Neousys Technology Inc.

POC-120 Series

Ultra-compact Atom™ Bay Trail-I

Fanless General-Purpose Embedded Controller

User's Manual

Rev. A1

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Date	Description	Version
2015/05/29	First formal release	A1

Contents

Declaimer

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FCC

This equipment has been tested and found to comply with the limits for a Class A 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 commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CE

The product(s) described in this manual complies with all applicable European Union (CE) directives if it has a CE marking. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques.

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Chapter 1 Introduction

1.1 Overview

Introducing the new member of Neousys' ultra-compact POC family! POC-120 is a low-cost, entry-level embedded controller with yet more compact dimension. It further reduces its height to 3.4 cm to have a very low-profile chassis for restricted space.

POC-120 incorporates Intel® Atom™ E3826 dual-core processor to deliver adequate computing performance. It provides general I/O, such as Gigabit Ethernet ports, COM ports and USB3/USB2 ports, for most embedded applications. Instead of traditional HDD , POC-120 supports mSATA SSD to ensure reliable disk access in harsh environments.

POC-120 reserves internally a high-speed interface for I/O expansion. By customizing a mezzanine board, you can have versatile I/O functions. This makes POC-120 not only an ultra-compact controller, but also a tailor-made embedded system for your designated application. Please contact Neousys for POC-120 OEM/ODM projects

1.2 Product Specification

System Core	
Processor	Intel® Atom™ E3826 1.46 GHz dual-core processor
Graphics	Integrated Intel® HD Graphics
Memory	1x SODIMM socket for DDR3L-1333, up to 8GB
Panel I/O Interface	
Ethernet	2x Gigabit Ethernet ports by Intel® I210 GbE controller
Video Port	1x VGA connector for analog RGB output, supporting up to 2560 x 1600 resolution
Serial Port	1x software-programmable RS-232/422/485 (COM1) 1x RS-232 (COM2)
USB	1x USB 3.0 port via native XHCI controller 2x USB 2.0 ports
Audio	1x Speaker-out
Storage Interface	
mSATA	1x full-size mSATA socket
Power Supply	
DC Input	Built-in 8~35 VDC DC input
Input Connector	2-pin spring-clamp terminal block for DC input
Power Consumption	Typical: 6.7 W ((0.28 A @ 24 V) Full-loading*: 12 W (0.5 A @ 24 V)
Mechanical	
Dimension	149mm (D) x 105 mm (W) x 34mm (H)
Weight	0.9 kg
Mounting	Wall-mount (Standard) or DIN-rail mount (Optional)
Environmental	
Operating Temperature	-25°C ~ 70°C with mSATA, 100% CPU loading **/***
Storage Temperature	-40°C ~85°C
Humidity	10%~90% , non-condensing
Vibration	Operating, 5 Grms, 5-500 Hz, 3 Axes (w/ SSD, w/o add-on card, according to
Shock	Operating, 50 Grms, Half-sine 11 ms Duration (w/ SSD, w/o add-on card, according to IEC60068-2-27)
EMC	CE/FCC Class A, according to EN 55022 & EN 55024

Full-loading power consumption is measured with 2GB DDR3L memory and one mSATA SSD installed under the following conditions:

1. *100% loading for Atom E3826 CPU*
2. *100% loading for 3D graphics*

3. 100% loading for memory read/write

** The 100% CPU loading is applied using Passmark® BurnInTest™ v7.0. For detail testing criteria, please contact

 Neousys Technology

*** For sub-zero operating temperature, wide-temperature DDR3-L and wide-temperature mSATA module are required.

Chapter 2 Knowing your POC-120

2.1 Unpacking your POC-120

When you receive the package of POC-120 series, please check immediately if the package contains all the items listed in the following table. If any item is missing or damaged, please contact your local dealer or Neousys Technology Inc. for further assistance.

Item	Description	Qty
1	POC-120 ultra-compact fanless controller (According to the configuration you order, your POC-120 may contain DDR3L or mSATA module. Please verify these items if necessary.)	1
2	Neousys Drivers & Utilities DVD	1

2.2 Front Panel I/O Functions

On POC-120 series, we design general-purpose I/O functions on the front panel so you can easily access them. In this section, we'll illustrate each I/O function on the front panel.

2.2.1 Power Button

The power button is a non-latched switch for ATX mode on/off operation. To turn on the POC-120, press the power button and the PWR LED on the center-top side is lighted up. To turn off the POC-120, you can either issue a shutdown command in OS, or just simply press the power button. In case of system halts, you can press and hold the power button for 5 seconds to compulsorily shut down the system. Please note that a 5 seconds interval is kept by the system between two on/off operations (i.e. once turning off the system, you shall wait for 5 seconds to initiate another power-on operation).

2.2.2 Reset Button

The reset button is used to manually reset the system in case of any abnormal condition. To avoid unexpected operation, the reset button is hidden behind the front panel. You need to use a pin-like object to push the reset button.

2.2.3 LED Indicators

There are three LED indicators on the front panel: PWR, WDT and HDD. The descriptions of these three LED are listed in the following table.

Indicator	Color	Description
PWR	Green	Power indicator, lighted-up when system is on, off when system is off.
WDT	Yellow	Watchdog timer indicator, flashing when watchdog timer is started.
HDD	Red	Hard drive indicator, flashing when mSATA module is active.

2.2.4 USB 2.0 Connector

There are totally one USB 3.0 port and two USB 2.0 ports on POC-120 series. One of USB 2.0 ports is located on the front panel. By BIOS default, this USB 2.0 port is operated in EHCI (Enhanced Host Control Interface) mode and are compatible with USB 2.0, USB 1.1 and USB 1.0 devices. Legacy USB support is provided so you can use USB keyboard/mouse in DOS environment.

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2.2.5 Speaker-out Jack

POC-120 series provides speaker-out function using Intel® High Definition Audio (built-in in Bay Trail SoC) and Realtek ALC262 codec. An audio jack is located on the front panel. To utilize the speaker-out function in Windows, you need to install corresponding drivers for both Intel® ICH8-M chipset and Realtek ALC262 codec. Please refer to section 4.3 for information of driver installation.

2.2.6 Gigabit Ethernet Ports

POC-120 series offers two Gigabit Ethernet ports using Intel® I210 GbE controller. When plugging in the Ethernet cable, you can tell the Ethernet status and speed from the LED indicators on the RJ45 connector as following:

Active/Link LED

| LED Color	Status	Description
Yellow	Off	Ethernet port is disconnected
	On	Ethernet port is connected and no data transmission
	Flashing	Ethernet port is connected and data is transmitting/receiving

Speed LED

LED Color	Status	Description
Green or Orange	Off	10 Mbps
	Green	100 Mbps
	Orange	1000 Mbps

To utilize the GbE port in Windows, you need to install corresponding driver for Intel® I210 GbE controller. Please refer to section 4.3 for information of driver installation.

2.2.7 VGA Connector
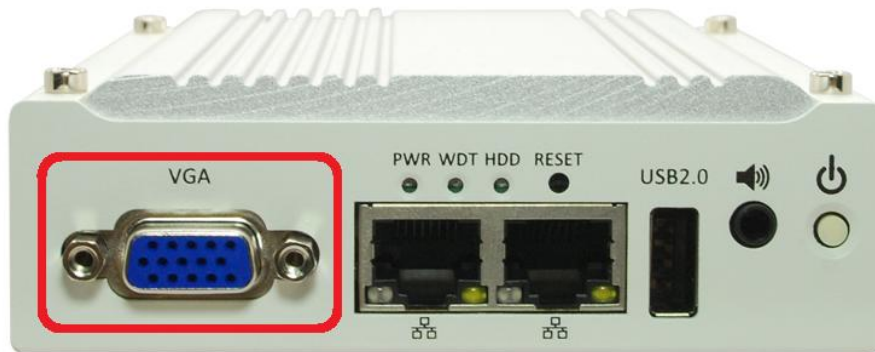
POC-120 series features VGA output which is directly driven by integrated Intel HD Graphics engine and supports up to 2560 x 1600 resolution. By BIOS default and hardware implementation, the VGA output is always enabled in any case. To achieve best VGA output resolution in Windows, you need to install corresponding graphics driver. Please refer to section 4.3 for information of driver installation.

2.3 Back Panel I/O Functions

To fit more general application requirements, POC-120 series offers more I/O functions on its back panel. In this section, we'll illustrate each I/O function on the back panel.

2.3.1 USB3.0 Connectors

There are totally one USB 3.0 port and two USB 2.0 ports on POC-120 series. The USB 3.0 port is located on the back panel. This USB 3.0 port is implemented via native xHCI controller inside Bay Trail SoC. By BIOS default, this USB port is operated in xHCI (eXtensible Host Control Interface) mode and is compatible to USB 3.0, USB 2.0, USB 1.1 and USB 1.0 devices.

To utilize USB 3.0 function in Windows, you need to install corresponding USB 3.0 driver for Bay Trail SoC. Please refer to section 4.3 for information of driver installation.

2.3.2 USB2.0 Connectors

In addition to the USB 3.0 ports, POC-120 series provides another USB 2.0 port on its back panel. By BIOS default, this USB 2.0 ports is operated in EHCI (Enhanced Host Control Interface) mode and are compatible with USB 2.0, USB 1.1 and USB 1.0 devices. Legacy USB support is provided so you can use USB keyboard/mouse in DOS environment.

2.3.3 COM Ports
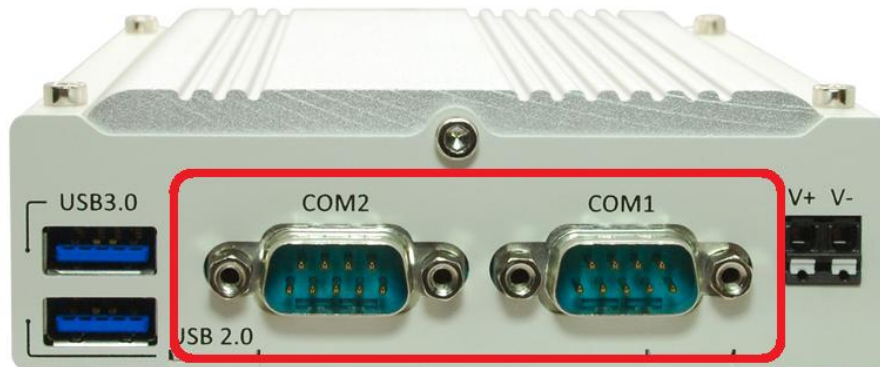
POC-120 provides two COM ports via two 9-pin D-Sub male connectors on the back panel for communicating with external devices. They are implemented using industrial-grade ITE8783 Super IO chip (-40 to 85°C) and provide up to 115200 bps baud rate.

COM1 is a BIOS-configurable RS-232/422/485 port and COM2 supports RS-232 only. The operation mode of COM1 can be set in BIOS setup utility (refer to section 4.1.1 for detail). The following table describes the pin definition of COM ports.
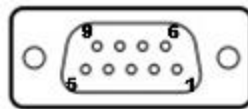
Pin#	COM1			COM2
	RS-232 Mode	RS-422 Mode	RS-485 Mode (Two-wire 485)	RS-232 Mode
1	DCD			DCD
2	RX	422 TXD+	485 TXD+/RXD+	RX
3	TX	422 RXD+		TX
4	DTR	422 RXD-		DTR
5	GND	GND	GND	GND
6	DSR			DSR
7	RTS			RTS
8	CTS	422 TXD-	485 TXD-/RXD-	CTS
9	RI			RI

2.3.4 2-Pin Spring-Clamp Terminal Block for DC Input

POC-120 series features a spring-clamp terminal block for direct DC wiring. It accepts a wide range of DC power input from 8 to 35V. And the spring-clamping connection of terminal block gives an easy and reliable way for wiring the DC power. The following table describes the pin definition of the terminal block. For detail information of connecting DC power, please refer to section 3.5.

Pin	Description
V+	Positive polarity of DC power input (8 ~ 35V).
V-	Negative polarity of DC power input (usually power ground).

Note

1. *The spring-clamp terminal block accepts wires of gauge 16 ~ 24 AWG and stripping length of 8 mm. Please always use wires with correct gauge/stripping length to ensure reliable DC power wiring.*

2. *Please make sure the voltage and polarity of DC power is correct before you connect it to POC-120. Supplying a voltage over 35V will damage the system..*

2.4 Internal I/O Functions

2.4.1 Remote On/Off Control
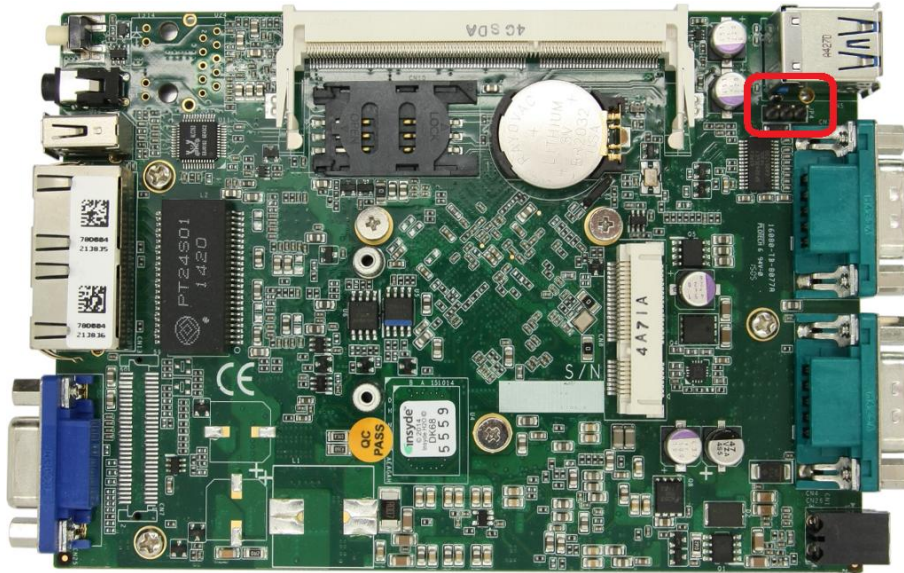
The remote on/off control function allows users to turn on or turn off the system remotely by connecting an external switch. This function is provided via a 1x3 pins, 2.0mm pitch pin header on the PCBA.
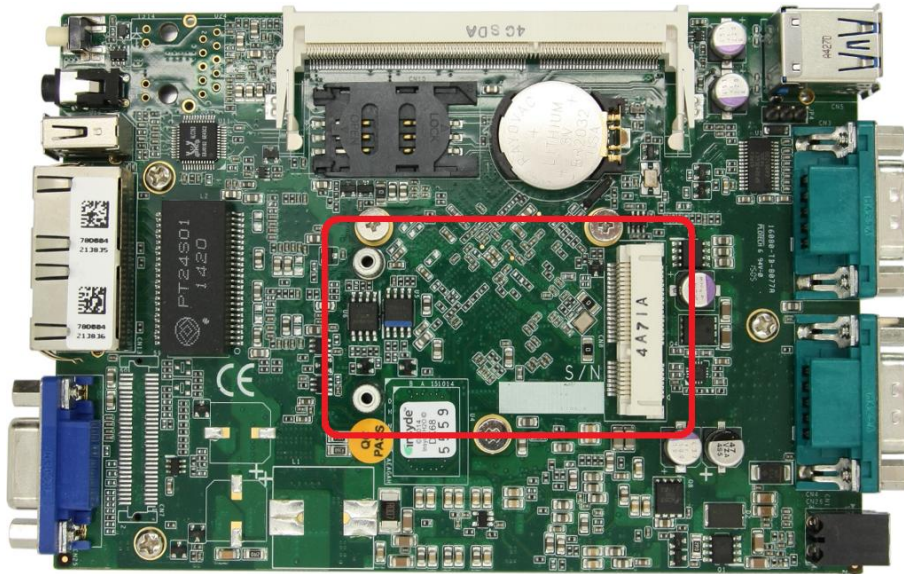
Both AT-mode and ATX-mode on/off control are supported. For detail information of using remote on/off control function, please refer to section 3.6.2/3.6.3.

**Switch Connection for AT/ATX Mode Remote On/Off Control**
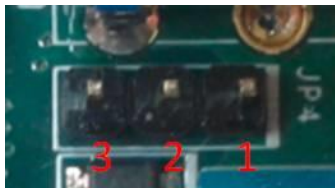
Mode	Jumper Setting
AT	
ATX	

2.4.2 mSATA Connector

POC-120 provides a mSATA port to accommodate mSATA flash disk module. mSATA is a solid-state storage device with SATA interface and is very reliable for harsh environments with intense vibration/shock. The system recognizes mSATA as a native storage device and accordingly you can install any operating system in the mSATA module, such as Windows 7, Windows 8, Linux and etc.

2.4.3 DDR3L SODIMM Socket
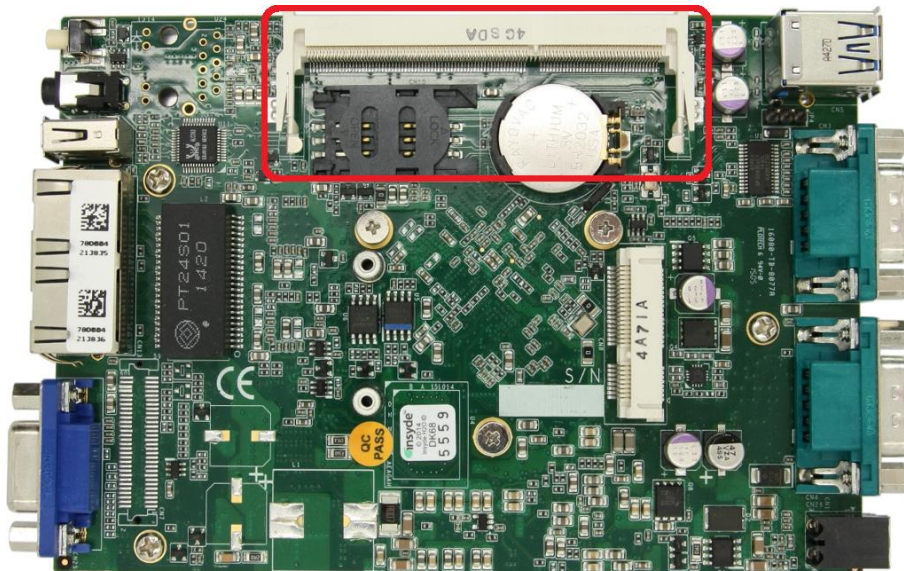
POC-120 series provides one 204-pin, SODIMM socket for memory installation. It supports a maximal 8GB capacity by installing one low-voltage 1.35V DDR3L-1333 SODIMM modules. For information of installing DDR3L memory modules, please refer to section 3.2 for detail.

Note

Please make sure you're installing a 1.35V DDR3L SODIMM module to POC-120. Installing a 1.5V DDR3 SODIMM will cause system failed to boot.

2.5 POC-120 Mechanical Dimension

2.5.1 Top View

2.5.2 Front View
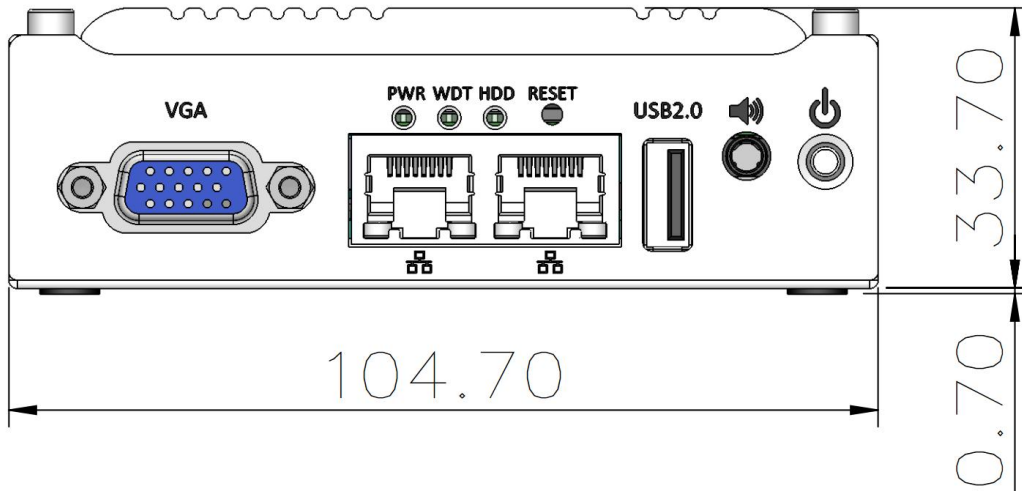
2.5.3 Side View

2.5.4 Bottom View

M4 Thread

88.00
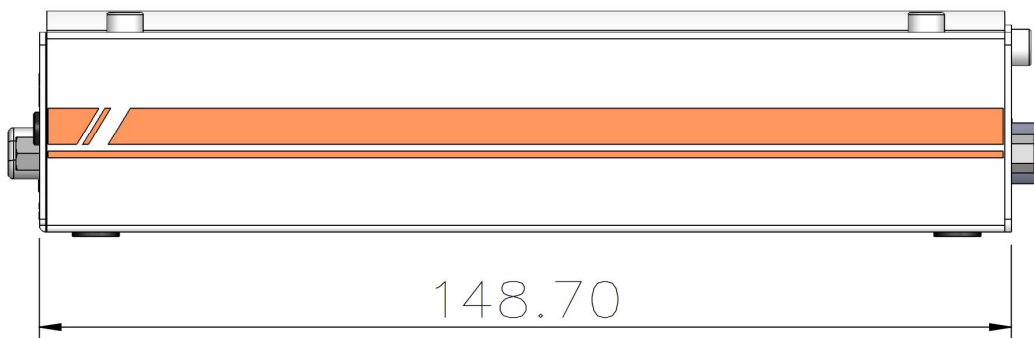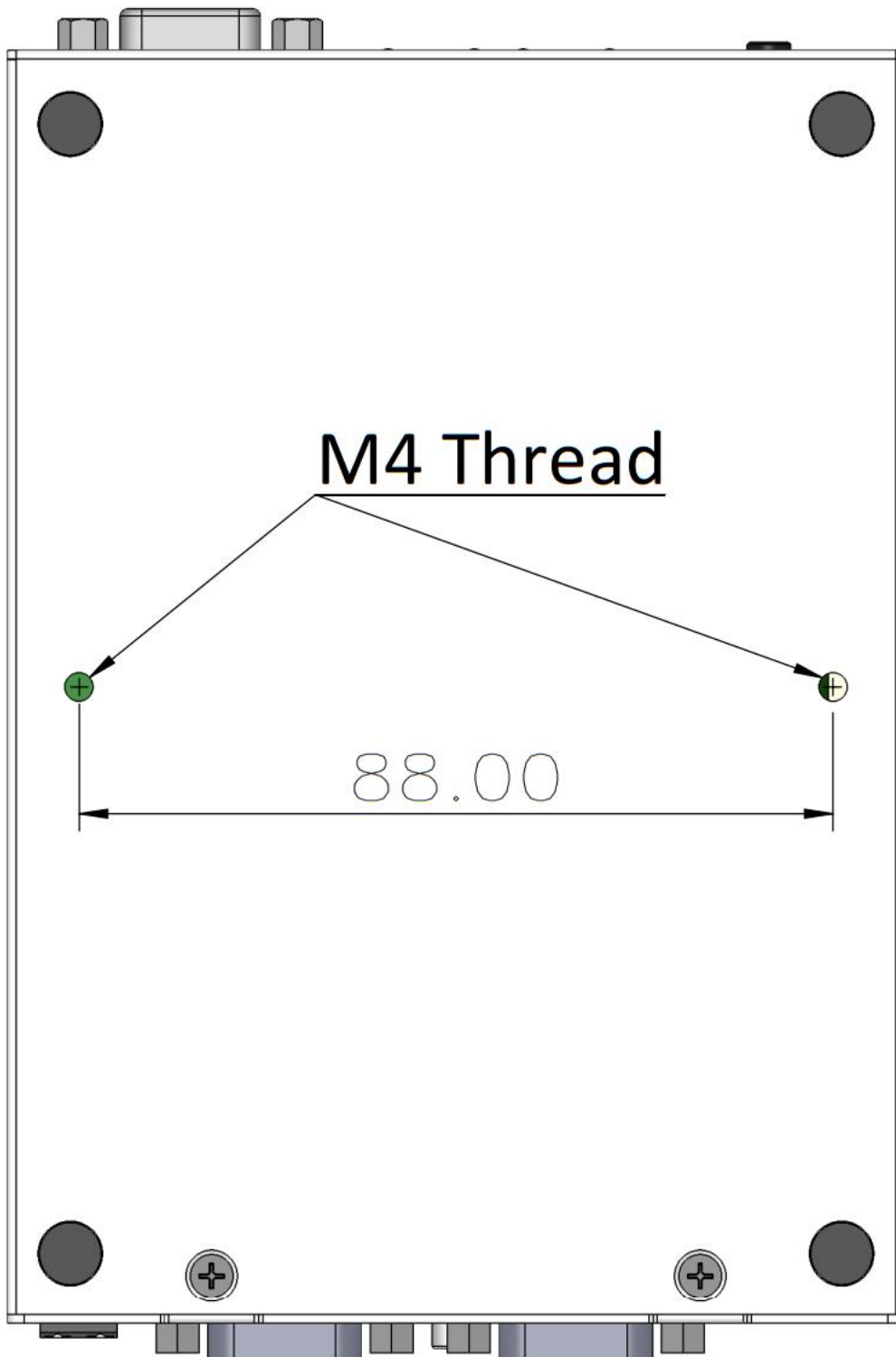
Chapter 3 Getting Start

In this chapter, we'll illustrate how to disassemble your POC-120 and install peripheral devices. Please follow the correct procedures to prevent any damage on your POC-120 series.

3.1 Dissemble your POC-120 Series

1. Unscrew two M3 F-head screws on the bottom side and one hex socket cap screw to remove the front panel.

2. Unscrew 4 hex bolts on the top of the heat sink.

3. Gently slide the PCBA/heat-sink assembly out of the case.
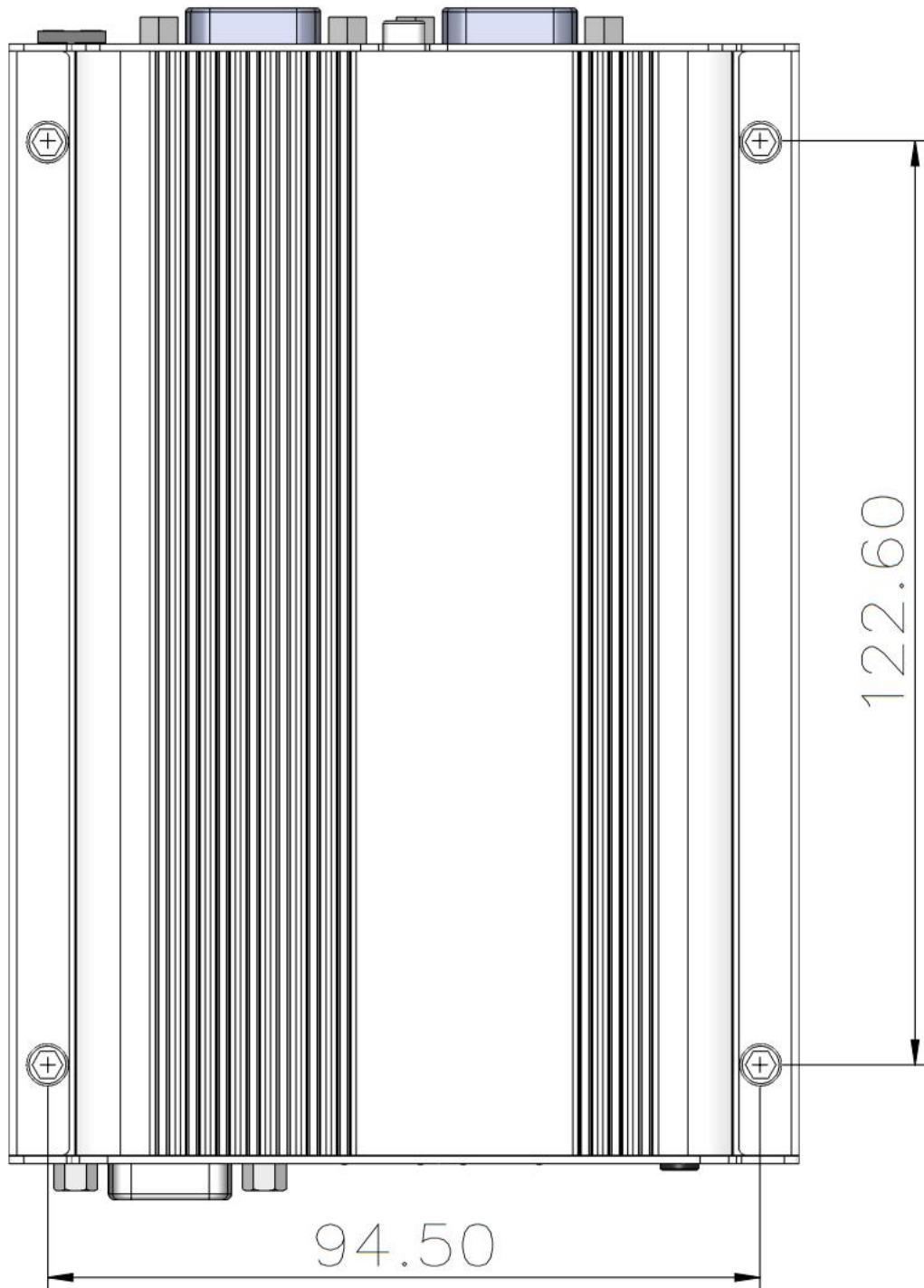
3.2 Install a DDR3L SODIMM Module

Note

Please make sure you're installing a 1.35V DDR3L SODIMM module on POC-120. Installing a 1.5V DDR3 SODIMM will cause system failed to boot.

1. Follow the steps in section 3.1 to dissemble your POC-120 series. You can see the DDR3L socket exposed.
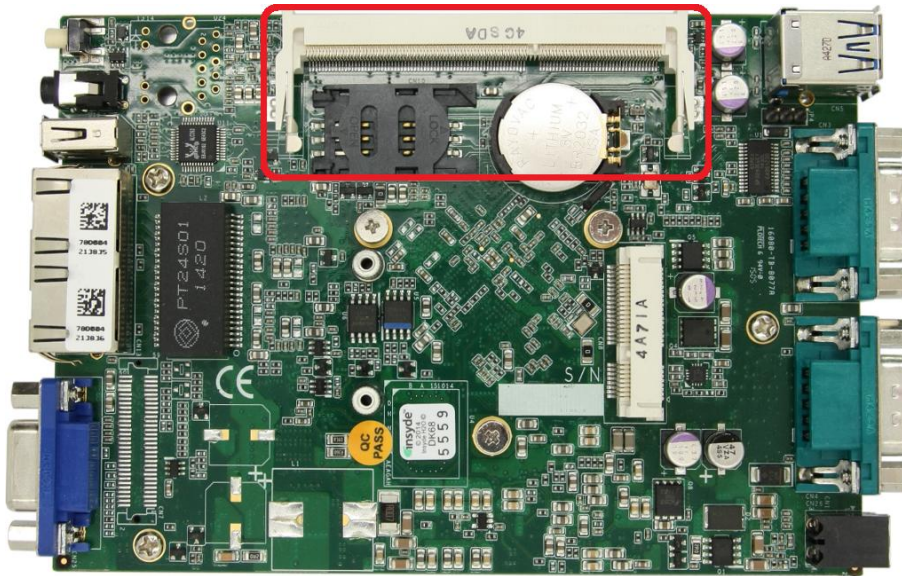
2. Tile the DDR3L SODIMM module and insert it to the SODIMM socket. As it's firmly contacted with socket connectors, press it down until the clamps of the socket snap into the latching position of SODIMM module.
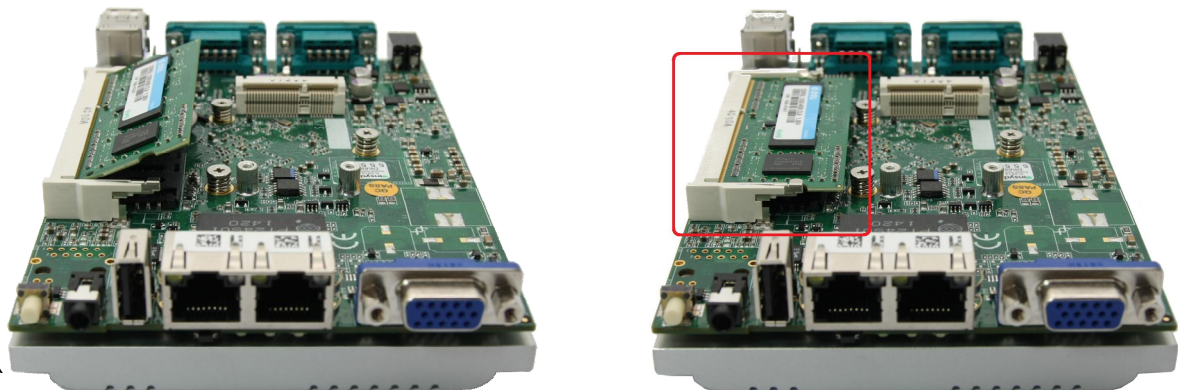
3.3 Install a mSATA SSD

The mSATA port of POC-120 is located on the PCBA. It accommodates a full-size mSATA SSD module. To install a mSATA SSD on mSATA port, please follow the steps listed below. below.

1. Follow the steps in section 3.1 to dissemble your POC-120 series. You can see the mSATA port exposed.
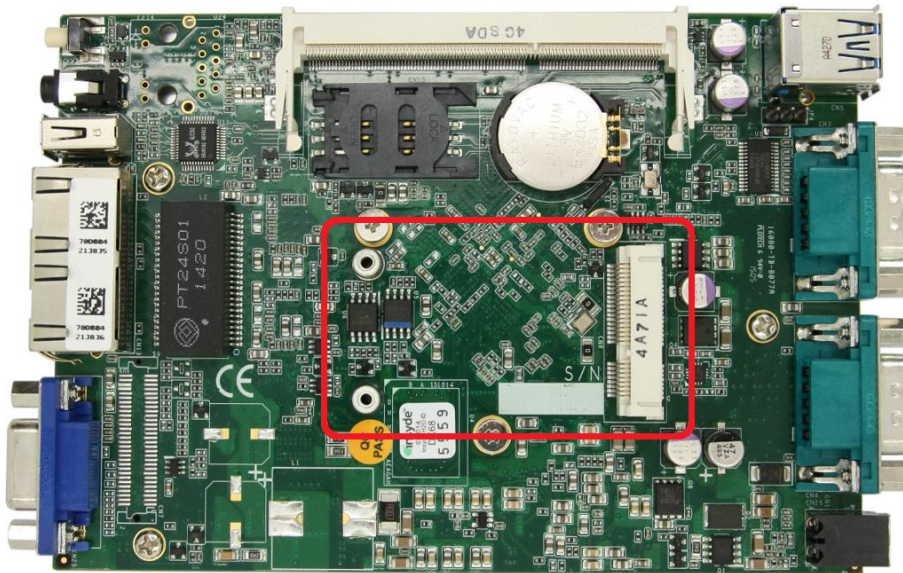
2. Tilt the mSATA SSD module and insert it to the mSATA port. And Fix the mSATA SSD module with two M2.5 P-head screws.
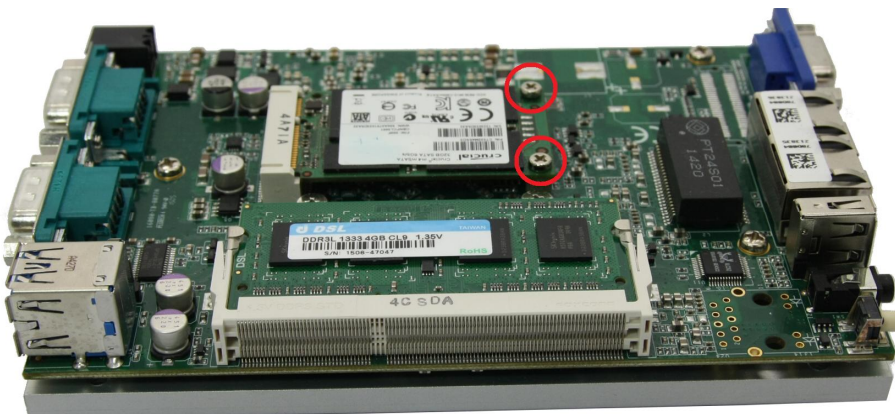
3.4 Mount your POC-120 Series

POC-120 series provides two ways of mounting. The chassis itself is designed to be used as a mounting bracket, which can be mounted outside-in. Neousys also offers the option of DIN-rail mounting clip so you can mount POC-120 on a DIN rail. To mount your POC-120, please refer to the information listed below.

3.4.1 Mount your POC-120 Outside-in on a Surface

There are two nuts with M4x0.7 thread on the bottom side of POC-120. You can fix it outside-in using two M4 screws. This is applicable when you want to deploy POC-120 on a flat surface.
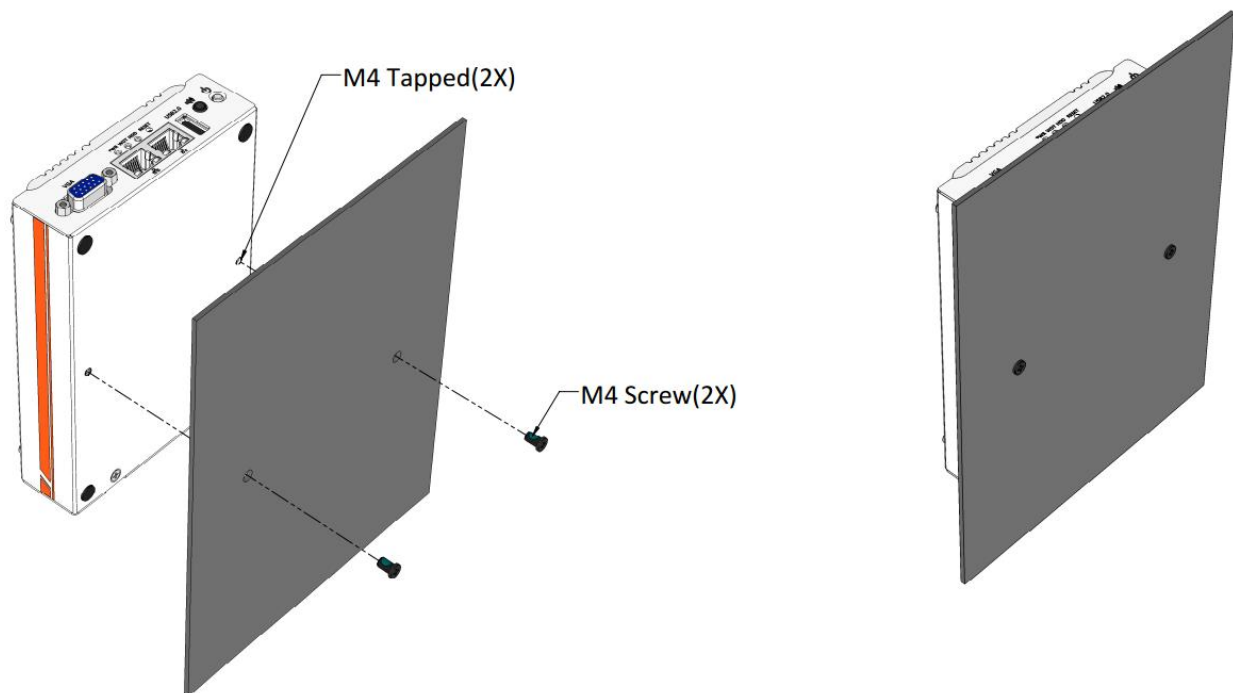
3.4.2 Mount your POC-120 on the DIN Rail

Neousys also provides the option of the DIN-rail mounting clip. With the mounting clip, you can fix POC-120 on a DIN rail. This option is useful when you want to deploy POC-120 inside an equipment cabinet where DIN rail is available.
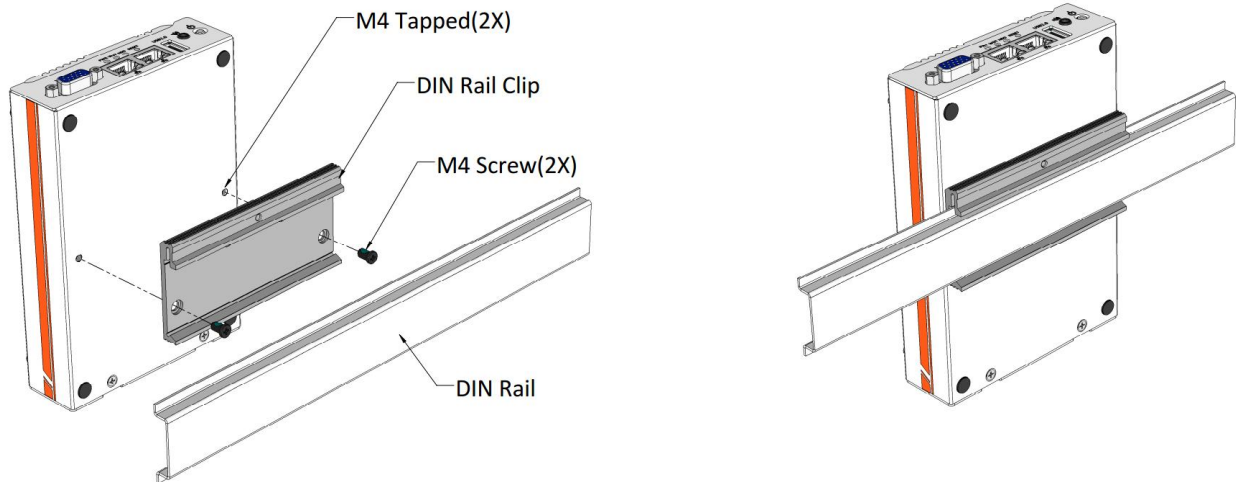
3.5 Connect DC power to you POC-120

POC-120 series uses a 2-pin spring-clamp terminal block to accept 8~35V DC power input. It provides the way for directly wiring the DC power. To connect DC power via the terminal block, please follow the steps listed below.

1. Make sure the external DC power supply is power off or disconnected before wiring.
2. Carefully identify the positive and negative contacts of your DC power supply and spring-clamp terminal block. The polarities between DC power supply and terminal block must be positive (+) to positive (+) and negative (-) to negative (-).
3. Make sure wires from power supply are with gauge of 16 ~ 24 AWG and stripping length of 8 mm. Insert wires to the spring-clamp terminal block and push them to the end. The terminal block shall clamp wires securely.
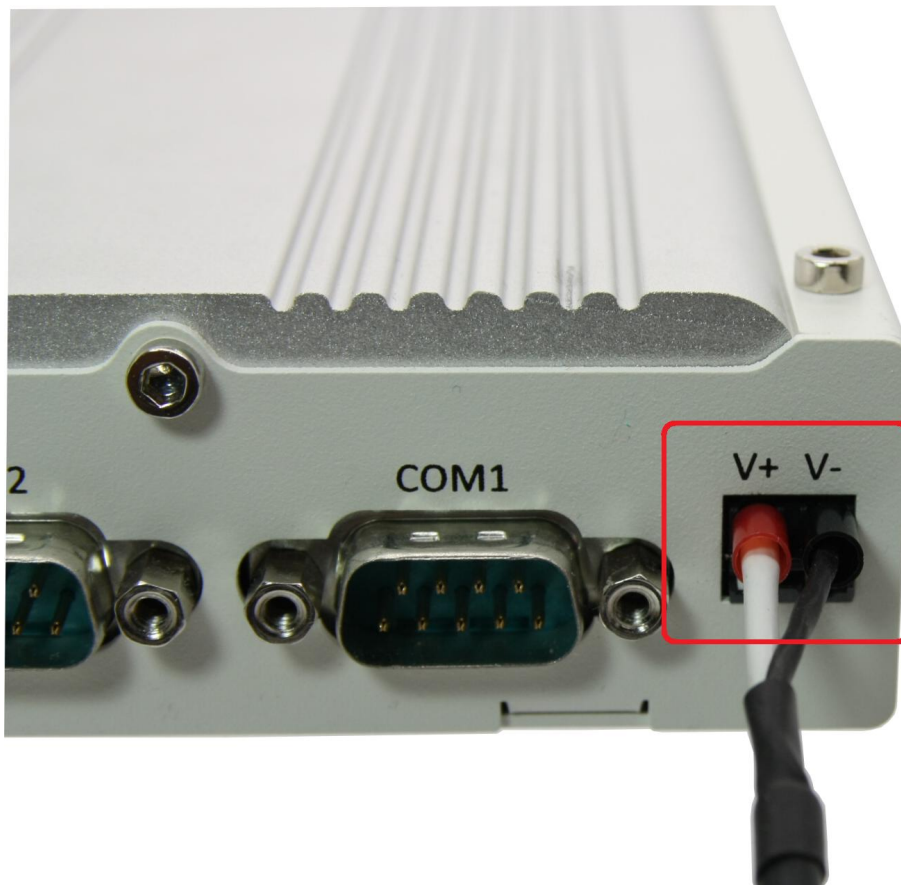
4. To eject wires (if necessary), use a slotted screwdriver to push the ejector key to the end and you are able to pull out the wires.
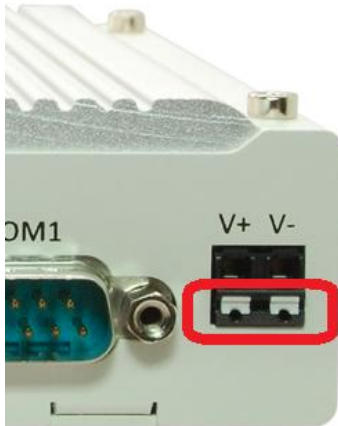
Caution

1. *POC-120 accepts 8~35 VDC when using terminal block for DC input. Please make sure the voltage and polarity of DC power is correct before you connect it to POC-120. Supplying a voltage over 35V will damage the system.*

3.6 Power on your POC-120

For better flexibility of operation, POC-120 series provides four alternatives to power on your POC-120. You can turn on your POC-120 by pressing the power button, using an external latched or non-latched on/off switch, or by sending a special LAN packet. In this section, we'll illustrate these four ways to power on your POC-120.

3.6.1 To Power on POC-120 Using the Power Button

This is the simplest way to turn on your POC-120. The power button on the front panel is a non-latched switch and behaves the ATX-mode on/off control. As DC power is connected, push the power button will turn on the system as well as the PWR LED indicator. Push the button when system is on will turn off the system. If your operating system supports ATX power mode (i.e. Microsoft Windows or Linux), push the power button causes a pre-defined system behavior, such as shutdown or hibernation.

3.6.2 To Power on POC-120 Using an Latched Switch (AT-mode)

For an application which places POC-120 inside a cabinet, it's useful to control the on/off of the system using an external switch. POC-120 series provides an on-board connector (for detail, please refer to section 2.4.1) for connecting a latched/non-latched switch and behaves either AT-mode or ATX-mode power on/off control.

When using the AT-mode on/off control, you need a latched switch. The external latched switch controls the feed-in of DC power. When the switch is closed, the DC power is break-off. When it's opened, the DC power is feed-in. To power on POC-120 using an external latched switch (AT-mode), please follow the steps listed below.

1. Prepare a latched switch with a 2-pin, 2.0mm pitch connector.
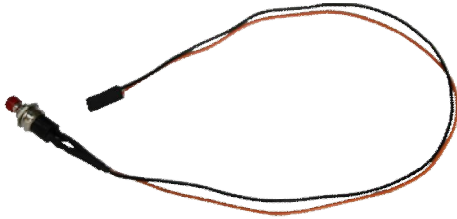
2. Connect the latched switch to the pin#1 and pin#2 of the on-board 1x3 pins, 2.0mm pitch pin header (polarity is negligible).

Mode	Jumper Setting
AT	
ATX	

3. When the latched switch is closed, the DC power is break off and system is turn off. When the latched switch is opened, the DC power is feed-in, and, with the correct setting of "**Power On after Power Failure**" BIOS option (please refer to section 4.1.6), the system is turn on.

3.6.3 To Power on POC-120 Using an Non-latched Switch (ATX-mode)

For an application which places POC-120 inside a cabinet, it's useful to control the on/off of the system using an external switch. POC-120 series provides an on-board 3-pin wafer connector (for detail, please refer to section 2.4.1) for connecting a latched/non-latched switch and behaves either AT-mode or ATX-mode power on/off control.

When using the ATX-mode on/off control, you need a non-latch switch. The external non-latched switch acts exactly the same as the power button on the front panel. To power on POC-120 using an external non-latched switch (ATX-mode), please follow the steps

listed below.

1. Prepare a non-latched switch with a 2-pin, 2.0mm pitch connector.
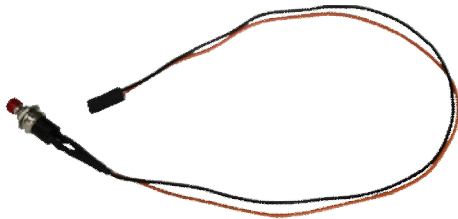
2. Connect the non-latched switch to the pin#2 and pin#3 of the on-board 1x3 pins, 2.0mm pitch pin header (polarity is negligible).

Mode	Jumper Setting
AT	
ATX	

3. Push the non-latched switch will turn on the system (the PWR LED indicator on the front panel is on at the same time). Push the non-latched switch when system is on will turn off the system. If your operating system supports ATX power mode (i.e. Microsoft Windows or Linux), push the power button causes a pre-defined system behavior, such as shutdown or hibernation.
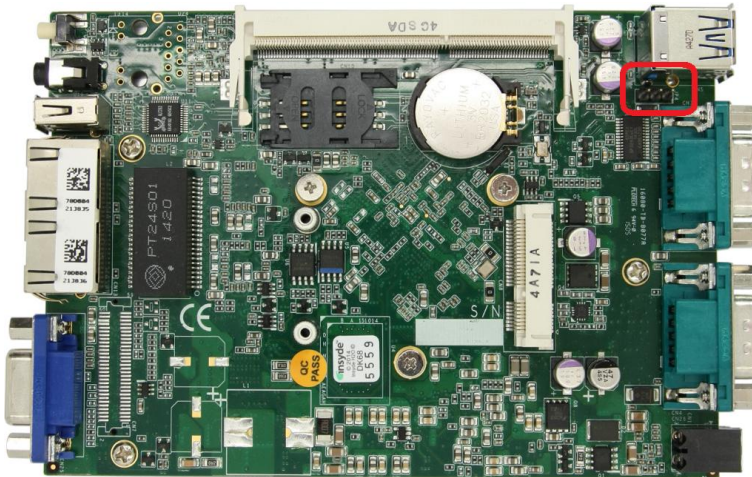
3.6.4 To Power on POC-120 Using Wake-on-LAN Function

Wake-on-LAN (WOL) is a mechanism to wake up a computer system from a S3 (standby), S4 (Hibernate) or S5 (system off with standby power) state via issuing Subnet Directed Broadcasts (SDB) or a magic packet. POC-120 series implements the Wake-on-LAN function for its first GbE port.
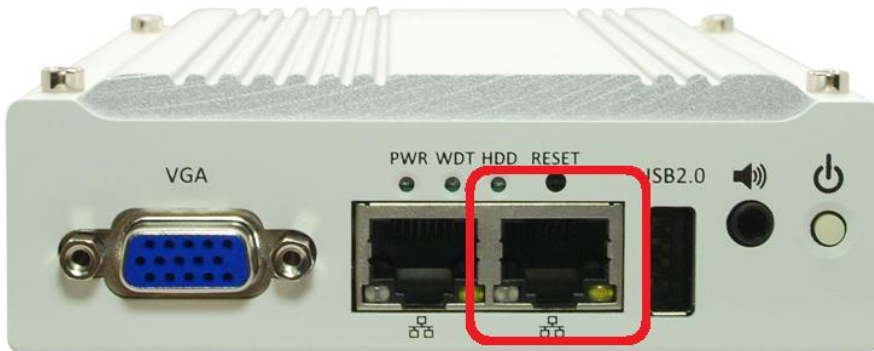
To enable WOL function and power on you POC-120, please follow the steps listed below.

1. When POC-120 boots up, press F2 to enter BIOS setup utility.
2. Enter the **[Power]** menu. And configure the **[Wake On LAN]** option as **[Enabled]**. This setting enables the Wake-on-LAN function for POC-120 series. Please refer to section 4.1.5 for the instruction of configuring this BIOS option.
3. In Windows 7 system, identify the Local Area Connection of corresponding Intel® I210 Gigabit Controller and click the **Configure** button.
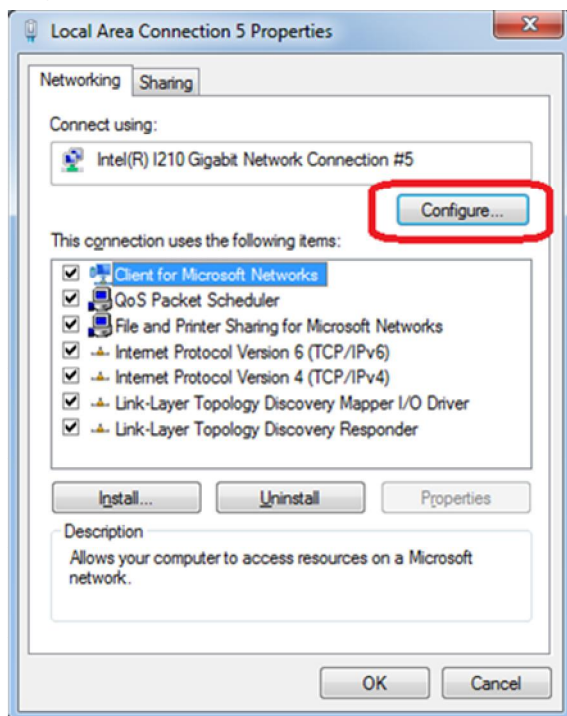
4. Click the **Power Management** tag, and check the following two options accordingly
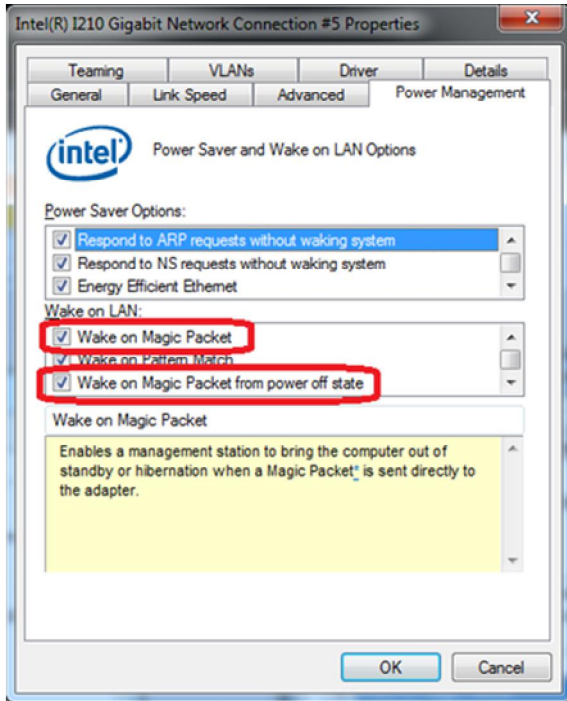
- **Wake on Magic Packet**

  POC-120 can wake from S3 or S4 state when receiving a magic packet. The magic packet is a broadcast frame containing anywhere within its payload 6 bytes of all 255 (FF FF FF FF FF FF in hexadecimal), followed by sixteen repetitions of the target computer's 48-bit MAC address.

  For example, NIC's 48-bit MAC Address is 78h D0h 04h 0Ah 0Bh 0Ch

  DESTINATION SOURCE MISC

  FF FF FF FF FF FF

  78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

  78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

  78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

  78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

  78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

  78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

  78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

  78 D0 04 0A 0B 0C 78 D0 04 0A 0B 0C

  MISC   CRC

  There are some free tools available on Internet that can be used to send a magic packet. Please refer to the following link to understand more about Magic Packet.
  http://en.wikipedia.org/wiki/Wake-on-LAN

● **Wake on Magic Packet from power off state**

When checking this option, POC-120 can wake from S5 (system off with standby power) state when receiving a magic packet.

Chapter 4 BIOS and Driver

4.1 BIOS Settings

POC-120 series is shipped with factory-default BIOS settings cautiously programmed for best performance and compatibility. In this section, we'll illustrate some of BIOS settings you may need to modify. Please always make sure you understand the effect of change before you proceed with any modification.

To Enter BIOS setup:

When POC-120 is booting up, press F2 to enter BIOS setup utility. Use following keys to edit/change BIOS options.

Keys	Function
F1	Help
↑↓←→	Select Item
F5/F6	Change Values
F9	Load Setup Defaults
Esc	Exit
Enter	Select -> SubMenu
F10	Save and Exit
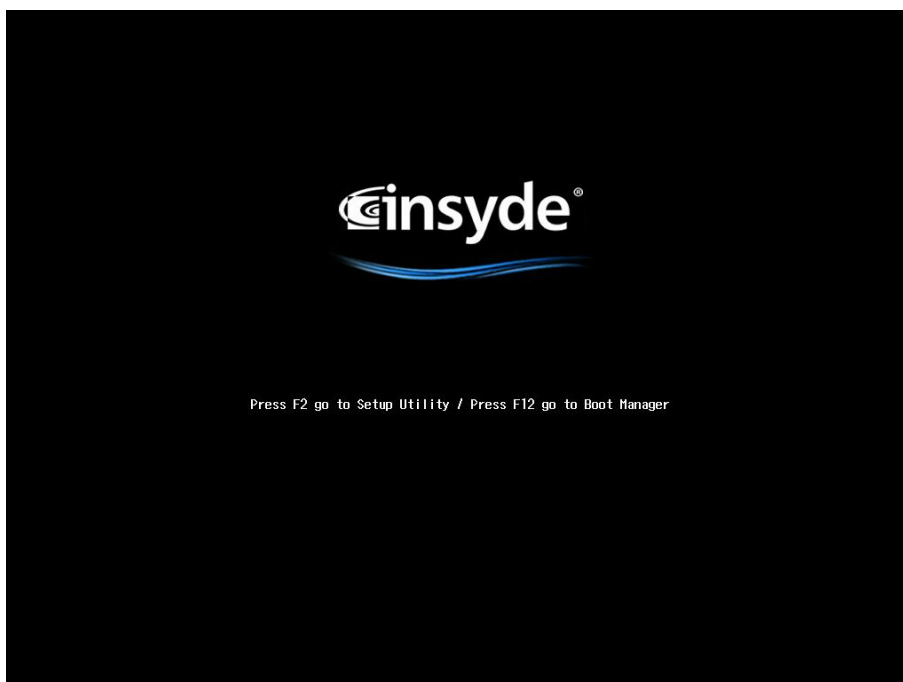
4.1.1 COM1 Operation Mode

COM1 of POC-120 series supports RS-232 (full-duplex), RS-422 (full-duplex) and RS-485 (half-duplex) mode. You can set the COM1 operating mode via BIOS settings. Another option in BIOS called "*Slew Rate*" defines how sharp the rising/falling edge is for the output signal of COM1. For long-distance RS-422/485 transmission, you may set the "*Slew Rate*" option as "**High**" to improve signal integrity. For RS-422/485 communication, the "***RS-422/485 Termination***" option determines whether to enable/disable internal termination of RS-422/485 transceiver according to your wiring configuration (e.g. with or without external termination).

To set COM1 operating mode:
1. When POC-120 boots up, press F2 to enter BIOS setup utility.
2. Go to **[Advanced]** → **[Peripheral Configuration]**.
3. Set the **[Set COM1 as]** option to a proper mode for COM1 of your POC-120.

```
                          POC-120 Series Setup Utility
 Advanced

 Peripheral Configuration                                 Set COM1 as RS-232
                                                          Full-Duplex) or RS-
 COM1                              <Enabled>
   Set COM1 as                     <RS-232>
   Slew Rate                       <Low>
   RS-422/485 Termination          <Disabled>

 COM2                              <Enabled>

 Audio Controller                  <Enabled>



                                        RS-232
                                        RS-422
                                        RS-485

```
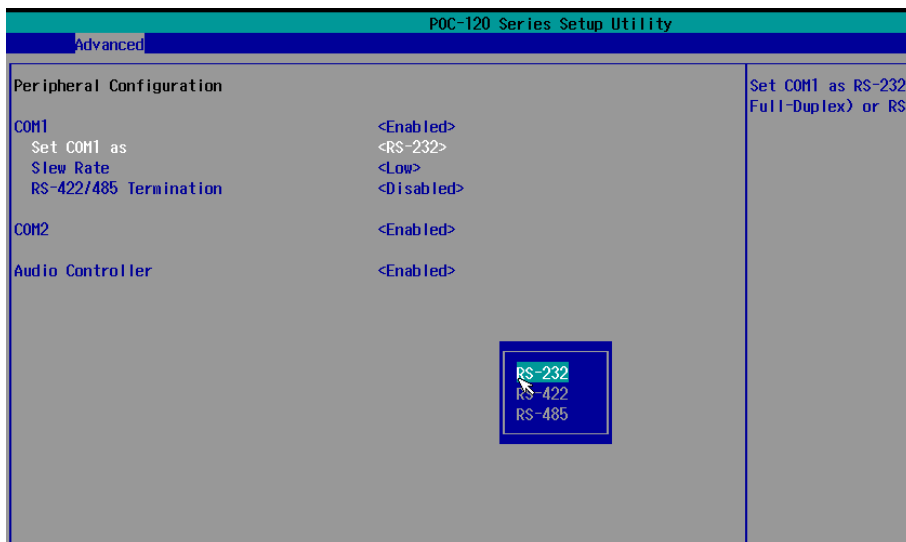
4.1.2 USB xHCI Mode Configuration

POC-120 offers one USB 3.0 and two USB 2.0 port via its native XHCI/EHCI controller. Legacy USB support is implemented so you use USB keyboard/mouse in legacy environment (e.g. DOS). Due to the nature that xHCI is not natively supported in some operating systems, we suggest to disable the xHCI mode is BIOS in prior to OS installation to avoid possible issue. Once OS is installed and corresponding xHCI driver is installed, you can enable xHCI mode to work with USB 3.0 port on POC-120.

To set xHCI mode:
1. When POC-120 boots up, press F2 to enter BIOS setup utility.

2. Go to **[Advanced]** → **[USB Configuration]**.

3. Set the **[xHCI Mode]** option to according to the following conditions.

Operating System	xHCI Mode
Windows 7 32/64-bit	Disabled
Linux (Ubuntu/Fedora/OpenSuSE/CentOS ...)	
Windows 8/8.1 32/64-bit	Auto

4. Once OS and corresponding xHCI driver is installed, you can restore the **[xHCI Mode]** option to **Auto**.

```
                        POC-120 Series Setup Utility
     Advanced

 USB Configuration                                      Mode of operation o

 XHCI Pre-Boot Mode Support          <Enabled>
 xHCI Mode                           <Auto>
 Win 7 Uninstall XHCI driver workaround   <Disabled>

 XHCI Controller                     <Enabled>
 USB2 Link Power Management           <Enable>
 XHCI Streams                        <Disabled>

 EHCI Contorller                     <Enabled>
 USB EHCI debug                      <Disabled>

 USB Per-Port Control                <Enabled>
 USB Port #0                         <Enabled>    Disabled
 USB Port #1                         <Enabled>    Enabled
 USB Port #2                         <Enabled>    Auto
 USB Port #3                         <Enabled>    Smart Auto
```

4.1.3 Chipset SATA Mode

The SATA controller of POC-120 series supports two modes of operations, **IDE** and **AHCI** mode. **IDE** mode configures SATA controller to access SATA interface in legacy IDE mode, and is compatible with most storage devices. **AHCI** mode, which exposes SATA's advanced capabilities such as hot swapping and native command queuing, can deliver better performance for disk read/write. As POC-120 series no longer supports Windows XP, we highly recommend you to set "**Chipset SATA Mode**" to "AHCI" for better system performance.
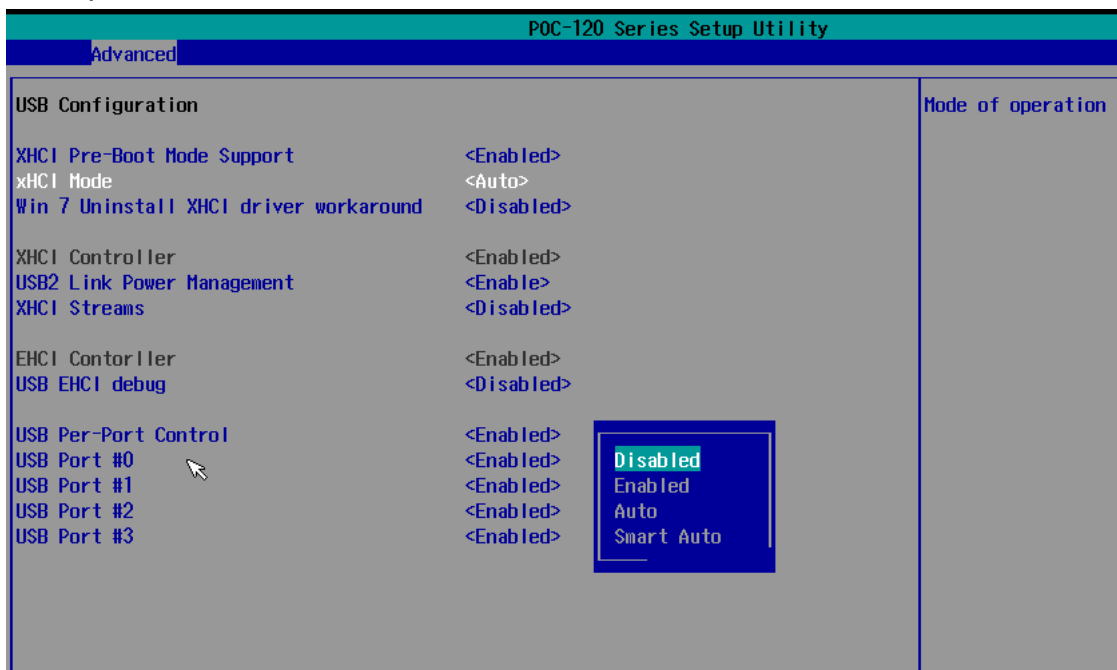
To set Chipset SATA mode:

1. When POC-120 boots up, press F2 to enter BIOS setup utility.

2. Go to **[Advanced]** → **[SATA Configuration]**.

3. Set the **[Chipset SATA Mode]** option to a proper mode for your POC-120.
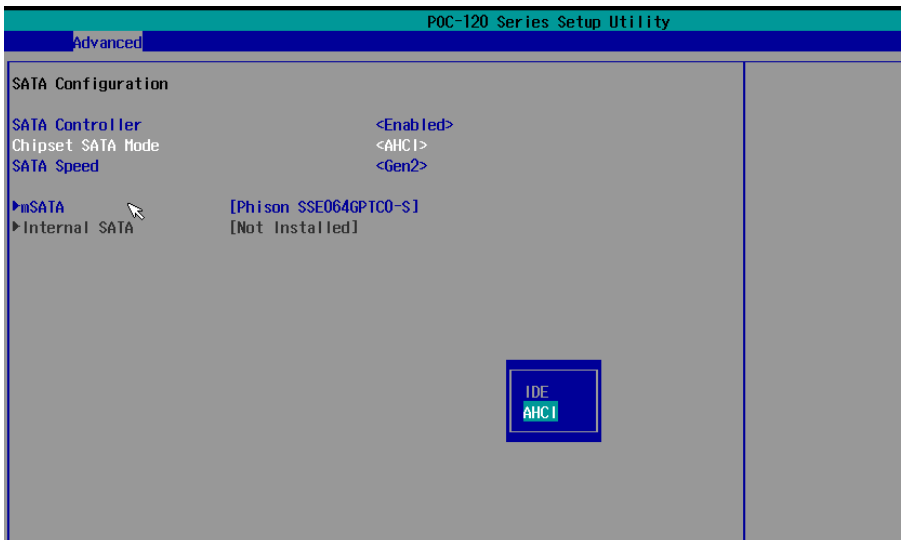
4.1.4 C-States and Max C-States

C-States is a power-saving technique implemented in modern Intel processors. It shuts down clock signals and power for idle logic units inside the CPU to reduce energy consumed. The trade-off, however, is a longer latency for CPU to wake up and be 100% operational. Depending on your application, you can configure these options to have higher performance (disable "C-States") or lower power-consumption (enable "C-States" and set "Max C-States" to C6/C7).

To set C-States and Enhanced C-States:

1. When POC-120 boots up, press F2 to enter BIOS setup utility.
2. Go to **[Power]** → **[Advanced CPU Control]**.
3. Enable/disable the **[C-States]** option according to your application.
4. Configure the **[Max C-States]** option according to your application.
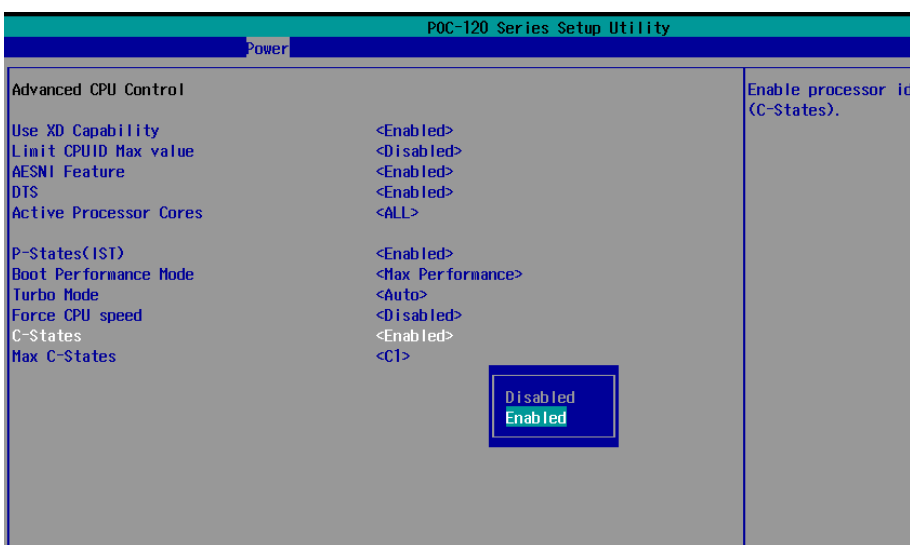
4.1.5 Wake-on-LAN Option

Wake-on-LAN (WOL) is a mechanism which allows you to turn on your POC-120 via Ethernet connection. To utilize Wake-on-LAN function, you have to enable this option first in BIOS settings. Please refer to section 3.6.4 for instructions of using WOL function.

To enable/disable "Wake on LAN" option:

1. When POC-120 boots up, press F2 to enter BIOS setup utility.
2. Go to **[Power]**.
3. Enable/disable the **[Wake on LAN]** option according to your application.
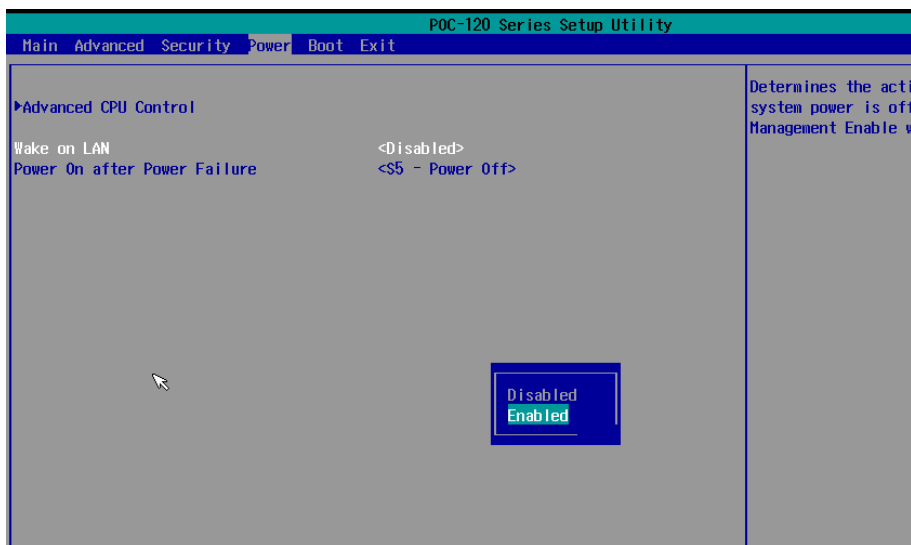
4.1.6 Power On after Power Failure Option

This option defines the behavior of POC-120 series when DC power is supplied.

Value	Description
S0 – Power On	System is powered on when DC power is supplied.
S5 – Power Off	System is kept in off state when DC power is supplied.

When you want to use the AT-mode remote on/off control function, you have to set this option to "S0 – Power On". Please refer to section 3.6.2 for instructions of using AT-mode remote on/off control function.

To set "**Power On after Power Failure**" option:

1. When POC-120 boots up, press F2 to enter BIOS setup utility.
2. Go to **[Power]**.
3. Set the **[Power On after Power Failure]** option to a proper value for your POC-120.

```
                        POC-120 Series Setup Utility
  Main  Advanced  Security  Power  Boot  Exit

                                                        Specify what state
 ▶Advanced CPU Control                                   re-applied after a
                                                        state).
 Wake on LAN                        <Disabled>
 Power On after Power Failure       <S5 - Power Off>




                                   ┌─────────────────┐
                                   │S0 - Power On    │
                                   │S5 - Power Off   │
                                   └─────────────────┘


```
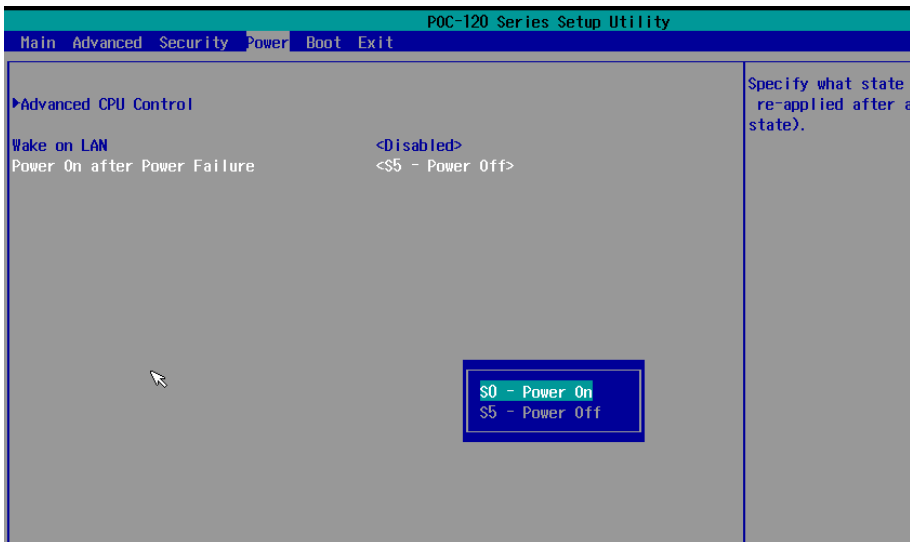
4.1.7 Watchdog Timer for Booting

The BIOS of POC-120 series has a useful feature which allows users to use the watchdog timer to secure the booting process. You can specify the timeout value for watchdog timer. Once the watchdog timer expires, the BIOS issues a reset command to initiate another booting process. You can also set the behavior of how to stop the watchdog timer. There are two options in BIOS menu, "*Automatically after POST*" and "*Manually after Entering OS*". When "*Automatically after POST*" is selected, the BIOS automatically stop the watchdog timer after POST (Power-On Self Test) OK. When "*Manually after Entering OS*" is selected, it's user's responsibility to stop the watchdog timer when entering OS. This guarantees the system can always boot to OS, otherwise another booting process will be initiated. For information about programming watchdog timer, please refer to **Appendix A Using W Watchdog Timer and DIO**.

To set the watchdog timer for boot in BIOS:
1. When POC-120 boots up, press F2 to enter BIOS setup utility.
2. Go to **[Boot]** menu.
3. Disable or select timeout value for **[WDT for Booting]** option.
4. Once you give a timeout value, the **[WDT Stop Option]** option appears. You can select either *"Automatically after POST"* or *"Manually after Entering OS"*.
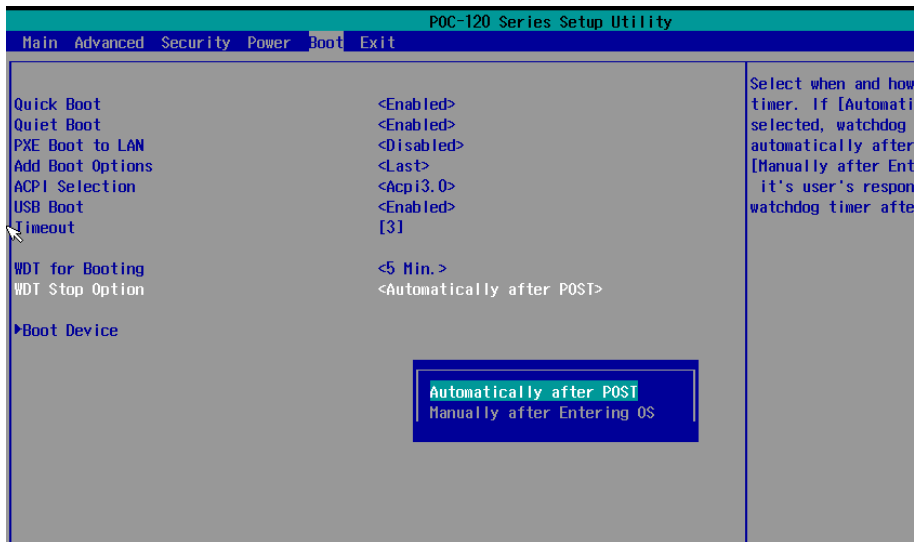
4.1.8 Select a Boot Device

When you have multiple bootable devices connected to your POC-120 (i.e. mSATA SSD, USB flash disk, USB DVD-drive), you may need to select one of them as the first boot device. There are two ways to select the device. You can either, press F12 when system boots up to go to Boot Manager and then select one of the devices, or select the boot device in BIOS settings.

To select a boot device in BIOS:
1. When POC-120 boots up, press F2 to enter BIOS setup utility.
2. Go to **[Boot]** → **[Boot Device]**.
3. The **[Boot Menu]** option determines whether to list all bootable devices connected to your POC-120 according to device or device type. The default order of boot device type is
   ● Hard Disk Drive
   ● USB
   ● CD/DVD-ROM Driver
   ● Floppy Drive
   ● Others
   You can use F5/F6 or +/- to change the boot order of devices or device types.

```
                         POC-120 Series Setup Utility
                    Boot

Boot Device Priority                                    List the boot optio
                                                          device.
Boot Menu                        <By Device>

Phison SSE064GPTCO-S91
SanDisk Cruzer Glide
```
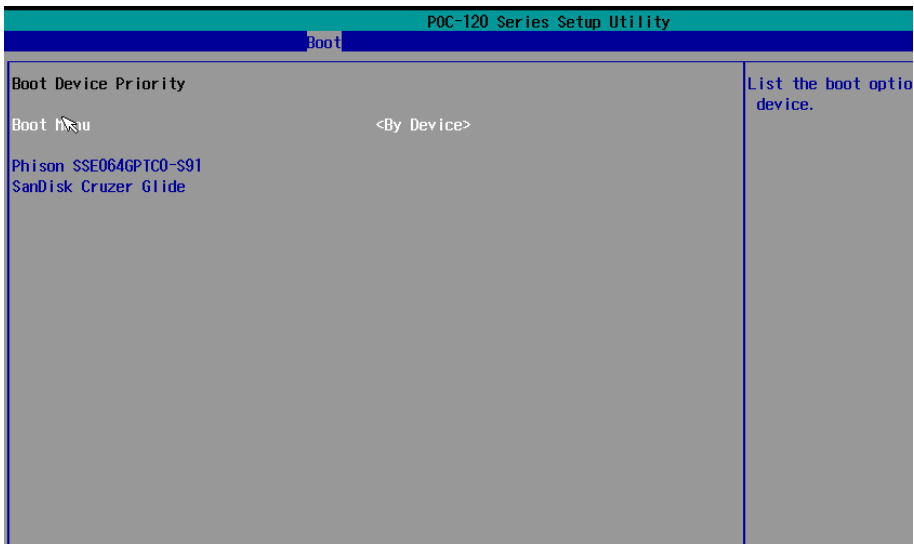
4.2 Operating System Support

POC-120 series supports most operating system developed for Intel® x86 architecture. The following list contains the operating systems which have been tested in Neousys Technology Inc.

- Microsoft Window 7 32-bit
- Microsoft Window 7 64-bit
- Microsoft Window 8/8.1 32-bit
- Microsoft Window 8/8.1 64-bit
- Ubuntu 14.04 or later version
- Fedora 20.1 or later version
- OpenSuSE 13.1 or later version
- CentOS 7 or later version

Neousys will keep this list updated as we continuously test other operating systems with POC-120 series. Please contact us for the latest OS support list.

4.3 Driver Installation

Neousys Technology Inc. provides a very convenient utility in "Drivers & Utilities DVD" to allow the "One-Click" driver installation. This utility automatically detects your Windows operating system and installs all necessary drivers to your POC-120 series with just one mouse click.

4.3.1 Install All Drivers Using "One-Click" Driver Installation

1. Insert the "Drivers & Utilities DVD" into a USB DVD-drive attached to your POC-120. A setup utility launches and the following dialog appears.

2. Click on the **"Automatic Driver Installation"**. The setup utility will automatically detect your Windows operating system and install all necessary drivers. According to different versions of Windows, the installation process takes about 6~8 minutes. Once driver installation is done, the setup utility reboots your Windows and your system works normally afterward.

4.3.2 Install Drivers Manually

You can also manually install each driver for POC-120 series. Please refer to the following information about installing drivers for different operating system.

Windows 7 32-bit

The recommended driver installation sequence is

1. Chipset driver (x:\Driver_Pool\Chipset_Vlv\Win7_8_ALL\SetupChipset.exe)
2. Graphics driver (x:\ Driver_Pool\Graphics_Vlv_EMGD\Win7_32\Setup.exe)
3. Audio driver (x:\Driver_Pool\Audio_ALC262\Win7_8_ALL\Setup.exe)
4. LAN driver
    (x:\Driver_Pool\GbE_I210\Win7_8_32\APPS\PROSETDX\Win32\DxSetup.exe)
5. USB 3.0 driver (x:\USB3_Vlv\Win7_ALL\Setup.exe)
6. TXE driver (x:\Driver_Pool\TXE_Vlv\Win7_8_ALL\SetupTXE.exe)

Windows 7 64-bit

The recommended driver installation sequence is

1. Chipset driver (x:\Driver_Pool\Chipset_Vlv\Win7_8_ALL\SetupChipset.exe)
2. Graphics driver (x:\Driver_Pool\Graphics_Vlv_EMGD\Win7_64\Setup.exe)
3. Audio driver (x:\Driver_Pool\Audio_ALC262\Win7_8_ALL\Setup.exe)
4. LAN driver
    (x:\Driver_Pool\GbE_I210\Win7_8_64\APPS\PROSETDX\Winx64\DxSetup.exe)
5. USB 3.0 driver (x:\Driver_Pool\USB3_Vlv\Win7_ALL\Setup.exe)
6. TXE driver (x:\Driver_Pool\TXE_Vlv\Win7_8_ALL\SetupTXE.exe)

Windows 8/8.1 32-bit

The recommended driver installation sequence is

1. Chipset driver (x:\Driver_Pool\Chipset_Vlv\Win7_8_ALL\SetupChipset.exe)
2. Graphics driver (x:\Driver_Pool\Graphics_3rd_i7_Vlv\Win7_8_32\Setup.exe)
3. Audio driver (x:\Driver_Pool\Audio_ALC262\Win7_8_ALL\Setup.exe)
4. LAN driver
    (x:\Driver_Pool\GbE_I210\Win7_8_32\APPS\PROSETDX\Win32\DxSetup.exe)
5. TXE driver (x:\Driver_Pool\TXE_Vlv\Win7_8_ALL\SetupTXE.exe)

Windows 8/8.1 64-bit

The recommended driver installation sequence is

1. Chipset driver (x:\Driver_Pool\Chipset_Vlv\Win7_8_ALL\SetupChipset.exe)
2. Graphics driver (x:\Driver_Pool\Graphics_3rd_i7_Vlv\Win7_8_64\Setup.exe)

3. Audio driver (x:\Driver_Pool\Audio_ALC262\Win7_8_ALL\Setup.exe)
4. LAN driver
    (x:\Driver_Pool\GbE_I210\Win7_8_64\APPS\PROSETDX\Winx64\DxSetup.exe)
5. TXE driver (x:\Driver_Pool\TXE_Vlv\Win7_8_ALL\SetupTXE.exe)

Appendix A Using Watchdog Timer

POC-120 series provides watchdog (WDT) timer function to ensure reliable system operation. WDT is a hardware mechanism to reset the system if the watchdog timer is expired. Users can start WDT and keep resetting the timer to make sure the system or program is running flawlessly.
In this chapter, we'll illustrate how to use the WDT_DIO function library provided by Neousys to program the WDT and DIO functions.

Install WDT and DIO Library

The WDT_DIO function library is delivered in the form of a setup package. For POC-120 series, please use WDT_DIO_Setup_v2.0.6.exe or later revision. In prior to program WDT and DIO on POC-120 series, you should execute the setup program and install the library.
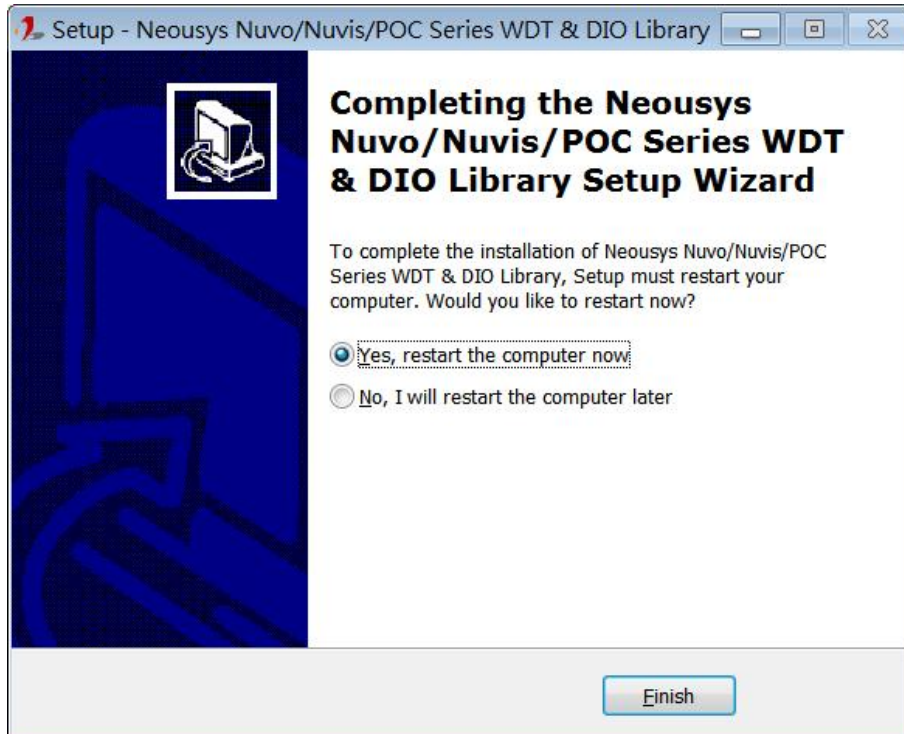
1. Execute **WDT_DIO_Setup.exe**. The following dialog appears.
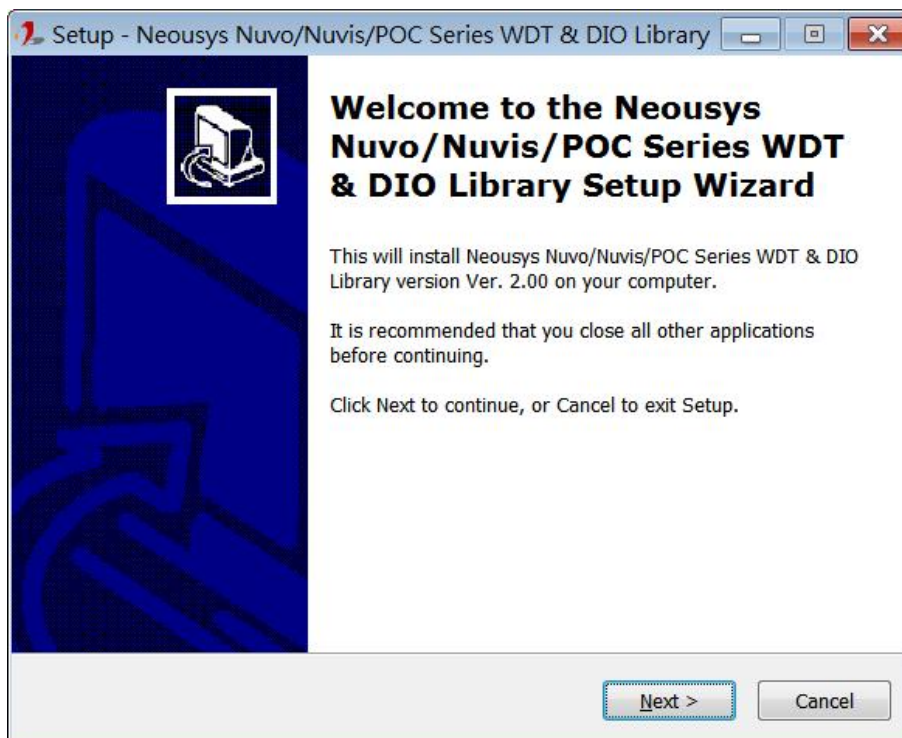
2. Click "Next >" and specify the directory of installing related files. The default directory is *C:\Neousys\WDT_DIO*.
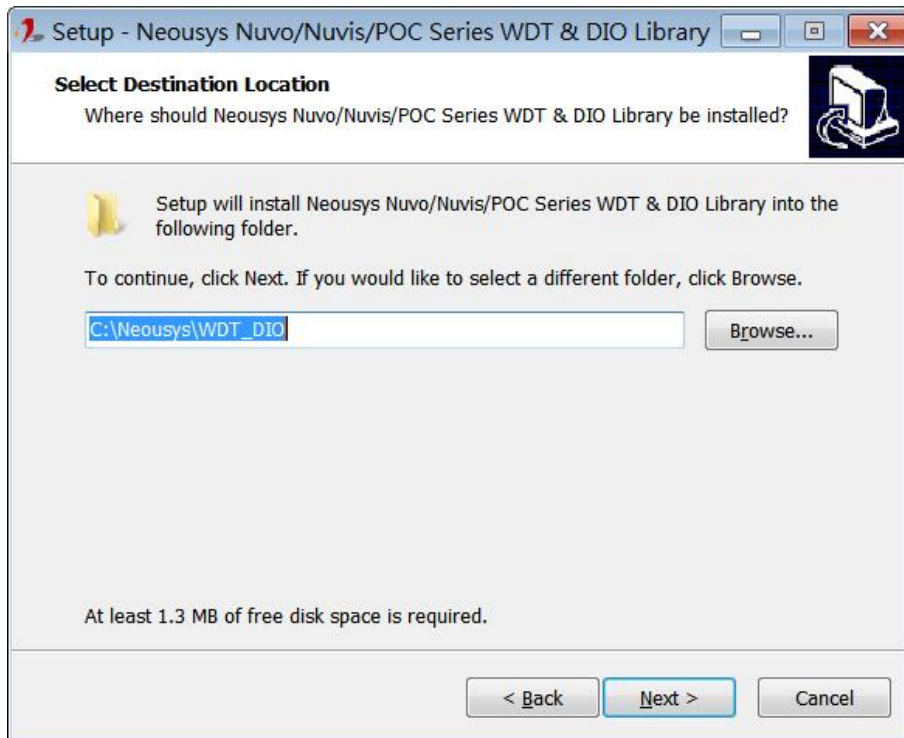
3. Once the installation is finished, a dialog appears to prompt you to reboot the system. The WDT & DIO library will take effect after system rebooting.

4. When you programming your WDT or DIO program, the related files are located in

☐☐Header File: \Include
☐☐Library File: \Lib
☐☐Function Reference: \Manual
☐☐Sample Code: \Sample\WDT_Demo (Watchdog Demo)
                       \Sample\DIO_Demo   (Polling I/O Demo) *
                       \Sample\COS_Demo   (Change-of-State Interrupt Demo) *
                       \Sample\DTIO_Demo (DTIO Demo) *
                       \Sample\DTFO_Demo (Trigger Fan-out Demo) *
                       \Sample\PoE_Demo   (PoE per-port Control Demo) *

These sample programs can not work with POC-120

WDT Function Reference

InitWDT

Description

Initialize the WDT function. You should always invoke InitWDT() before set or start watchdog timer.

Parameter

None

Return Value

Returns TRUE if initialization successes, FALSE if initialization failed.

Usage

BOOL   bRet = InitWDT()

SetWDT

Description

Set timeout value and unit for watchdog timer. When InitWDT() is invoked, a default timeout value of 255 seconds is assigned.

Parameter

tick

WORD value to indicate timeout ticks.

tick should be a value of 1 ~ 16 if *unit* is 0 (minute)

tick should be a value of 6 ~ 1027 if *unit* is 1 (second)

unit

BYTE value (0 or 1) to indicate unit of timeout ticks.

0 : unit is minute

1 : unit is second

Return Value

If value of unit is correct (0 or 1), this function returns TRUE, otherwise FALSE.

Usage

WORD   tick=255;

BYTE   unit=1; //unit is second.

BOOL   bRet = SetWDT(tick, unit); //timeout value is 255 seconds

StartWDT

Description

Start countdown of WDT. When WDT is started, the WDT LED indicator starts to blink in a frequency of 1Hz. If no ResetWDT() or StopWDT is invoked before WDT is counted to 0, the WDT expires and system resets.

Parameter

None

Return Value

If the timeout value is given in correct format, this function returns TRUE, otherwise FALSE.

Usage

BOOL   bRet = StartWDT()

ResetWDT

Description

Reset the timeout value to the value given by SetWDT(). If no ResetWDT() or StopWDT is invoked before WDT is counted to 0, the WDT expires and system resets.

Parameter

None

Return Value

Always returns TRUE;

Usage

BOOL   bRet = ResetWDT()

StopWDT

Description

Stop the countdown of WDT. When WDT is stopped, the WDT LED indicator stops blinking.

Parameter

None

Return Value

Always returns TRUE;

Usage

BOOL   bRet = StopWDT()

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