User Manual

UNO-148 Industrial PC

Intel® UP3 Processor Automation Computer, with 3 x LAN, 4 x COM, 3 x USB 3.2 Gen 2, 1 x USB 2.0, 2 x DP 1.4, 8DI/8DO, 1 x mPCIe, 1 x M.2 B-Key, 1 x M.2 M-Key, 1 x M.2 E-Key, 1 x Nano SIM Slot and TPM 2.0

ADVANTECH

Enabling an Intelligent Planet

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Support

For more information on this and other Advantech products, please visit our website at http://www.advantech.com

For technical support services, please visit our support website at http://support.advantech.com/

This manual applies to the following models. These are abbreviated as UNO-148 products in this article.

*Model name

UNO-148

UNO148B

*Part numbers:

UNO-148-B73BA/UNO-148-B53BA/UNO-148-B33BA

UNO-148-B73BI/UNO-148-B53BI/UNO-148-B33BI

UNO148B73B2101-T	UNO148B73B2102-T	UNO148B73B2103-T
UNO148B73B2201-T	UNO148B73B2202-T	UNO148B73B2203-T
UNO148B73B2204-T	UNO148B73B2205-T	UNO148B73B2206-T
UNO148B73B2207-T	UNO148B73B2208-T	UNO148B73B2209-T
UNO148B73B2301-T	UNO148B73B2302-T	UNO148B73B2303-T
UNO148B73B2304-T	UNO148B73B2305-T	UNO148B73B2306-T
UNO148B73B2307-T	UNO148B73B2308-T	UNO148B73B2309-T
UNO148B73B2401-T	UNO148B73B2402-T	UNO148B73B2403-T
UNO148B73B2404-T	UNO148B73B2405-T	UNO148B73B2406-T
UNO148B73B2501-T	UNO148B73B2502-T	UNO148B73B2503-T
UNO148B53B2101-T	UNO148B53B2102-T	UNO148B53B2103-T
UNO148B53B2201-T	UNO148B53B2202-T	UNO148B53B2203-T
UNO148B53B2204-T	UNO148B53B2205-T	UNO148B33B2206-T
UNO148B53B2207-T	UNO148B53B2208-T	UNO148B53B2209-T

UNO148B53B2301-T   UNO148B53B2302-T   UNO148B53B2303-T
UNO148B53B2304-T   UNO148B33B2305-T   UNO148B53B2306-T
UNO148B53B2307-T   UNO148B33B2308-T   UNO148B53B2309-T
UNO148B53B2401-T   UNO148B53B2402-T   UNO148B53B2403-T
UNO148B53B2404-T   UNO148B53B2405-T   UNO148B53B2406-T
UNO148B53B2501-T   UNO148B53B2502-T   UNO148B53B2503-T
UNO148B33B2101-T   UNO148B33B2102-T   UNO148B33B2103-T
UNO148B33B2201-T   UNO148B33B2202-T   UNO148B33B2203-T
UNO148B33B2204-T   UNO148B33B2205-T   UNO148B53B2206-T
UNO148B33B2207-T   UNO148B33B2208-T   UNO148B33B2209-T
UNO148B33B2301-T   UNO148B33B2302-T   UNO148B33B2303-T
UNO148B33B2304-T   UNO148B53B2305-T   UNO148B33B2306-T
UNO148B33B2307-T   UNO148B53B2308-T   UNO148B33B2309-T
UNO148B33B2401-T   UNO148B33B2402-T   UNO148B33B2403-T
UNO148B33B2404-T   UNO148B33B2405-T   UNO148B33B2406-T
UNO148B33B2501-T   UNO148B33B2502-T   UNO148B33B2503-T

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 on-screen 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.

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 criteria 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 A

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 this event, users are required to correct the interference at their own expense.

甲類資訊技術設備

甲類設備為其他符合甲類設備限制值之資訊技術設備，而非符合乙類資訊技術設備的限制值；雖然不可限制此類設備之行銷，但使用場所必須被限制，不得進行居住的環境中，且應於其機器本體及使用說明書中含有下列警語：

> 警告使用者：
>
> 此為甲類資訊技術設備，於居住環境中使用時，可能會造成射頻擾動，在此種情況下，使用者會被要求採取某些適當的對策。

Technical Support and Assistance

1. Visit the Advantech website at 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 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.

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. Do not use liquid or spray detergents.
4. For pluggable equipment, the power outlet socket must be located near the equipment and be 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 -20 °C (-4 °F) or above 60 °C (140 °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. In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position should not exceed 70 dB (A).

18. This product is intended to be supplied by a UL-certified power supply or DC source with SELV output, rated 10 V_{DC}, 7.7 A, with a minimum TMA of 40 °C. If you need further assistance, please contact Advantech for further information.

19. Ensure that the voltage of the power source is correct before connecting the equipment to a power outlet. The power outlet socket should have a grounded connection.

20. This equipment is for use in indoor, pollution-free environments.

21. This equipment is not suitable for use in locations where children are likely to be present.

22. If the equipment is used in a manner not specified by Advantech, the protection provided by the equipment may be impaired.

23. The equipment contains no user-serviceable parts. Do not open. Return to the manufacturer for servicing.

24. Do not block air ventilation holes.

25. This is open-type equipment and should be installed in a suitable enclosure.

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

Consignes de sécurité

1. Lire attentivement les instructions de sécurité.

2. Conserver ce manuel pour utilisation ultérieure,

3. Débranchez cet équipement de toute prise secteur avant le nettoyer. Utilisez seulement un chiffon humide. N'utilisez pas de détergent liquide ou pulvérisé pour le nettoyage.

4. Gardez cet équipement à l'abri de l'humidité.

5. Placez cet équipement sur une surface fiable pendant l'installation. Le faire ou bien le laisser tomber peut causer des dégâts.

6. Les ouvertures sur l'enceinte servent à la convection de l'air. Protégez l'équipement contre surchauffe. NE COUVREZ PAS LES OUVERTURES.

7. Assurez-vous que la tension de la source d'alimentation est correcte avant de connecter l'équipement à une prise de courant. La prise de courant doit avoir une connexion à la terre.

8. Placez le câble d'alimentation de manière à ce que personne ne puisse marcher dessus. Ne placez rien sur le câble d'alimentation.

9. Toutes les mises en garde et tous les avertissements sur l'équipement doivent être notés.

10. Si l'équipement n'est pas utilisé pendant une longue période, débranchez-le de la source d'alimentation pour éviter tout endommagement dû à une surtension transitoire.

11. Ne jamais verser de liquide dans une ouverture. Cela pourrait provoquer un incendie ou un choc électrique.

12. N'ouvrez jamais l'équipement. Pour des raisons de sécurité, l'équipement doit être ouvert uniquement par du personnel qualifié.

13. Si l'une des situations suivantes se présente, faites vérifier l'équipement par le personnel de service:
    - Un liquide a pénétré dans l'équipment.
    - L'équipement a été exposé à l'humidité.
    - L'équipement ne fonctionne pas bien, ou vous ne pouvez pas le faire fonctionner selon le manuel de l'utilisateur.

■ L'équipement est tombé et endommagé.

■ L'équipement présente des signes évidents de rupture.

14. NE LAISSEZ PAS CET ÉQUIPEMENT DANS UN ENVIRONNEMENT OU LA TEMPÉRATURE DE STOCKAGE PEUT ÊTRE INFÉRIEURE À -40 °C (-4 °F) OU BIEN SUPÉRIEURE À 70 °C (158 °F). CECI POURRAIT ENDOMMAGER L'EQUIPEMENT. L'ÉQUIPEMENT DEVRAIT ÊTRE DANS UN ENVIRONNE-MENT CONTRÔLÉ.

15. Ce produit est destiné à être alimenté par une source d'alimentation certifiée UL ou par une source cc convenant à une utilisation à une température minimale de 40 degrés Celsius, dont la sortie est conforme à la norme SELV et dont la puissance nominale est de 10 V_{DC}, 7.7 A, en cas de besoin. contactez Advant-ech pour plus d'informations.

16. Pour une utilisation dans des environnements non polluant et à l'intérieur.

17. C'est appareil ne doit pas être utilisé dans des endroits où se trouvent des enfants.

18. Si l'équipement est utilisé d'une manière non spécifiée par le fabricant, la pro-tection fournie par l'équipement peut être altéré.

19. L'équipement ne contient aucune pièce réparable par l'utilisateur. Ne pas ouvrir, retourner au fabricant pour réparation.

20. Ne bloquez pas les ou es de ventilation.

21. Il s'agit d'un équipement de type ouvert et doit être installé dans un boîtier approprié.

ATTENTION: Danger d'explosion si la batterie est mal remplace. Remplacer unique-ment par le meme type ou equivalent recommandé par le fabricant. Jeter les piles usagées selon les instructions du fabricant.

安全指示

1. 請仔細閱讀此安全操作說明。
2. 請妥善保存此用戶手冊供日後參考。
3. 用濕抹布清洗設備前，請確認拔除電源線。請勿使用液體或去污噴霧劑清洗設備。
4. 對於使用電源線的設備，設備周圍必須有容易接觸到的電源插座。
5. 請勿在潮濕環境中試用設備。
6. 請在安裝前確保設備放置在可靠的平面上，意外摔落可能會導致設備損壞。
7. 設備機殼的開孔適用於空氣對，從而防止設備過熱。請勿覆蓋開孔。
8. 當您連接設備到電源插座前，請確認電源插座的電壓符合要求。
9. 請將電源線佈置在人們不易絆倒的位置，請勿在電源線上覆蓋任何雜物。
10. 請注意設備上所有的警告標示。
11. 如果長時間不使用設備，請拔除與電源插座的連結，避免設備被超標的電壓波動損壞。
12. 請勿讓任何液體流入通風口，以免引起火災或短路。
13. 請勿自行打開設備。為了確保您的安全，請透過經認證的工程師來打開設備。
14. 如遇下列情況，請由專業人員維修：

■ 電源線或插頭損壞；

■ 設備內部有液體流入；

■ 設備曾暴露在過度潮濕環境中使用；

■ 設備無法正常工作，或您無法透過用戶手冊來正常工作；

■ 設備摔落或損壞；

■ 設備有明顯外觀損；

15. 請勿將設備放置在超出建議溫度範圍的環境，即不要低於 -40 ℃ （-40 ℉）或高於 60 ℃ （140 ℉），否則可能會造成設備損壞。

16. 注意：若電池更換不正確，將有爆炸危險。因此，只可以使用製造商推薦的同一種或者同等型號的電池進行替換。請按照製造商的指示處理舊電池。

17. 根據 IEC 704‐1:1982 規定，操作員所在位置音量不可高於 70 分貝。

18. 限制區域：請勿將設備安裝於限制區域使用。

19. 免責聲明：請安全訓示符合 IEC 704‐1 要求。研華公司對其內容之準確性不承擔任何法律責任。

20. 消费者若使用电源适配器供电，则应购买配套使用获得 CCC 认证并满足标准要求的电源适配器。

Contents

Chapter 1

Overview

This chapter outlines specifications for UNO-148.

- Introduction
- Safety Precautions
- Accessories
- Hardware Specifications
- Dimensions

1.1 Introduction

Advantech's UNO-100 series are DIN-rail integrated controllers that feature a modular design for flexible configuration according to specific usage requirements. UNO-148 is equipped with an 11th Generation Intel® Core™ i Processor (standard 1.8 GHz, optional up to 4.4 Ghz) with 8 GB DDR4 RAM, and 3 x LAN, 4 x COM, 3 x USB 3.2 Gen 2, 1 x USB 2.0, 8 x DI, 8 x DO and 2 x DP 1.4. The controller also supports 1 x full size Mini PCIe, 1 x M.2 (B-Key), 1 x M.2 (M-Key), 1 x M.2 (E-Key), and 1 x nano SIM card for expansion such as Advantech's iDoor technology for integrating additional industrial Fieldbus, wireless communication, I/O, and peripheral modules.

1.2 Safety Precautions

Below are a few safety precautions for preventing injury when making connections. In most cases, users can use a standard cable for connection.

Warning! *Always disconnect the power cord from the chassis before manual handling. Do not connect the chassis while the system power is on. A sudden rush of power can damage sensitive electronic components. Only experienced electronics personnel should open the chassis.*

Warning! *Toujours à la terre pour éliminer toute charge d'électricité statique avant toucher UNO-148. Appareils électroniques modernes sont très sensibles à charges d'électricité statique. Utilisez un bracelet antistatique à tout moment. Placez tous composants électroniques sur une surface antistatique ou dans un statique-sac blindé.*

Caution! *Always ground yourself to remove any static electric charge before touching UNO-148. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static shielded bag.*

Caution! *Toujours débrancher le cordon d'alimentation de votre boîtier lorsque vous êtes travailler. Ne branchez pas lorsque l'appareil est allumé. Un afflux soudain de puissance peut endommager les composants électroniques sensibles. Seulement connu personnel de l'électronique devraient ouvrir le châssis.*

1.3 Packing List

Please refer to the below packing list:
- UNO-148 (with DIN-rail mount)
- 2 x 10-pin plug-in block for COM port
- 1 x 20-pin plug-in block for DIO
- 1 x 2-pin plug-in for Power
- 1 x earth-ground cable
- Quick Start Guide
- Warranty card

If anything is missing or damaged, contact your distributor or sales representative immediately.

1.4 Hardware Specifications

1.4.1 General

Table 1.1: General Specifications	
Dimensions (W x D x H)	45 x 140 x 200 mm
Weight (Net)	1.5 kg
Mounting	DIN-rail
Power Requirement	10 - 36VDC
Power Consumption	26 W (typical), 60 W (max)

1.4.2 System Hardware

Table 1.2: System Hardware	
BIOS	AMI UEFI 256 Mbit
Watchdog Timer	Programmable 255-level timer interval, from 1 to 255 sec
Hardware Security	TPM 2.0
Processor	11th Gen Intel® Core™ 1.8 GHz (up to 4.4 GHz)
Memory	2 Slots, Built-in 8 GB DDR4 3200 MHz (default 8 GB single slot, max. up to 32 GB per slot)
Graphics Engine	Intel® Iris® Xe (supports i5 & i7 CPU)
	Intel® UHD Graphics (supports i3 CPU)
Ethernet	2 x 10/100/1000BASE-T Fast Ethernet (RJ-45)
	1 x 10/100/1000/2500BASE-T Fast Ethernet (RJ-45)
LED Indicators	1x Power: Green-S0, Orange S3 or S5
	1x RUN: Green-Programmable (PLED)
	1x BTR: RED-RTC Battery Low
Communication	M.2 slot for B-Key and E-Key
Storage	1 x M.2 M-Key 2280 NVMe SSD (PCIe x4 Signal)
	1 x M.2 B-Key 2242 (SATA Signal)
Expansion	1 x M.2 B-key 3042 or 3052 Module (USB 3.2 Gen 2 Signal)
	1 x Nano SIM card slot for B-Key use
	1 x M.2 E-Key 2230 WiFi module (PCIe / USB 2.0 Signal)
	1 x Mini PCIe (PCIe / USB 2.0 Signal)

Note! The M.2 B-Key can support either 2242 storage (w/ SATA signal) or 3042/3052 Module (w/ USB signal).

1.4.3 I/O Interfaces

Table 1.3: I/O Interfaces	
Serial Ports	4 x RS-232/422/485 (terminal block), 50 ~115.2 kbps (Isolation Protection: 2500 VDC)
LAN Ports	1x Intel® I225 Ethernet Chip
	1x Intel® I219 Ethernet Chip
	1x Intel® I210 Ethernet Chip
Speed	2 x 10/100/1000BASE-T Fast Ethernet (RJ-45)
	1 x 10/100/1000/2500BASE-T Fast Ethernet (RJ-45)
USB Ports	3 x USB 3.2 Gen 2, and 1 x USB 2.0 (Type-A)
Isolated DIO	8-ch digital input, 8-ch digital output (Isolation Protection: 2500VDC)
	Input Voltage (Wet Contact)
	Logic 0: 10 ~ 30 VDC
	Logic 1: 0 ~ 3 VDC
	Input Voltage (Dry Contact)
	Logic 0: Shorted to GND
	Logic 1: Open
	Digital Output
	Output Voltage: 5 ~ 30 VDC
	Output Capability Sink: 500 mA max./channel
Displays	2 x DP 1.4, up to 7680x3480 (4K) @ 60Hz
Power Connector	1 x 2 Pin (terminal block)

1.4.4 Environment

Table 1.4: Environment	
Operating Temperature	-20 ~ 60 °C (-4 ~ 140 °F) with 0.7 m/s airflow
Storage Temperature	- 40 ~ 85 °C (-40 ~ 185 °F)
Relative Humidity	95% RH @ 40 °C / 104 °F, non-condensing
Shock Protection	Operating, IEC 60068-2-27, 50G, half sine, 11 ms
Vibration Protection	Operating, IEC 60068-2-64, 4 Grms, random, 5 ~ 500 Hz, 1hr/axis (SSD)
	Operating, IEC 60068-2-64, 0.3 Grms, random, 5 ~ 500 Hz, 1hr/axis (HDD)

1.4.5 Certification

Table 1.5: Certification	
Certification	CE, FCC, CB, UL 61010-2-201, BSMI

1.4.6 Extension Kit (Optional)

UNO-148 features a modularized design. Advantech offers an optional 2nd extension kit.

■ UNO-148-ID1EA Expansion unit (iDoor x 1)

Part number	UNO-148-ID1EA
Description	2nd stack extension kit to support 1 x iDoor on UNO-148-ID1EA
Ports	1 x iDoor
Dimensions (W x D x H)	35 x 140 x 200 mm
Weight	0.4 kg

■ UNO-148-IS2EA Expansion unit (1 x iDoor and 1 x 2.5"SSD/HDD)

Part number	UNO-148-IS2EA
Description	2nd stack extension kit to support 1 x iDoor and 1 x 2.5" SSD/HDD storage on UNO-148-IS2EA
Ports	1 x iDoor, 1 x 2.5" SSD/HDD
Dimensions (W x D x H)	35 x 140 x 200 mm
Weight	0.8 kg

■ UNO-148-P11EA Expansion unit (1 x PCIe x4 expansion)

Part number	UNO-148-P11EA
Description	2nd stack extension kit to support 1 x PCIe x4 on UNO-148-P11EA
Ports	1 x PCIe x4 expansion
Dimensions (W x D x H)	35 x 140 x 200 mm
Weight	0.5 kg

Note! *1. When UNO-148-P11EA is installed, the PCIe signals of the mPCIe port and SATA signals of the M.2 B-Key socket are occupied by the expansion kit and cannot be used anymore.*

2. Because of the power used by PCIe x4, the recommended power input for UNO-148 is 24 V_{DC} (±20%).

1.5 Dimensions

45 x 140 x 200 mm (W x D x H mm)
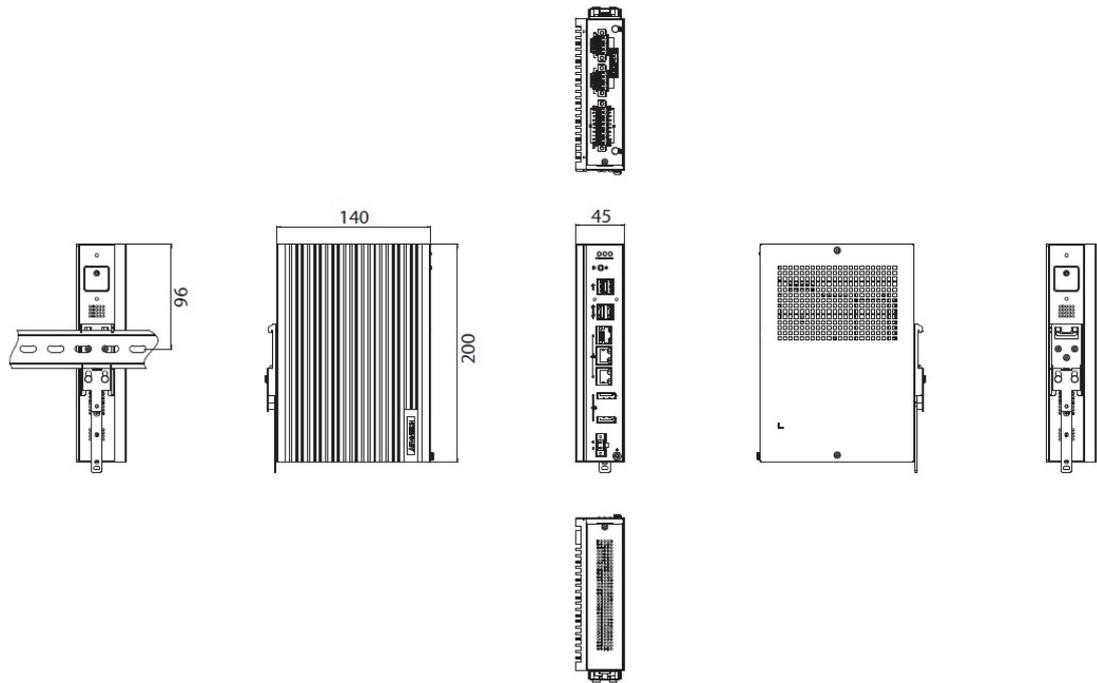
Figure 1.1 UNO-148 Dimensions

80 x 140 x 200 mm (W x D x H mm)
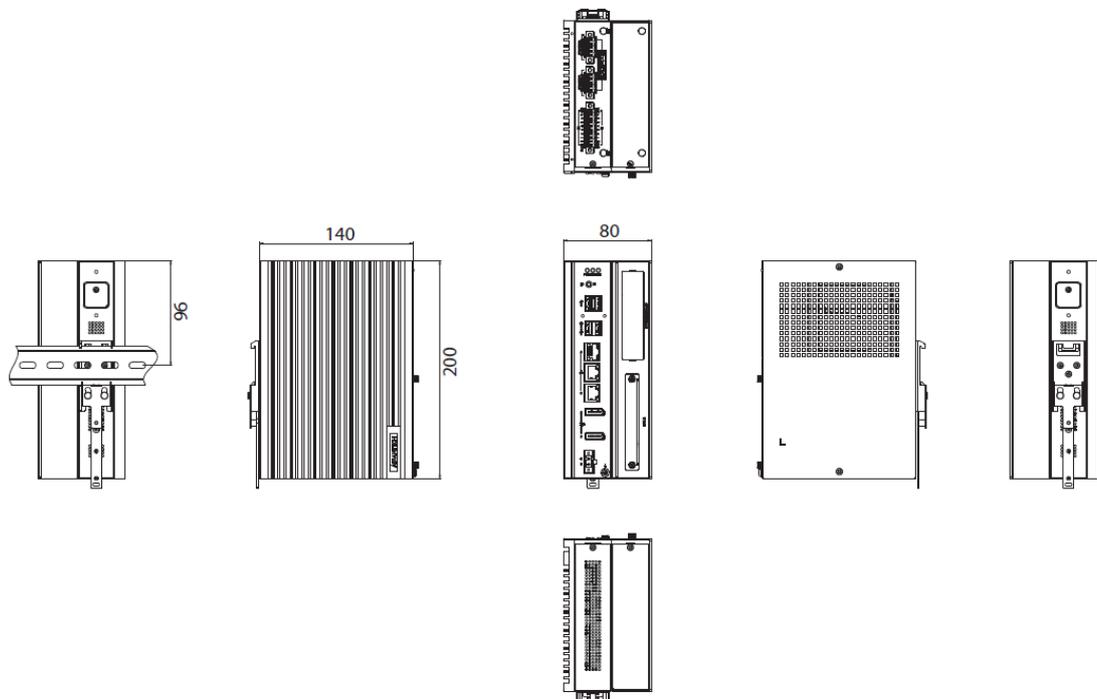
Figure 1.2 UNO-148 Dimensions (With UNO-148-IS2EA Optional Extension Kit))

80 x 140 x 200 mm (W x D x H mm)
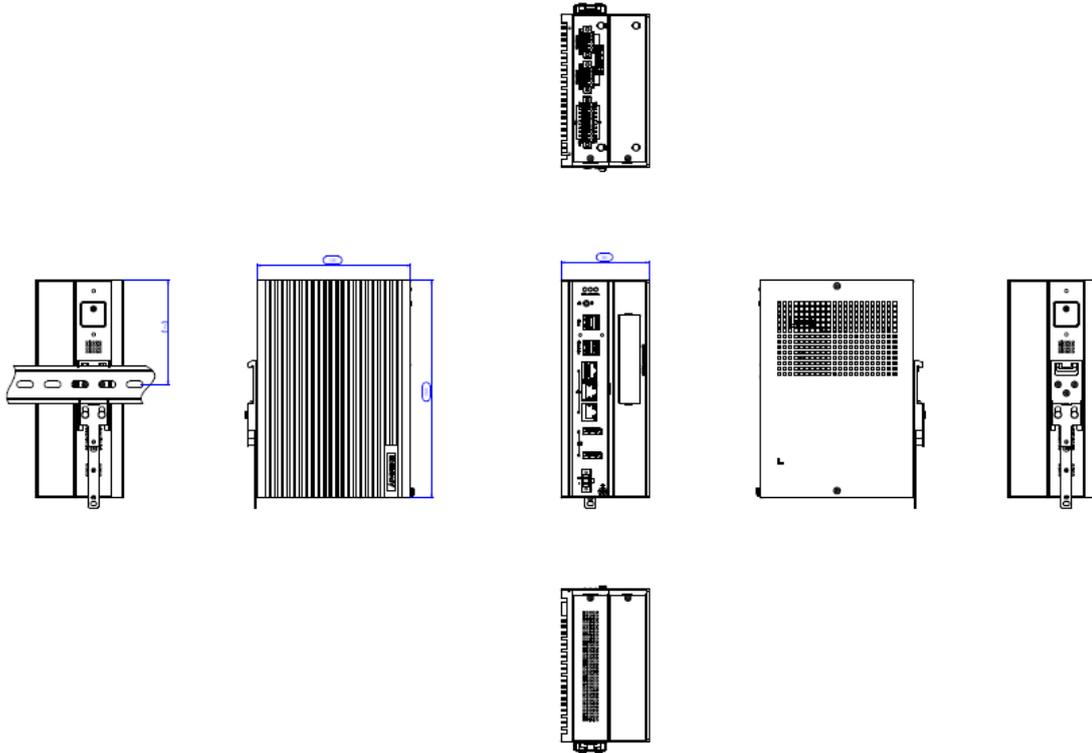
Figure 1.3 UNO-148 Dimensions (With UNO-148-ID1EA Optional Extension Kit)
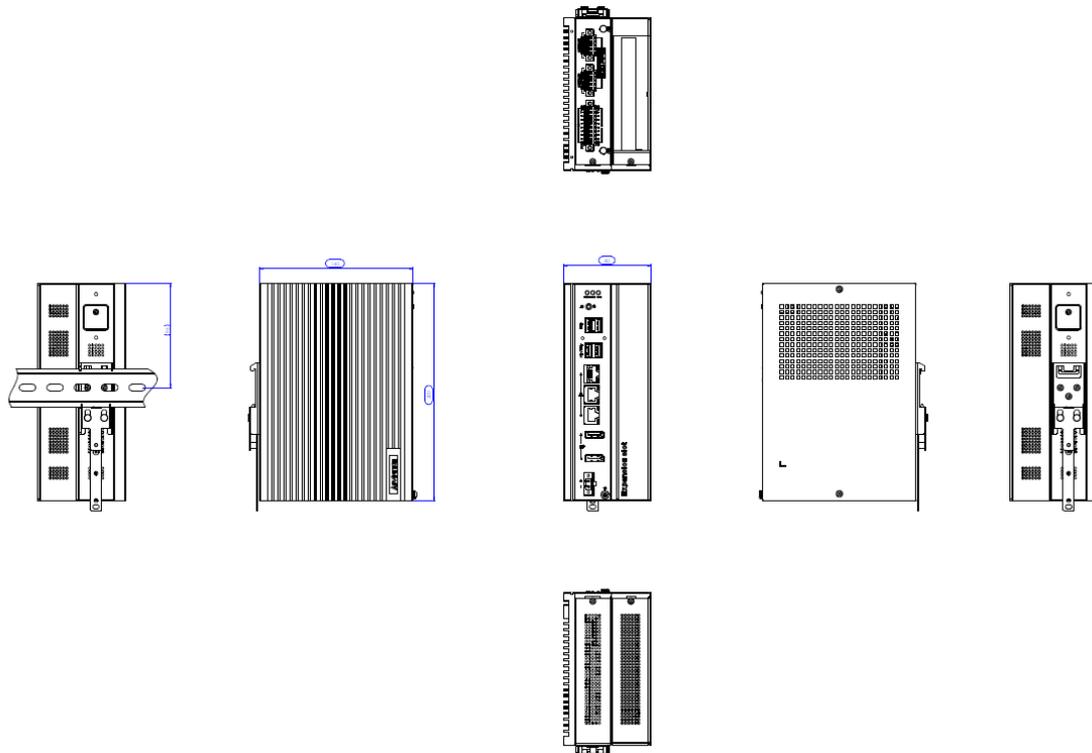
Figure 1.4 UNO-148 Dimensions (With UNO-148-ID1EA Optional Extension Kit)

Chapter 2

Hardware Functionality

This chapter details setup instructions for the hardware functions of the UNO-148. It includes connecting peripherals and indicators.

- Introduction
- External I/O Connectors
- Internal I/O Connectors
- LED Indicators
- Reset Buttons
- Antenna Holes

2.1 Introduction

The following diagram shows the locations of the UNO-148 motherboard's key components and internal/external connectors.
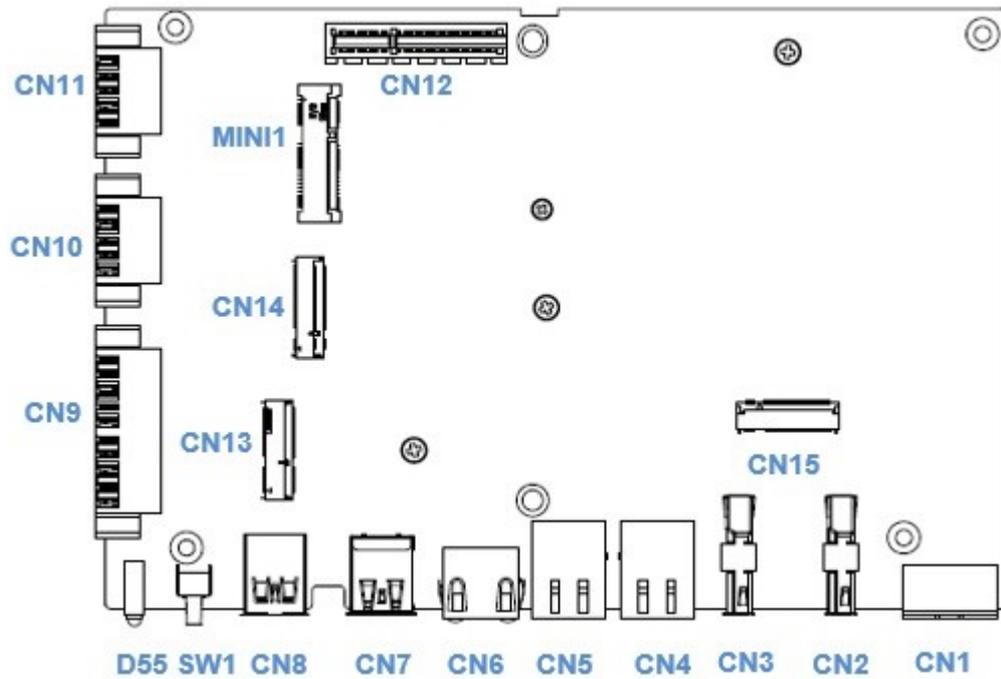
Figure 2.1 Diagram of Connector Locations on UNO-148 (Top Side)
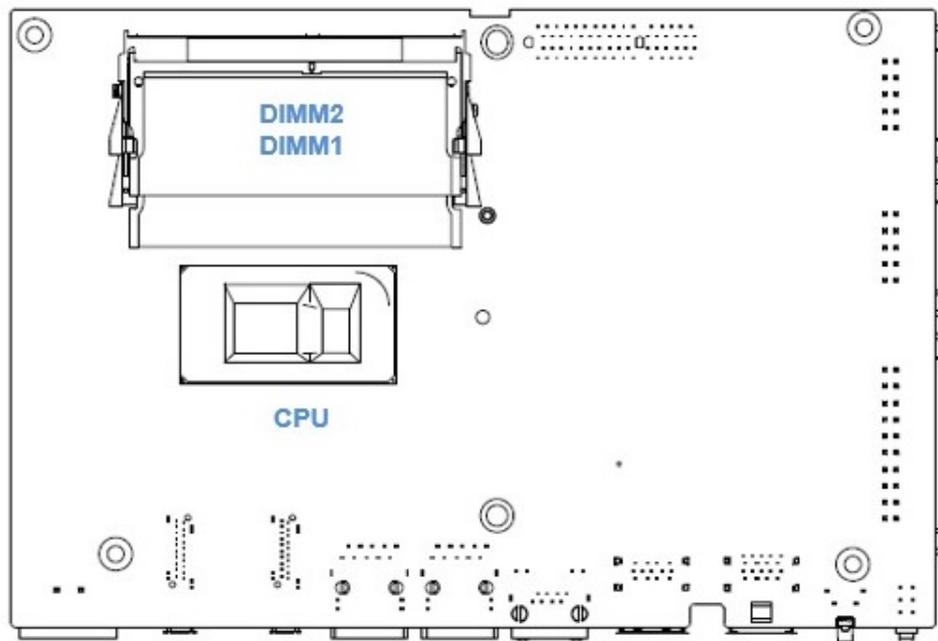
Figure 2.2 Key Component Locations on UNO-148 (Bottom Side)

Table 2.1: Key Components, Connectors Onboard

Category	Label	Function
External	CN1	Power Connector
	CN2	DisplayPort Connector
	CN3	DisplayPort Connector
	CN4	LAN Connector
	CN5	LAN Connector
	CN6	LAN Connector
	CN7	USB 3.0 +2.0 Connector
	CN8	USB 3.0 x2 Connector
	SW1	Reset Button + Power Button
	D55	LED Indicator
	CN9	8DI/8DO Terminal Connector
	CN10	COM Port Terminal Connector (RS232/422/485)
	CN11	COM Port Terminal Connector (RS232/422/485)
Internal	CN12	Riser Connector
	MINI1	Mini PCIe Connector
	CN14	M.2 B-Key for 2242/3042/3052 Connector
	CN13	M.2 E-Key for 2230 Connector
	CN15	M.2 M-Key for 2280 Connector
	DIMM2	Memory Slot
	DIMM1	Memory Slot
	CPU	CPU

2.2 External I/O Connector

2.2.1 UNO-148 Base Unit
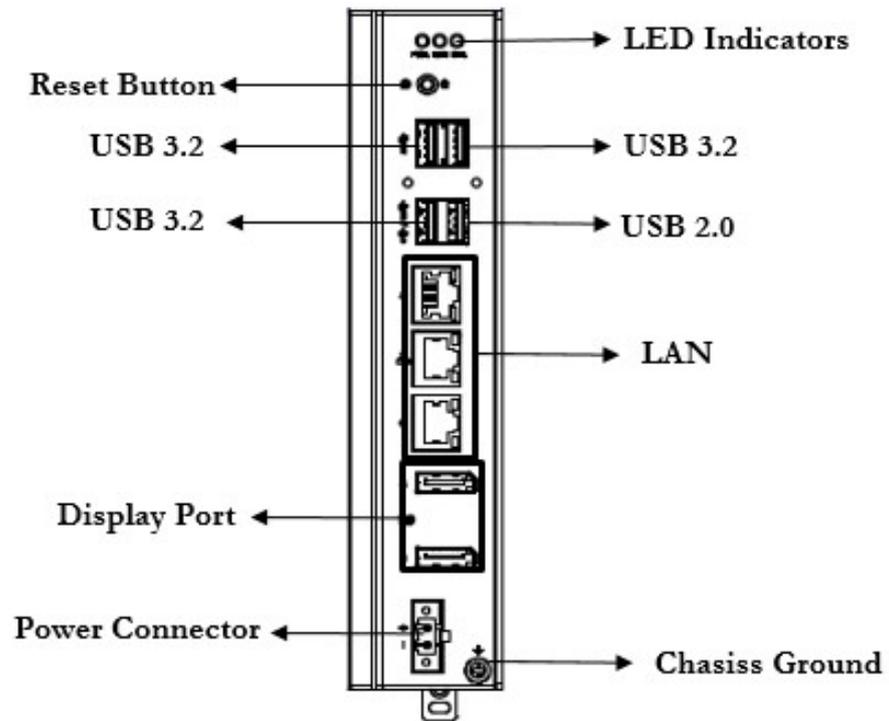
Figure 2.3 Front Panel of UNO-148
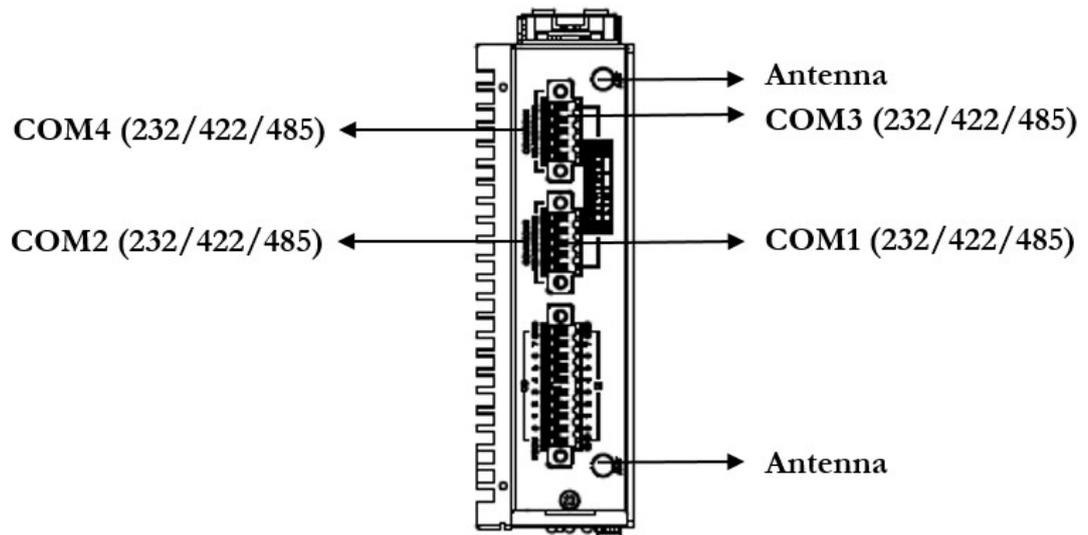
Figure 2.4 Top View of UNO-148

2.2.2 UNO-148 Base Unit with UNO-148-IS2EA Expansion Unit (1 x iDoor and 1 x 2.5" SSD/HDD)
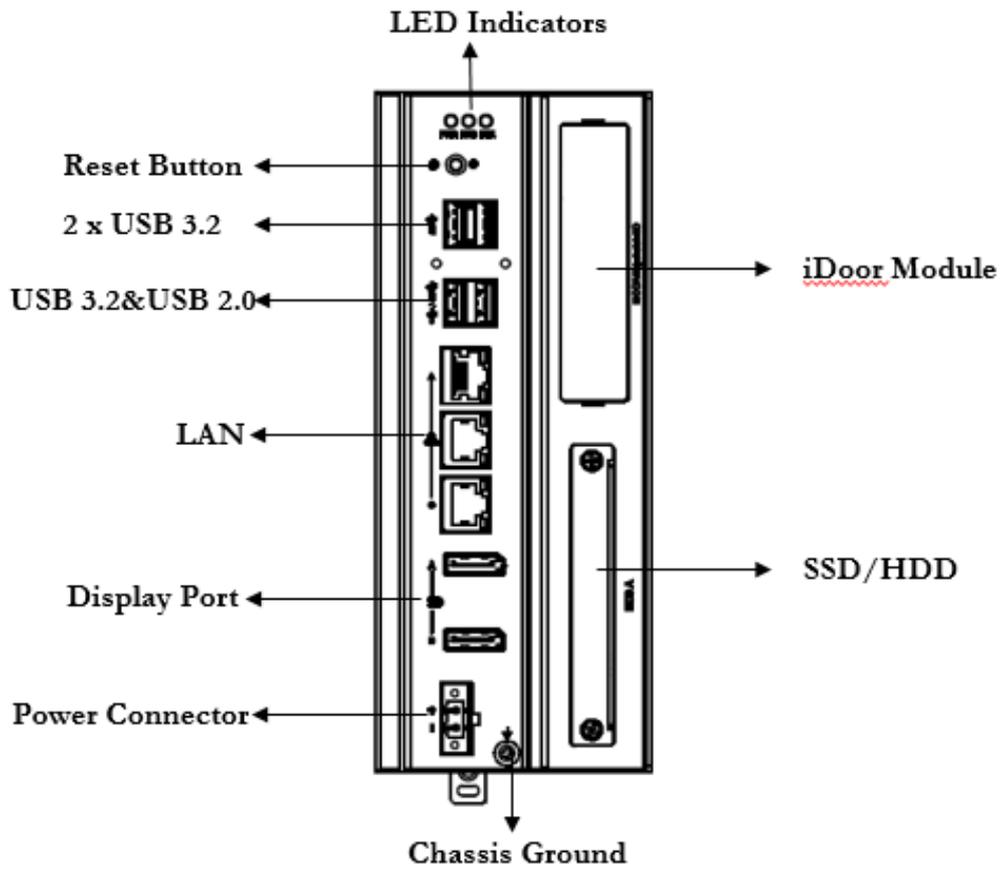
Figure 2.5 Front Panel of UNO-148
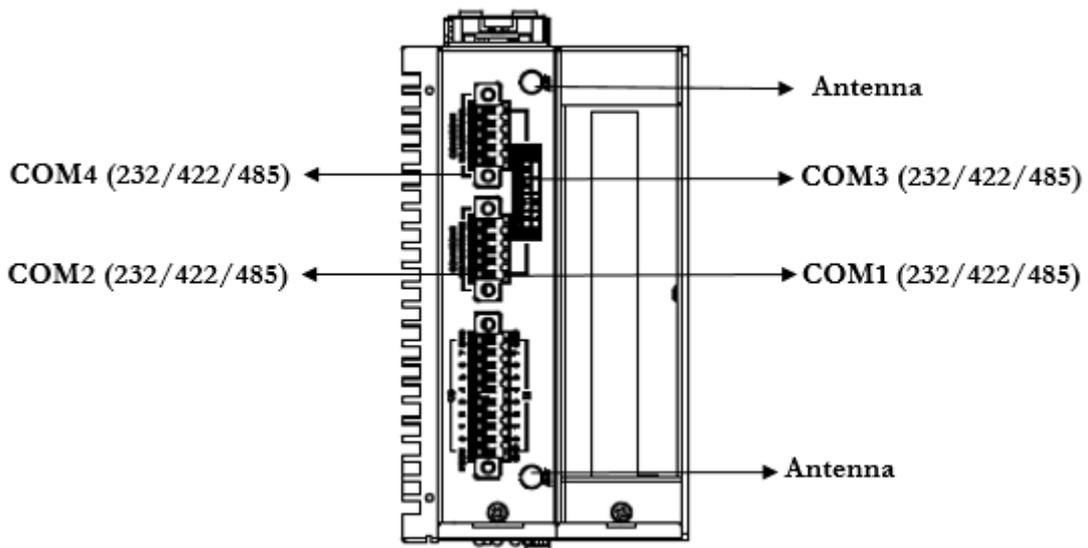
Figure 2.6 Top View of UNO-148

2.2.3 UNO-148 Base Unit with UNO-148-ID1EA Expansion Unit (iDoor x 1)
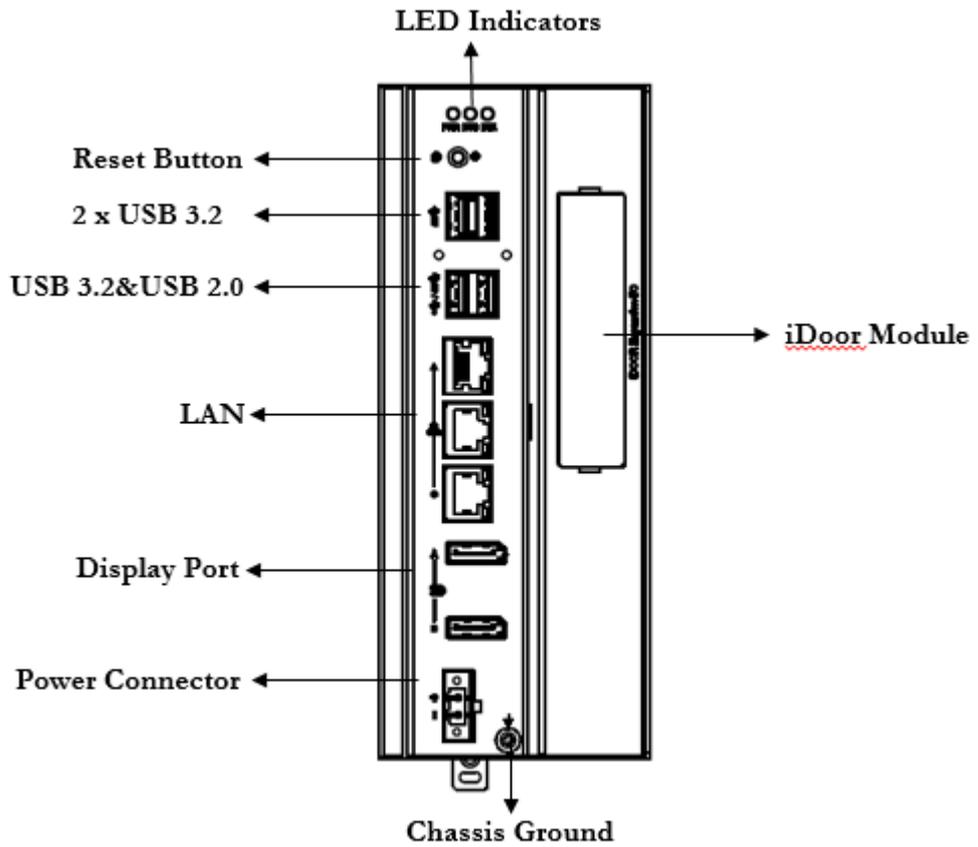
Figure 2.7 Front Panel of UNO-148
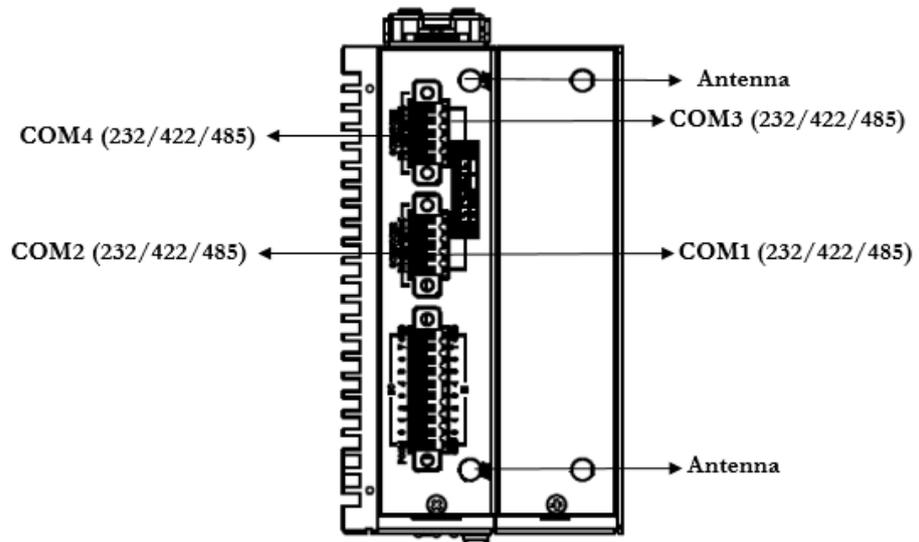
Figure 2.8 Top View of UNO-148

2.2.4 UNO-148 Base Unit with UNO-148-P11EA Expansion Unit (1 x PCIe x4 expansion)
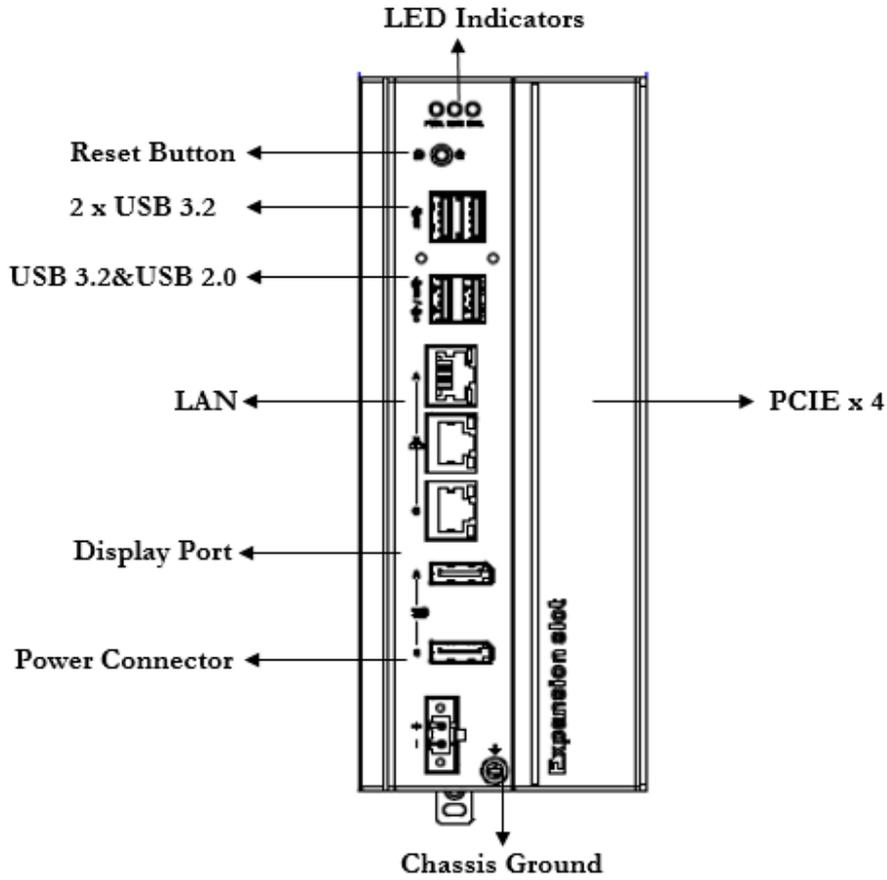
Figure 2.9 Front Panel of UNO-148
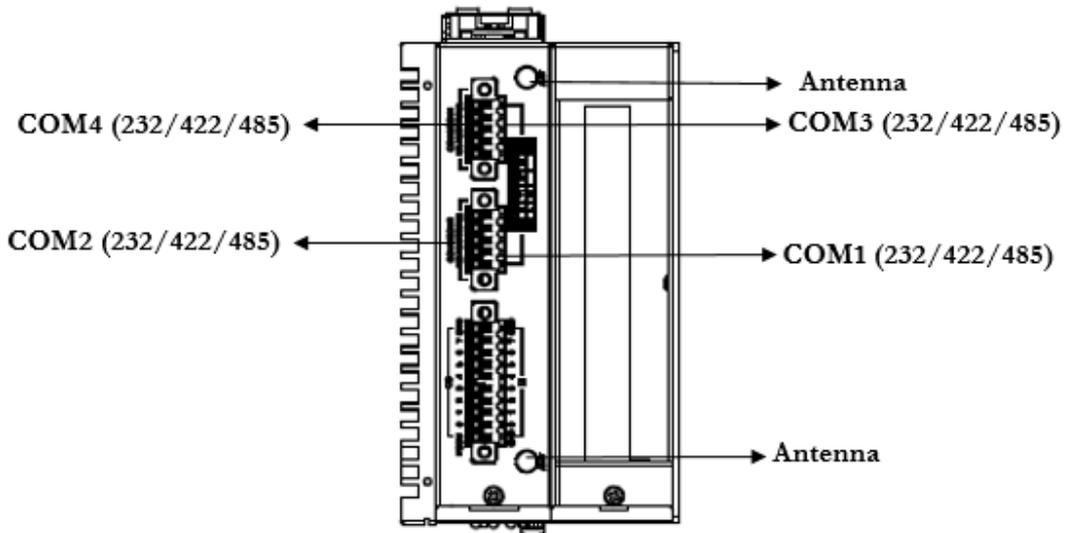
Figure 2.10 Top View of UNO-148

2.2.5 Power Connector

UNO-148 comes with a Phoenix connector that carries 10 - 36 V_{DC} external power input, and features reversed wiring protection. Therefore, the system will not accrue damage from reversed polarity of ground lines and power lines.

2.2.6 LAN: Ethernet Connectors

UNO-148 is equipped with two Gigabit LAN controllers. An Intel$^®$ i210/i219/i225 Ethernet controller that complies with IEEE 802.3u 10/100/1000/2500 Base-T is used as the controller chip. The Ethernet port is a standard RJ-45 jack. Additionally, LED indicators are provided on the front of the device to indicate the system's Link (off/green/orange) and Active (green) status.

2.2.7 USB Connectors

UNO-148 features 4 x USB ports that comply with USB EHCI (3 x USB 3.2, 1 x USB 2.0 (Type-A)) specifications. The USB connectors support plug-and-play and hot-swapping functionality for external devices. Additionally, this can be enabled/disabled in the BIOS menu.

2.2.8 Display Connectors

The UNO-148 provides 2 x DP 1.4 connectors for a high-resolution interface up to 7680x3840 @ 60Hz. It also supports DP++ which can be compatible with a passive adapter.

2.2.9 COM Connector

UNO-148 has 4 x COM RS232/422/485 ports of terminal block type. They offer transmission speeds of 50 ~115.2 kbps.

The default mode for both COM ports (COM1&COM2) is RS-232 Mode. Settings can be adjusted via an on-board switch (SW1).
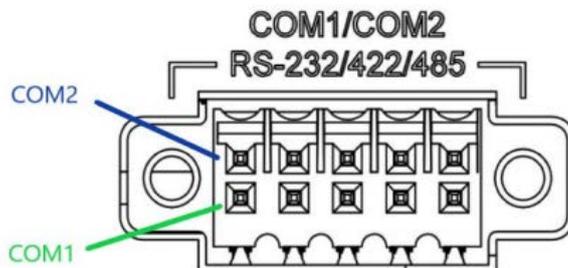
COM2	Pin 2	Pin 4	Pin 6	Pin 8	Pin10
COM1	Pin 1	Pin 3	Pin 5	Pin 7	Pin 9

Table 2.2: COM Connector Pin Assignments

Pin	COM1 Mode	Signal Name	Pin	COM2 Mode	Signal Name
1	RS232	CTS	2	RS232	CTS
	RS422	T-		RS422	T-
	RS485	D-		RS485	D-
3	RS232	RXD	4	RS232	RXD
	RS422	T+		RS422	T+
	RS485	D+		RS485	D+
5	RS232	TXD	6	RS232	TXD
	RS422	R+		RS422	R+
	RS485			RS485	
7	RS232	RTS	8	RS232	RTS
	RS422	R-		RS422	R-
	RS485			RS485	
9	RS232	GND	10	RS232	GND
	RS422	GND		RS422	GND
	RS485	GND		RS485	GND

2.2.10 Digital Inputs and Outputs

There are 8 x digital inputs and 8 x digital outputs configured from GPIO pins for on/off triggering and status reading.
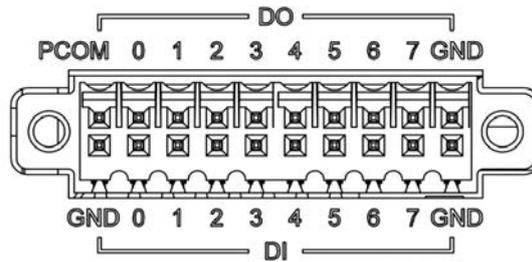
The following table indicates the mapping for DIO and GPIO.

GPIO Pin	Pin 0	Pin1	Pin2	Pin3
DI Pin	DI0	DI1	DI2	DI3
GPIO Pin	Pin 4	Pin5	Pin6	Pin7
DI Pin	DI4	DI5	DI6	DI7
GPIO Pin	Pin 8	Pin9	Pin10	Pin11
DO Pin	DO0	DO1	DO2	DO3
GPIO Pin	Pin 12	Pin13	Pin14	Pin15
DO Pin	DO4	DO5	DO6	DO7

And the below table indicates the mapping of DIO and Linux GPIO.

Table 2.3: Mapping Table of DIO and Linux GPIO			
DI point	Number	DO point	Number
DI0	424	DO0	314
DI1	425	DO1	315
DI2	426	DO2	325
DI3	427	DO3	326
DI4	428	DO4	327
DI5	429	DO5	328
DI6	430	DO6	329
DI7	431	DO7	330

Use SW3 to set Wet Contact and Dry Contact for Digital input.
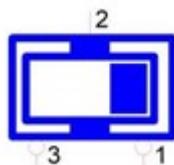
Dry: Configure to Setting 1 (Default)   Wet: Configure to Setting 3
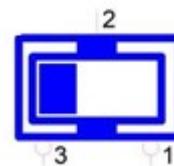
Digital Input

- Input Channels 8
- Input Voltage (Wet Contact), Configure SW3 to Setting 3
  - Logic 0: 10 ~ 30 V_{DC}
  - Logic 1: 0 ~ 3 V_{DC}
- Input Voltage (Dry Contact), Configure SW3 to Setting 1
  - Logic 0: Shorted to GND
  - Logic 1: Open
- Isolation Protection 2,500 V_{DC}
- Over-voltage Protection 30 V_{DC}
- Opto-Isolator Response 50 µs

Digital Output
- Output Channels 8
- Output Voltage: 5 ~ 30 V_{DC}
- Output Capability Sink: 500 mA max./channel
- Opto-Isolator Response 50 µs

Isolated Digital Input

Each of the 8 x isolated digital input channels accept voltages from 0 to 30 V. The following figure shows how to connect an external input source to the isolated inputs of UNO- 148.
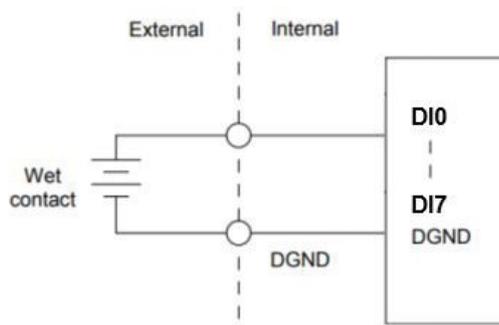
Figure 2.11 Isolated DI Wet Connection Diagram
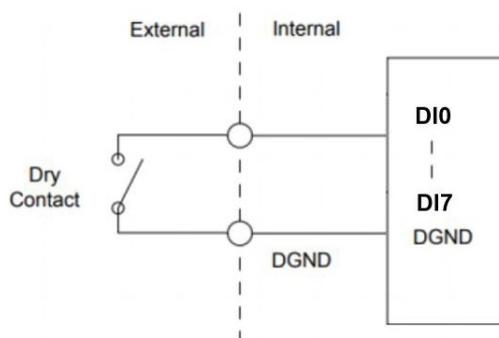
Figure 2.12 Isolated DI Dry Connection Diagram

Isolated Digital Output

If the external voltage source (5 ~ 30 V) is connected to each isolated digital output channel and its isolated digital output turns on (500 mA max./ch), the board's current will sink from the external voltage source. The following figure shows how to connect an external output load to the isolated outputs on UNO-148.
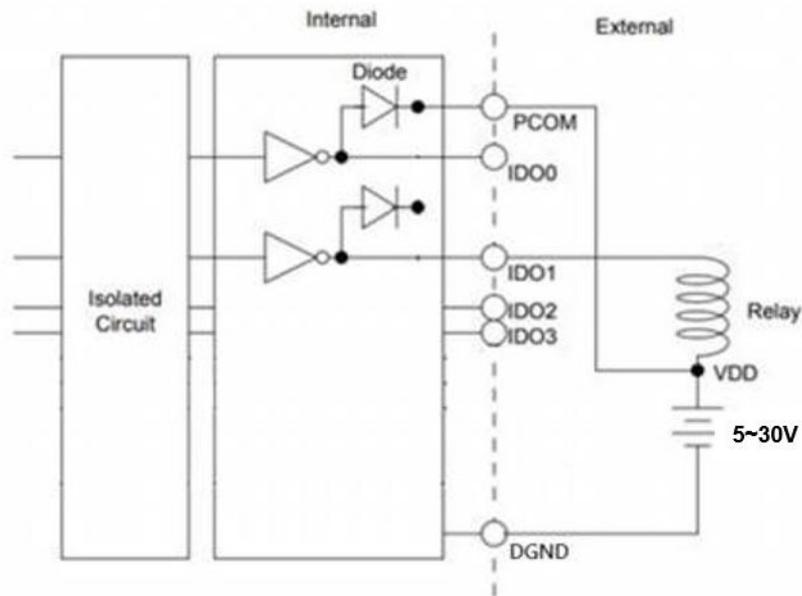
Figure 2.13 Isolated DO Connection Diagram

2.3 Internal I/O Connectors and Switches

The following figure demonstrates the locations of internal connectors and switches on the UNO-148 motherboard.
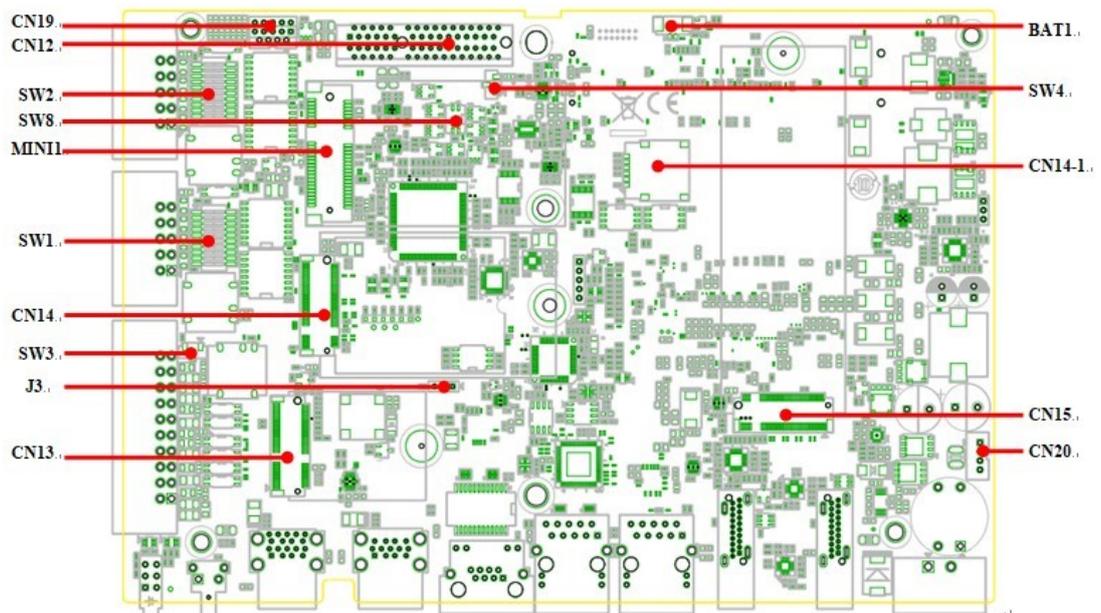
Figure 2.14 Locations Internal I/O Connectors/Switches for UNO-148

Table 2.4: Internal Connectors and Jumper Switches

Label	Function
CN19	Internal USB Connector
CN12	Riser Connector
SW2	COM Port RS232/422/485 settings
SW8	AT/ATX/Remote setting
MINI1	Mini PCIe Connector
SW1	COM Port RS232/422/485 settings
CN14	M.2 B-Key for 2242/3042/3052 Connector
SW3	DI Setting (Dry/Wet)
J3	Clear CMOS Connector
CN13	M.2 E-Key for 2230 Connector
CN20	iDoor Power Connector
CN15	M.2 M-Key for 2280 Connector
CN14-1	Nano SIM slot Connector
BAT1	RTC Battery Connector
SW4	BIOS update Setting

Note! *This power is from DC Power inputs.*

Configure the UNO-148 to match the needs of your application by setting switches. The following details the switch setting definitions:

Dip switch definition:
Bit 1: on
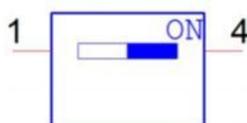
Bit 1: off
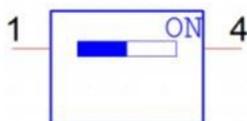
2.3.1 M.2 Connector

There is one M.2 B-Key connector for M.2 cards, labeled "CN14" on the board. This M.2 interface is an SATA signal co-lay with a USB signal. It will automatically detect which device you installed and determine the appropriate SATA or USB signal to use. Therefore, it supports the installation of M.2 2242 (w/SATA signal) or 3042/3052 module (w/ USB Signal).

2.3.2 mPCIe Connector

There is one socket for a full-size Mini PCI Express card, labeled "MINI1" on the board. It supports the iDoor module for diversified applications such as isolated COM port, Profibus, WLAN GPRS, LTE, and MRAM. Users can install iDoor easily with the optional extension kit.

2.3.3 Nano SIM Slot

There's one Nano SIM Slot for supporting LTE functionality, labeled "CN14-1" on the board. In addition to installing a SIM card in "CN14-1", users are required to install an LTE Module on "CN14" M.2 B-Key to enable the functionality.

2.4 Others
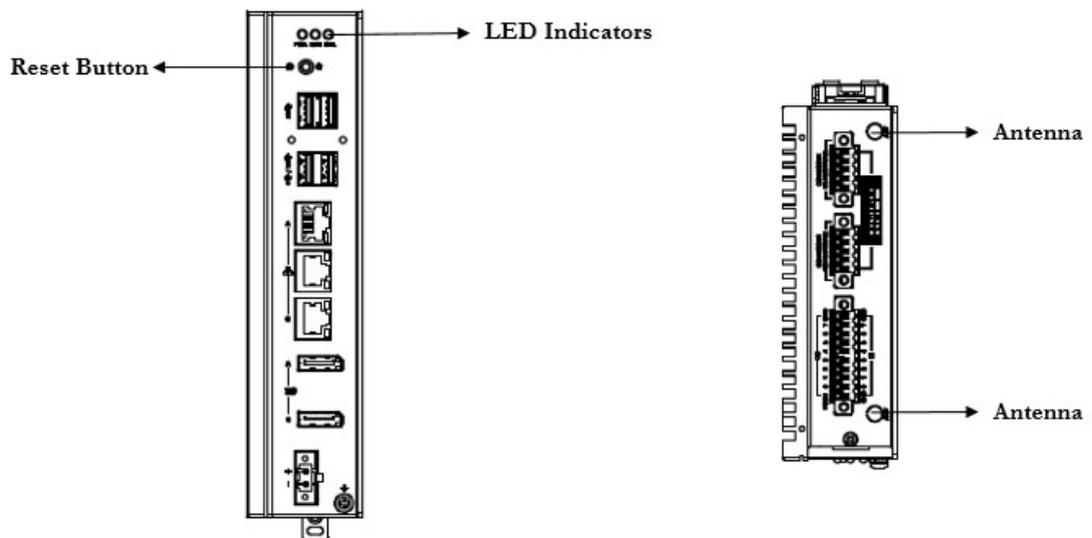
Figure 2.15 Indicators, Reset Buttons, and Antenna Holes

2.4.1 LED Indicators

Three LEDs indicate the status of the system's power, RTC battery, and programmable LED for user configurations.

- PWR (Power): Green indicates "normal" and orange indicates "standby".
- BTR (RTC Battery): Red indicates a low RTC battery. Check the RTC battery.
- RUN (Programmable): Users can configure the LED indicator's behavior through GPO signal controls. Green indicates programmed operation.

2.4.2 Reset Buttons

Press the "Reset" button to initiate a hardware reset.

2.4.3 Antenna Hole

This product offers two antenna mounting holes pre-cut for users to install an antenna kit for LTE or wireless functions.

> **Note!** *Please be aware of the Maximum OD value of the Antenna Hole when selecting the antenna.*
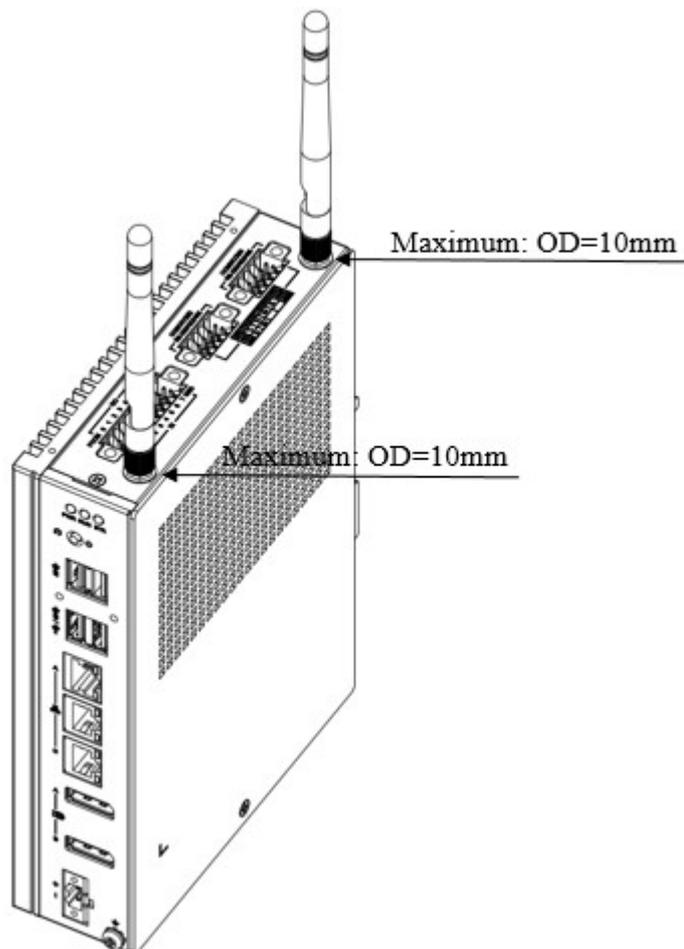
Figure 2.16 Diagram of Maximum OD Value for the Antenna Holes

Chapter 3

Initial Setup

This chapter explains how to Initialize UNO-148.

- Chassis Grounding
- Connecting Power
- Storage Installation (Optional)
- DIN-Rail Installation
- Wireless Module Installation (Optional)
- Expansion Module Installation (Optional)
- Remote Power/On & Reset Setting
- BIOS Setting

3.1 Chassis Grounding

UNO-148 provides good EMI protection and a stable grounding base. There is an easy-to-connect chassis grounding point.
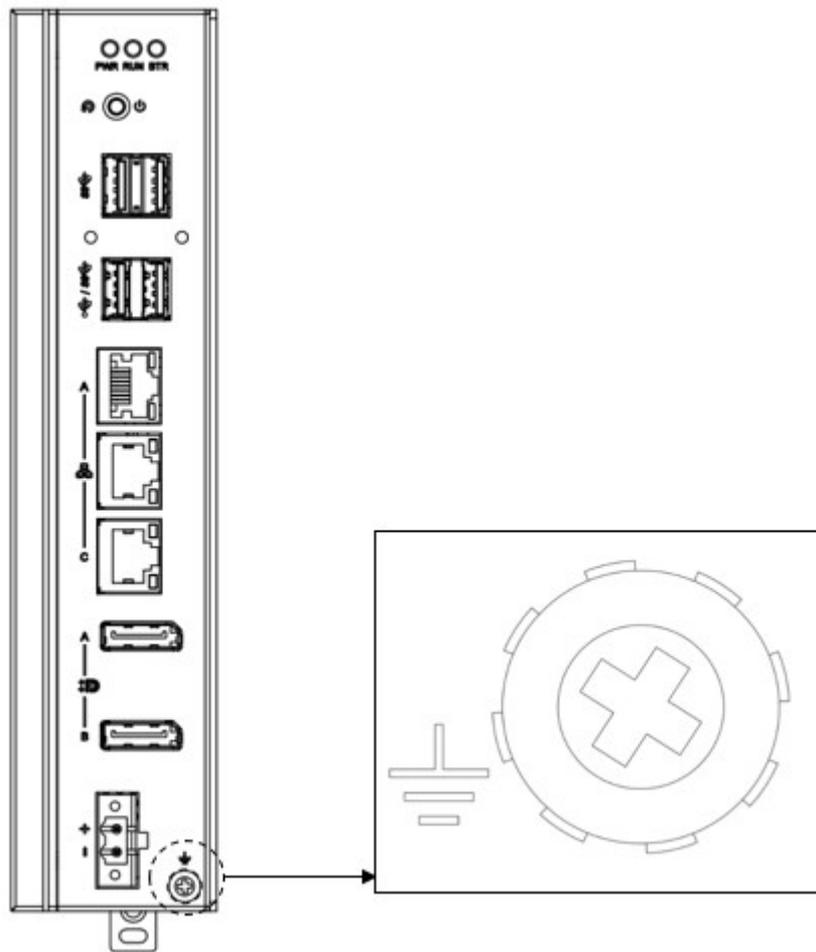
Figure 3.1 Chassis Grounding Connection

The earth terminal should use a 16 AWG minimum size green and yellow conductor connector to connect to the earth.

3.2 Connecting Power

This product is intended to be supplied by an approved power adapter or DC power source. This adapter is rated at 10 - 36 V_{DC}, 7.7-1.31 A and has a maximum temperature of 70°C (158°F). If you need further assistance or information, please contact Advantech.

> **Note!** *It is recommended to choose a 150 W adapter when the iDoor expansion module (e.g. PCM-24R2PE) is installed. Recommended PN: 96PSA-A150W24T2-3.*

Follow the below instructions:

1. Insert the positive and negative wires into the V+ and V- contacts on the terminal block connector.
2. Tighten the wire-clamp screws to prevent the DC wires from coming loose.

Take the following guidelines into consideration before wiring the device:

1. The terminal block is suitable for 12-24 AWG (12 A). Torque value = 7 lb-in. Use copper conductors only.
2. The temperature rating of the input connection cable should be higher than 95 °C (203 °F).
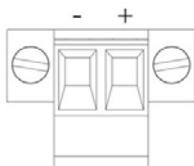
3.3 Storage Installation (Optional)

UNO-148 supports the installation of one M.2 2280 NVMe SSD. The installation is demonstrated in the following steps.

3.3.1 Installing M.2 2280 NVMe

1. Remove the 2 screws from the UNO-148 back cover.
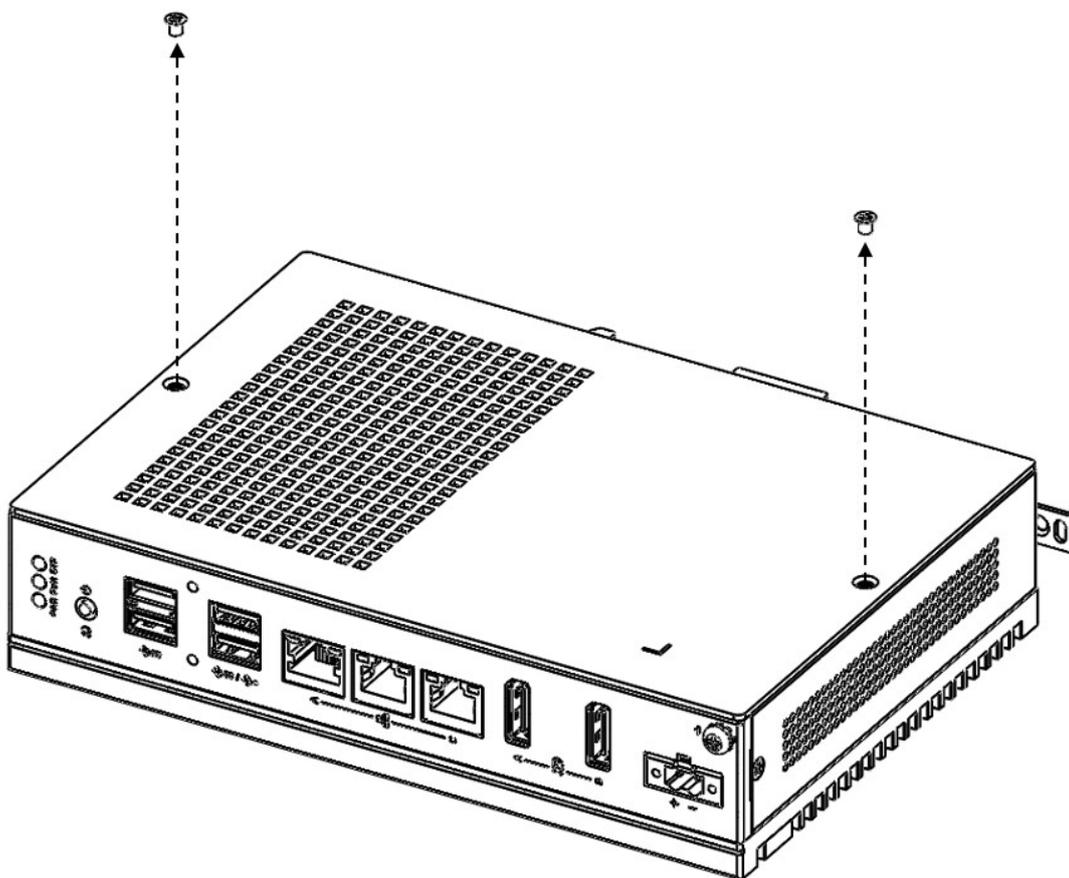
2. Remove the provided screws from the board.
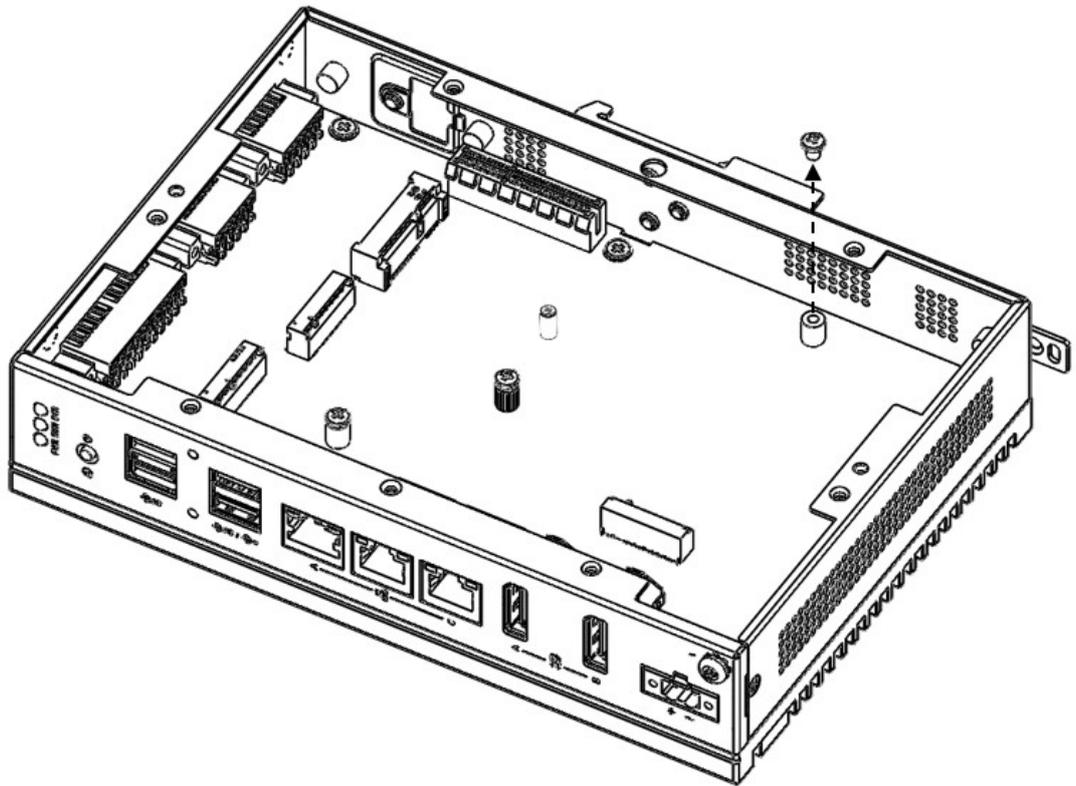
3. Insert the NVMe Card at the "CN15" location. Secure it with the provided screws from Step 2.
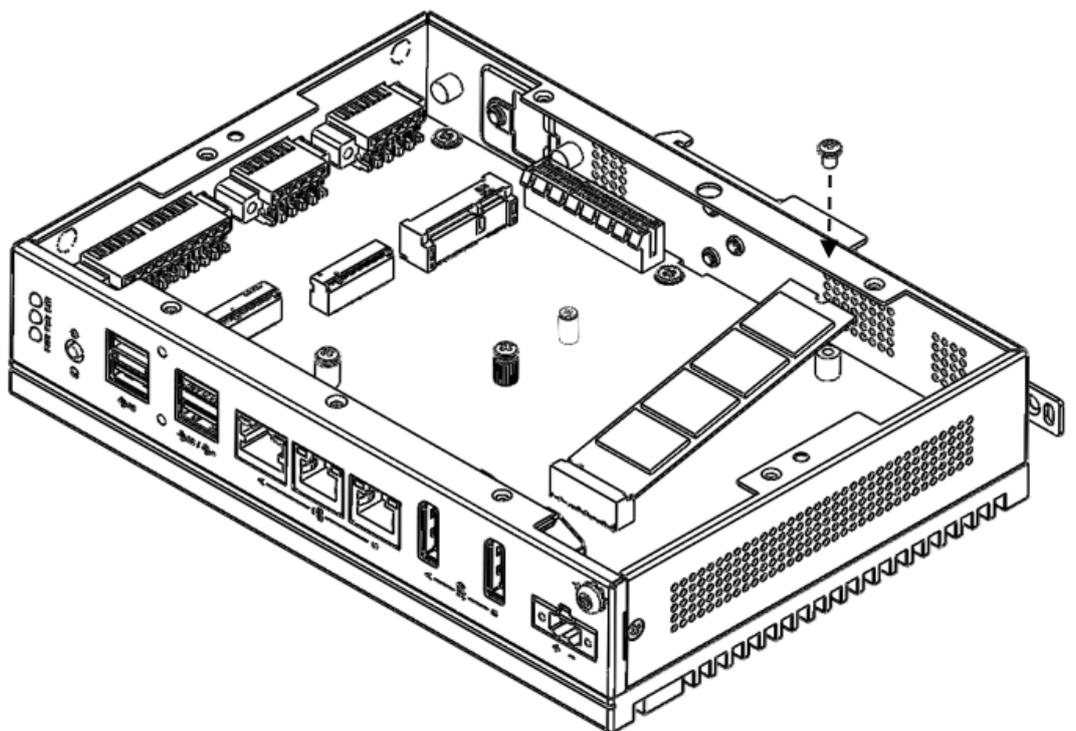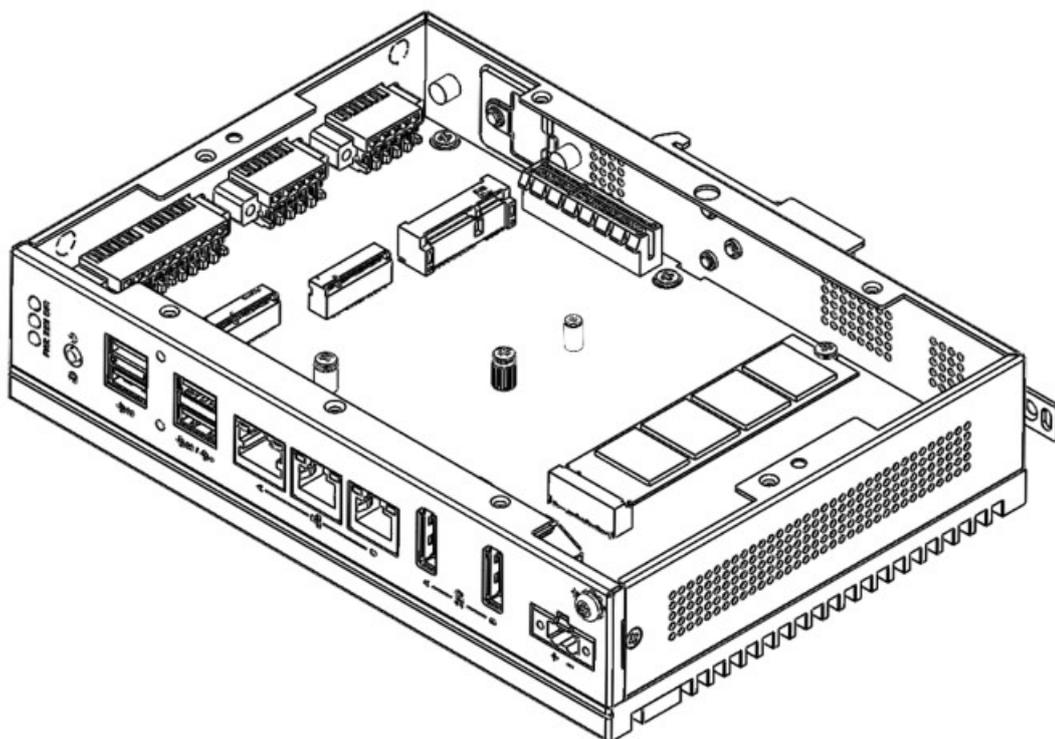
3.3.2 Installing the M.2 3042 Module

1. Loosen the provided screws on the board. (No need to remove the screws.)
2. Use the 3042 bracket from the accessory bag and insert it in the gap underneath where the screw was loosened in Step1.
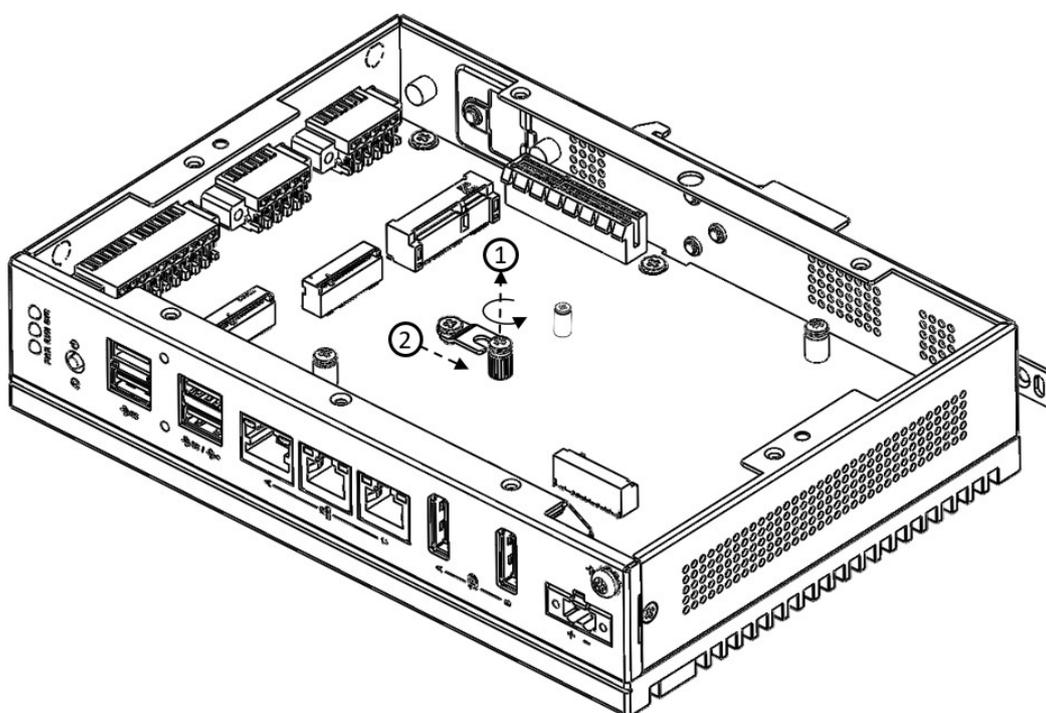
3. Move the 3042 bracket to the center of M.2 and tighten the screws.
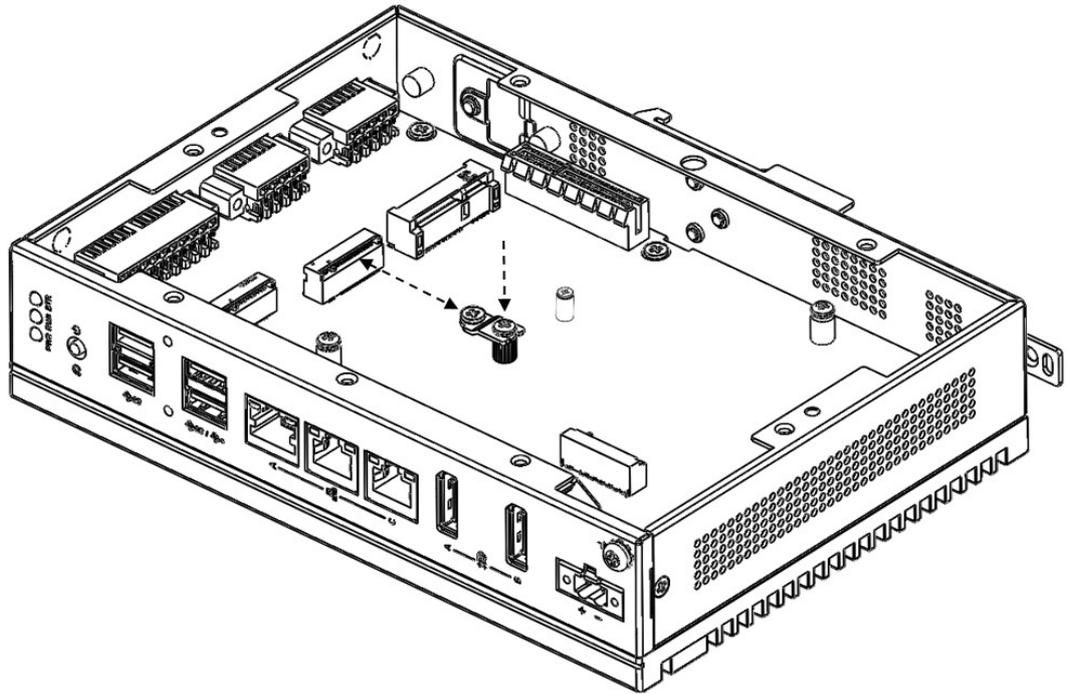
4. Remove the provided screw from the 3042 bracket first.
   Insert the M.2 3042 card and tighten the screw.
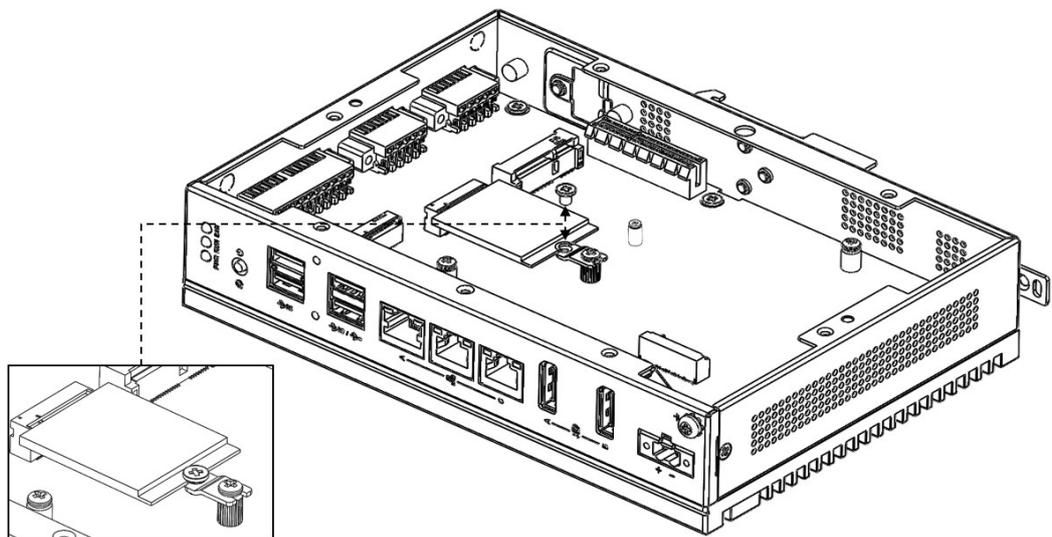
3.3.3 Installing the M.2 3052 Module

1. Remove the provided screws from the board.
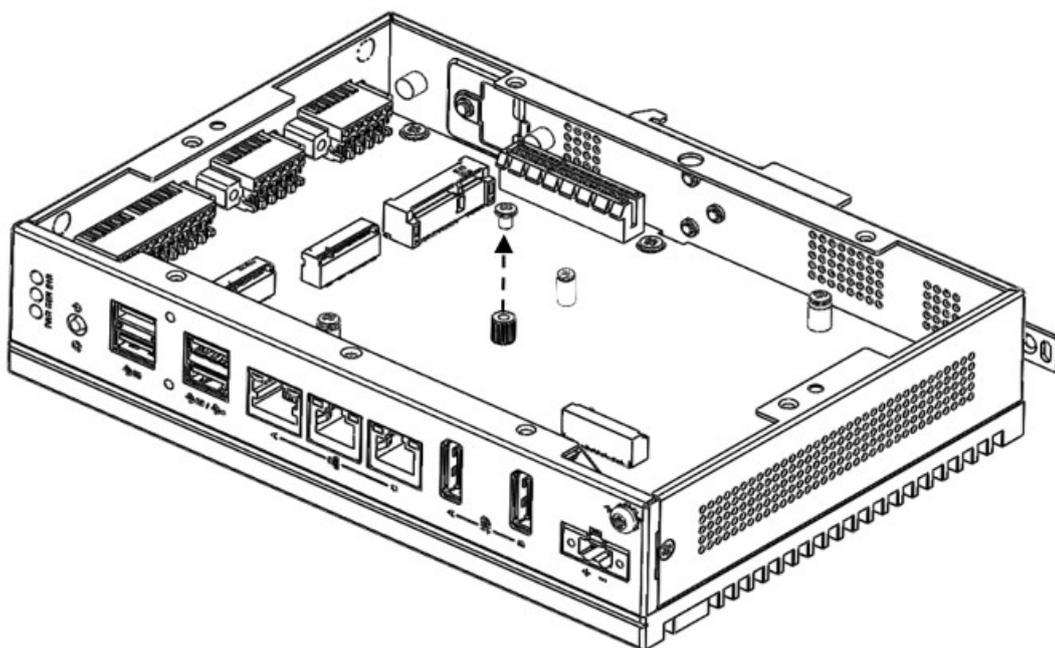
2. Insert the M.2 3052 to the "CN14" location and tighten the screw.
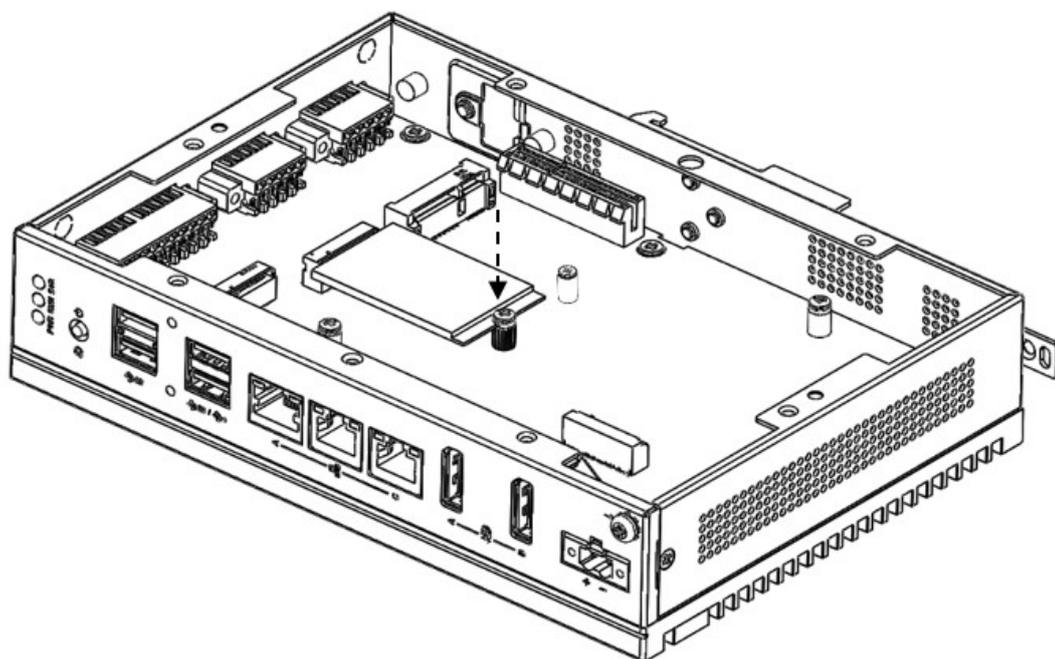
3.4 Installing the M.2 2230 Module

1. Remove the provided screws from the board.
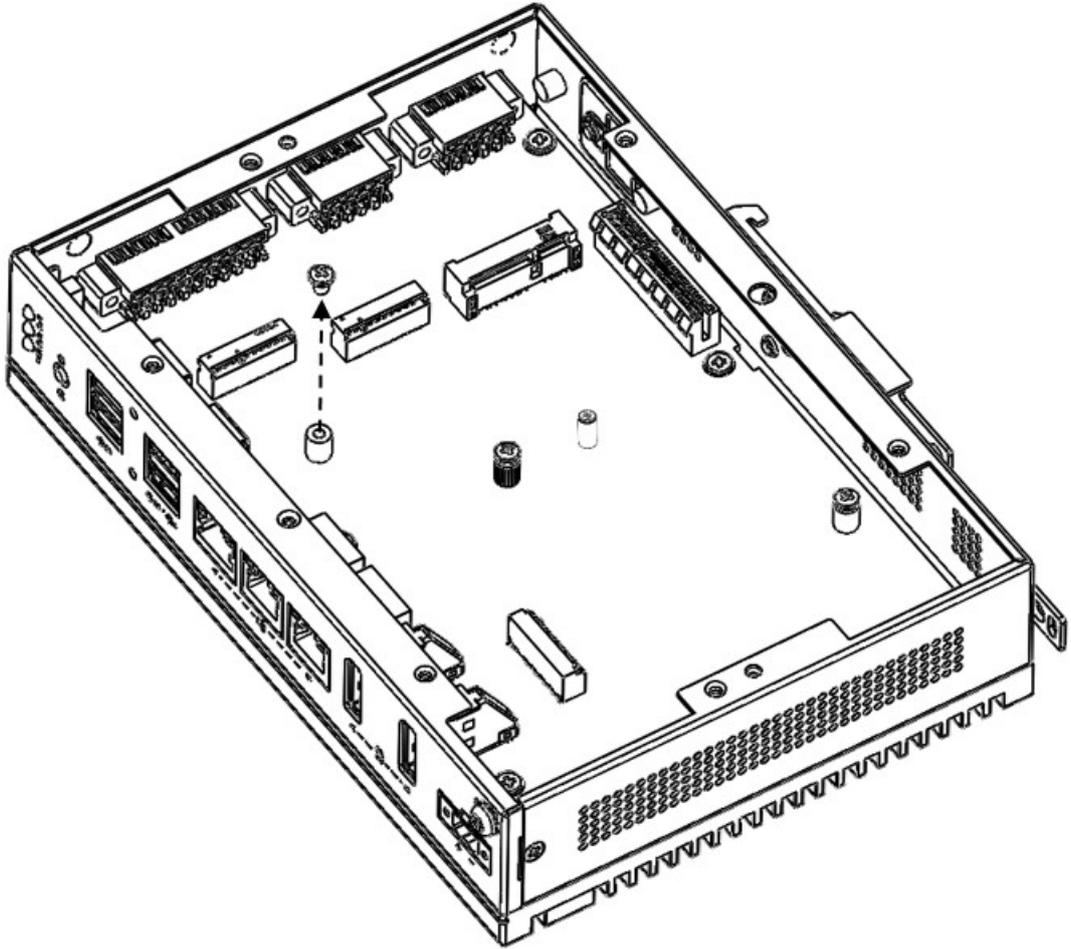
2. Insert the M.2 2230 to the "CN13" location and tighten the screw.
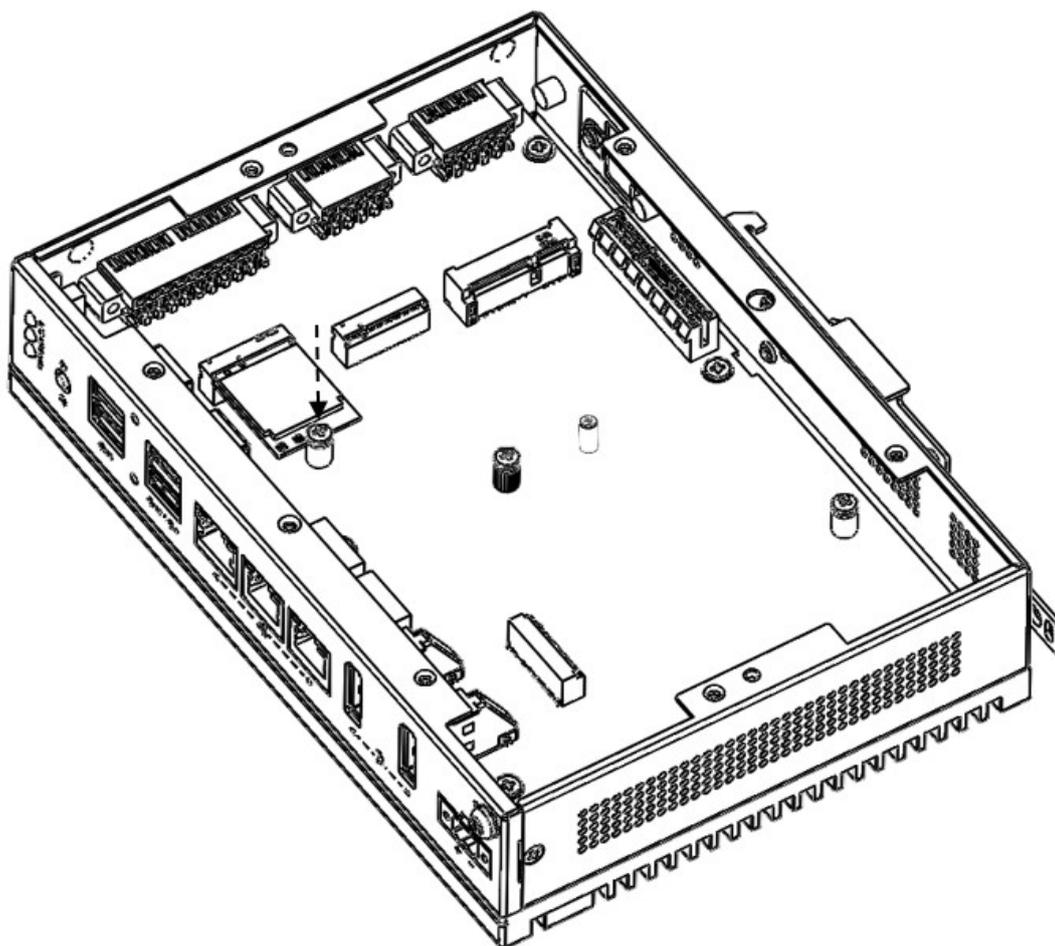
3.4.1 Installing mPCIe

1. Remove the provided screws from the board.
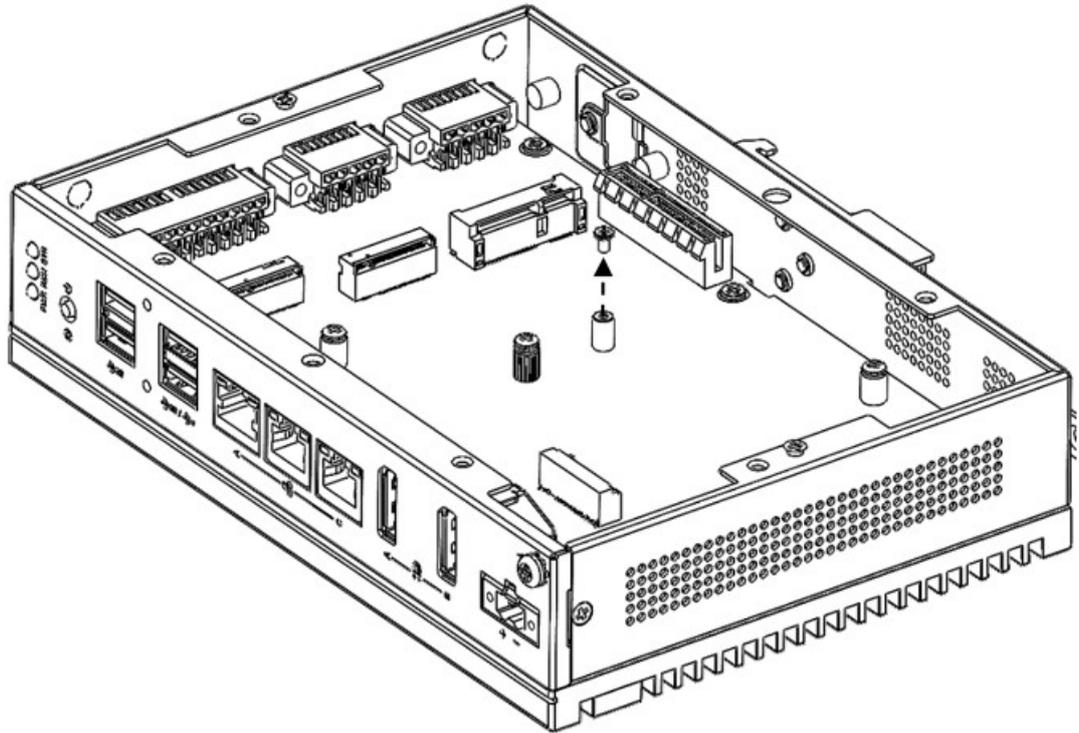
2. Insert the mPCIe to the "MINI1" location and tighten the screw.
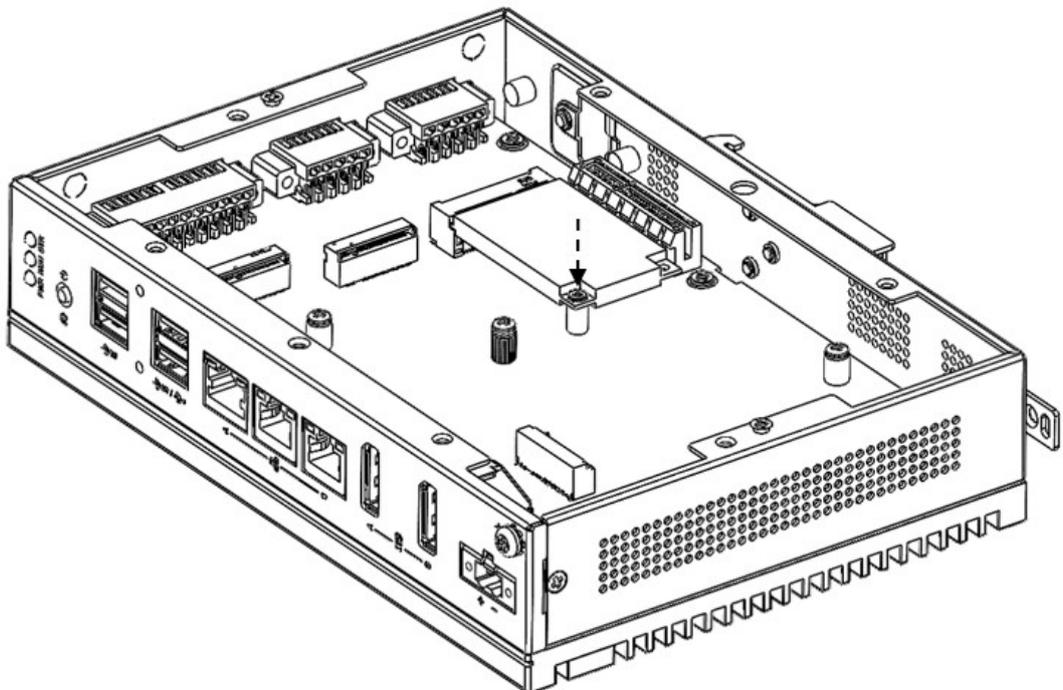
3.5 DIN-Rail Installation

1. Install UNO-148 on the rail and secure it to the rail.

Buckle inward
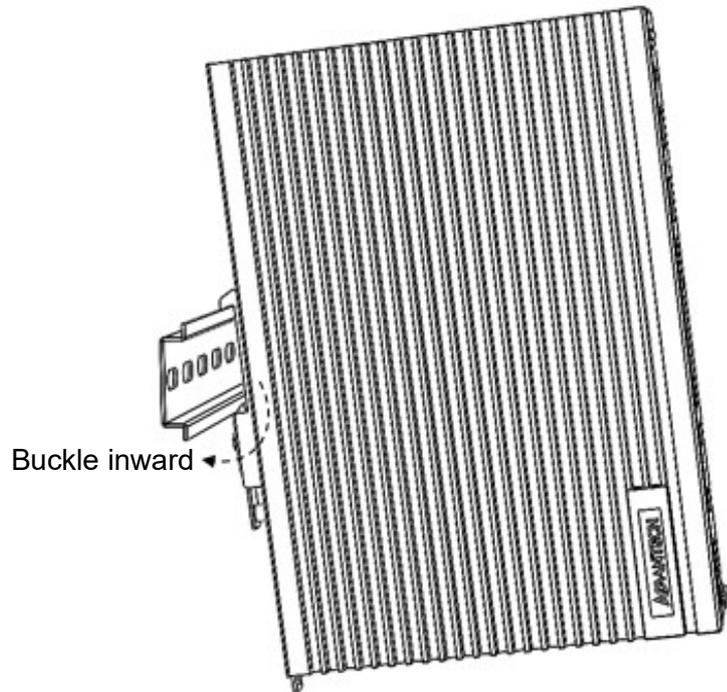
2. Pull down the "Release Latch" for disassembly using a screwdriver.
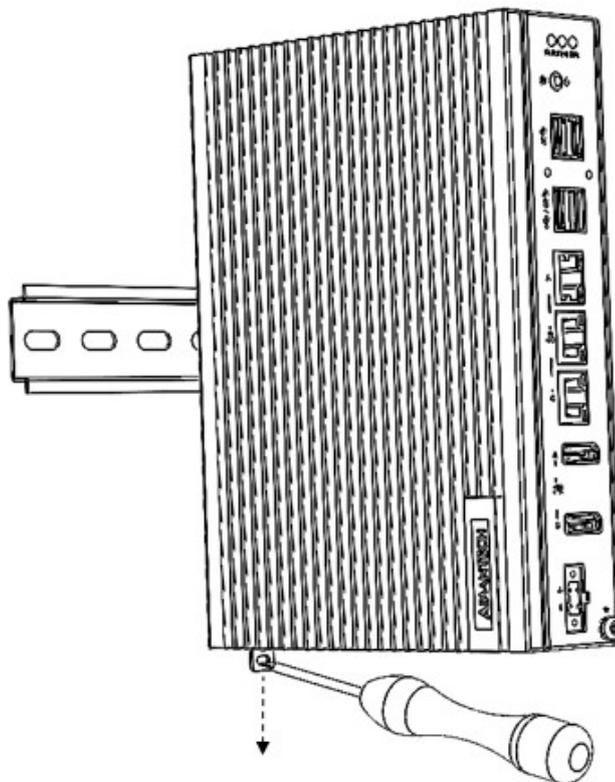
3.6 Wireless Module Installation (Optional)

UNO-148 supports a WiFi iDoor/M.2 3042/M.2 3052 module. Follow the steps below for installation:

1. Remove the 2 screws from the back cover of the UNO.
2. Remove the plugs in the pre-cut antenna hole(s) on the top panel for antenna installation.
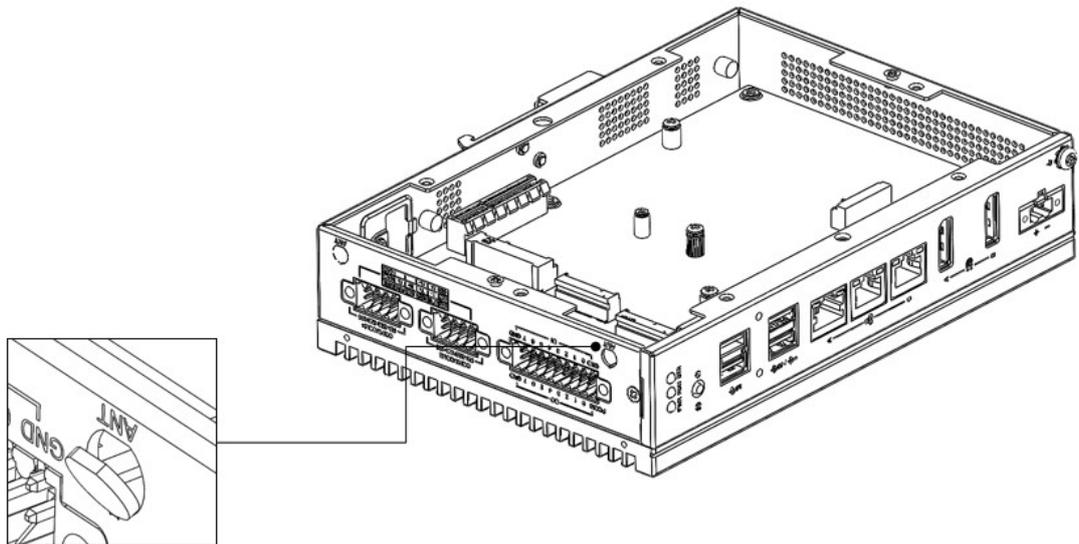
3. Install the SMA connector for the *Antenna cable to the Antenna hole.
4. Connect the MHF of the Antenna cable to the module.
5. Affix the washers and screw nut.
6. Return the back cover and gently screw it into place.
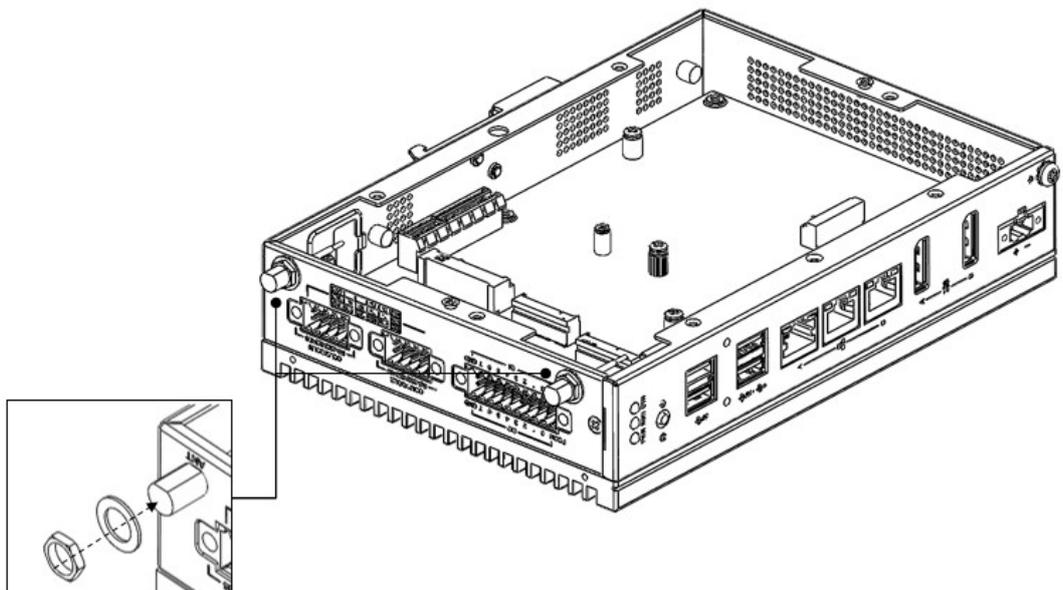
3.7 Extension Kit Installation (Optional)

3.7.1 iDoor and HDD/SSD Storage Extension Kit (UNO-148-IS2EA)

You can additionally install a 2nd stacked iDoor and external swappable 2.5" HDD/ SSD storage extension kit (PN: UNO-148-IS2EA) on UNO-148 to expand its functionality:
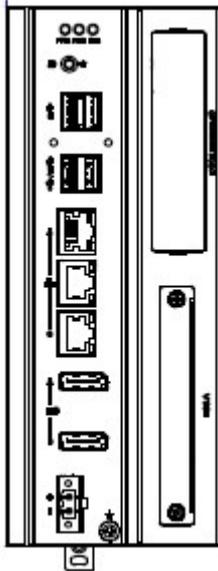
The accessory list for iDoor extension kit (PN: UNO-148-IS2EA)
5 x M3x4L screws for extension kit installation
4 x M3x4L screws for HDD/SSD installation

Follow the steps below for extension kit Installation:

1. Remove the 2 x M3x4L screws from the back cover of UNO-148.
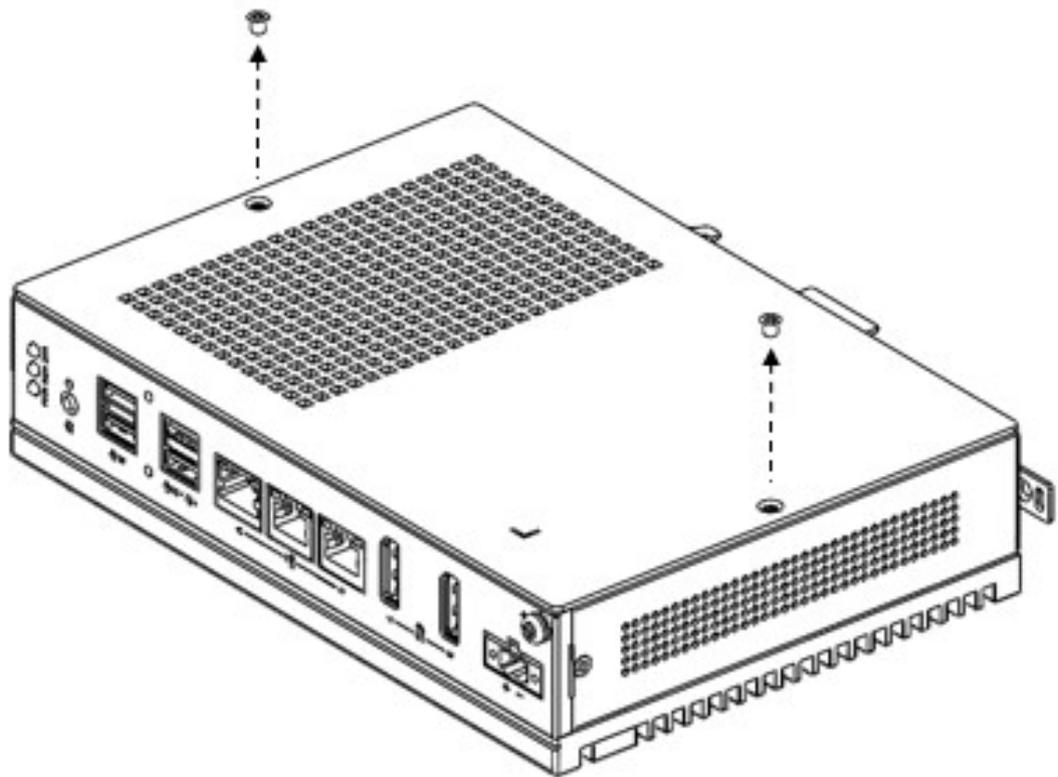
2. Remove the 2 x M3x6L screws from the extension kit.
3. Detach the iDoor dummy cover from the iDoor extension kit.
4. Loosen the 2 screws holding the SSD/HDD tray and remove the tray.
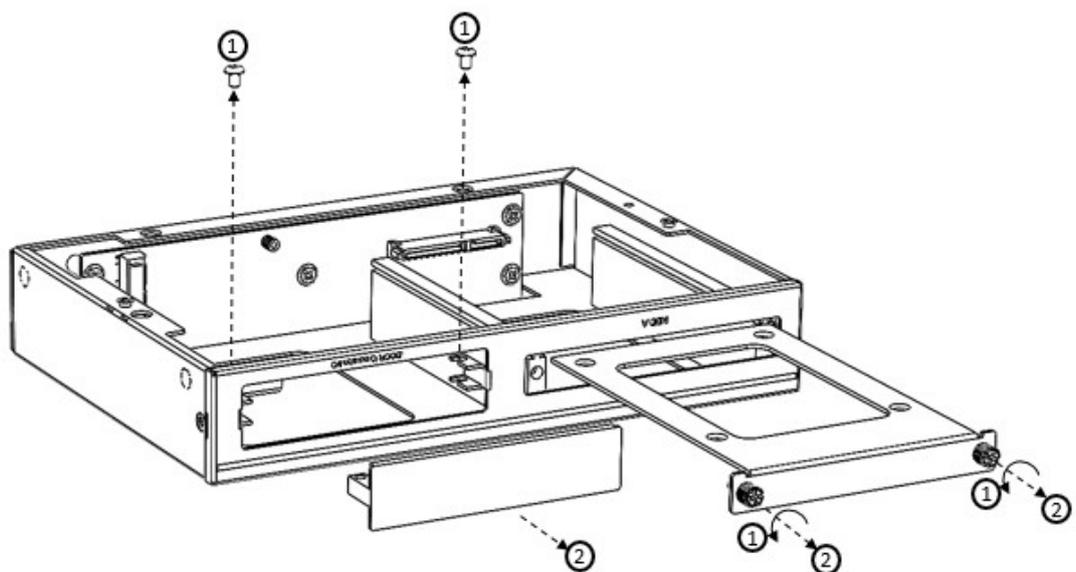
5.   Attach the 2nd bracket (UNO-148-IS2EA) with 6 x M3x4L screws to the Base Unit (UNO-148).
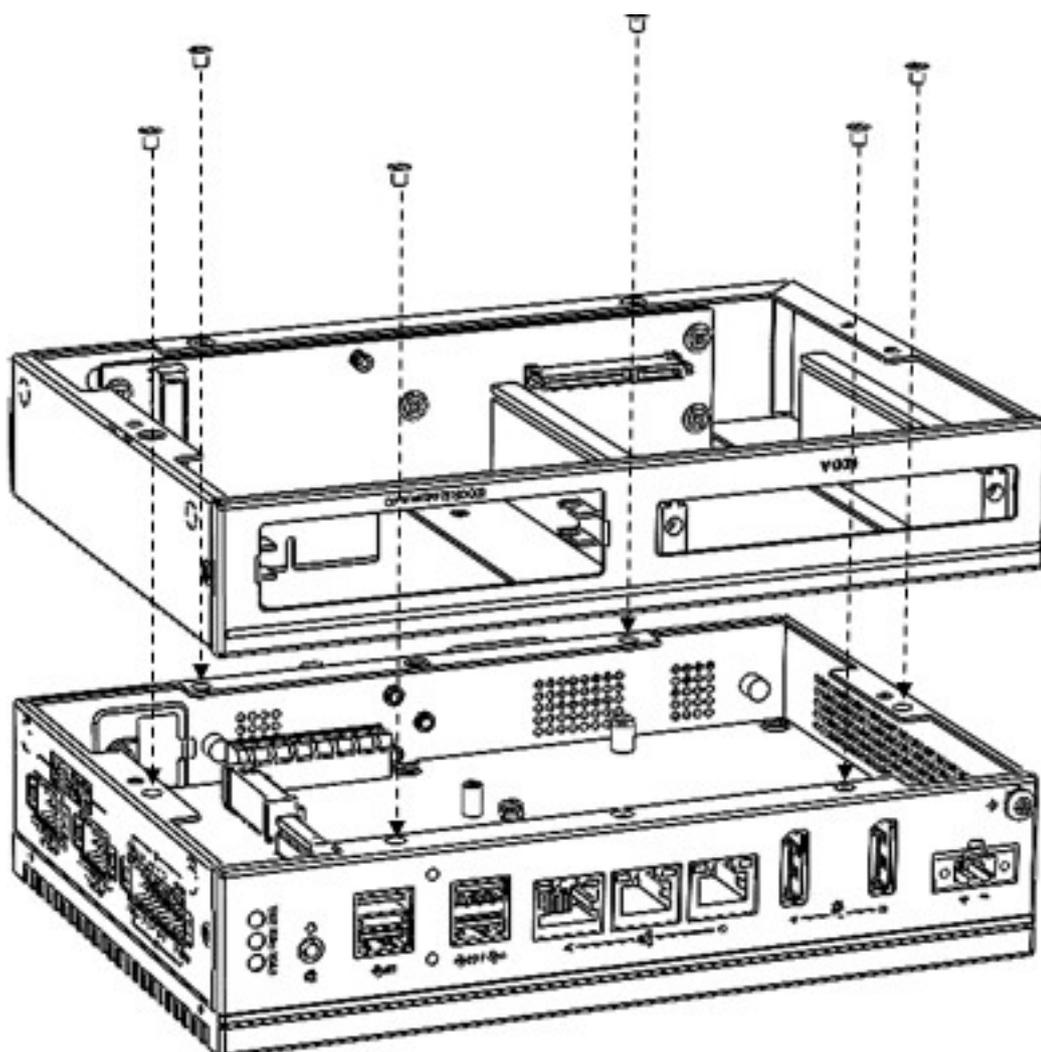
6. Connect the mPCIe connector of the iDoor module onto the board of the UNO-148, and affix it with the 2 x M2x4L screws from the accessory bag of the iDoor extension kit.
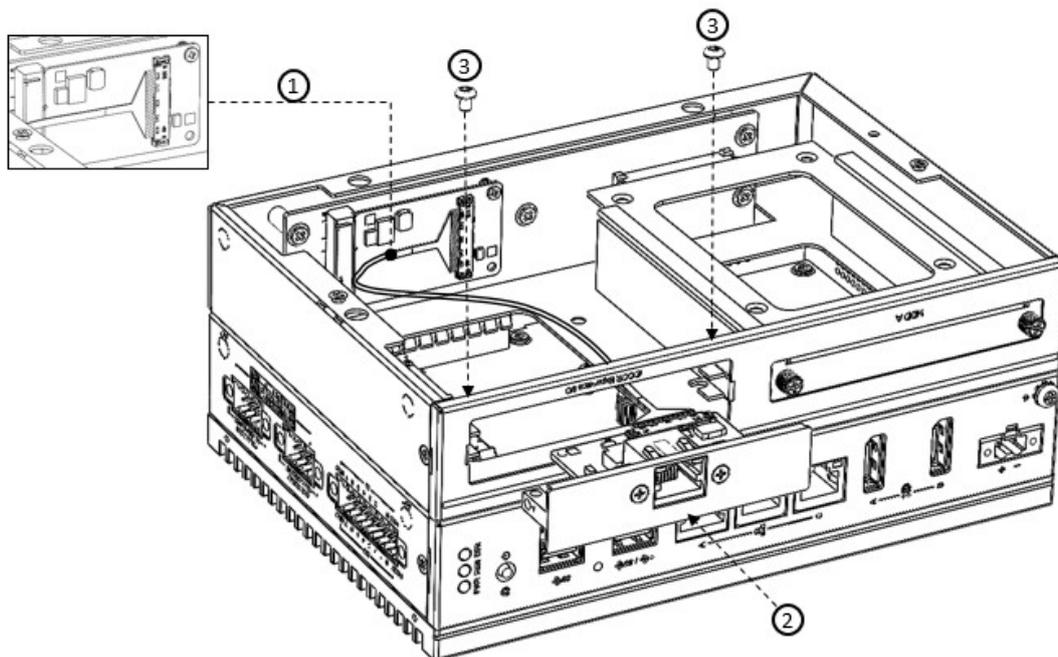
7. Detach the HDD/SSD bracket from the 2nd stack extension kit, then affix the 2.5" HDD/SSD to the HDD bracket with the 4 x M3x4L screws from the accessory bag of the iDoor extension kit.
8. Affix the HDD/SSB bracket back to the extension kit with the provided screws from Step 4.
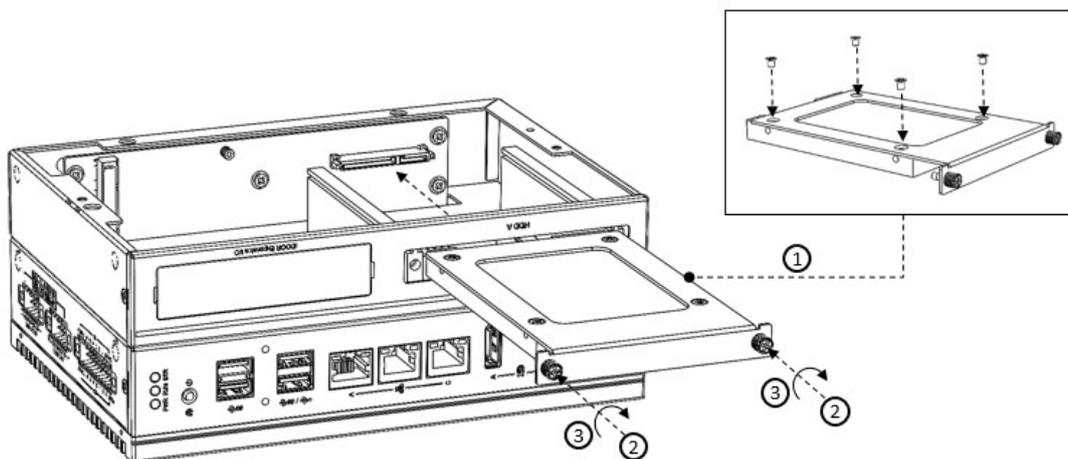
9. Return the back cover and gently screw it into place.
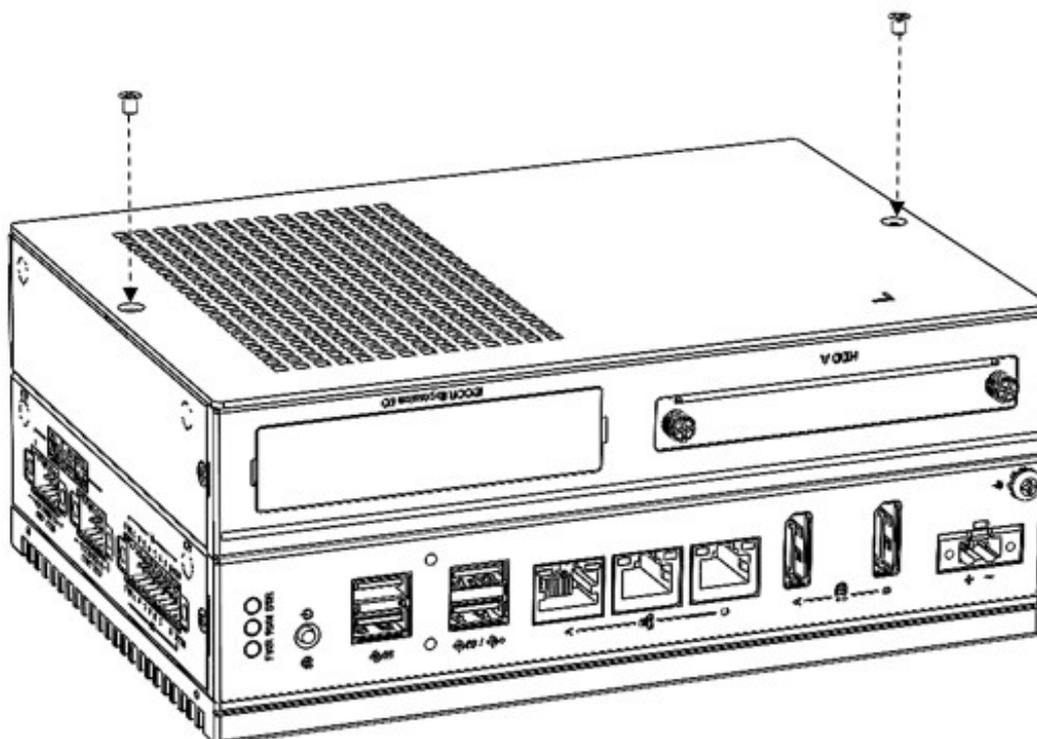
3.7.2 iDoor Extension Kit (UNO-148-ID1EA)

You can additionally install a 2nd stack iDoor extension kit (PN: UNO-148-ID1EA) on UNO-148 to expand its functionality:
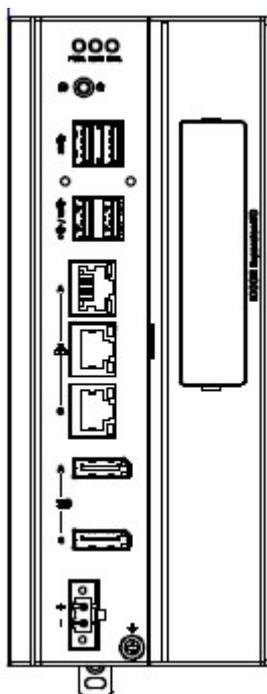
The accessory list for the iDoor extension kit (PN: UNO-148-ID1EA)

5 x M3x4L screws for extension kit installation

Follow the steps below for extension kit Installation:

1. Remove 2 x M3x4L screws from the back cover of UNO-148.
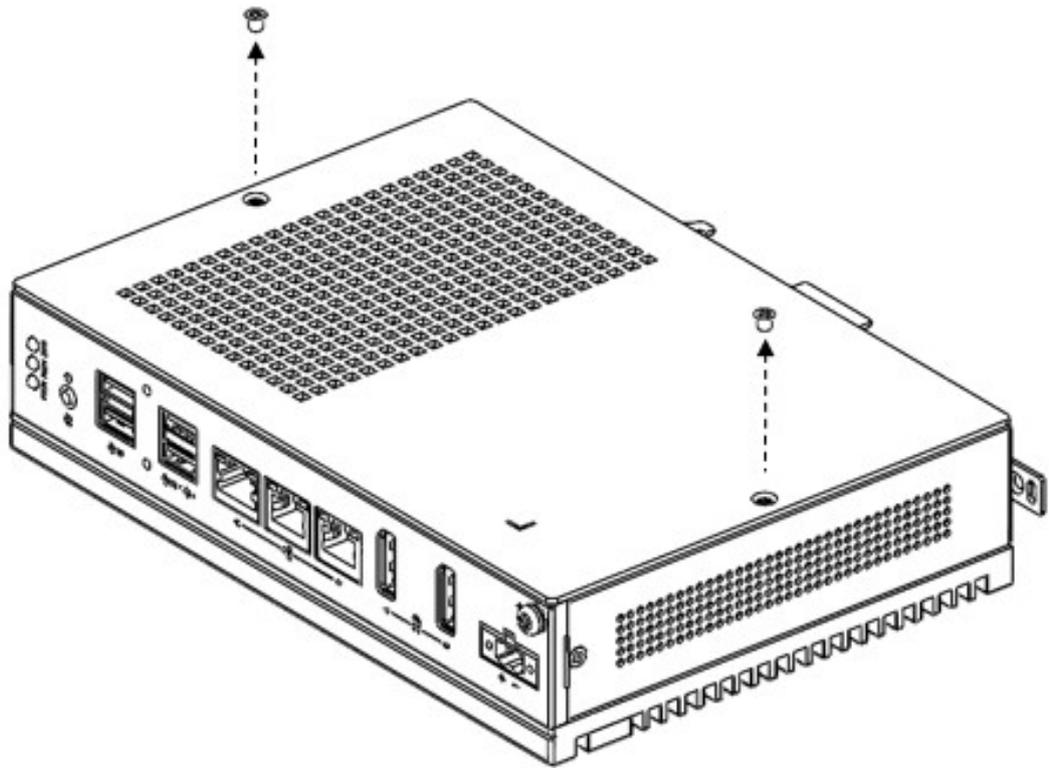
2. Detach the iDoor dummy cover from the iDoor extension kit.
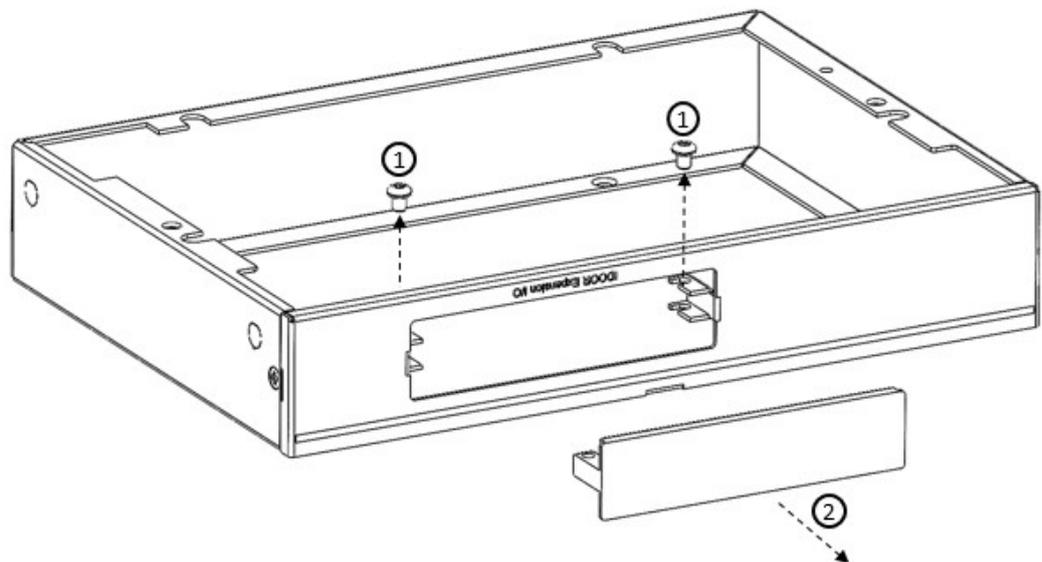
3. Attach the 2nd bracket (UNO-148-ID1EA) with 6 x M3x4L screws to the Base Unit (UNO-148).
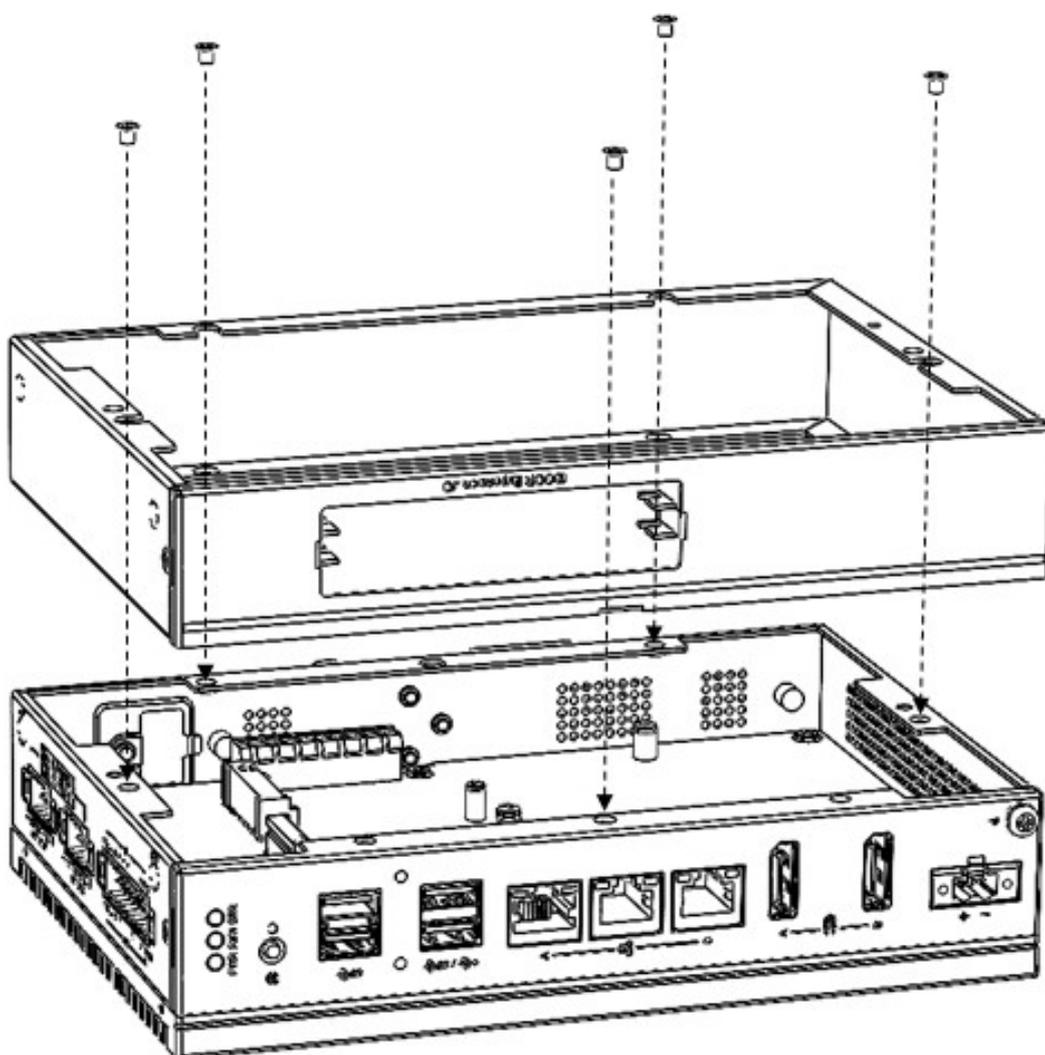
4. Connect the mPCIe connector of the iDoor module onto the board of the UNO-148, and affix it with the 2 x M3x4L screws from the accessory bag of the iDoor extension kit.
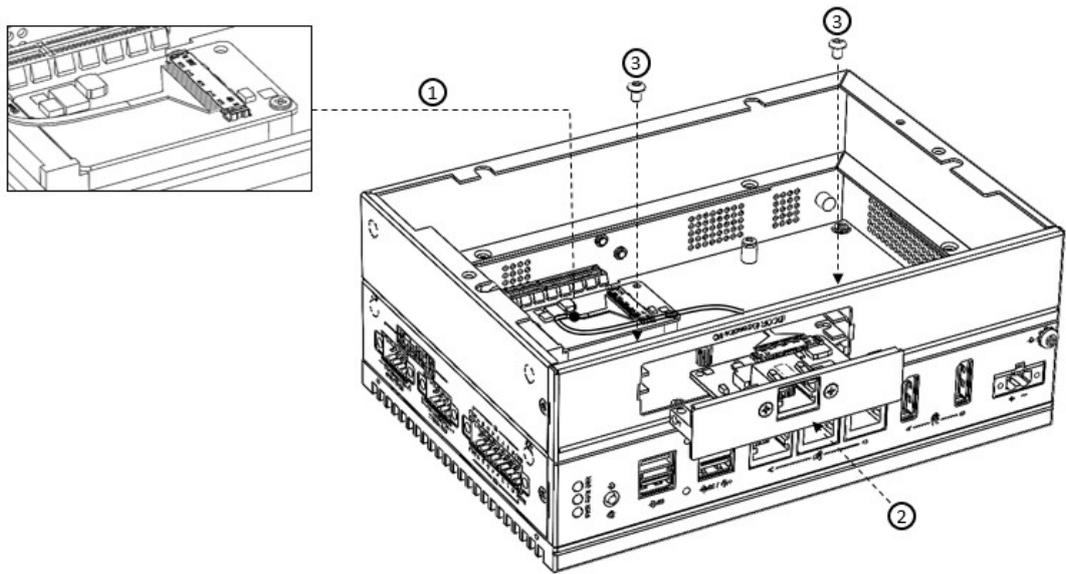
5. Return the back cover and gently screw it into place.
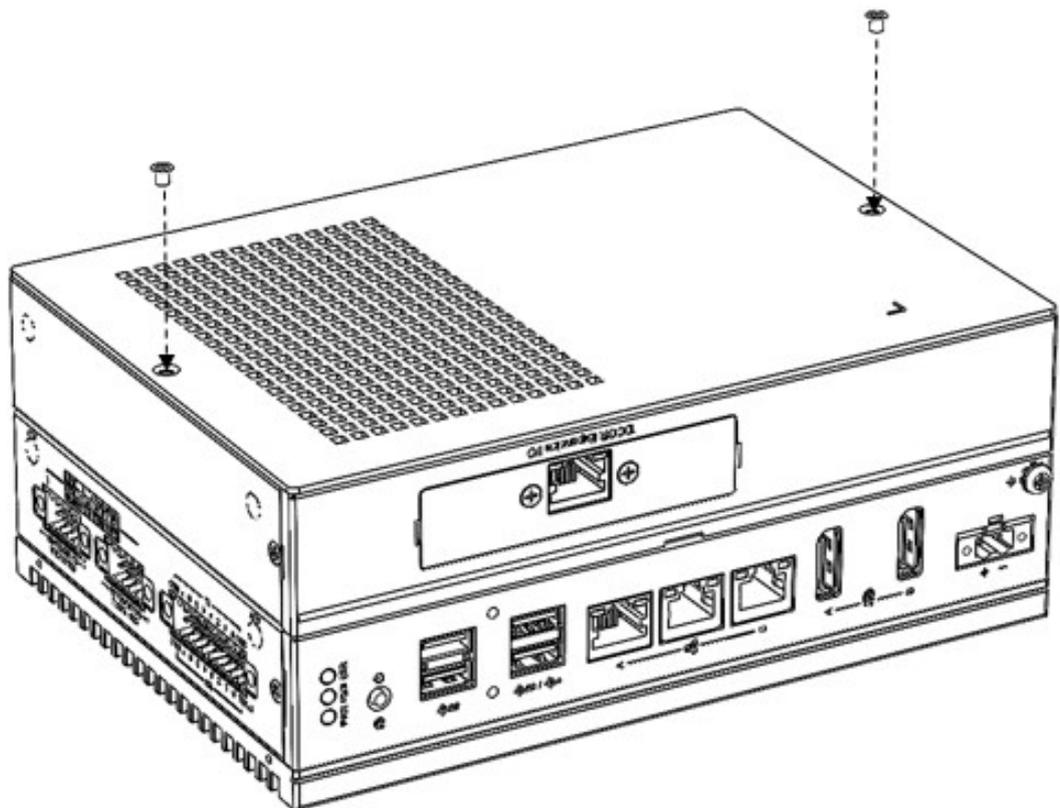
3.7.3 PCIe x4 Expansion (UNO-148-P11EA)

You can additionally install a 2nd stack PCIe x4 expansion kit (PN: UNO-148-P11EA) on UNO-148 to expand its functionality:
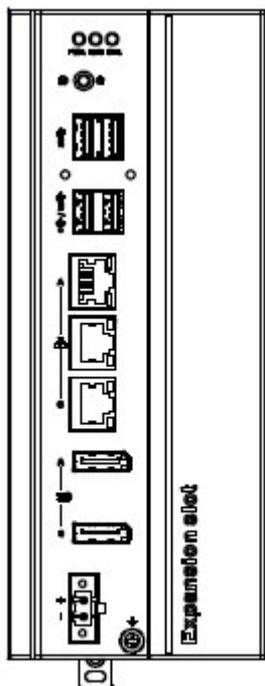
The accessory list for the iDoor extension kit (PN: UNO-148-P11EA)
8x M3x4L screws for extension kit installation

Follow the steps below for extension kit Installation:

1. Remove the 2 x M3x4L screws from the back cover of UNO-148.
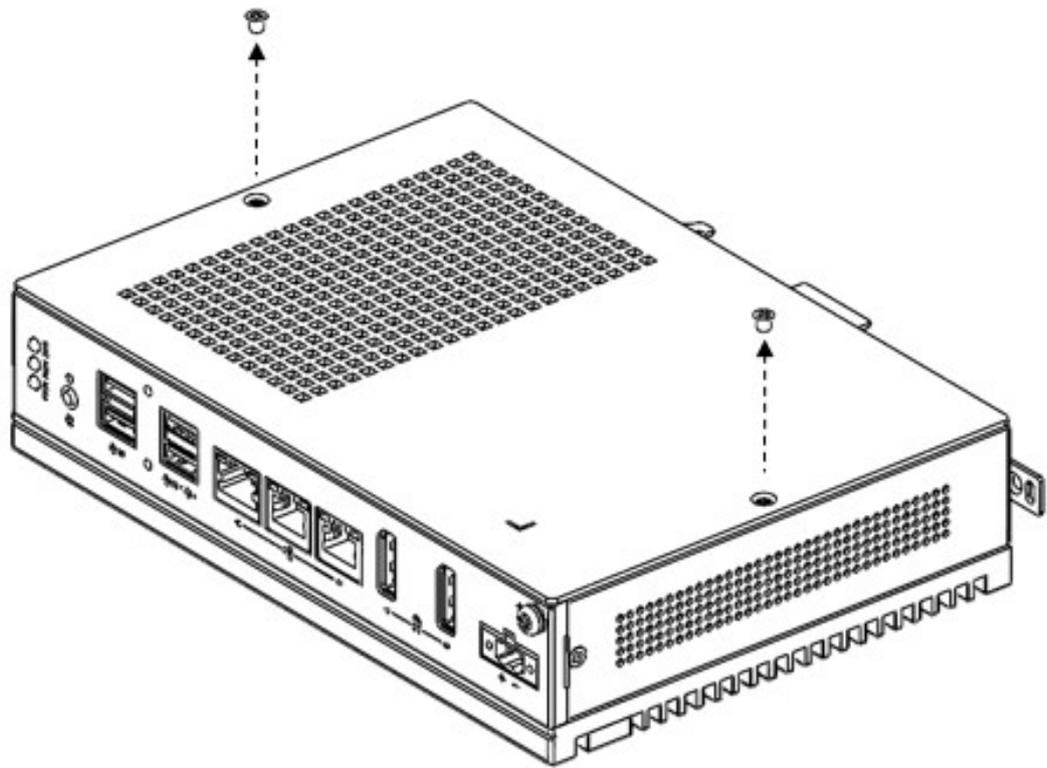
2. Attach the 2nd bracket (UNO-148-P11EA) with 6 x M3x4L screws to the Base Unit (UNO-148).
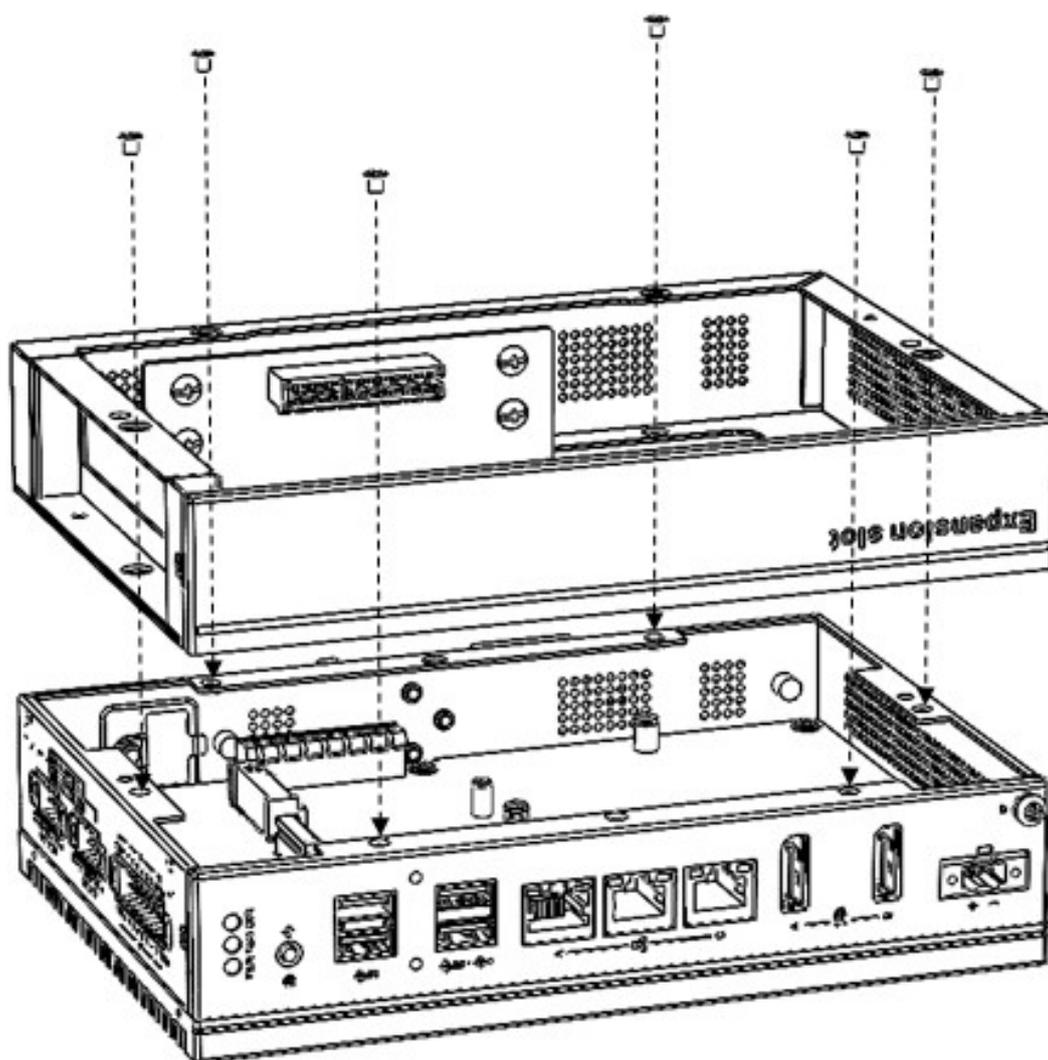
3. Remove the PCIe cover and PCIe bracket from the 2nd extension kit (UNO-148-P11EA) with 3 x M3x4L screws.
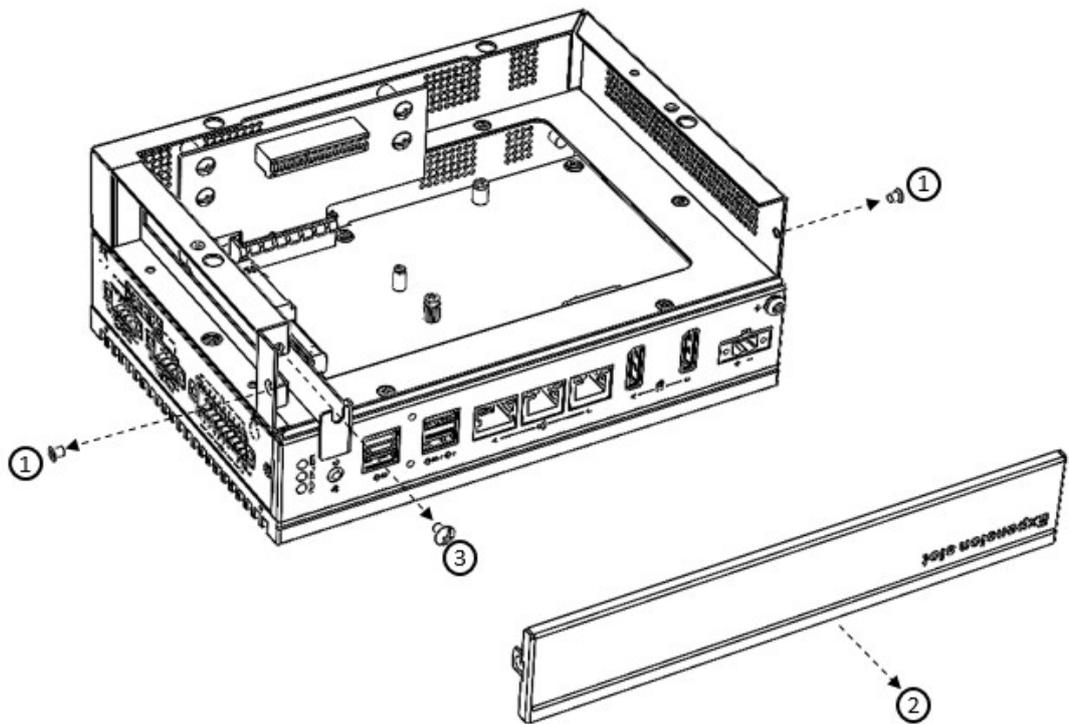
4. Install the PCIe card and tighten the screw.
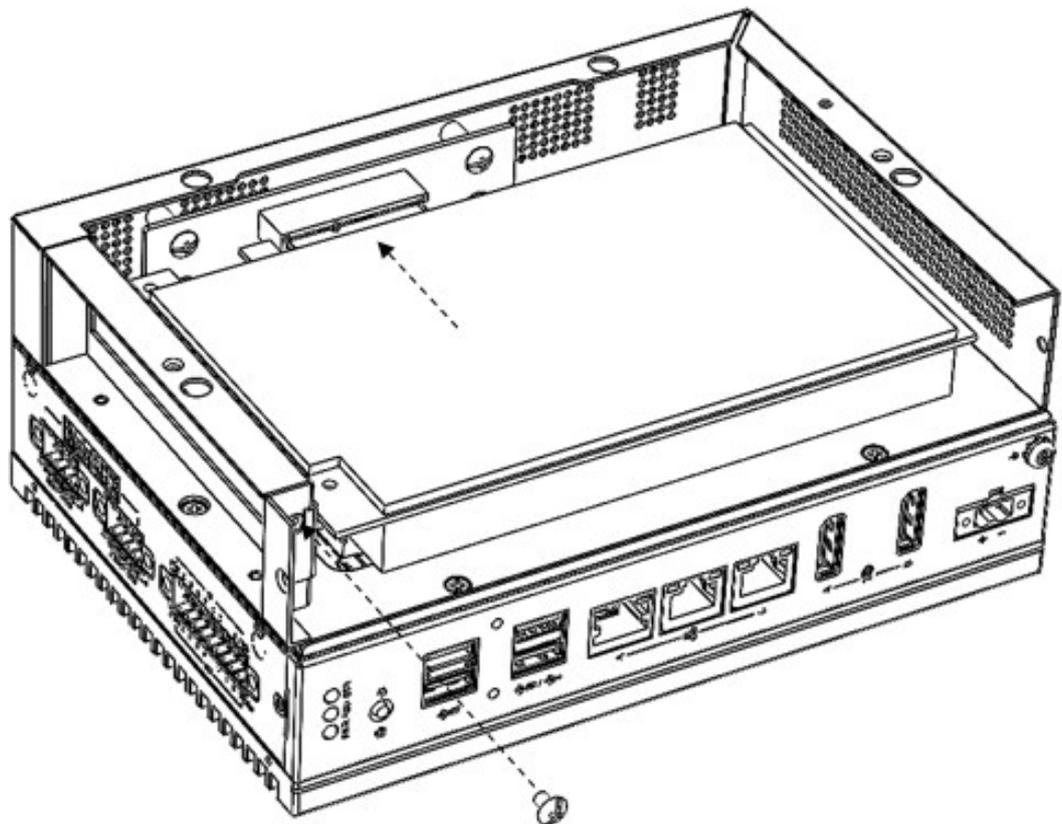
5. Return the back cover of UNO-148.
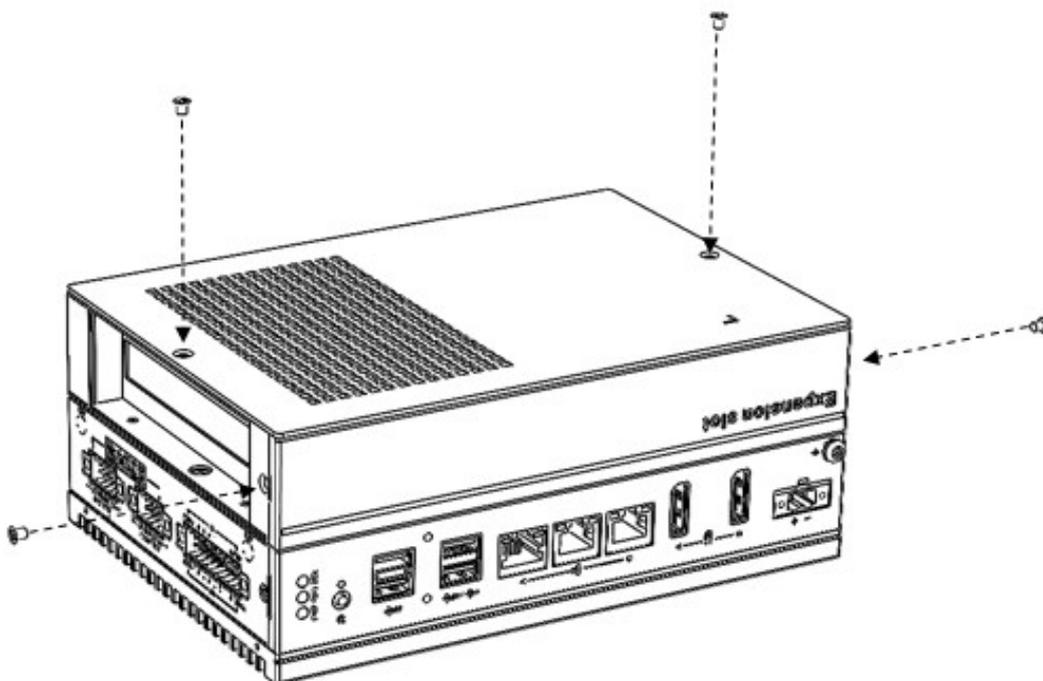
Note! *PCIe expansion module dimension limitations.*

The maximum length of the PCIe expansion module is 182 mm.

182 mm

14.49 mm

2.67 mm
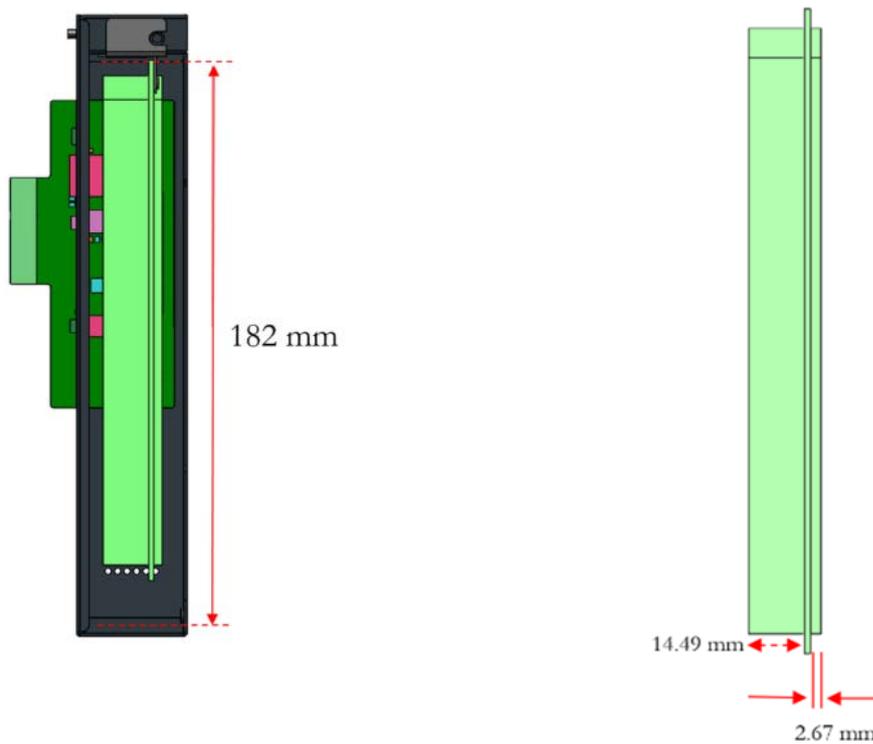
3.8 Remote Power & Reset Settings via DIO

UNO-148 supports remote power & reset functions through a DI connector with the switch setting (SW8) on the motherboard. The default setting is for DI6/DI7 functionality. If you want to configure UNO-148 for remote control functions, configure SW8-Bit 2 to "on", then DI6 can be used for remote power settings, and DI7 can be used for remote reset setting.

Table 3.1: Remote Power/On & Reset Settings		
SW8 Default		
Description	**Instruction**	**SW8**
DI function for DI6/DI7 (Default)	Bit 2 off	
Remote Setting Function (mandatory requirement for remote setting function)	Bit 2 on	
Wet contact and dry contact for digital input setting switch	Dry Configuration	
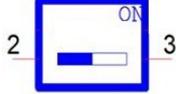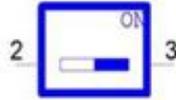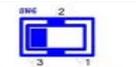
3.9 BIOS Setting

With the BIOS Setup program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning special features on or off.

Press the "ESC" key upon the first boot up to enter the BIOS Setup screen, then,

press the "Delete" key during the Power On Self Test (POST) process to enter the BIOS Setup screen, otherwise the system will continue the POST process.

(Please refer to User Manual- Appendix A.11~A.15 for more settings)

3.9.1 BIOS setup for Remote function

Enter BIOS setup and disable ErP Control feature:
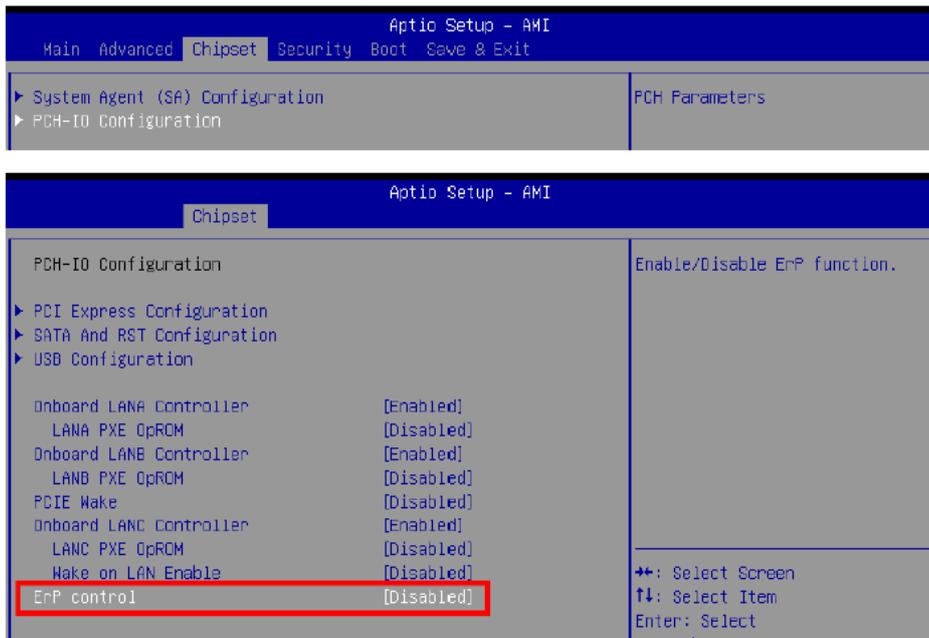
Appendix A

System Settings / Pin Assignments

A.1 Power Connector (CN1)
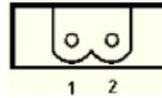
Table A.1: Power Connector Pin Assignments

Pin	Signal	Description
1	Power IN V+	10 - 36 V_{DC}
2	Power IN V- (GND)	

A.2 LAN: Ethernet Connector (CN4)
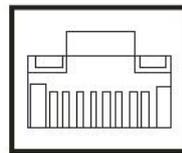
Table A.2: Ethernet Connector Pin Assignments

RJ45 Pin	Signal	Description
1	MDI0+	■ In BASE-T: Media Dependent Interface[0]: ■ 2500BASE-T: In MDI configuration, MDI[0]+/- corresponds to BI_DA+/- and in MDI-X configuration MDI[0]+/- corresponds to BI_DB+/-.
2	MDI0-	■ 10BASE-T and 100BASE-TX: In MDI configuration, MDI[0]+/- is used for the transmit pair and in MDIX configuration MDI[0]+/- is used for the receive pair.
3	MDI1+	■ In BASE-T: Media Dependent Interface[1]: 2500BASE-T: In MDI configuration, MDI[1]+/- corresponds to BI_DB+/- and in MDI-X configuration MDI[1]+/- corresponds to BI_DA+/-.
6	MDI1-	■ 10BASE-T and 100BASE-TX: In MDI configuration MDI[1]+/- is used for the receive pair and in MDI-X configuration MDI[1]+/- is used for the transmit pair.
4	MDI2+	■ In BASE-T: Media Dependent Interface[3:2]: 2500BASE-T: In MDI and in MDI-X configuration, MDI[2]+/- corresponds to BI_DC+/- and MDI[3]+/- corresponds to BI_DD+/-.
5	MDI2-	
7	MDI3+	■ 100BASE-TX: Unused.
8	MDI3-	■ 10BASE-T: Unused.

Left LED			Right LED
100/10 Link	**1000 Link**	**2500 Link**	**Active**
Off	**Orange**	**Green**	**Green**

A.3 USB Connectors (CN5, CN6)

A.3.1 USB 2.0 Connector
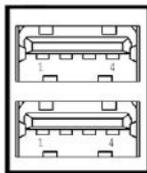
Table A.3: Connector Pin Assignments		
Pin	**Signal Name**	**Description**
1	VBUS	Power
2	D-	USB 2.0 differential pair
3	D+	
4	GND	Ground for power return

A.3.2 USB 3.0 Connector
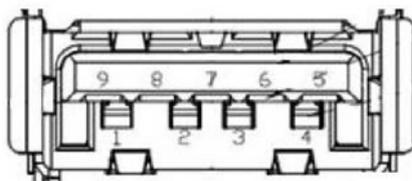
Table A.4: USB 3.0 Connector Pin Assignments		
Pin	**Signal Name**	**Description**
1	VBUS	Power
2	D-	USB 2.0 differential pair
3	D+	
4	GND	Ground for power return
5	StdA_SSRX-	SuperSpeed receiver differential pair
6	StdA_SSRX+	
7	GND_DRIAN	Ground for signal return
8	StdA_SSTX-	SuperSpeed transmitter differential pair
9	StdA_SSTX+	

A.4 Display Connector (CN2, CN3)
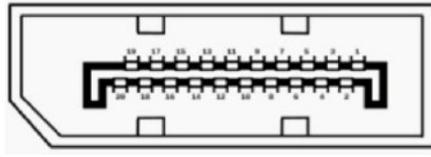
Table A.5: DisplayPort Adapter Cable Pin Assignments	
Pin	**Signal Name**
1	ML_Lane 0 (p)
2	GND
3	ML_Lane 0 (n)
4	ML_Lane 1 (p)
5	GND
6	ML_Lane 1 (n)
7	ML_Lane 2 (p)
8	GND
9	ML_Lane2 (2)
10	ML_Lane 3 (p)
11	GND
12	ML_Lane 3 (n)
13	CONFIG1
14	CONFIG2
15	AUX CH (p)
16	GND
17	AUX CH (n)
18	Hot Plug
19	Return

A.5 M.2 Connector (CN15)
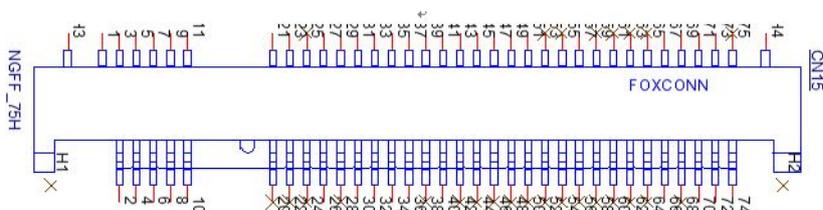
Pin	Signal Name	Pin	Signal Name
**Table A.6: M.2 B-Key Connector Pin Assignments**
1	M2_SATA1_DET	2	+V3.3_M2
3	GND	4	+V3.3_M2
5	GND	6	M2_LTE_PWR_OFF#
7	M2_LTE_USB_DP	8	M2_LTE_W1_DISABLE_N
9	M2_LTE_USB_DN	10	+V3.3_M2
11	GND	12	Mechanical notch B
13	Mechanical notch B	14	Mechanical notch B
15	Mechanical notch B	16	Mechanical notch B
17	Mechanical notch B	18	Mechanical notch B
19	Mechanical notch B	20	NC
21	NC	22	NC
23	WAKE_ON_WAN#	24	NC
25	NC	26	M2_LTE_W2_DISABLE_N
27	GND	28	NC
29	USB_Z_SSRX1-	30	M2_SIM1_RESET
31	USB_Z_SSRX1+	32	M2_SIM1_CLK
33	GND	34	M2_SIM1_DATA
35	USB_C_SSTX1-	36	M2_SIM1_PWR
37	USB_C_SSTX1+	38	NC
39	GND	40	M2_SIM2_DET
41	SATA1_RX+	42	NC
43	SATA1_RX-	44	NC
45	GND	46	NC
47	SATA1_C_TX-	48	NC
49	SATA1_C_TX+	50	NC
51	GND	52	NC
53	NC	54	NC
55	NC	56	NC
57	GND	58	NC
59	NC	60	NC
61	NC	62	NC
63	NC	64	NC
65	NC	66	M2_SIM1_DET
67	LTE_RST#_P67	68	NC
69	NC	70	+V3.3_M2
71	GND	72	+V3.3_M2
73	GND	74	+V3.3_M2
75	NC		

A.6 mPCIe Connector (MINI1)
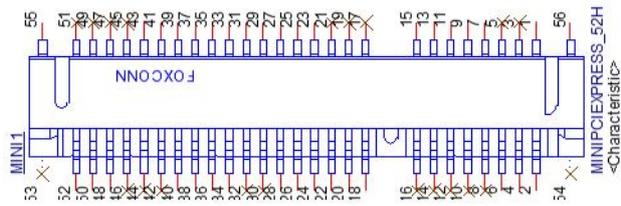
Pin	Signal Name	Pin	Signal Name
Table A.7: mPCIe Connector Pin Assignments			
Pin	Signal Name	Pin	Signal Name
1	PCIE_WAKE#_3.3	2	+V3.3_MINI
3	NC	4	GND
5	NC	6	+V1.5
7	+V3.3	8	NC
9	GND	10	NC
11	CLK_PCIE_mPCIe1-	12	NC
13	CLK_PCIE_mPCIe1+	14	NC
15	GND	16	NC
17	NC	18	GND
19	NC	20	WIFI_DISABLE#
21	NC	22	MINI_PLTRST#
23	PCIE_mPCIe_RX4-	24	+V3.3_MINI
25	PCIE_mPCIe_RX4+	26	GND
27	GND	28	+V1.5
29	GND	30	NC
31	PCIE_TX2-_Z	32	NC
33	PCIE_TX2+Z	34	GND
35	GND	36	USB_Z_P0-
37	GND	38	USB_Z_P0+
39	+V3.3_MINI	40	GND
41	+V3.3_MINI	42	NC
43	MPCIE_PWRSEL	44	NC
45	NC	46	NC
47	NC	48	+V1.5
49	NC	50	GND
51	NC	52	+V3.3_MINI
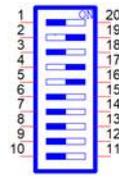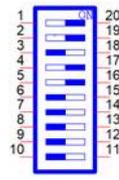
A.7   COM Port RS232/422/485 Settings

The default setting for the COM port is RS-232. This can be changed to RS-422 or RS-485 modes and can be configured by adjusting the switch on the motherboard.

A.7.1   COM1/COM2 RS232/422/485 Settings (SW1)
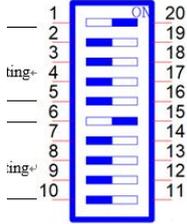
SW1 Default	
Description settings	This switch is used to select RS232/422/485 mode setting
Default	RS232 mode

A.7.2   COM3/COM4 RS232/422/485 Settings (SW2)

SW2 Default		
Description settings	This switch is used to select RS232/422/485 mode setting	
Default	RS232 mode	
	RS232 Mode	Bit 1 ON
		Bit 2,3,4,5,6,7,8,9,10 OFF
COM1	**RS485 Mode**	Bit 2,4,5 ON
		Bit 1,3,6,7,8,9,10 OFF
	RS422 Mode	Bit 1,2,4,5 ON
		Bit 3,6,7,8,9,10 OFF

COM2	**RS232 Mode**	Bit 6 ON Bit 1,2,3,4,5,7,8,9,10 OFF	
	RS485 Mode	Bit 7,9,10 ON Bit 1,2,3,4,5,7,8 OFF	
	RS422 Mode	Bit 6,7,9,10 ON Bit 1,2,3,4,5,8 OFF	
COM3	**RS232 Mode**	Bit 1 ON Bit 2,3,4,5,6,7,8,9,10 OFF	
	RS485 Mode	Bit 2,4,5 ON Bit 1,3,6,7,8,9,10 OFF	
	RS422 Mode	Bit 1,2,4,5 ON Bit 3,6,7,8,9,10 OFF	
COM4	**RS232 Mode**	Bit 6 ON Bit 1,2,3,4,5,7,8,9,10 OFF	
	RS485 Mode	Bit 7,9,10 ON Bit 1,2,3,4,5,7,8 OFF	
	RS422 Mode	Bit 6,7,9,10 ON Bit 1,2,3,4,5,8 OFF	

A.7.3 COM Port RS422/485 Termination Resistor Settings

SW1	Termination Resistor Setting
Description	This switch is used to select the Termination Resistor (120 ohm) for long distance transmission or device matching.
Default	Bit3 off & Bit8 off
COM1	Bit3 on
COM2	Bit8 on

SW2	Termination Resistor Setting
Description	This switch is used to select the Termination Resistor (120 ohm) for long distance transmission or device matching.
Default	Bit3 off & Bit8 off
COM3	Bit3 on
COM4	Bit8 on
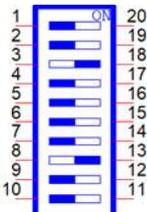
A.8 BIOS Update Settings

Use SW4 to set BIOS1/2 update selection, BIOS1 (Default), BIOS2 (PCIe x4) for Factory Engineering staff use.
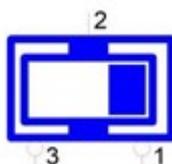
BIOS1: Configure to Setting 1 (Default)
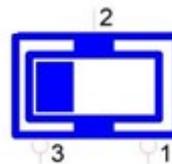
BIOS2: Configure to Setting 3

A.9 AT/ATX Setting (SW8)

SW8 can be used for the AT/ATX setting. The default setting is AT mode. See the following table for switch configuration.

SW8 Default	
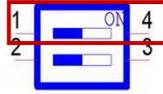
Description	Instruction	SW8
AT Mode (Default)	Bit 1 off	
ATX Mode	Bit 1 on	

A.10 Riser Connector (CN12)

Pin	Signal Name	Pin	Signal Name
Table A.8: Expansion Board to Board Connector Pin Assignments			
A1	DCIN	B1	GND
A2	DCIN	B2	GND
A3	DCIN	B3	GND
A4	DCIN	B4	GND
A5	N/A	B5	SMB_CLK
A6	GND	B6	SMB_DAT
A7	GND	B7	GND
A8	GND	B8	+V5
A9	USB+	B9	+V5
A10	USB-	B10	+V5
A11	GND	B11	+V5
A12	GND	B12	PCIeX4_EN
A13	CLK+	B13	GND
A14	CLK-	B14	RX0+
A15	GND	B15	RX0-
A16	TX0+	B16	GND
A17	TX0-	B17	SLP_S3
A18	GND	B18	GND
A19	N/A	B19	RX1+
A20	GND	B20	RX1-
A21	TX1+	B21	GND
A22	TX1-	B22	GND
A23	GND	B23	RX2+
A24	GND	B24	RX2-
A25	TX2+	B25	GND
A26	TX2-	B26	GND
A27	GND	B27	RX3+
A28	GND	B28	RX3-
A29	TX3+	B29	GND
A30	TX3-	B30	PLTRST
A31	GND	B31	SATA0_DET
A32	SATA1_DET	B32	GND

A.11 TPM 2.0 BIOS Settings

UNO-148 systems support TPM 2.0 functionality. This can be enabled or disabled in the BIOS menu by following the instructions provided below:

1. Power on the UNO-148 system and press "Delete" to enter the BIOS configuration menu.
2. On the "Advanced" tab, select "Trusted Computing".

```
                            Aptio Setup - AMI
        Main  Advanced  Chipset  Security  Boot  Save & Exit

  ▶ CPU Configuration                              Trusted Computing Settings
  ▶ Power & Performance
  ▶ PCH-FW Configuration
  ▶ Trusted Computing
  ▶ ACPI Settings
  ▶ NCT6126D Super IO Configuration
  ▶ H/W Monitor Configuration
  ▶ USB Configuration
  ▶ Network Stack Configuration
  ▶ CSM Configuration
  ▶ NVMe Configuration

                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit



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```

3. Then select "Security Device Support".
4. Choose "Enable/Disable" to enable or disable the TPM 2.0 function (The default setting is to disable this function).

```
                              Aptio Setup - AMI
  Advanced

    TPM 2.0 Device Found                             Enables or Disables BIOS
    Firmware Version:              7.63              support for security device.
    Vendor:                        IFX               O.S. will not show Security
                                                     Device. TCG EFI protocol and
    Security Device Support        [Enable]          INT1A interface will not be
    Active PCR banks               SHA256            available.
    Available PCR banks            SHA-1,SHA256

    SHA-1 PCR Bank                 [Disabled]
    SHA256 PCR Bank                [Enabled]

    Pending operation              [None]
    Platform Hierarchy             [Enabled]
    Storage Hierarchy              [Enabled]         ↔: Select Screen
    Endorsement Hierarchy          [Enabled]         ↑↓: Select Item
    TPM 2.0 UEFI Spec Version      [TCG_2]           Enter: Select
    Physical Presence Spec Version [1.3]             +/-: Change Opt.
    TPM 2.0 InterfaceType          [TIS]             F1: General Help
    Device Select                  [Auto]            F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit



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```

A.12 CPU Turbo Mode BIOS Settings

The UNO-148 system supports CPU Turbo mode. This can be enabled or disabled in the BIOS menu through the following instructions:

1. Power on the UNO-148 system and press "Delete" to enter the BIOS configuration menu.
2. On the "Advanced" tab, select "Power & Performance".

```
                              Aptio Setup - AMI
        Main  Advanced  Chipset  Security  Boot  Save & Exit

     ▶ CPU Configuration                        Power & Performance Options
     ▶ Power & Performance
     ▶ PCH-FW Configuration
     ▶ Trusted Computing
     ▶ ACPI Settings
     ▶ NCT6126D Super IO Configuration
     ▶ H/W Monitor Configuration
     ▶ USB Configuration
     ▶ Network Stack Configuration
     ▶ CSM Configuration
     ▶ NVMe Configuration

                                                →←: Select Screen
                                                ↑↓: Select Item
                                                Enter: Select
                                                +/-: Change Opt.
                                                F1: General Help
                                                F2: Previous Values
                                                F3: Optimized Defaults
                                                F4: Save & Exit
                                                ESC: Exit

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```

3. Then select "CPU Power Management Control".

```
                              Aptio Setup - AMI
     Advanced

  Power & Performance                              CPU - Power Management Control
                                                   Options
▶ CPU - Power Management Control
▶ GT - Power Management Control




                                                   ←→: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit



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```
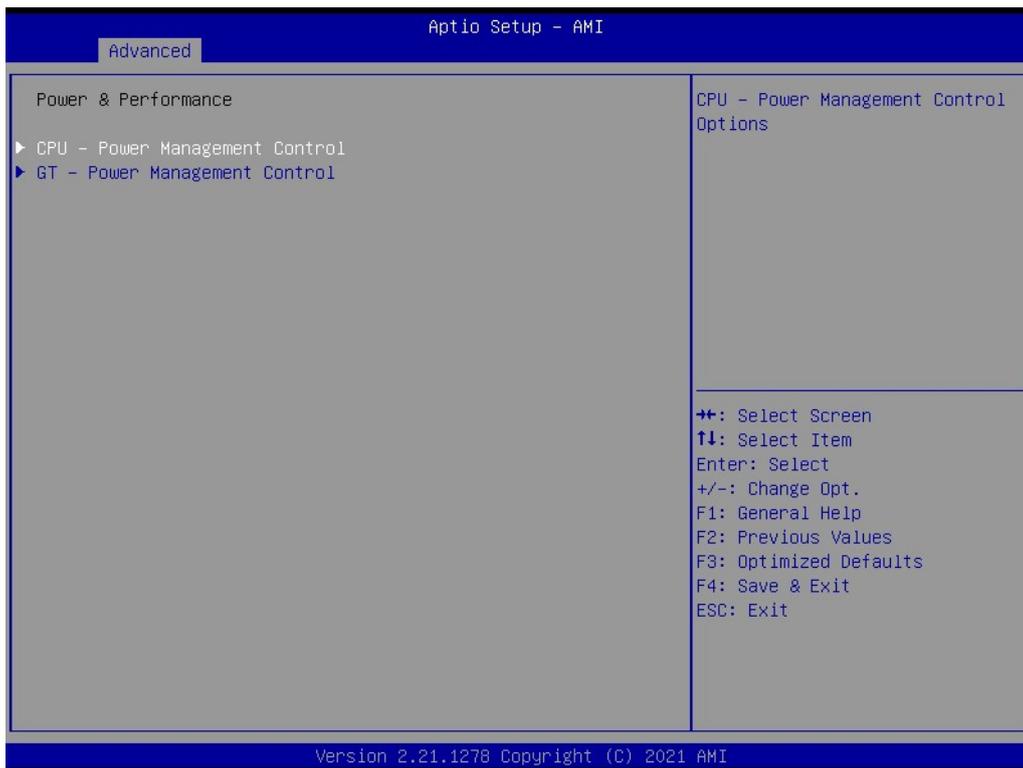
4. Choose "Enable/Disable" to enable or disable CPU Turbo mode (The default setting is to disable this function).

```
                              Aptio Setup - AMI
     Advanced

  CPU - Power Management Control                   Enable/Disable processor Turbo
                                                   Mode (requires EMTTM enabled
  Boot performance mode        [Max Non-Turbo      too). AUTO means enabled.
                                Performance]
  Intel(R) SpeedStep(tm)       [Enabled]
  Intel(R) Speed Shift Technology  [Enabled]
  HDC Control                  [Enabled]
    Turbo Mode                 [Disabled]
▶    View/Configure Turbo Options
▶    Config TDP Configurations
  Platform PL1 Enable          [Disabled]
  Platform PL2 Enable          [Disabled]
  Power Limit 4 Override       [Disabled]
  C states                     [Disabled]          ←→: Select Screen
▶ Power Limit 3 Settings                           ↑↓: Select Item
▶ CPU Lock Configuration                           Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit



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```

A.13 TDP Power Consumption BIOS Settings

The UNO-148 system supports Power Management Control for TDP switching. This can be enabled or disabled in the BIOS menu by following these instructions:

1. Power on the UNO-148 system and press "Delete" to enter the BIOS configuration mode.
2. On the "Advanced" tab, select the "Power & Performance" item.

```
                          Aptio Setup - AMI
        Main  Advanced  Chipset  Security  Boot  Save & Exit

    ▶ CPU Configuration                           Power & Performance Options
    ▶ Power & Performance
    ▶ PCH-FW Configuration
    ▶ Trusted Computing
    ▶ ACPI Settings
    ▶ NCT6126D Super IO Configuration
    ▶ H/W Monitor Configuration
    ▶ USB Configuration
    ▶ Network Stack Configuration
    ▶ CSM Configuration
    ▶ NVMe Configuration

                                                  →←: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save & Exit
                                                  ESC: Exit

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```

3. Then select the "CPU Power Management Control" item.

```
                              Aptio Setup - AMI
        Advanced

   Power & Performance                           CPU - Power Management Control
                                                 Options
 ▶ CPU - Power Management Control
 ▶ GT - Power Management Control




                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit



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```
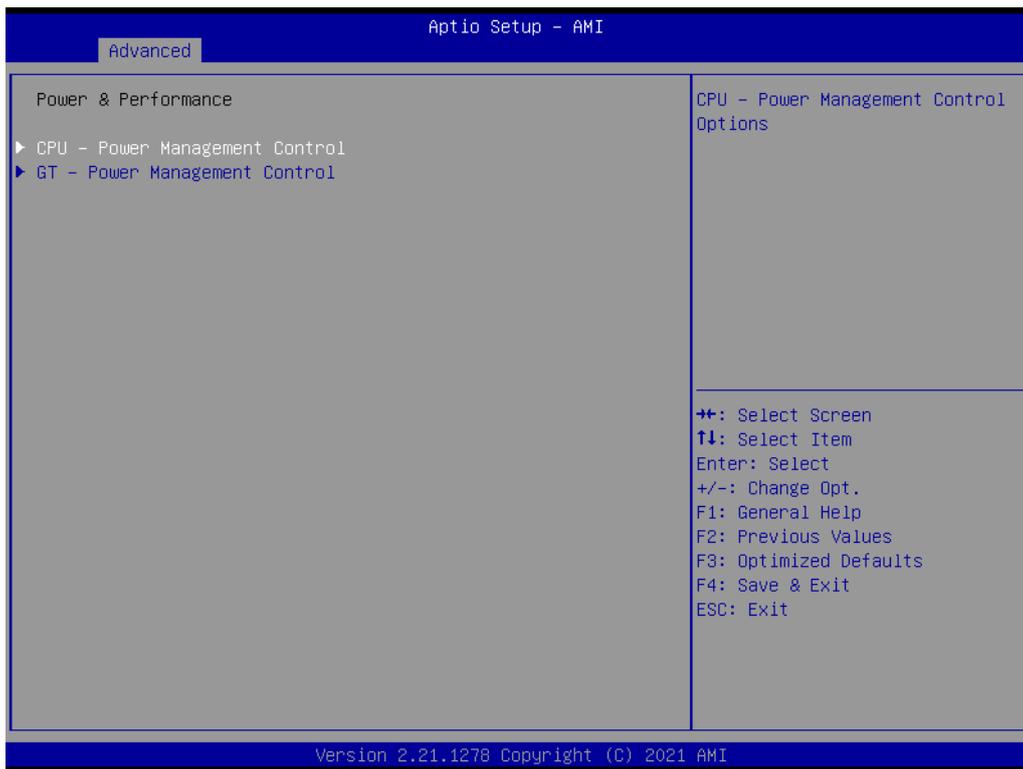
4. Then select the "Config TDP Configurations" item.

```
                              Aptio Setup - AMI
        Advanced

   CPU - Power Management Control                Config TDP Configurations

   Boot performance mode          [Max Non-Turbo
                                   Performance]
   Intel(R) SpeedStep(tm)         [Enabled]
   Intel(R) Speed Shift Technology [Enabled]
   HDC Control                    [Enabled]
     Turbo Mode                   [Disabled]
 ▶   View/Configure Turbo Options
 ▶   Config TDP Configurations
   Platform PL1 Enable            [Disabled]
   Platform PL2 Enable            [Disabled]
   Power Limit 4 Override         [Disabled]
   C states                       [Disabled]       →←: Select Screen
 ▶ Power Limit 3 Settings                          ↑↓: Select Item
 ▶ CPU Lock Configuration                          Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F3: Optimized Defaults
                                                   F4: Save & Exit
                                                   ESC: Exit



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```

5. From the "TDP Boot Mode" options, choose "UP" for standard spec usage. ("Nominal" →28 W, "UP"→15 W, "Down"→12 W)

```
                          Aptio Setup - AMI
      Advanced

Config TDP Configurations                            ▲ Configurable TDP Mode as
                                                       Nominal/Up/Down/Deactivate TDP
Enable Configurable TDP        [Applies to cTDP]       selection. Deactivate option
Configurable TDP Boot Mode     [Up]                    will set MSR to Nominal and
Configurable TDP Lock          [Disabled]              MMIO to Zero.
ConfigTDP Levels               3
ConfigTDP Turbo Activation Ratio   17 (Unlocked)
Power Limit 1                  15.0W (MSR:15.0)
Power Limit 2                  60.0W (MSR:60.0)
                        ┌─── Configurable TDP Boot Mode ───┐
Custom Settings Nominal │  Nominal                         │
ConfigTDP Nominal       │  Down                            │
                        │  Up                              │
Power Limit 1           │  Deactivate                      │  Select Screen
Power Limit 2           └──────────────────────────────────┘  Select Item
Power Limit 1 Time Window                             er: Select
ConfigTDP Turbo Activation Ratio   0                  +/-: Change Opt.
                                                      F1: General Help
Custom Settings Down                                  F2: Previous Values
ConfigTDP Level1               Ratio:12 TAR:11         F3: Optimized Defaults
                               PL1:12.0W               F4: Save & Exit
Power Limit 1                  0                       ESC: Exit
Power Limit 2                  0
Power Limit 1 Time Window      [0]
ConfigTDP Turbo Activation Ratio   0                 ▼

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```

Note! *System will perform a short reboot every time (Power LED will turn orange for a short while) with the default TDP setting due to a CPU feature. It doesn't affect system stability in the long term.*

A.14 Storage RAID Configuration (VMD Setup)

UNO-148 has special RAID configuration steps which differ from previous CPU generations. Customers can enable RAID with 2 x SATA storage or 2 x NVMe storage.

SATA RAID: M.2 B-Key & 2.5" HDD/SSD (UNO-148 base unit + UNO-148-IS2EA)

PCIe RAID: M.2 M-Key & PCIe x4 slot (UNO-148 base unit + UNO-148-P11EA, needs PCIe x4 to M.2 M NVMe transfer card)

Please refer to the below configuration instructions:

1. Go to Chipset→VMD setup menu.

```
                          Aptio Setup - AMI
      Chipset

  System Agent (SA) Configuration            VMD Configuration settings

▶ VMD setup menu




                                             →←: Select Screen
                                             ↑↓: Select Item
                                             Enter: Select
                                             +/-: Change Opt.
                                             F1: General Help
                                             F2: Previous Values
                                             F3: Optimized Defaults
                                             F4: Save & Exit
                                             ESC: Exit


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```
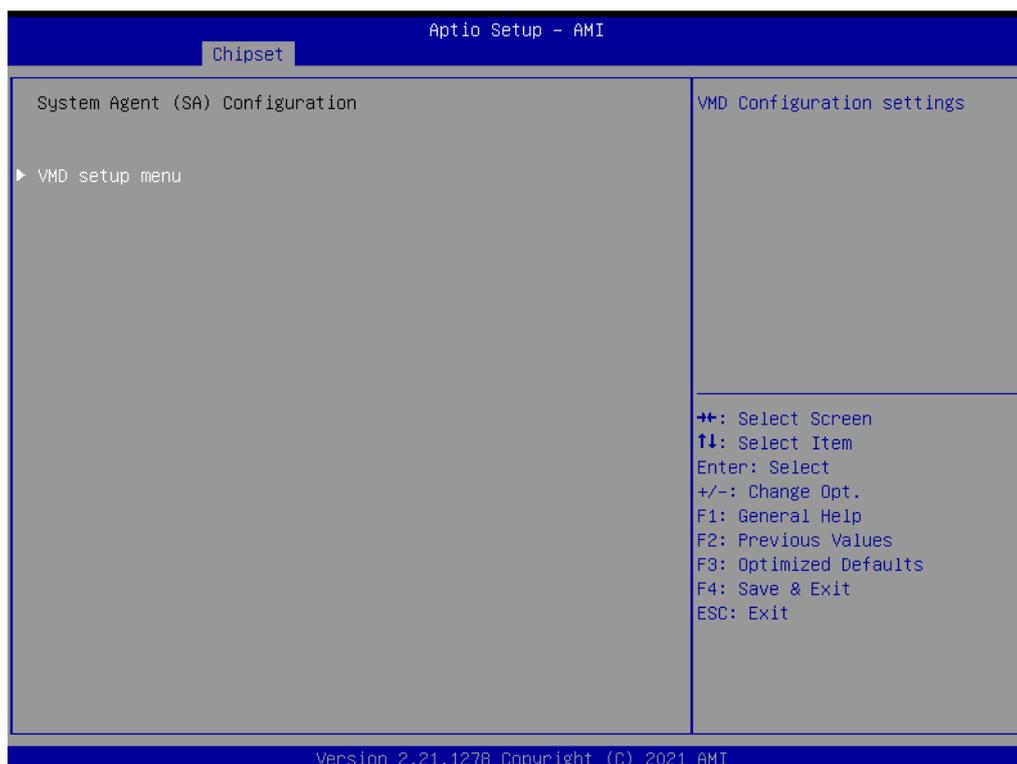
2. Set VMD controller to "Enabled".

```
                          Aptio Setup - AMI
           Chipset

 VMD Configuration                                  Enable/Disable to VMD
                                                    controller
 Enable VMD controller            [Disabled]




                ┌─── Enable VMD controller ───┐
                │ Disabled                     │
                │ Enabled                      │
                └──────────────────────────────┘
                                                 →: Select Screen
                                                 ↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit



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```
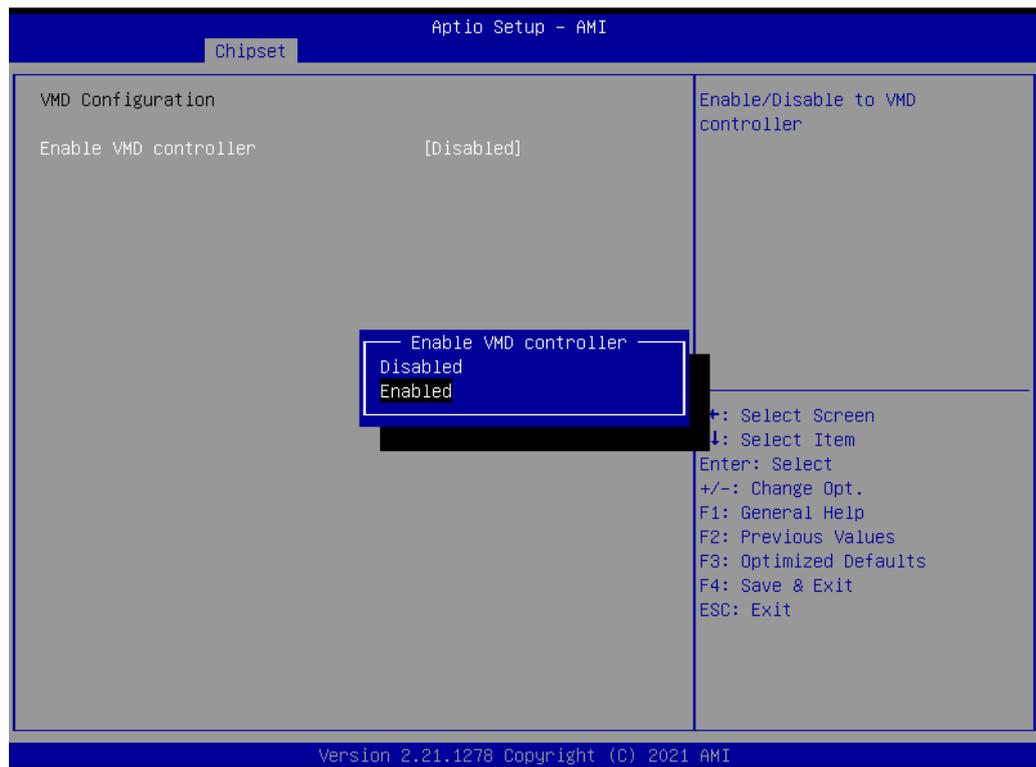
3. The system will detect the storage type (SATA/NVMe) and the RAID option will automatically pop up and the corresponding storage device will be installed.

SATA RAID

```
                          Aptio Setup - AMI
           Chipset

 VMD Configuration                                  SATA RAID

 Enable VMD controller            [Enabled]

 SATA RAID                        [Disabled]

 RAID0                            [Enable]
 RAID1                            [Enable]

                ┌──── SATA RAID ────┐
                │ Disabled          │
                │ Enabled           │
                └───────────────────┘
                                                 →←: Select Screen
                                                 ↑↓: Select Item
                                                 Enter: Select
                                                 +/-: Change Opt.
                                                 F1: General Help
                                                 F2: Previous Values
                                                 F3: Optimized Defaults
                                                 F4: Save & Exit
                                                 ESC: Exit



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```

PCIe RAID (NVMe)

```
                            Aptio Setup - AMI
           Chipset

VMD Configuration                                    PCIe RAID(NVMe)

Enable VMD controller          [Enabled]

PCIe RAID(NVMe)                [Disabled]

PCIe RAID(NVMe)                [Disabled]

RAID0                          [Enabled]
RAID1                          [Enabled]
                        ┌──── PCIe RAID(NVMe) ────┐
                        │ Disabled                │
                        │ Enabled                 │
                        └─────────────────────────┘
                                                     ++: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save & Exit
                                                     ESC: Exit


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```

A.15 Dynamic Range Temperature Statement

Thermal Management of the 11th Gen Intel® Core™ Processor External Design Specification:

DTR is the range of temperature starting from boot (TBOOT) and transitioning to Cold-to-Hot (TBOOT + DTR) and/or Hot-to-Cold (TBOOT - DTR). A temperature out-side the DTR range requires a reboot but is not enforced by the hardware. (A manual reboot can recover the system).

Enabling an Intelligent Planet