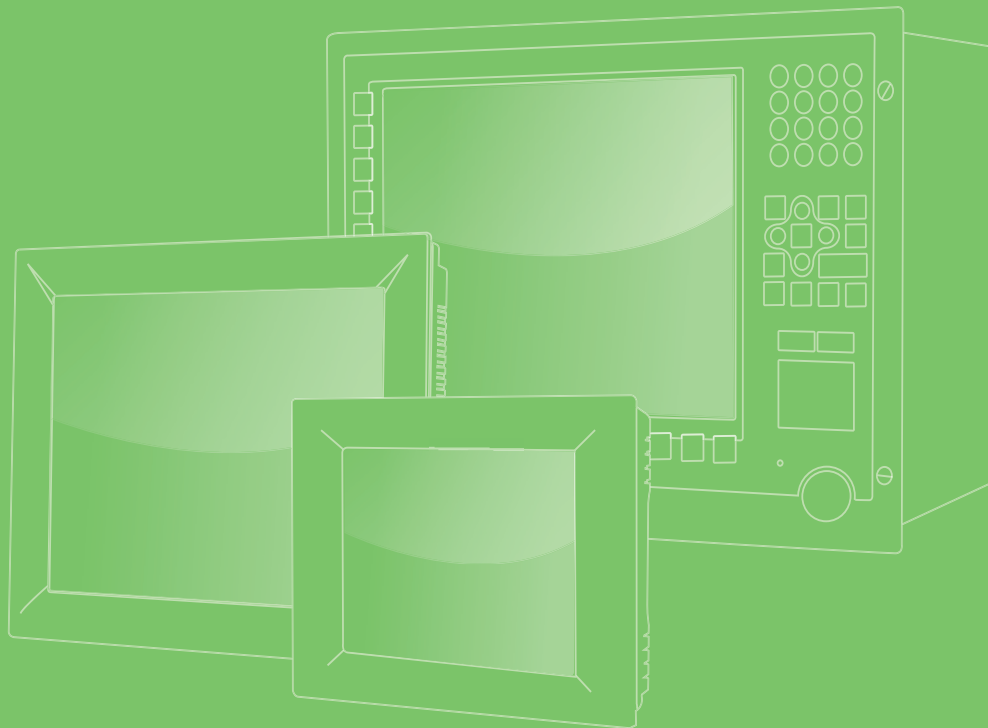


User Manual



## PPC-415 TGL

Intel® Core i Processor Based  
Micro-Computer with  
15" Color TFT LCD Display

**ADVANTECH**

*Enabling an Intelligent Planet*

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## Copyright

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## Acknowledgments

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## Product Warranty (2 years)

Advantech warrants the original purchaser that each of its products will be free from defects in materials and workmanship for two years from the date of purchase.

This warranty does not apply to any products that have been repaired or altered by persons other than repair personnel authorized by Advantech, or products that have been subject to misuse, abuse, accident, or improper installation. Advantech assumes no liability under the terms of this warranty as a consequence of such events.

Because of Advantech's high quality-control standards and rigorous testing, most customers never need to use our repair service. If an Advantech product is defective, it will be repaired or replaced free of charge during the warranty period. For out-of-warranty repairs, customers will be billed according to the cost of replacement materials, service time, and freight. Please consult your dealer for more details.

If you believe your product to be defective, follow the steps outlined below.

1. Collect all the information about the problem encountered. (For example, CPU speed, Advantech products used, other hardware and software used, etc.) Note anything abnormal and list any onscreen messages displayed when the problem occurs.
2. Call your dealer and describe the problem. Please have your manual, product, and any helpful information readily available.
3. If your product is diagnosed as defective, obtain a return merchandise authorization (RMA) number from your dealer. This allows us to process your return more quickly.
4. Carefully pack the defective product, a completed Repair and Replacement Order Card, and a proof of purchase date (such as a photocopy of your sales receipt) into a shippable container. Products returned without a proof of purchase date are not eligible for warranty service.
5. Write the RMA number clearly on the outside of the package and ship the package prepaid to your dealer.

Part No. 2003041500

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Edition 1

April 2022

# Declaration of Conformity

## CE

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This type of cable is available from Advantech. Please contact your local supplier for ordering information.

Test conditions for passing also include the equipment being operated within an industrial enclosure. In order to protect the product from damage caused by electrostatic discharge (ESD) and EMI leakage, we strongly recommend the use of CE-compliant industrial enclosure products.

## FCC 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 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 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 assistance.

# Technical Support and Assistance

1. Visit the Advantech website at [www.advantech.com/support](http://www.advantech.com/support) to obtain the latest product information.
2. Contact your distributor, sales representative, or Advantech's customer service center for technical support if you need additional assistance. Please have the following information ready before calling:
  - Product name and serial number
  - Description of your peripheral attachments
  - Description of your software (operating system, version, application software, etc.)
  - A complete description of the problem
  - The exact wording of any error messages

---

## Safety Instructions

1. Read these safety instructions carefully.
2. Retain this user manual for future reference.
3. Disconnect the equipment from all power outlets before cleaning. Use only a damp cloth for cleaning. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket must be located near the equipment and easily accessible.
5. Protect the equipment from humidity.
6. Place the equipment on a reliable surface during installation. Dropping or letting the equipment fall may cause damage.
7. The openings on the enclosure are for air convection. Protect the equipment from overheating. Do not cover the openings.
8. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet.
9. Position the power cord away from high-traffic areas. Do not place anything over the power cord.
10. All cautions and warnings on the equipment should be noted.
11. If the equipment is not used for a long time, disconnect it from the power source to avoid damage from transient overvoltage.
12. Never pour liquid into an opening. This may cause fire or electrical shock.
13. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
14. If any of the following occurs, have the equipment checked by service personnel:
  - The power cord or plug is damaged.
  - Liquid has penetrated the equipment.
  - The equipment has been exposed to moisture.
  - The equipment is malfunctioning, or does not operate according to the user manual.
  - The equipment has been dropped and damaged.
  - The equipment shows obvious signs of breakage.
15. Do not leave the equipment in an environment with a storage temperature of below  $-40^{\circ}\text{C}$  ( $-40^{\circ}\text{F}$ ) or above  $60^{\circ}\text{C}$  ( $140^{\circ}\text{F}$ ) as this may damage the components. The equipment should be kept in a controlled environment.
16. **CAUTION:** Batteries are at risk of exploding if incorrectly replaced. Replace only with the same or equivalent type as recommended by the manufacturer. Discard used batteries according to the manufacturer's instructions.
17. This product is intended to be supplied by an UL certified DC source rated 9-32Vdc, 10-3A. Tma 50 degree C minimum, if need further assistance, please contact Advantech for further information.
18. In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position does not exceed 70 dB (A).

**DISCLAIMER:** These instructions are provided according to IEC 704-1 standards. Advantech disclaims all responsibility for the accuracy of any statements contained herein.



## Safety Precautions - Static Electricity

Follow these simple precautions to protect yourself from harm and the products from damage.

- To avoid electrical shock, always disconnect the power from the PC chassis before manual handling. Do not touch any components on the CPU card or other cards while the PC is powered on.
- Disconnect the power before making any configuration changes. A sudden rush of power after connecting a jumper or installing a card may damage sensitive electronic components.

## Battery Information

Batteries, battery packs and accumulators should not be disposed of as unsorted household waste. Please use the public collection system to return, recycle, or treat them in compliance with the local regulations.





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# Chapter 1

## Overview

This chapter gives background information on the PPC-415 TGL panel PC.

Sections Include:

- Introduction
- Specifications
- Dimensions

## 1.1 Introduction

PPC-415 TGL is a new generation XGA (1024 x 768) panel PC. It is based on the 11th. Gen Intel Core processor and adopts an effective fanless thermal solution, featuring excellent performance and reliability, for this product series. PPC-415 TGL offers multiple I/O, including 3 COMs, 4 USBs, and dual 2.5Giga Ethernet ports, which allows for easier connection with any peripheral devices and easier integration with machine manufacturing. It provides PCIe/PCI expansion for more applications. The multi-control touchscreen is consistent with the current operating experience and user habits.

## 1.2 Specifications

### 1.2.1 General Specifications

<b>Product Name</b>	PPC-415 TGL
<b>LCD Specification</b>	15" LCD
<b>Display Type</b>	15" TFT LCD (LED backlight)
<b>Max. Resolution</b>	1024 x 768
<b>Color</b>	16.7M/262K
<b>Dot Pitch</b>	0.297 x 0.297 mm
<b>Viewing Angle</b>	88° (Left), 88° (Right), 88° (Up), 88° (Down) (Typ.)
<b>Luminance</b>	500 cd/m2(Typ.)
<b>Contrast</b>	2500 (Typ.)
<b>Backlight Life</b>	70,000 hrs
<b>Weight</b>	5.4 Kg (11.90 lb)
<b>Dimension</b>	391.4 x 312.5 x 55.35 mm (15.41" x 12.3" x 2.18")
<b>CPU</b>	Intel® Core™ i5-1145G7E/i3-1115G4E/i7-1185G7E
<b>Memory</b>	2 x SODIMM, DDR4 3200, max. 32GB x 2
<b>Storage</b>	1 x 2.5" SATA bay M.2 M key bay (size: 22 x 42 mm or 22 x 80 mm, for storage only)
<b>Network (LAN1, LAN2)</b>	2 x Intel I225LM controller; Speed: 10M/100M/1000M/2.5G
<b>I/O Connectors</b>	1 x RS-422/485 2 x RS-232 4 x USB 3.2 1 x HDMI 1.4 1 x DP 1.2 (3840 x 2160) 1 x Line-out, 1 x Mic-in, 2 x 1 W speaker (internal) 1 x Phoenix power connector 1 x TPM 2.0 (optional)
<b>Expansion Slots</b>	1 x PCIe x1 (standard configuration) 1 x PCI (in accessory box)
<b>Additional Expansion Slots</b>	1 x M.2 2230 E Key slot for wireless card 1 x M.2 3052(3042) B Key slot for 5G (4G)
<b>OS</b>	Microsoft® Windows 10 (64-bit), Win10 IOT LTSC, Linux

## 1.2.2 Power Specifications

<b>Power Consumption</b>	i5: 60 W (Test system: Windows10 64bit)
<b>Input Voltage</b>	9 - 32 Vdc, 10 ~ 3 A

**Note!** For its test conditions, please see Note 1.



## 1.2.3 Touchscreen Specifications

<b>Type</b>	10-point projective capacitive
<b>Light Transmission</b>	85%+/-3%
<b>Controller</b>	USB interface

## 1.2.4 Environment Specifications

<b>Operating temperature</b>	-10 ~ 50° C
<b>Storage Temperature</b>	-40 ~ 60° C (-40 ~ 140° F)
<b>Relative Humidify</b>	10 ~ 95% @ 40° C (Non-condensing)
<b>Shock</b>	10 G peak acceleration (11 ms duration)
<b>Vibration</b>	5 ~ 500 Hz 1 G RMS

## 1.2.5 Certifications

<b>EMC</b>	BSMI, CE, FCC Class B
<b>Safety</b>	CB, CCC, UL, BSMI

## 1.2.6 IP Grade

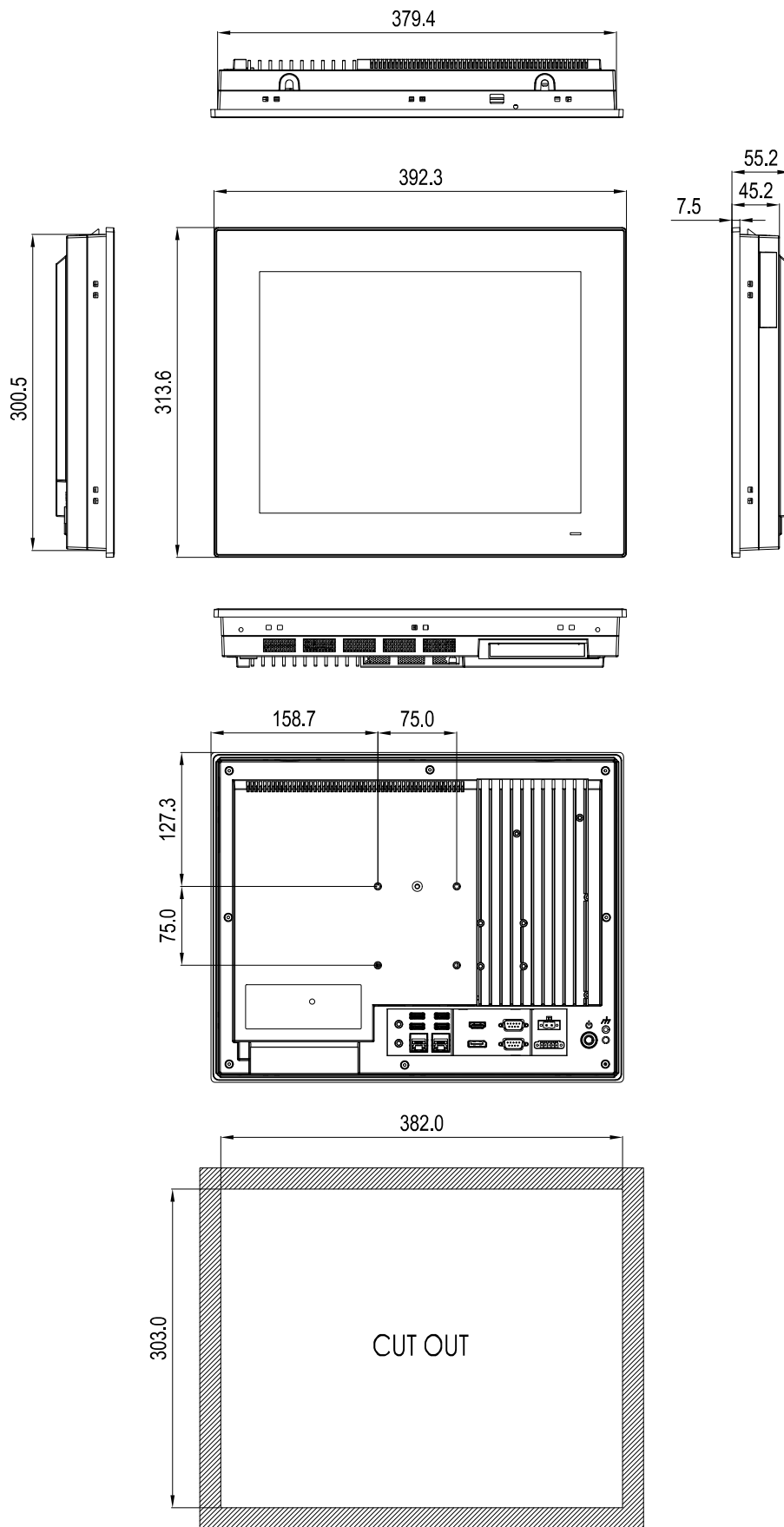
<b>Front Panel Dustproof and Waterproof</b>	IP66
---	------

### Note 1:

Power consumption of PPC-415 TGL is shown below:

Test Software	Test Configuration	Test System
Burn-in 7.0	Memory: 8G DDR4 2133 HDD: 2.5" 500G SATA III I/O: COM Port RS232 loopback x 2, USB 3.0 x 4	Win 10 (64bit)

## 1.3 Dimensions





**Note!** *Screw specification: M4; hole depth is 8 mm for maximum. Use suitable mounting apparatus to avoid risk of injury.*





# Chapter 2

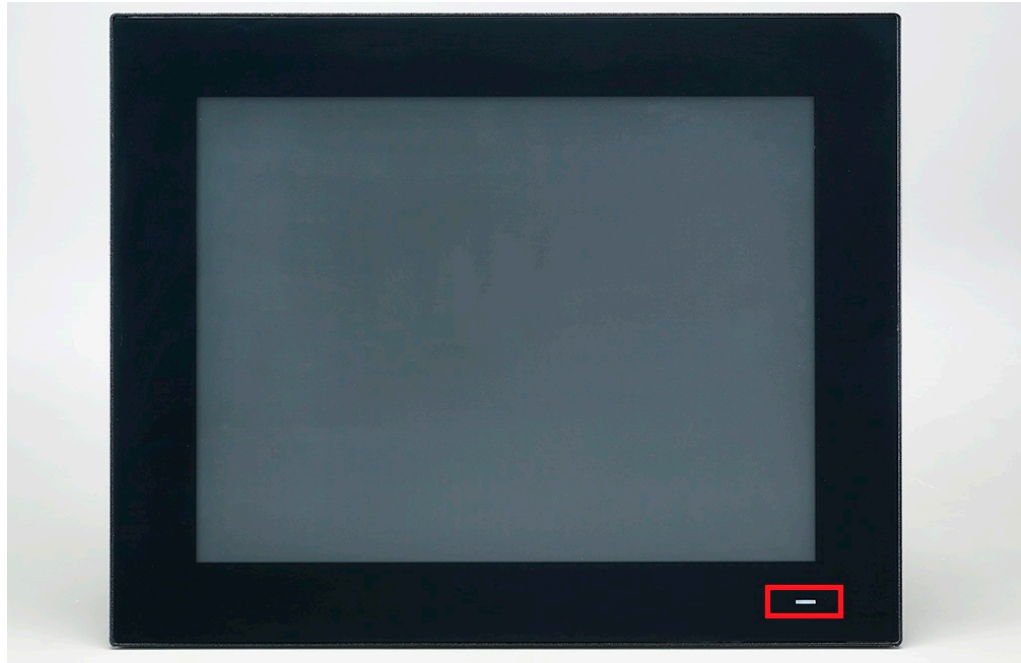
## System Installation and Setup

Sections Include:

- Quick Tour
- Installation Procedures
- Replacing Memory
- Installing HDD
- Installing M.2
- Installing Wireless LAN
- Installing Expansion Card
- Adjusting AT/ATX Functions
- Grounding
- Installing Hooks
- Single Person Quick Installation Guide

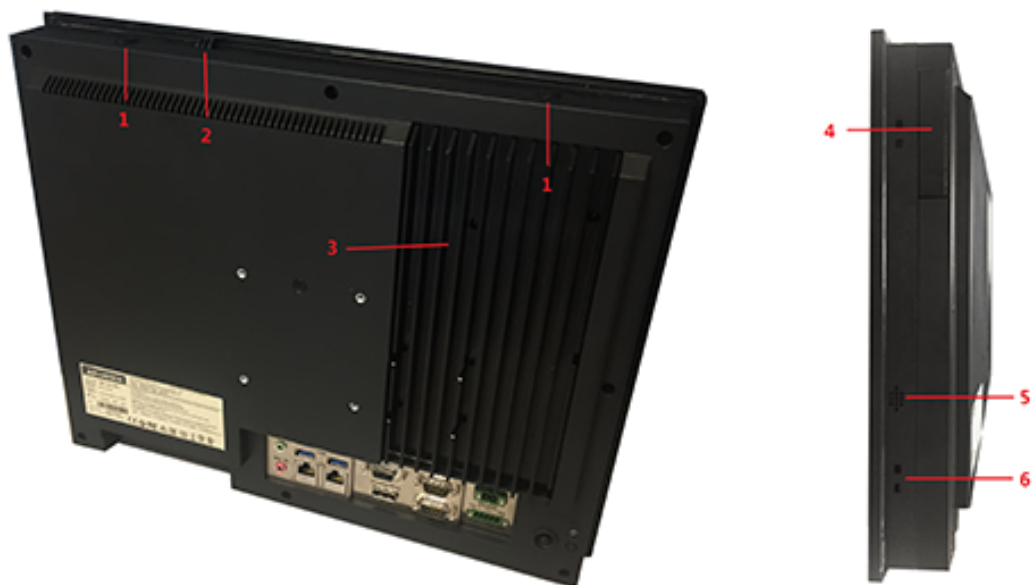
## 2.1 A Quick Tour

Before you install the panel PC, please be familiar with the location and function of each control key, driver, connector and port (please refer to the following content and figures). When the panel PC is placed on the desk, its front panel is shown as Figure 2.1.



**Figure 2.1: Front View**

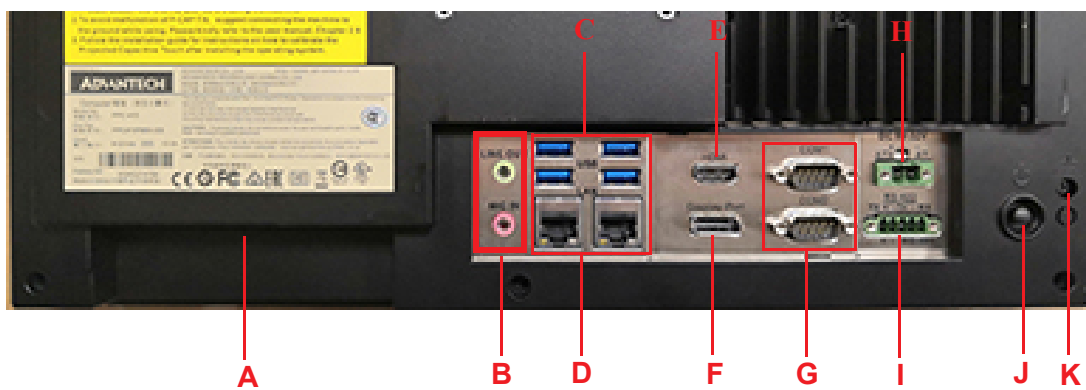
Power status LED: Off (S5) Orange; Sleep (S3) Orange; On (S0) Blue.



**Figure 2.2: Side View**

1. Antenna hole
  2. Quick installation clip
  3. CPU heatsink
- I/O connectors:

4. Expansion slot for optional module
5. Speaker (left, right)
6. Hooking holes for panel installation (ten holes)



**Figure 2.3: I/O Connectors**

- |                             |                               |
|-----------------------------|-------------------------------|
| A. PCI/PCIE expansion slots | G. 2 x RS-232                 |
| B. Line-out/Mic-in          | H. DC power connector (9-32V) |
| C. 4 x USB 3.2              | I. 1 x RS-422/485             |
| D. 2 x 2.5G Ethernet ports  | J. Power switch               |
| E. HDMI                     | K. Grounding screw            |
| F. DP                       |                               |

## 2.2 Installation Procedures

### 2.2.1 Connecting Power Cord

The panel PC supports 9 - 32 V<sub>DC</sub> power supply. Please always hold the plug end when connecting the power cord. Please follow the below procedures to connect the power cord:

1. Plug the 2-pin connector into the DC inlet of the panel PC.
2. Connect power cord with power adapter with the 3-pin female connector.



Figure 2.4: Connecting Power Cord

### 2.2.2 Connecting Keyboard and Mouse

Connect mouse and keyboard to the I/O connector of the panel PC. Refer to Figure 2.3, C, USB.

### 2.2.3 Switching on the Panel PC

Power switch is located at the lower right corner of the rear cover. Refer to Figure 2.3, J, Power switch.

**Note!** Power cord and adapter are optional.

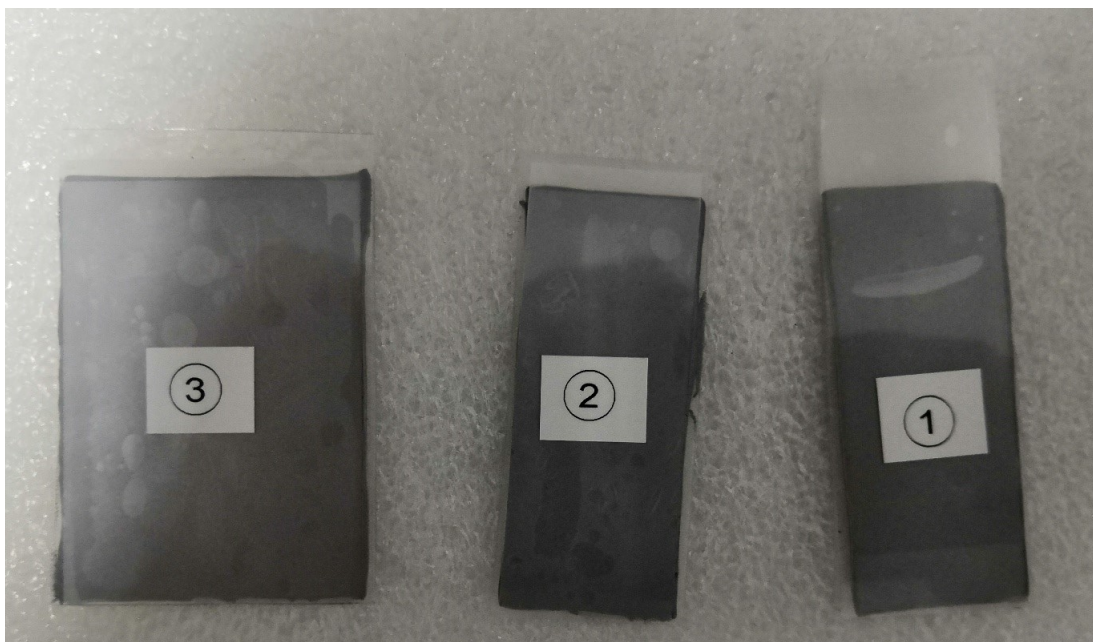




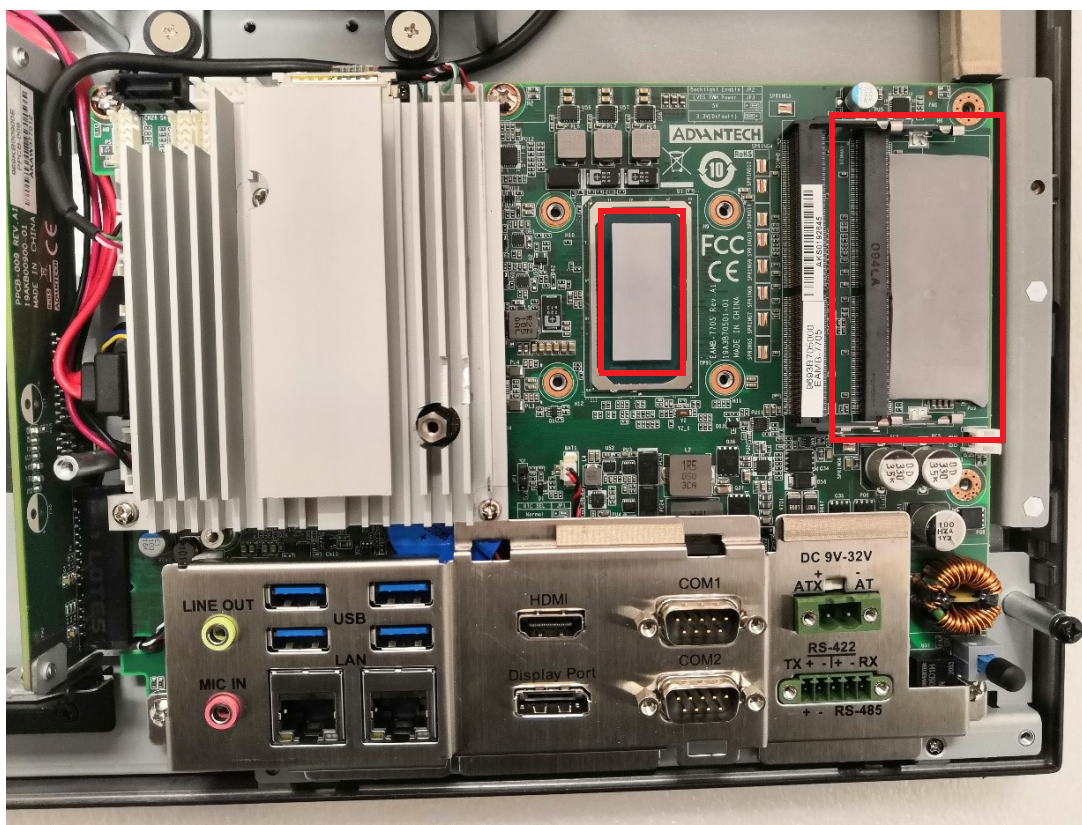
## 2.3 Installing Memory

Please install one or two memories as needed.

1. Take out the thermal PADS for the CPU and memory from the accessory box. Please note the labels of the bags of the memory thermal PADS.



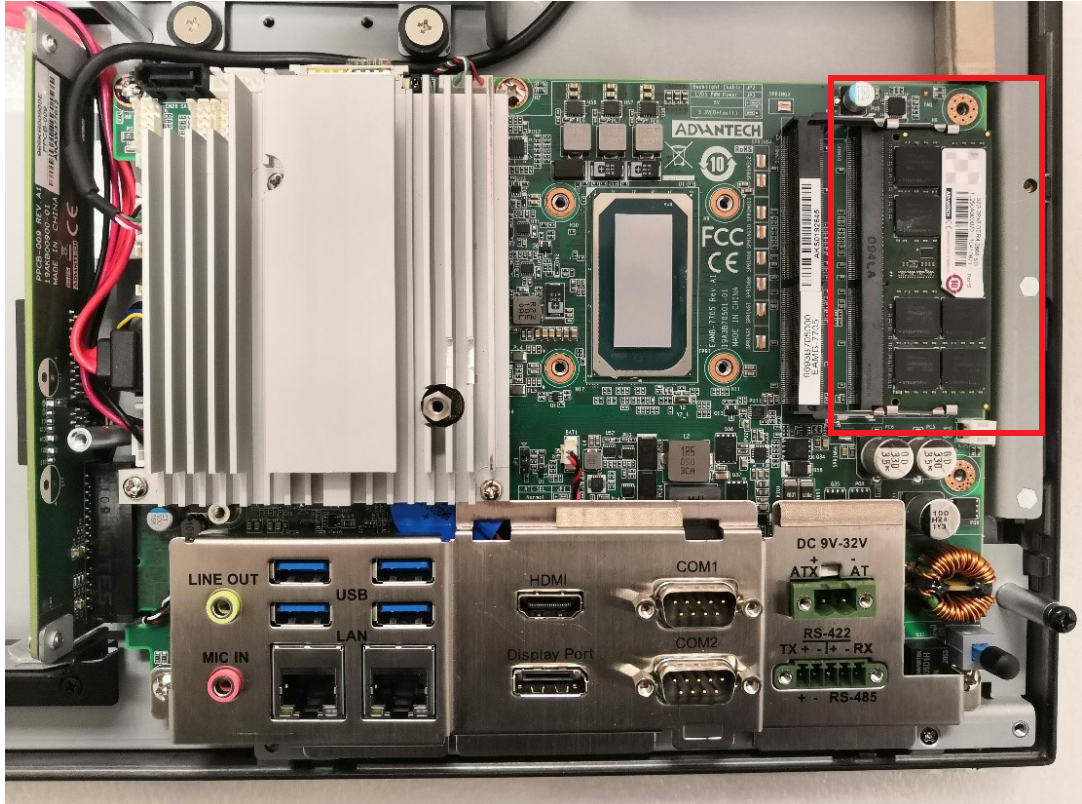
2. Open the back cover and heat sink and install CPU thermal. Install the memory PAD of No.1 directly beneath the memory slot.



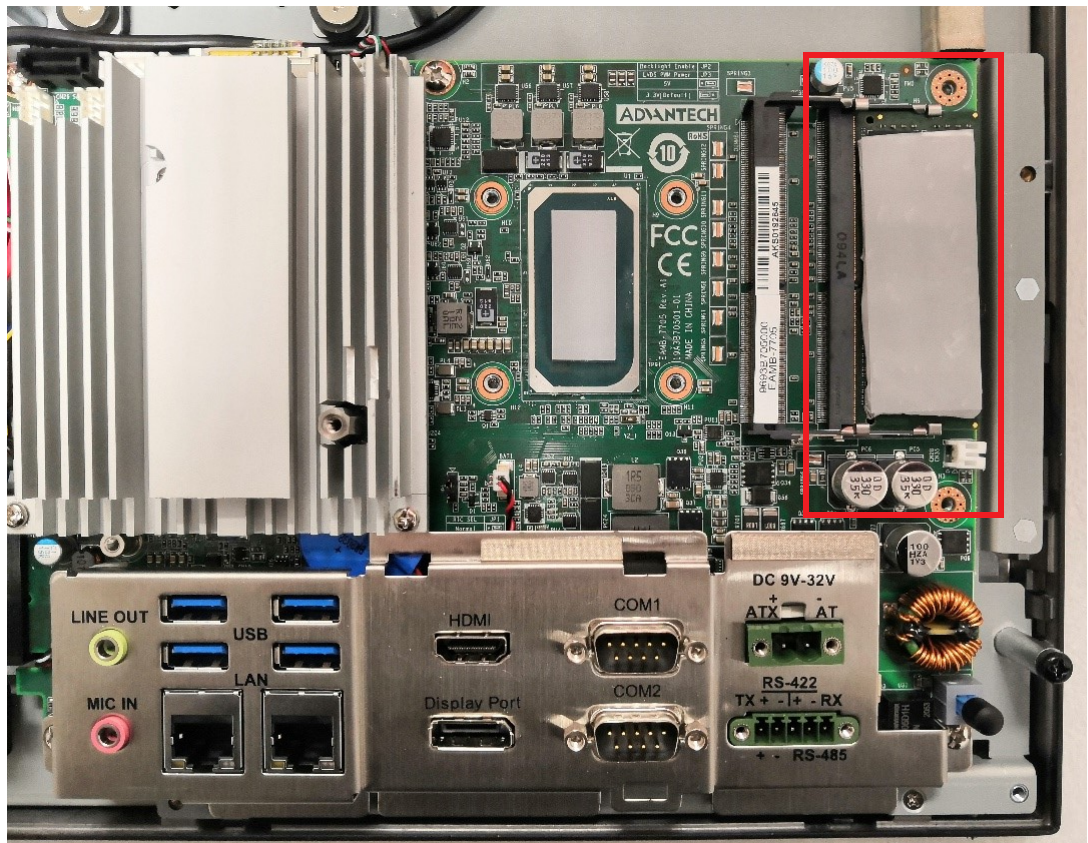


## 2.3.1 Installing One Memory

1. Install one memory.



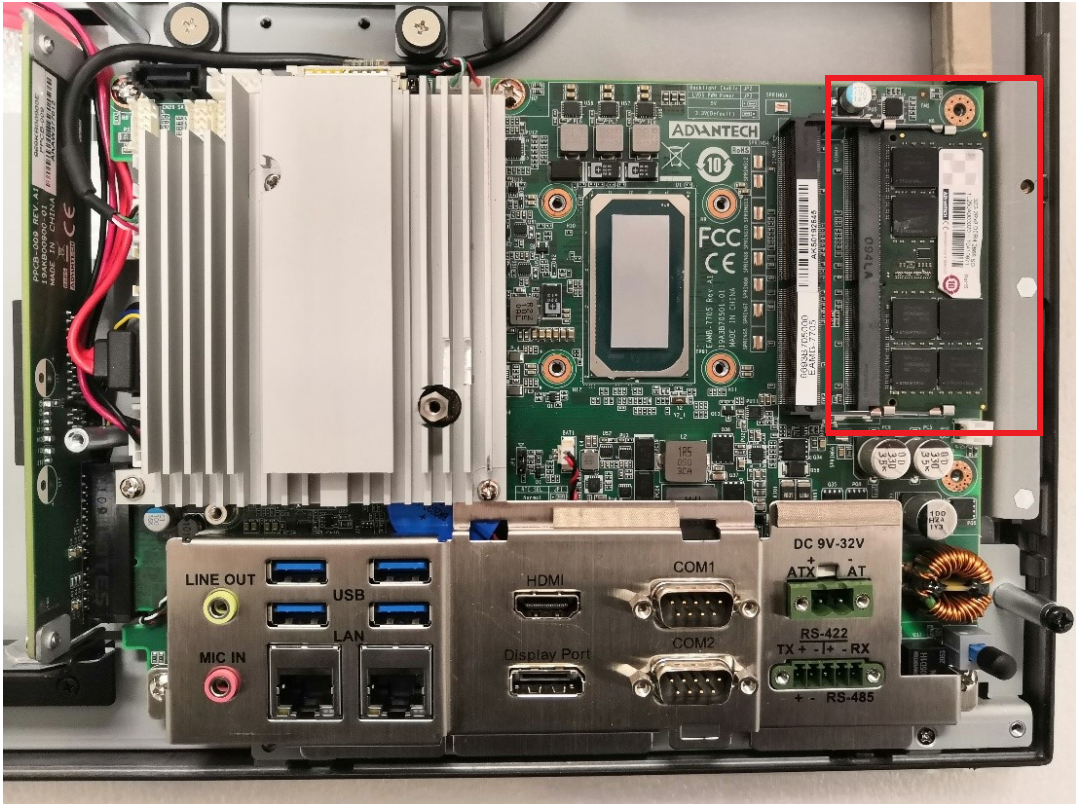
2. Install thermal PAD No. 2 above the memory and then install the heat sink.



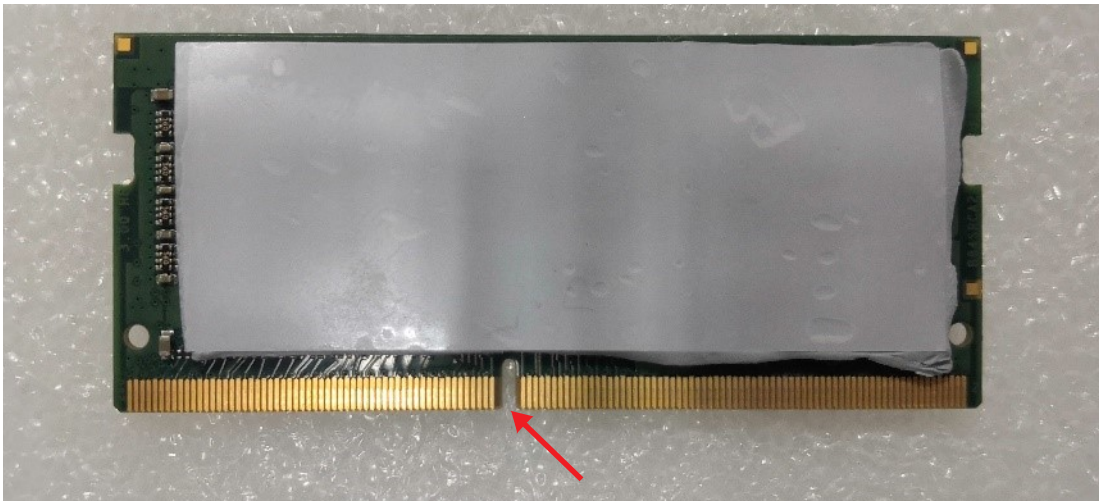


## 2.3.2 Installing Two Memories

1. Install the first memory.



2. Install the No. 2 thermal PAD on the back of the second memory (identified by the notch position of the memory).

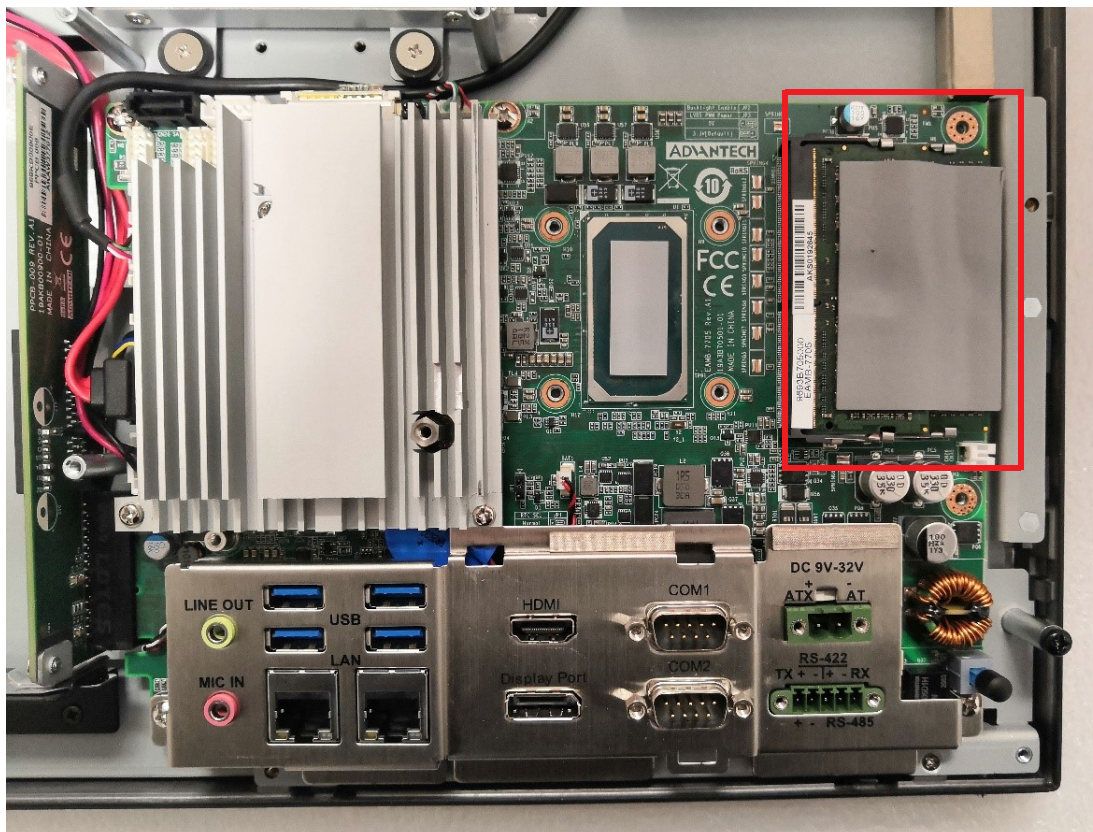




3. Install the second memory.

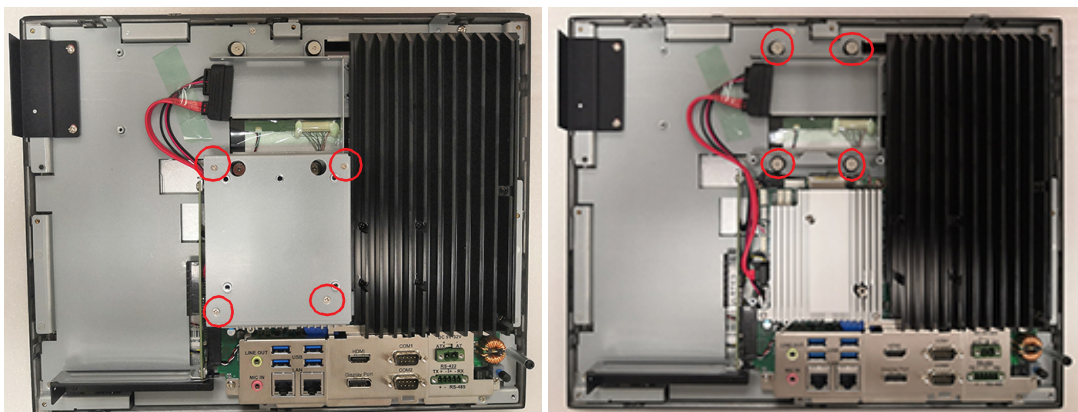


4. Install thermal PAD No. 3 above the two memories and then install the heat sink.

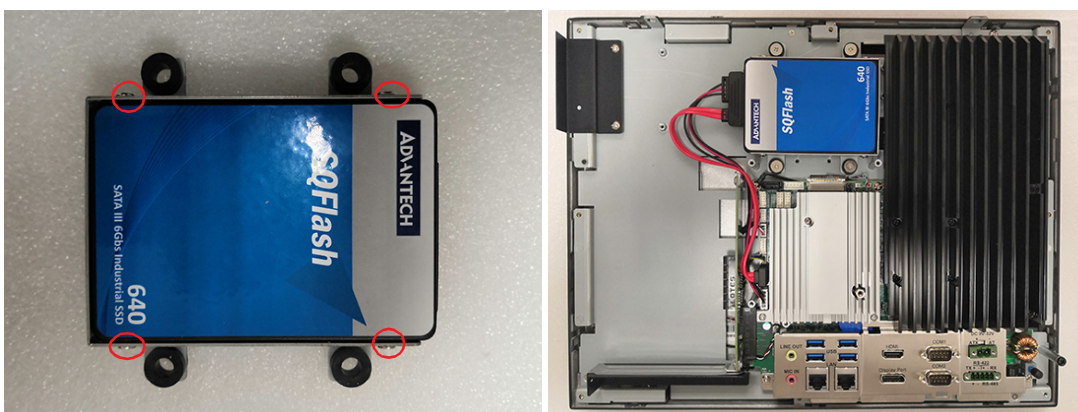


## 2.4 Installing HDD

1. Follow the procedures in Chapter 2.3 to remove the rear cover. Unfasten the screws marked with red circles and remove VESA holder below left, then take out the HDD bracket below right.



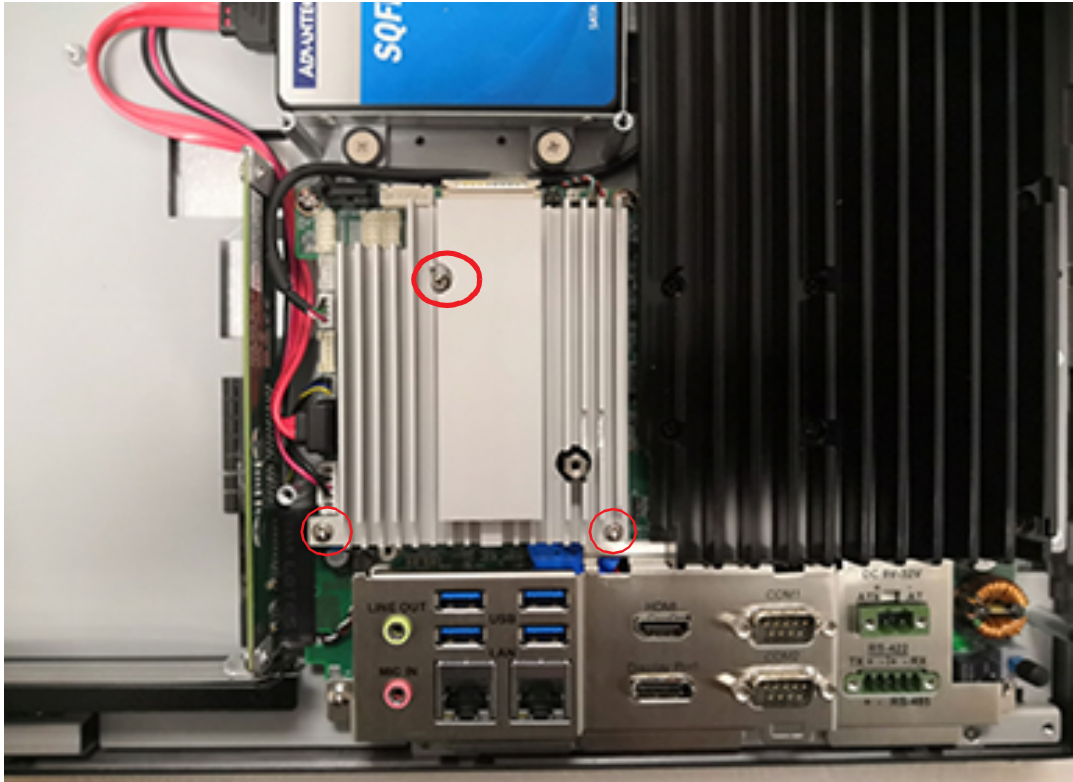
2. Take out 4 screws (see below) from the accessory box to secure the HDD onto the bracket, then replace and fix the HDD bracket.



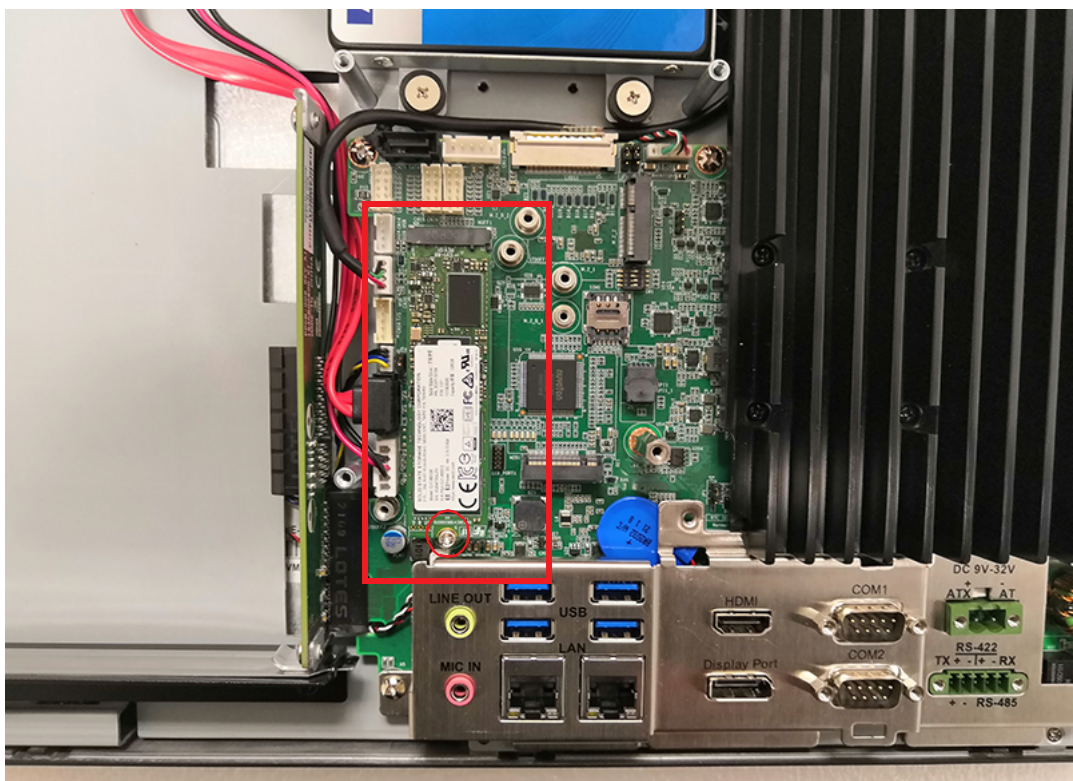


## 2.5 Installing M.2

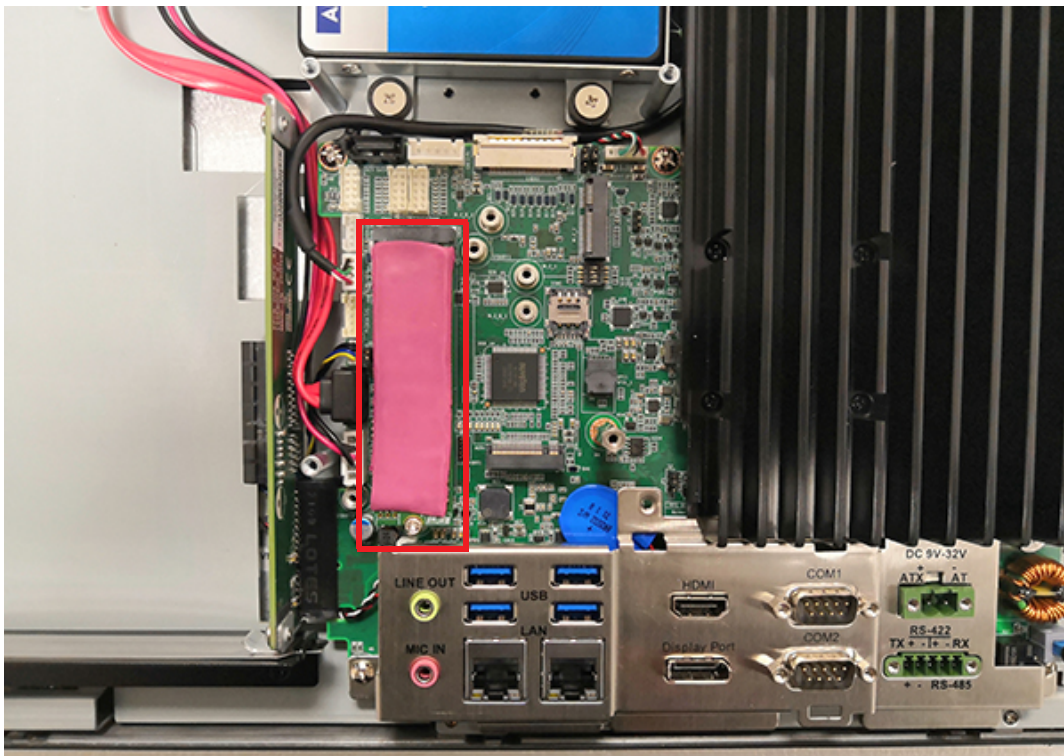
1. Follow the procedures in Chapter 2.3 and 2.4 to remove rear cover and VESA holder.
2. Unfasten the screws marked with red circles and remove the heatsink.



3. Fix M.2 card to the location marked with a rectangle.



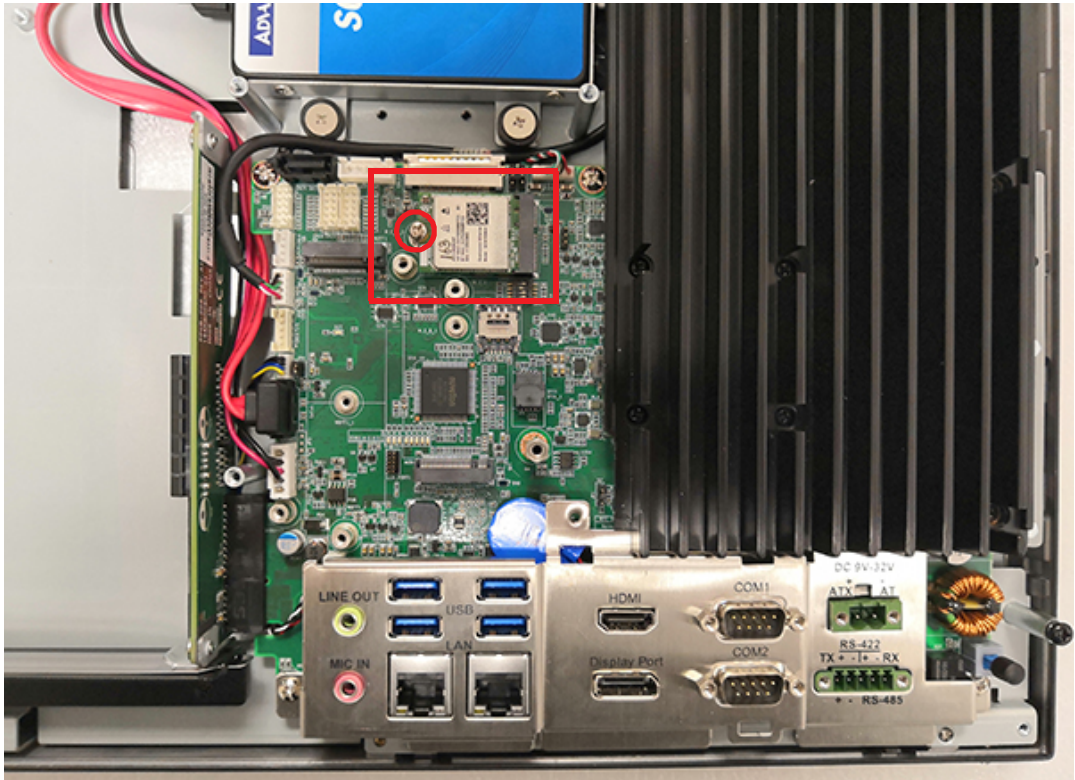
4. Add thermal PAD of M.2 card.



5. Then use screws to install the heatsink on the motherboard.

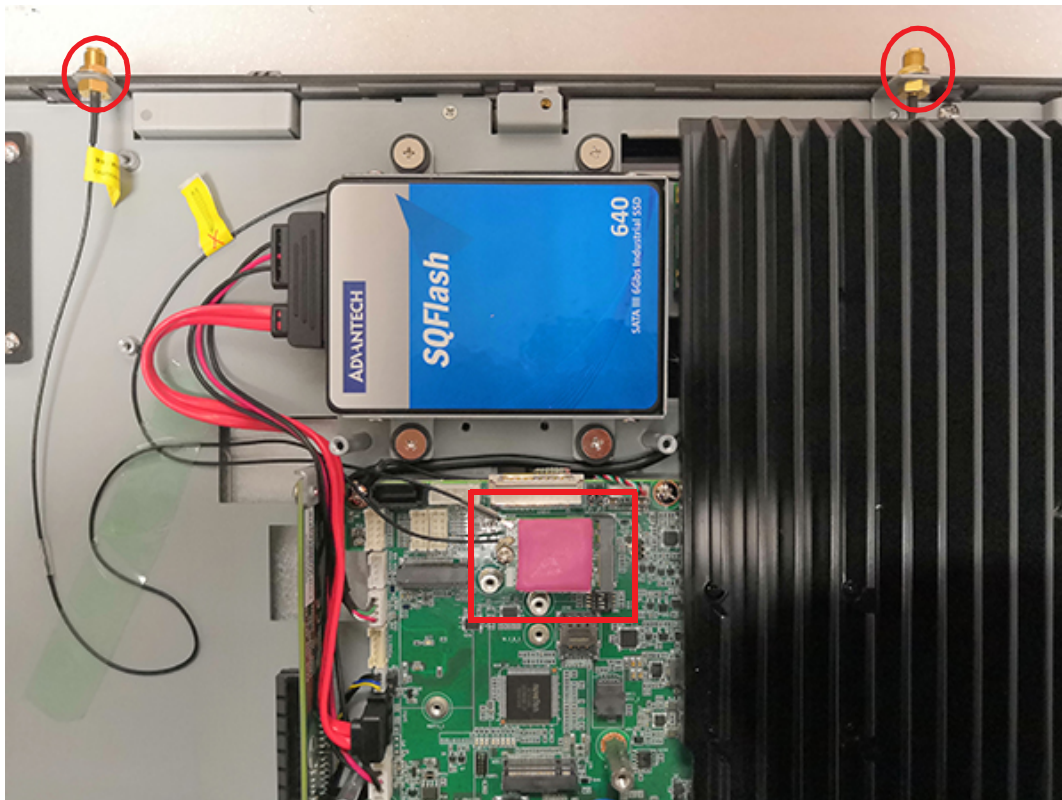
## 2.6 Installing Wireless LAN Card

1. Follow the procedures in Chapter 2.3, 2.4 and 2,5 to remove rear cover VESA holder and heatsink.
2. Then fix the card to the location with a rectangle.

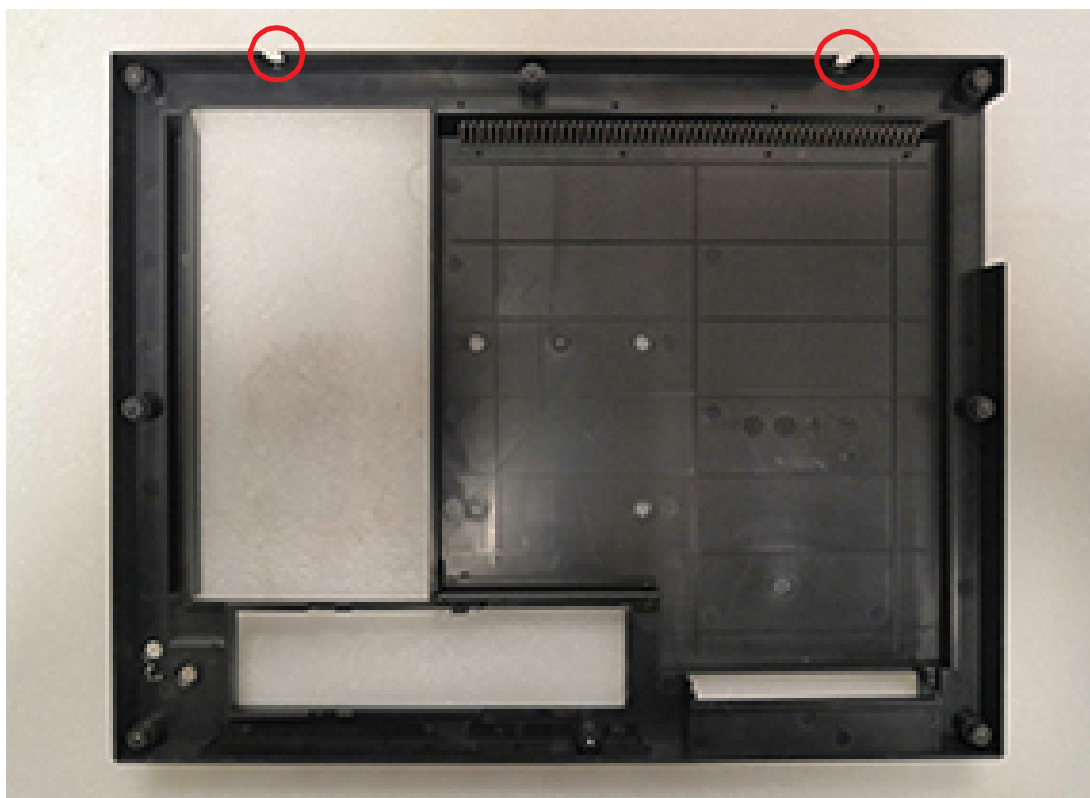




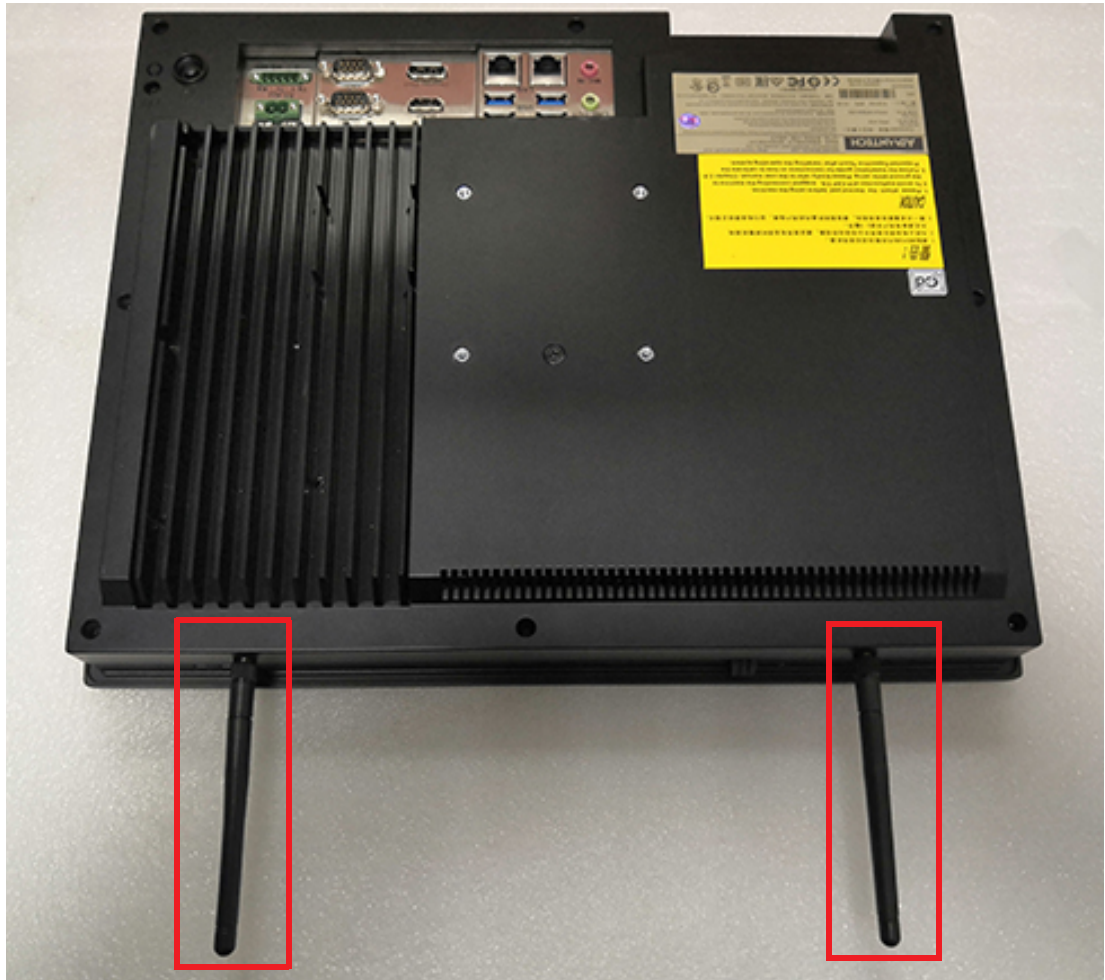
3. Connect the Wi-Fi cable and add the thermal Pad for the Wi-Fi card.



4. Then use screws to install the heatsink on the motherboard and VESA holder.
5. Remove two plugs on the rear cover as shown below.



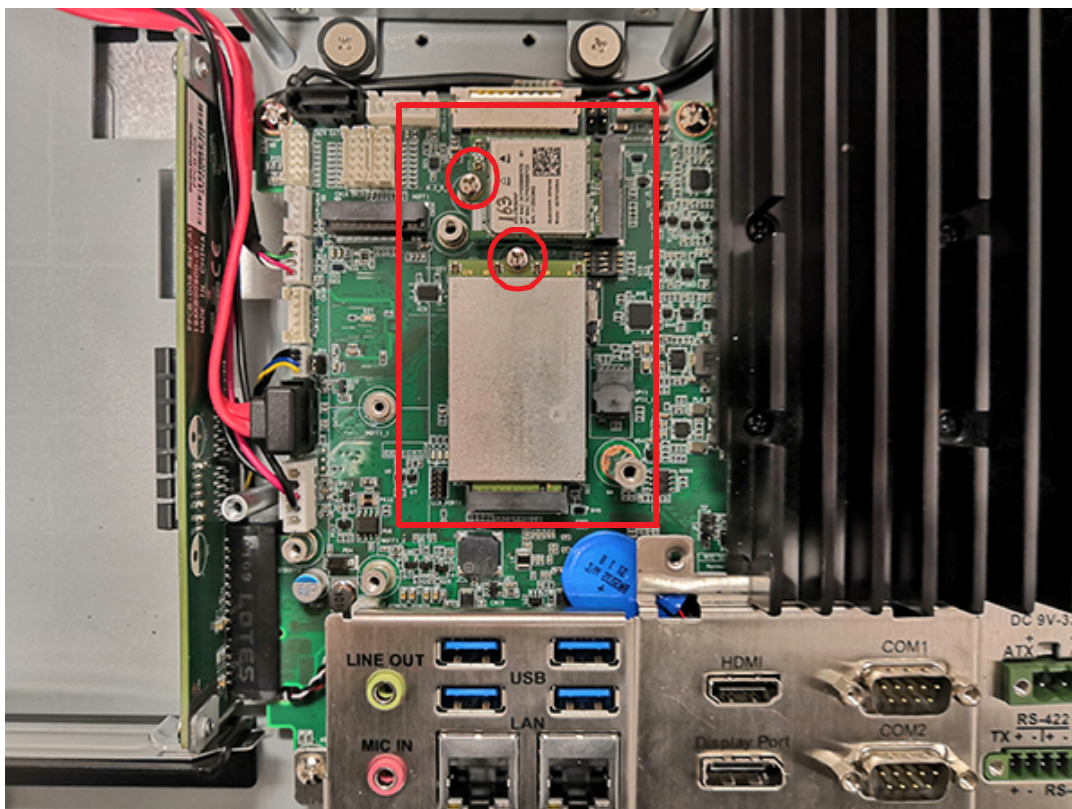
6. Then replace the rear cover and install the antenna of wireless LAN card module.



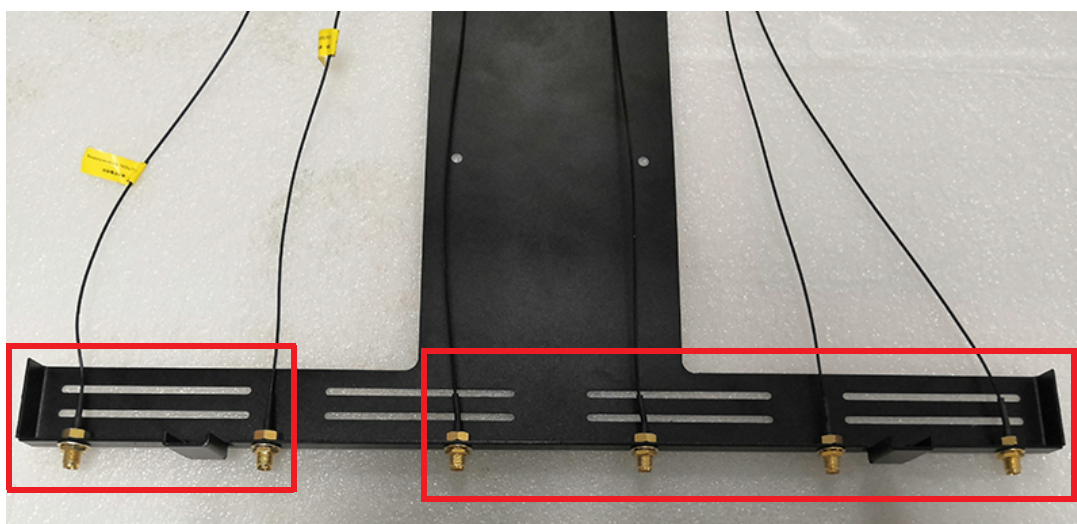


## 2.7 Installing Wireless LAN Card and 5G Card

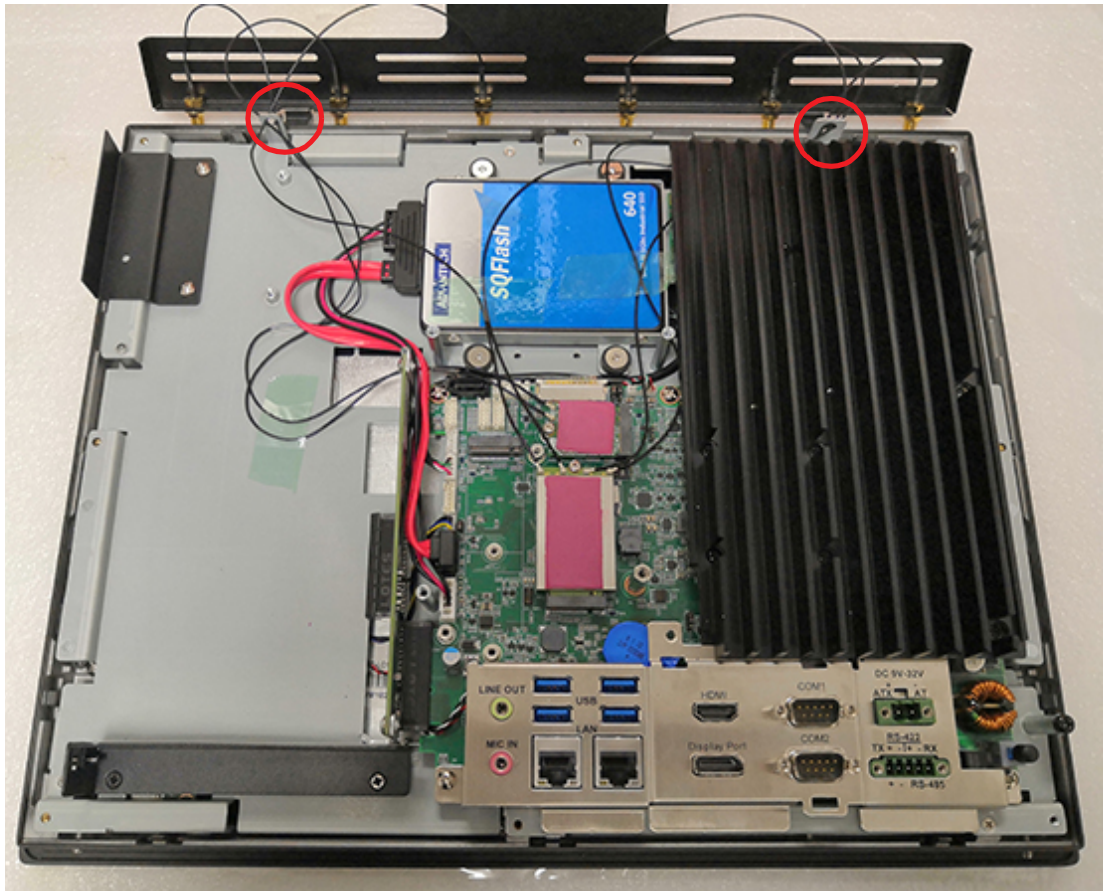
1. Follow the procedures in Chapter 2.3, 2.4 and 2.5 to remove rear cover VESA holder and heatsink.
2. Then fix the card to the location with a rectangle.



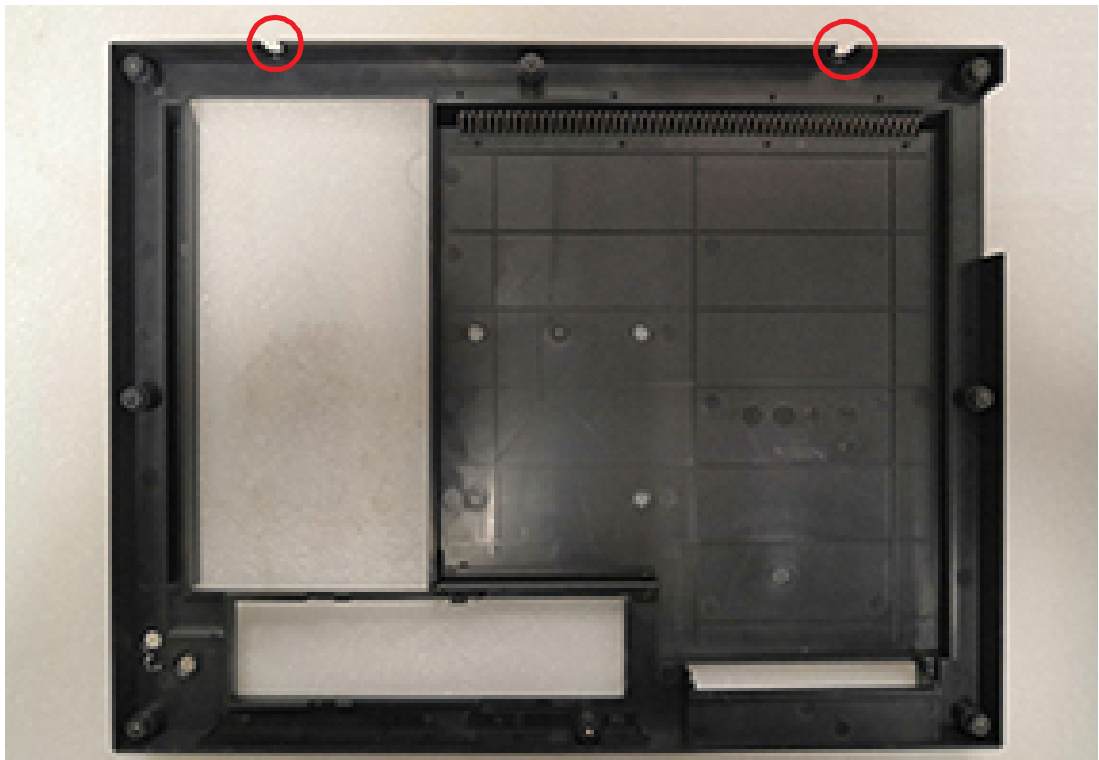
3. Fix the antenna to the bracket (bracket PN is 1960104428N001, need to purchase separately). (The right rectangle is antenna of 5G and left rectangle is antenna of Wi-Fi.)



4. Connect the Wi-Fi&5G cable and add the thermal Pad for card. (Fix the cable with adhesive tape.)



5. Then use screws to install the heatsink on the motherboard and VESA holder.
6. Remove two plugs on the rear cover as shown below.





7. Then replace the rear cover.

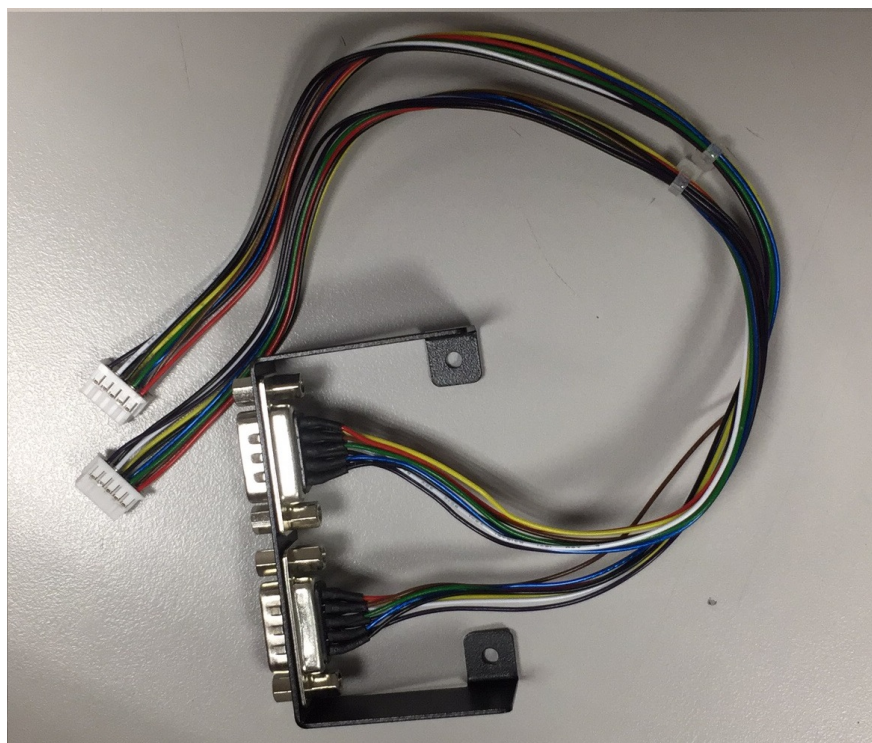


8. Fix the antenna Bracket and connect the antenna.

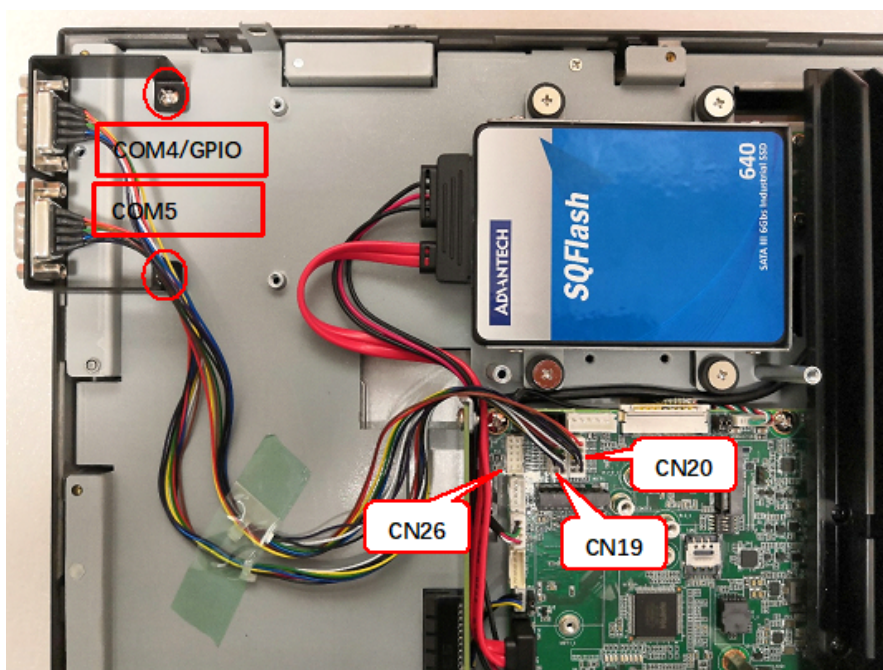


## 2.8 Installing Side COM/GPIO

1. Follow the procedures in Chapter 2.3, Chapter 2.4 and Chapter 2.5 to remove rear cover, VESA bracket and heatsink of card. Fetch materials from COM port module (Advantech PN: 98R3C31530E) as shown below.



2. Assemble COM port module as shown below. Use two screws to fix the COM port module onto the system frame. Insert COM5 cable on CN20 connector. For COM4/GPIO cable, there are two functions. COM4 if you insert the cable with the CN19 connector and GPIO if you insert the cable with the CN26 connector.

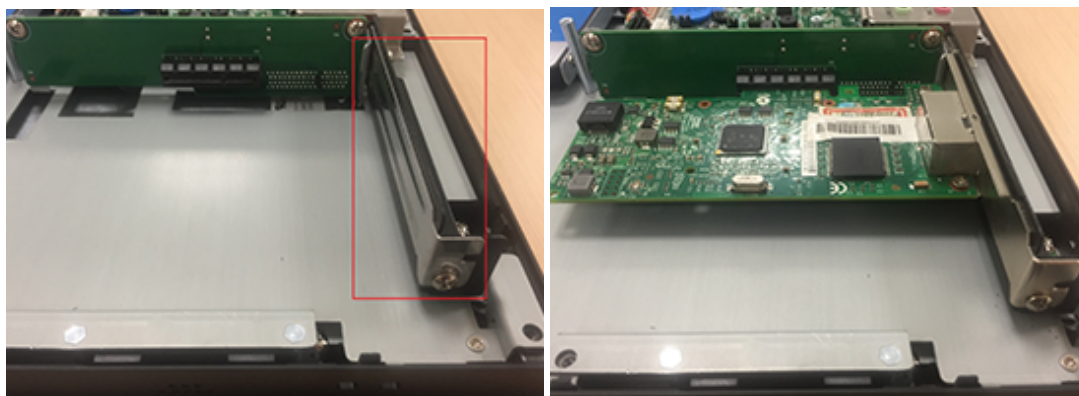


3. Assemble back VESA bracket and rear cover after the COM port module is installed.



## 2.9 Installing Expansion Card

1. Follow the procedures in Chapter 2.3 to remove rear cover.
2. Remove the screws and the blank plate marked with a red rectangle to install the expansion card. The product comes with a PCIE riser card and a PCI riser card is also provided in the accessory box for additional use.



**Note!** The maximum supported size of the expansion card is 176mm x 107mm.



## 2.10 Adjusting AT/ATX Functions

You can adjust AT or ATX function by the internal switch indicated by the red rectangle without removing the rear cover.



## 2.11 Grounding

Grounding screw is marked with a red circle as below. It is recommended that products with a capacitive screen should be properly grounded.



### 警告!

1. 为防止电容屏在使用中出现误动作现象，建议使用电容屏时将整机接地。
2. 第一次或重新安装系统后，请依照附件盒内的用户指南，运行电容屏校正程式。

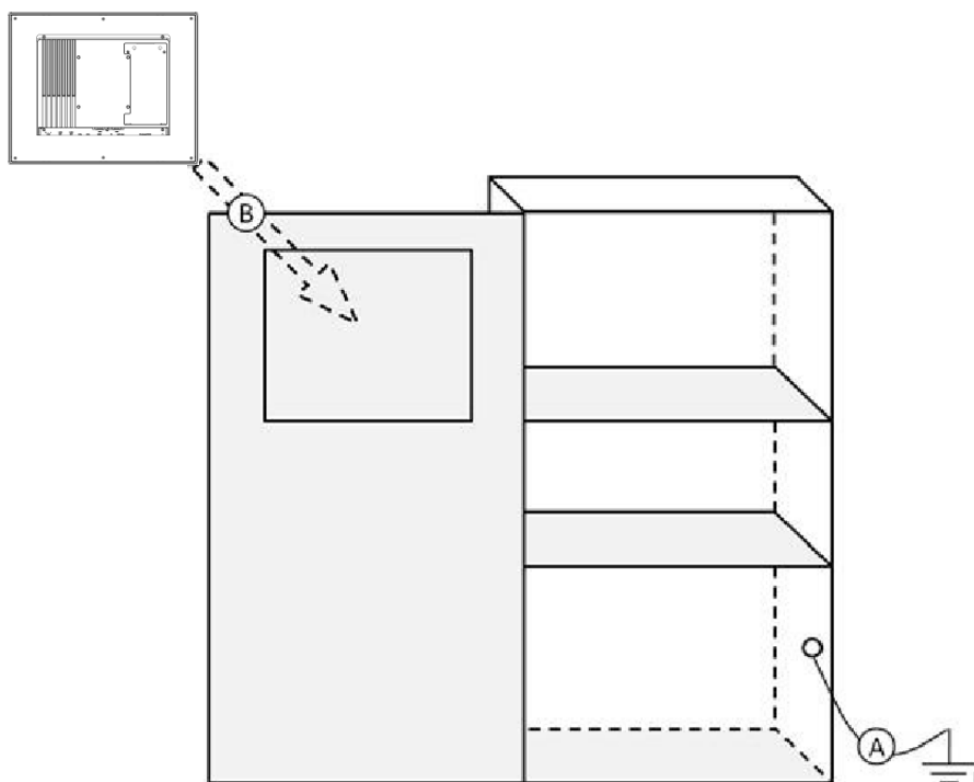
### CAUTION:

1. To avoid malfunction of P-CAP T/S, suggest connecting the machine to the ground while using. Please kindly refer to the user manual, Chapter 2.9.
2. Follow the installation guide for instructions on how to calibrate the Projected Capacitive Touch after installing the operating system.

## 2.11.1 Cabinet Installation and Grounding

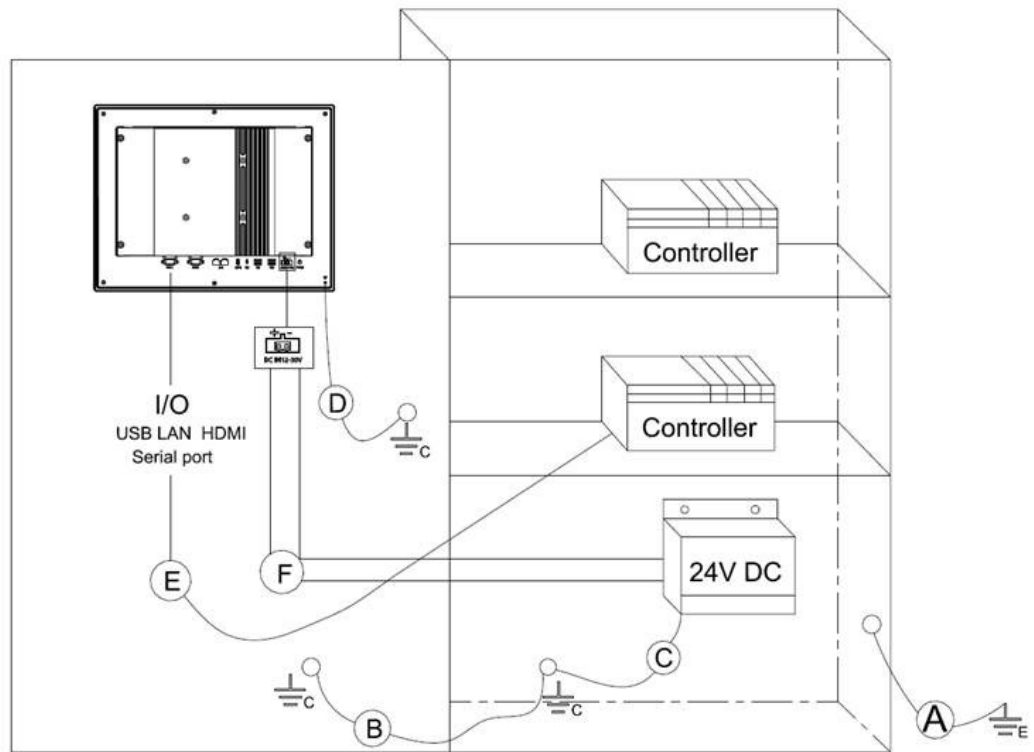
Follow these instructions to install the PPC system, and pay attention to the ground pin which should be connected to the earth/ground. PPC system should give the best performance for EMI optimum EMI immunity, ESD immunity, surge immunity, and system isolation. If the PPC system is embedded in the cabinet, the PPC system's ground, cabinet's ground and earth/ground should be connected together.

1. Install the PPC system into the cabinet.



**Figure 2.5 Cabinet Installation**

- a. Connect the cabinet to the earth/ground.
- b. Embed null PPC system into the cabinet without any I/O cable and power.
2. System wiring.



**Figure 2.6 System Wiring Diagram**

- a. Connect the cabinet to the earth/ground.
- b. Ensure that all cabinets have been grounded together.
- c. Connect the ground of the power supply to the cabinet.
- d. Connect the ground pin of PPC system to the cabinet.

**Note!** *The wire of the protective earthing conductor should be green-and-yellow, xx AWG/ 0.75mm<sup>2</sup> and connected to the earth of the building.*

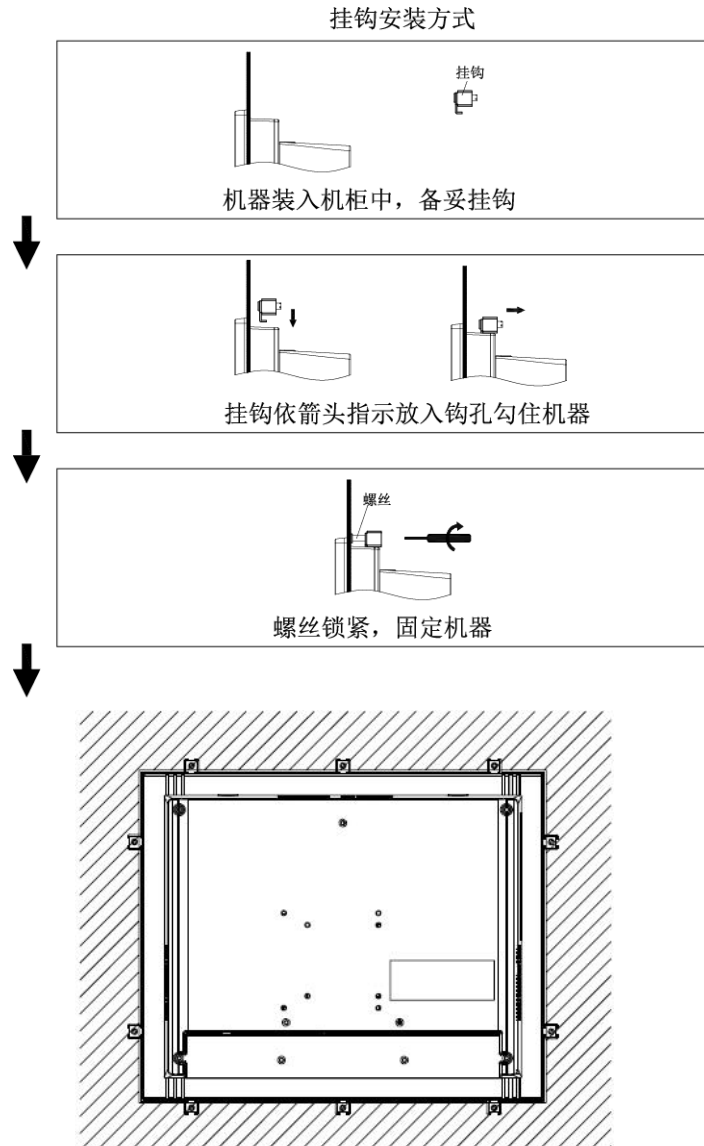


*Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet. By means of a power cord connected to a socket-outlet with earthing connection.*



## 2.12 Installing Hook

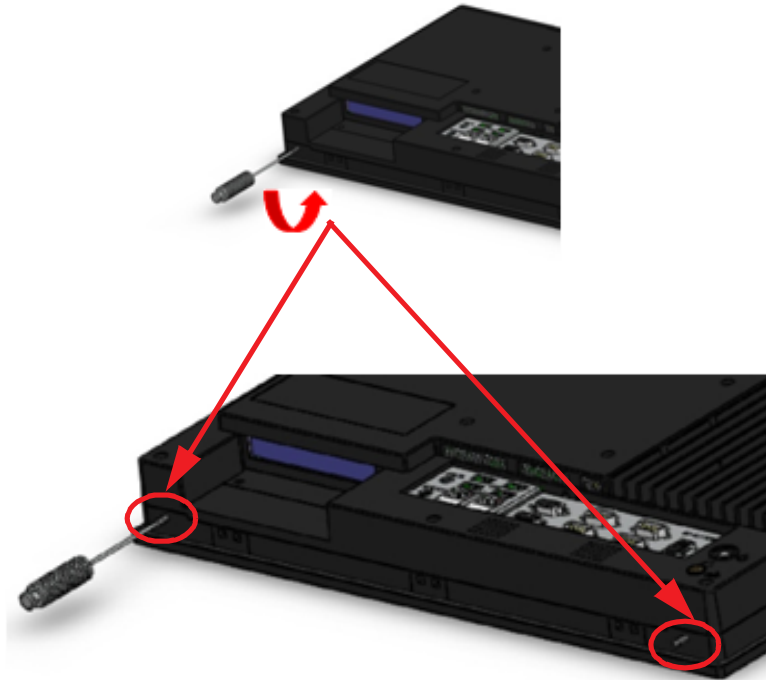
Please refer to the figure below:



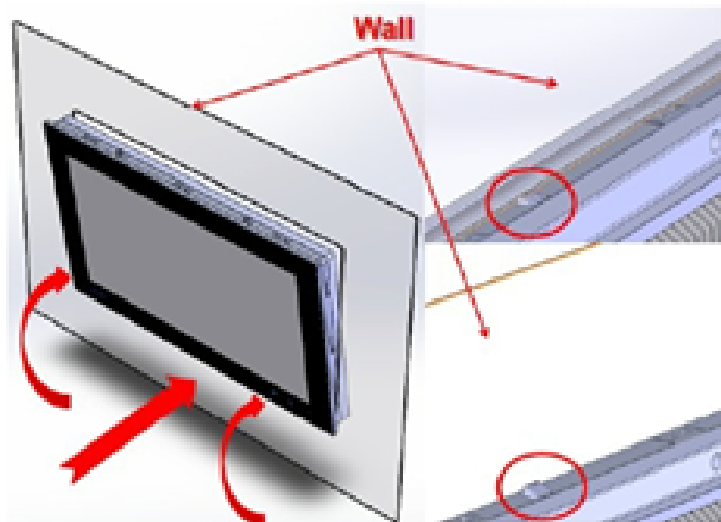
## 2.13 Solo Quick Installation

Please follow the below procedures to complete the wall mount by yourself.

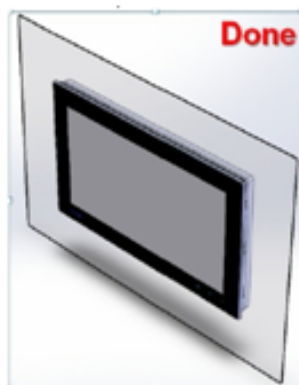
1. Unfasten the two screws at the bottom as shown below.



2. See diagram below to place and push the panel PC into the opening on the wall, then the hook will secure the PC onto the wall.



3. Here the wall mount is complete. Refer to Chapter 2.10 "Installing Hook" to fasten the hook screw in order to firmly secure the panel PC.



**Note!** *It is recommended that the panel inlaid depth should be less than 2mm (0.079") according to "Quick Installation Guide". In other circumstances, it is recommended that the panel inlaid depth should be less than 3mm (0.118").*





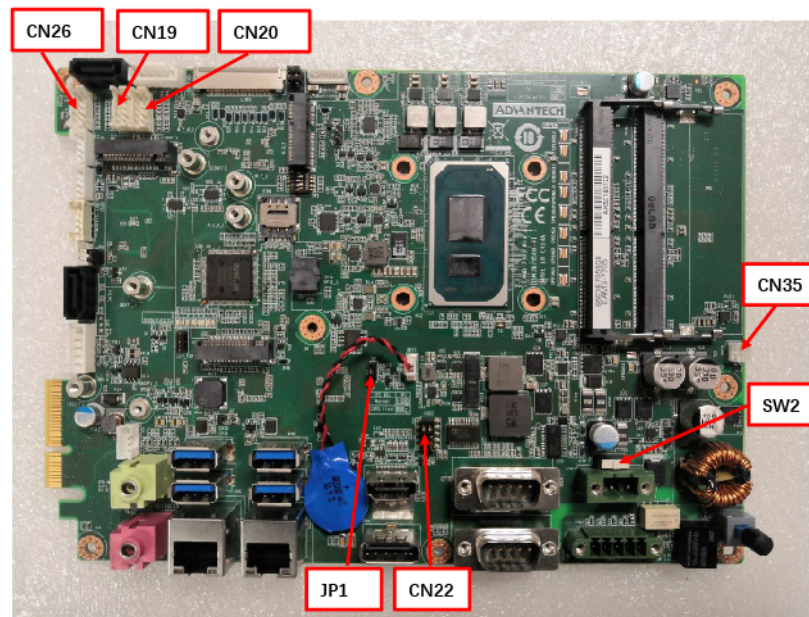
# Chapter 3

## Jumper and Switch Settings

Sections Include:

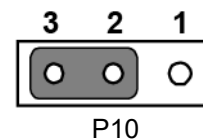
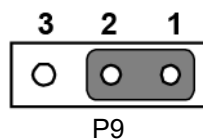
- Jumpers and Connectors
- External COM Port & DIO Switch and Pin Assignments

## 3.1 Jumpers and Connectors

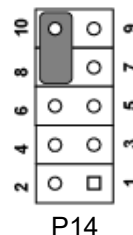
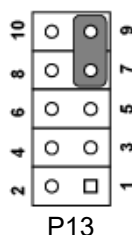
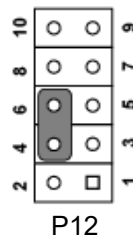
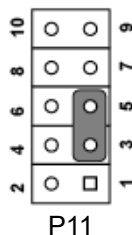
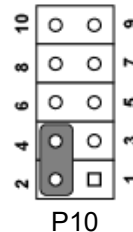
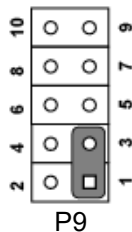


Connector	Function
CN26	GPIO
CN22	COM Pin9 power selection
CN35	Power button
SW2	AT/ATX selection
JP1	Clear CMOS
CN19	COM4
CN20	COM5

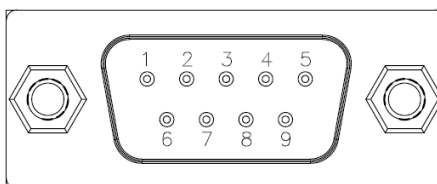
JP1	Icon	Clear CMOS	
(1-2)	P9	Normal *	Default *
(2-3)	P10	Clear CMOS	



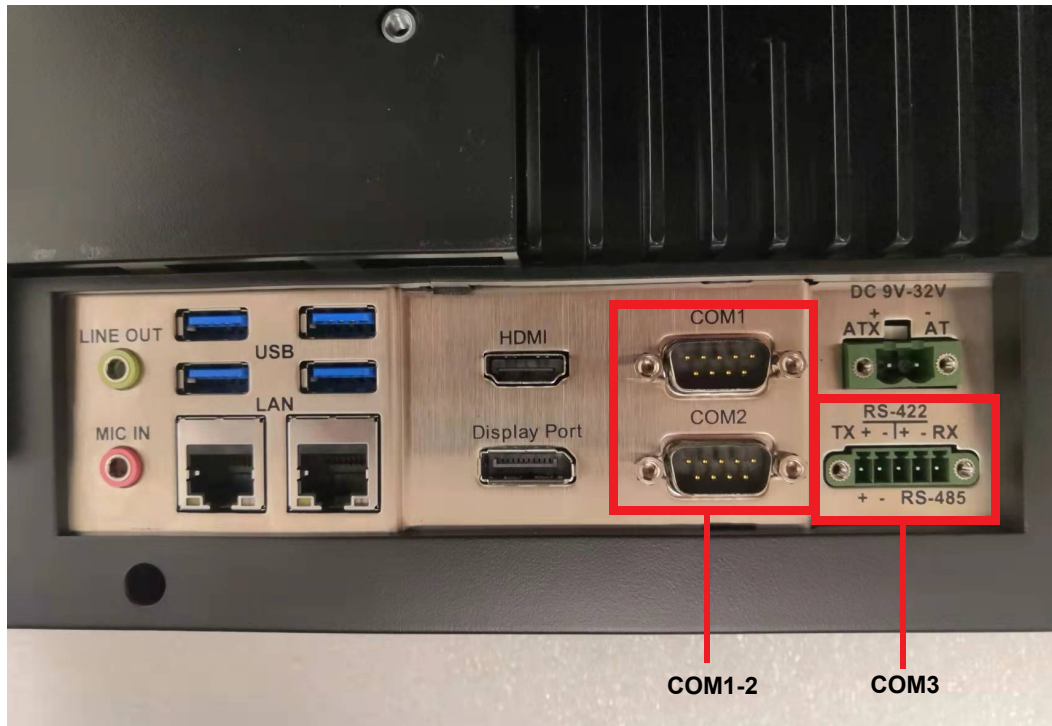
CN22	COM1/2 RI type selection		
(1-3)/(2-4)	P9/P10	COM1/COM2 RI	Default *
(3-5)/(4-6)	P11/P12	COM1/COM2 5V	
(7-9)/(8-10)	P13/P14	COM1/COM2 12V	



CN26 (on DB9 cable)	Pin	Signal
	1	GND
	2	GPIO4
	3	GPIO0
	4	GPIO5
	5	GPIO1
	6	GPIO6
	7	GPIO2
	8	GPIO7
	9	GPIO3



## 3.2 External COM Port Pin Assignments



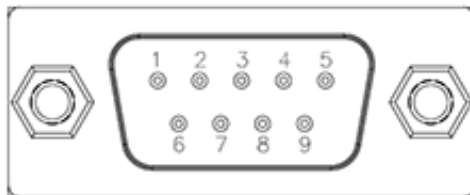
COM1, COM2 (RS232, Pin9 supports 5 V/12 V output)

COM3 RS-422/485

COM1-2:

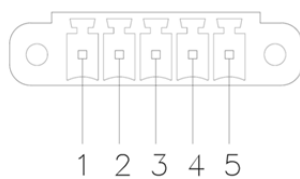
Pin	COM1/COM2
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RING or 5V/12V output

Pin9 is set as RI signal in COM port by default, and can be set as 5V/12V output by Jumper. 12V: Max. 200 mA; 5V: Max. 500 mA.





**COM3:** RS422/485 supports isolation voltage of 1000 V<sub>DC</sub>, which can be selected by BIOS.



Pin	1	2	3	4	5
RS422	TX+	TX-	RX+	RX-	GND
RS485	D+	D-			GND

UART RS485 auto flow control

COM5 supports RS485 auto flow control function

When enabling the RS485 auto control function, it will automatically drive RTS# pin to logic high or low for flow control



# Chapter 4

## Software Setup

Sections Include:

- Installing Drivers
- BIOS Setup Utility

## 4.1 Installing Drivers

When you install the system for the first time, please install the corresponding drivers in advance to make sure all the functions run normally. Please select the drivers to be installed based on the OS you use. Please go to the Advantech official website to get the latest versions of the drivers: <http://www.advantech.com.cn>

## 4.2 BIOS Setup Utility

### 4.2.1 Entering BIOS Setup

You can enter BIOS setup utility by pressing "Delete". You should always press "F4" to save the settings you have made and exit the setup utility, otherwise those settings will not be saved in BIOS.

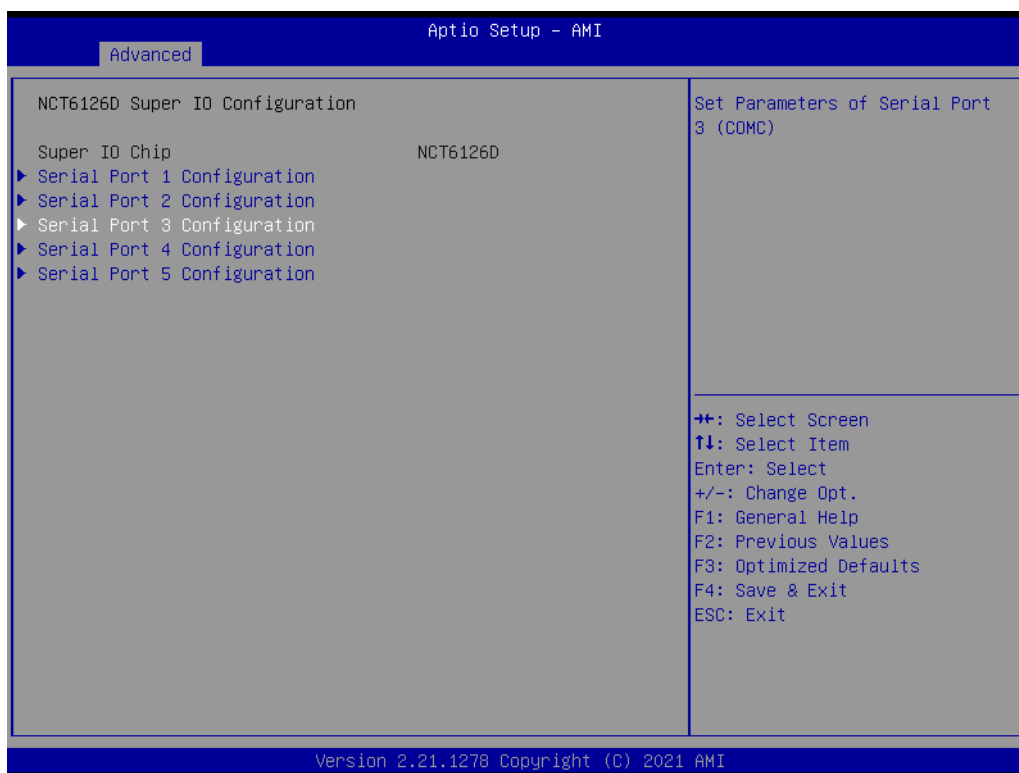


## 4.2.2 COM5 Mode (RS422/485) Selection

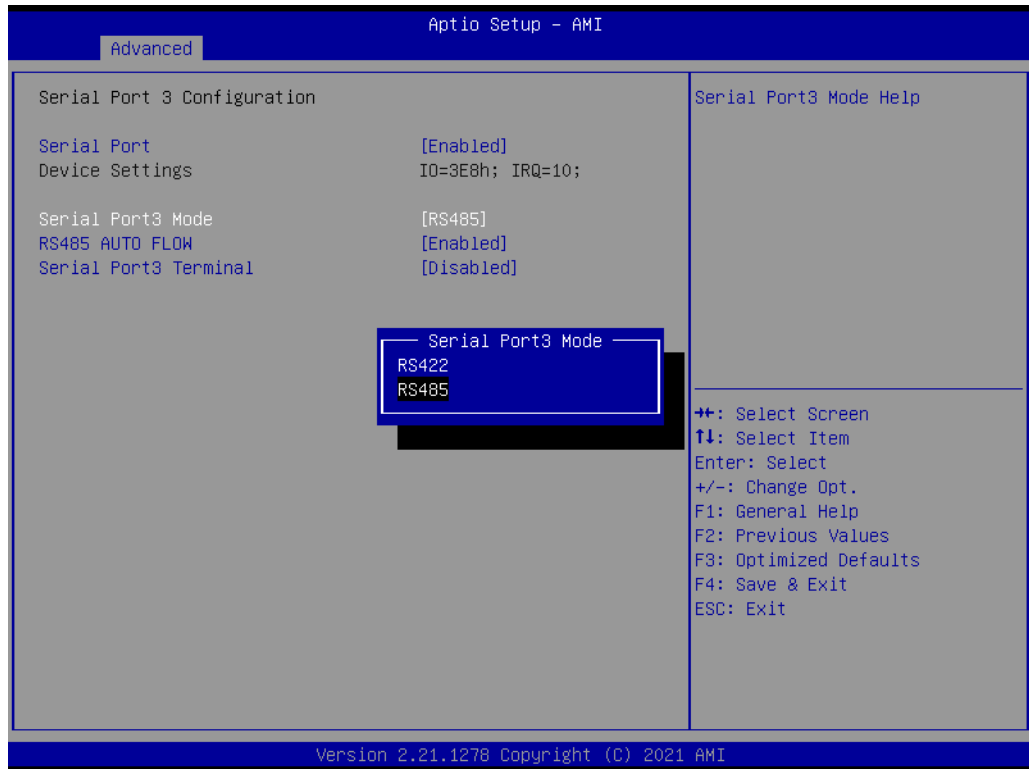
1. Select "NCT6126D Super I/O Configuration" under "Advanced" tab.



2. Then choose "Serial Port3 Configuration" under "NCT6126D Super I/O Configuration" item.

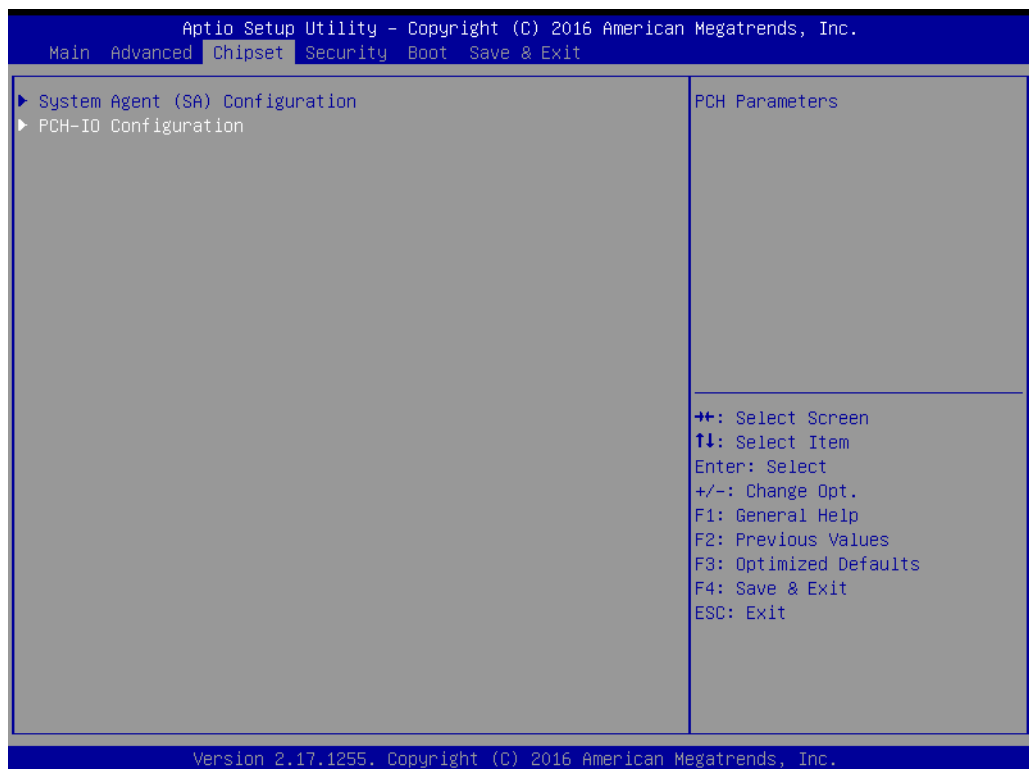


3. Click "Serial Port3 Configuration" item to choose the operating mode of COM3.

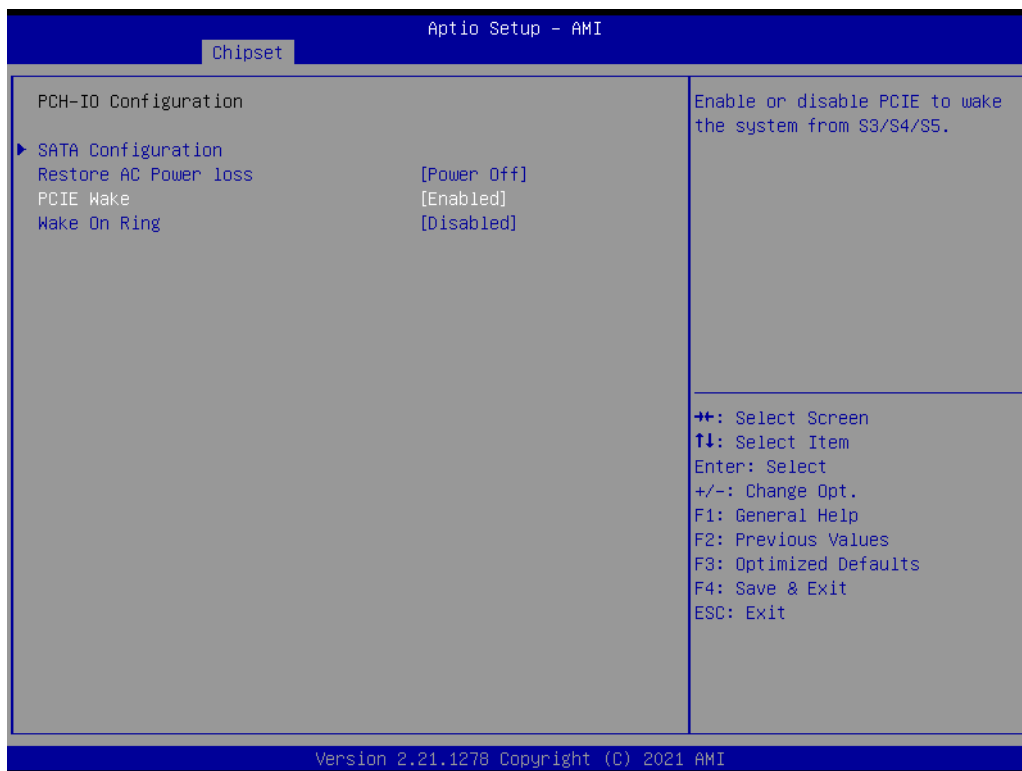


### 4.2.3 Wake Up by LAN

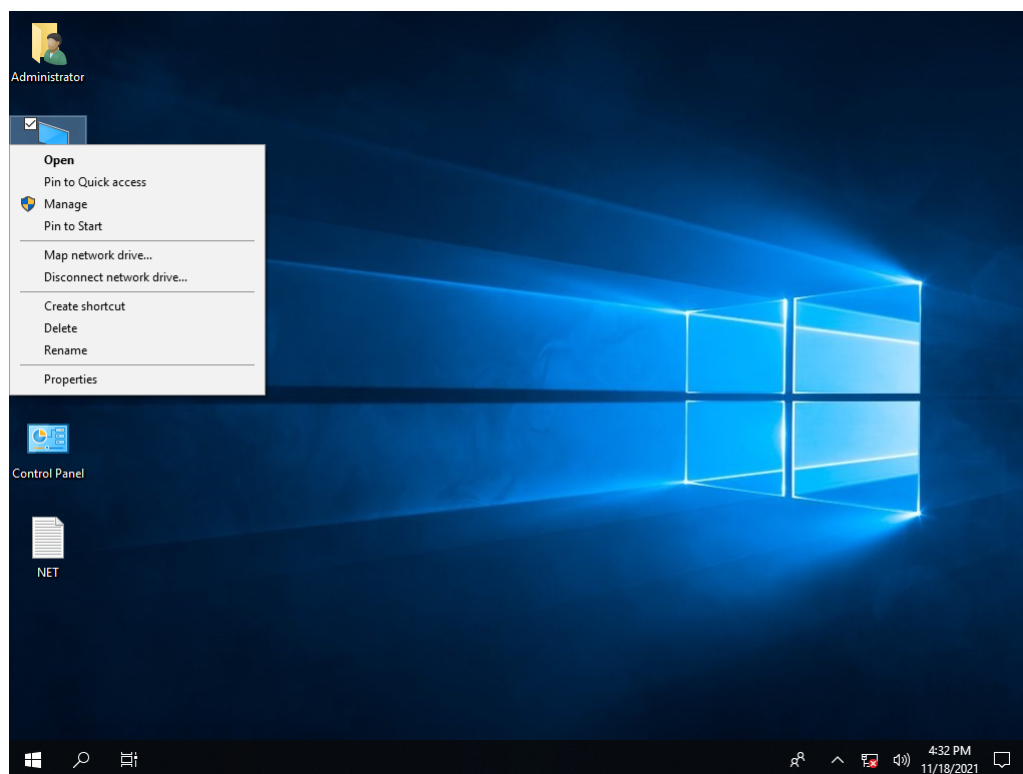
1. Select "PCH-IO Configuration" under "Chipset" tab.



2. Set "PCIE Wake" as "Enable".

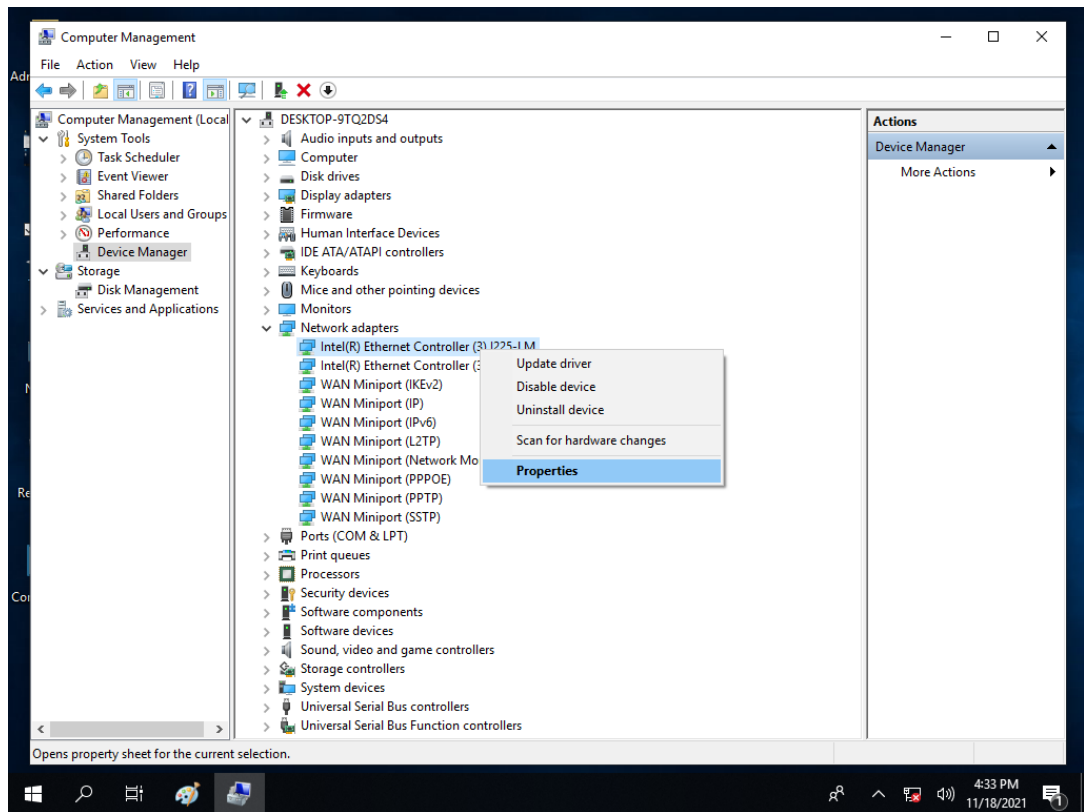


3. Save all the settings and exit. Then enter the OS.
4. Right-click on "Computer" and select "Manage" to pop up "Computer Management" window.

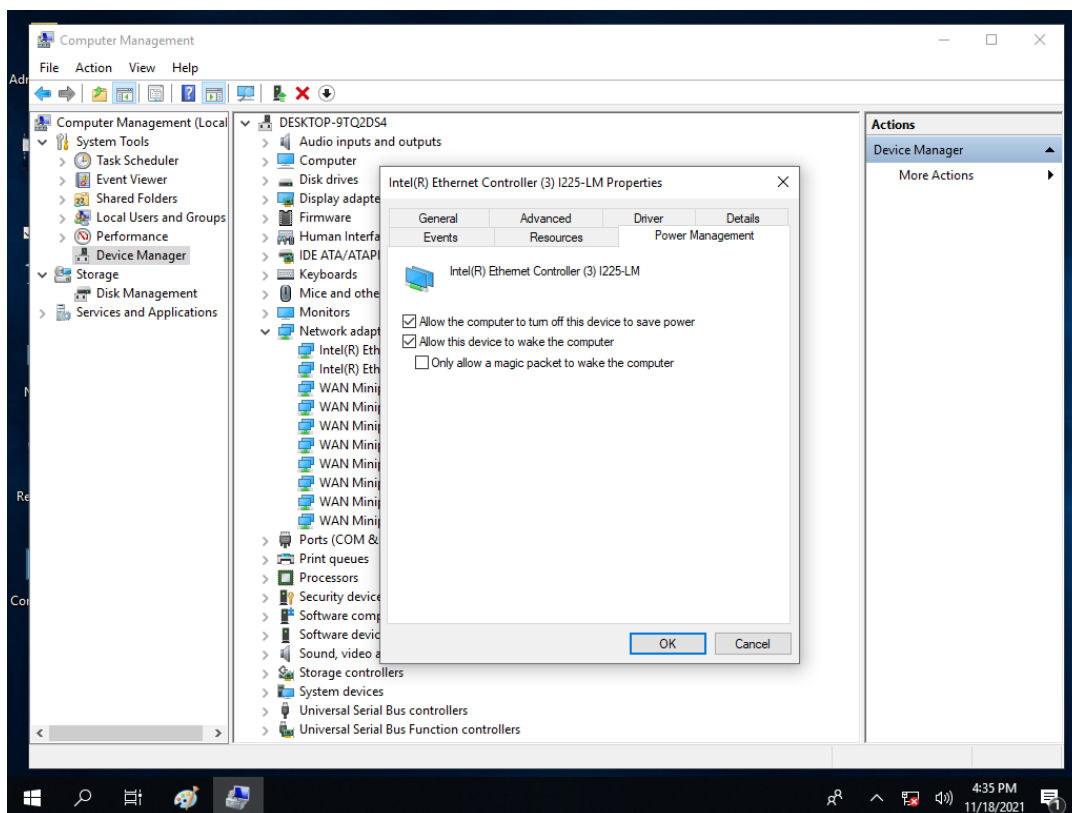




5. Click “Device Manager” to select “Network adapters”. Then right-click on the LAN port you want to use and select “Properties” to pop up “Intel(R) Ethernet” window.



- In "Intel(R) Ethernet Controller I225-LM Properties" window, go to "Power Management" tab and check the boxes of "Allow the computer to turn off this device to save power" and "Allow this device to wake the computer".



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