

IE32 3.5" SBC

**3.5" Form Factor SBC with Intel® Celeron® N6210 Processor (1.5M Cache, up to 2.60 GHz),
HDMI, eDP, LVDS, USB 3.2 Gen2 x1, SATA III, and M.2 Interface**

V100



User Manual

Document Version 1.0

Document Part No. 9171111104Q

Please read these instructions carefully before using this product, and save this manual for future use.

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Preface

Copyright Notice

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Disclaimer

We reserve the right to make changes, without notice, to any product, including circuits and/or software described or contained in this manual in order to improve design and/or performance. We assume no responsibility or liability for the use of the described product(s), conveys no license or title under any patent, copyright, or masks work rights to these products, and makes no representations or warranties that these products are free from patent, copyright, or mask work right infringement, unless otherwise specified. Applications that are described in this manual are for illustration purposes only. We make no representation or warranty that such application will be suitable for the specified use without further testing or modification.

Warranty

We warrant that each of its products will be free from material and workmanship defects for a period of one year from the invoice date. (Standard is one year, extended warranty will need to discuss with our sales representatives. If the customer discovers a defect, we will, at its option, repair or replace the defective product at no charge to the customer, provided it is returned during the warranty period of one year, with transportation charges prepaid. The returned product must be properly packaged in its original packaging to obtain warranty service.

If the serial number and the product shipping data differ by over 30 days, the in-warranty service will be made according to the shipping date. In the serial numbers the third and fourth two digits give the year of manufacture, and the fifth digit means the month (e. g., with A for October, B for November and C for December).

For example, the serial number 1W19Axxxxxxx means October of year 2019.

Packing List

Before using this Motherboard, please make sure that all the items listed below are present in your package:

- IE32 3.5" SBC
- User Manual & Driver CD

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

Customer Service

We provide a service guide as below for any problem by the following steps: First, contact your distributor, sales representative, or our customer service center for technical support if you need additional assistance.

You need to prepare the following information before you call:

- Product serial number
- Peripheral attachments
- Software (OS, version, application software, etc.)
- Detailed problem description
- The exact wording of any error messages

In addition, free technical support is available from our engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products. Please do not hesitate to call or e-mail us.

Advisory Conventions

Four types of advisories are used throughout the user manual to provide helpful information or to alert you to the potential for hardware damage or personal injury. These are Notes, Important, Cautions, and Warnings. The following is an example of each type of advisory.



NOTE:

A note is used to emphasize helpful information



IMPORTANT:

An important note indicates information that is important for you to know.



CAUTION

A Caution alert indicates potential damage to hardware and explains how to avoid the potential problem.



WARNING!

An Electrical Shock Warning indicates the potential harm from electrical hazards and how to avoid the potential problem.

Safety Precautions



CAUTION

Always ground yourself to remove any static charge before touching the CPU card. Modern electronic devices are very sensitive to static electric charges. As a safety precaution, use a grounding wrist strap at all times. Place all electronic components in a static-dissipative surface or static-shielded bag when they are not in the chassis.

Safety and Warranty

1. Please read these safety instructions carefully.
2. Please keep this user manual for later reference.
3. Please disconnect this equipment from any AC outlet before cleaning. Do not use liquid or spray detergents for cleaning. Use a damp cloth.
4. For pluggable equipment, the power outlet must be installed near the equipment and must be easily accessible.
5. Keep this equipment away from humidity.
6. Put this equipment on a reliable surface during installation. Dropping it or letting it fall could cause damage.
7. Make sure the voltage of the power source is correct before connecting the equipment to the power outlet.
8. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
9. All cautions and warnings on the equipment should be noted.
10. If the equipment is not used for a long time, disconnect it from the power source to avoid damage by transient over-voltage.
11. If any of the following situations arises, get the equipment checked by service personnel:
 - A. The power cord or plug is damaged.
 - B. Liquid has penetrated into the equipment.
 - C. The equipment has been exposed to moisture.
 - D. The equipment does not work well, or you cannot get it to work according to the user's manual.
 - E. The equipment has been dropped and damaged.
 - F. The equipment has obvious signs of breakage.

About This User Manual

This User Manual provides information about using the IE32 3.5" SBC. The documentation set for the IE32 3.5" SBC provides information for specific user needs, and includes:

- **IE32 3.5" SBC User Manual** – contains detailed description on how to use the motherboard, its components and features.



NOTE:

Some pictures in this guide are samples and can differ from actual product.

Chapter 1: General Information

This chapter includes the IE32 3.5" SBC background information.

1.1 Introduction

1.2 Features

1.3 Motherboard Specifications

1.4 Functional Description

1.5 Physical Description



1.1 Introduction

Thank you for choosing the IE32 3.5" SBC. This motherboard can be integrated with Intel® Celeron® Elkhart Lake N6210 Processor, up to 2.6GHz, which offers a high performance computing platform with low power consumption. The IE32 3.5" SBC supports 260-pin DDR4-3200 non-ECC SO-DIMM RAM, up to 16 GB.

There is an advanced full set of I/O ports including 2 x SATA III, 4 x COM, 2 x USB 3.2 Gen2 x1 (10Gbps), 4 x USB 2.0. The motherboard is designed in 3.5" form factor and measures 146mm x 102mm.

Abundant I/O connectors and expandability makes the IE32 3.5" SBC to be the right fit in the majority of industrial computer applications such as machine vision and control, gaming, POS, KIOSK systems, industrial automation, and others. Powerful processor in 3.5" form-factor meets the demanding performance requirements of modern industrial applications.

1.2 Features

IE32 3.5" SBC features:

- 3.5" Form Factor (146mm x 102mm)
- Intel® Celeron® Elkhart Lake N6210 Processor
- One DDR4-3200 SO-DIMM RAM
- 2 x Intel Gigabit Ethernet
- 2 x SATA III, 4 x COM, 2 x USB 3.2 Gen2 x1, 4 x USB 2.0
- 1 x M.2 2242 B-Key SSD, up to 512GB
- 2 x SATA III for 2.5" SSD/HDD, up to 1TB (Optional)
(SATA2 is only available when M.2 SATA is not in use)

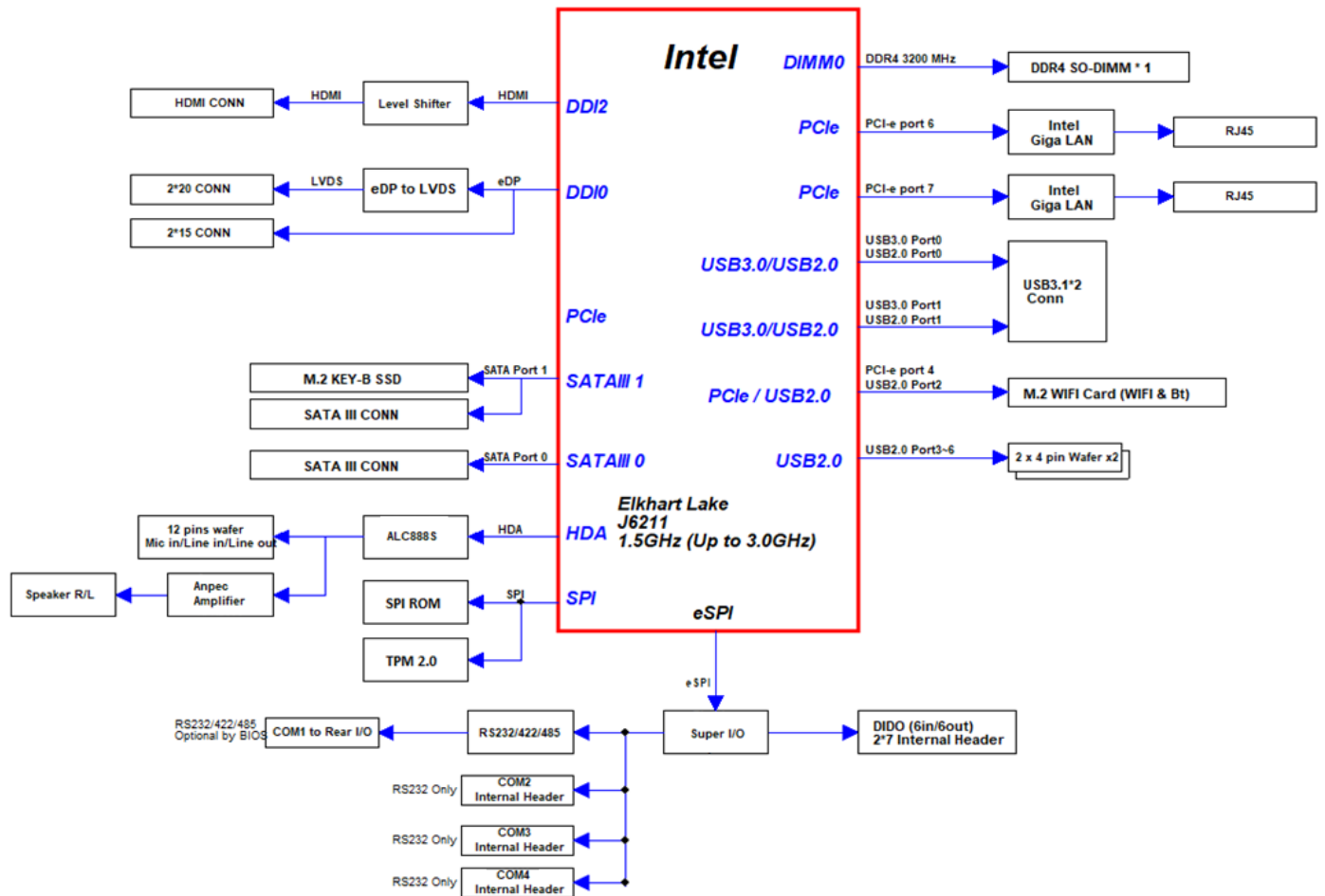
1.3 Motherboard Specifications

	Model Name	
	IE32 3.5" SBC	
System Specifications	CPU	Intel® Celeron® Elkhart Lake N6210 Processor (1.5M Cache, up to 2.60 GHz)
	System Memory	260 pin DDR4-3200 non-ECC SO-DIMM RAM (max to 16 GB)
	Storage	1 x M.2 2242 B-key SSD up to 512GB 2 x SATA III for 2.5" SSD/HDD up to 1TB (Optional) (SATA2 is only available when M.2 SATA is not in use)
	BIOS	Insyde H20 BIOS
	Graphic Controller	Intel® UHD Graphics
	Graphic Resolution	HDMI Mode:HDMI 2.0b/ 4096x2160@ 60Hz eDP Mode: eDP 1.3/4096x2160@ 60Hz
Display Specifications	Audio Codec	Realtek HD Audio Codec
Audio	Audio Interface	Mic-in / Line-in / Line-out
	Ethernet Controller	Intel Gigabit-LAN Controller x 2
Ethernet	Ethernet Interface	Standard IEEE 802.3 Ethernet interface for 2500BASE-T, 1000BASE-T, 100BASE-TX, and 10BASE-TE applications
	Rear I/O	2 x RJ-45 1 x RS-232/RS422/RS485 2 x USB 3.2 Gen 2 x1 (10Gbps) 1 x HDMI 2.0b (Optional) 1 x DC-in Power Jack (+12V)
I/O Ports Specification	Internal I/O	1 x eDP / 30-pin(2x15) DF-13 connector 1 x LVDS / 40-pin(2x20) DF-13 connector 2 x SATA III connector 1 x SATA Power connector 4 x USB 2.0 1 x Digital I/O(12-bit GPIO) / 14-pin(2x7) 1 x Power-input / 6-pin 1 x +12V for external power(Yellow) / 2-pin 1 x +5V for external power(Red) / 2-pin 1 x +3.3V for external power(Blue) / 2-pin 1 x Fan / 3-pin 1 x Brightness control / 3-pin

		1 x VR/Software brightness switch jumper/ 3-pin 1 x PWM/DA brightness switch jumper / 3-pin 1 x 3.3V/5V PWM Level switch jumper / 3-pin 1 x Panel Inverter / 7-pin 1 x Front Panel / 10-pin(2x5) 2 x Speaker with Amp. / 2-pin 1 x Audio (Mic-in / Line-in / Line-out) / 12-pin(2x6) 1 x RTC Battery / 2-pin 3 x COM Ports / 2x 5 pin Headers
	Expansions Slot	2 x SATA III (SATA2 is only available when M.2 SATA is not in use.) 1 x 8pin(2x4) for SATA power
Mechanical Specifications	Dimensions	146 mm x 102 mm / 5.7 x 4 inches (3.5" Form Factor)
Environment Considerations	Operating Temp.	0°C ~ 50°C
	Storage Temp.	-20°C ~ 60°C
	Humidity	10~95% RH@40°C, non-condensing
Power Management	Power Requirement	12V 2.5ϕ DC-IN Power Jack
	Power Consumption	6.5W
Operating System	OS	Windows 11 IoT Enterprise (Optional) Windows 10 IoT Enterprise (Optional) Linux Ubuntu 20.04 (Optional)
Packing List	Standard	Single Board Computer Manual & Driver CD

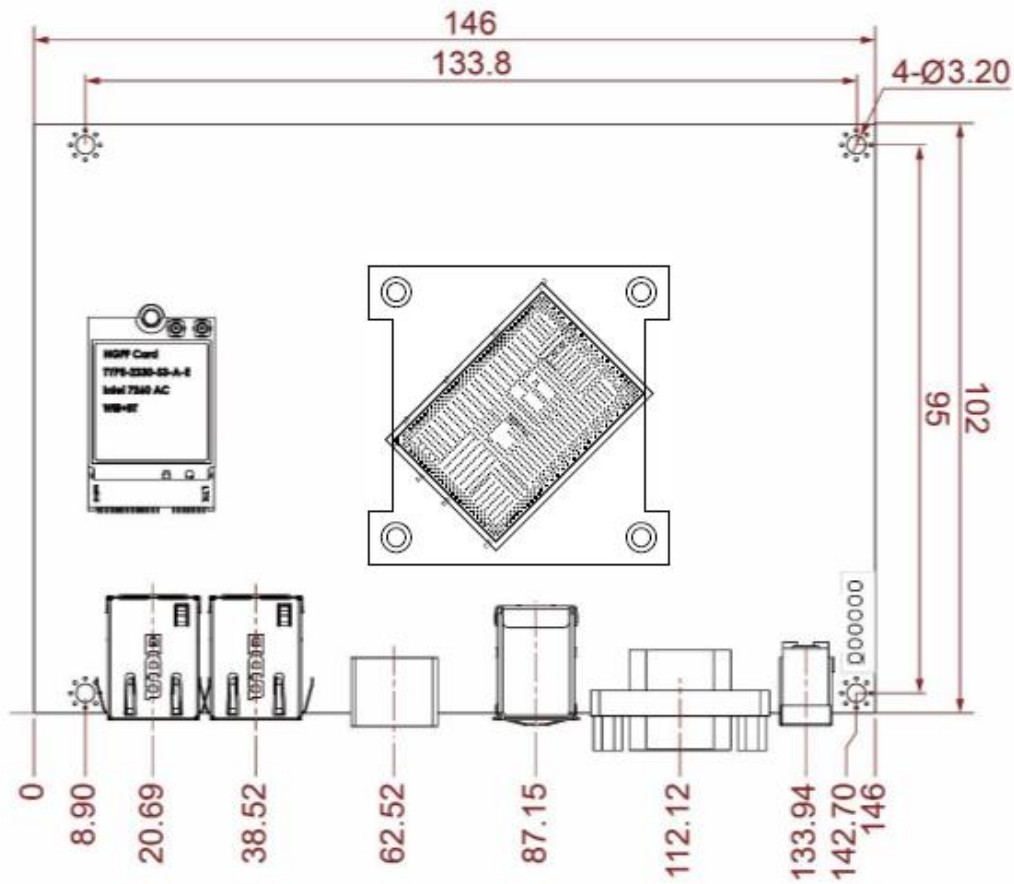
1.4 Functional Description

IE32 3.5" SBC Function block



1.5 Physical Description

IE32 3.5" SBC Board Dimensions



Chapter 2: Hardware Installation

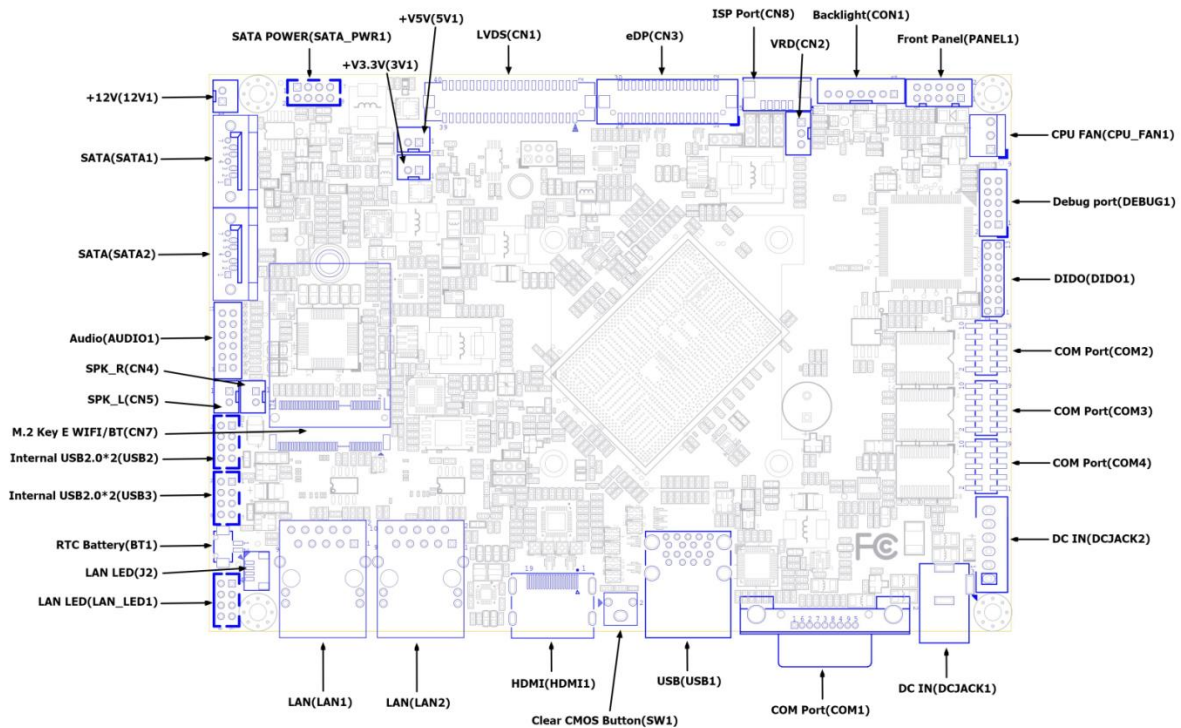
This chapter provides information on how to use jumpers and connectors on the IE32 3.5" SBC. Be cautious while working with these modules. Carefully read the content of this chapter in order to avoid any damages.

- 2.1 Motherboard Components
 - 2.2 Memory Module Installation
 - 2.3 I/O Equipment Installation
 - 2.4 Jumper Settings
 - 2.5 Motherboard Connectors
-

2.1 Motherboard Components

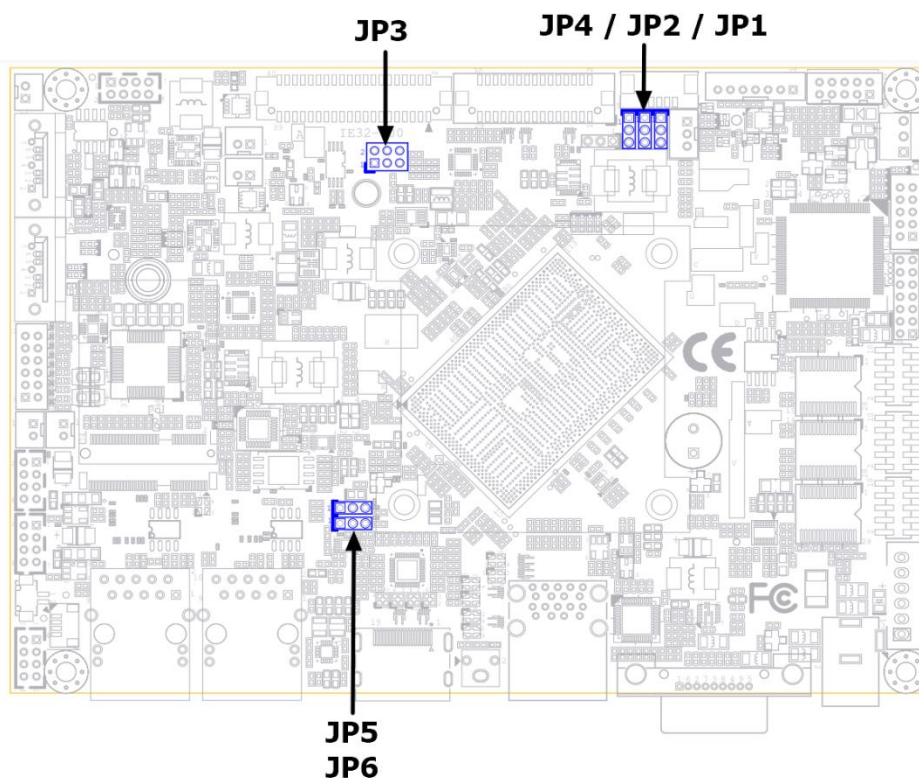
2.1.1 Component Side

IE32 3.5" SBC Top Layer (Top View)



2.1.2 Solder Side

IE32 3.5" SBC Bottom Layer (Top View)



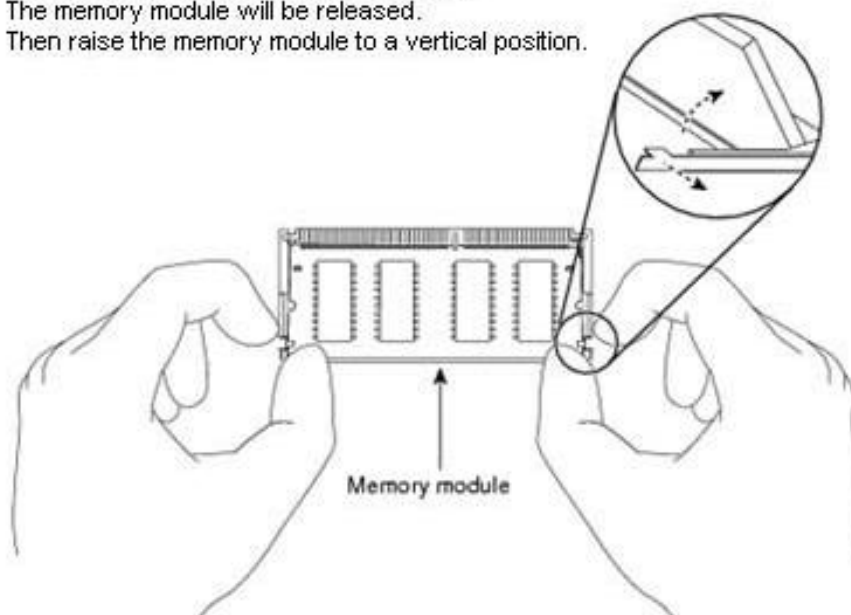
2.2 Memory Module (SO-DIMM) Installation

The IE32 3.5" SBC has two 260-pin SODIMM slot. The socket supports DDR4.

When installing the memory unit, please follow the steps below:

1. Firmly insert the SO-DIMM at an angle of about 30-degree into the slot. Align the SO-DIMM with the slot until it is fully inserted. The notch on the SO-DIMM should match the break on the slot.
2. Press downwards on SO-DIMM until the retaining clips at both ends fully snap closed and the SO-DIMM is properly seated.

Pull the tabs away with your thumbs,
bracing your forefingers against the rails.
The memory module will be released.
Then raise the memory module to a vertical position.



CAUTION

The SO-DIMM only fits in one correct orientation. It will cause permanent damage to the development board and the SO-DIMM if the SO-DIMM is forced into the slot at the incorrect orientation.

2.3 I/O Equipment Installation

2.3.1 Power Input 12V DC in

The IE32 3.5" SBC allows plugging 12V DC-IN jack on the board without another power module converter under power consumption by Intel® Celeron® Processor N series.

2.3.2 Serial COM Port

Three COM Port Pin Headers are build in the IE32 3.5" SBC. Optional COM ports support RS-422/485.

**When an optional touch-screen is ordered with PPC, serial COM port can connect to a serial or an optional touch-screen.*

2.3.3 HDMI

The IE32 3.5" SBC has one HDMI port that can be connected to an external LCD monitor. Use HDMI cable to connect to an external LCD monitor, and connect the power cable to the outlet. The HDMI connector is a standard 19-pin HDMI connector.

2.3.4 Ethernet Interface

The IE32 3.5" SBC is equipped with Intel Gigabit-LAN Controller which is fully compliant with the PCIe Ethernet protocol compatible. It is supported by major network operating systems. The Ethernet ports provide two standard RJ-45 jacks.

2.3.5 USB Port

Six USB devices (four with pin headers) may be connected to the system though an adapter cable. Various adapters may come with USB ports. USB usually connect the external system to the system. The USB ports support hot plug-in connection. Whatever, you should install the device driver before you use the device.

2.3.6 Audio

The Audio is provided by a Realtek HD Audio Codec supporting digital audio outputs. The audio interface includes Mic-in / Line-in / Line-out.

2.4 Jumper Settings

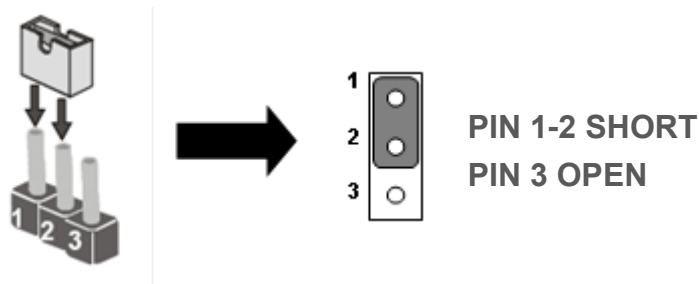
This section explains how to set jumpers for correct configuration of the motherboard.



NOTE:

A pair of needle nose pliers may be helpful when working with jumpers. If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes. Generally, you simply need a standard cable to make most connections.

The jumper setting diagram is shown below. When the jumper cap is placed on both pins, the jumper is **SHORT**. The illustration below shows a 3-pin jumper; pins 1 and 2 are short. If you remove the jumper cap, the jumper is **OPEN**.

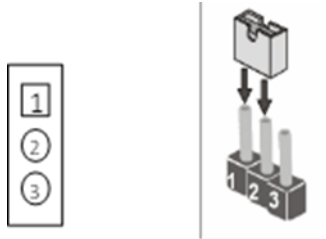


CAUTION

To avoid damaging the module, always turn off the power supply before setting jumpers or clearing CMOS.

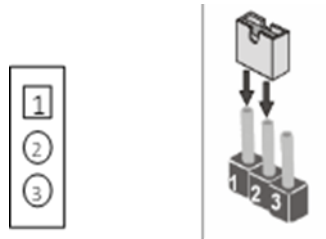
Jumpers		
Label	Function	Note
JP1	Backlight Power Voltage Select	1x3 header, pitch 2.0mm
JP2	PWM/DC Mode Select	1x3 header, pitch 2.0mm
JP3	Panel Power Voltage Select	2x3 header, pitch 2.54mm
JP4	Brightness PWM Control Select	1x3 header, pitch 2.0mm
JP5	Clear CMOS	1x3 header, pitch 2.0mm
JP6	Clear RTC	1x3 header, pitch 2.0mm

2.4.1 JP1: Backlight Power Voltage Select



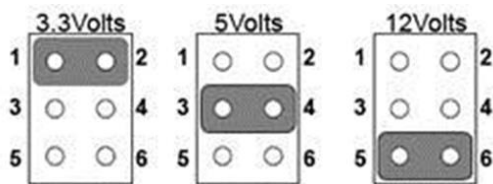
Pin №	Name
1-2 (Default)	+5V
2-3	+12V

2.4.2 JP2: PWM/DC Mode Select



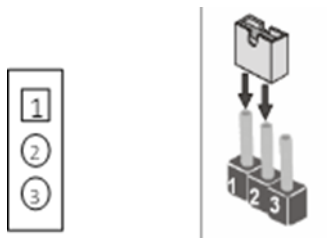
Pin №	Name
1-2(Default)	PWM Mode
2-3	DC Mode

2.4.3 JP3: Panel Power Voltage Select



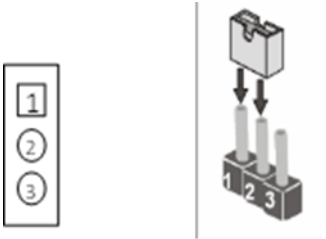
Pin №	Name
1-2 (Default)	+3.3V
3-4	+5V
5-6	+12V

2.4.4 JP4: Brightness PWM Control Select



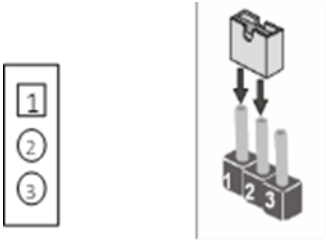
Pin №	Name
1-2	Chipset Control
2-3(Default)	VR Control

2.4.5 JP5: CLR CMOS Select



Pin №	Name
1-2(Default)	Normal
2-3	Clear CMOS

2.4.6 JP6: CLR RTC Select



Pin №	Name
1-2(Default)	Normal
2-3	Clear CMOS

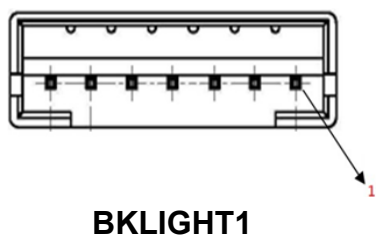
2.5 Connector Description

2.5.1 Connector List

Label	Function	Note
CON1	Backlight Power/Control	1 x 7 wafer, pitch 2.0 mm
BT1	RTC Battery	2P wafer, pitch 1.25 mm
COM1	D-SUB9	
COM2.3.4	COM Port	2 x 5 header, pitch 2.0mm
DCJACK1	Power Jack	3p 2.5-5.5ψ DC Jack
DCJACK2	Power Jack	1 x 6 wafer, pitch 2.5 mm
DIDO1	Digital I/O Header	2 x 7 wafer, pitch 2.0mm
CN3	eDP Connector	2 x 15 wafer, pitch 1.25mm
CPU_FAN1	CPU FAN	3P 2.54mm DIP180°
HDMI1	HDMI	HDMI port
LVDS1	LVDS Connector	2 x 20 wafer, pitch 1.25mm
LAN1	RJ45	
LAN2	RJ45	
LAN_LED1	LAN LED For F65EAC BOX	1x4 wafer, pitch 1.0mm
CN6	M.2 Key B SSD	NGFF KEY B Slot
CN7	M.2 Key E WIFI/BT	NGFF KEY E Slot
CN1	Front Panel	2 x 5 wafer, pitch 2.0mm
SATA1,SATA2	SATA Connector	
SATA_PWR1	SATA Power	2 x 4 wafer, pitch 2.0mm
AUDIO1	Audio	2 x 6 wafer, pitch 2.0mm
CN5	Left Speaker	1 x 2 wafer, pitch 2.0 mm
CN4	Right Speaker	1 x 2 wafer, pitch 2.0 mm
USB1	USB3.2 Connector * 2	UEA1112C-8HK1-4H
USB2/ USB3	USB 2.0 Wafer	2 x 4 wafer, pitch 2.0 mm
CN2	Backlight Control VR	1 x 3 wafer, pitch 2.0mm
12V1	Power Output Wafer 12V	1x2 wafer, pitch 2.0 mm. Yellow color
5V1	Power Output Wafer 5V	1x2 wafer, pitch 2.0 mm. Red color
3.3V1	Power Output Wafer 3.3V	1x2 wafer, pitch 2.0 mm. Blue color

2.5.2 Connector Description

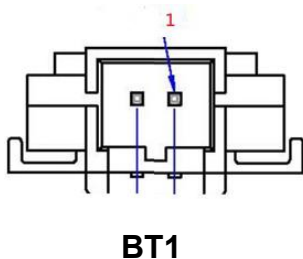
2.5.2.1 CON1: Backlight Power/Control



Pin №	Signal Name
1	BKL_PWR
2	BKL_PWR
3	BKL_PWR
4	GND
5	BRIGHT
6	GND
7	BLON_5V

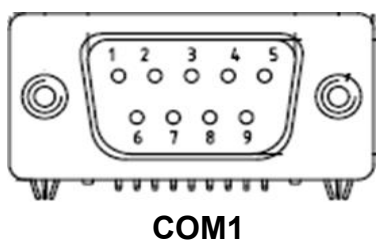
Note: Please refer to INV_VCC1 settings to select Power Rating.

2.5.2.2 BT1: RTC Battery



Pin №	Signal Name	Pin №	Signal Name
1	GND	2	+.3.3V

2.5.2.3 COM1: D-SUB9

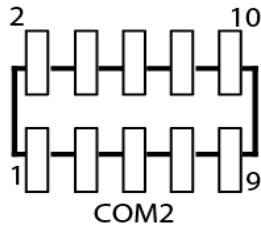


Pin №	RS232	RS422	RS485
1	DCD	TxD-	D-
2	RXD	TxD+	D+
3	TXD	RxD+	NC
4	DTR	RxD-	NC
5	GND	GND	GND
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC

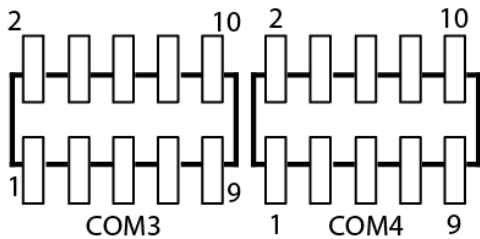
Note: Refer to [BIOS](#) to change serial COM port settings.

2.5.2.4 COM2/COM3/COM4: Internal RS232 COM

The serial port which is Winbond I/O support is RS232 only.



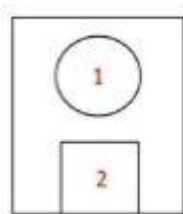
Pin №	Signal Name	Pin №	Signal Name
1	FK_NDCD2	2	FK_NDSR2
3	FK_NSIN2	4	FK_NRTS2
5	FK_NSOUT2	6	FK_NCTS2
7	FK_NDTR2	8	FK_NRI2
9	GND	10	COM2_5V



Pin №	Signal Name	Pin №	Signal Name
1	FK_NDCD3	2	FK_NDSR3
3	FK_NSIN3	4	FK_NRTS3
5	FK_NSOUT3	6	FK_NCTS3
7	FK_NDTR3	8	USB
9	GND	10	COM3_5V

Pin №	Signal Name	Pin №	Signal Name
1	FK_NDCD4	2	FK_NDSR4
3	FK_NSIN4	4	FK_NRTS4
5	FK_NSOUT4	6	FK_NCTS4
7	FK_NDTR4	8	FK_NRI4
9	GND	10	COM4_5V

2.5.2.5 DCJACK1: Power Jack



DCJACK1

Pin	Signal Name
1	DC_IN
2	NC
3	DC_GND

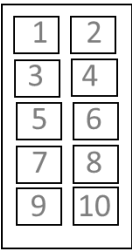
2.5.2.6 DCJACK2: Power Jack



DCJACK3

Pin	Signal Name
1	DC_IN
2	DC_IN
3	DC_IN
4	DC_GND
5	DC_GND
6	DC_GND

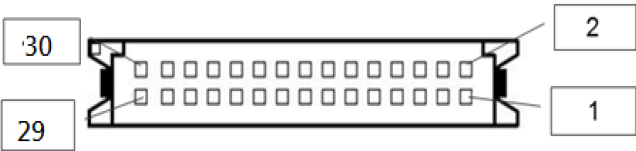
2.5.2.7 DIDO1: Digital I/O Header



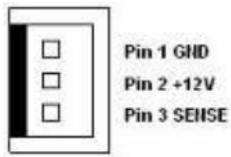
DIDO1

Pin №	Signal Name	Pin №	Signal Name
1	GND	2	DIO_5V
3	DOUT3	4	DOUT1
5	DOUT2	6	DOUT0
7	DINT3	8	DINT1
9	DINT2	10	DINT0

2.5.2.8 CN3: eDP Connector



Pin №	Signal Name	Pin №	Signal Name
1	EMB_AUXN	2	SMB_DATA_MAIN
3	EMB_AUXP	4	SMB_DATA_CLK
5	GND	6	GND
7	DP_TXN3_C	8	+VCC_EDP_BKLT
9	DP_TXP3_C	10	+VCC_EDP_BKLT
11	GND	12	+VCC_EDP_BKLT
13	DP_TXN2_C	14	GND
15	DP_TXP2_C	16	GND
17	GND	18	GND
19	DP_TXN1_C	20	GND
21	DP_TXP1_C	22	LCDVDD
23	GND-	24	LCDVDD
25	DP_TXN0_C	26	LCDVDD
27	DP_TXP0_C	28	LCDVDD
29	GND	30	+VCC_EDP_BKLT

2.5.2.9 CPU_FAN1: CPU FAN**FAN1**

Pin №	Signal Name	Pin №	Signal Name
1	GND	2	+12V
3	SENSE		

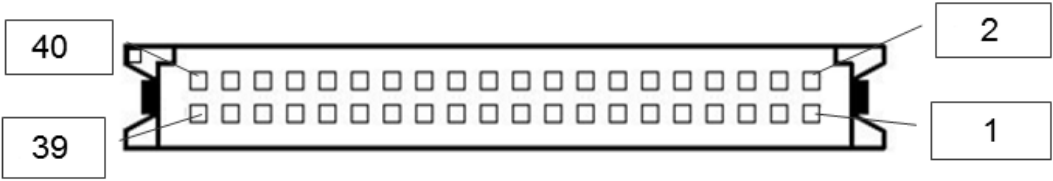
2.5.2.10 HDMI1: HDMI Port Connector

Use HDMI connector to connect the IE32 3.5" SBC to an external monitor.

**HDMI**

Pin №	Signal Name	Pin №	Signal Name
1	TMDS_DATA2+	2	GND
3	TMDS_DATA2-	4	TMDS_DATA1+
5	GND	6	TMDS_DATA1-
7	TMDS_DATA0+	8	GND
9	TMDS_DATA0-	10	TMDS_CLOCK+
11	GND	12	TMDS_CLOCK-
13	CEC	14	NC
15	DDC_CLOCK	16	DDC_DATA
17	GND	18	5V
19	Hot Plug Detect		

2.5.2.11 LVDS1: LVDS Connector

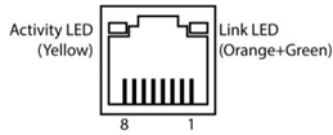


CN12

Pin №	Signal Name	Pin №	Signal Name
1	LCDVDD	2	LVDS0_TX0_N
3	LCDVDD	4	LVDS0_TX0_P
5	LCDVDD	6	LVDS0_TX1_N
7	GND	8	LVDS0_TX1_P
9	GND	10	LVDS0_TX2_N
11	GND	12	LVDS0_TX2_P
13	GND	14	LVDS0_CLK_N
15	GND	16	LVDS0_CLK_P
17	GND	18	LVDS0_TX3_N
19	GND	20	LVDS0_TX3_P
21	GND	22	LVDS1_TX0_N
23	GND	24	LVDS1_TX0_P
25	GND	26	LVDS1_TX1_N
27	GND	28	LVDS1_TX1_P
29	GND	30	LVDS1_TX2_N
31	GND	32	LVDS1_TX2_P
33	GND	34	LVDS1_CLK_N
35	GND	36	LVDS1_CLK_P
37	GND	38	LVDS1_TX3_N
39	GND	40	LVDS1_TX3_P

2.5.2.12 LAN1/LAN2: RJ45

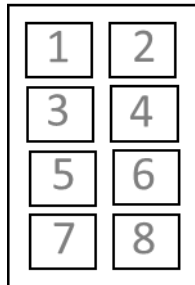
The IE32 3.5" SBC has two Ethernet connectors located on the front. Ethernet ports provide a standard RJ45 jack connector with LED indicators on the front side to show its Active/ Link status and Speed status.



LAN1, LAN2

Pin №	Signal Name	Pin №	Signal Name
1	TX1+	2	TX1-
3	TX2+	4	TX2-
5	TX3+	6	TX3-
7	TX4+	8	TX4-

2.5.2.13 LAN_LED1: LAN LED



LAN_LED1

Pin №	Signal Name	Pin №	Signal Name
1	+5V	2	+3.3V
3	GND	4	SATA_LED#
5	PWRBTN_N	6	GND
7	ADJ+	8	RSTBTN
9	ADJ-	10	+5V

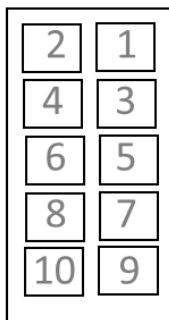
2.5.2.14 CN6:NGFF_KEY B SSD

The IE32 3.5" SBC has NGFF M.2 connector for SATAIII.

2.5.2.15 CN7:NGFF_KEY_E WIFI/BT

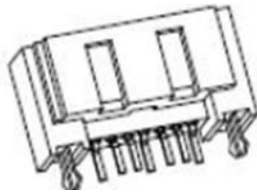
The IE32 3.5" SBC has NGFF M.2 Key E connector for WIFI/BT.

2.5.2.16 CN1: Front Panel



PANEL 1

Pin №	Signal Name	Pin №	Signal Name
1	PW_LED+	2	HD_LED+
3	GND	4	HD_LED-
5	PW_BT	6	GND
7	BRI+	8	RST-BT
9	BRI-	10	5VSB

2.5.2.17 SATA1, SATA2: SATA Connector**SATA1, SATA2**

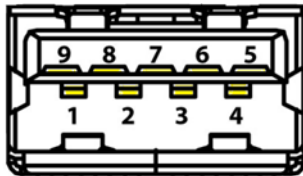
Pin	Signal Name
1	GND
2	SATA_TX-
3	SATA_TX+
4	GND
5	SATA_RX-
6	SATA_RX+
7	GND

2.5.2.18 CN5,CN4 :Left: SPK_L & SPK_R**LEFT**

Pin1 LOUT+
Pin2 LOUT-

**RIGHT**

Pin1 ROUT+
Pin2 ROUT-

2.5.2.19 USB1:USB3.2 Connector * 2**USB1**

Pin №	Signal Name	Pin №	Signal Name
1	+5V	2	USB_D-
3	USB_D+	4	GND
5	STDA_SSRX-	6	STDA_SSRX+
7	GND_DRAIN	8	STDA_SSTX-
9	STDA_SSTX+		

2.5.2.20 USB2/USB3: USB 2.0 Wafer

Pin №	Signal Name	Pin №	Signal Name
1	USB1_PWR	2	USB2_PWR
3	USB1_D-	4	USB2_D-
5	USB1_D+	6	USB2_D+
7	GND	8	GND

2.5.2.21 CN2: VR Knob

Pin	Signal Name
1	GND
2	+12V
3	Sense Pin

2.5.2.22 Power Output Wafer

12V1 (Yellow Wafer)

Pin	Signal Name
1	+12V
2	GND

5V1 (Red Wafer)

Pin	Signal Name
1	+5V
2	GND

3V1 (Blue Wafer)

Pin	Signal Name
1	+3.3V
2	GND

Chapter 3: Insyde H20 BIOS Setup

This chapter describes the different settings available in the INSYDE BIOS that comes with the board. This chapter offers information on the Award BIOS installation utility.

- 3.1 How and When to Use BIOS Setup
 - 3.2 BIOS Functions
 - 3.3 Using Recovery Wizard to Restore Computer
 - 3.4 How to Enable Watchdog
-

3.1 How and When to Use BIOS Setup

To enter the BIOS setup, you need to connect an external USB keyboard, external monitor and press Del key when the prompt appears on the screen during start up. The prompt screen shows only few seconds so need press **Del** key quickly.



IMPORTANT:

Updated BIOS version may be published after the manual released. Check the latest version of BIOS on the website.

You may need to run BIOS setup utility for reasons listed below:

1. Error message on screen indicates to check BIOS setup
2. Restoring the factory default settings.
3. Modifying the specific hardware specifications
4. Necessity to optimize specifications

BIOS Navigation Keys

The following keys are enabled during POST:

Key	Function
Del	Enters the BIOS setup menu.
F7	Display the boot menu. Lists all bootable devices that are connected to the system. With cursor ↑ and cursor ↓ and by pressing <ENTER>, select the device used for the boot.
Pause	Pressing the [Pause] key stops the POST. Press any other key to resume the POST.

The following Keys can be used after entering the BIOS Setup.

Key	Function
F1	Help
F5/ F6	Change Values
F9	Setup Defaults
F10	Save & Exit
Esc	Exit
Enter	Select SubMenu
↑ / ↓	Select Item
← / →	Select Item

For items marked ► press <Enter> for more options.



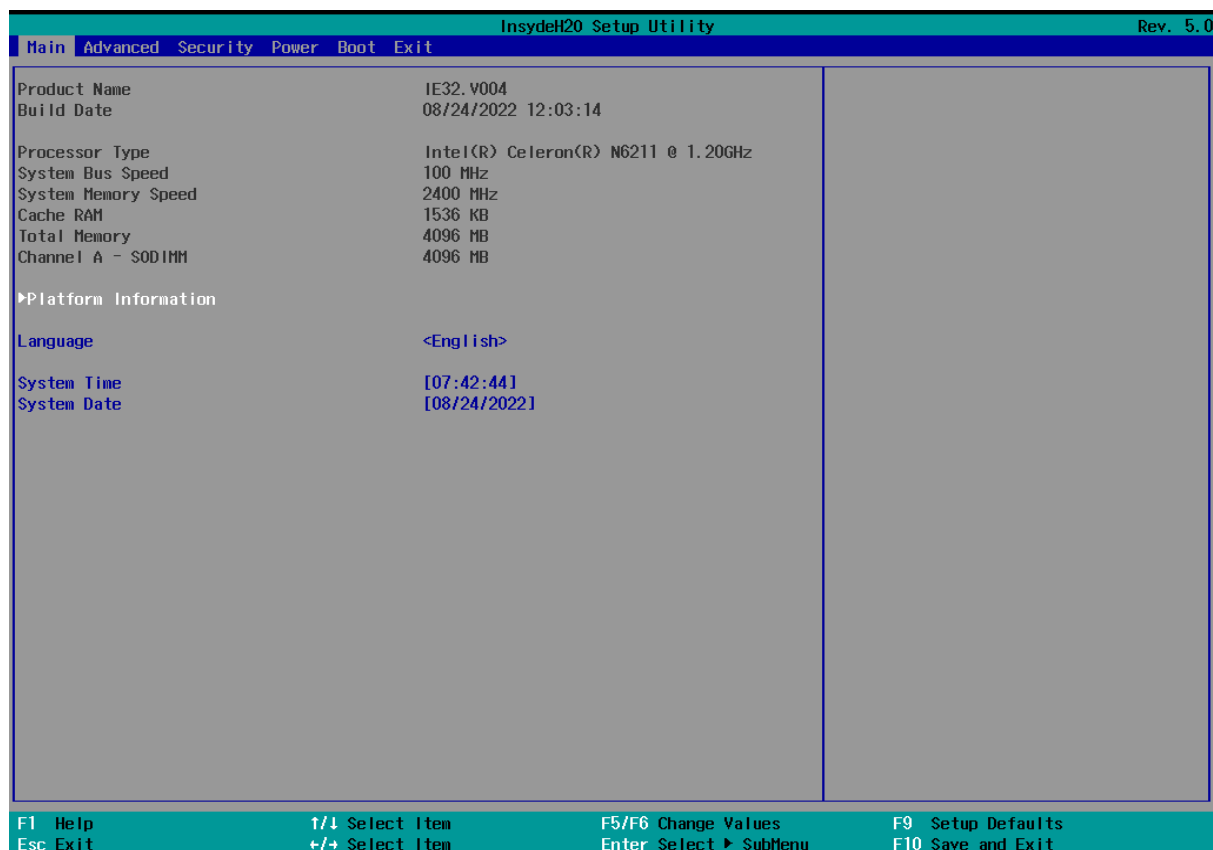
NOTE:

You can press the F1, F2, F3, F4, -/+, and Esc keys by connecting a USB keyboard to your computer.

3.2 BIOS Functions

3.2.1 Main Menu


The Main menu displays the basic information about your system including BIOS version, processor RC version, system language, time, and date. When you enter BIOS setup, the first menu that appears on the screen is the main menu. It contains the system information including BIOS version, processor RC version, system language, time, and date.



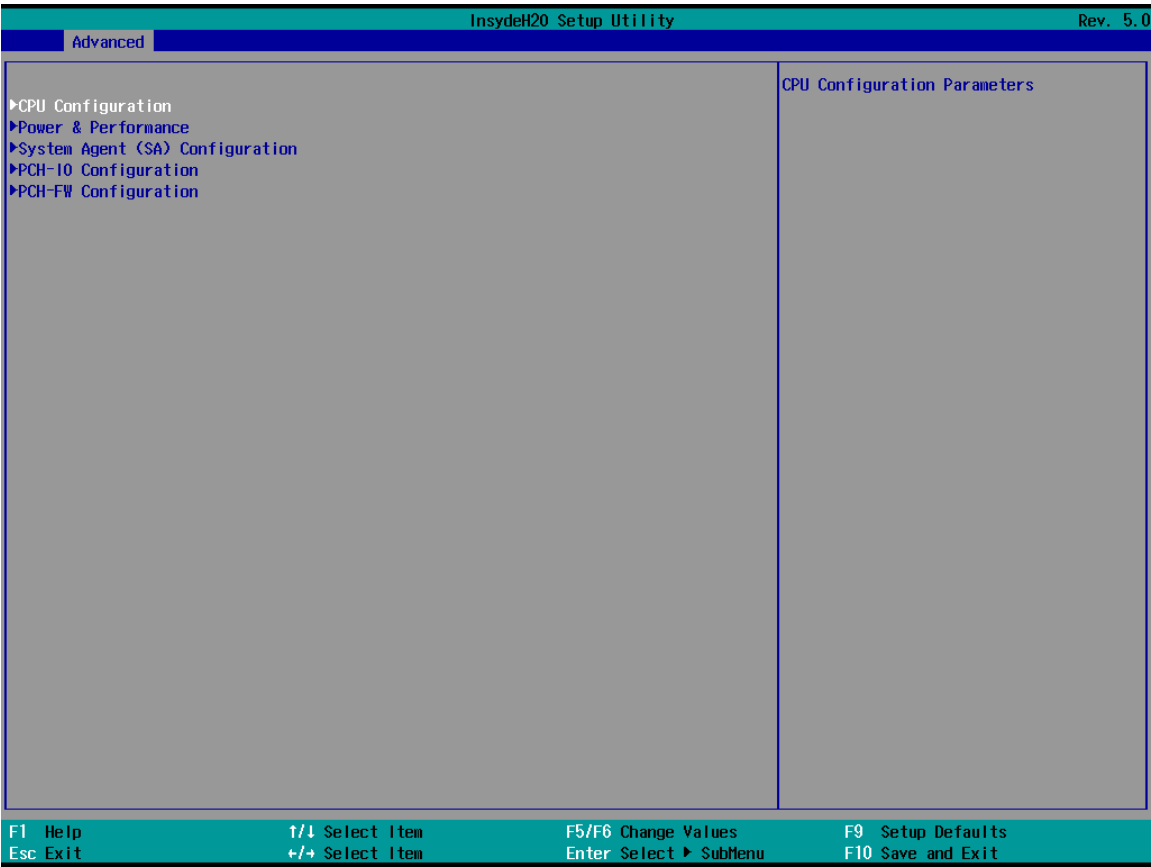
BIOS Setting	Description	Setting Option	Effect
Language	Displays the system language. [English] is set up by default.	Adjustment of the language	Set the language in other language. The language in this device is English.
System Time	This is current time setting. The time is maintained by the battery when the device is turned off.	Date and time changes.	Set the time in the format: [hh/mm/ss]
System Date	This is current date setting.	Date and time changes.	Set the date in the format [mm/dd/yyyy];

3.2.2 Advanced

Select the Advanced Tab from the setup menu to enter the advanced BIOS setup screen. You can select any of the items on the left frame of the screen to go to the sub menu for the item, such as CPU Configuration. You can use the <Arrow> keys enter all advanced BIOS setup options. The advanced BIOS setup menu is shown below. The submenus described on the following pages.

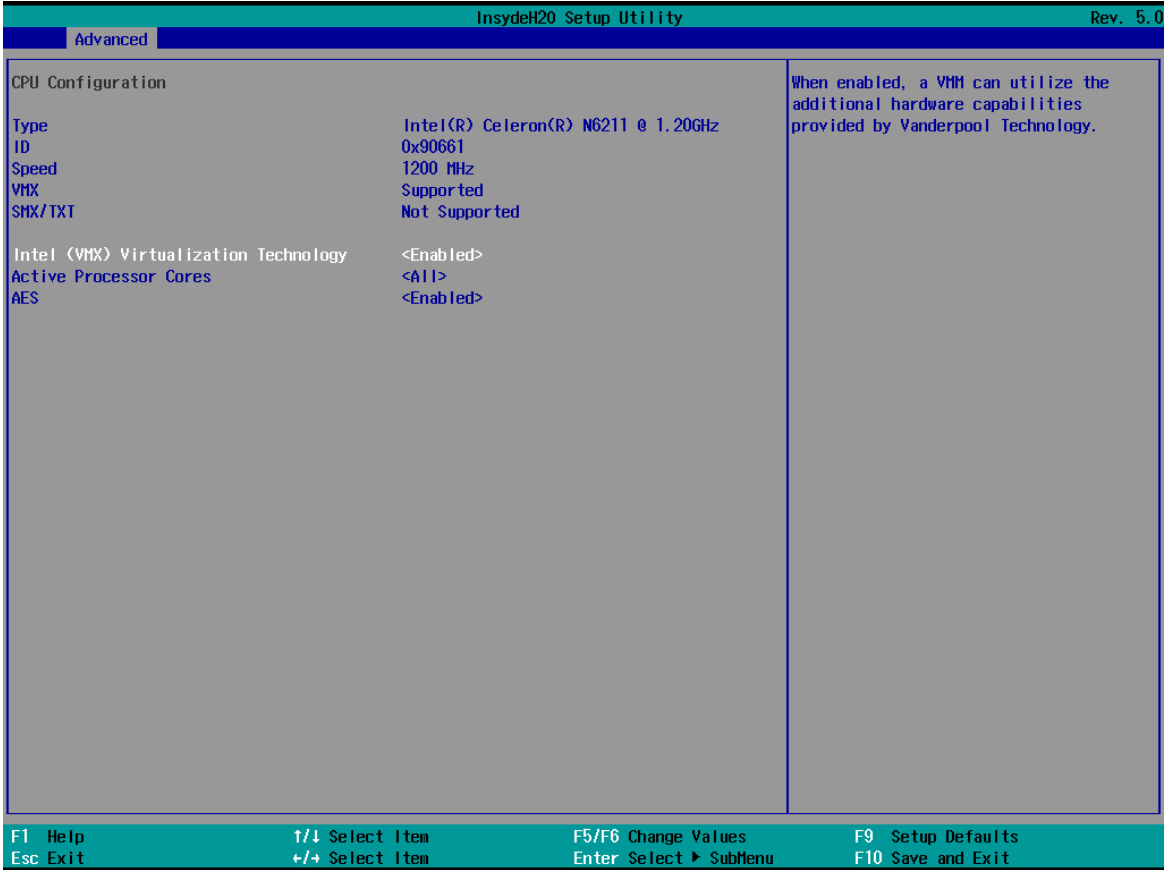


CAUTION
Handle advanced BIOS settings page with caution. Any changes can affect the operation of your computer.



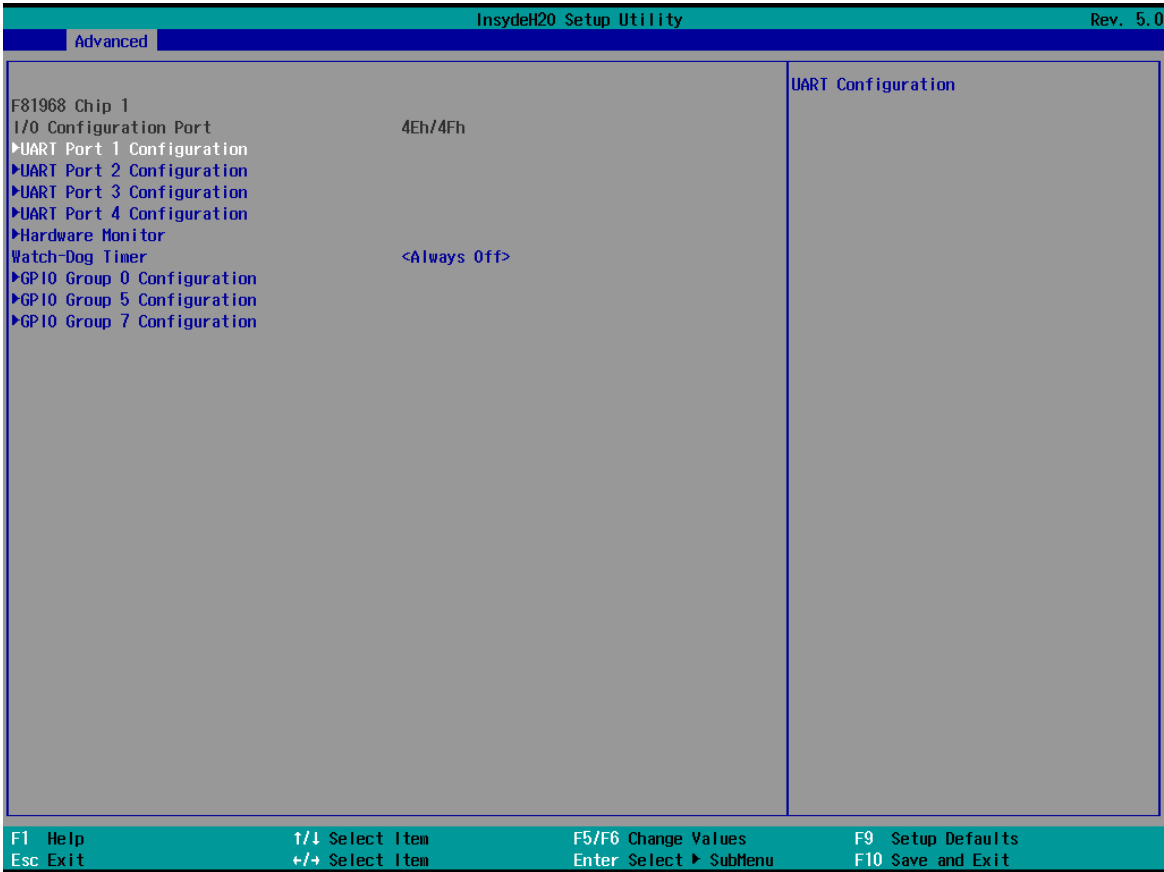
BIOS Setting	Description	Setting Option	Effect
CPU Configuration	Configures Trusted Computing parameters	Enter	Opens submenu
Power & Performance	Configures Power & Performance parameters	Enter	Opens submenu
System Agent Configuration	Configures System Agent Configuration parameters	Enter	Opens submenu
PCH-OI Configuration	Configures PCH-OI parameters	Enter	Opens submenu
PCH-FM Configuration	Configures PCH-FM parameters	Enter	Opens submenu
SIO F81866A	Configures SIO F81866A parameters	Enter	Opens submenu

3.2.2.1 CPU Configuration

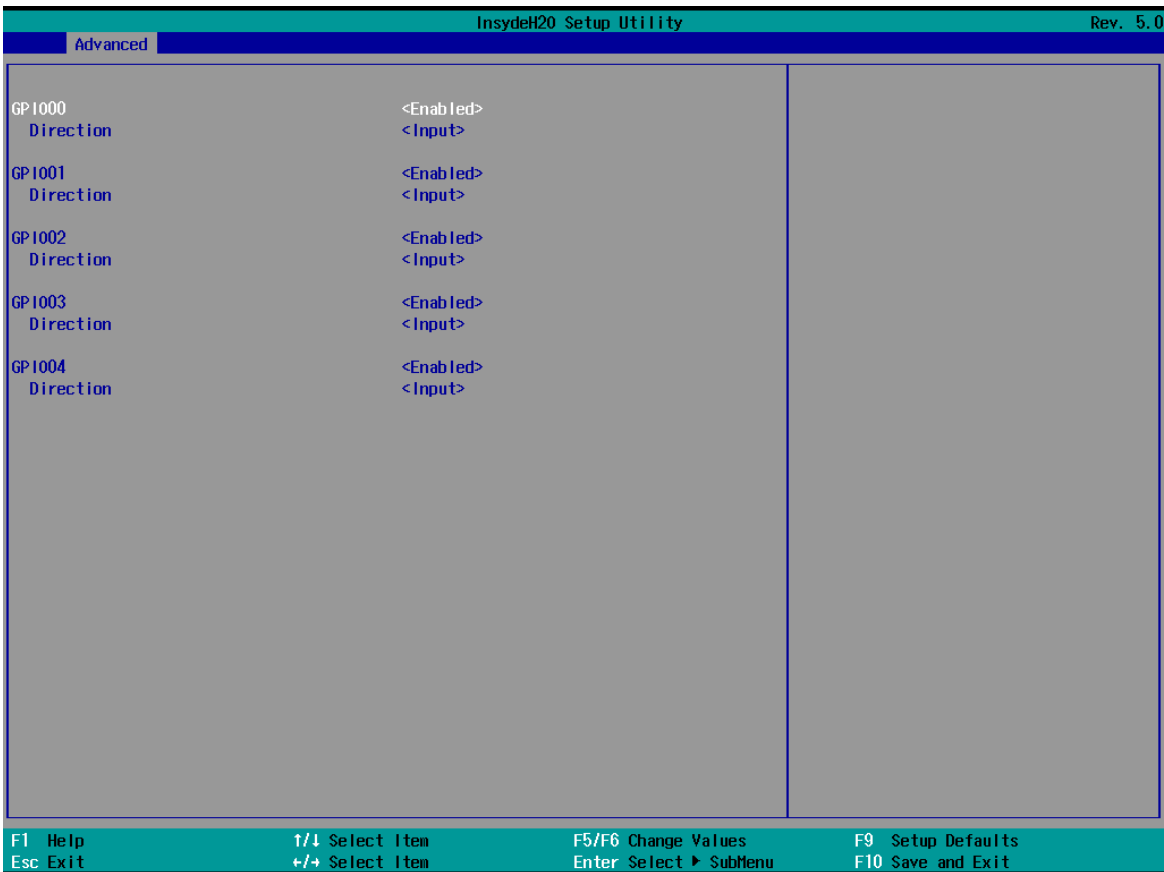


BIOS Setting	Description	Setting Option	Effect
Intel (VMX) Virtualization Technology	Enable or disable Intel Virtualization Technology.	Enable/Disable	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
Active Processor Cores	Number of core to enable in each processor package	All / 1 / 2/ 3	Select number of core to enable in each processor package
Hyper Threading	Intel Hyper-Threading Technology allows a single processor to execute two or more separate threads concurrently.	Enable / Disable	Enable or disable Hyper Threading
AES	Enable or disable AES (Advanced Encyption Standard)	Enable/Disable	Enable or disable AES

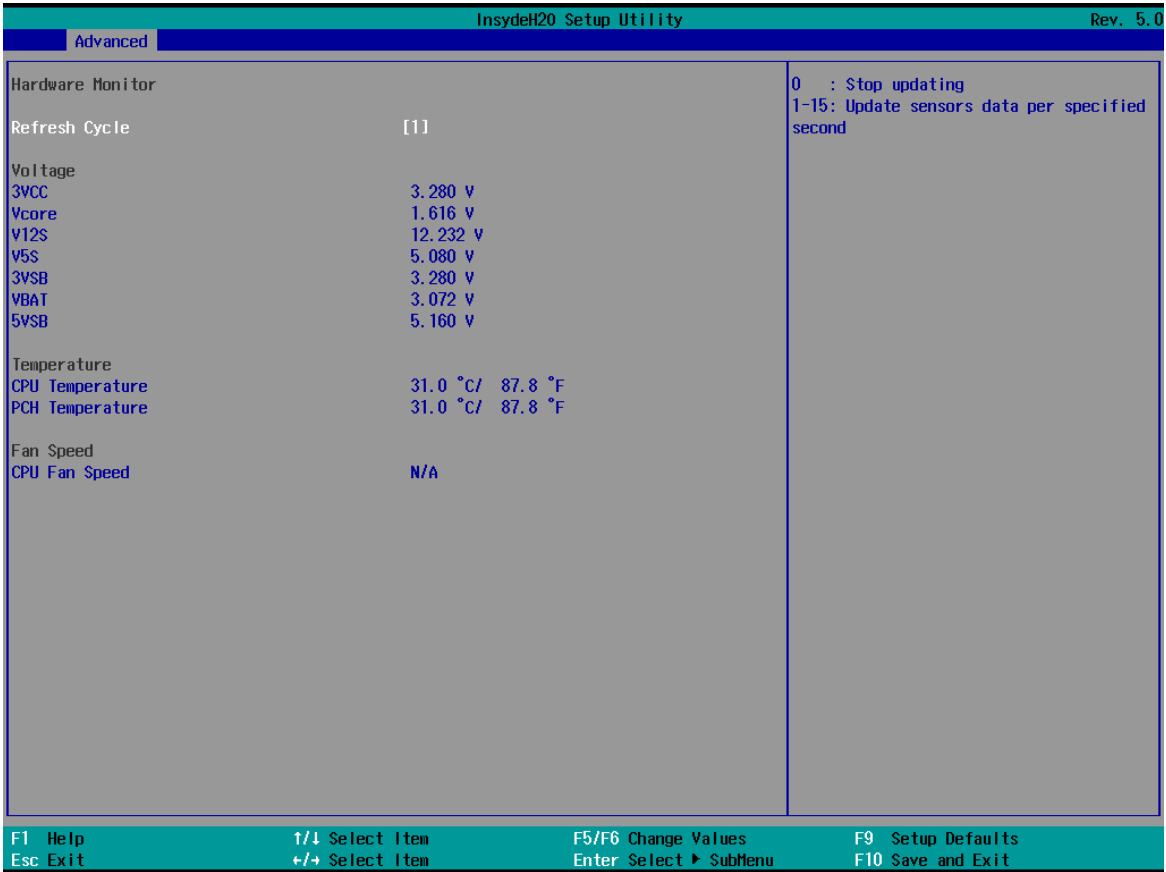
3.2.2.2 F81968 Configuration



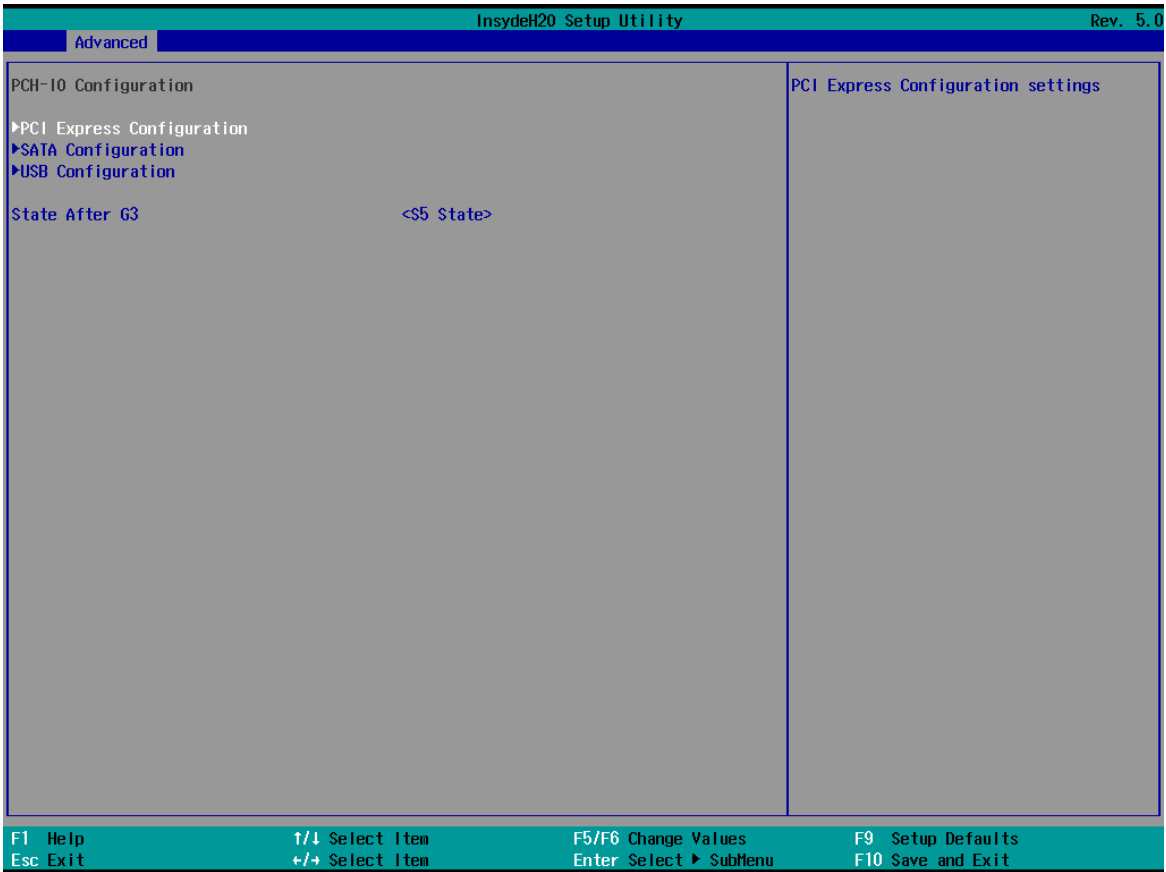
3.2.2.3 GPIO Configuration



3.2.2.4 Hardware Monitor

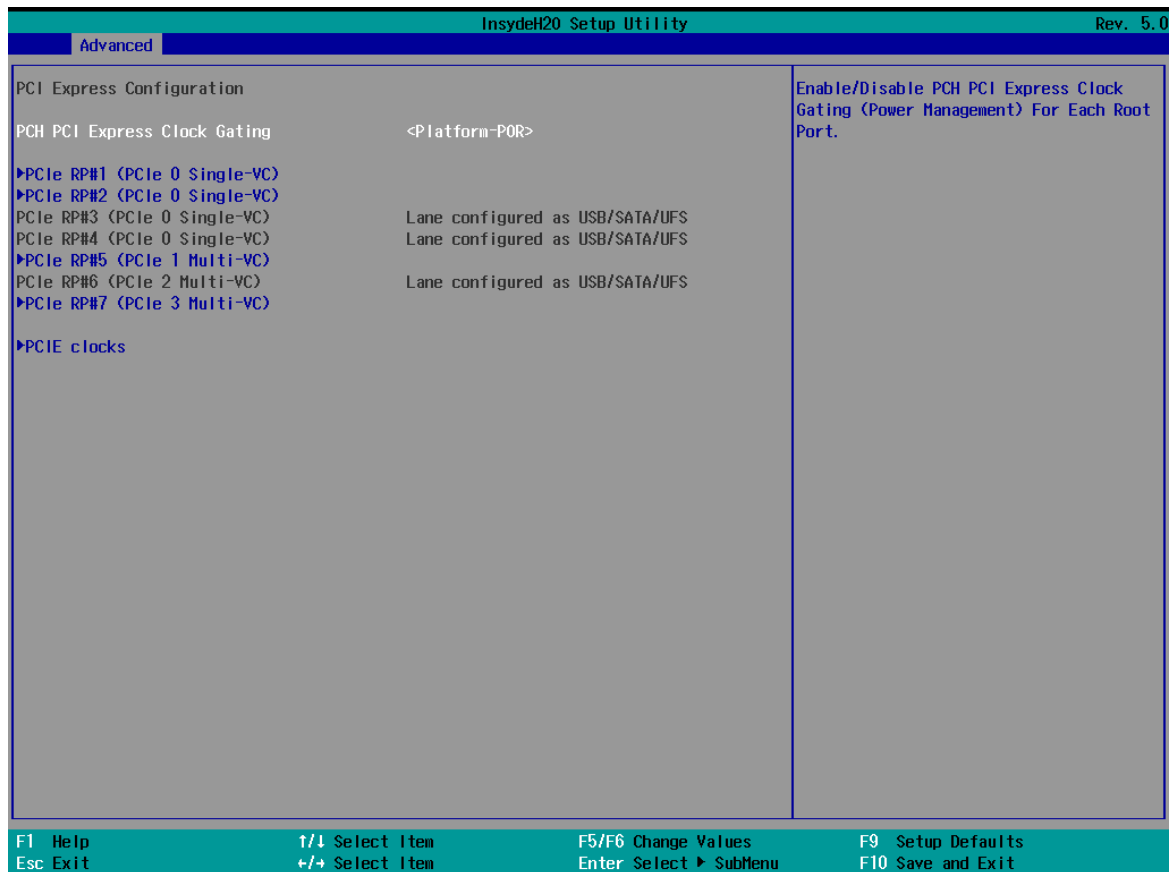


3.2.2.5 PCH-IO Configuration

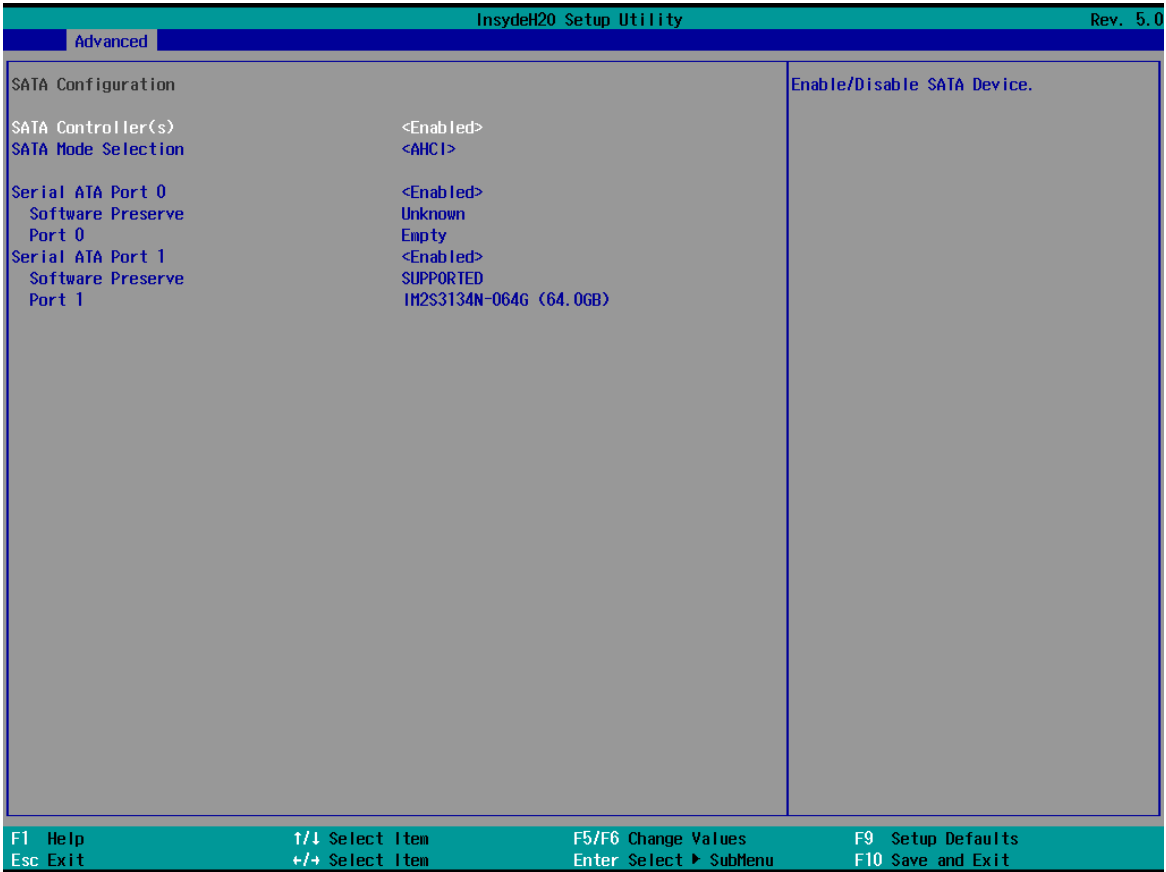


BIOS Setting	Description	Setting Option	Effect
PCI Express Configuration	PCI Express clock gating enable/disable for each root port.	Enter	Opens sub-menu
SATA And RST Configuratuion	Enable/ Disable SATA device	Enter	Opens sub-menu
USB Configuration	Selectively enable/ disable the corresponding USB port from reporting a Device Connection to the controller.	Enter	Opens sub-menu
State After G3	System power state setting	S0 State S5 State	

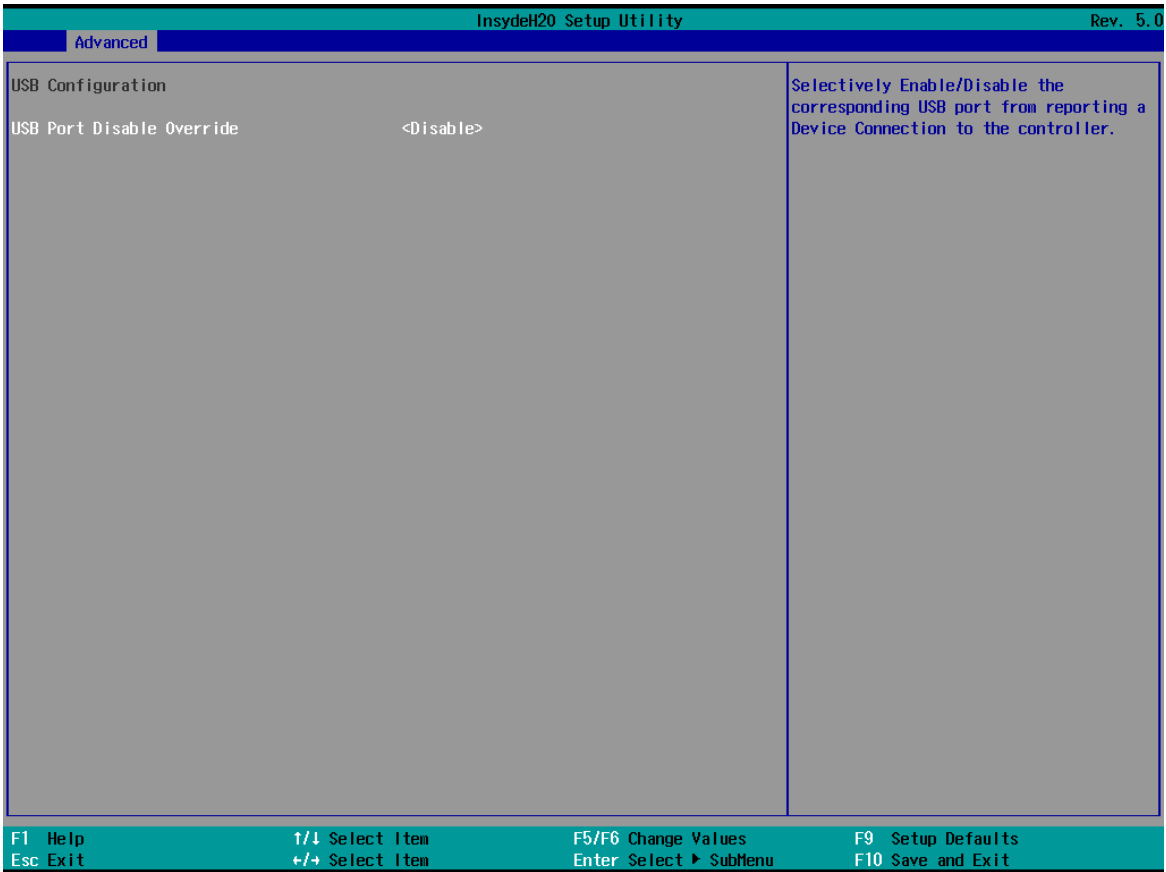
3.2.2.6 PCI Express Configuration



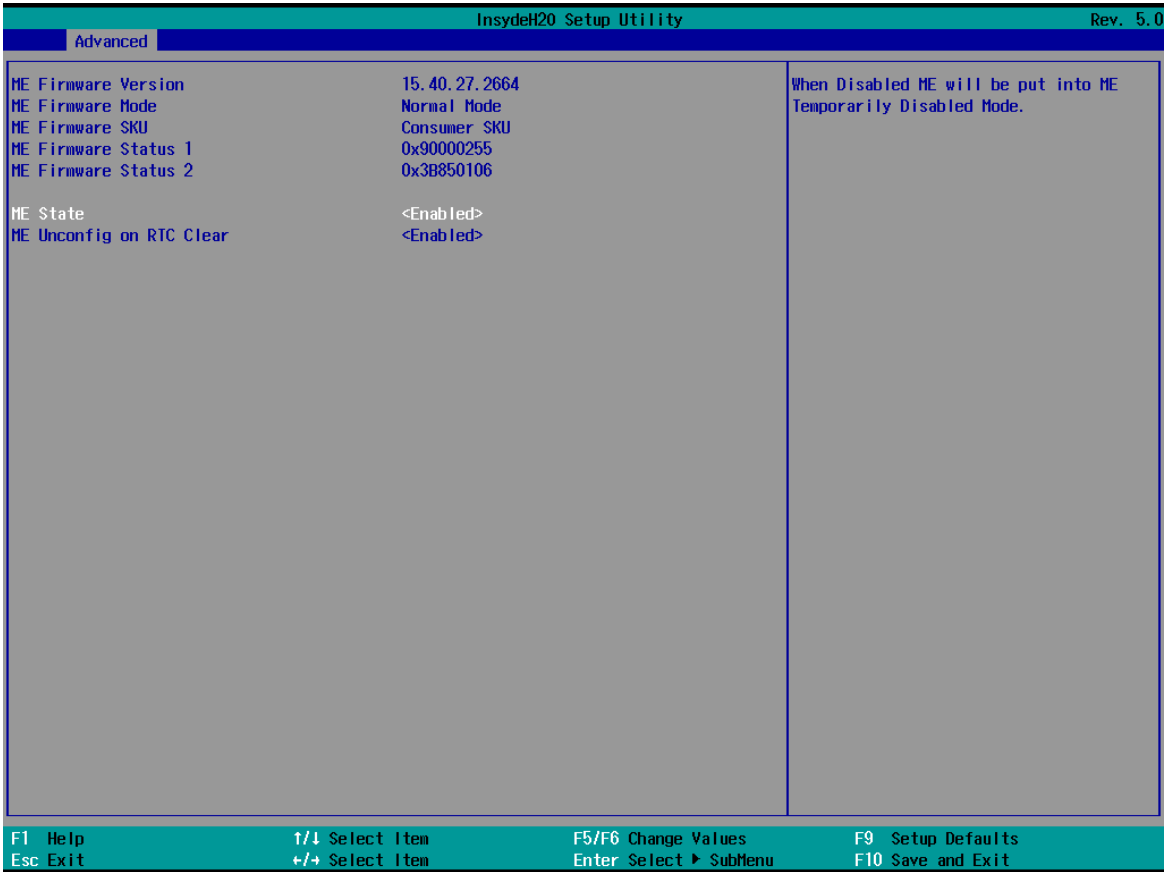
3.2.2.7 SATA and RST Configuration



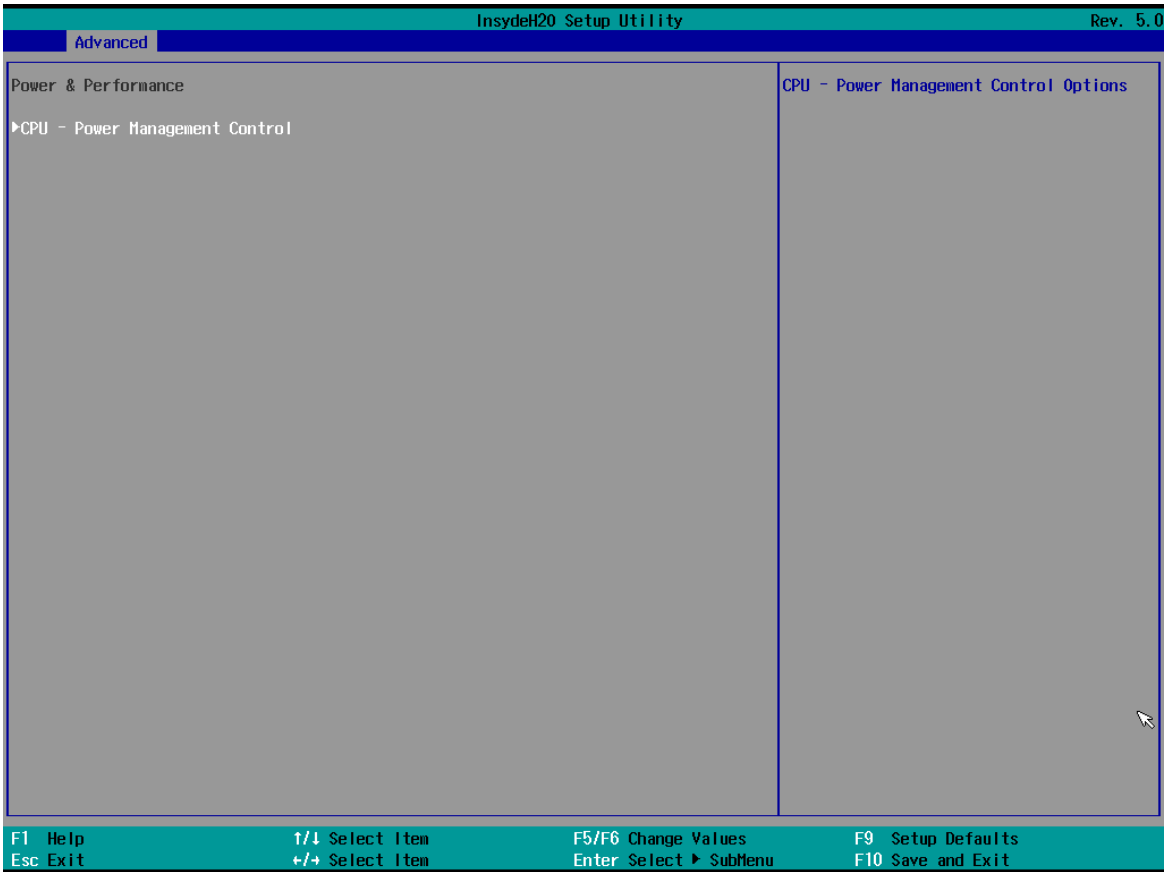
3.2.2.8 USB Configuration



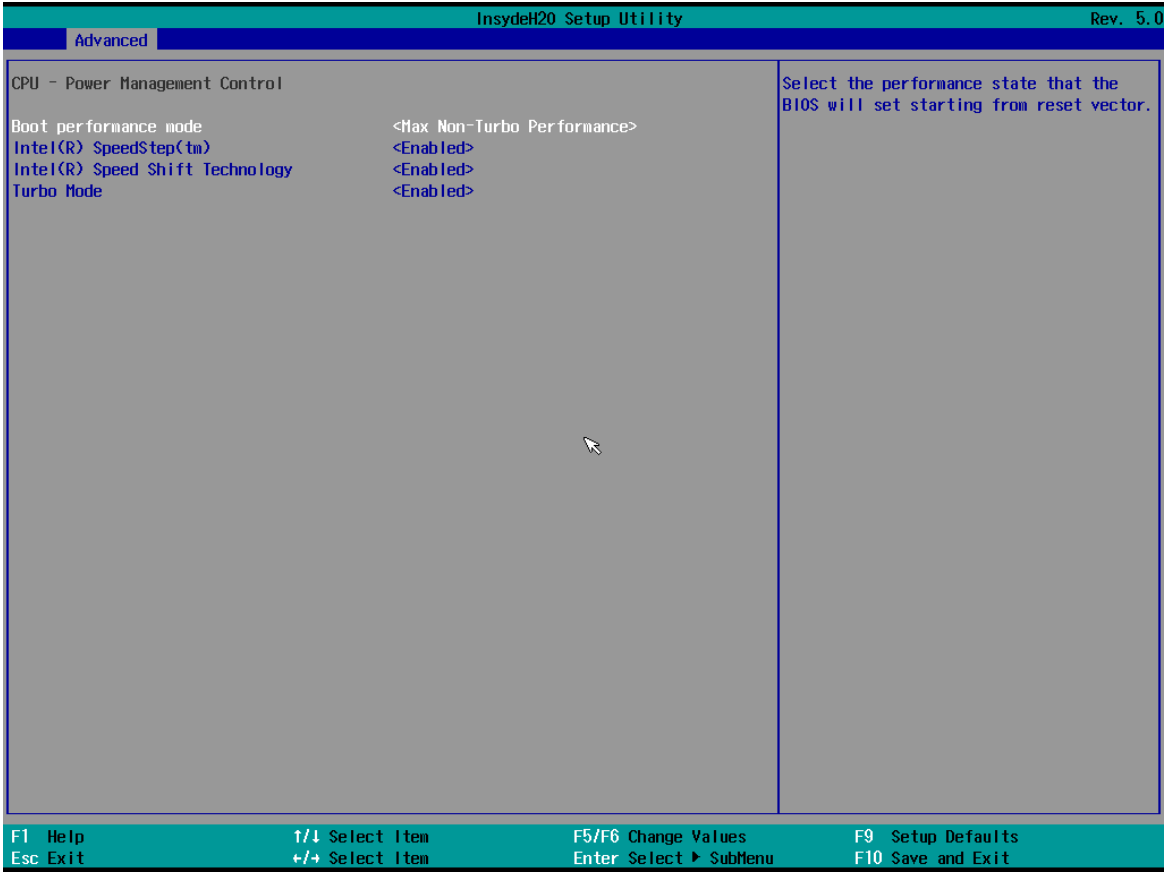
3.2.2.9 ME Firmware Configuration



3.2.2.10 Power & Performance



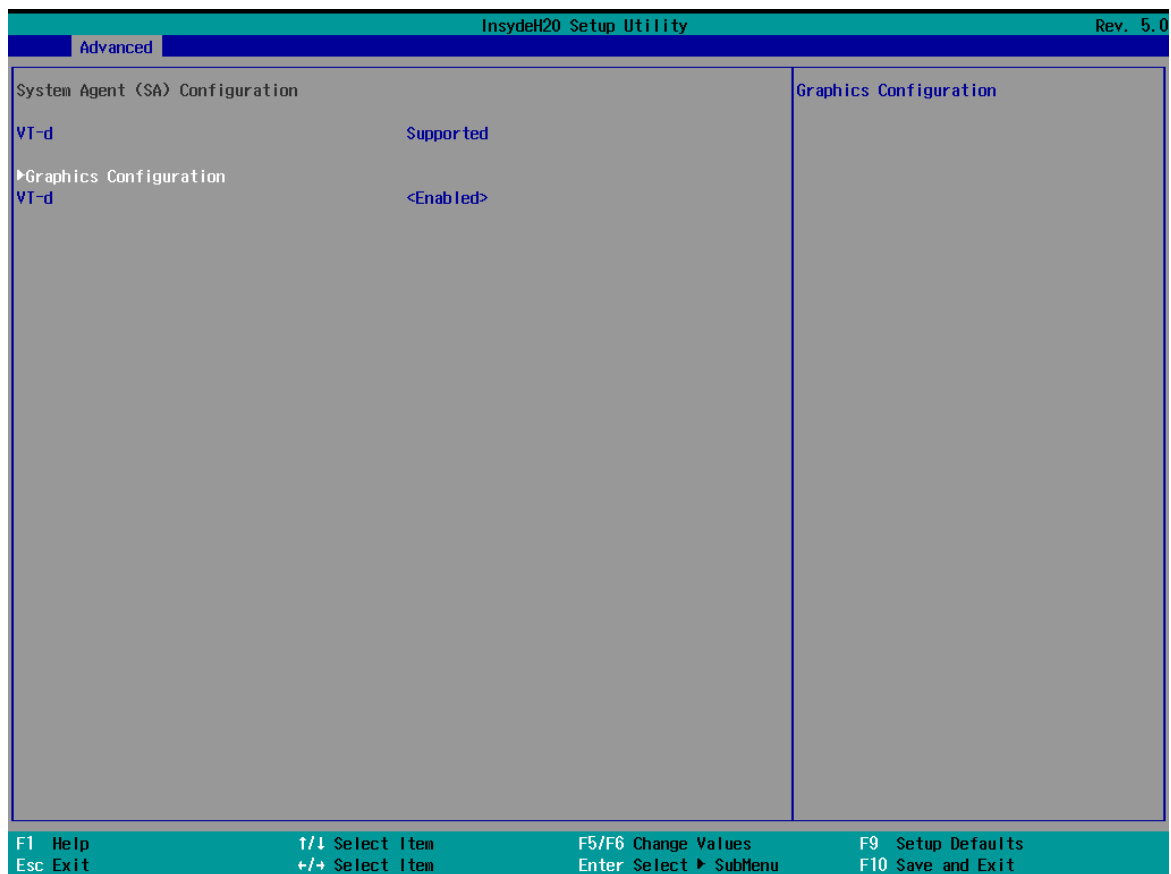
BIOS Setting	Description	Setting Option	Effect
CPU – Power Management Control	Configure CPU – Power Management parameters	Enter	Opens sub-menu



BIOS Setting	Description	Setting Option	Effect
Boot Performance Mode	Configure Boot Performance Mode parameters	-Max non-turbo performance -Max battery -Turbo Performance	Select the performance state that the BIOS will set starting from reset vector
Intel SpeedStep (ta)	Configure Intel SpeedStep (ta) parameters	Enabled/ Disabled	Allows more than two frequency ranges to be supported
Intel Speed Shift Technology	Configure Intel Speed Shift Technology parameters	Enabled/ Disabled	Enable/ Disable Intel Speed Shift Technology support. Enabling will expose the CPP v2 interface to allow for hardware controlled P-states

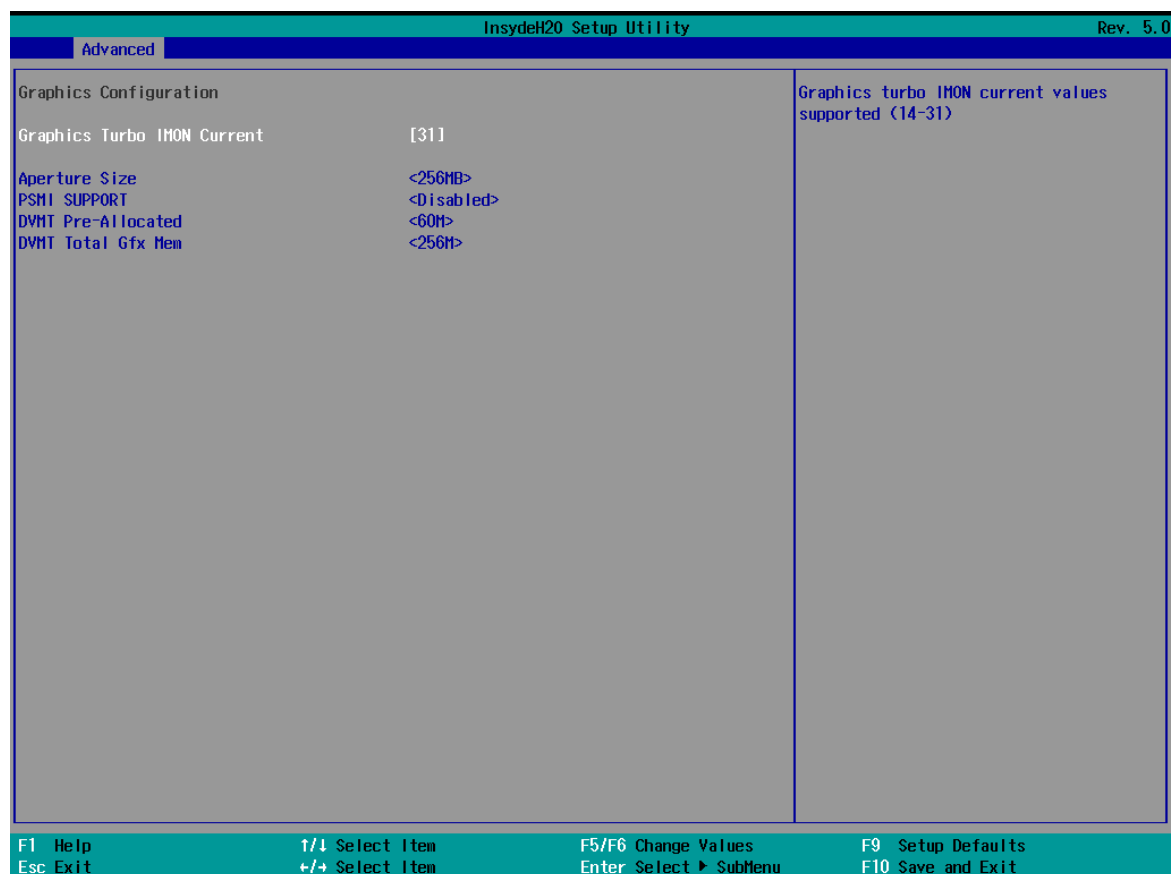
BIOS Setting	Description	Setting Option	Effect
-Turbo Mode	Enable or disable Turbo Mode	Enabled/ Disabled	Enable/ Disable processor Turbo Mode (requires EMTTM enabled too). Auto means enabled, unless max turbo ratio is bigger than 16 – SKL AO W/A
C states	Enable or disable C states	Enabled/ Disabled	Enable/ Disable CPU Power Management. Allows COU to go to C states when it is not 100% utilized
Custom P-state Table	Configure Custom P-state Table parameters	Enter	Enters sub-menu
-Number of P-states	Select the number of custom P-states.	[Number]	Set the number of custom P-states. At least 2 states must be present

3.2.2.7 System Agent (SA) Configuration



BIOS Setting	Description	Setting Option	Effect
Graphics Configuration	Configure Graphics Configuration parameters	Enter	Opens sub-menu
Vt-d	Intel® Virtualization Technology for Directed I/O	Enabled Disabled	Vt-d capability

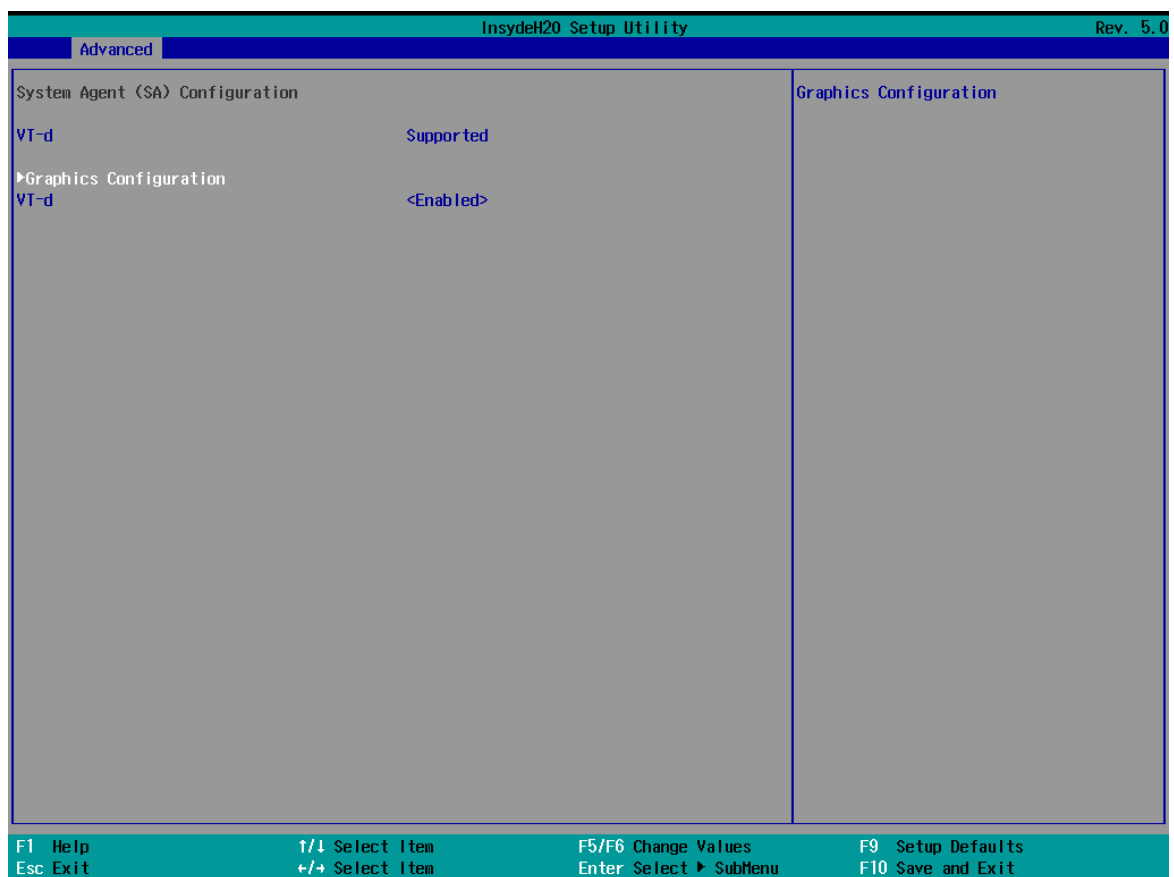
3.2.2.7.1 Graphics Configuration



BIOS Setting	Description	Setting Option	Effect
Internal Graphics	Internal Graphics settings	Auto Enabled Disabled	Keep IGFX enabled based on the setup options
Aperture Size	Select the aperture size	128MB 256MB 512MB 1024MB 2048 MB	Select the aperture size <i>Note: Above 4MB MMIO BIOS assignment is automatically enabled when selecting 2048MB aperture. To use this feature please disable CSM port</i>

BIOS Setting	Description	Setting Option	Effect
DVMT Pre-Allocated	Select DVMT Pre-Allocated	0M~60M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphic Memory size used by Internal Graphic Device
DVMT Total Gfx Mem	Select DVMT Total Gfx Mem	256M 128M MAX	Select DVMT 5.0 Total Graphic Memory size used by the Internal Graphic Device
Gfx Low Power Mode	Select Gfx Low Power Mode	Enabled/ Disabled	This option is applicable for SFF only

3.2.2.7.2 Vt-d



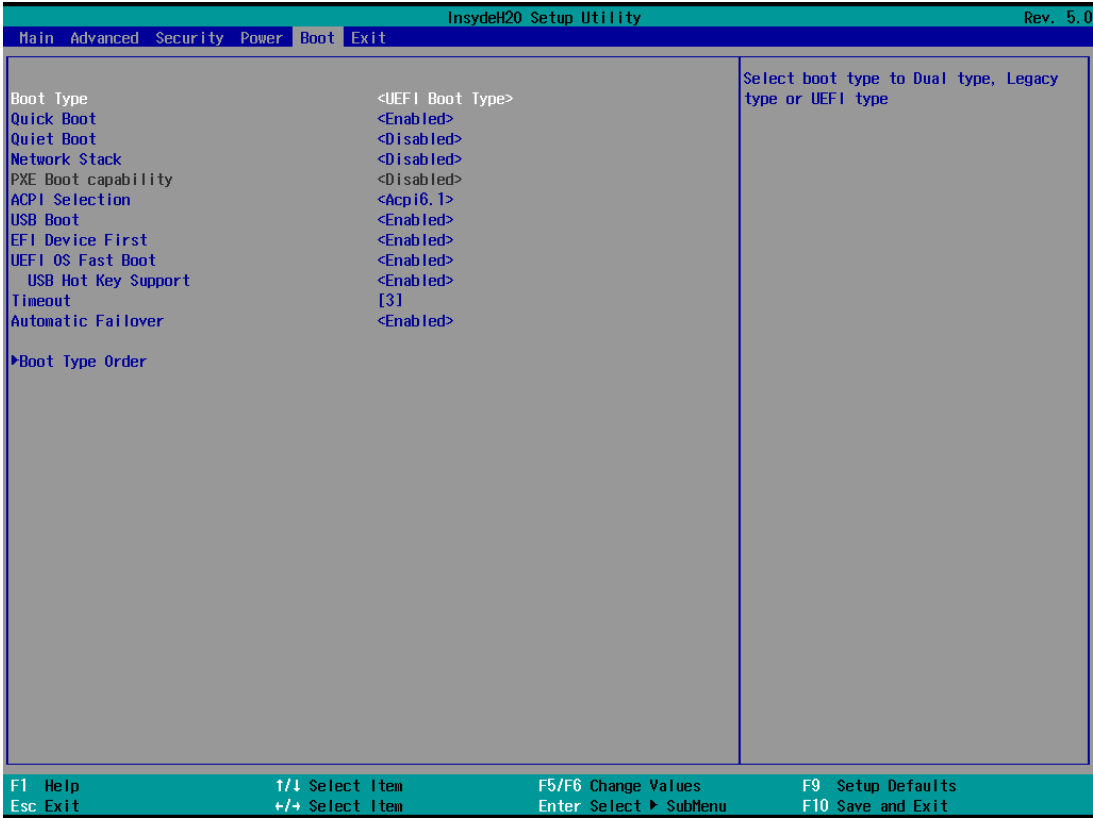
BIOS Setting	Description	Setting Option	Effect
Vt-d	Intel® Virtualization Technology for Directed I/O	Enabled Disabled	Vt-d capability

3.2.3 Boot



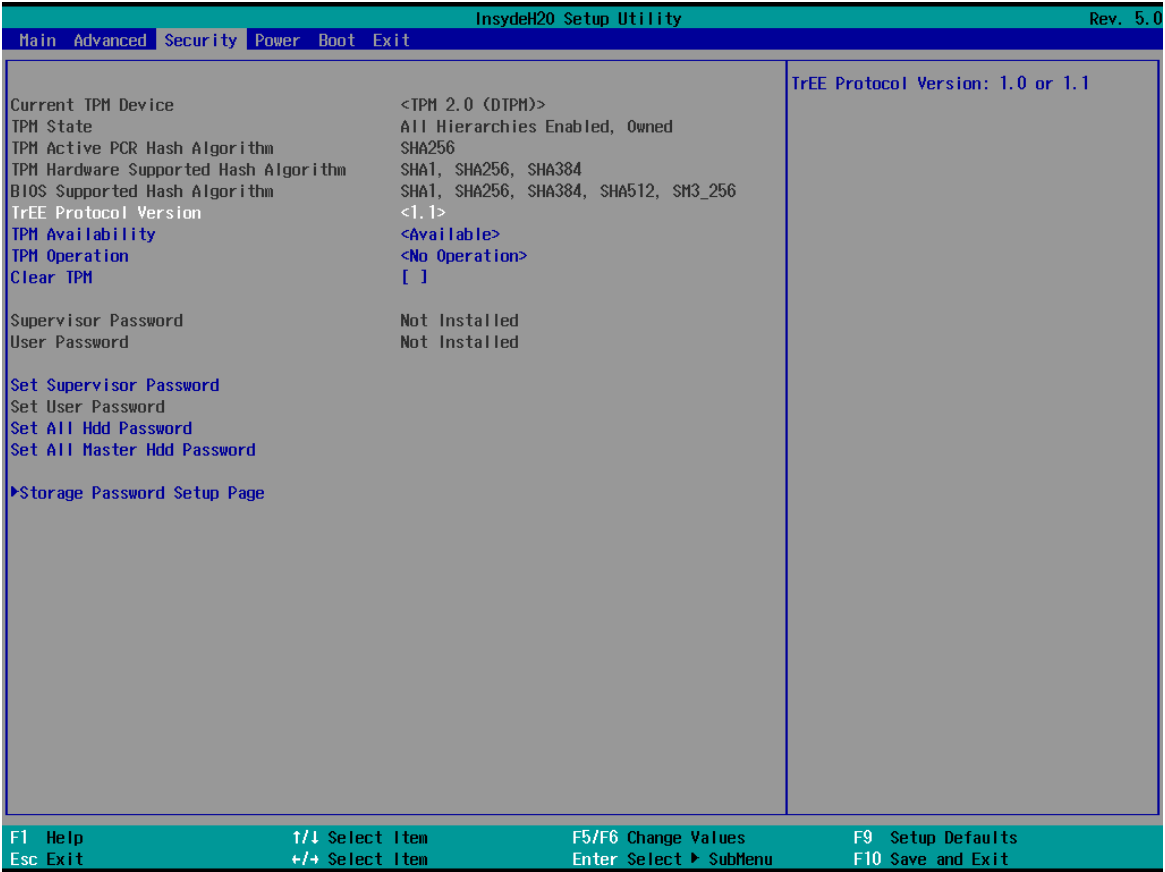
BIOS Setting	Description	Setting Option	Effect
Boot Type	Boot Type configuration	UEFI Boot Type	Select boot type to Dual type, Legacy type or UEFI type
Quick Boot	Quick Boot configuration	Enabled Disabled	Allows InsydeH20 to skip certain tests while booting. This will decrease the time needed to boot the system
Quiet Boot	Quiet Boot configuration	Enabled Disabled	Disable or enable booting in text Mode.
Timeout	Timeout	[Value]	Timeout settings
Automatic Failover		Enable	If boot to default device fail, it will directly try to boot next device
		Disable	If boot to default device fail, it will pop warning message then go to firmware UI
Boot Type Order	Boot Type Order	Enter	Opens sub-menu

3.2.3.1 Boot Type Order



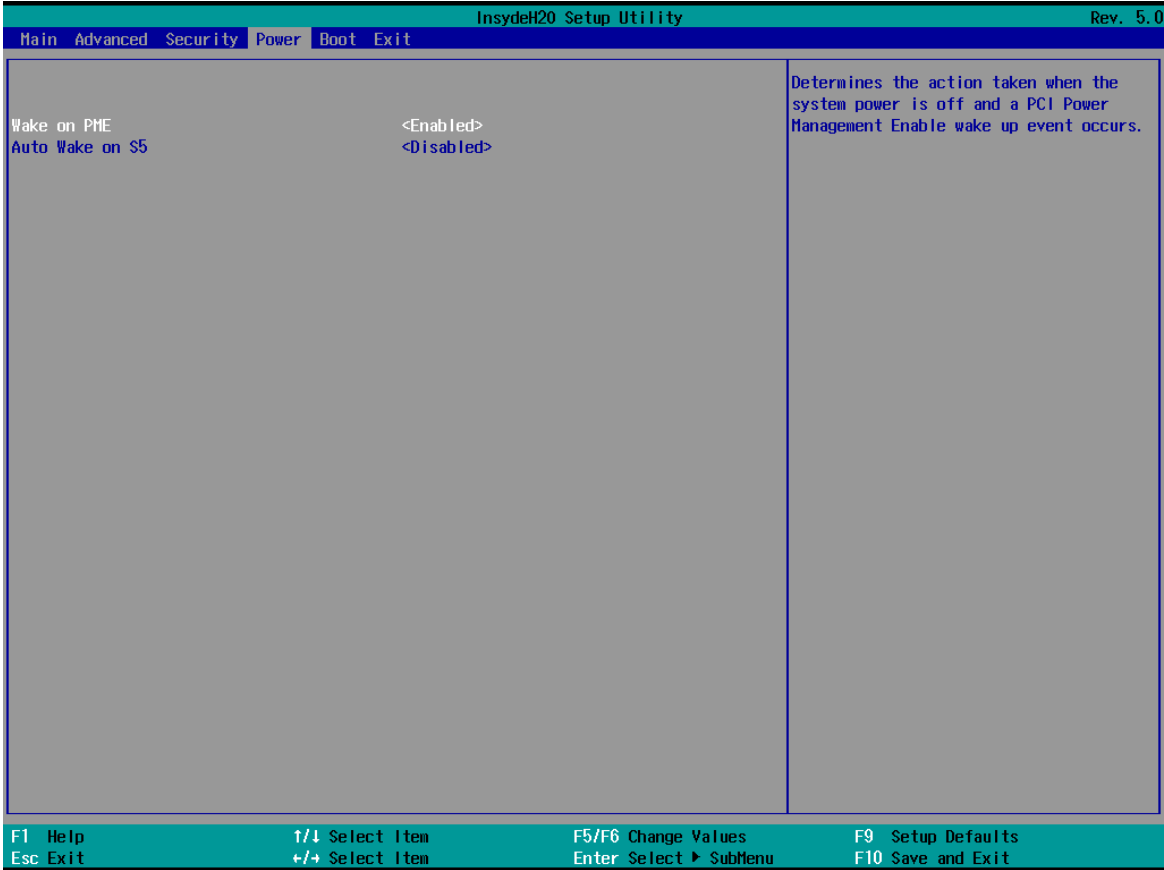
BIOS Setting	Description	Setting Option	Effect
Hard Disk Type	Hard Disk Type configuration	Enter	Opens Sub-menu
Others	Other configuration	Enter	Opens Sub-menu

3.2.4 Security



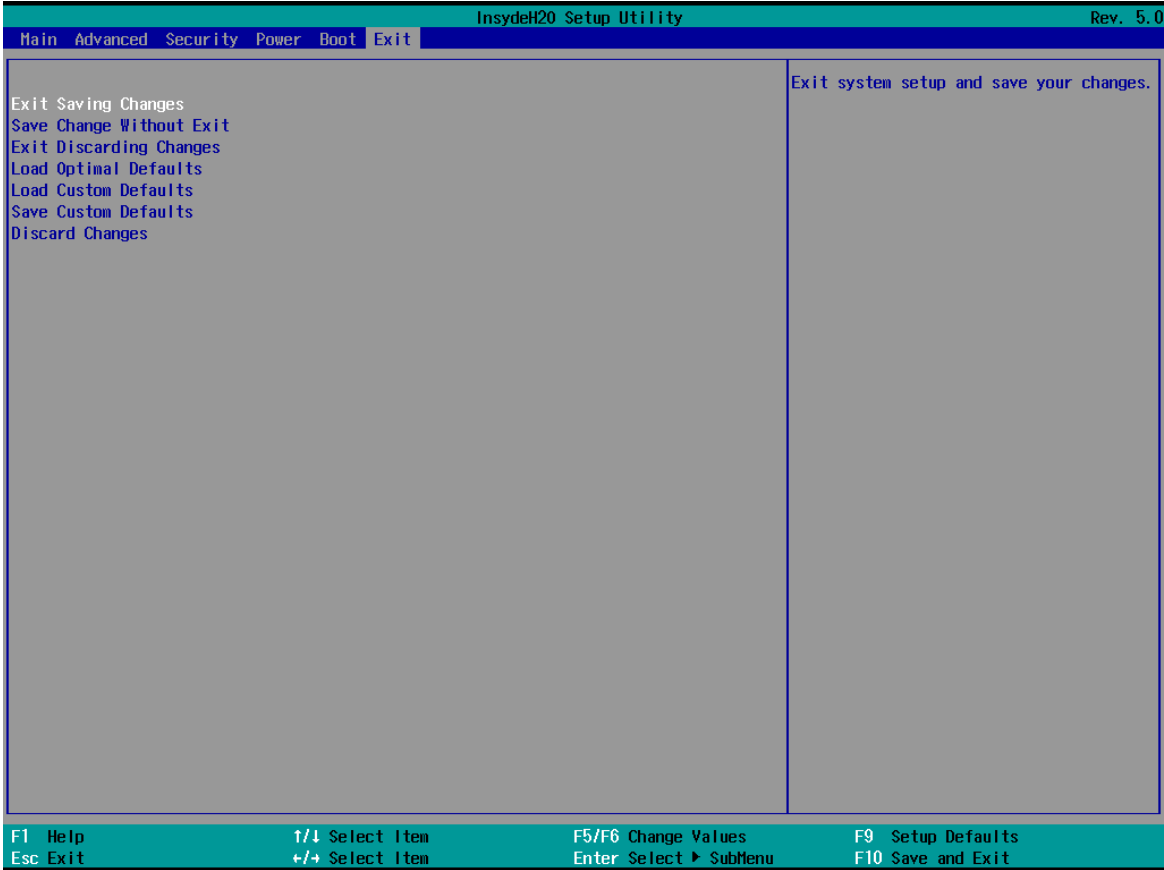
BIOS Setting	Description	Setting Option	Effect
TrEE Protocol Version	Choose TrEE Protocol Version	1.0 1.1	TrEE Protovol Version: 1.0 or 1.1
TPM Availability	TPM Availability configuration	Available Hidden	When hidden don't exposes TPM to 0
TPM Operation	TPM Operation configuration	[]	Select one of the supported operation to change TPM2state
Clear TPM	Clear TPM configuration	[]	Select to Clear TPM
Set Supervisor Password	Set Supervisor Password	Enter New password	Install or Change the password and the length of password must be greater than one character

3.2.5 Power



BIOS Setting	Description	Setting Option	Effect
ACPI S3	ACPI S3 configuration	Disabled Enabled	Enable/ Disable ACPI S1/S3 Sleep state
Auto Wake on S5	Auto Wake on S5 configuration	Disabled By Every Day By Every Month	Auto Wake on S5, by Day or Month or fixed time of every day

3.2.6 Exit



3.3 Using Recovery Wizard to Restore Computer

**Note:**

Before starting the recovery process, make sure to backup all user data. The data will be lost after the recovery process.

**Important:**

Before starting the recovery process, remove any expansion card.

To enable quick one-key recovery procedure:

1. Connect the computer to the power source. Make sure the computer stays plugged in to power source during the recovery process.
2. Turn on the computer, and when the boot screen shows up, press **F6** to initiate the Recovery Wizard.
3. The following screen shows the Recovery Wizard. Click **Recovery** button to continue.





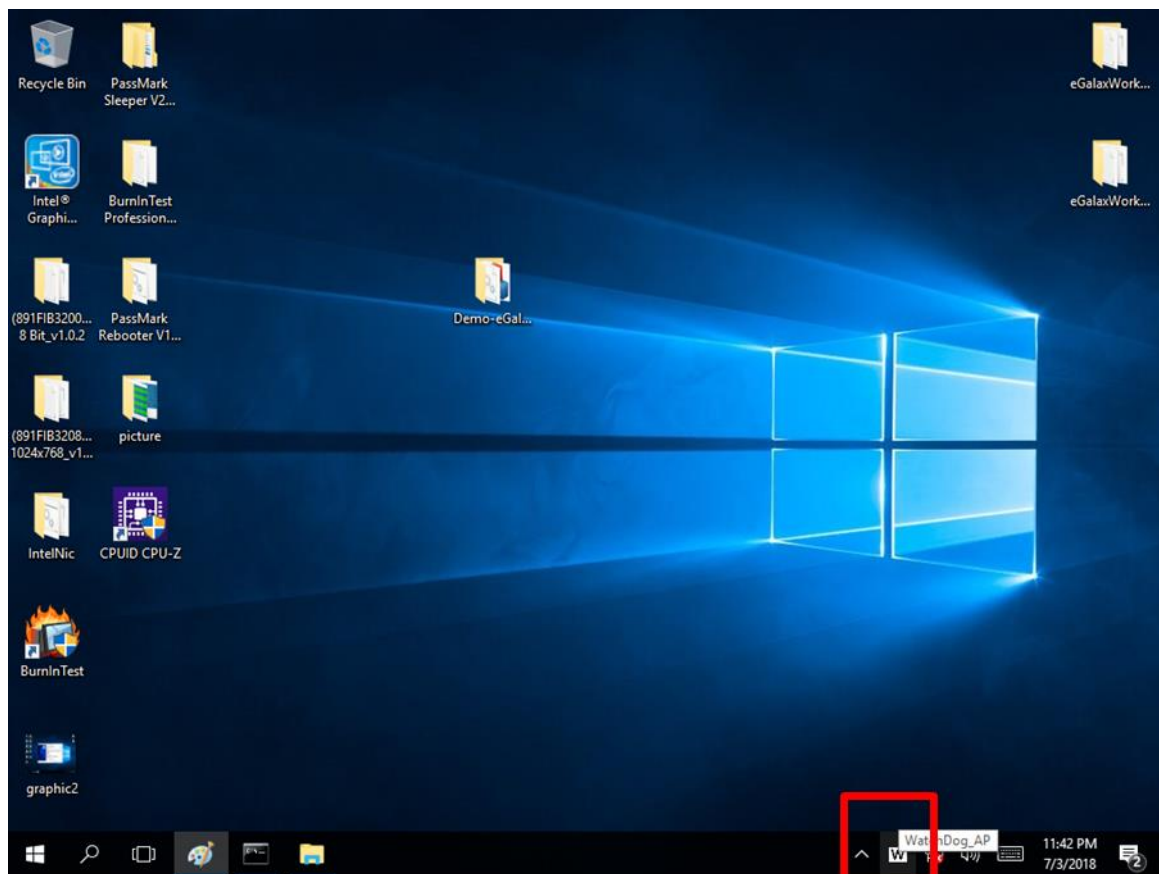
4. A warning message about data loss will show up. Make sure the data is backed up before recovery, and click Yes to continue.
5. During the recovery process, a command prompt will show up to indicate the percent of recovery process complete.
6. After the recovery process to complete, please restart your computer manually.

3.4 How to Enable Watchdog

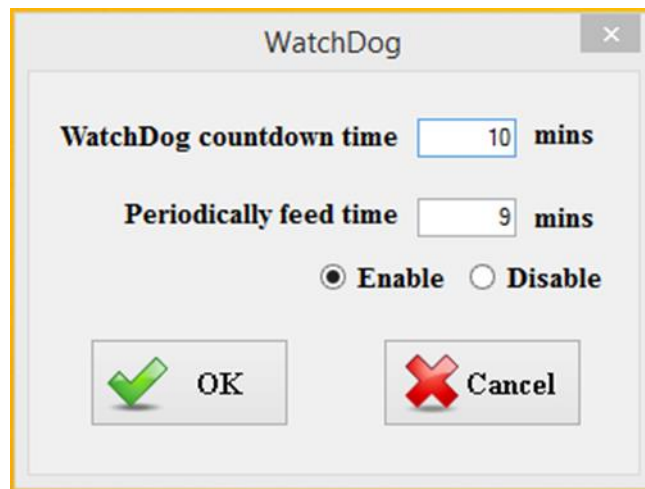
To enable Watchdog, you need to download Winmate Watchdog utility. Find more information on Watchdog in “Watchdog Guide” that you can download from Winmate Download Center or File Share. Refer to the User Manual for more details.

To enable watchdog in Watchdog AP follow the instructions below:

1. On the right bottom side of the desktop screen, click  **triangle button** to show hidden icons.
2. Click  icon to open Watchdog utility.



3. In Watchdog utility window set countdown time and periodically feed time, or disable watchdog.



Setting	Description
Watchdog Countdown Time	The system automaticity restarts when this countdown time reaches zero. <i>Default: 10 min</i>
Periodically Feed Time	To set a cycle time to automatically reset watchdog timer. <i>Default: 9 min</i>
Enable / Disable	Enable or disable watchdog. <i>Default: Enable</i>

Example:

Every 10 min watchdog will monitor the system, in case any error occurs the system will restart automatically when the countdown time reaches 0.

Every 9 min watchdog timer will be reset to 10 min.

Chapter 4: Driver Installation

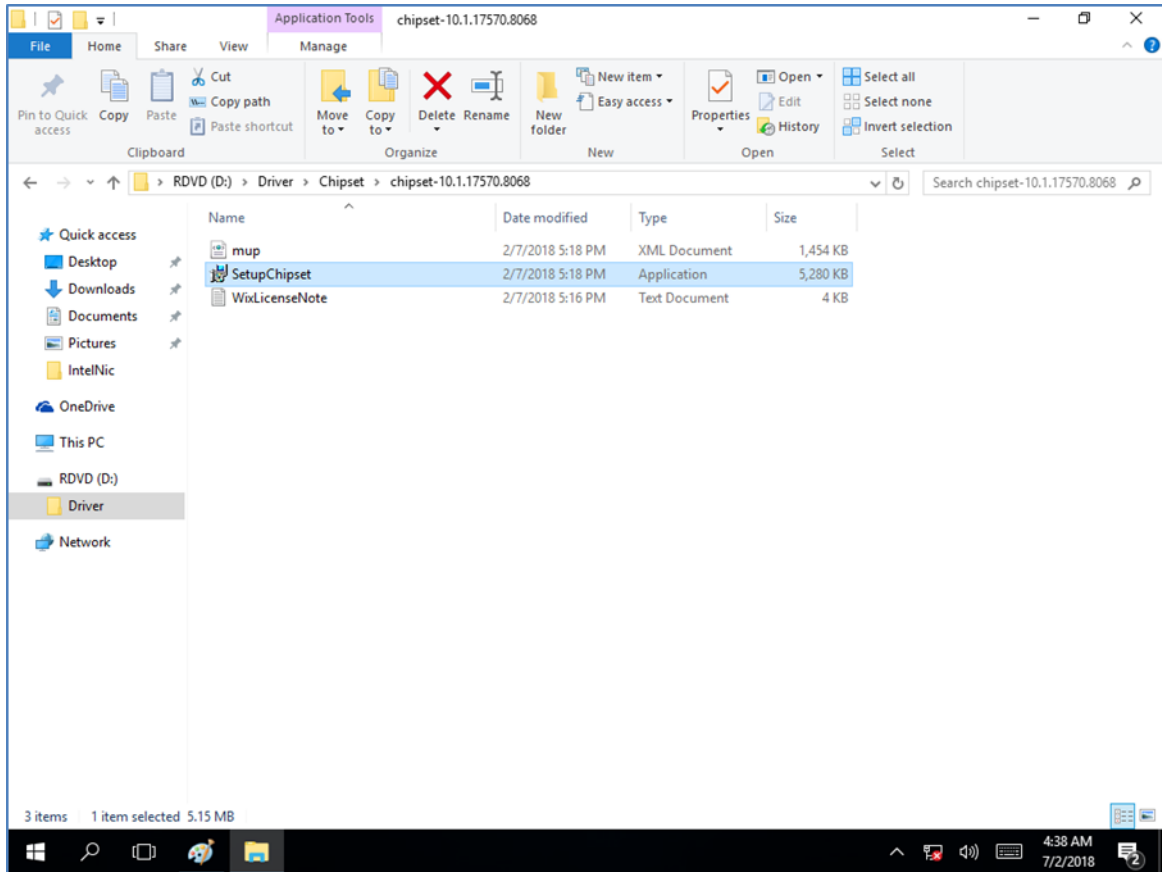
This chapter contains driver installation guide. Follow the instructions below to complete the installation. You will quickly complete the installation. This chapter provides instructions on how to install drivers on the IE32 3.5" SBC.

- 4.1 Chipset Driver Installation
 - 4.2 Graphic Driver Installation
 - 4.3 Management Engine (ME)
 - 4.4 SST Driver Installation
 - 4.5 Audio Driver Installation
 - 4.6 Ethernet Driver Installation
 - 4.7 Watchdog Driver Installation
 - 4.8 Digital IO Driver Installation
 - 4.9 Resistive Touch Driver for Windows 11 System
-

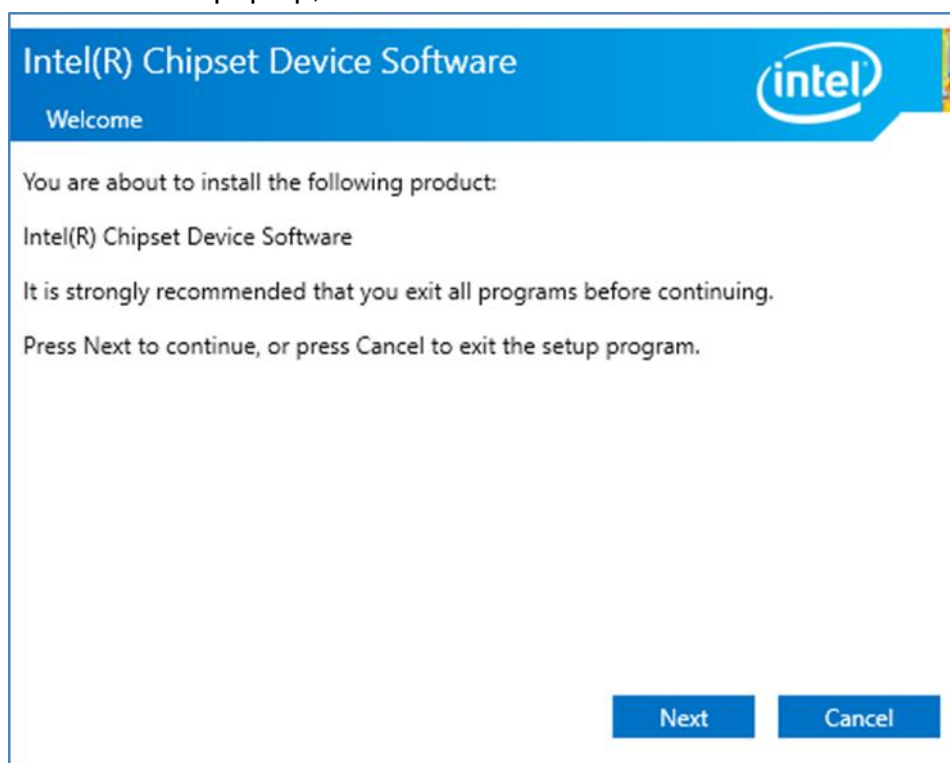
4.1 Chipset Driver

Follow instructions below to install Chipset driver.

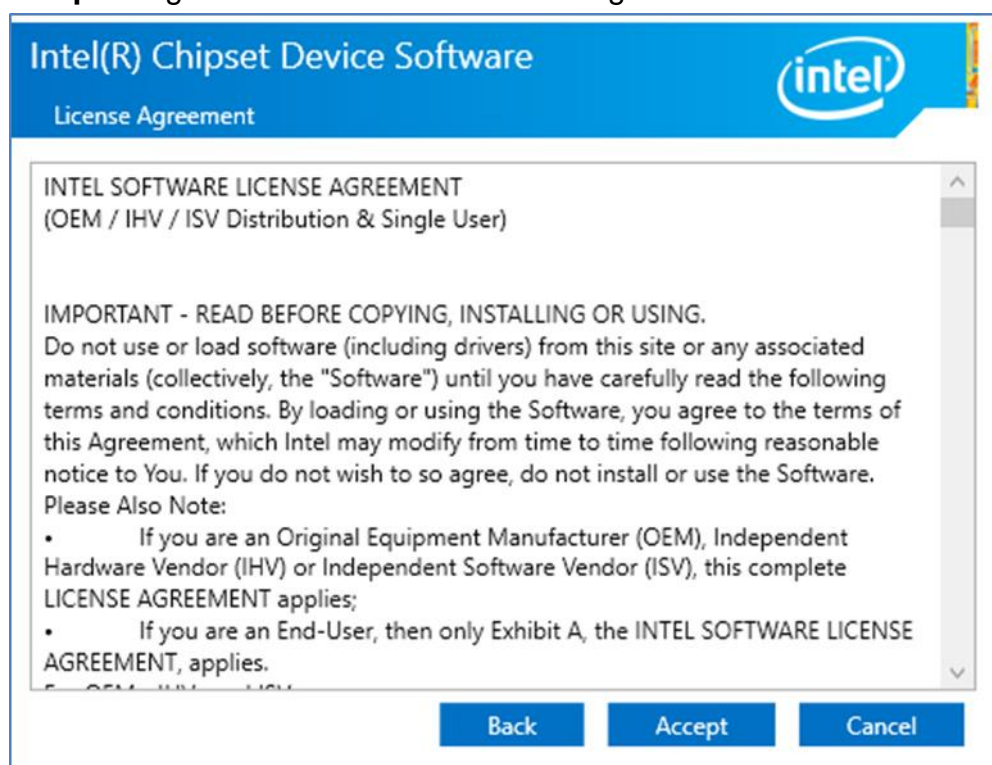
1. Open the Driver CD (included in the package) and select **Chipset** driver.



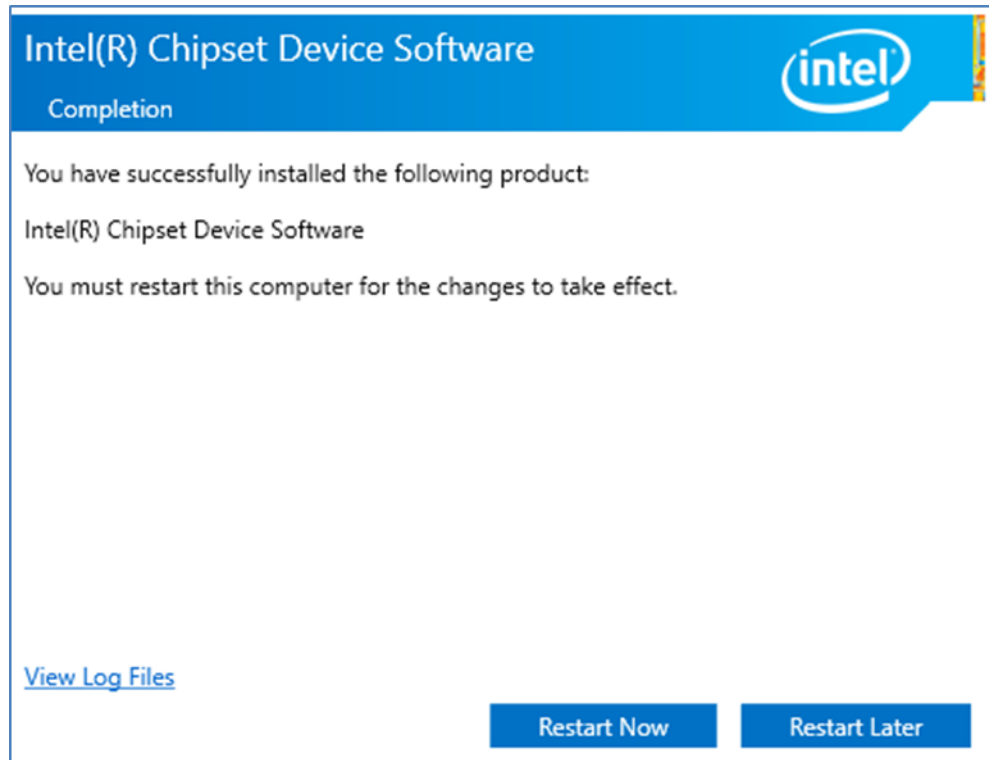
2. Installation window will pop up, select **Next**.



3. Select **Accept** to agree with the terms of license agreement.



4. Check the ReadMe file information, select **Install** to continue.



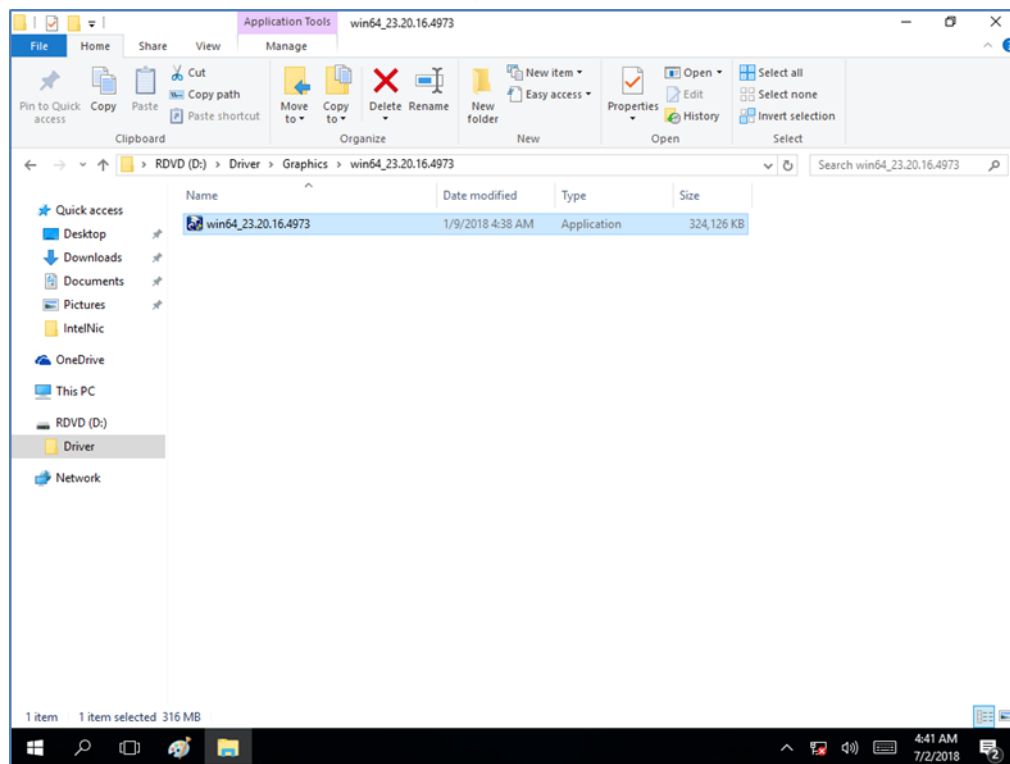
5. Wait for the driver to be installed. When installation completed, select **Restart Now** to restart your computer.



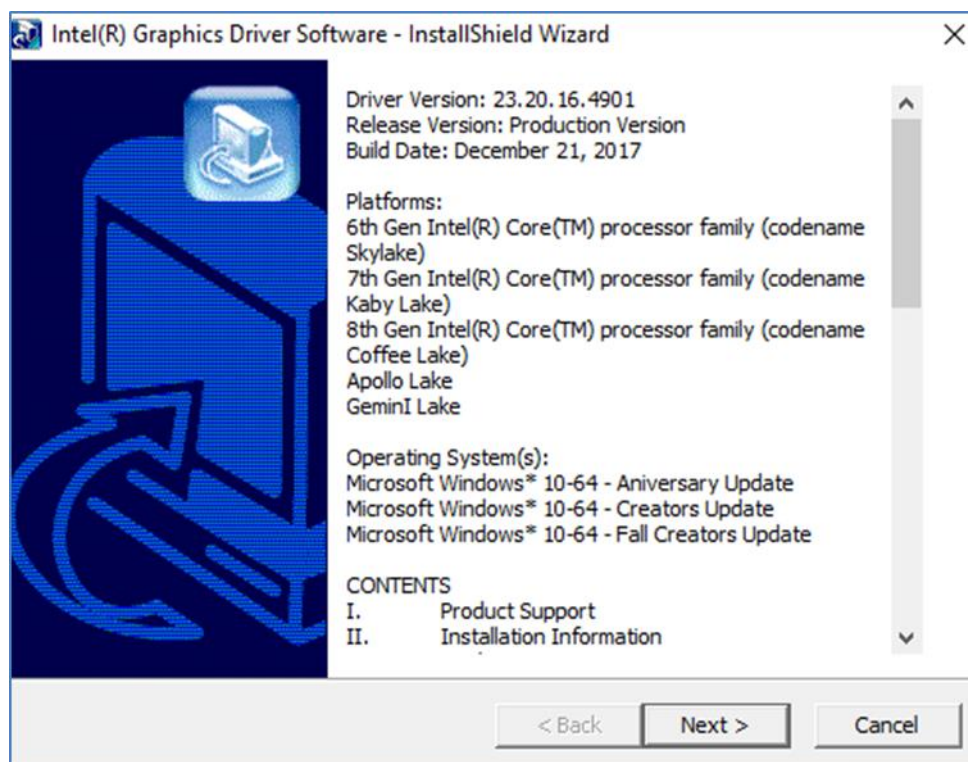
4.2 Graphic Driver

Follow instructions below to install Graphic driver.

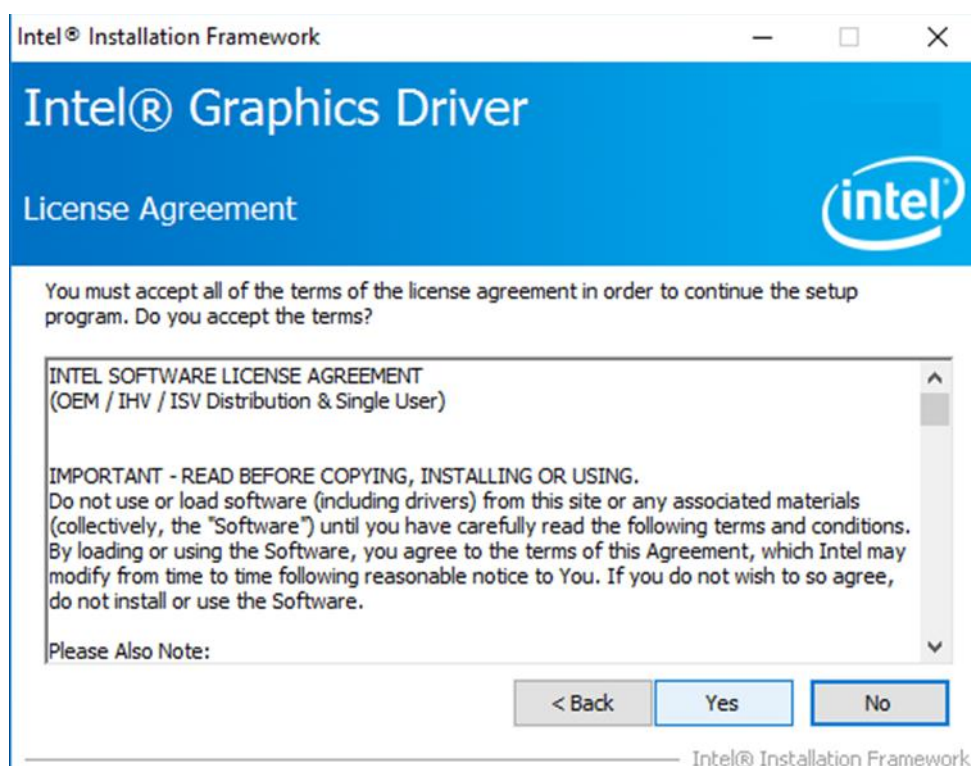
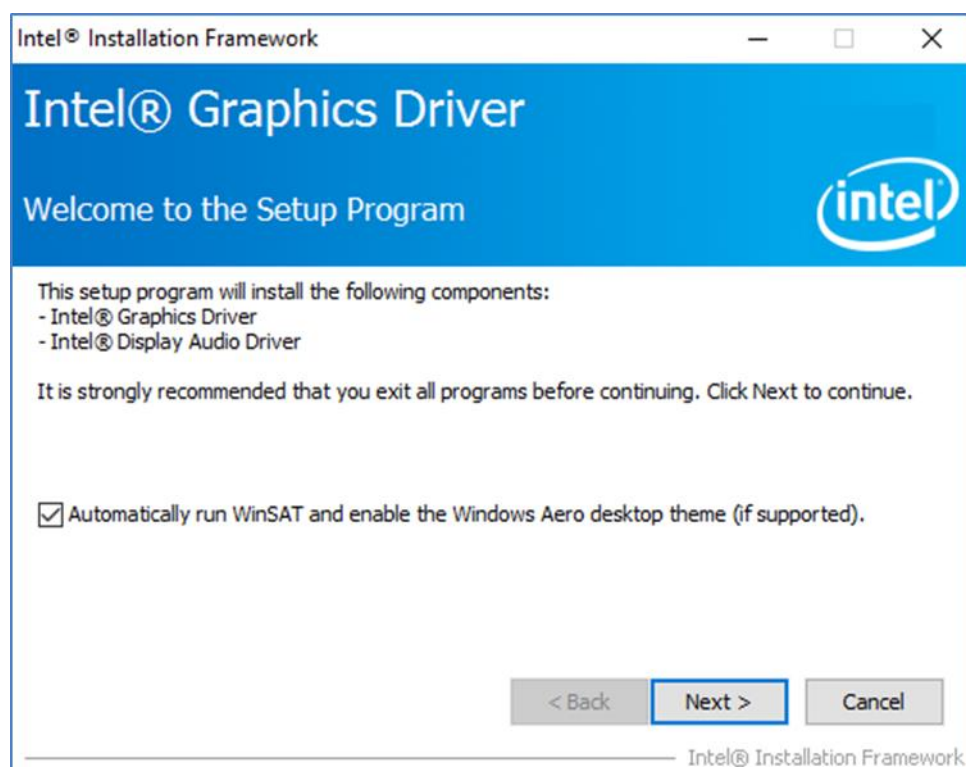
1. Open the Driver CD (included in the package) and select **Graphic** driver.



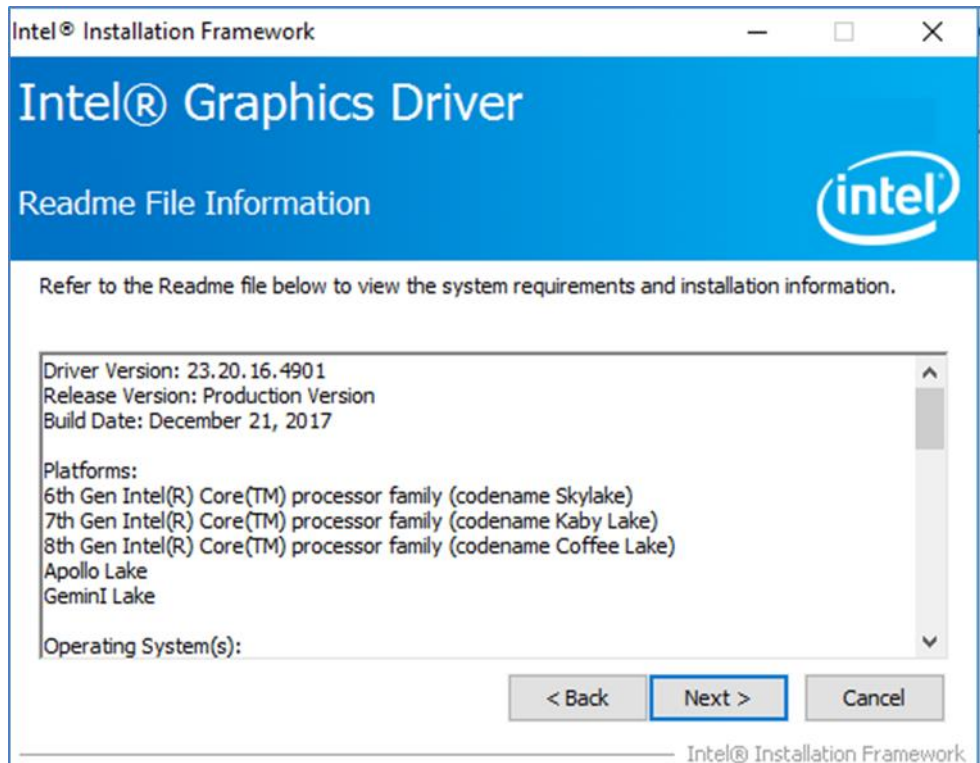
2. Installation window will pop up, select **Next**.



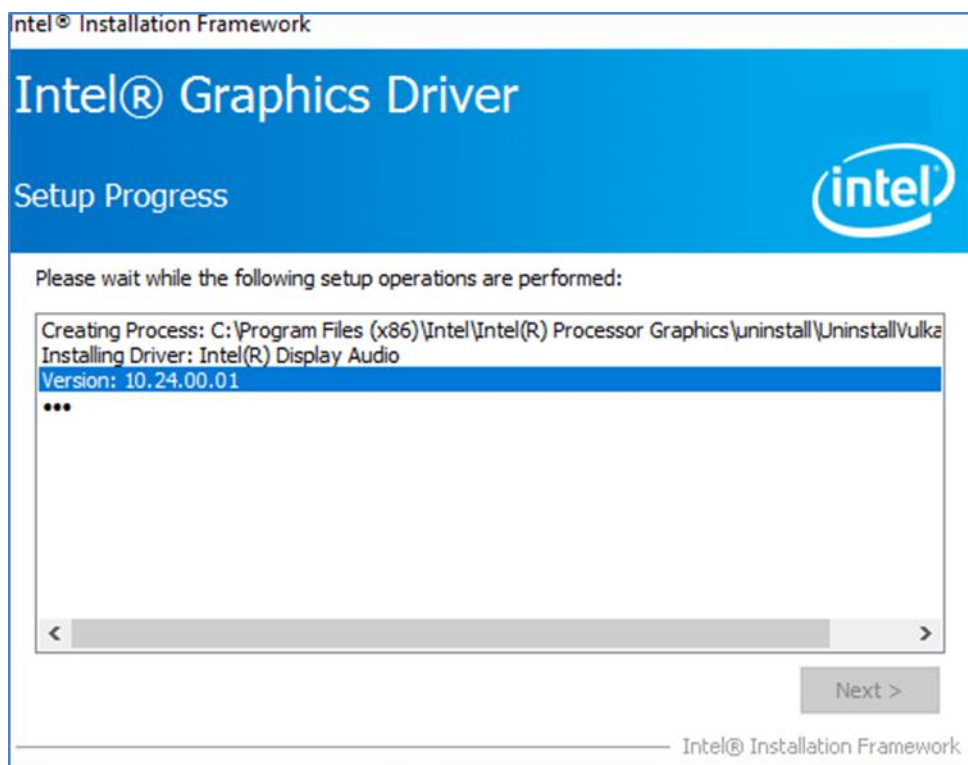
3. Select Accept to agree with the terms of license agreement.



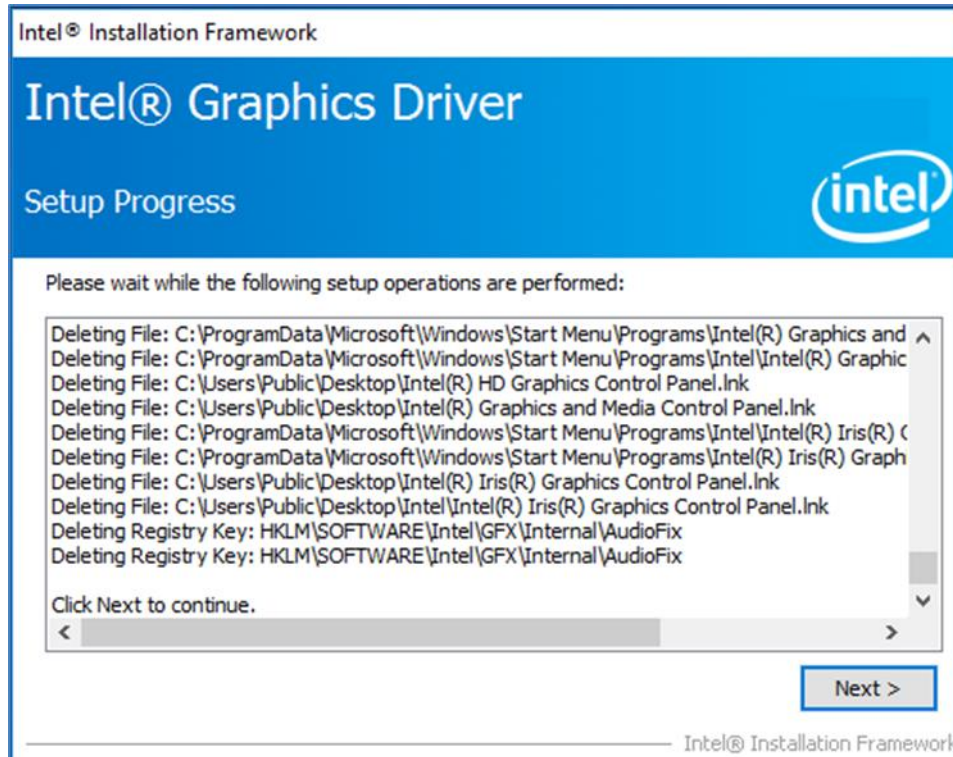
Check the ReadMe file information, select **Next** to continue.



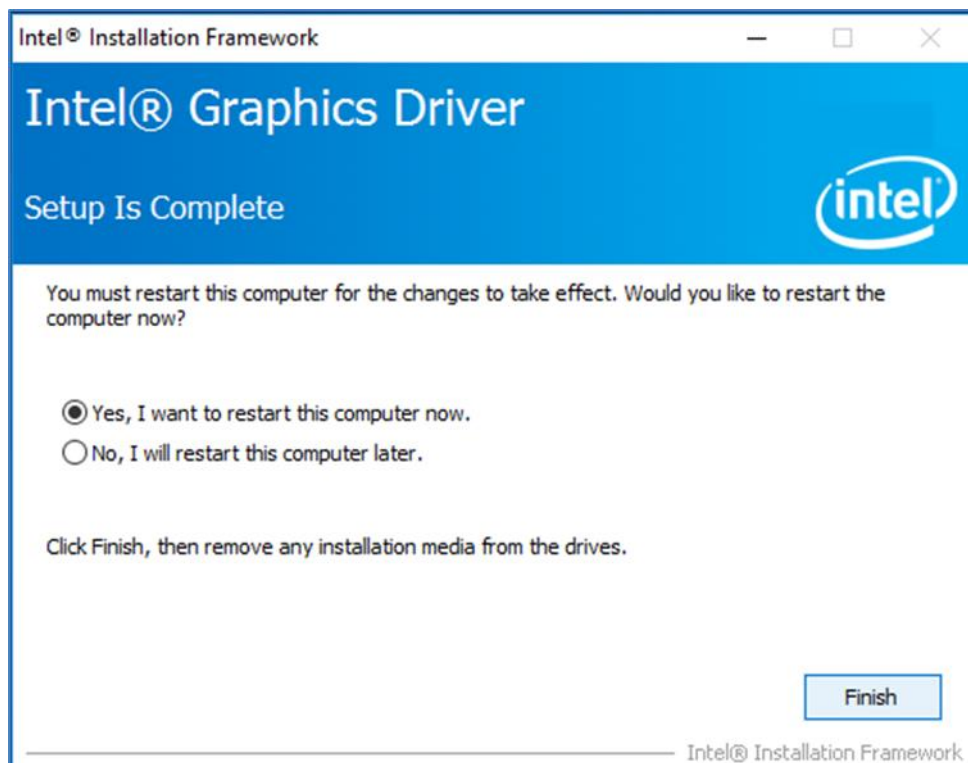
4. Wait for the driver to be installed.



5. Select **Next** to continue.



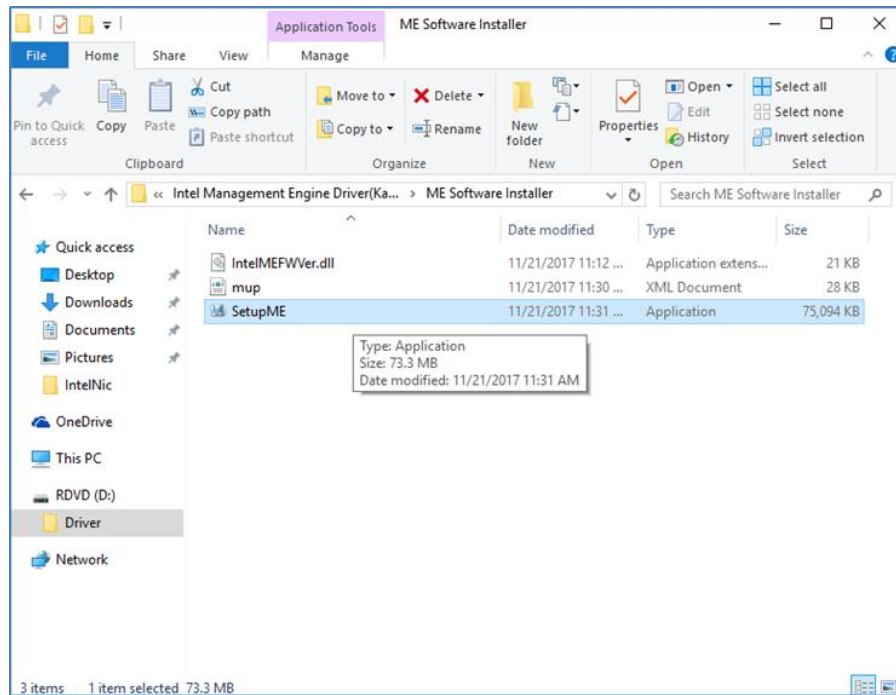
6. After installation is completed, select “**Yes, I want to restart this computer now**”, and click **Finish**.



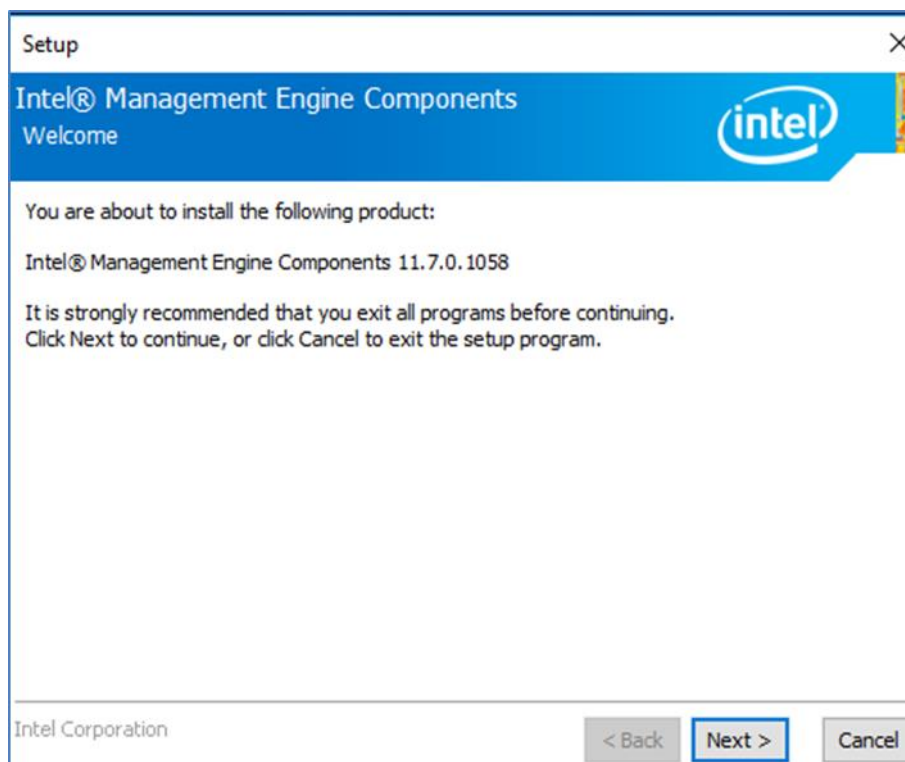
4.3 Management Engine (ME)

Follow instructions below to install Management Engine (ME) .

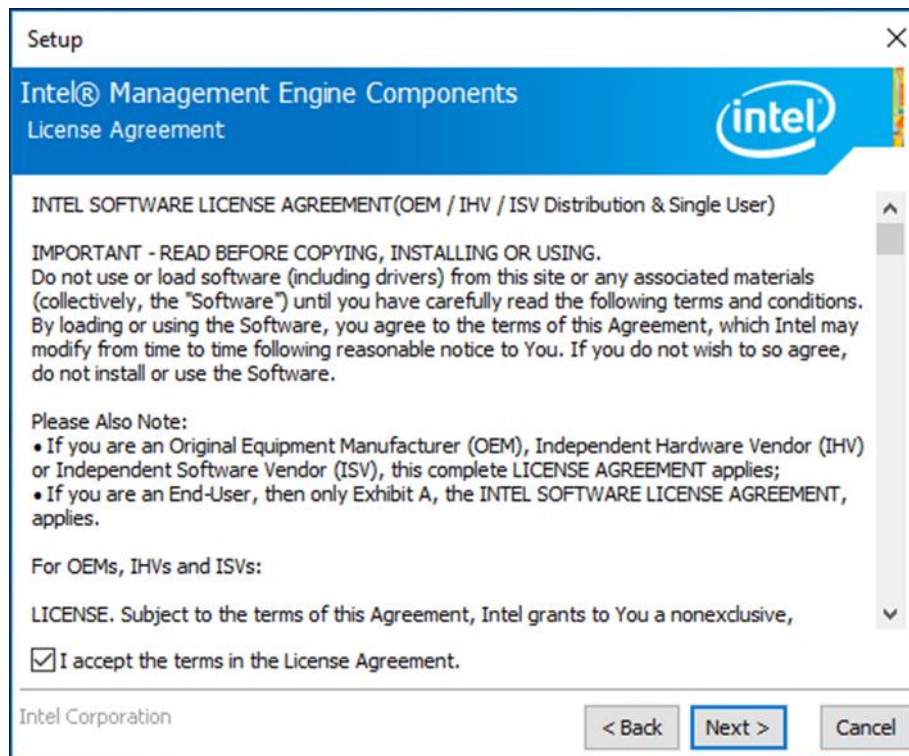
1. Open the Driver CD (included in the package) and select **ME** driver.



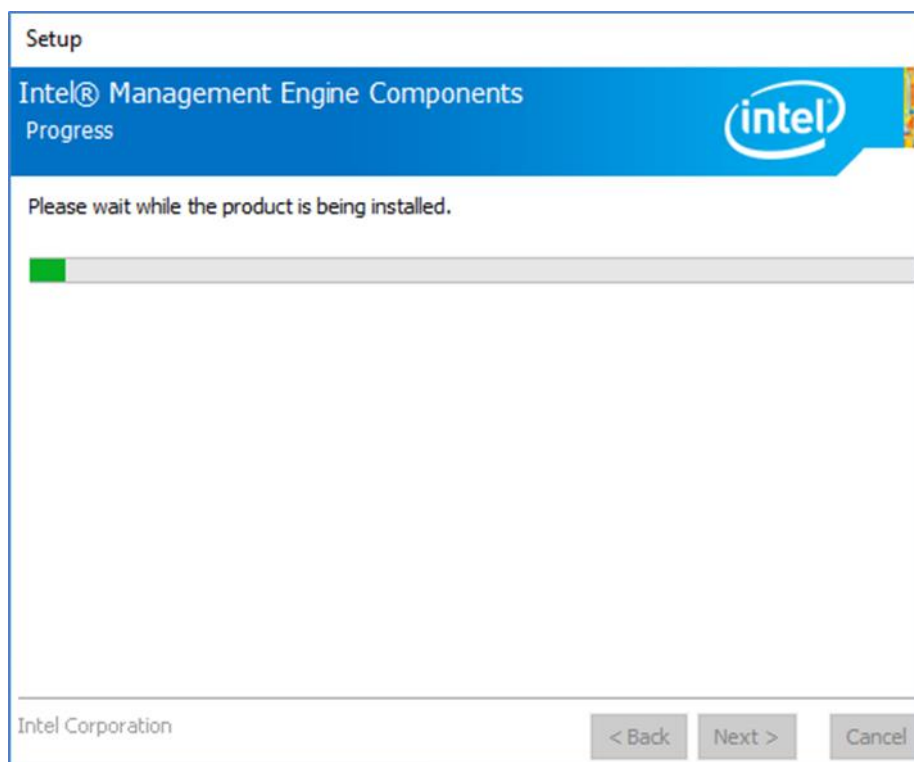
2. Select **Next** to start the installation.



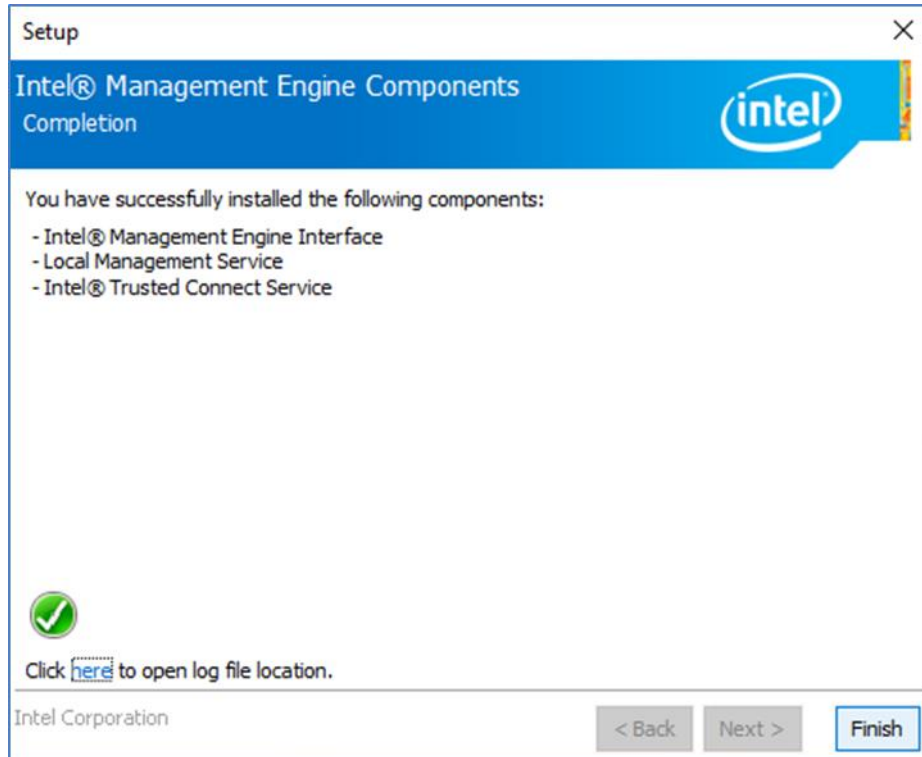
3. Select **Next** to agree with the terms of license agreement.



4. Wait for the driver to be installed.



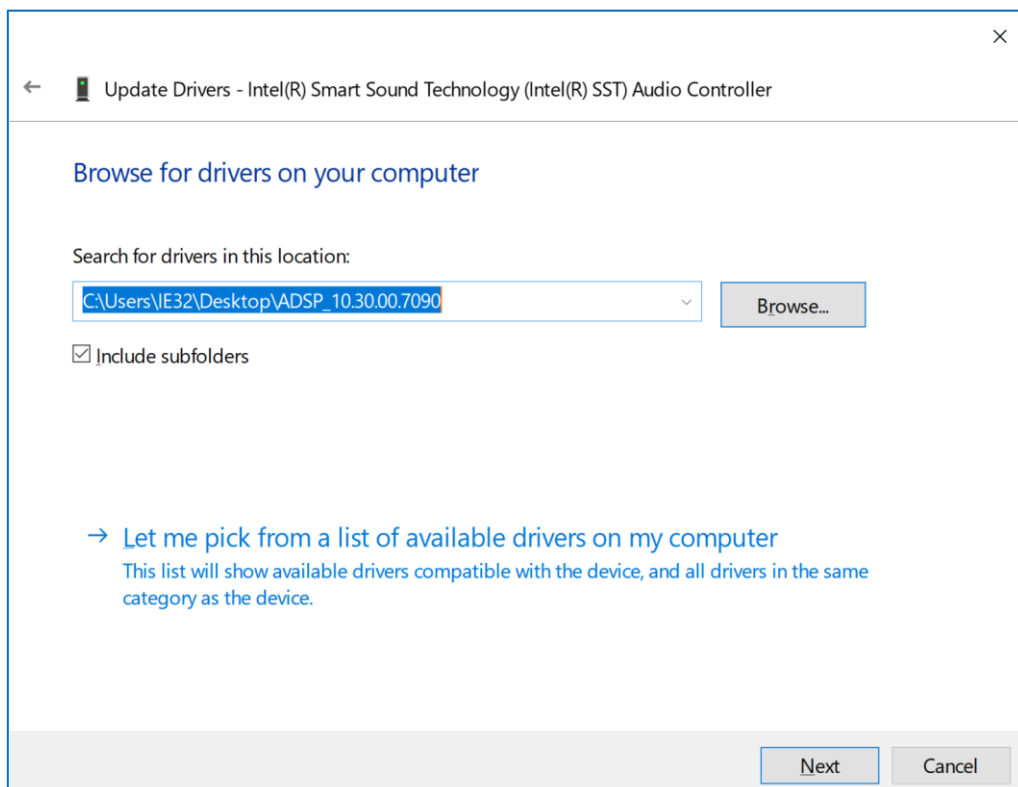
5. When installation completed, select **Finish** complete installation.



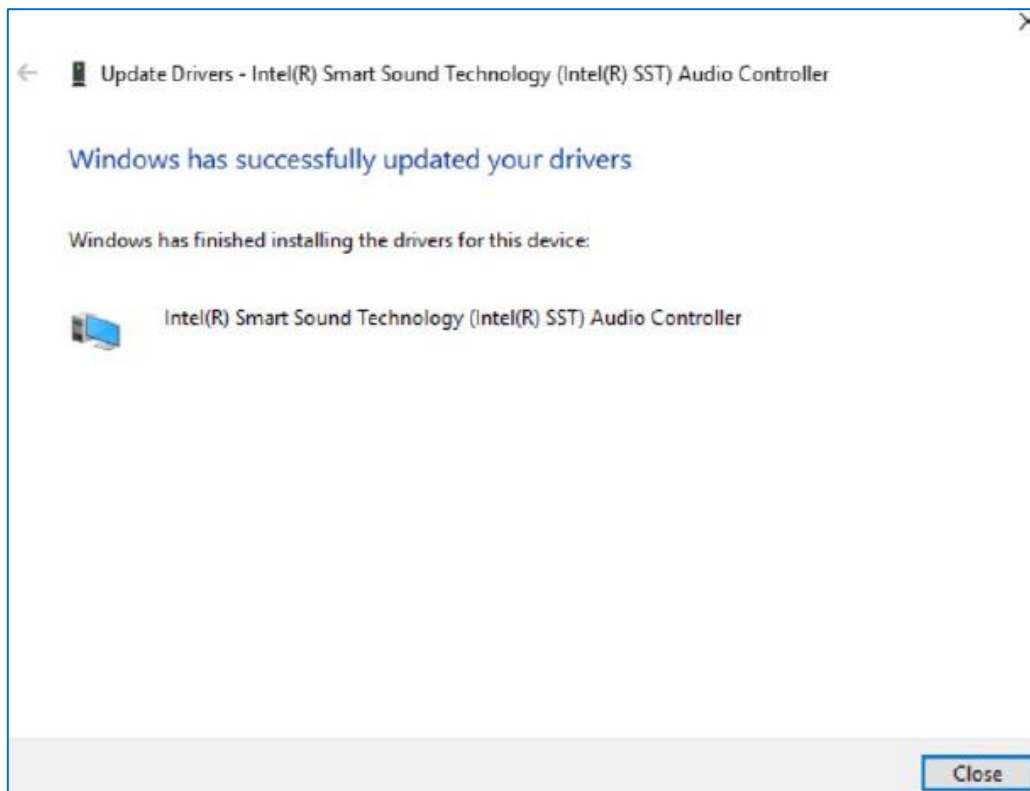
4.4 SST Driver

Follow instructions below to install SST driver.

1. Update Drivers > Browse “My computer” for driver software > Next



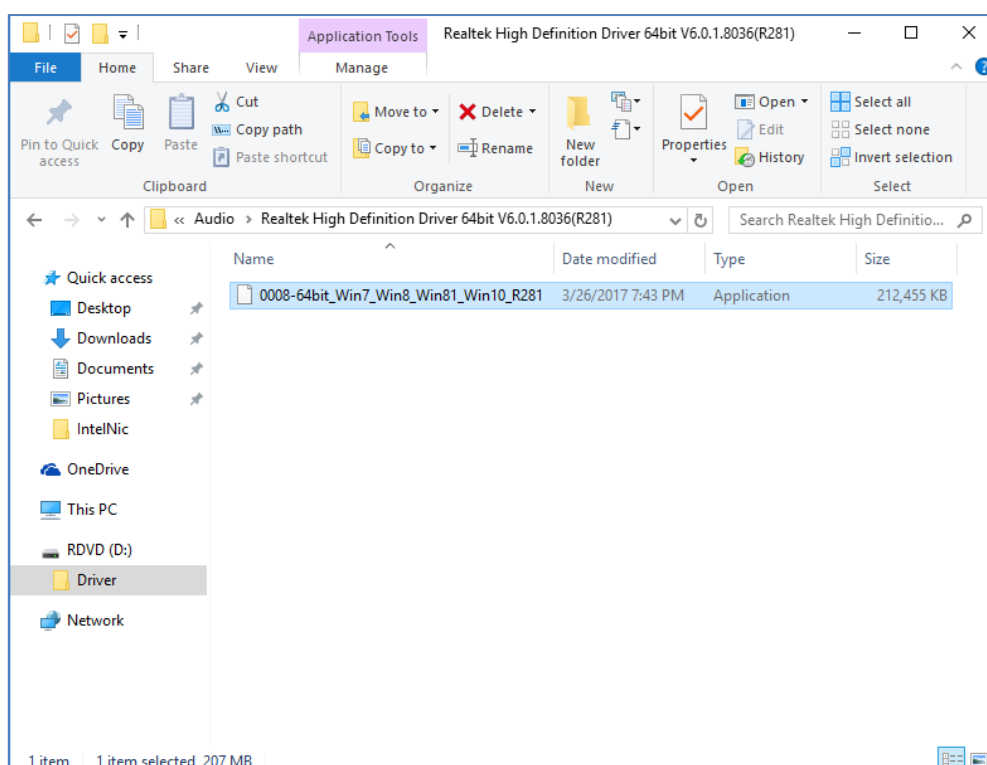
2. Wait for driver installation to complete.



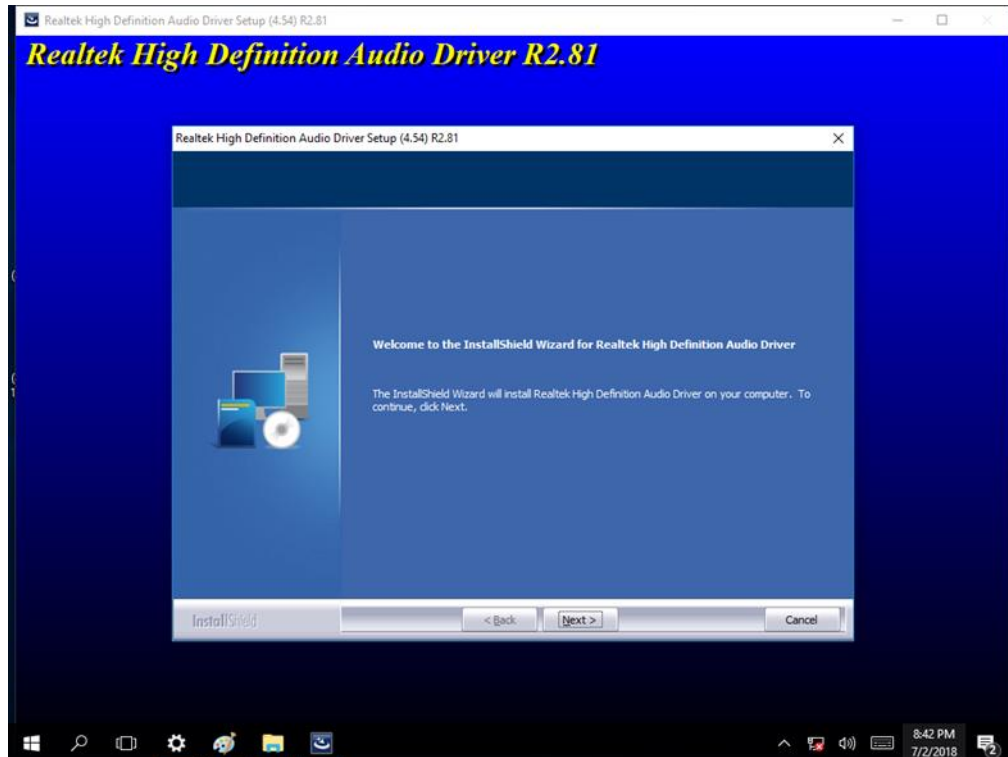
4.5 Audio Driver

Follow instructions below to install Audio driver.

1. Open the Driver CD (included in the package) and select **Audio** driver.



2. Select **Next** to continue.



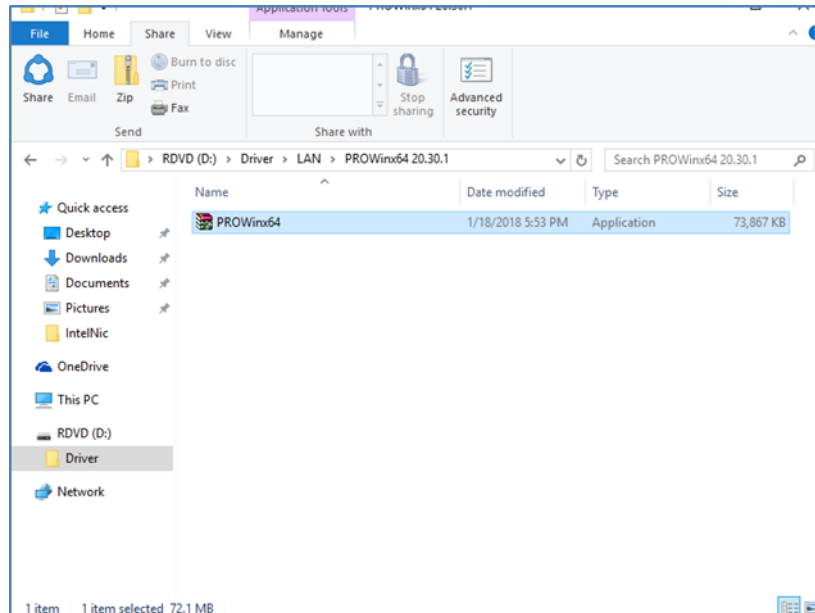
3. When installation completed, select **Finish** complete installation.



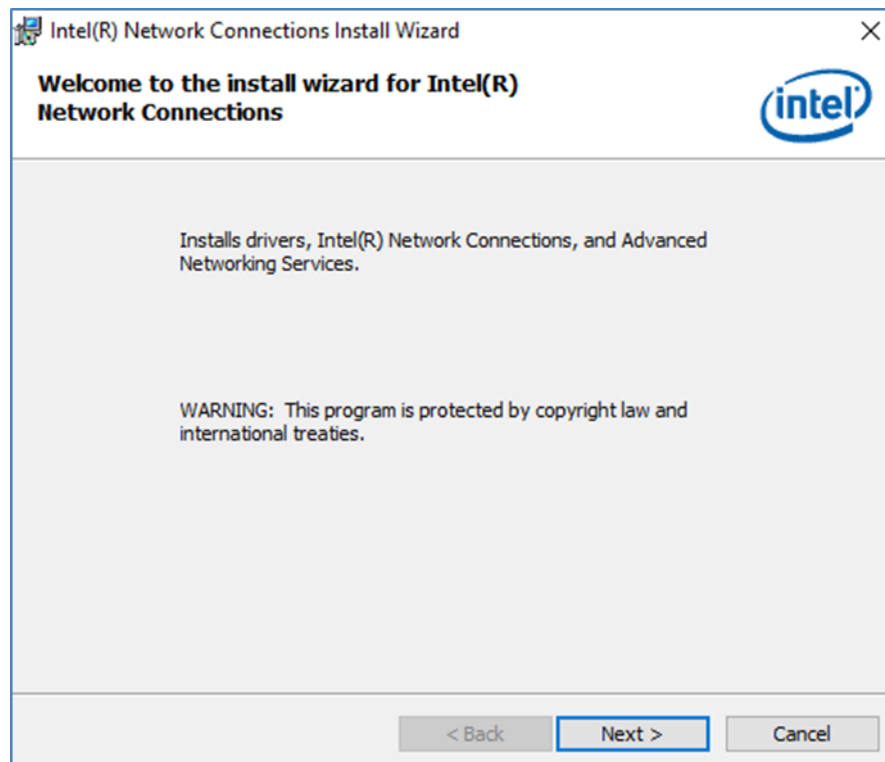
4.6 Ethernet Driver

Follow instructions below to install LAN driver.

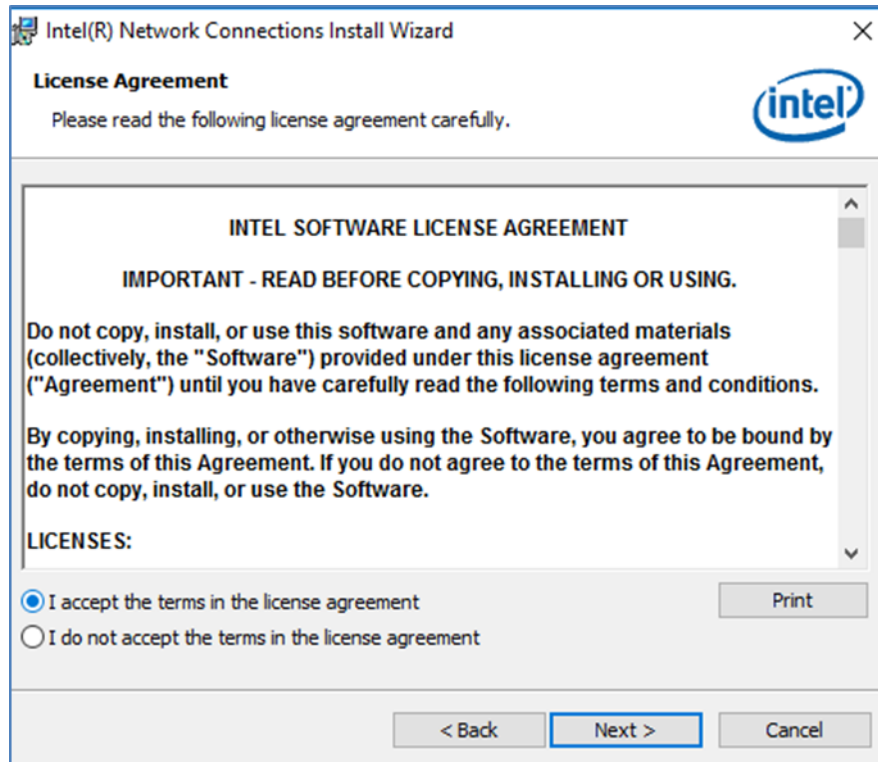
1. Open the Driver CD (included in the package) and select **LAN** driver.



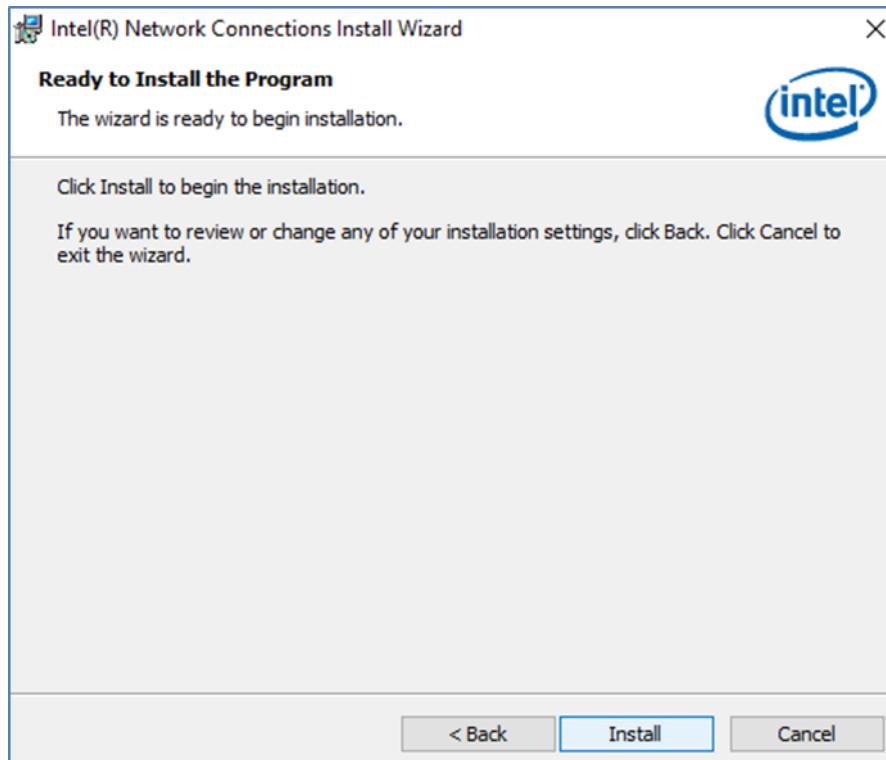
2. When compression is complete, select **Next**.



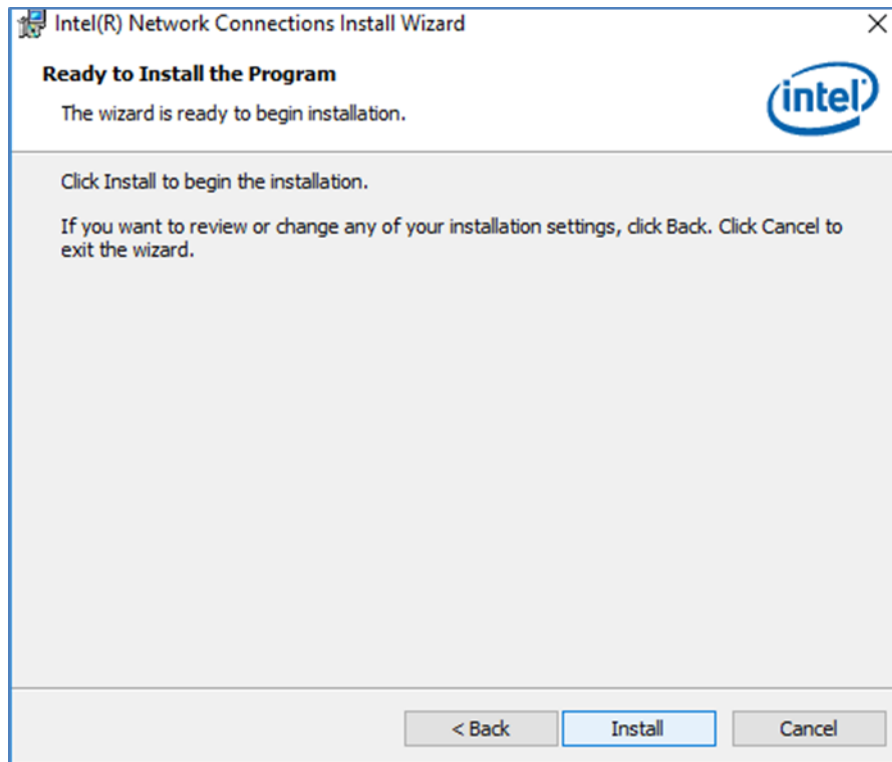
3. Read the license agreement, and then select **Next**.



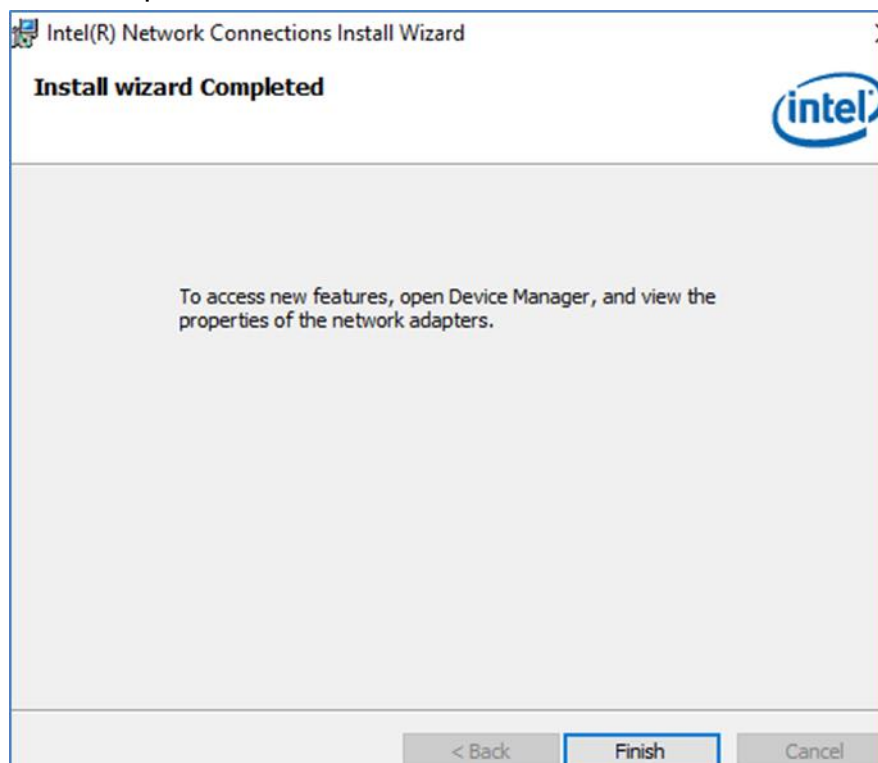
4. System displays the installed packages, select **Next**.



5. Confirm the installation, select **Install** to start the installation.



6. When installation is completed, select **Finish** to close the window.



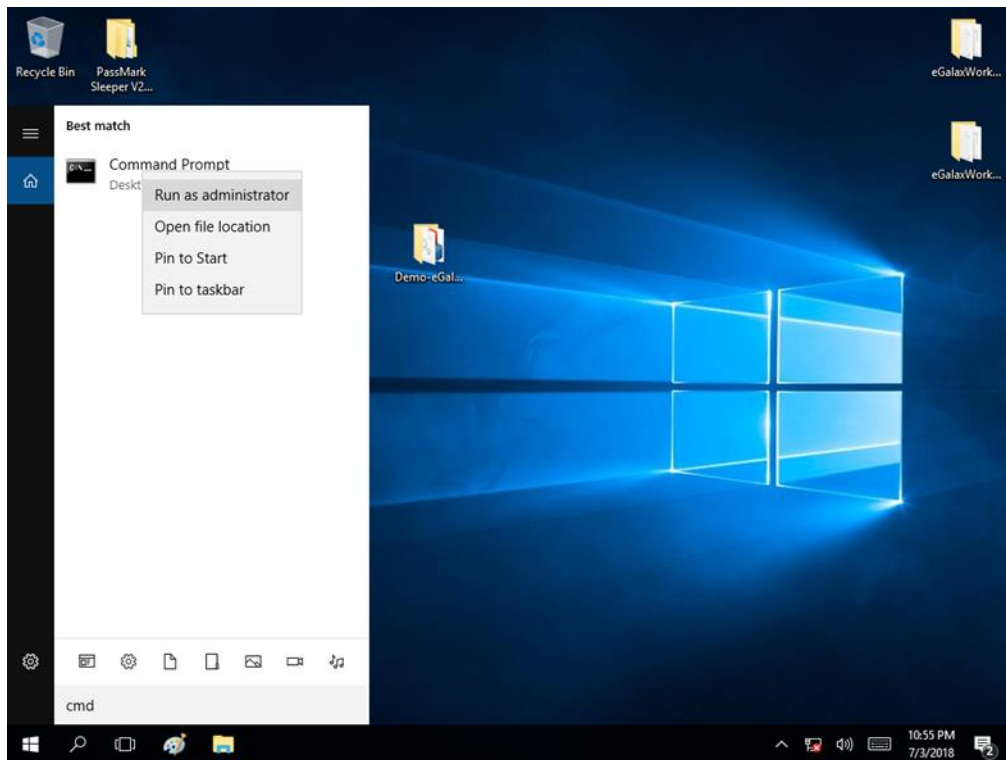
4.7 Watchdog Driver

For more details about Winmate Watchdog, please download Watchdog Guide from Winmate Downloads Center:

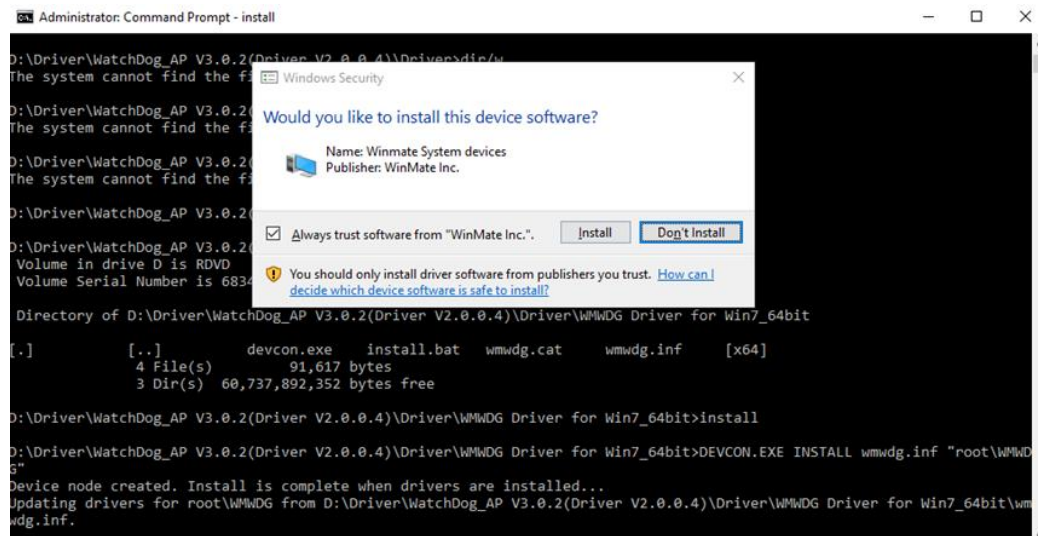
Follow instructions below to install **Watchdog** driver.

1. Type "cmd" in the run box then the cmd.exe will appear in programs.
2. Right click on the cmd.exe and click on "Run as administrator" to start

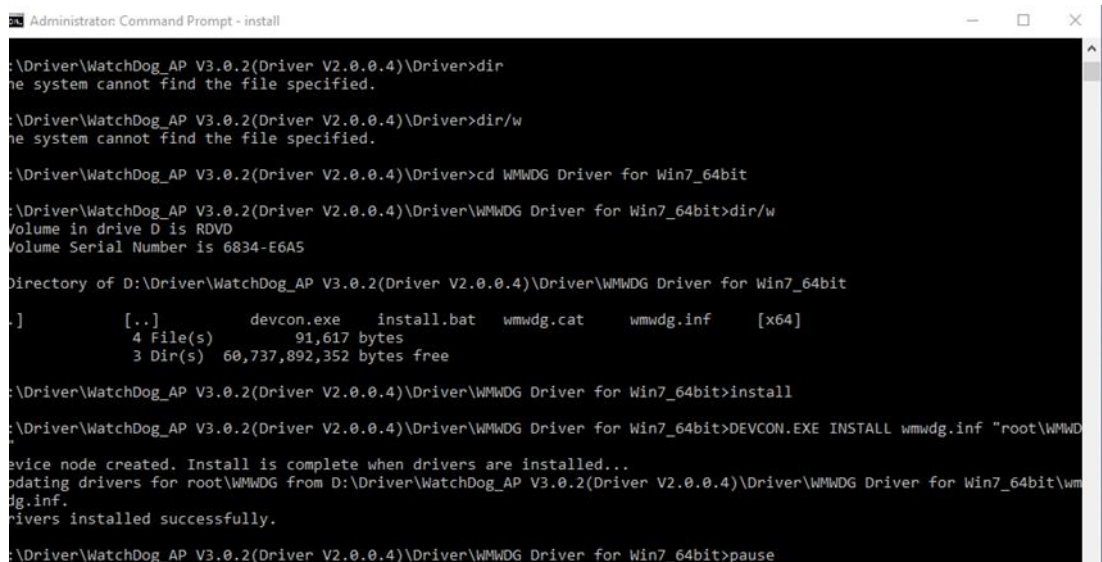
Open the Driver CD (included in the package) and select Watchdog driver.



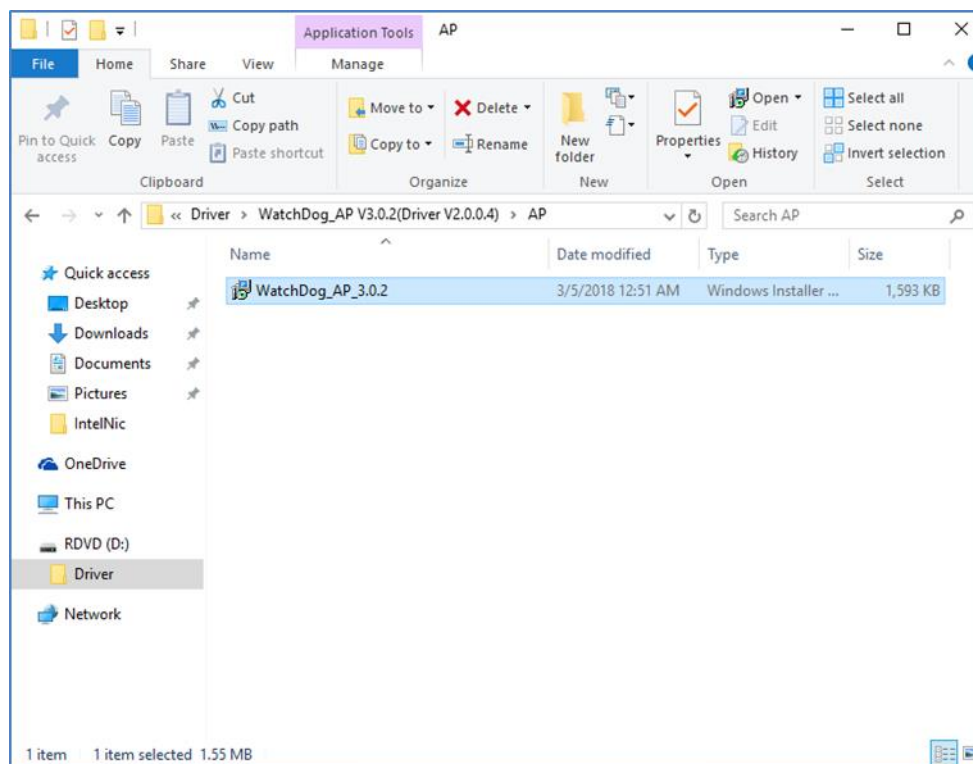
- When Windows Security dialog appear, select install to continue the Installation.



- Wait for installation to complete. When installation is complete, press any key to close.



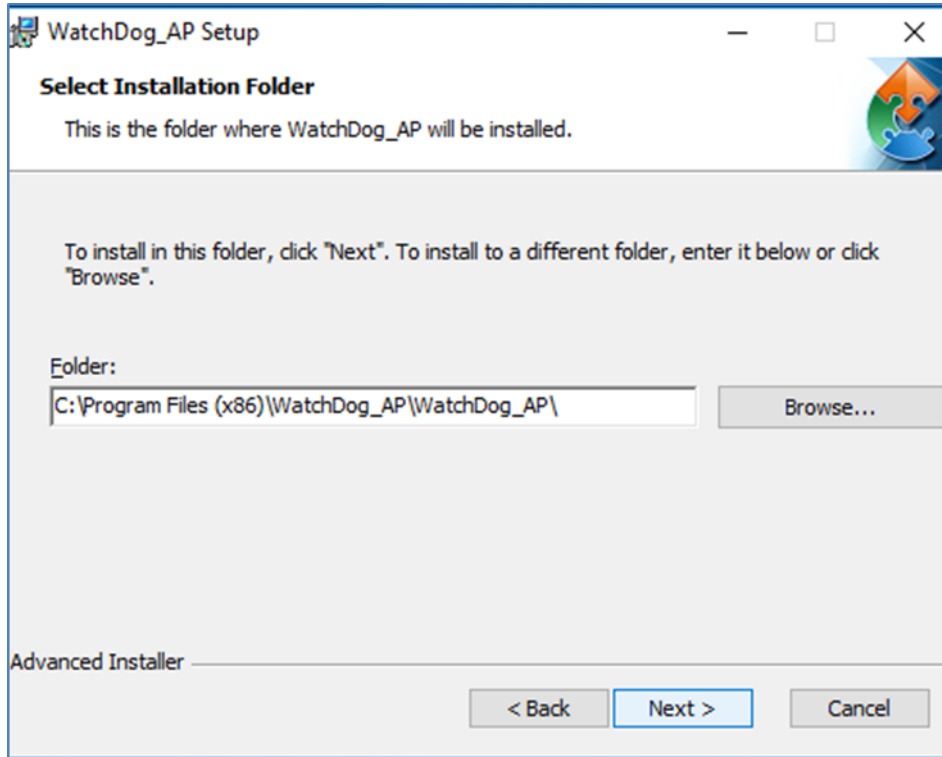
5. Open the Driver CD (included in the package) and select **Watchdog AP**.



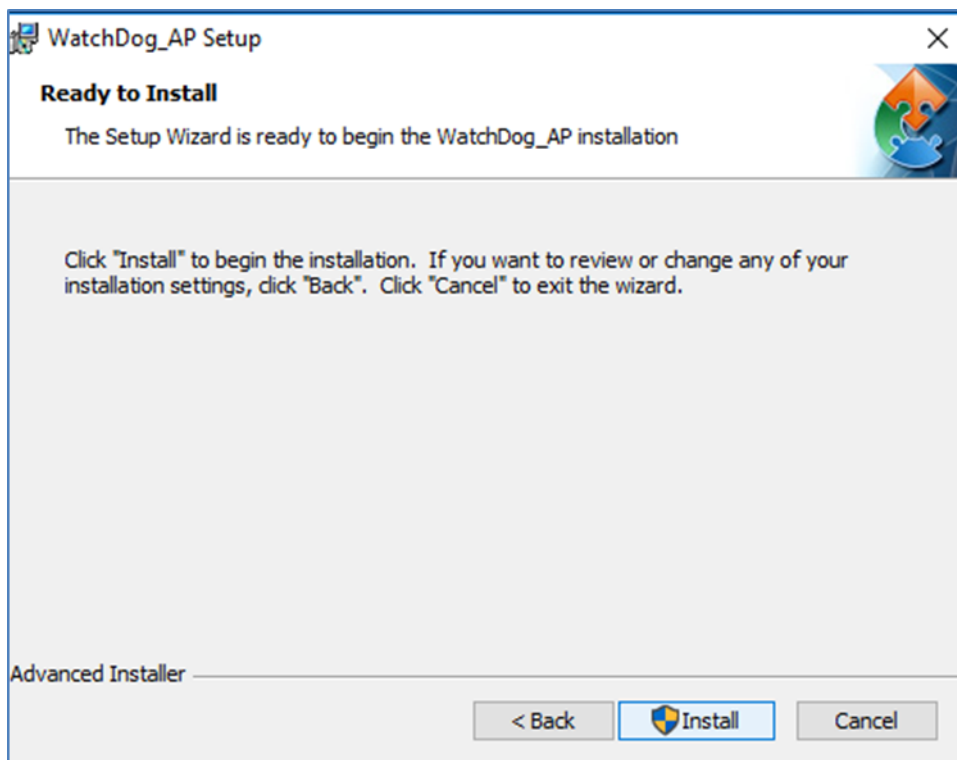
6. Select **Next**.



7. The installed storage location is displayed, select **Next** to continue.



8. Select **Next** to start the installation.



9. When installation is completed, select **Finish** to close the window.

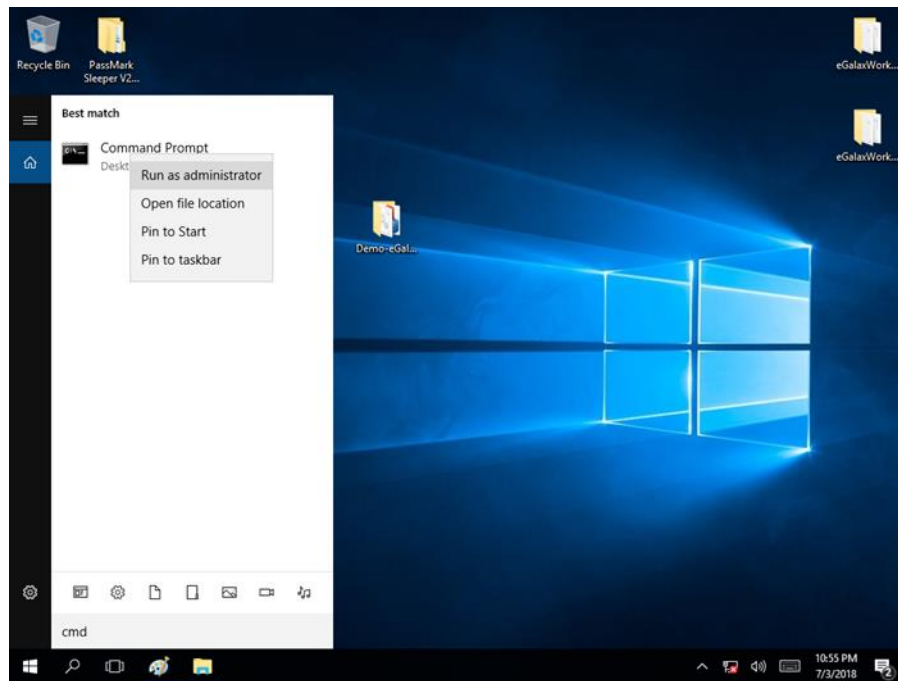


4.8 Digital IO Driver

For more details about Winmate Watchdog, please download Digital IO Guide from Winmate Downloads Center:

Follow instructions below to install **Digital IO** driver.

1. Type "cmd" in the run box then the cmd.exe will appear in programs.
2. Right click on the cmd.exe and click on "Run as administrator" to start.



3. Open the Driver CD (included in the package) and select Digital IO driver.
4. When Windows Security dialog appear, select install to continue the Installation.
5. Wait for installation to complete. When installation is complete, press any key to close.

```
Administrator: Command Prompt

C:\>cd D:\Driver\WMDIO APP v1.0.0.3\Driver\5.0.6.0\WMDIO Driver for Win7_64bit
C:\>dir
. . .
WMDIO 64bit Driver Installation Guide v101.pdf      WMDIO Driver for Win7_32bit.zip
WMDIO Driver for Win7_64bit.zip
3 File(s)    227,270 bytes
2 Dir(s)    60,734,410,752 bytes free

D:\Driver\WMDIO APP v1.0.0.3\Driver\5.0.6.0\WMDIO Driver for Win7_64bit>CD WMDIO Driver for Win7_64bit
D:\Driver\WMDIO APP v1.0.0.3\Driver\5.0.6.0\WMDIO Driver for Win7_64bit>DIR/W
Volume in drive D is R0V0
Volume Serial Number is 6834-E6A5

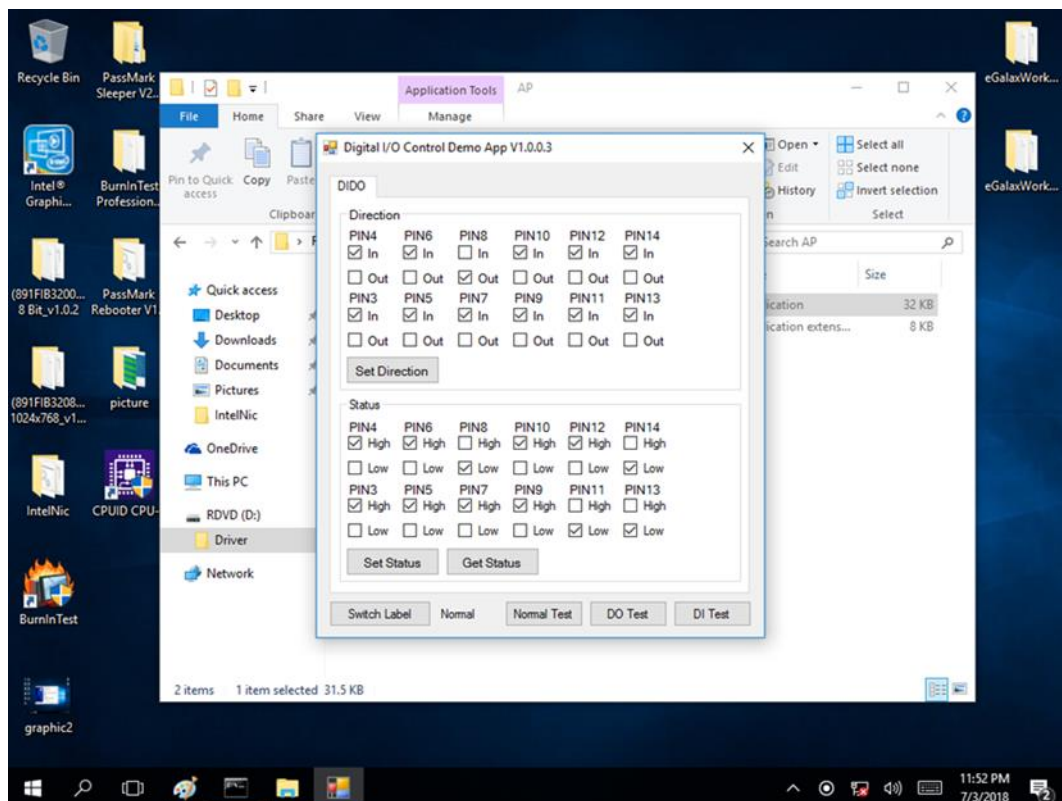
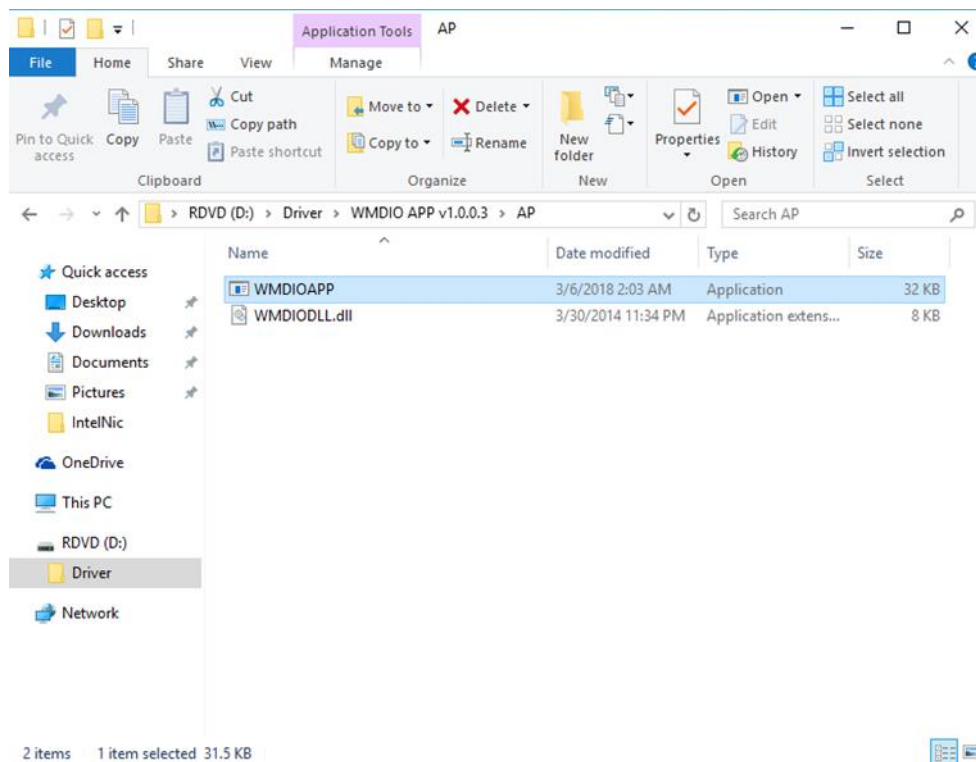
Directory of D:\Driver\WMDIO APP v1.0.0.3\Driver\5.0.6.0\WMDIO Driver for Win7_64bit

. . .
[.]          devcon.exe    install.bat    wmdio.cat    wmdio.inf    [x64]
4 File(s)    91,614 bytes
3 Dir(s)    60,736,315,392 bytes free

D:\Driver\WMDIO APP v1.0.0.3\Driver\5.0.6.0\WMDIO Driver for Win7_64bit>INSTALL
D:\Driver\WMDIO APP v1.0.0.3\Driver\5.0.6.0\WMDIO Driver for Win7_64bit>DEVCON.EXE INSTALL wmdio.inf "root\WMDIO"
Device node created. Install is complete when drivers are installed...
Updating drivers for root\WMDIO from D:\Driver\WMDIO APP v1.0.0.3\Driver\5.0.6.0\WMDIO Driver for Win7_64bit\wmdio.inf.
Drivers installed successfully.

D:\Driver\WMDIO APP v1.0.0.3\Driver\5.0.6.0\WMDIO Driver for Win7_64bit>pause
Press any key to continue . . .
```

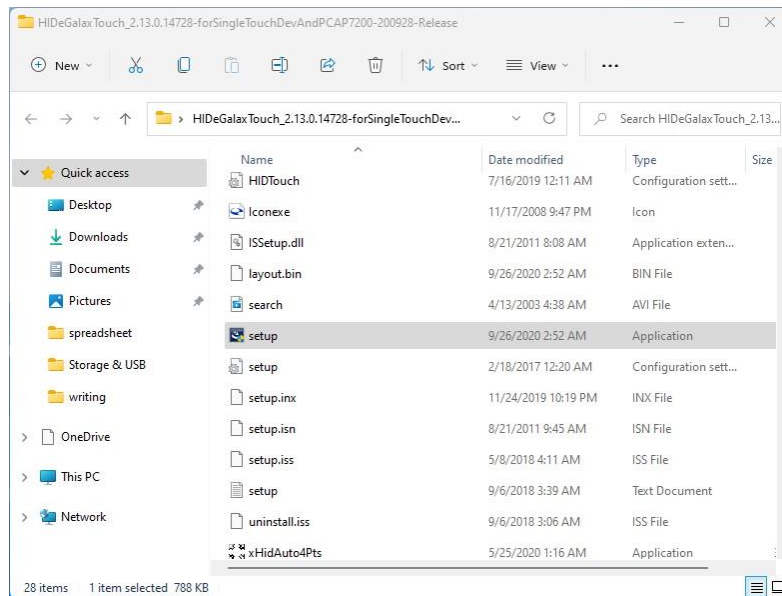
6. Open the Driver CD (included in the package) and select **Digital IO AP**.



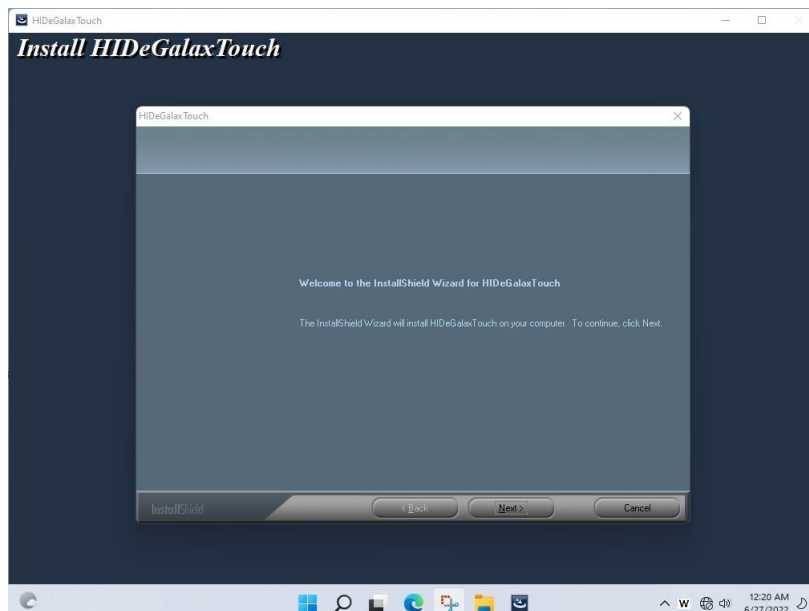
4.9 Resistive Touch Driver for Windows 11 System

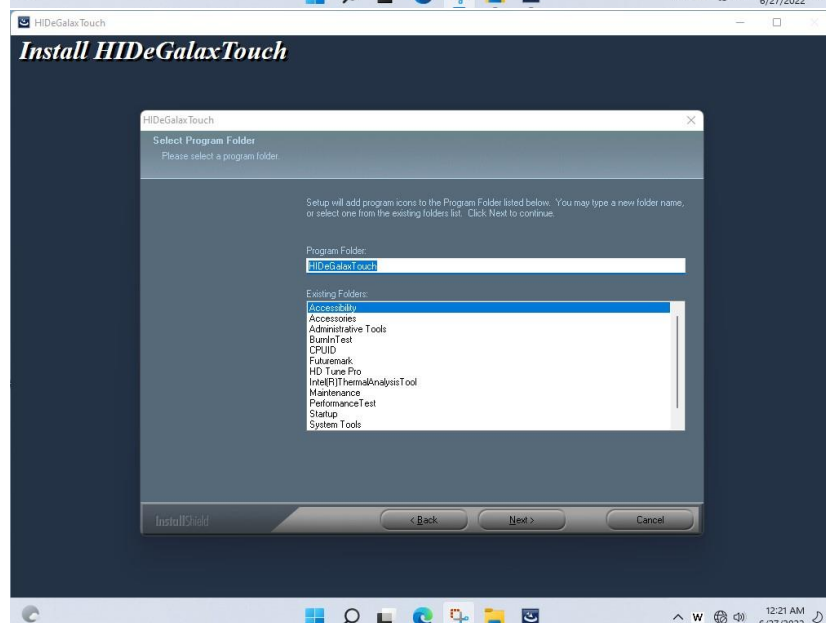
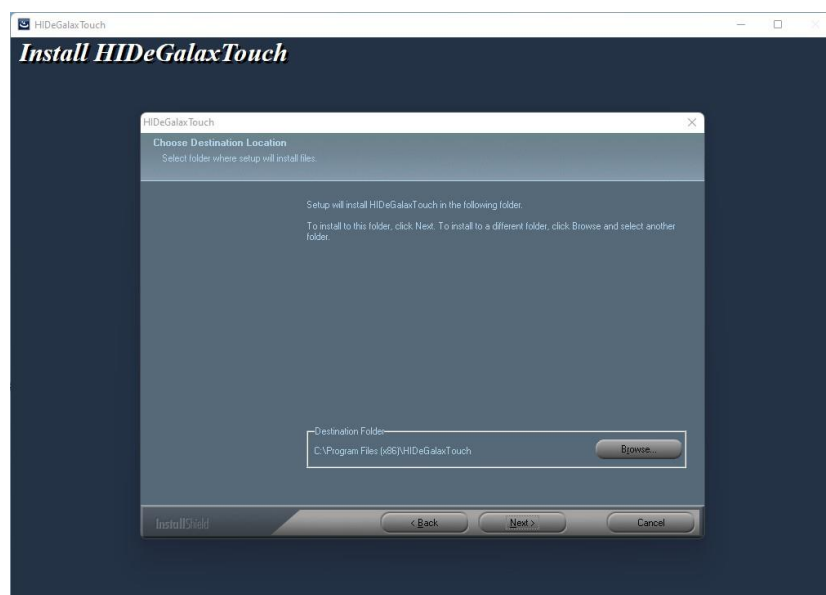
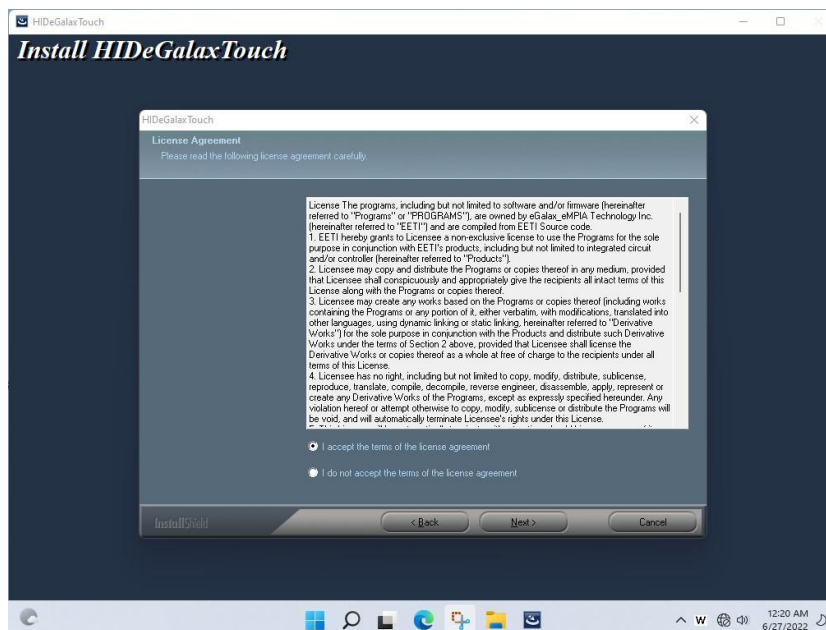
Follow the instructions below to install the touch driver.

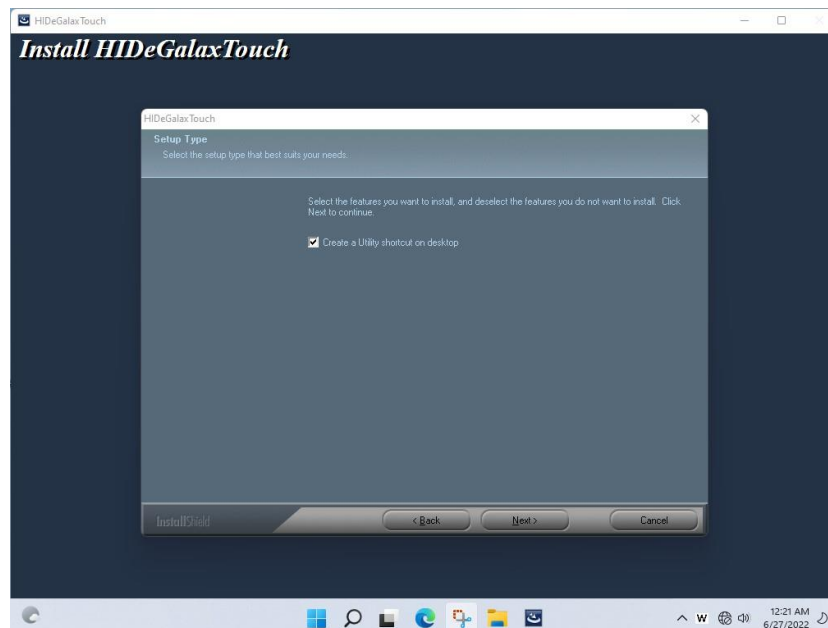
1. Click setup



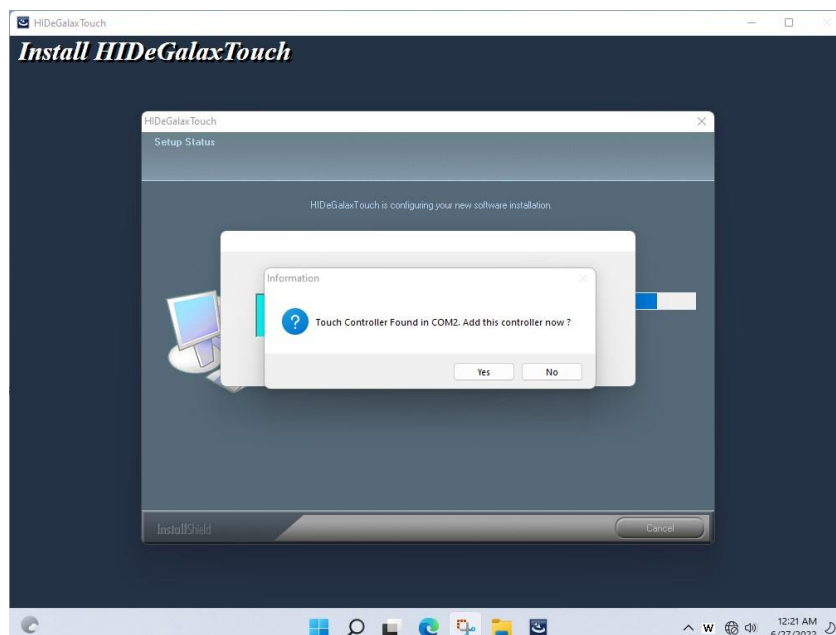
2. Click Next to continue



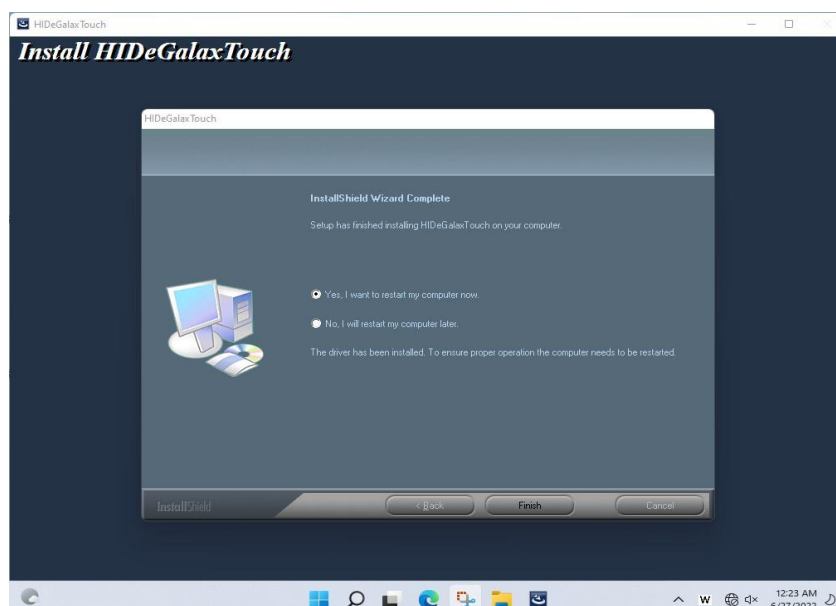




3. Click Yes to add this controller



4. Restart the computer now and finish the setup.



Chapter 5: Technical Support

This chapter includes the directory for technical support. Free technical support is available from our engineers every business day. We are always ready to give advice on application requirements or specific information on the installation and operation of any of our products. If any problem occurs immediately contact us.

5.1 Drivers

5.2 Software Development Kit (SDK)

5.1 Drivers

The list of drivers available for IE32 3.5" SBC:

Item	Driver
1	Chipset Driver
2	Graphic Driver
3	ME Driver
4	Audio Driver
5	Ethernet Driver
6	Watchdog Driver/AP
7	Digital IO Driver/AP
8	Windows 11 Resistive Touch Driver

To find the Drivers, please refer to the Driver CD that comes in the package or contact us.

5.2 Software Development Kit (SDK)

The list of SDK available for IE32 3.5" SBC:

Item	File Type	Description
1	SDK	Watchdog SDK
2	SDK	Digital IO SDK

To find the SDK, please refer to the Driver CD that comes in the package or [contact us](#).

