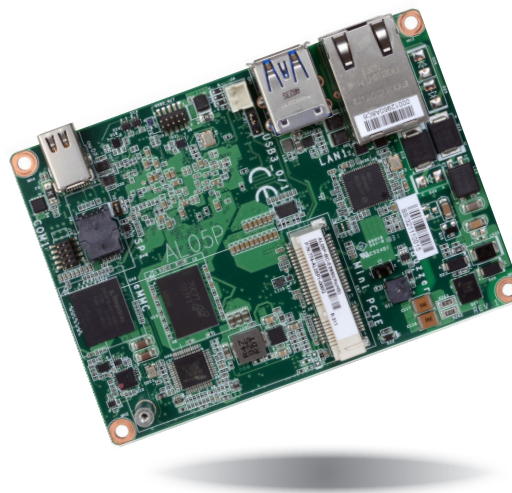# DFI

AL05P
Embedded SBC 2.5"
User's Manual

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Changes after the publication's first release will be based on the product's revision. The website will always provide the most updated information.

Trademarks

Product names or trademarks appearing in this manual are for identification purpose only and are the properties of the respective owners.

FCC and DOC Statement on Class B

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

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

Notice:

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

Table of Contents

Warranty

1. Warranty does not cover damages or failures that arised from misuse of the product, inability to use the product, unauthorized replacement or alteration of components and product specifications.

2. The warranty is void if the product has been subjected to physical abuse, improper installation, modification, accidents or unauthorized repair of the product.

3. Unless otherwise instructed in this user's manual, the user may not, under any circumstances, attempt to perform service, adjustments or repairs on the product, whether in or out of warranty. It must be returned to the purchase point, factory or authorized service agency for all such work.

4. We will not be liable for any indirect, special, incidental or consequencial damages to the product that has been modified or altered.

Static Electricity Precautions

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

1. To prevent electrostatic build-up, leave the system board in its anti-static bag until you are ready to install it.

2. Wear an antistatic wrist strap.

3. Do all preparation work on a static-free surface.

4. Hold the device only by its edges. Be careful not to touch any of the components, contacts or connections.

5. Avoid touching the pins or contacts on all modules and connectors. Hold modules or connectors by their ends.

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

Safety Measures

To avoid damage to the system:
• Use the correct AC input voltage range.

To reduce the risk of electric shock:
• Unplug the power cord before removing the system chassis cover for installation or servicing. After installation or servicing, cover the system chassis before plugging the power cord.

About the Package

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

- One AL05P board
- One Heat spreader (Height: 15mm)

Optional Items

- USB port cable (Length: 200mm)
- COM port cable (Length: 300mm)
- Heat sink for 0 to 60°C (Height: 28mm)

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

Before Using the System Board

Before using the system board, prepare basic system components.
If you are installing the system board in a new system, you will need at least the following internal components.

- Storage devices such as hard disk drive, etc.

You will also need external system peripherals you intend to use which will normally include at least a keyboard, a mouse and a video display monitor.

Chapter 1 - Introduction

Specifications

SYSTEM	Processor	Intel Atom® Processor E3900 Series, BGA 1296 Intel Atom® x5-E3940 Processor, Quad Core, 2M Cache, 1.6GHz (1.8GHz), 9.5W Intel Atom® x5-E3930 Processor, Dual Core, 2M Cache, 1.3GHz (1.8GHz), 6.5W Intel® Pentium® Processor N4200, Quad Core, 2M Cache, 1.1GHz (2.5GHz), 6W Intel® Celeron® Processor N3350, Dual Core, 2M Cache, 1.1GHz (2.4GHz), 6W
	Memory	SDRAM Memory Down up to 4GB Single Channel DDR4 2400MHz
	BIOS	Insyde SPI 128Mbit (supports UEFI boot only)
GRAPHICS	Controller	Intel® HD Graphics
	Feature	OpenGL 4.2, Direct X 11.1, OpenCL 1.2, OGL ES 3.0 HW Decode: H.264, MPEG2, VC1, VP8, H.265, MPEG4 HW Encode: H.264, MPEG2, MPEG4
	Display	1 x Mini DP++ Mini DP++: resolution up to 4096x2160 @ 60Hz
EXPANSION	Interface	1 x Full-size Mini PCIe (PCIe/USB 2.0/SATA 3.0, optional USB 3.1 Gen1/USB 2.0)
STORAGE	eMMC	1 x 16GB/32GB/64GB eMMC
ETHERNET	Controller	1 x Intel® I210AT PCIe (10/100/1000Mbps) 1 x Intel® I210IT PCIe (10/100/1000Mbps) (available upon request)
REAR I/O	Ethernet	1 x GbE (RJ-45)
	USB	2 x USB 3.1 Gen1
	Display	1 x Mini DP++
INTERNAL I/O	Serial	1 x RS-232/422/485 (1.27mm pitch)
	USB	2 x USB 2.0 (1.27mm pitch)
	DIO	1 x 8-bit DIO
	SMBus	1 x SMBus
WATCHDOG TIMER	Output & Interval	System Reset, Programmable via Software from 1 to 255 Seconds
SECURITY	TPM	fTPM2.0
POWER	Type	48VDC PoE
	Connector	PoE LAN
	RTC Battery	CR2032 Coin Cell
OS SUPPORT (UEFI ONLY)	Microsoft/Linux	Windows 10 IoT Enterprise (64-bit) Ubuntu 16.04
ENVIRONMENT	Temperature	Operating: 0 to 60°C, -20 to 70°C Storage: -40 to 85°C
	Humidity	Operating: 5 to 90% RH Storage: 5 to 90% RH
MECHANICAL	Dimensions	2.5" Pico-ITX Form Factor 100mm (3.94") x 72mm (2.83")
	Height	PCB: 1.6mm Top Side: 15mm, Bottom Side: 8mm

Features

● **Watchdog Timer**

The Watchdog Timer function allows your application to regularly "clear" the system at the set time interval. If the system hangs or fails to function, it will reset at the set time interval so that your system will continue to operate.

● **LPDDR4**

LPDDR4 SDRAM provides backward compatibility to LPDDR3 memory modules but can operate at a lower power level.

● **Graphics**

The integrated Intel® HD graphics engine delivers an excellent blend of graphics performance and features to meet business needs. It provides excellent video and 3D graphics with outstanding graphics responsiveness. These enhancements deliver the performance and compatibility needed for today's and tomorrow's business applications. Supports 1 x Mini DP++ interface for display output.

● **Gigabit LAN**

One Intel® I210AT PCI Express Gigabit Ethernet controller or one optional Intel® I210IT PCI Express Gigabit Ethernet controller supports up to 1Gbps data transmission.

● **Power Failure Recovery**

When power returns after an AC power failure, you may choose to either power-on the system manually or let the system power-on automatically.

● **USB**

The system board supports the USB 3.1 Gen1. It is capable of running at a maximum transmission speed of up to 5 Gbit/s (625 MB/s) and is faster than USB 2.0 (480 Mbit/s, or 60 MB/s) and USB 1.1 (12Mb/s). USB 3.1 Gen1 reduces the time required for data transmission, reduces power consumption, and is backward compatible with USB 2.0. It is a marked improvement in device transfer speeds between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

● **Wake-On-LAN**

This feature allows the network to remotely wake up a Soft Power Down (Soft-Off) PC. It is supported via the onboard LAN port or via a PCI LAN card that uses the PCI PME (Power Management Event) signal. However, if your system is in the Suspend mode, you can power-on the system only through an IRQ or DMA interrupt.

● **ACPI STR**

The system board is designed to meet the ACPI (Advanced Configuration and Power Interface) specification. ACPI has energy saving features that enable PCs to implement power management and plug-and-play with operating systems that support power management features.

With ACPI, the system can further utilize the Ethernet adapter's wake-on-LAN (WOL) capability that enables remote wake-up if the Ethernet adapter supports such feature.

● **Power over Ethernet**

The system board is powerd by PoE (Power over Ethernet) for industrial and signage user under PoE environment.

7

Chapter 2 - Hardware Installation

Board Layout

LAN/PoE PD

Intel I210AT or optional I210IT

Buzzer

12V DC Connector for Debug (opt.)

USB 0-1
USB 3.1 Gen1

Mini PCIe

2 1
Battery

1 2
9 10
USB 6-7
USB 2.0

LPDDR4

F81803

Mini DP++ SPI Flash BIOS

2   10
COM 1
1   9

eMMC

Top View

Standby Power LED

Intel Atom

LPDDR4

Front Panel
5 1
6 2

DIO
9   1
10   2

SMBus
5 1
6 2
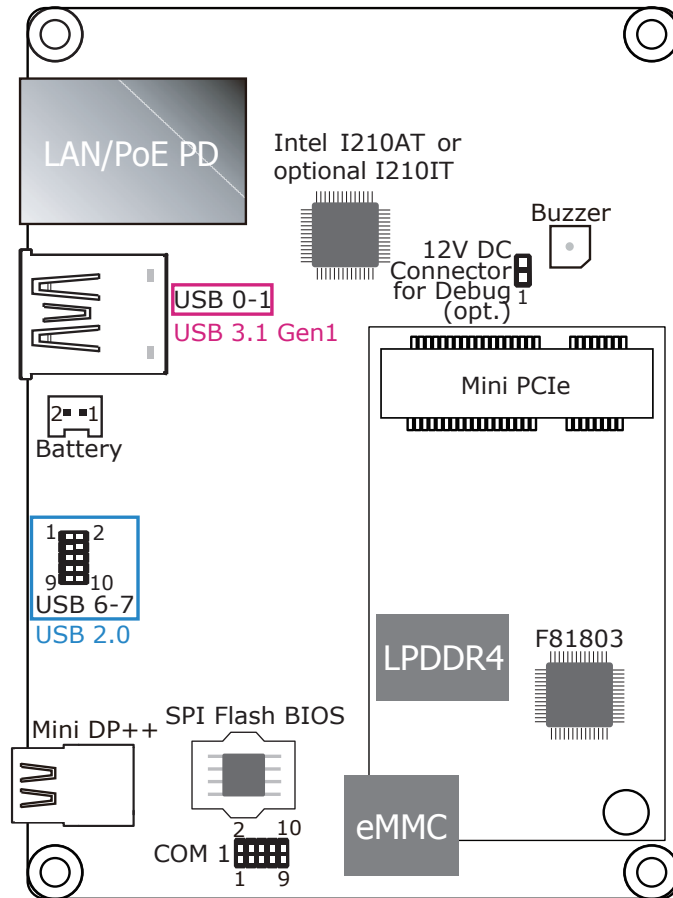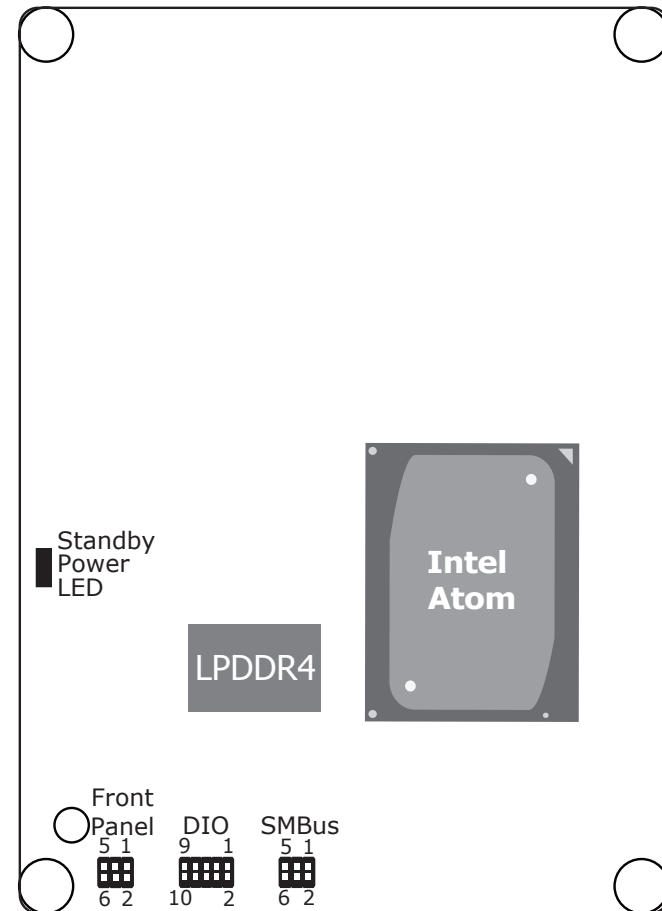
Bottom View

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

System Memory

Important:
When the Standby Power LED lights red, it indicates that there is power on the system board. Power-off the PC then unplug the power cord prior to installing any devices. Failure to do so will cause severe damage to the motherboard and components.

LPDDR4   Standby Power LED   LPDDR4
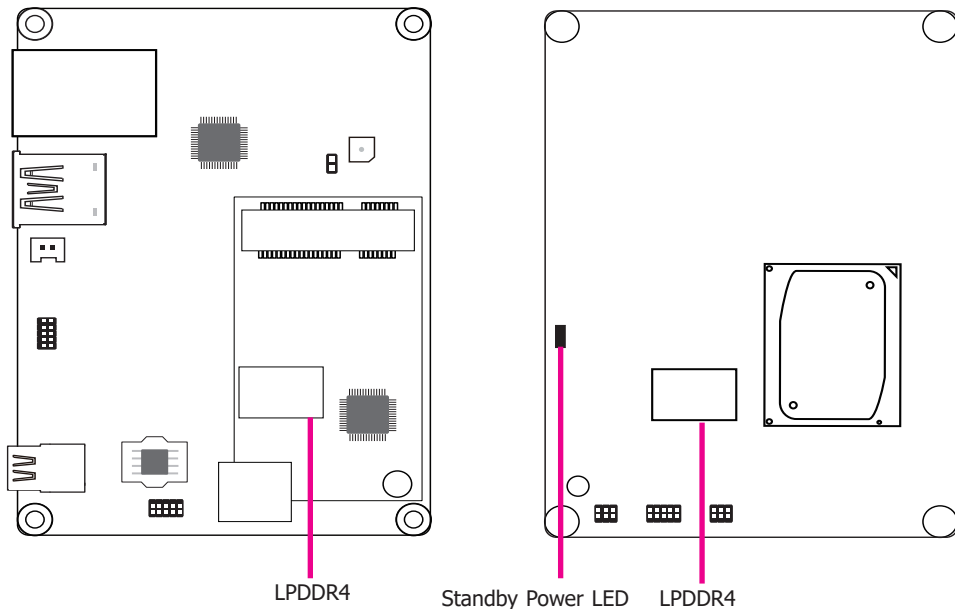
Block Diagram

Features

- SDRAM Memory Down up to 4GB
- Single Channel LPDDR4 2400MHz

Rear Panel I/O Ports
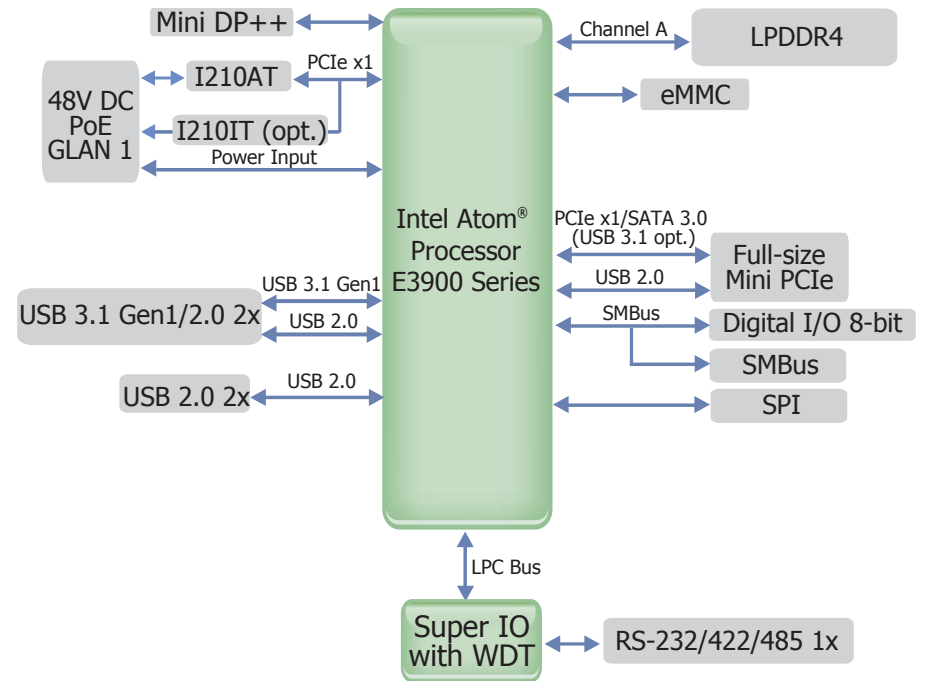
LAN/PoE PD
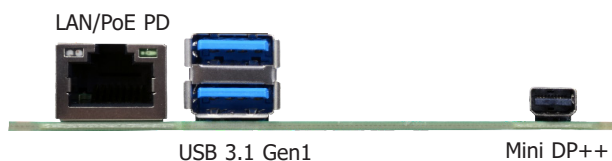
USB 3.1 Gen1

Mini DP++

The rear panel I/O consists of the following ports:

- 1 LAN/PoE PD
- 2 USB 3.1 Gen1 ports
- 1 Mini DP++ port
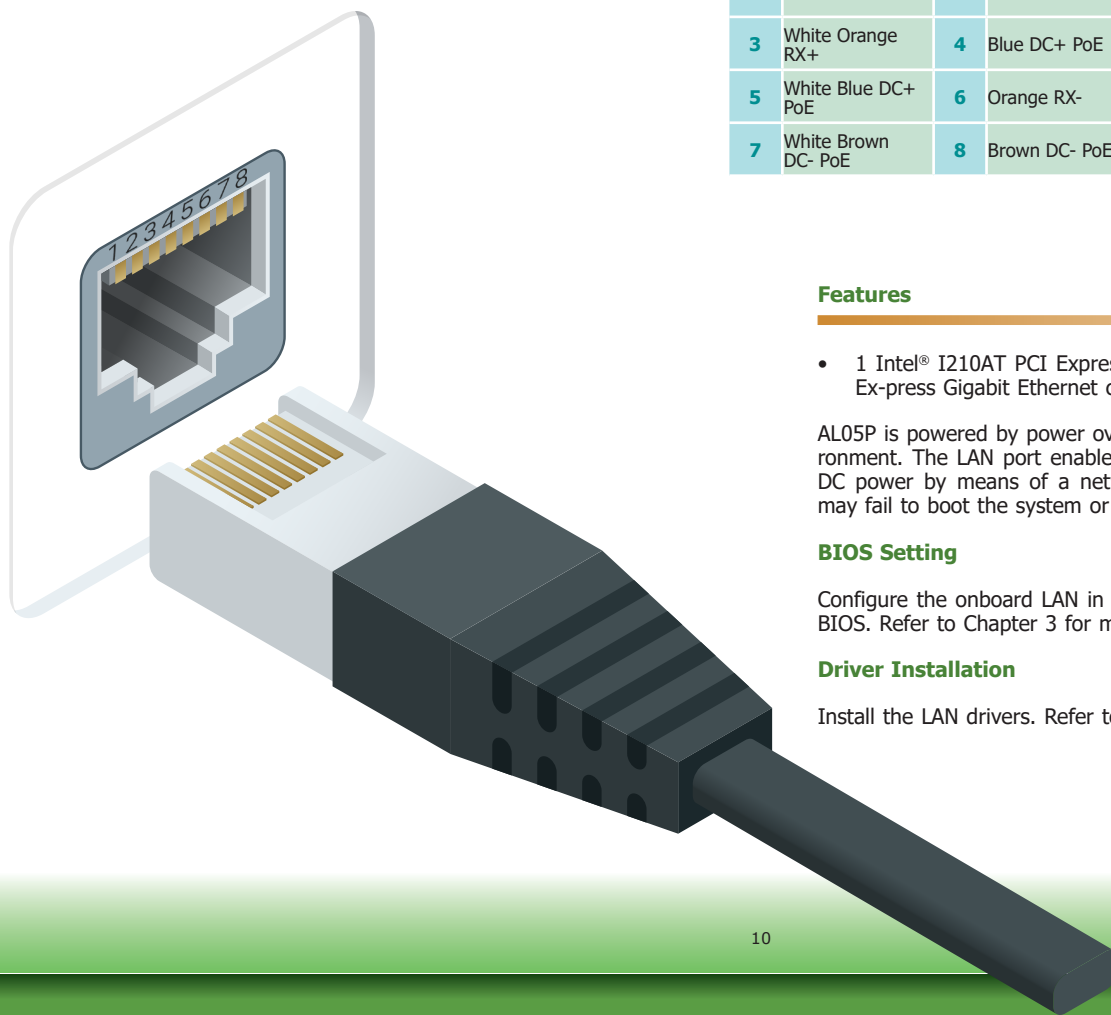
LAN/PoE PD (48V DC, 802.3af)

LAN/PoE PD (48V DC)

8   1
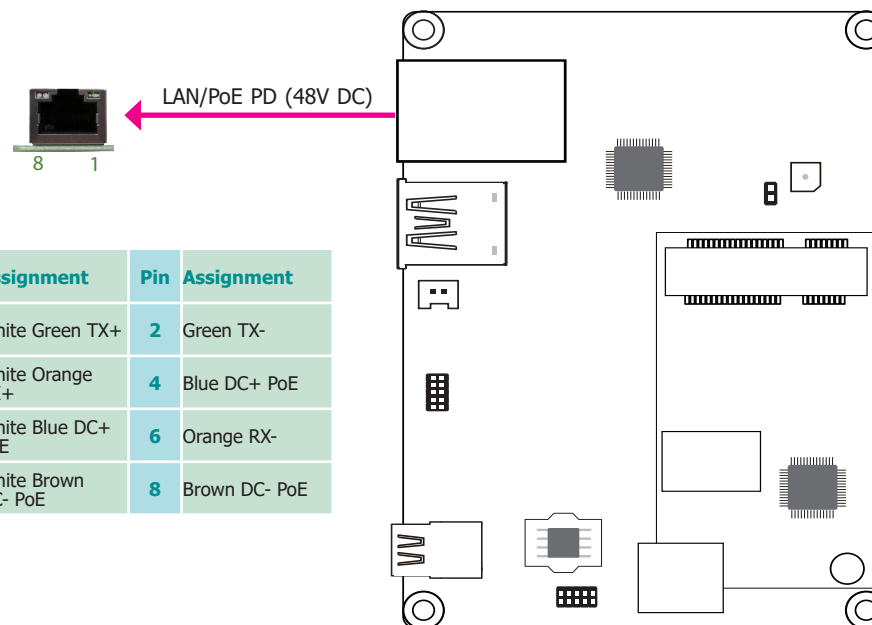
Pin	Assignment	Pin	Assignment
1	White Green TX+	2	Green TX-
3	White Orange RX+	4	Blue DC+ PoE
5	White Blue DC+ PoE	6	Orange RX-
7	White Brown DC- PoE	8	Brown DC- PoE

Features

- 1 Intel® I210AT PCI Express Gigabit Ethernet controller or 1 optional Intel® I210IT PCI Ex-press Gigabit Ethernet controller

AL05P is powered by power over ethernet (PoE) for industrial and signage use under PoE environment. The LAN port enables the system board to connect to a local area network and 48V DC power by means of a network hub. Using a voltage more than the recommended range may fail to boot the system or cause damage to the system board.

BIOS Setting

Configure the onboard LAN in the "ACPI Configuration" submenu of the Advanced menu in the BIOS. Refer to Chapter 3 for more information.

Driver Installation

Install the LAN drivers. Refer to Chapter 4 for more information.

Graphics Interface

The display port consists of the following:

• 1 Mini DP++ port
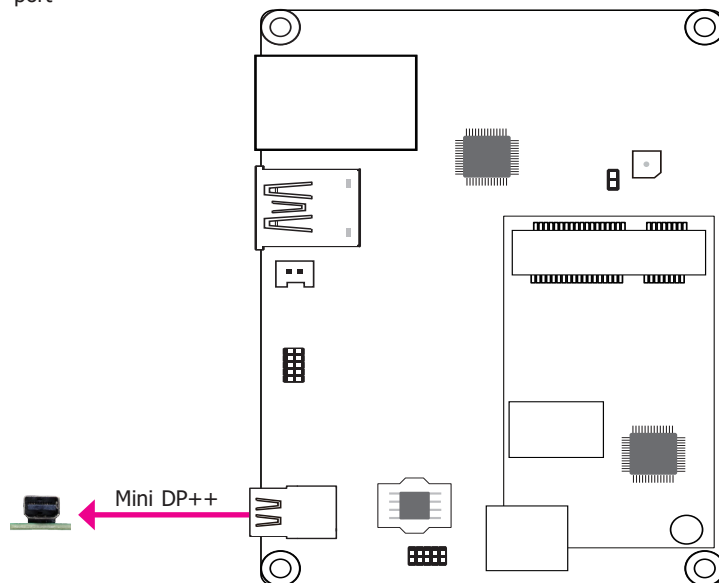
Mini DP++

Mini DP++ Port

The Mini DP++ port is a digital display interface used to connect a display device such as a computer monitor. It is used to transmit audio and video simultaneously. The interface, which is developed by VESA, delivers higher performance features than any other digital interfaces.

Driver Installation

Install the graphics driver. Refer to Chapter 4 for more information.

USB Ports

USB 1
USB 0

USB 3.1 Gen1

	1 2	
PWR		PWR
DATA-		DATA-
DATA+		DATA+
GND		GND
NC		NC
	9 10	

USB 6-7

USB 2.0
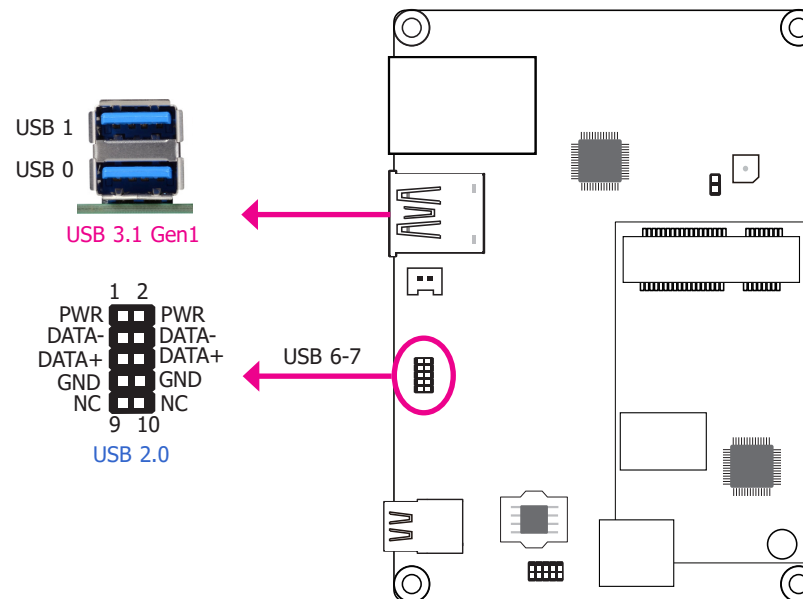
The USB device allows data exchange between your computer and a wide range of simultaneously accessible external Plug and Play peripherals.

The system board is equipped with 2 onboard USB 3.1 Gen1 ports (USB 0-1). The 10-pin connector allows you to connect 2 additional USB 2.0 ports (USB 6-7). The additional USB ports may be mounted on a card-edge bracket. Install the card-edge bracket to an available slot at the rear of the system chassis and then insert the USB port cables to a connector.

BIOS Settings

Configure the onboard USB in the Boot menu in the BIOS. Refer to Chapter 3 for more information.

I/O Connectors
Digital I/O Connector
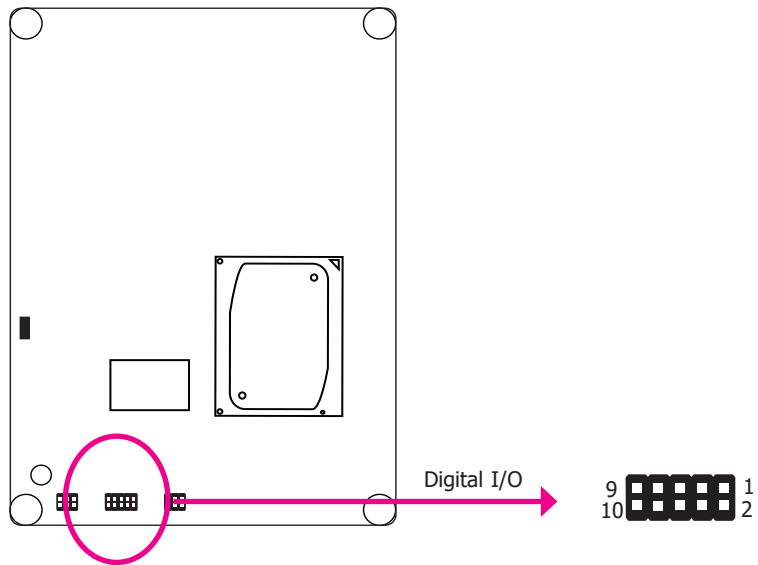
Digital I/O

The Digital I/O connector supports 8-bit digital input/output signals to provide the ability of monitoring and controlling the states of the connected external devices.

Digital I/O Connector

Pin	Assignment	Pin	Assignment
1	DIO7	2	DIO6
3	DIO5	4	DIO4
5	DIO3	6	DIO2
7	DIO1	8	DIO0
9	+5V	10	GND

Expansion Slot

Full-size Mni PCIe (PCIe/USB 2.0/SATA 3.0, optional USB 3.1 Gen1/USB 2.0)
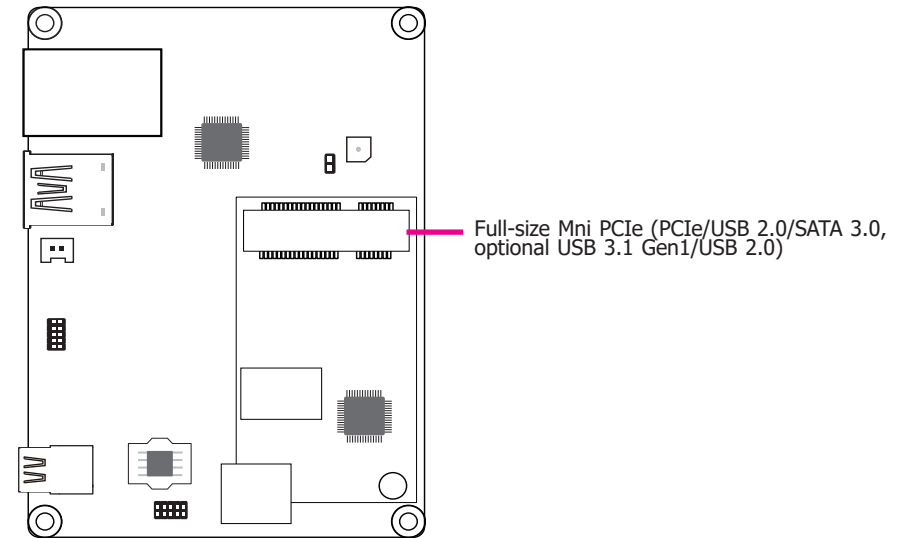
Mini PCI Express Slot
The full-size Mini PCIe socket supports PCIe x1, USB 2.0, and SATA 3.0 (optional USB 3.1 Gen1/USB 2.0) signals and is used to install a Mini PCIe card.

COM (Serial) Port

COM 1: RS232/422/485
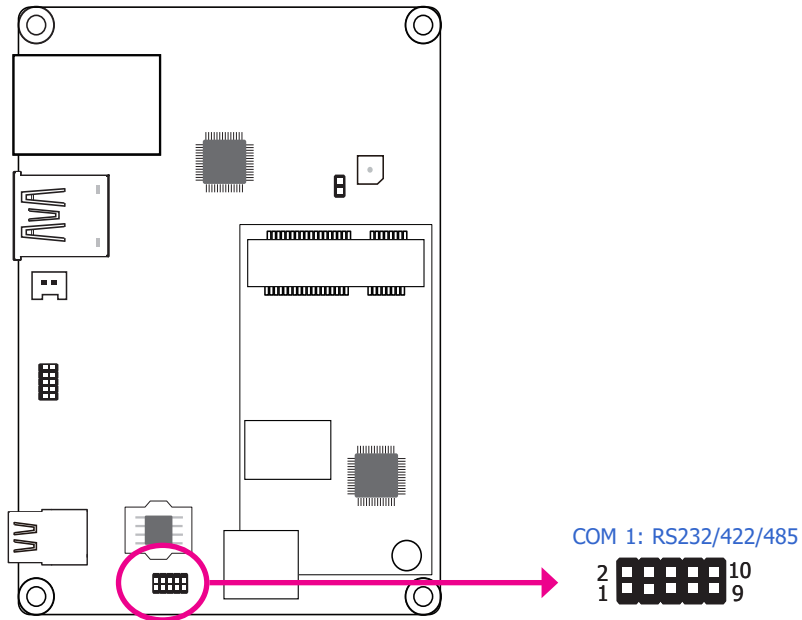
COM 1 can be selected among RS232, RS422 and RS485.

The serial port is asynchronous communication ports with 16C550A-compatible UARTs that can be used with modems, serial printers, remote display terminals, and other serial devices.

BIOS Setting

Configure the serial port in the "SIO FINTEK81803" submenu of the Advanced menu in the BIOS. Refer to Chapter 3 for more information.

COM 1

Pin	RS232	RS422 Full Duplex	RS485
1	DCD-	TX-	DATA-
2	RD	TX+	DATA+
3	TD	RX+	NC
4	DTR-	RX-	NC
5	GND	GND	GND
6	DSR-	NC	NC
7	RTS-	NC	NC
8	CTS-	NC	NC
9	RI-	NC	NC
10	GND	GND	GND

SMBus Connector

SMBus

```
5        1
6        2
```
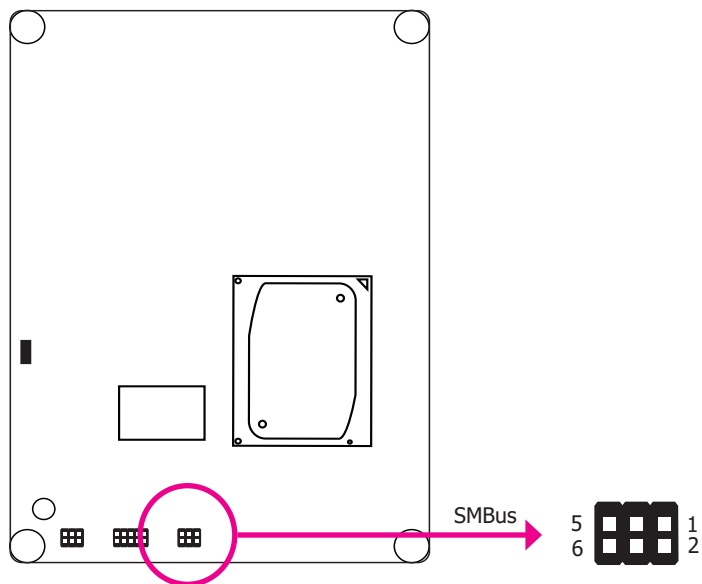
The System Management Bus (SMBus) connector is used to connect SMBus devices. It is a multiple device bus that allows multiple chips to connect to the same bus and enable each one to act as a master by initiating data transfer.

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

Front Panel Connector

Front Panel

ATX-SW
RESET

```
5        1
6        2
```

SATA-LED
PWR-LED
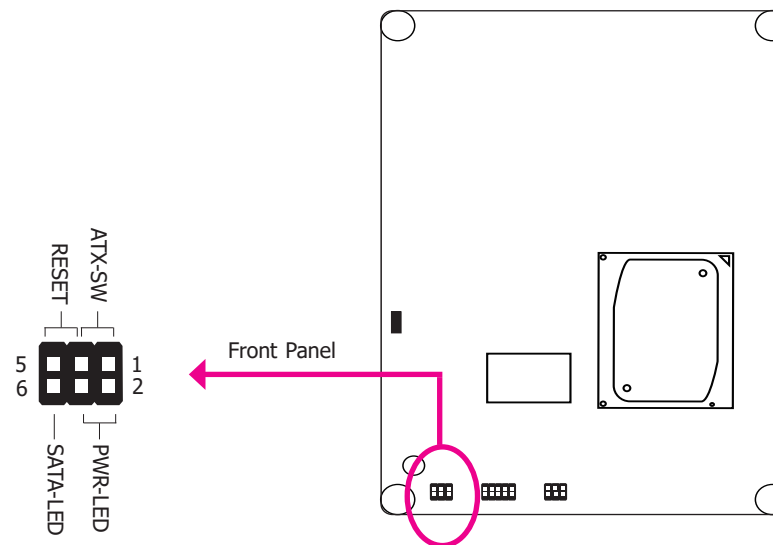
ATX-SW

This switch is used to power on or off the system.

RESET

This switch allows you to reboot without having to power off the system.

PWR-LED

When the system's power is on, this LED will light. When the system is in the S1 (POS - Power On Suspend) state, it will blink every second. When the system is in the S3 (STR - Suspend To RAM) state, it will blink every 4 seconds.

	Pin	Assignment		Pin	Assignment
ATX-SW	1	Signal	PWR-LED	2	LED Power
	3	GND		4	Signal
RESET	3	GND	SATA-LED	6	SATA_LED
	5	Signal			

Battery

Battery Connector

1 2
+3.3V GND
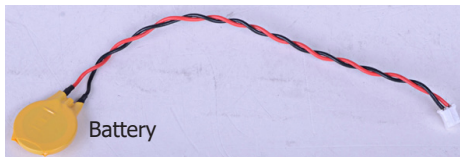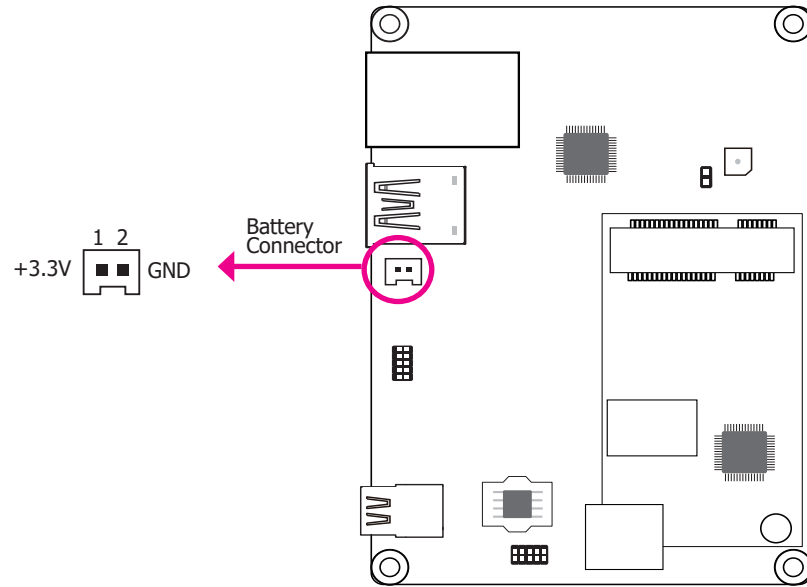
Battery

Connect to the battery connector

The lithium ion battery powers the real-time clock and CMOS memory. It is an auxiliary source of power when the main power is shut off.

Safety Measures

• Danger of explosion if battery incorrectly replaced.

• Replace only with the same or equivalent type recommended by the manufacturer.

• Dispose of used batteries according to local ordinance.

12V DC Connector for Debug (optional)

12V DC Connector for Debug (optional)

2 GND
1 12VSB
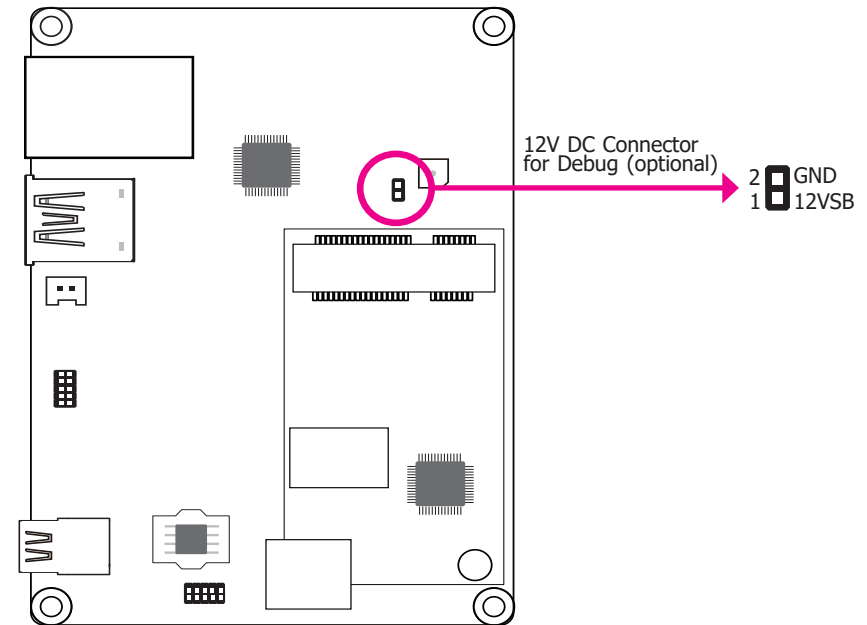
12V DC connector (optional) is for debug.

Chapter 3 - BIOS Setup

Overview

The BIOS is a program that takes care of the basic level of communication between the CPU and peripherals. It contains codes for various advanced features found in this system board. The BIOS allows you to configure the system and save the configuration in a battery-backed CMOS so that the data retains even when the power is off. In general, the information stored in the CMOS RAM of the EEPROM will stay unchanged unless a configuration change has been made such as a hard drive replaced or a device added.

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

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

Default Configuration

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

Entering the BIOS Setup Utility

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

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

Legends

Keys	Function
Right and Left arrows	Moves the highlight left or right to select a menu.
Up and Down arrows	Moves the hightlight up or down between submenu or fields.
<Esc>	Exit to the BIOS Setup Utility.
<F5>	Scrolls forward through the values or options of the highlighted field.
<F6>	Scrolls backward through the values or options of the highlighted field.
<F1>	Displays general help
<F9>	Optimized defaults
<F10>	Saves and resets the setup program.
<Enter>	Press <Enter> to enter the highlighted submenu.

Scroll Bar

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

Submenu

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

Insyde BIOS Setup Utility

Main

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

```
                    InsydeH2O Setup Utility                     Rev. 5.0
   Main     Advanced    Security    Boot     Exit

   Project Name                AL05P              This is the help for the
   BIOS Version                B192.19A           hour, minute, second field.
                                                  Valid range is from 0 to
   Intel(R) Atom(TM) Processor E3950 @ 1.60GHz    23, 0 to 59, 0 to 59. IN-
   CPU Speed                   1600 MHz           CREASE/REDUCE : +/-.
   CPUID                       0x506C9
   L1 Data Cache               24 KB
   L1 Instruction Cache        32 KB
   L2 Cache                    1024 KB
   L3 Cache                    0 KB
   Number Of Processors        4 Core(s) / 4 Thread(s)
   BXT SOC                     B1 Stepping
   Microcode Rev               00000032

   Total Memory                2048 MB
   System Memory Speed         2400 MHz
   SODIMM 0                    1024 MB
   SODIMM 1                    1024 MB

   TXE FW Version              3.1.55.2269

   System Time                 [11:14:24]
   System Date                 [04/25/2019]

   F1   Help        ↑/↓   Select Item   F5/F6 Change Values    F9   Setup Defaults
   Esc  Exit        ←/→   Select Item   Enter Select ▶ SubMenu F10  Save and Exit
```

System Time

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

System Date

The date format is <month>, <date>, <year>. Month displays the month, from 01 to 12. Date displays the date, from 01 to 31. Year displays the year, from 2000 to 2099.

Advanced

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

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

```
                    InsydeH2O Setup Utility                     Rev. 5.0
   Main     Advanced    Security    Boot     Exit

   ▶ACPI Configuration                          ACPI Configuration Setting
   ▶CPU Configuration
   ▶Video Configuration
   ▶SATA Configuration
   ▶PCI Express Configuration
   ▶Console Redirection
   ▶SIO FINTEK81803

   F1   Help        ↑/↓   Select Item   F5/F6 Change Values    F9   Setup Defaults
   Esc  Exit        ←/→   Select Item   Enter Select ▶ SubMenu F10  Save and Exit
```

ACPI Configuration

This section configures the system ACPI parameters.

```
                    InsydeH2O Setup Utility                    Rev. 5.0
      Advanced
 Wake On LAN              <Disabled>              Enable/Disable Wake On
 After G3                 <Always On>             LAN capability




 F1   Help         ↑/↓   Select Item     F5/F6 Change Values       F9   Setup Defaults
 Esc  Exit         ←/→   Select Item     Enter Select ▶ SubMenu    F10  Save and Exit
```
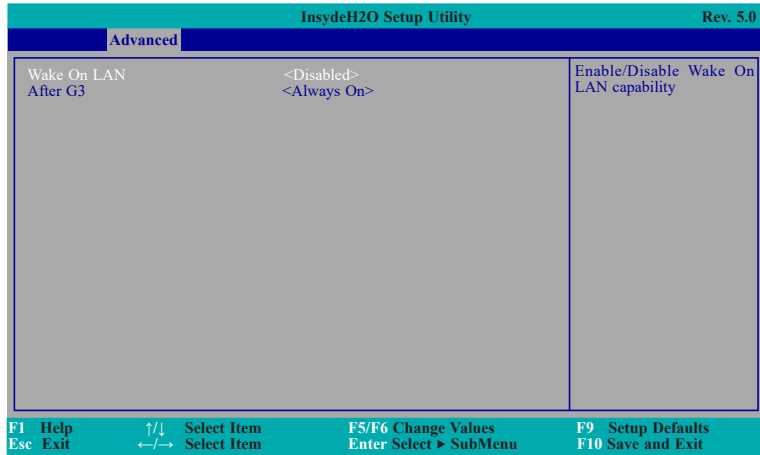
Wake On LAN

This field is used to enable or disable the LAN signal to wake up the system.

After G3

This field is to specify what state the system should be in when power is re-applied after a power failure (G3, the mechanical-off, state).

Always On   The system working state.

Always Off   Off, except for trickle current to devices such as the power button.

Note:
If "Quiet Boot" of Boot menu is set to enabled, "BGRT Logo" will appear for configuration. Refer to the Boot menu in this chapter for more information.

```
                    InsydeH2O Setup Utility                    Rev. 5.0
      Advanced
 Wake On LAN              <Disabled>              Support display logo with
 After G3                 <Always On>             ACPI BGRT table.
 BGRT Logo                <Enabled>




 F1   Help         ↑/↓   Select Item     F5/F6 Change Values       F9   Setup Defaults
 Esc  Exit         ←/→   Select Item     Enter Select ▶ SubMenu    F10  Save and Exit
```
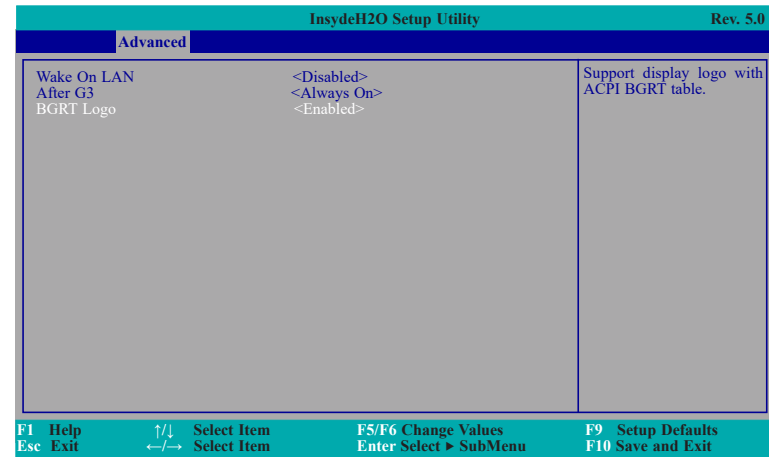
BGRT Logo

This field is used to enable or disable to support display logo with ACPI BGRT table.

CPU Configuration

This section is used to configure the CPU.

```
                         InsydeH2O Setup Utility                    Rev. 5.0
    Advanced

   EIST                        <Enabled>            Enable/Disable  Intel
   Turbo Mode                  <Enabled>            SpeedStep
   C-States                    <Enabled>




 F1   Help         ↑/↓   Select Item      F5/F6 Change Values      F9   Setup Defaults
 Esc  Exit         ←/→   Select Item      Enter Select ▶ SubMenu   F10  Save and Exit
```

EIST

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

Turbo Mode

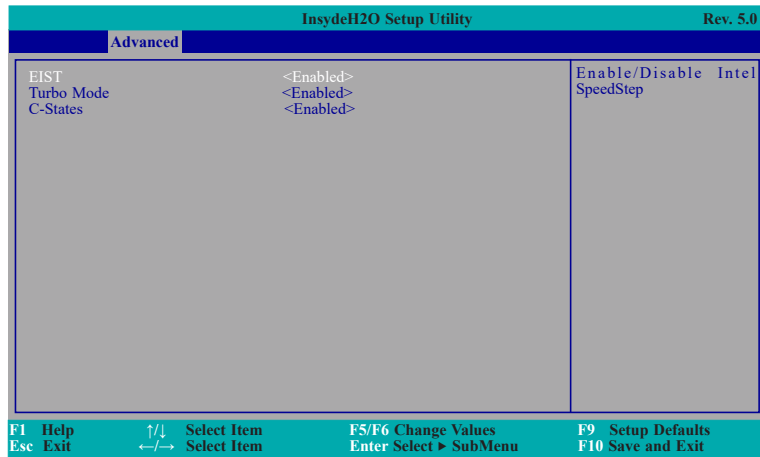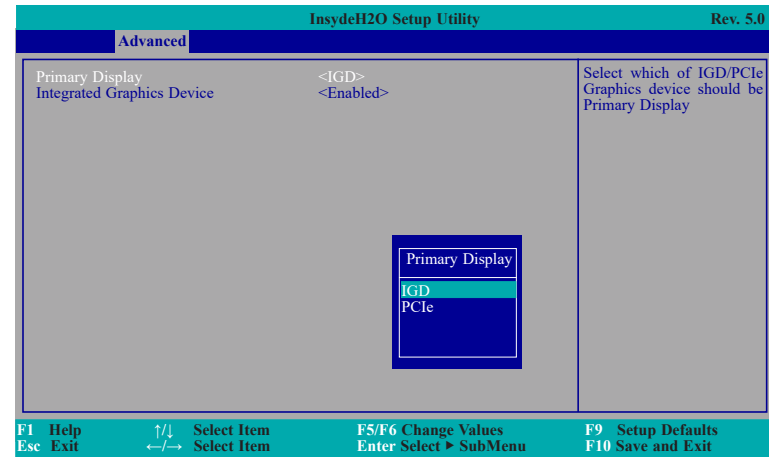This field is used to enable or disable processor turbo mode (requires that EIST is enabled too), which allows the processor core to automatically run faster than the base frequency when the processor's power, temperature, and specification are within the limits of TDP.

C-States

Enable or disable CPU Power Management. It allows CPU to go to C States when it's not 100% utilized.

Video Configuration

This section configures the video settings.

```
                         InsydeH2O Setup Utility                    Rev. 5.0
    Advanced

   Primary Display              <IGD>               Select which of IGD/PCIe
   Integrated Graphics Device   <Enabled>           Graphics device should be
                                                    Primary Display




                                     Primary Display

                                   IGD
                                   PCIe




 F1   Help         ↑/↓   Select Item      F5/F6 Change Values      F9   Setup Defaults
 Esc  Exit         ←/→   Select Item      Enter Select ▶ SubMenu   F10  Save and Exit
```
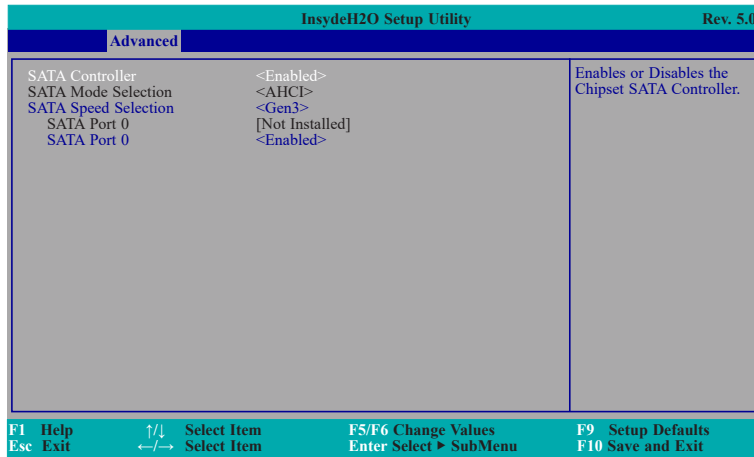
Primary Display

Select either IGD or PCIe Graphics device to be the primary display.

Integrated Graphics Device

Keep IGD enabled or disabled based on the setup options.

SATA Configuration

This section configures the SATA controller.

```
                        InsydeH2O Setup Utility                    Rev. 5.0
          Advanced

   SATA Controller            <Enabled>            Enables or Disables the
   SATA Mode Selection        <AHCI>               Chipset SATA Controller.
   SATA Speed Selection       <Gen3>
      SATA Port 0             [Not Installed]
      SATA Port 0             <Enabled>




 F1   Help          ↑/↓   Select Item      F5/F6 Change Values      F9   Setup Defaults
 Esc  Exit          ←/→   Select Item      Enter Select ▶ SubMenu   F10  Save and Exit
```

SATA Controller

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

SATA Mode Selection

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

AHCI
This option allows the Serial ATA devices to use AHCI (Advanced Host Controller Interface).
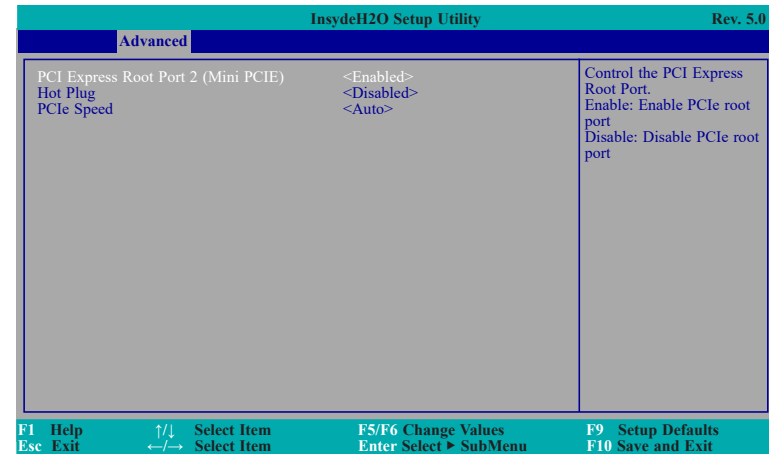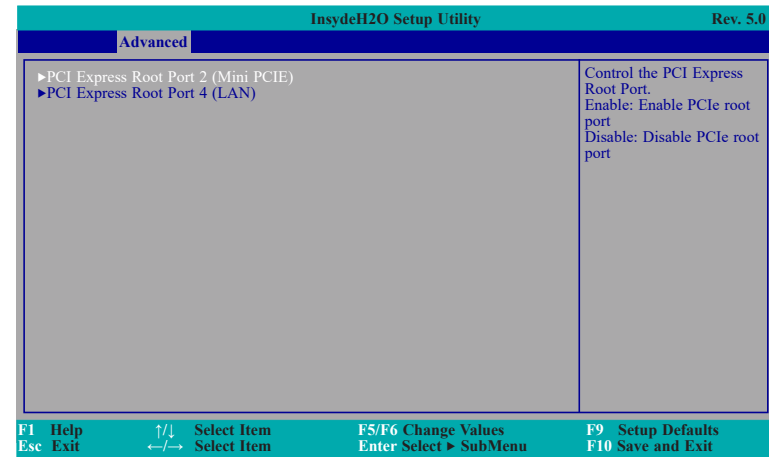
SATA Speed Selection

Select Serial ATA controller(s) speed from Gen1 (1.5 Gbit/s), Gen2 (3.0 Gbit/s) or Gen3 (6.0 Gbit/s).
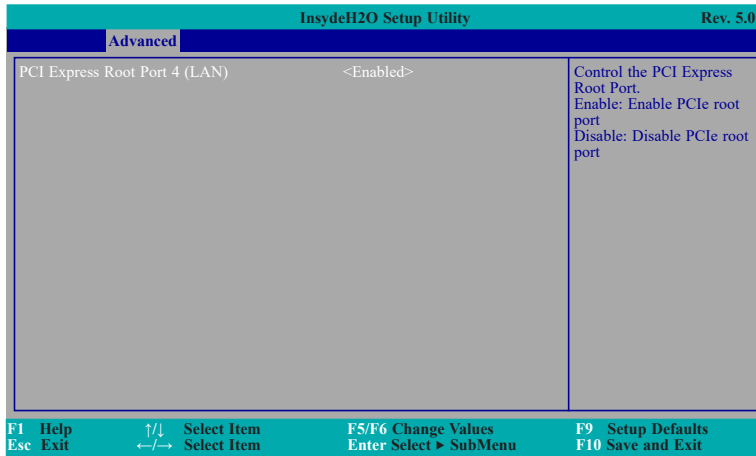
Serial ATA Port 0

This field is used to enable or disable the serial ATA port.

PCI Express Configuration

This section configures settings relevant to PCI Express root ports.

```
                        InsydeH2O Setup Utility                    Rev. 5.0
          Advanced

   ▶PCI Express Root Port 2 (Mini PCIE)          Control the PCI Express
   ▶PCI Express Root Port 4 (LAN)                Root Port.
                                                 Enable: Enable PCIe root
                                                 port
                                                 Disable: Disable PCIe root
                                                 port




 F1   Help          ↑/↓   Select Item      F5/F6 Change Values      F9   Setup Defaults
 Esc  Exit          ←/→   Select Item      Enter Select ▶ SubMenu   F10  Save and Exit
```

```
                        InsydeH2O Setup Utility                    Rev. 5.0
          Advanced

   PCI Express Root Port 2 (Mini PCIE)    <Enabled>    Control the PCI Express
   Hot Plug                               <Disabled>   Root Port.
   PCIe Speed                             <Auto>       Enable: Enable PCIe root
                                                       port
                                                       Disable: Disable PCIe root
                                                       port




 F1   Help          ↑/↓   Select Item      F5/F6 Change Values      F9   Setup Defaults
 Esc  Exit          ←/→   Select Item      Enter Select ▶ SubMenu   F10  Save and Exit
```

```
                    InsydeH2O Setup Utility                  Rev. 5.0
      Advanced
  PCI Express Root Port 4 (LAN)        <Enabled>        Control the PCI Express
                                                        Root Port.
                                                        Enable: Enable PCIe root
                                                        port
                                                        Disable: Disable PCIe root
                                                        port




  F1   Help         ↑/↓   Select Item     F5/F6 Change Values        F9   Setup Defaults
  Esc  Exit         ←-/→  Select Item     Enter Select ▶ SubMenu     F10  Save and Exit
```

PCI Express Root Port 2/4

This field is used to enable or disable the PCI Express Root Port.

Hot Plug

This field is used to enable or disable the PCI Express Hot Plug.

PCIe Speed

Select the speed of the PCI Express Root Port: Auto, Gen1 or Gen2.

Console Redirection

This section configures settings relevant to console redirection.

```
                    InsydeH2O Setup Utility                  Rev. 5.0
        Advanced
   Console Serial Redirect        <Disabled>         Enable  Console  Redirec-
                                                     tion Function




  F1   Help         ↑/↓   Select Item     F5/F6 Change Values        F9   Setup Defaults
  Esc  Exit         ←-/→  Select Item     Enter Select ▶ SubMenu     F10  Save and Exit
```
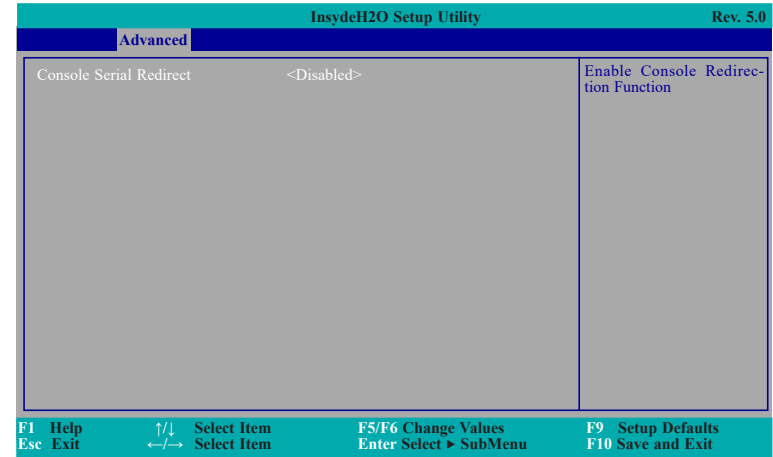
Console Serial Redirect

This field is used to enable or disable the console serial redirection function.

When Console Serial Redirect is set to enabled, the screen will appear like below:

```
                    InsydeH2O Setup Utility                    Rev. 5.0
       Advanced

  Console Serial Redirect      <Enabled>        Enable Console Redirec-
  Terminal Type                <VT_100>         tion Function
  Baud Rate                    <115200>
  Data Bits                    <8 Bits>
  Parity                       <None>
  Stop Bits                    <1 Bit>
  Flow Control                 <None>

  ►COM1
    Enable VT-100, 115200, N81




  F1  Help        ↑/↓  Select Item    F5/F6 Change Values    F9   Setup Defaults
  Esc Exit        ←/→  Select Item    Enter Select ► SubMenu F10  Save and Exit
```
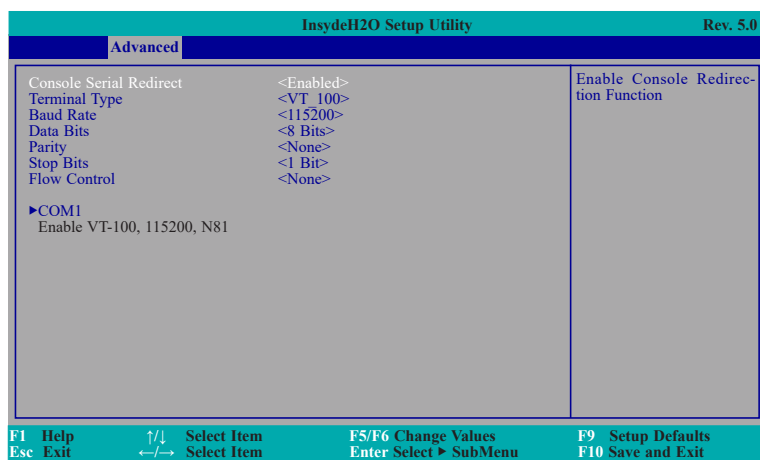
Terminal Type

Select terminal type: VT_100, VT_100+, VT_UTF8 or PC_ANSI.

Baud Rate

Select baud rate: 115200, 57600, 38400, 19200 or 9600.

Data Bits

Select data bits: 7 Bits or 8 Bits.

Parity

Select parity bits: None, Even or Odd.

Stop Bits

Select stop bits: 1 Bit or 2 Bits.

Flow Control

Select flow control type: None, RTS/CTS or XON/XOFF.

COM1

```
                    InsydeH2O Setup Utility                    Rev. 5.0
       Advanced

  COM1

  PortEnable                   <Enabled>
  UseGlobalSetting             <Enabled>






  F1  Help        ↑/↓  Select Item    F5/F6 Change Values    F9   Setup Defaults
  Esc Exit        ←/→  Select Item    Enter Select ► SubMenu F10  Save and Exit
```
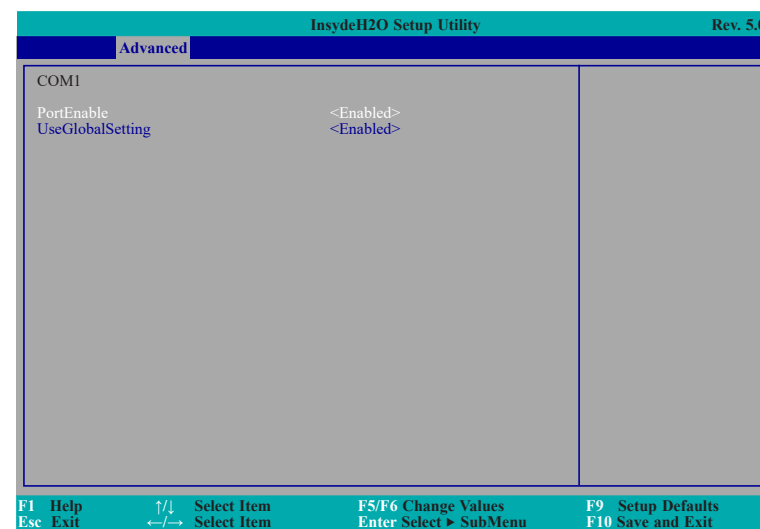
PortEnable

This field is used to enable or disable the COM port to redirect the console.

UseGlobalSetting

This field is to enable or disable to use global setting. When enabled the global setting, setting of the COM port will be the same as those in Console Redirection section. When disabled the global setting, setting of the COM port can be configured independently in this section.

When UseGlobalSetting is set to disabled, the screen will appear like below:

```
                    InsydeH2O Setup Utility                    Rev. 5.0
        Advanced
  COM1

  PortEnable                       <Enabled>
  UseGlobalSetting                 <Disabled>
  Terminal Type                    <VT_100>
  Baud Rate                        <115200>
  Data Bits                        <8 Bits>
  Parity                           <None>
  Stop Bits                        <1 Bit>
  Flow Control                     <None>




 F1   Help          ↑/↓   Select Item      F5/F6 Change Values      F9   Setup Defaults
 Esc  Exit          ←/→   Select Item      Enter Select ▶ SubMenu   F10  Save and Exit
```
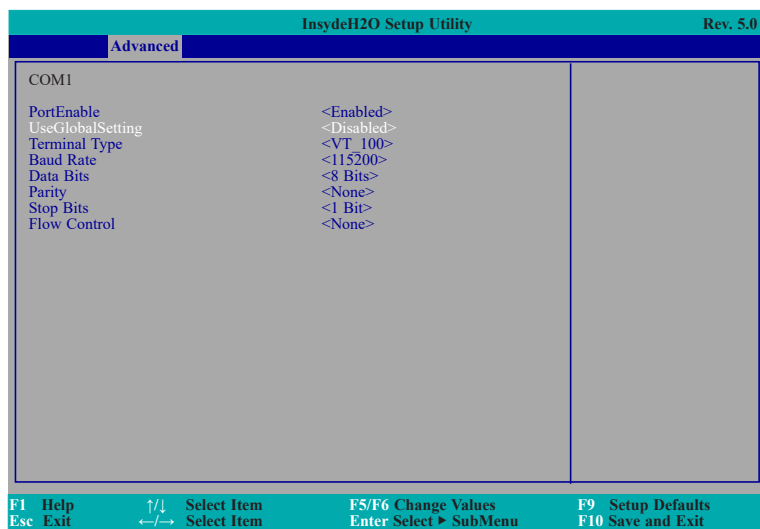
SIO FINTEK81803

This section configures the system super I/O chip parameters.

```
                    InsydeH2O Setup Utility                    Rev. 5.0
         Advanced
  COM Port 1                       <Enable>        Configure Serial port using
     Base I/O Address              <3F8>           options : [Disable] No
     Interrupt                     <IRQ4>          Configuration  [Enable]
     Type                          <RS232>         User Configuration
  WDT                              <Disable>
  ▶PC Health Status




 F1   Help          ↑/↓   Select Item      F5/F6 Change Values      F9   Setup Defaults
 Esc  Exit          ←/→   Select Item      Enter Select ▶ SubMenu   F10  Save and Exit
```
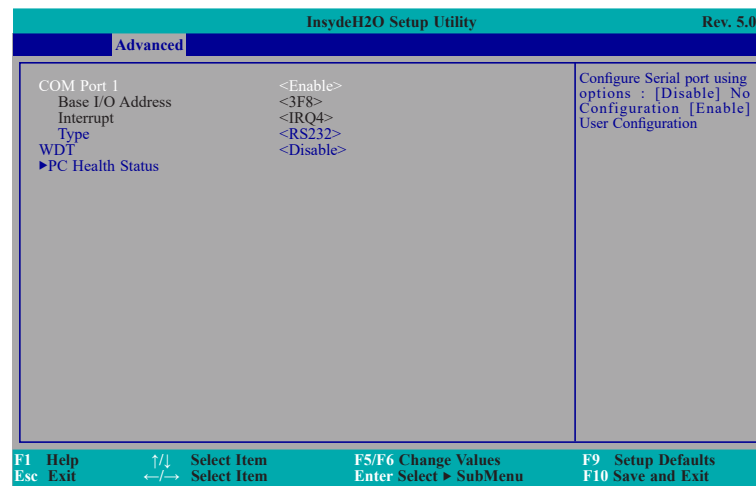
COM Port 1
Configure the settings to use the serial port.

Disable No configuration
Enable   User configuration

Type
Choose RS232/RS422/RS485 (Peer-to-Peer) for COM type.

WDT

Enable or disable the watchdog function. A counter will appear if you select to enable WDT. Input any value between 1 to 255 seconds.

PC Health Status

This section displays the PC health status.

```
                          InsydeH2O Setup Utility                    Rev. 5.0
                Advanced
      Voltage
        VCORE                    0.880  V
        VDDQ                     1.104  V
        3VSB                     3.328  V
        3VCC                     3.312  V
        5VA                      4.968  V
        3VA                      3.328  V

      Temperature
        CPU (ºC/ºF)              43 C/109 F
        System (ºC/ºF)           45 C/113 F




      F1   Help       ↑/↓   Select Item    F5/F6 Change Values      F9   Setup Defaults
      Esc  Exit       ←/→   Select Item    Enter Select ▶ SubMenu   F10  Save and Exit
```

Security

```
                          InsydeH2O Setup Utility                    Rev. 5.0
      Main    Advanced   Security   Boot     Exit

      Current TPM Device        <TPM 2.0 (FTPM)>              When  Hidden,  don't  ex-
      TPM State                 All Hierarchies Enabled, UnOwned  poses TPM to 0
      TPM Availability          <Available>
      TPM Operation             <No Operation>
      Clear TPM                 [   ]

      Supervisor Password       Not installed

      Set Supervisor Password




      F1   Help       ↑/↓   Select Item    F5/F6 Change Values      F9   Setup Defaults
      Esc  Exit       ←/→   Select Item    Enter Select ▶ SubMenu   F10  Save and Exit
```

TPM Availability

Show or hide the TPM availability and its configurations.

TPM Operation

Enable or disable the TPM function. It displays the following options:

No Operation No changes to current state.

Enable Enable TPM.

Disable Disable TPM.

Clear TPM

Remove all TPM context associated with a specific owner.

Set Supervisor Password

Set the supervisor's password and the length of the password must be greater than one character.

Boot

```
                    InsydeH2O Setup Utility                    Rev. 5.0
     Main      Advanced     Security     Boot      Exit

     Setup Prompt Timeout        [0]              The number of seconds
     Numlock                     <On>             that the firmware will wait
     Quiet Boot                  <Disabled>       before booting the original
     Network Stack               <Disabled>       default boot selection.
     PXE Boot capability         <Disabled>
     USB Boot                    <Enabled>




     F1   Help         ↑/↓   Select Item     F5/F6 Change Values     F9   Setup Defaults
     Esc  Exit         ←/→   Select Item     Enter Select ▶ SubMenu  F10  Save and Exit
```
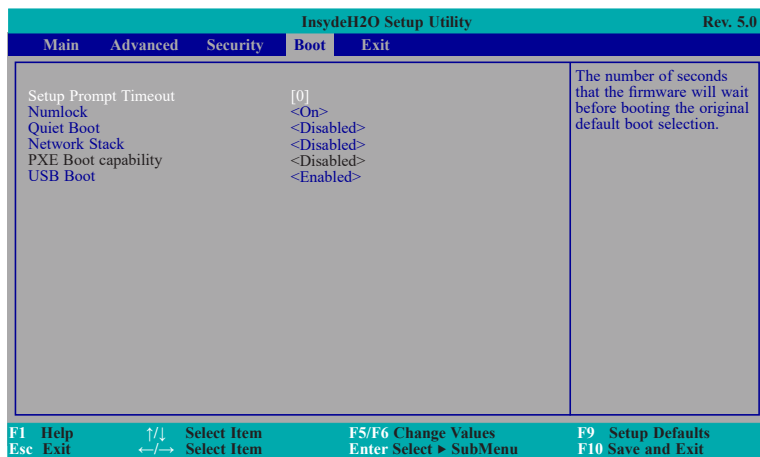
Setup Prompt Timeout

Setup the number of seconds that the firmware will wait before booting the original default boot selection.

Numlock

Select the power-on state for numlock.

Quiet Boot

Enable or disable booting in text mode.

Network Stack

This field is used to enable or disable network stack.

PXE Boot capability

Disabled Suppoort Network Stack

UEFI IPv4/IPv6

USB Boot

Enable or disable booting to USB boot devices.

Exit

```
                    InsydeH2O Setup Utility              Rev. 5.0
   Main    Advanced    Security    Boot    Exit

                                              Exit system setup and save
   Exit Saving Changes                        your changes.
   Load Optimal Defaults
   Discard Changes
   Save Setting to file




 F1   Help          ↑/↓    Select Item    F5/F6 Change Values    F9   Setup Defaults
 Esc  Exit          ←/→    Select Item    Enter Select ▶ SubMenu  F10 Save and Exit
```
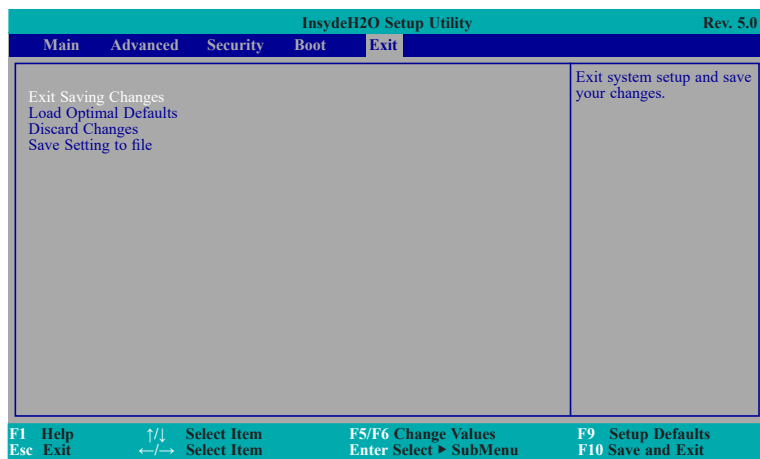
Exit Saving Changes

Select Yes and press <Enter> to exit the system setup and save your changes.

Load Optimal Defaults

Select YES and press <Enter> to load optimal defaults.

Discard Changes

Select YES and press <Enter> to exit the system setup without saving your changes.

Save Setting to file

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

Restore Setting from file

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

Updating the BIOS

To update the BIOS, you will need the new BIOS file and a flash utility. Please contact technical support or your sales representative for the files. For updating Insyde BIOS in UEFI mode, you may refer to the how-to-video at https://www.dfi.com/Knowledge/Video/31 .

Notice: BIOS SPI ROM

1. The Intel® Trusted Execution Engine has already been integrated into this system board. Due to the safety concerns, the BIOS (SPI ROM) chip cannot be removed from this system board and used on another system board of the same model.

2. The BIOS (SPI ROM) on this system board must be the original equipment from the factory and cannot be used to replace one which has been utilized on other system boards.

3. If you do not follow the methods above, the Intel® Trusted Execution Engine will not be updated and will cease to be effective.

Note:
a. You can take advantage of flash tools to update the default configuration of the BIOS (SPI ROM) to the latest version anytime.
b. When the BIOS IC needs to be replaced, you have to populate it properly onto the system board after the EEPROM programmer has been burned and follow the technical person's instructions to confirm that the MAC address should be burned or not.

Chapter 4 - Supported Software

Please download drivers, utilities and software applications required to enhance the performance of the system board at https://www.dfi.com/product/index/1447#download .

Intel Chipset Software Installation Utility

The Intel Chipset Software Installation Utility is used for updating Windows® INF files so that the Intel chipset can be recognized and configured properly in the system.

To install the utility, download "AL05P Chipset Driver" zip file at our website.

1. Setup is ready to install the utility. Click "Next".
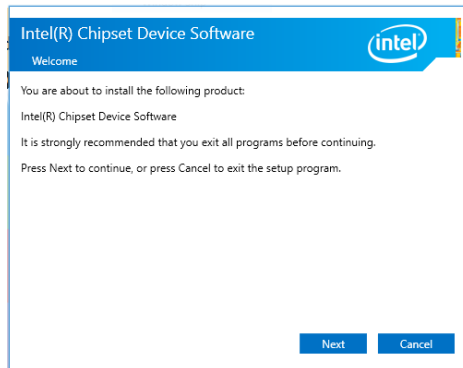
2. Read the license agreement then click "Accept".
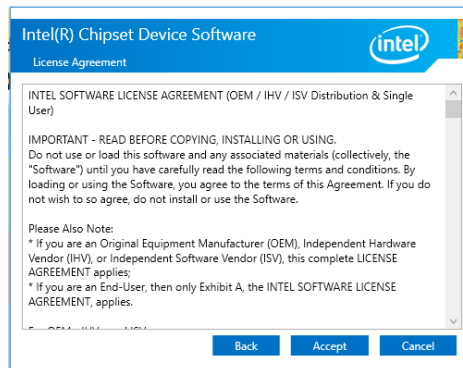
3. Go through the readme document for more installation tips then click "Install".
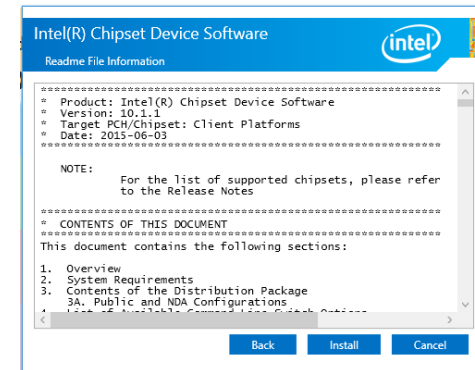

4. The step displays the installing status in the progress.
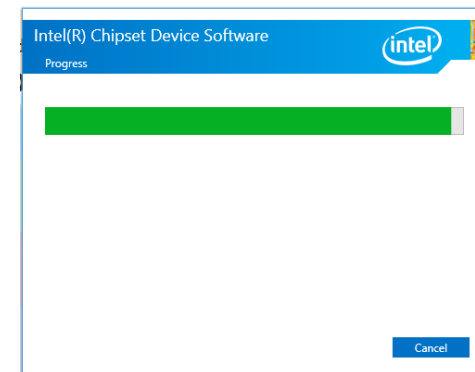
5. After completing installation, click "Restart Now" to exit setup.

   Restarting the system will allow the new software installation to take effect.
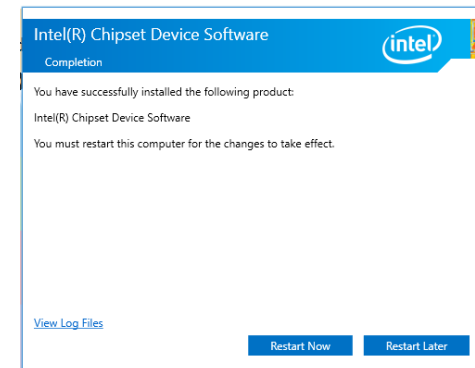
Intel Graphics Driver

To install the driver, download "AL05P Graphics Driver" zip file at our website.

1. Setup is now ready to install the graphics driver. Click "Next".
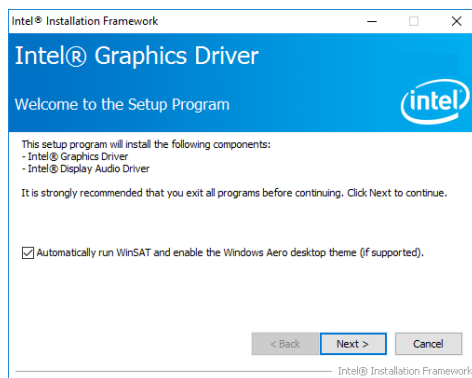
By default, the "Automatically run WinSAT and enable the Windows Aero desktop theme" is enabled. With this enabled, after installing the graphics driver and the system rebooted, the screen will turn blank for 1 to 2 minutes (while WinSAT is running) before the Windows 10 desktop appears. The "blank screen" period is the time Windows is testing the graphics performance.

We recommend that you skip this process by disabling this function then click "Next".

2. Read the license agreement then click "Yes".
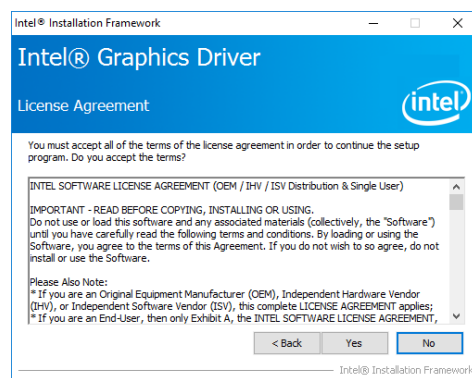
3. Go through the readme document for system requirements and installation tips then click "Next".
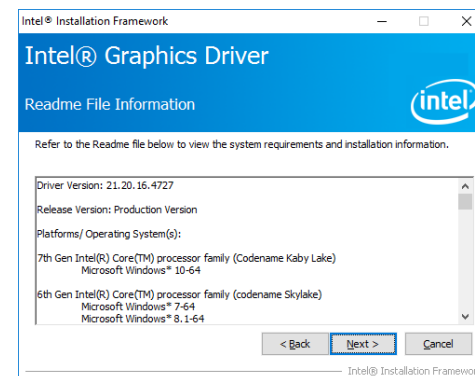
4. Setup is now installing the driver. Click "Next" to continue.
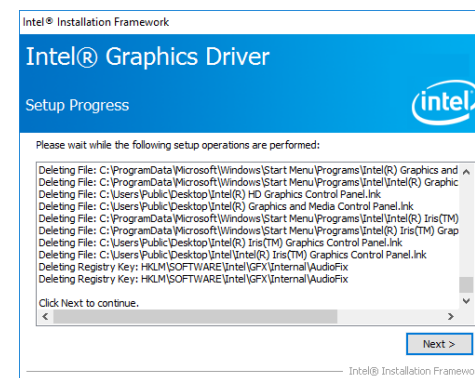
5. Click "Yes, I want to restart this computer now" then click "Finish".

   Restarting the system will allow the new software installation to take effect.
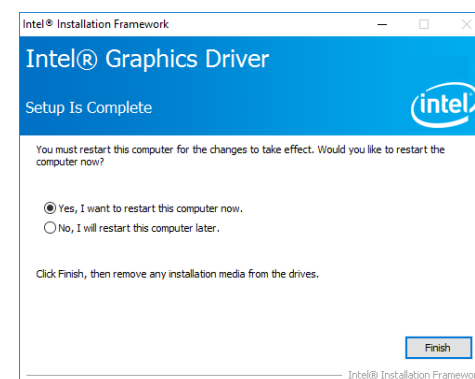
Intel LAN Driver

To install the driver, download "AL05P LAN Driver" zip file at our website.

1. Setup is ready to install the driver. Click "Next".
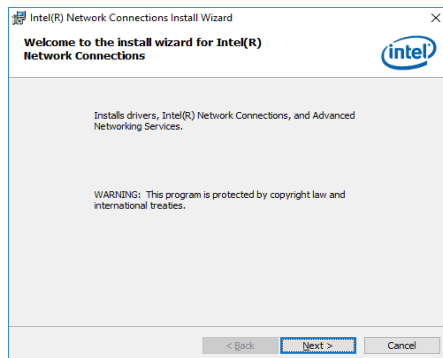
2. Click "I accept the terms in the license agreement" then click "Next".
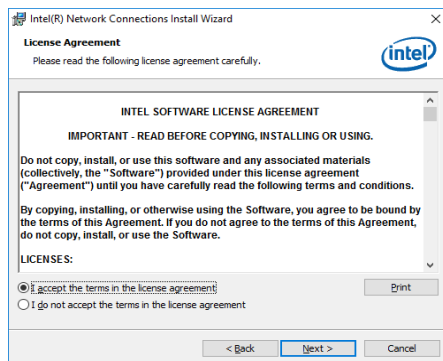
3. Select the program features you want installed then click "Next".
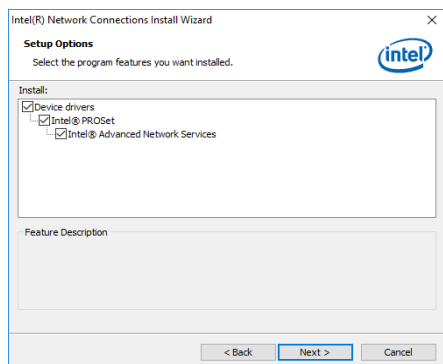
4. Click "Install" to begin the installation.
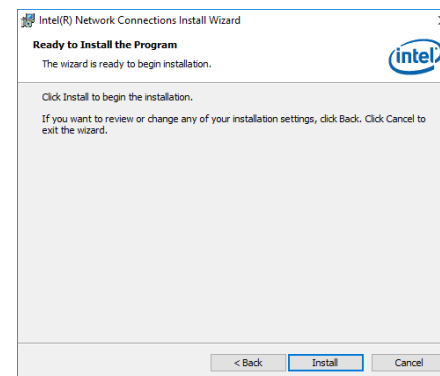
5. The step displays the installing status in the progress.
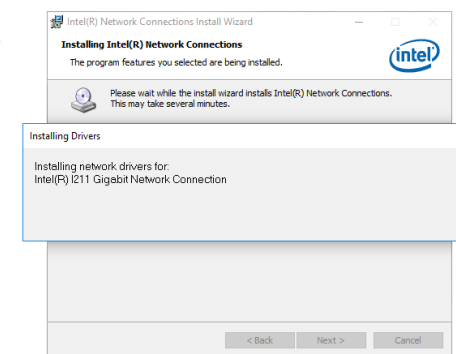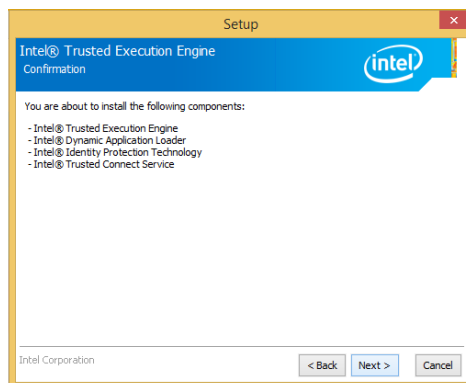

6. After completing installation, click "Finish".
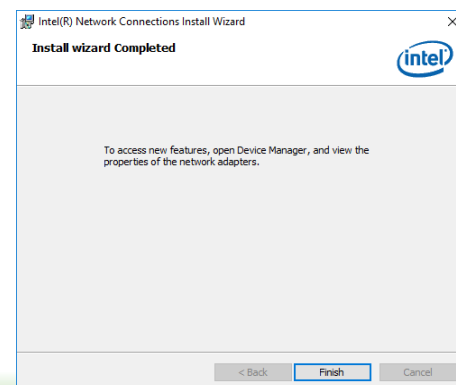
Intel Trusted Execution Engine Driver

To install the driver, download "AL05P TXE Driver" zip file at our website.

1. Tick "I accept the terms in the License Agreement" and then click "Next."
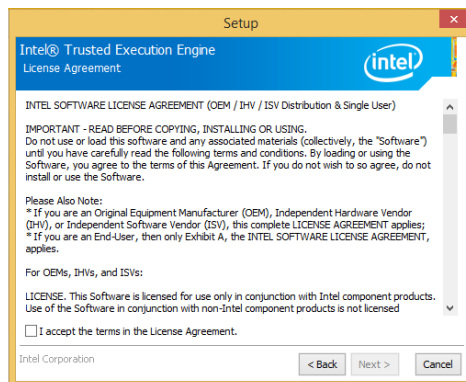
2. The step shows the components which will be installed. Then, Click Next.

3. The step displays the installing status in the progress.
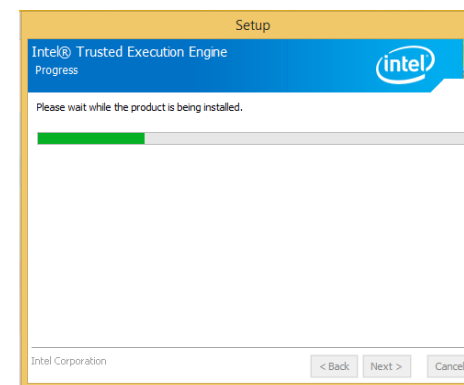
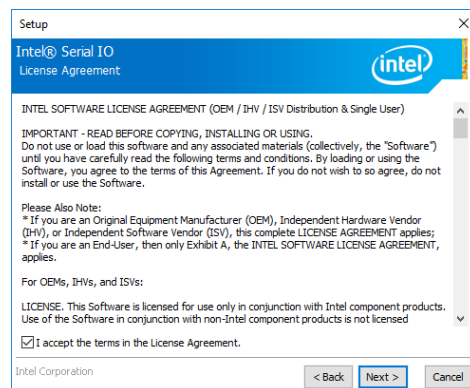4. Click "Finish" when the installation is complete.
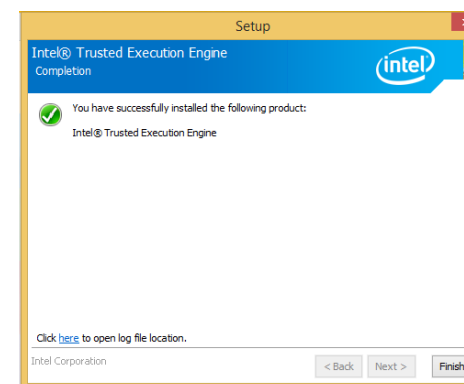
SIO Driver

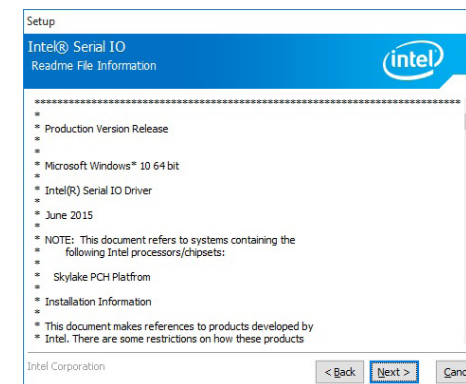To install the driver, download "AL05P SIO Driver" zip file at our website.

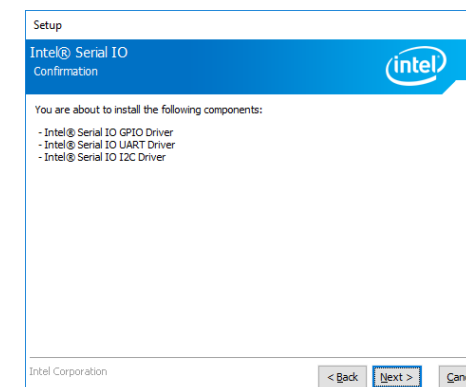1. Setup is ready to install the driver. Click "Next".
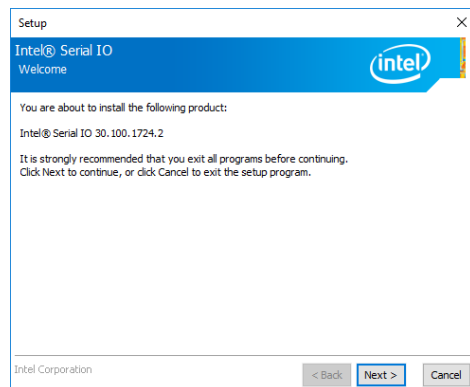
2. Read the license agreement carefully.

   Tick "I accept the terms in the License Agreement" then click "Next".
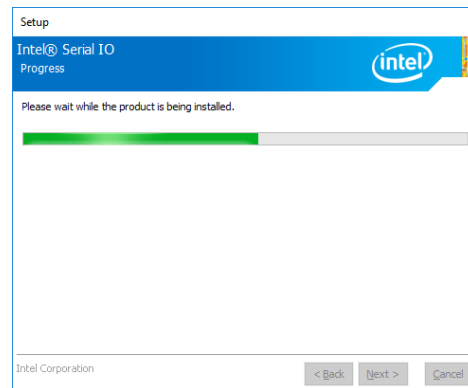
3. Go through the readme document for system requirements and installation tips then click "Next".

4. Setup is ready to install the driver. Click "Next".

5. Setup is now installing the driver.

6. Click "Yes, I want to restart this computer now" then click "Finish".

   Restarting the system will allow the new software installation to take effect.