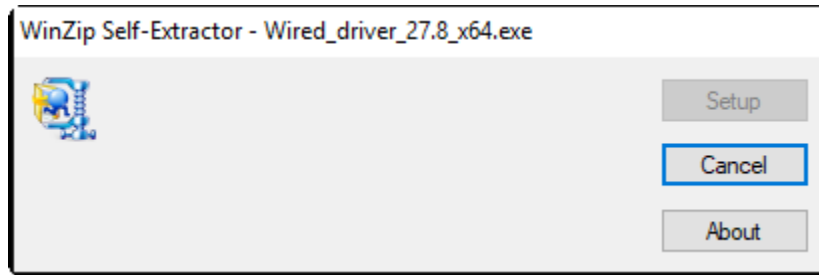
**Step 2.** Click **Yes, I want to restart my computer now.** Click **Finish** to complete the installation.



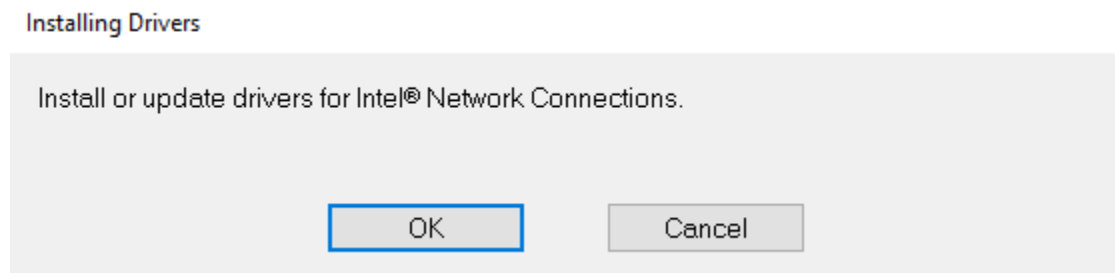
## 4.4 | LAN Driver

To install the LAN driver, please follow the steps below.

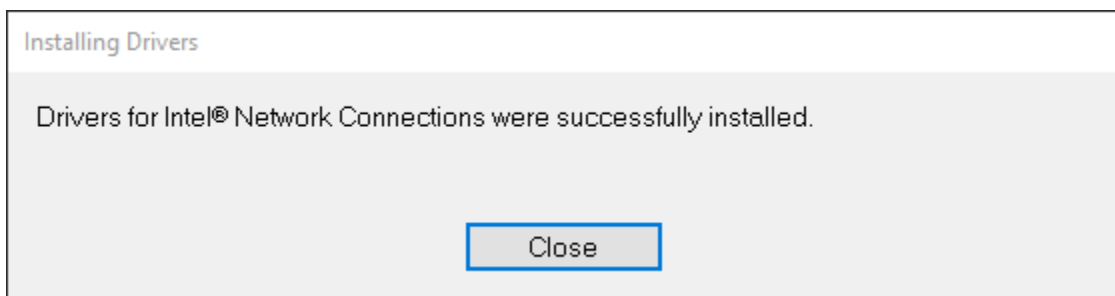
**Step 1.** Click **Zip File** to continue.



**Step 3.** Click **OK** to begin the installation.



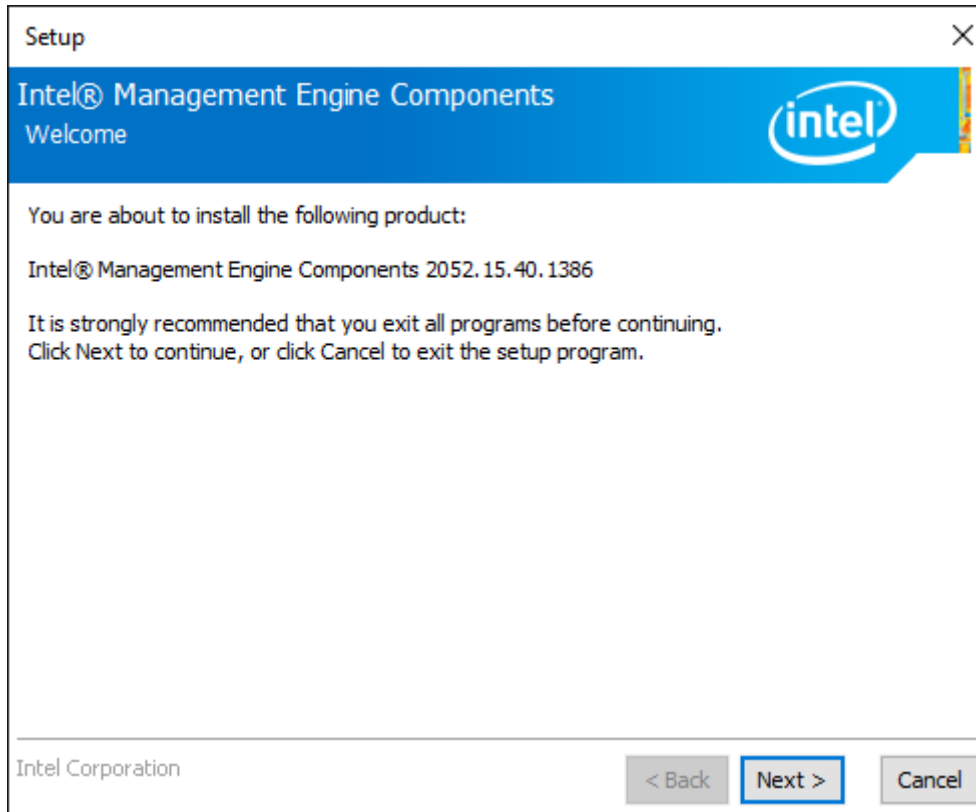
**Step 4.** Click **Close** to finish installation.



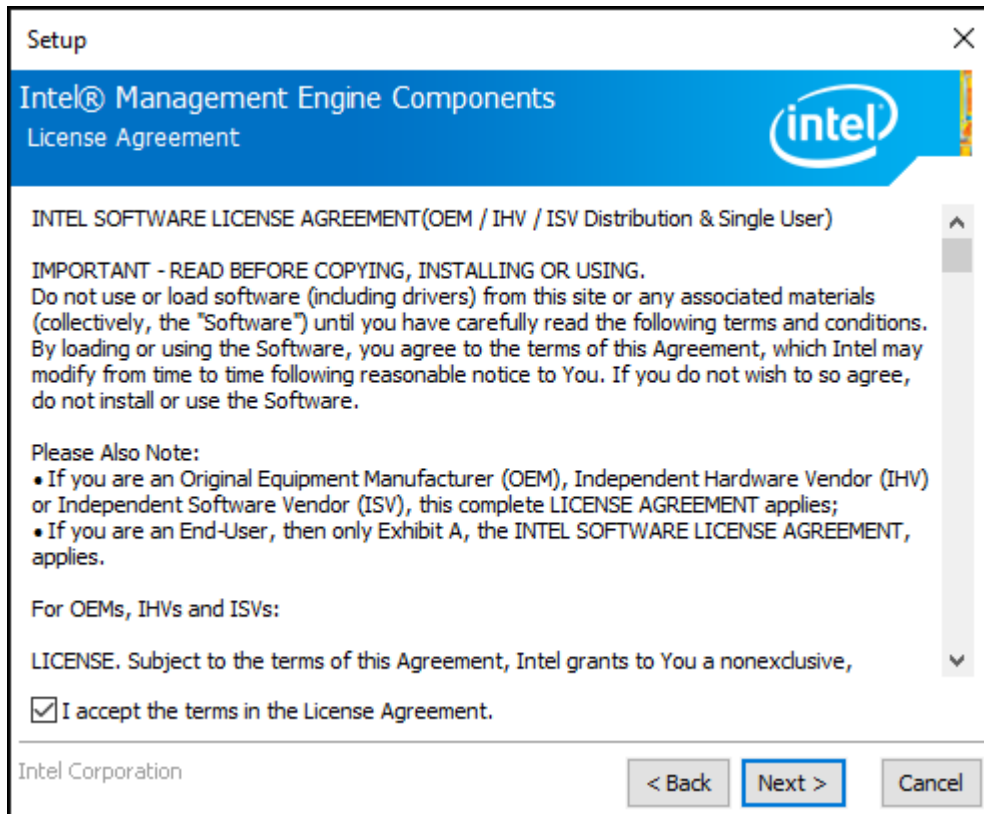
## 4.5 Intel® Management Engine Interface

To install the Intel® Management Engine Interface, please follow the steps below.

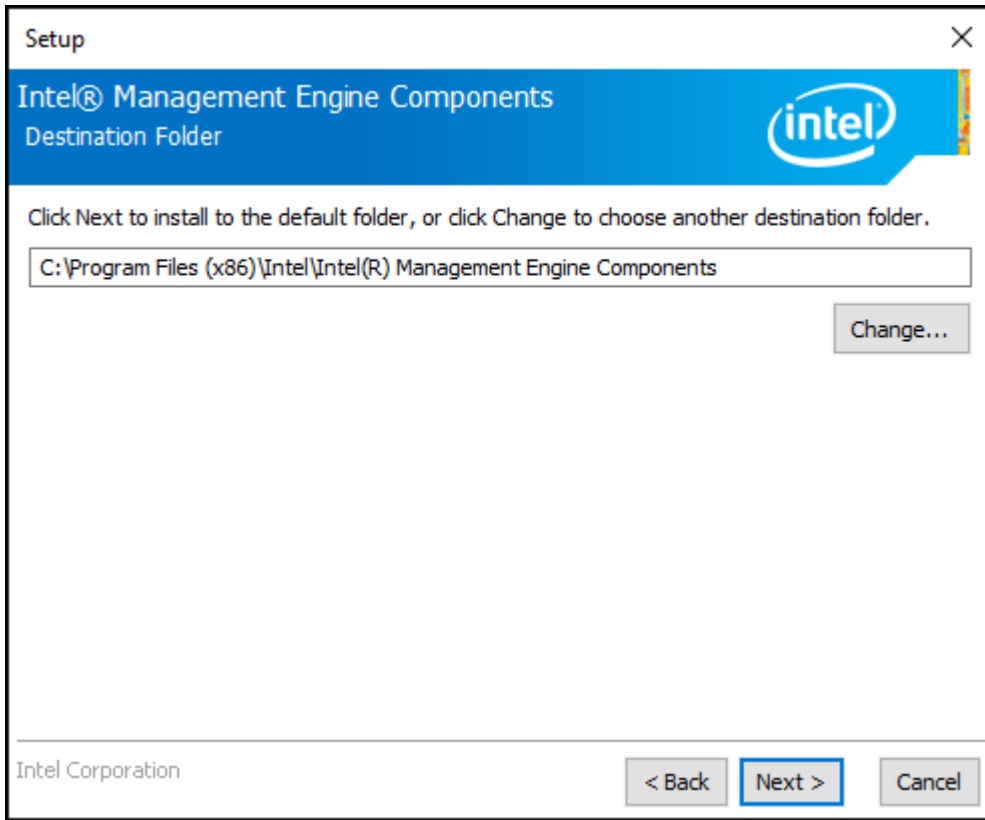
**Step 1.** Select setup language you need. Click **Next** to continue.



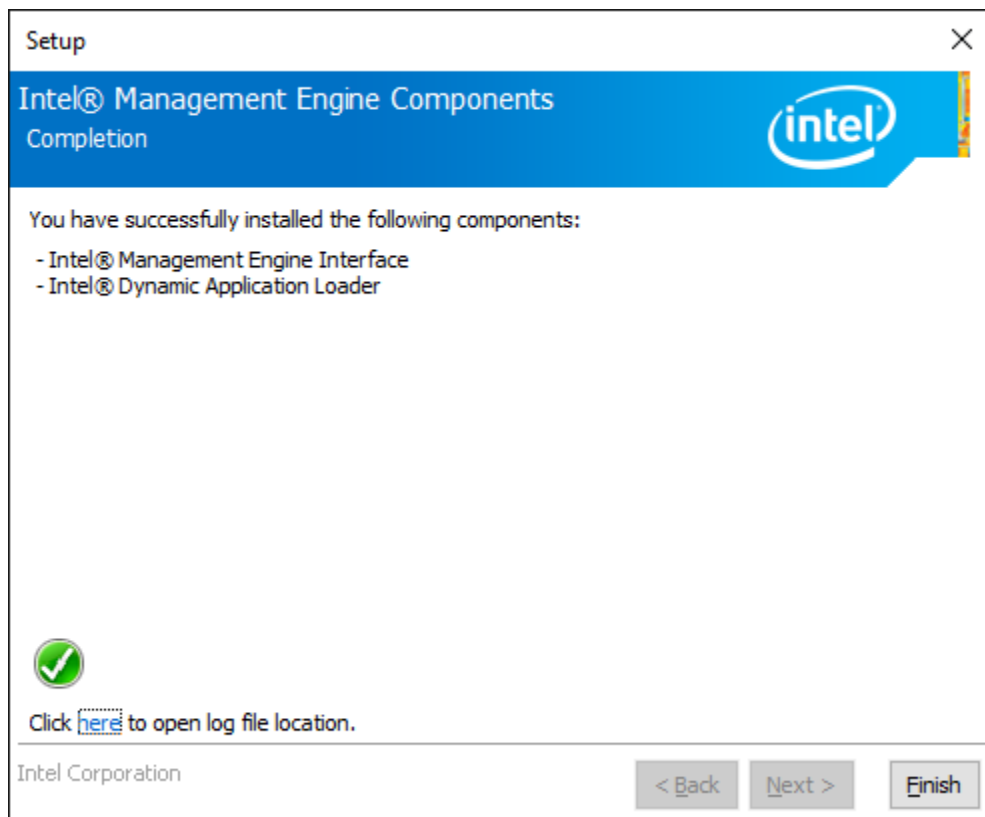
**Step 2.** Choose **I accept the terms in the License Agreement** and click **Next** to begin the installation.



**Step 3.** Click **Next** to continue.



**Step 4.** Click **Finish** to complete the installation.



## 4.6 Touch Screen Installation

This chapter describes how to install drivers and other software that will allow your touch screen work with different operating systems.

### 4.6.1 Windows 10 Universal Driver Installation for PenMount 6000 Series

Before installing the Windows 10 driver software, you must have the Windows 10 system installed and running on your computer. You must also have one of the following PenMount 6000 series controller or control boards installed: PM6500, PM6300.

### Resistive Touch

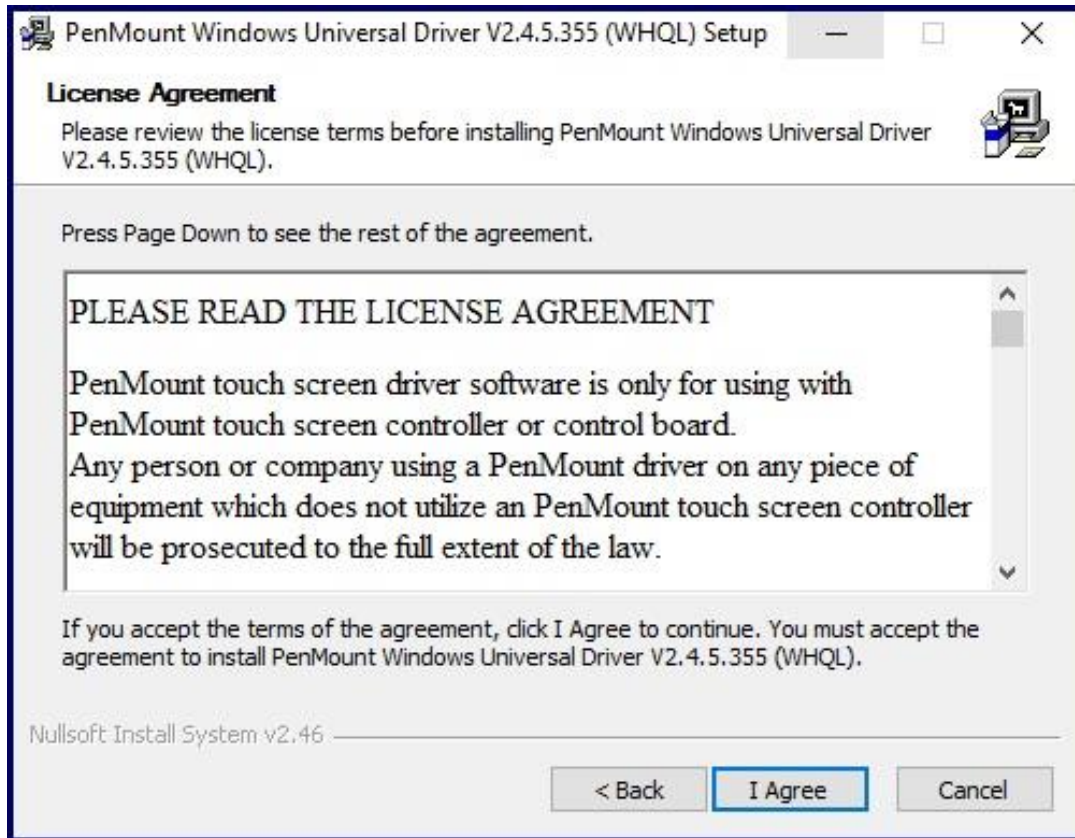
If you have an older version of the PenMount Windows 7 driver installed in your system, please remove it first. Follow the steps below to install the PenMount DMC6000 driver.

**Step 1.** Click **Next** to continue.

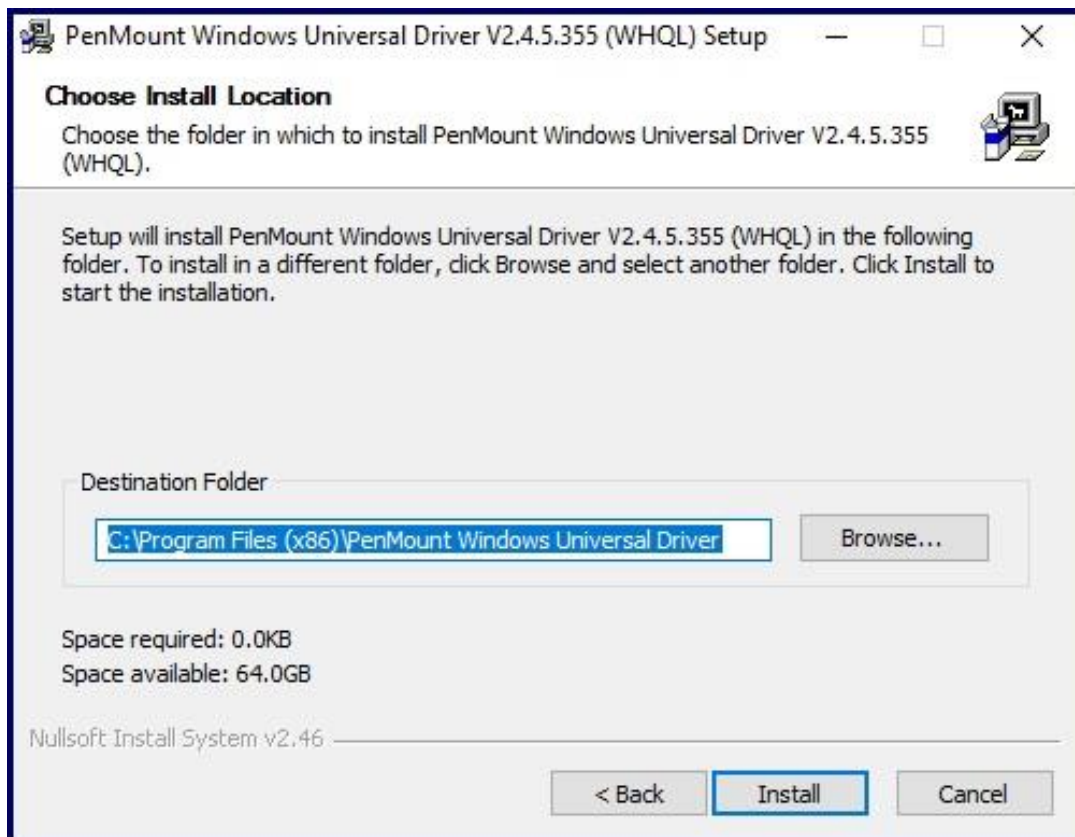


**Step 2.** Read the license agreement. Click **I Agree** to agree the license agreement.

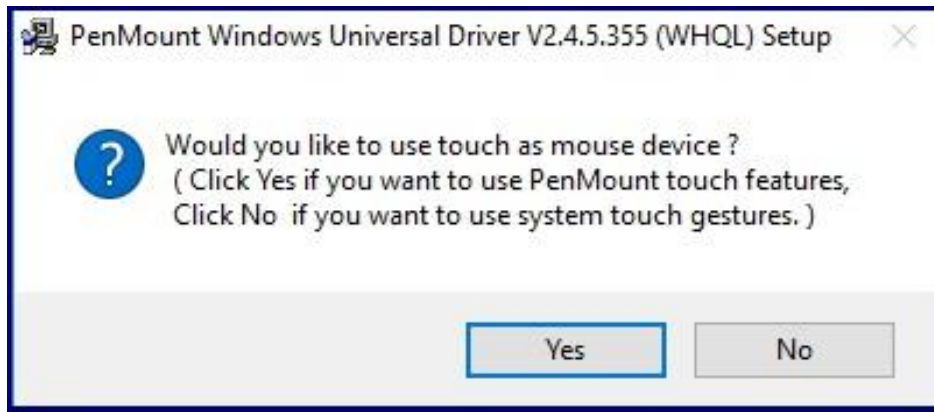




**Step 3.** Choose the folder in which to install PenMount Windows Universal Driver. Click **Install** to start the installation.



**Step 4.** Click **Yes** to continue.



**Step 5.** Click **Finish** to complete installation.



## 4.6.2 Software Functions

### Resistive Touch

Upon rebooting, the computer automatically finds the new 6000 controller board. The touch screen is connected but not calibrated. Follow the procedures below to carry out calibration.

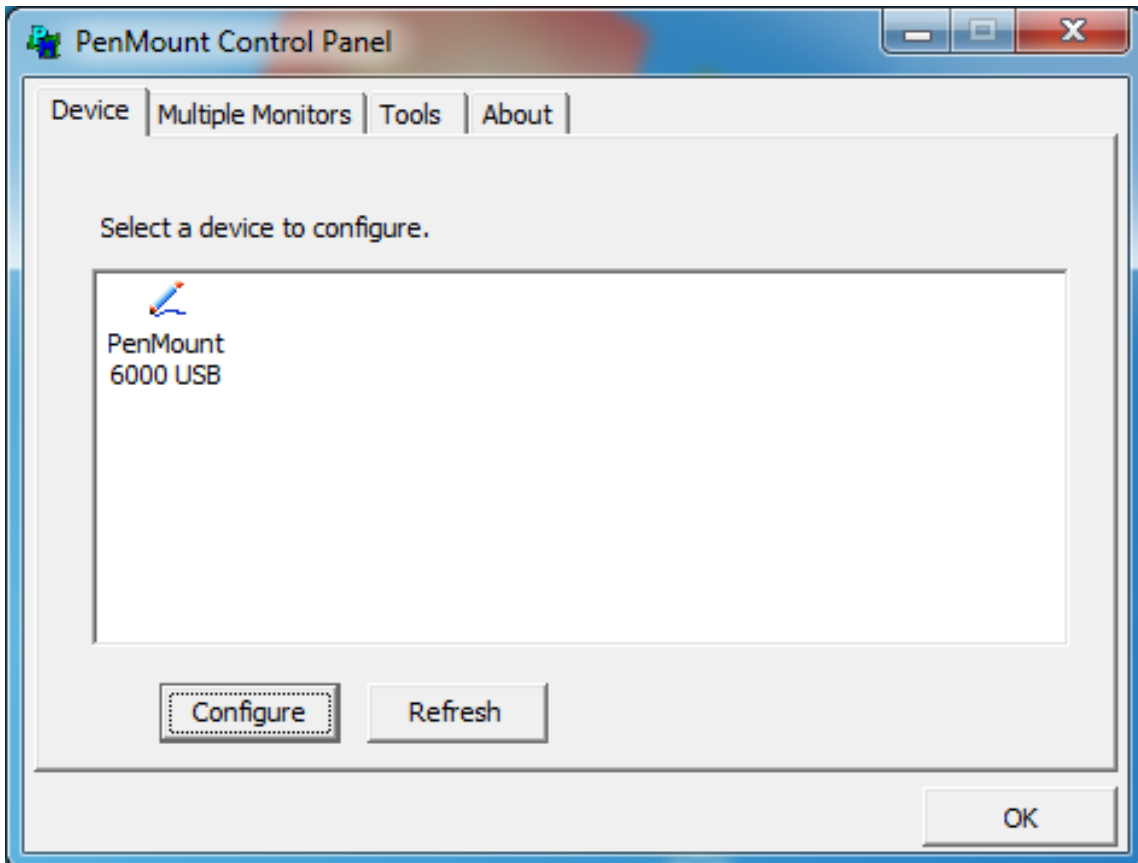
1. After installation, click the PenMount Monitor icon “PM” in the menu bar.
2. When the PenMount Control Panel appears, select a device to “Calibrate.”

### PenMount Control Panel (Resistive Touch)

The functions of the PenMount Control Panel are **Device**, **Multiple Monitors**, **Tools** and **About**, which are explained in the following sections.

#### Device

In this window, you can find out that how many devices be detected on your system.

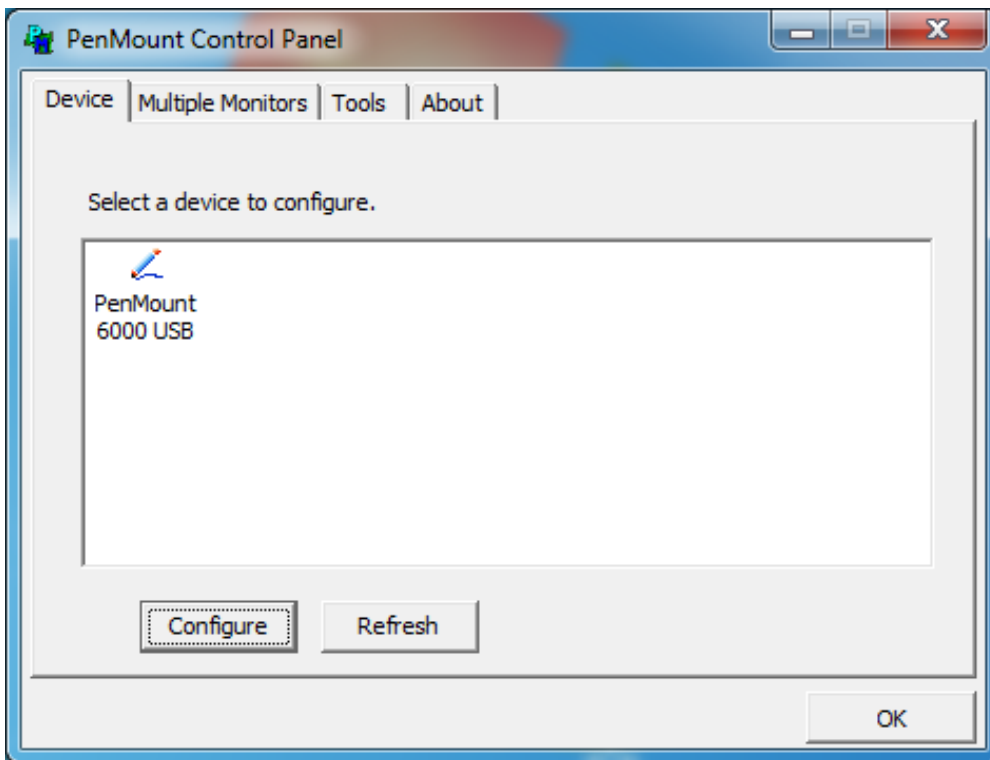


## Calibrate

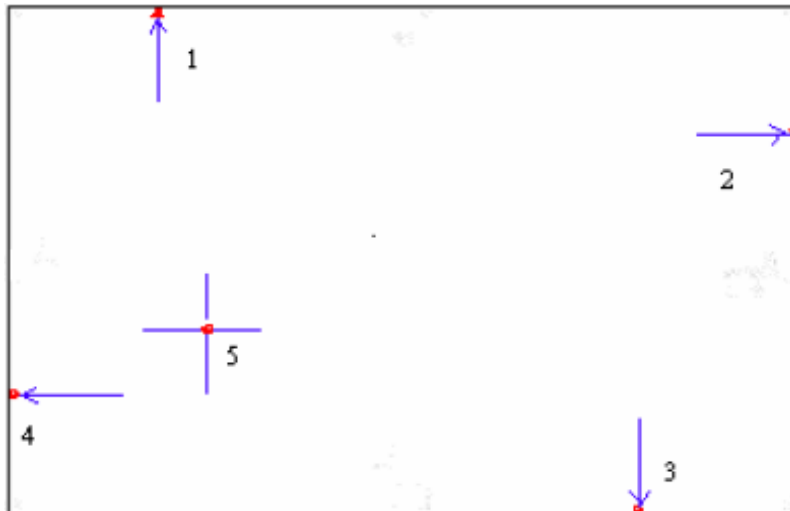
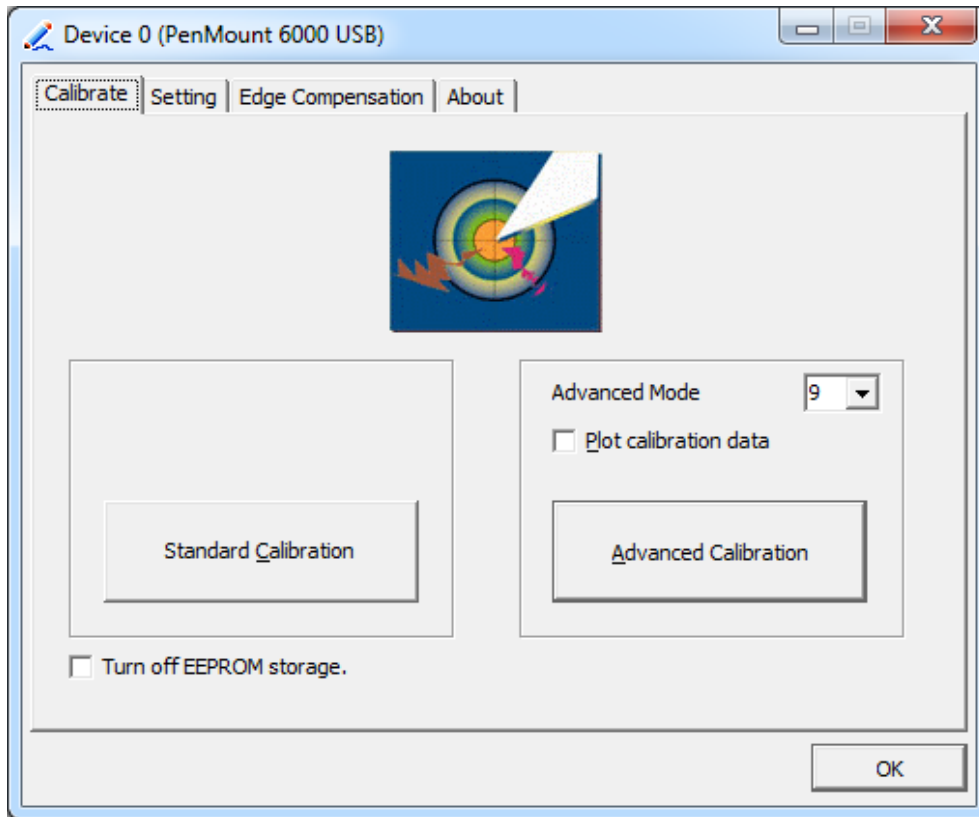
This function offers two ways to calibrate your touch screen. 'Standard Calibration' adjusts most touch screens. 'Advanced Calibration' adjusts aging touch screens.

Standard Calibration	<b>Click this button and arrows appear pointing to red squares. Use your finger or stylus to touch the red squares in sequence. After the fifth red point calibration is complete. To skip, press 'ESC'.</b>
Advanced Calibration	<b>Advanced Calibration uses 4, 9, 16 or 25 points to effectively calibrate touch panel linearity of aged touch screens. Click this button and touch the red squares in sequence with a stylus. To skip, press ESC'.</b>

**Step 1.** Please select a device then click "Configure". You can also double click the device too.

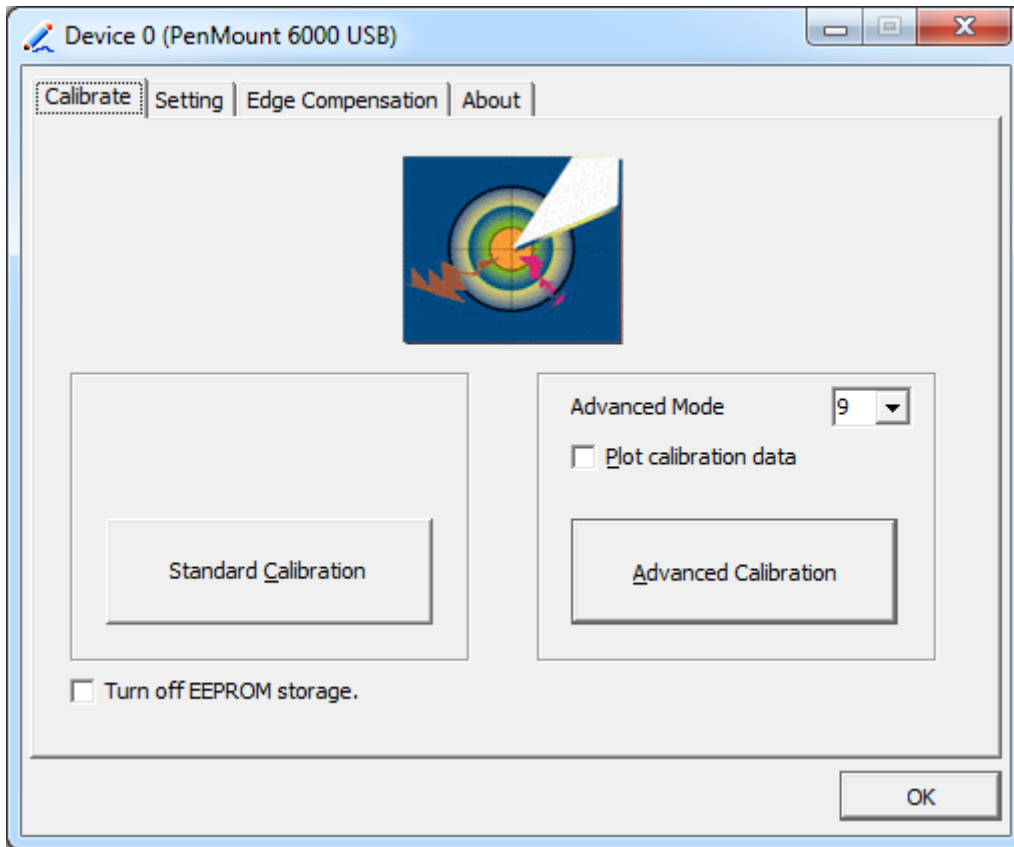


**Step 2.** Click “Standard Calibration” to start calibration procedure

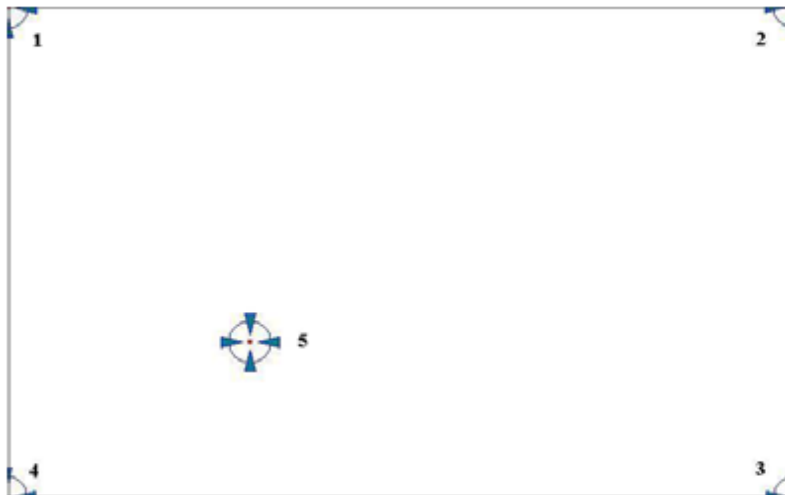


**NOTE:** The older the touch screen, the more Advanced Mode calibration points you need for an accurate calibration. Use a stylus during Advanced Calibration for greater accuracy. Please follow the step as below:

**Step 3.** Select **Device** to calibrate, then you can start to do **Advanced Calibration**.

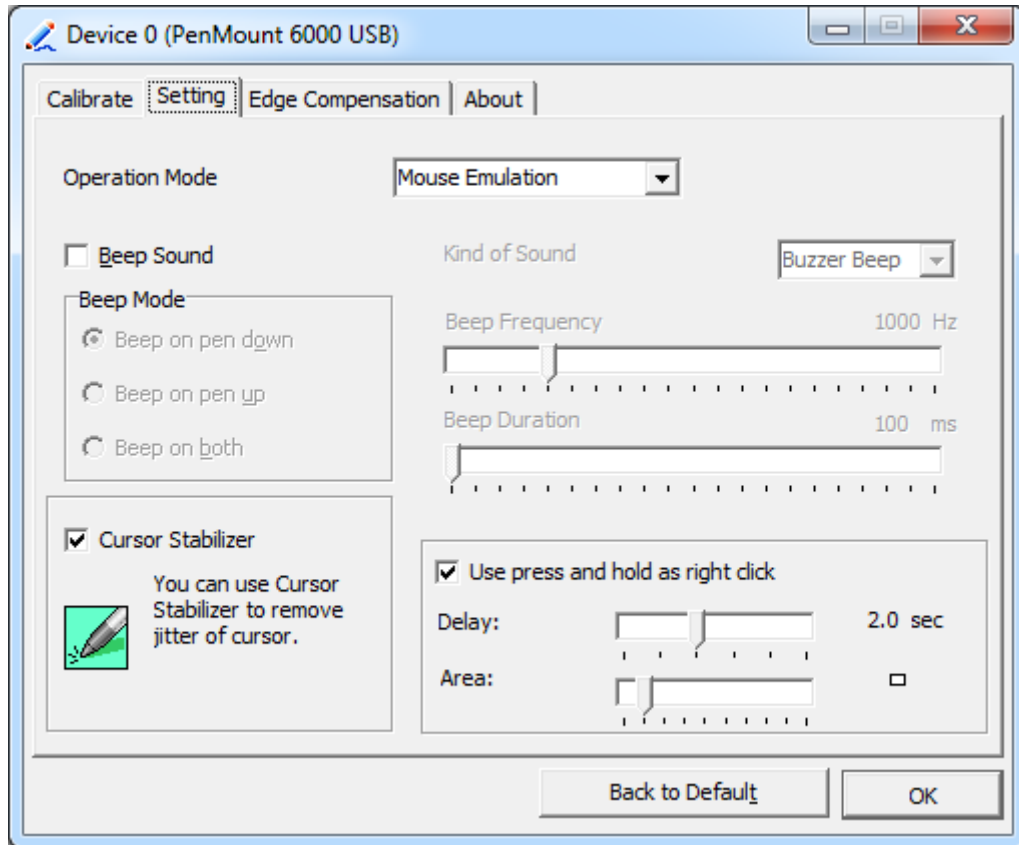


**NOTE:** Recommend to use a stylus during Advanced Calibration for greater accuracy.



Plot Calibration Data	<b>Check this function and a touch panel linearity comparison graph appears when you have finished Advanced Calibration. The blue lines show linearity before calibration and black lines show linearity after calibration.</b>
Turn off EEPROM storage	<b>The function disable for calibration data to write in Controller. The default setting is Enable.</b>

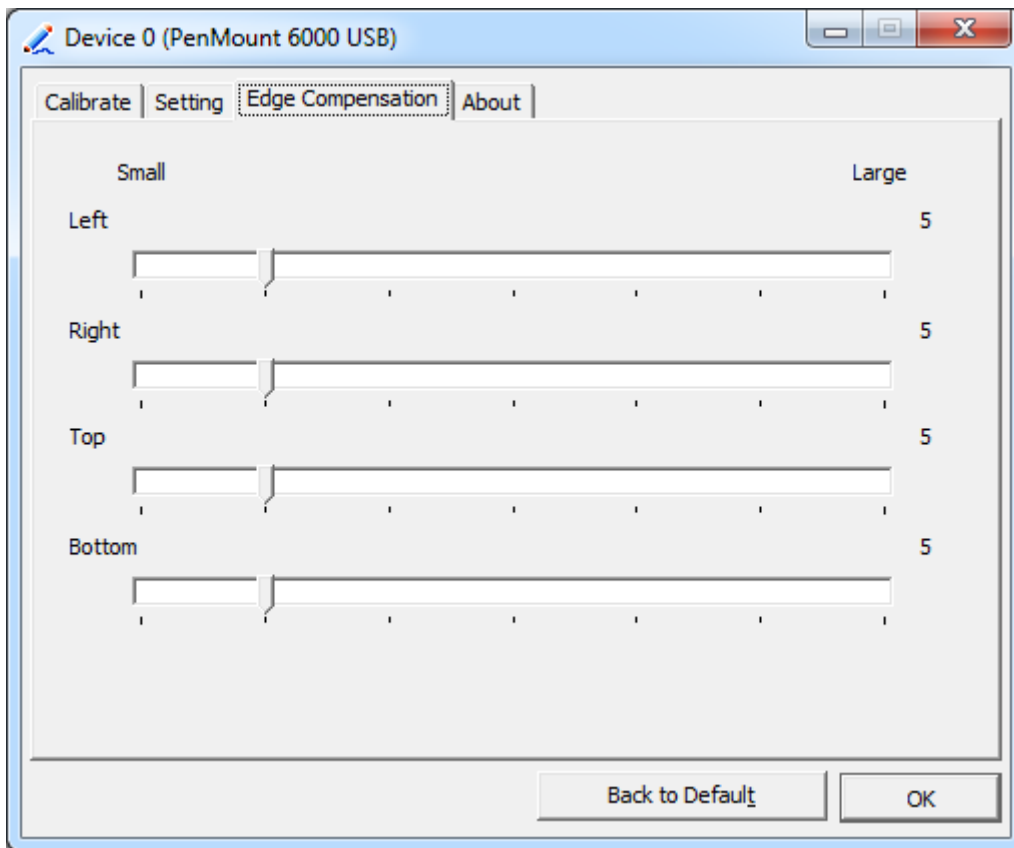
## Setting



Touch Mode	<p><b>This mode enables and disables the mouse’s ability to drag on-screen icons – useful for configuring POS terminals.</b></p> <p><b>Mouse Emulation – Select this mode and the mouse functions as normal and allows dragging of icons.</b></p> <p><b>Click on Touch – Select this mode and mouse only provides a click function, and dragging is disables.</b></p>
Beep Sound	<p><b>Enable Beep Sound – turns beep function on and off</b></p> <p><b>Beep on Pen Down – beep occurs when pen comes down</b></p> <p><b>Beep on Pen Up – beep occurs when pen is lifted up</b></p> <p><b>Beep on both – beep occurs when comes down and lifted up</b></p> <p><b>Beep Frequency – modifies sound frequency</b></p> <p><b>Beep Duration – modifies sound duration</b></p>
Cursor Stabilizer	<p><b>Enable the function support to prevent cursor shake.</b></p>
Use press and hold as right click	<p><b>You can set the time out and area for you need.</b></p>

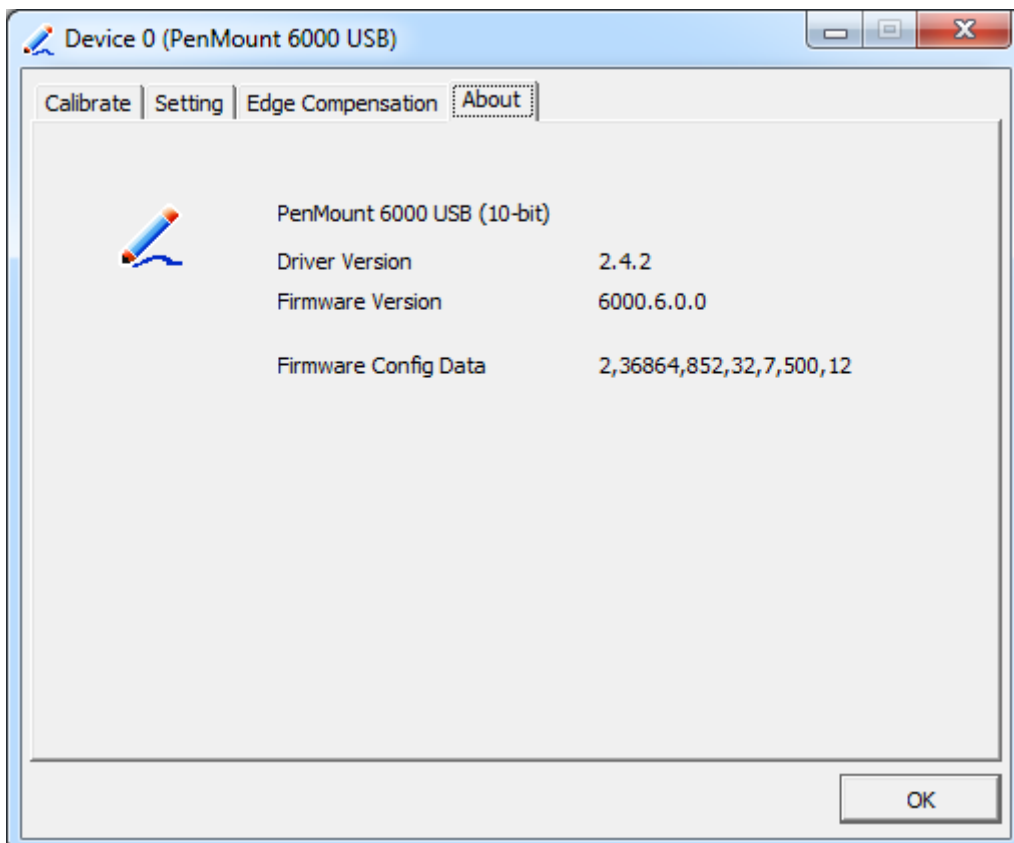
## Edge Compensation

You can use Edge Compensation to calibrate more subtly.



## About

This panel displays information about the PenMount controller and driver version.





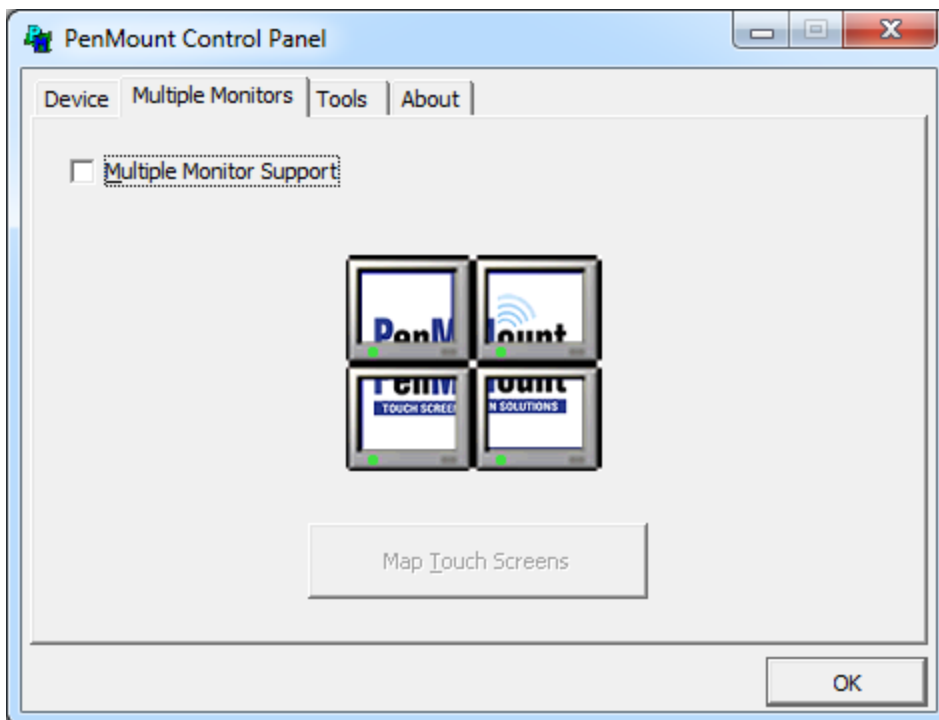
## Multiple Monitors

Multiple Monitors support from two to six touch screen displays for one system. The PenMount drivers for Windows 7/8/8.1 support Multiple Monitors. This function supports from two to six touch screen displays for one system. Each monitor requires its own PenMount touch screen control board, either installed inside the display or in a central unit. The PenMount control boards must be connected to the computer COM ports via the USB interface. Driver installation procedures are the same as for a single monitor. Multiple Monitors support the following modes:  
Windows Extends Monitor Function  
Matrox DualHead Multi-Screen Function  
nVidia nView Function

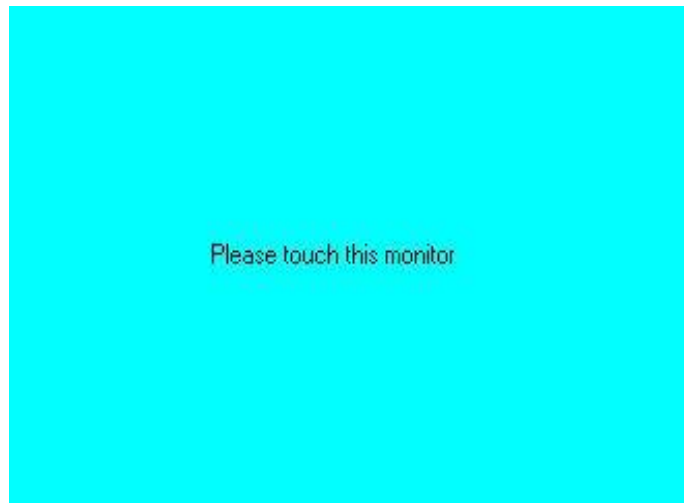
**NOTE:** The Multiple Monitor function is for use with multiple displays only. Do not use this function if you have only one touch screen display. Please note once you turn on this function the rotating function is disabled.

Enable the multiple display function as follows:

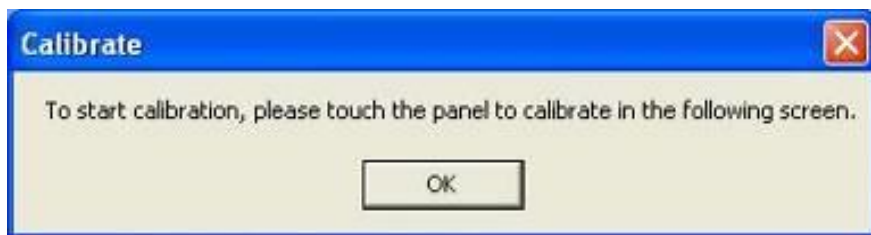
1. Check the **Enable Multiple Monitor Support** box; then click **Map Touch Screens** to assign touch controllers to displays.



2. When the mapping screen message appears, click **OK**.
3. Touch each screen as it displays “Please touch this monitor”. Following this sequence and touching each screen is called **mapping the touch screens**.



4. Touching all screens completes the mapping and the desktop reappears on the monitors.
5. Select a display and execute the “Calibration” function. A message to start calibration appears. Click **OK**.



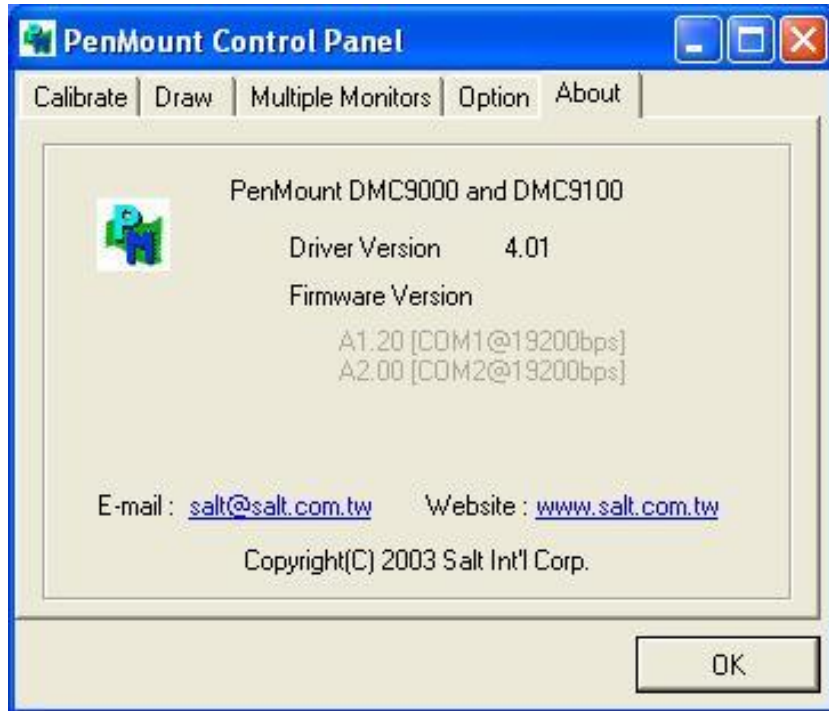
6. “Touch this screen to start its calibration” appears on one of the screens. Touch the screen.
7. “Touch the red square” messages appear. Touch the red squares in sequence.
8. Continue calibration for each monitor by clicking **Standard Calibration** and touching the red squares.

#### **NOTES:**

1. If you use a single VGA output for multiple monitors, please do not use the **Multiple Monitor** function. Just follow the regular procedure for calibration on each of your desktop monitors.
2. The Rotating function is disabled if you use the Multiple Monitor function.
3. If you change the resolution of display or screen address, you have to redo **Map Touch Screens**, so the system understands where the displays are.

## About

This panel displays information about the PenMount controller and this driver version.




### PenMount Monitor Menu Icon

The PenMount monitor icon (PM) appears in the menu bar of Windows 7/8/8.1 system when you turn on PenMount Monitor in PenMount Utilities.



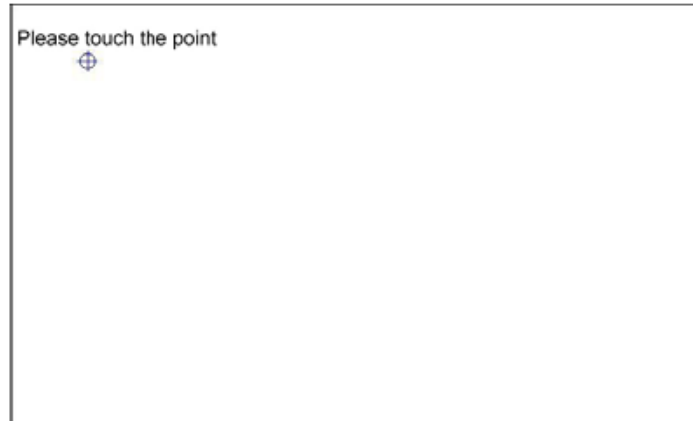
PenMount Monitor has the following function



Control Panel	<b>Open Control Panel Windows</b>
Beep	<b>Setting Beep function for each device</b>
Right Button	<p><b>When you select this function, a mouse icon appears in the right-bottom of the screen.</b></p> <p><b>Click this icon to switch between Right and Left Button functions.</b></p> 
Exit	<b>Exits the PenMount Monitor function.</b>

### Configuring the Rotate Function

1. Install the rotation software package.
2. Choose the rotate function (0°, 90°, 180°, 270°) in the 3rd party software. The calibration screen appears automatically. Touch this point and rotation is mapped.



**NOTE:** The Rotate function is disabled if you use Monitor Mapping