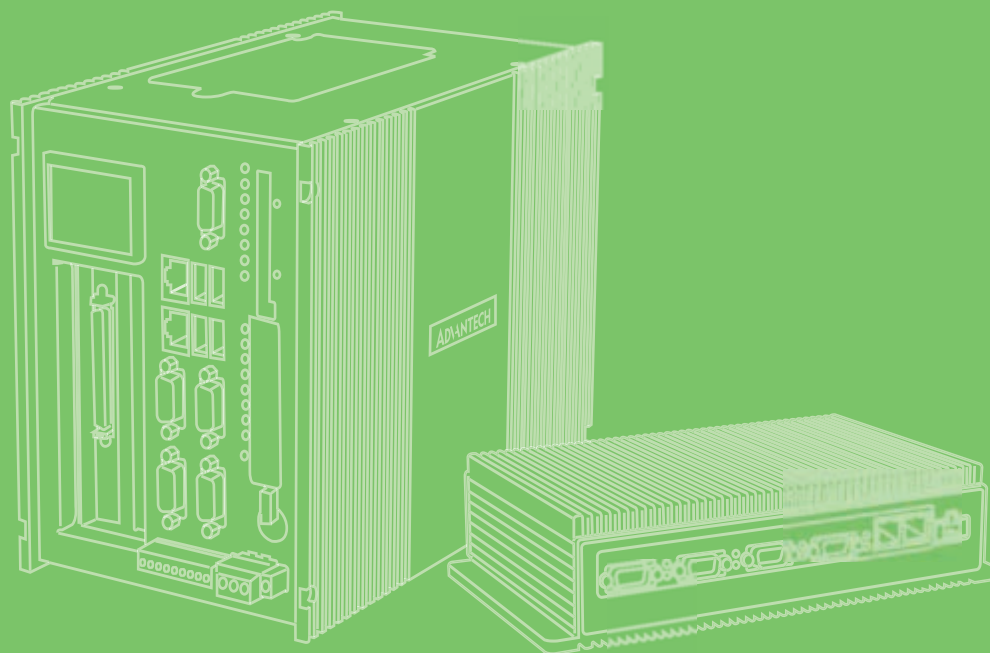




UNO-238 V2 電腦

Intel® Alder Lake processor IoT
Edge Computer, with 2 x LAN,
2 x COM, 2 x CAN, 4 x USB,
2 x Type-C, 1 x DP, 1 x HDMI,
1 x GPIO, 3 x M.2 B/M/E Key

ADVANTECH

Enabling an Intelligent Planet

Copyright

The documentation and the software included with this product are copyrighted 2023 by Advantech Co., Ltd. All rights are reserved. Advantech Co., Ltd. reserves the right to make improvements in the products described in this manual at any time without notice. No part of this manual may be reproduced, copied, translated, or transmitted in any form or by any means without the prior written permission of Advantech Co., Ltd. The information provided in this manual is intended to be accurate and reliable. However, Advantech Co., Ltd. assumes no responsibility for its use, nor for any infringements of the rights of third parties that may result from its use.

Acknowledgments

IBM, PC/AT, PS/2 and VGA are trademarks of International Business Machines Corporation.

Intel Core™ and Atom™ are trademarks of Intel Corporation

Microsoft Windows and MS-DOS are registered trademarks of Microsoft Corp.

All other product names or trademarks are properties of their respective owners.

Support

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

For technical support and service, please visit our support website at: <http://support.advantech.com/>

This manual applies to the below model which is abbreviated as UNO-238 V2 products in this article

*Model name UNO-238 V2

*Part number:

UNO-238-C3N1AE

UNO238C3N2301-T,	UNO238C3N2302-T,	UNO238C3N2401-T,
UNO238C3N2402-T,	UNO238C3N2403-T,	UNO238C3N2404-T,
UNO238C3N2501-T,	UNO238C3N2502-T,	UNO238C3N2503-T,
UNO238C3N2504-T,	UNO238C3N2601-T,	UNO238C3N2602-T,
UNO238C3N2603-T,	UNO238C3N2604-T,	UNO238C3N2701-T,
UNO238C3N2702-T,	UNO238C3N2703-T,	UNO238C3N2704-T,
UNO238C3N2801-T,	UNO238C3N2802-T,	UNO238C3N2803-T,
UNO238C3N2804-T,	UNO238C3N2901-T,	UNO238C3N2902-T,
UNO238C3N2903-T,	UNO238C3N2904-T	

UNO-238-C5N1AE

UNO238C5N2301-T,	UNO238C5N2302-T,	UNO238C5N2401-T,
UNO238C5N2402-T,	UNO238C5N2403-T,	UNO238C5N2404-T,
UNO238C5N2501-T,	UNO238C5N2502-T,	UNO238C5N2503-T,
UNO238C5N2504-T,	UNO238C5N2601-T,	UNO238C5N2602-T,
UNO238C5N2603-T,	UNO238C5N2604-T,	UNO238C5N2701-T,

Part Number. 2003023840

Printed in China

Edition 1

July 2023

UNO238C5N2702-T,	UNO238C5N2703-T,	UNO238C5N2704-T,
UNO238C5N2801-T,	UNO238C5N2802-T,	UNO238C5N2803-T,
UNO238C5N2804-T,	UNO238C5N2903-T,	UNO238C5N2901-T,
UNO238C5N2904-T	UNO238C5N2902-T,	

UNO-238-C7N1AE

UNO238C7N2301-T,	UNO238C7N2302-T,	UNO238C7N2401-T,
UNO238C7N2402-T,	UNO238C7N2403-T,	UNO238C7N2404-T,
UNO238C7N2501-T,	UNO238C7N2502-T,	UNO238C7N2503-T,
UNO238C7N2504-T,	UNO238C7N2601-T,	UNO238C7N2602-T,
UNO238C7N2603-T,	UNO238C7N2604-T,	UNO238C7N2701-T,
UNO238C7N2702-T,	UNO238C7N2703-T,	UNO238C7N2704-T,
UNO238C7N2801-T,	UNO238C7N2802-T,	UNO238C7N2803-T,
UNO238C7N2804-T,	UNO238C7N2903-T,	UNO238C7N2901-T,
UNO238C7N2904-T	UNO238C7N2902-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 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.

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 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.

警告使用者：這是甲類資訊產品，在居住的環境中使用時，可能會造成射頻干擾，在這種情況下，使用者會被要求採取某些適當對策。

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 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 skilled service personnel.
14. If any of the following occurs, have the equipment checked by skilled person:
 - 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.

In accordance with IEC 704-1:1982 specifications, the sound pressure level at the operator's position does not exceed 70 dB (A).

17. This product is intended to be supplied by an UL certified power supply or dc source with ES1 output, rated 12 Vdc, 5.5-2.5A minimum and Tma 60 degree. If you need further assistance, please contact Advantech for further information.
18. 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.
19. For use in pollution free environments and indoor use.
20. This equipment is not suitable for use in locations where children are likely to be present.
21. If the equipment is used in a manner not specified by the Advantech, the protection provided by the equipment may be impaired.

22. The equipment contains no user-serviceable parts. Do not open, Return to manufacturer for servicing.
 23. Do not block air ventilation holes.
 24. This is open type equipment and should be installed in a suitable enclosure.
- DISCLAIMER: This set of instructions is given according to IEC 704-1. 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 de 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 la 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 l'alimentation.
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 Personne qualifiée:
 - Un liquide a pénétré dans l'équipement.
 - 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 -20 °C (-4 °F) OU BIEN SUPÉRIEURE À 60 °C (140 °F). CECI POURRAIT ENDOMMAGER L'EQUIPEMENT. L'ÉQUIPEMENT DEVRAIT ÊTRE DANS UN ENVIRONNEMENT 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 60 degrés Celsius, dont la sortie est conforme à la norme ES1 et dont la puissance nominale est de 12 Vdc, 5-2.5A, en cas de besoin. contactez Advantech 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 protection 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 uniquement par le même type ou équivalent 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. 請勿在潮濕環境中使用設備。
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，請由專業人員來維修：
 - 電源線或者插頭損壞；
 - 設備內部有液體流入；
 - 設備曾暴露在過於潮濕的環境中使用；
 - 設備無法正常工作，或您無法通過用戶手冊來使其正常工作；
 - 設備跌落或者損壞；
 - 設備有明顯的外觀破損。
15. 請不要把設備放置在超出我們建議的溫度範圍的環境，即不要低於 -20°C (-4°F) 或高於 60°C (140°F)，否則可能會損壞設備。
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. 消費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

限用物質含有情況標示聲明書

Declaration of the Presence Condition of the Restricted Substances Marking

設備名稱：電腦 Equipment name		型號（型式）：UNO-238 V2（系列型號請參見手冊載明型號） Type designation (Type)				
單元 Unit	限用物質及其化學符號 Restricted substances and its chemical symbols					
	鉛 Lead (Pb)	汞 Mercury (Hg)	鎘 Cadmium (Cd)	六價鉻 Hexavalent chromium (Cr ⁺⁶)	多溴聯苯 Polybrominated biphenyls (PBB)	多溴二苯醚 Polybrominated diphenyl ethers (PBDE)
電路板	—	○	○	○	○	○
內外殼（外殼、內部框架 … 等）	○	○	○	○	○	○
其它固定組件（螺絲、夾具、卡榫）	—	○	○	○	○	○
配件（排線、傳輸線、網路線 … 等）	—	○	○	○	○	○
電源供應器	—	○	○	○	○	○
備考 1. “超出 0.1 wt %” 及 “超出 0.01 wt %” 係指限用物質之百分比含量超出百分比含量基準值。 Note 1. “Exceeding 0.1 wt %” and “exceeding 0.01 wt %” indicate that the percentage content of the restricted substance exceeds the reference percentage value of presence condition.						
備考 2. “○” 係指該項限用物質之百分比含量未超出百分比含量基準值。 Note 2. “○” indicates that the percentage content of the restricted substance does not exceed the percentage of reference value of presence.						
備考 3. “—” 係指該項限用物質為排除項目。 Note 3. The “—” indicates that the restricted substance corresponds to the exemption.						

申請商：研華股份有限公司

地址：台北市內湖區瑞光路 26 巷 20 弄 1 號

電話：02-27927818

Contents

Chapter 1 Overview.....1

1.1	Introduction	2
1.2	Safety Precautions	2
1.3	Accessories	3
1.4	Hardware Specifications	3
1.4.1	General	3
	Table 1.1: General	3
1.4.2	System Hardware	4
	Table 1.2: System Hardware	4
1.4.3	I/O Interfaces	4
	Table 1.3: I/O Interfaces	4
1.4.4	Environment	4
	Table 1.4: Environment	4
1.4.5	Certification	5
	Table 1.5: Certification	5
1.5	Mechanical Specifications	5
1.5.1	Dimensions	5
	Figure 1.1 UNO-238 V2 dimensions	5

Chapter 2 Hardware Functionality7

2.1	Introduction	8
	Figure 2.1 Key components locations of UNO-238 V2 (top side)	8
	Figure 2.2 Key components locations of UNO-238 V2 (bottom side)	8
	Table 2.1: Key components, connectors on board	9
2.2	External I/O Connectors	10
	Figure 2.3 Front I/O of UNO-238 V2	10
	Figure 2.4 Right I/O of UNO-238 V2	10
	Figure 2.5 Rear I/O of UNO-238 V2	10
2.2.1	Power Connector	11
2.2.2	LAN: Ethernet Connector	11
2.2.3	USB Connector	11
2.2.4	DisplayPort Connector	11
2.2.5	HDMI Connector	11
2.2.6	COM Connector	12
	Table 2.2: COM Connector Pin Assignments	12
2.2.7	GPIO Connector	13
	Table 2.3: GPIO Connector Pin Assignments	13
2.2.8	CAN Connector	13
	Table 2.4: CAN Connector Pin Assignments	13
2.3	Internal I/O Connector and Switch	14
	Figure 2.6 Internal I/O connector and switch (top side) of UNO-238 V2	14
	Figure 2.7 Internal I/O connector and switch (bottom side) of UNO-238 V2	14
	Table 2.5: Internal Connectors and Jumper Switches	15
2.3.1	M.2 Connector	15
2.3.2	Modify SIM Slot and B-key Location	15
2.4	Others	16
	Figure 2.8 LED indicator, power button, and antenna hole	16
2.4.1	LED Indicators	16
	Table 2.6: LED Indicators	16
2.4.2	Power Button	16

2.4.3	Antenna Hole	16
-------	--------------------	----

Chapter 3 Initial Setup..... 17

3.1	Chassis Grounding	18
	Figure 3.1 Chassis grounding connection	18
3.2	Connecting Power.....	18
3.3	M.2 Storage Installation (Optional)	18
3.4	M.2 LTE/5G Module Installation (Optional)	18
3.5	M.2 WiFi Module Installation (Optional)	18
3.6	SIM Card Installation.....	18
3.7	Install DDR and Thermal Pad	19
3.8	Din-Rail Installation Mounting	22
3.9	Install SMA.....	22
3.10	BIOS Setting	23

Appendix A System Settings/Pin Assignments.. 25

A.1	M.2 Connector	26
A.1.1	M.2 B Key 2242/3042/3052 (M2_B1)	26
	Table A.1: M.2 B Key	26
A.1.2	M.2 E Key 2230 (M2_1).....	28
	Table A.2: M.2 E Key	28
A.1.3	M.2 M Key 2280 (M2_2)	31
	Table A.3:	31
A.2	TPM 2.0 BIOS Setting.....	33
A.3	CPU Turbo mode BIOS Setting	34
A.4	Serial Port 1 Configuration	36
A.5	Serial Port 2 Configuration	38
A.6	GPIO Configuration.....	40
A.7	CANBus Configuration	42

Chapter 1

Overview

This chapter provides an overview of the UNO-238 V2 specifications.

Sections include:

- Introduction
- Safety precautions
- Accessories
- Hardware Specifications
- Dimensions

1.1 Introduction

Advantech's new UNO-200 series focuses on IT level applications, which only require semi-industrial design and cost efficiency. New UNO-238 V2 model aims to provide an optimized design with the 12th generation CPU Intel® Core™ Alder Lake P-Series processor. UNO-238 V2 is IT-oriented, fanless, with IoT edge computing features and sufficient connectivity including 2 x LAN, 2 x RS- 232/ 422/485, 1 x GPIO, 4 x USB 3.2, 2 x USB Type-C 1 x DP 1.4, 1 x HDMI 2.0 and 1 x CANBus. It also supports 3 x M.2 B/E/M Key and 1x Nano SIM card slot for expansion to fulfill various requirements for industrial applications.

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-238 V2. 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-238 V2. 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.*



HOT SURFACE & DO NOT TOUCH.



SURFACE CHAUDE & NE PAS TOUCHER.



1.3 Accessories

Please refer to below packing list:

- UNO-238 V2
- 1 x 90W power adapter (Advantech P/N: XARK-ADP-90MDH)
- 1 x Thermal grease for CPU (Advantech P/N: 2170000093-01)
- 1 x Earth-ground cable (Advantech P/N: 1703011001-11)
- 1 x Bracket for 3042/3052 LTE module (Advantech P/N: 1960098471N000)
- 2 x Screws for attaching 3042/3052 bracket (Advantech P/N: 1930001782)
- 1 x Thermal pad for NVMe/SATA storage (Advantech P/N: 1990036489N010)
- 1 x Thermal pad for 2nd DDR (Advantech P/N: 1990026184N010)
- Startup Manual
- China RoHs sheet
- Warranty card

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

1.4 Hardware Specifications

1.4.1 General

Table 1.1: General

Dimensions (W x D x H)	150 x 107 x 60 mm (5.9" x 4.2" x 2.3")
Weight (Net)	1.8 kg (3.9lbs)
Mounting	Stand, DIN rail (optional)
Power Requirement	12~24VDC
Power Consumption	30W (Typical), 60W (Max)

1.4.2 System Hardware

Table 1.2: System Hardware

BIOS	AMI UEFI 128Mbit
Watchdog Timer	Programmable 255 levels timer interval, from 1 to 255 sec
Hardware Security	TPM2.0
Processor	Intel® i7-1265UE 10 core, 1.7 GHz (up to 4.4 GHz)
	Intel® i5-1245UE 10 core, 1.6 GHz (up to 4.1 GHz)
	Intel® i3-1215UE 6 core, 2.2 GHz (up to 3.9 GHz)
Memory	2 socket DDR5 4800 (up to 64 GB max.)
Graphics Engine	Intel® Iris Xe Graphics 620
Ethernet	LAN A: Intel® i226, 10/100/1000/2500Mbps
	LAN B: Intel® i219-LM, 10/100/1000Mbps
LED Indicators	Power Only
Storage	1 x M.2 B Key 2242 (PCIex1/SATA, USB2.0)
	1 x M.2 M Key 2280 (PCIex4, Gen4 NVMe)
Expansion	1 x M.2 B Key 3042/3052 (PCIex1/SATA, USB2.0)
	1 x M.2 E Key 2230 (PCIex1, USB2.0)
	1 x M.2 M Key 2280 (PCIex4, Gen4 NVMe)

1.4.3 I/O Interfaces

Table 1.3: I/O Interfaces

Serial Ports	2 x RS-232/422/485, 50~115.2kbps (10-pin terminal for COM1/COM2)
LAN Ports	1 x 10/100/1000 Mbps, RJ45 for LAN1 (LAN B)
	1 x 10/1000/1000/2500 Mbps, RJ45 for LAN2 (LAN A)
USB Ports	4 x USB3.2 Gen2
	2 x Type-C USB3.2 Gen2, support DisplayPort1.4a Alt. Mode
Displays	1 x DP 1.4 (up to 4096 x 2304 @60 Hz)
	1 x HDMI 2.0 (up to 4096 x 2160 @60 Hz)
Power Connector	1 x Terminal block
Others	1 x 8GPIO (DB9)
	2 x CANBus (6 pin Terminal Block)

1.4.4 Environment

Table 1.4: Environment

Operating Temperature*	0 ~ 50 °C with 0.7 m/s airflow
	-20 ~ 60 °C with 0.7 m/s airflow and extended temperature peripherals
Storage Temperature	-40 ~ 85°C (-40 ~ 185°F)
Relative Humidity	10 ~ 95% RH @ 40 °C/104 °F, non-condensing
Shock Protection	Operating, IEC 60068-2-27, 50G, half sine, 11ms
Vibration Protection	Operating, IEC 60068-2-64, 2 Grms, random, 5 ~ 500 Hz, 1hr/axis

1.4.5 Certification

Table 1.5: Certification

Certification	CE/FCC, CB/UL, CCC, BSMI
---------------	--------------------------

1.5 Mechanical Specifications

1.5.1 Dimensions

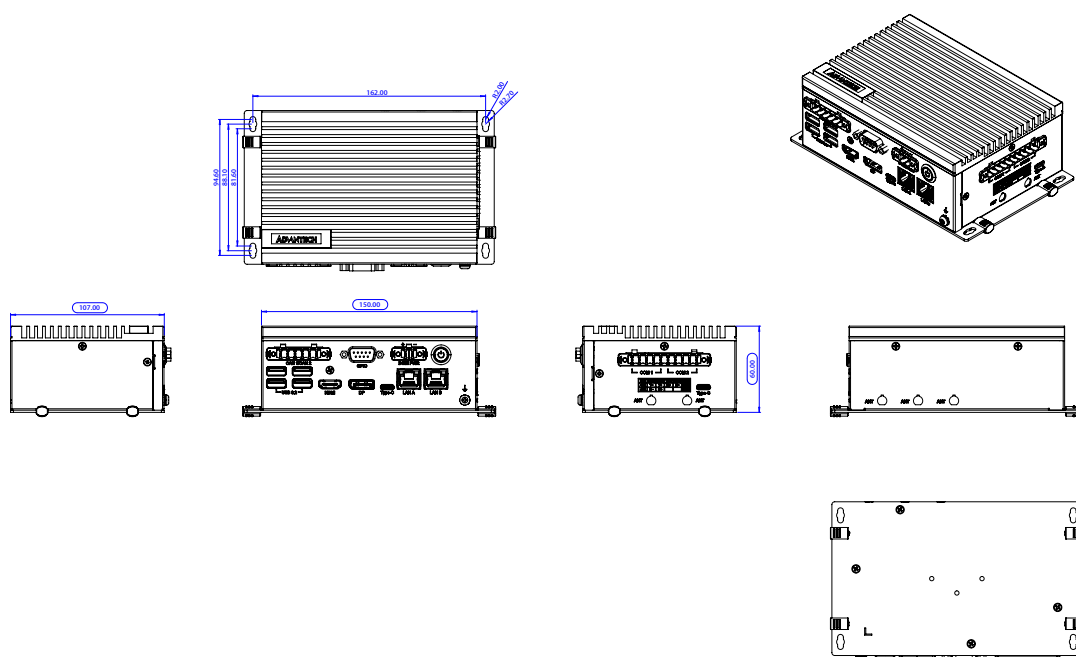


Figure 1.1 UNO-238 V2 dimensions

Chapter 2

Hardware Functionality

This chapter explains how to setup the UNO-238 V2 hardware functions, including connecting peripherals and indicators.

Sections include:

- Introduction
- External I/O Connector
- Internal I/O Connector
- LED Indicators
- Reset Buttons
- Antenna Hole

2.1 Introduction

The following figure shows the locations of key components, internal and the external connectors on motherboard of UNO-238 V2.

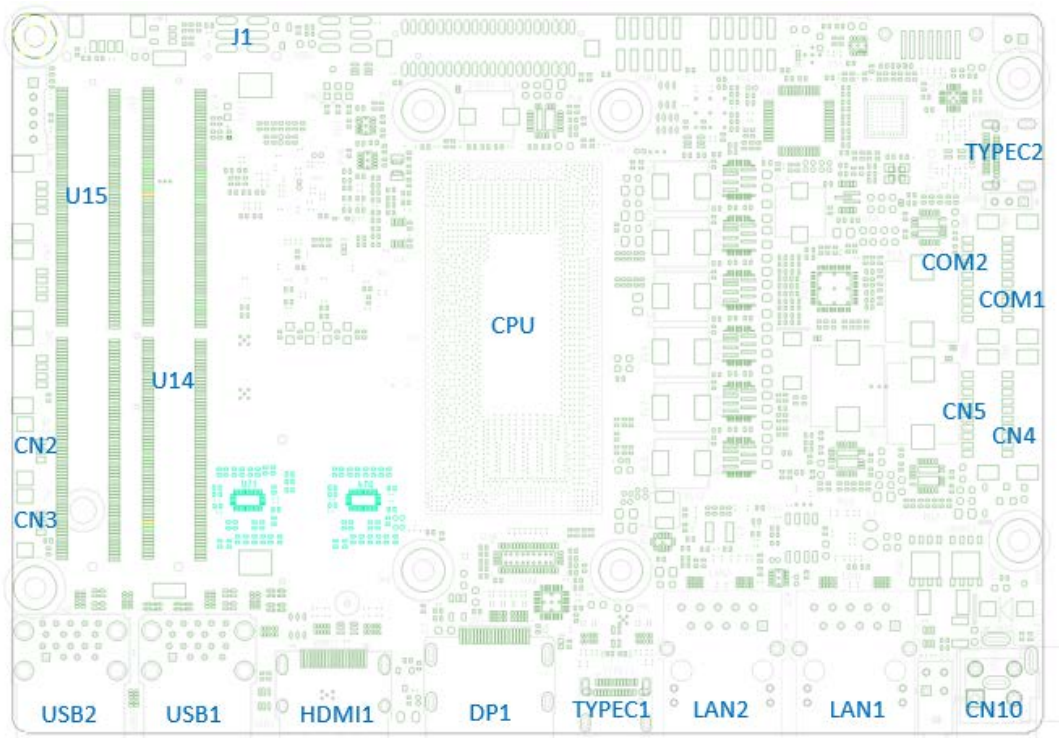


Figure 2.1 Key components locations of UNO-238 V2 (top side)

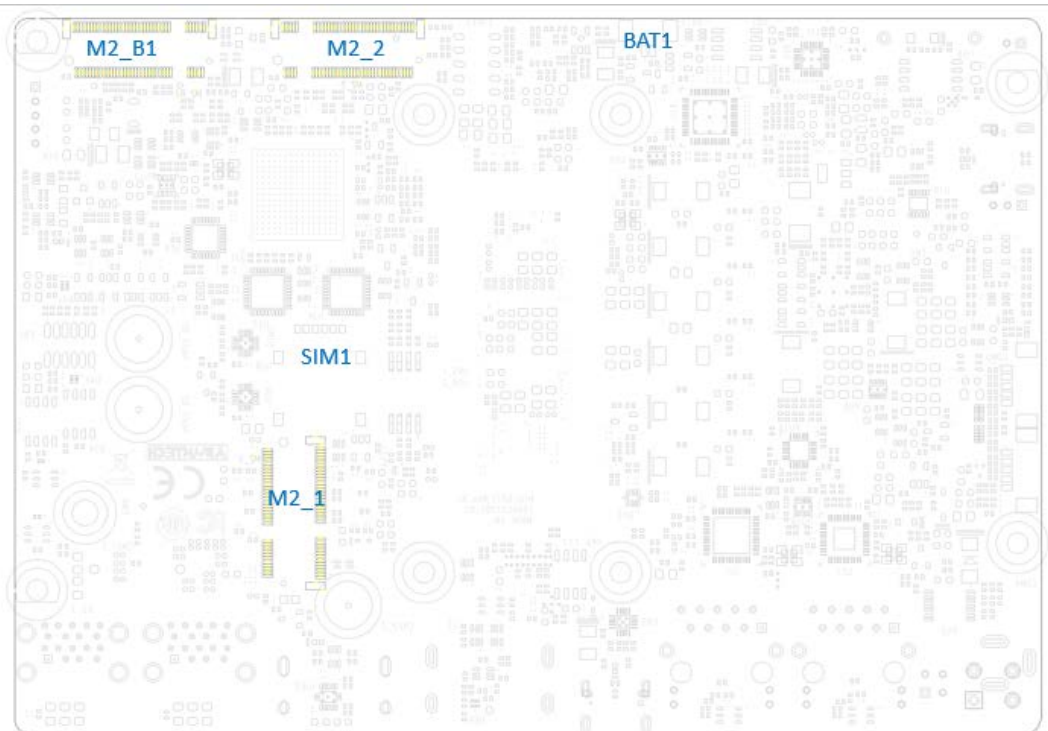


Figure 2.2 Key components locations of UNO-238 V2 (bottom side)

Table 2.1: Key components, connectors on board

Category	Label	Function
External	LAN1	LAN B RJ45 Connector
	LAN2	LAN A RJ45 Connector
	TYPEC1	Type-C Connector
	TYPEC2	
	DP1	DP Connector
	HDMI1	HDMI Connector
	USB1	USB3 Connector
	USB2	
Internal	CN10	DC Input power Connector (Convert to external I/O by cable)
	COM1	RS232/RS422/RS485 COM port Connector (Convert to external I/O by cable)
	COM2	RS232/RS422/RS485 COM port Connector (Convert to external I/O by cable)
	CN4	Power Button Connector (Convert to external I/O by cable)
	CN5	GPIO 8bit Connector (Convert to external I/O by cable)
	CN2	CANBus Connector (Convert to external I/O by cable)
	CN3	
	SIM1	Nano SIM slot Connector
	M2_B1	M.2 Key B Connector for Storage (SSD) or LTE/5G
	M2_1	M.2 Key E Connector for Wi-Fi
	M2_2	M.2 Key M Connector for Storage (NVMe)
	U14	DDR5 SO-DIMM 5.2mm
	U15	DDR5 SO-DIMM 9.2mm
	BAT1	RTC Battery Connector
	J1	AT mode/Load BIOS default

2.2 External I/O Connectors

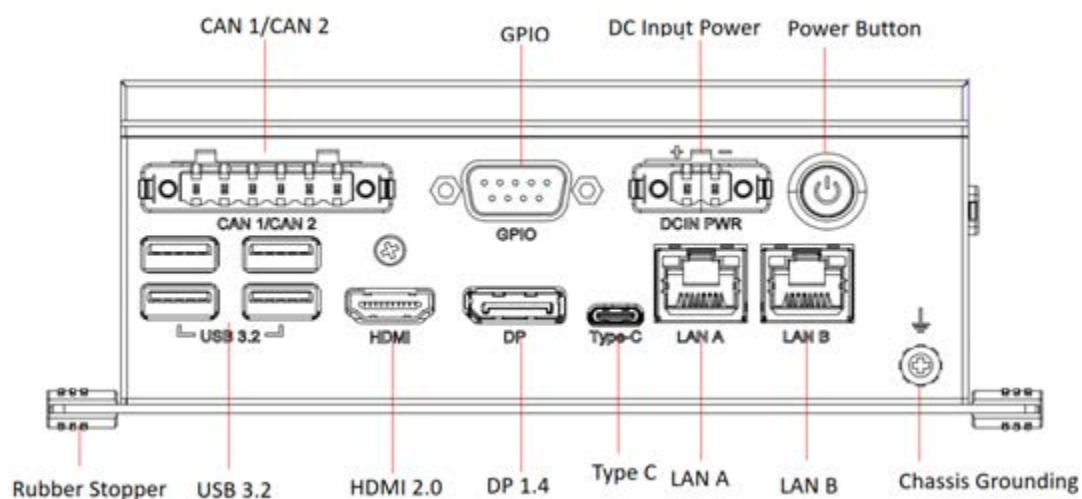


Figure 2.3 Front I/O of UNO-238 V2

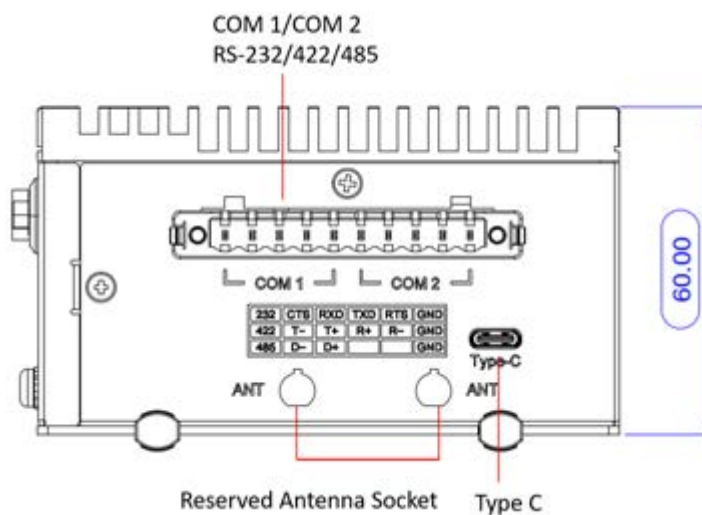


Figure 2.4 Right I/O of UNO-238 V2

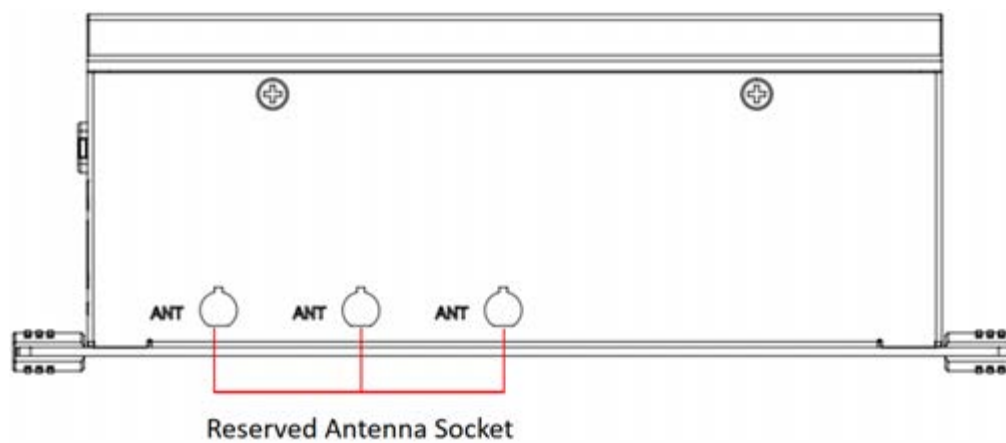


Figure 2.5 Rear I/O of UNO-238 V2

2.2.1 Power Connector

UNO-238 V2 comes with a terminal block that carries 12~24V_{DC} external power input, allows the flexibility of wiring and features reversed wiring protection. Therefore, it will not cause any damage to the system by reversed wiring of ground and power lines.

2.2.2 LAN: Ethernet Connector

UNO-238 V2 is equipped with two Gigabit LAN controllers. (LAN A: Intel® i226, 10/100/1000/2500Mbps; LAN B: Intel® i219-LM, 10/100/1000Mbps) that complies with IEEE 802.3u 10/100/1000 Base-T (10/100/1000/2500Mbps for Intel® i226) is used as the controller chip.

2.2.3 USB Connector

UNO-238 V2 features 4 USB ports that comply with USB 3.2 specifications. Besides, it also equipped with 2 x USB Type-C. Both Type-C ports support DP1.4a as well as Alt. mode. The one at right side can also support Thunderbolt 4 for data transmission. The USB connectors support plug-and-play and hot-swapping functionality for external devices without turning off the computer. It can also be enabled/disabled in the BIOS menu.

2.2.4 DisplayPort Connector

UNO-238 V2 provides 1 x DP 1.4 connector for a high resolution interface up to 4096 x 2160 @ 60Hz.

2.2.5 HDMI Connector

UNO-238 V2 provides 1 x HDMI 2.0 connector for a high resolution interface up to 4096 x 2160 @60 Hz.

2.2.6 COM Connector

UNO-238 V2 features 2 x RS232/422/485 ports (Combo) extender from COM port from COM1/COM2 function through a cable.

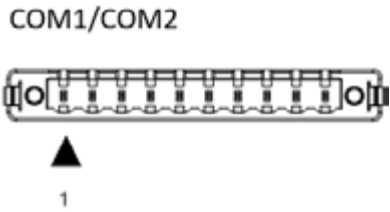


Table 2.2: COM Connector Pin Assignments	
PIN	Signal Pin Definition
1	COM1_CTS_T-_D-
2	COM1_RXD_T+_D+
3	COM1_TXD_R+
4	COM1_RTS_R-
5	GND
6	COM2_CTS_T-_D-
7	COM2_RXD_T+_D+
8	COM2_TXD_R+
9	COM2_RTS_R-
10	GND

2.2.7 GPIO Connector

UNO-238 V2 features 1 x GPIO port extender from GPIO from CN5 function through a cable.

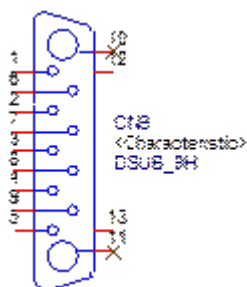


Table 2.3: GPIO Connector Pin Assignments

PIN	Signal Pin Definition
1	pin1 GND
2	GPIO0
3	GPIO1
4	GPIO2
5	GPIO3
6	GPIO4
7	GPIO5
8	GPIO6
9	GPIO7

2.2.8 CAN Connector

UNO-238 V2 supports 2 x CANBus terminal block from CN2/CN3 function through a cable for line out function.

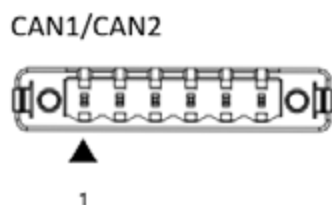


Table 2.4: CAN Connector Pin Assignments

PIN	Signal Pin Definition
1	CAN1_D+
2	CAN1_D-
3	GND
4	CAN2_D+
5	CAN2_D-
6	GND

2.3 Internal I/O Connector and Switch

The following figure shows the locations of internal connectors and switches on the mother board of UNO-238 V2.

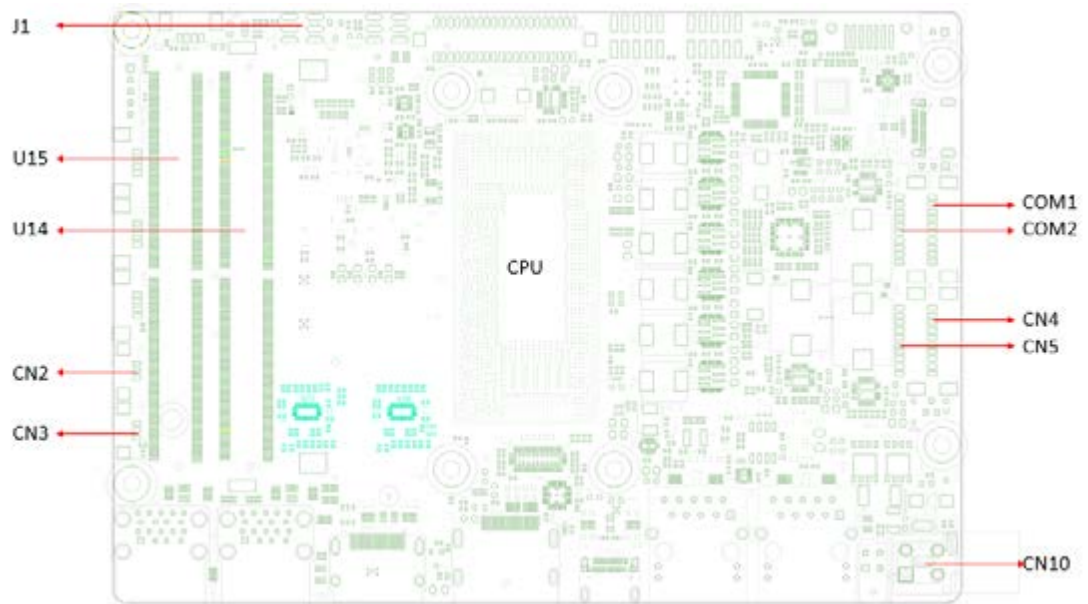


Figure 2.6 Internal I/O connector and switch (top side) of UNO-238 V2

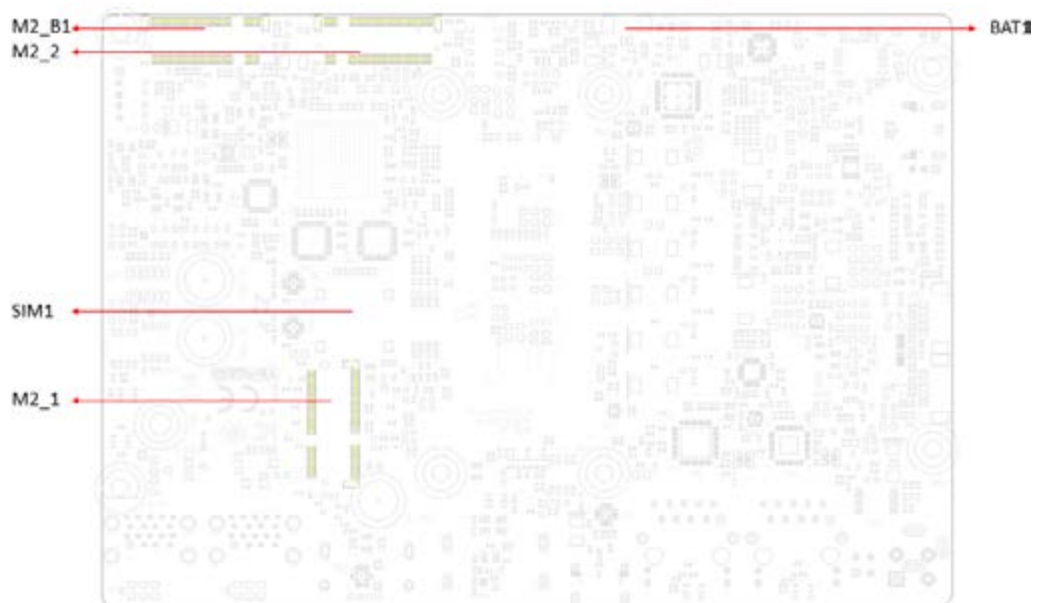


Figure 2.7 Internal I/O connector and switch (bottom side) of UNO-238 V2

Table 2.5: Internal Connectors and Jumper Switches

Label	Function
CN10	DC Input power Connector (Convert to external I/O by cable)
COM1	RS232/RS422/RS485 COM port Connector (Convert to external I/O by cable)
COM2	RS232/RS422/RS485 COM port Connector (Convert to external I/O by cable)
CN4	Power Button Connector (Convert to external I/O by cable)
CN5	GPIO 8bit Connector (Convert to external I/O by cable)
CN2	CANBus Connector (Convert to external I/O by cable)
CN3	
SIM1	Nano SIM slot Connector
M2_B1	M.2 Key B Connector for Storage (SSD) or LTE/5G
M2_1	M.2 Key E Connector for Wi-Fi
M2_2	M.2 Key M Connector for Storage (NVMe)
U14	DDR5 SO-DIMM 5.2mm
U15	DDR5 SO-DIMM 9.2mm
BAT1	RTC Battery Connector
J1	AT mode/Load BIOS default

2.3.1 M.2 Connector

UNO-238 V2 provides 1 x M.2 B Key 2242/3042/3052 connector, 1 x M.2 E Key 2230 and 1x M.2 M Key 2280 connector for storage (M-key supports NVMe PCIe4) while M.2 B key 3042/3052 is for LTE/5G module, 2242 is for storage (supports PCIe/SATA as well as USB 2.0). M.2 E Key 2230 connector is for WiFi module (supports PCIe and USB 2.0).

2.3.2 Modify SIM Slot and B-key Location

There's one Nano SIM Slot for supporting LTE function, labeled "SIM1" board. In addition to install SIM card on "CN20", users are required to install a LTE Module on "M2_B1" Key to enable functionality.

2.4 Others

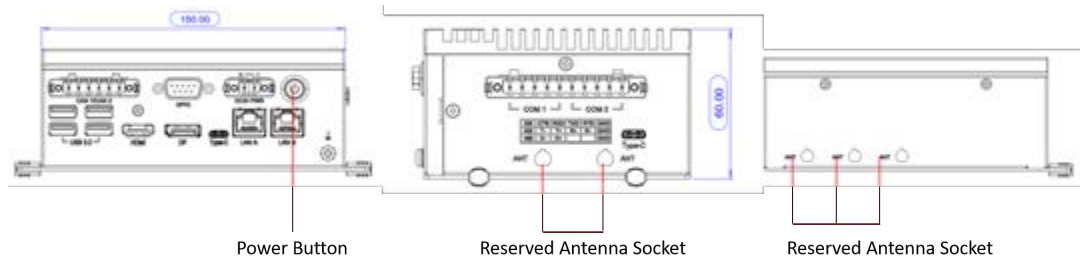


Figure 2.8 LED indicator, power button, and antenna hole

2.4.1 LED Indicators

- **PWR (Power):** One LED light to indicate the status of the system power: Green means normal. Light off means standby or power off.
- **LAN A & LAN B:**

Table 2.6: LED Indicators

	Speed			
	10MB	100MB	1G	2.5G
LAN A (i226)	Dark	Green	Orange	Orange
LAN B (i219)	Dark	Green	Orange	NA

2.4.2 Power Button

UNO-238 V2 features 1 x power button extend from LED function through cable. Press the power button to activate the hardware power on and shut down function.

2.4.3 Antenna Hole

This product offers four antenna mounting holes covered by pre-cut holes for users to install with an antenna kit if LTE or wireless functions are needed.

Chapter 3

Initial Setup

This chapter explains how to Initialize the UNO-238 V2.

Sections include:

- Chassis Grounding
- Connecting Power
- Storage Installation (Optional)

3.1 Chassis Grounding

UNO-238 V2 provides good EMI protection and a stable grounding base. There is an easy-to-connect chassis grounding point to use.

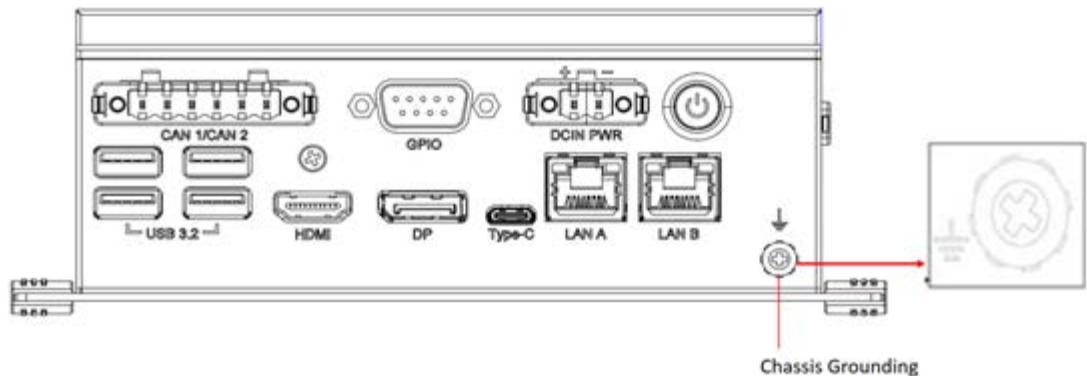


Figure 3.1 Chassis grounding connection

Use the Earth-Ground cable (16 AWG) from accessory bag to connect the chassis ground with the Earth ground.

3.2 Connecting Power

This product is intended to be supplied by an approved power adapter rated at 12Vdc, 4.5A and Tmax 60 degree C, if you need further assistance, please contact Advantech for further information.

3.3 M.2 Storage Installation (Optional)

Please refer to UNO-238 V2 Startup Manual.

3.4 M.2 LTE/5G Module Installation (Optional)

Please refer to UNO-238 V2 Startup Manual.

3.5 M.2 WiFi Module Installation (Optional)

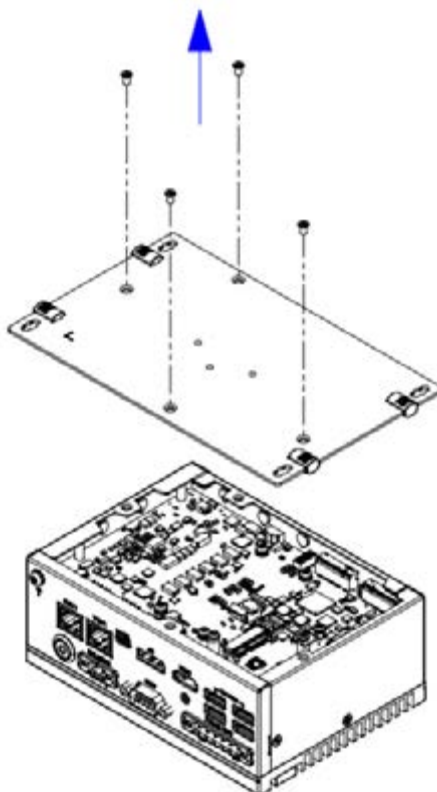
Please refer to UNO-238 V2 Startup Manual.

3.6 SIM Card Installation

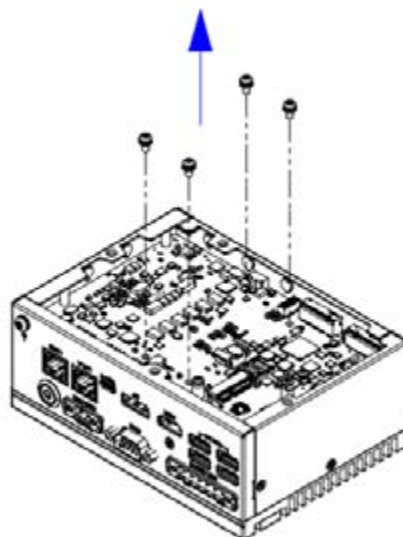
Please refer to UNO-238 V2 Startup Manual.

3.7 Install DDR and Thermal Pad

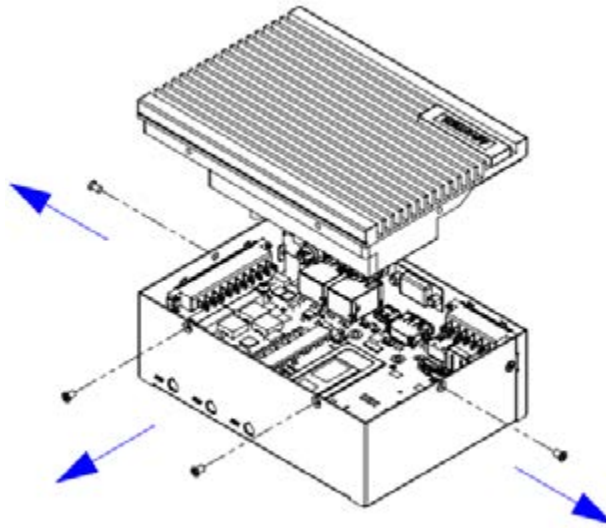
1. Unscrew (1930001241-11*4) and remove BTM cover (1960098469N011*1).



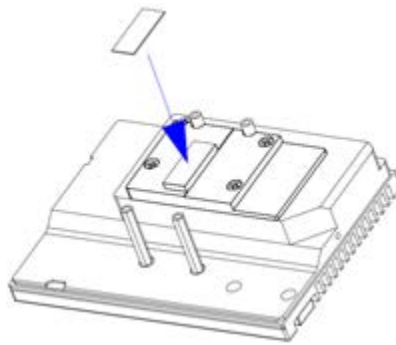
2. Unscrew (1930004041*4).



3. Unscrew (1930001241-11*4) and remove top cover (1960098692T011*1).



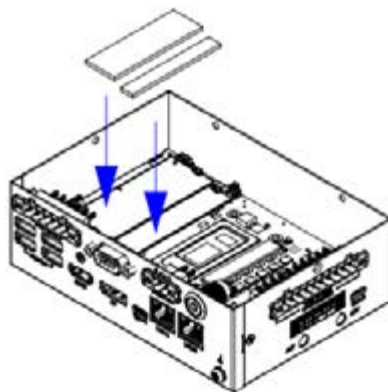
4. Paste Thermal pad (1990040074N000*1).



For DDR5 8/16G use

Paste Thermal pad (1990026727N030*1)

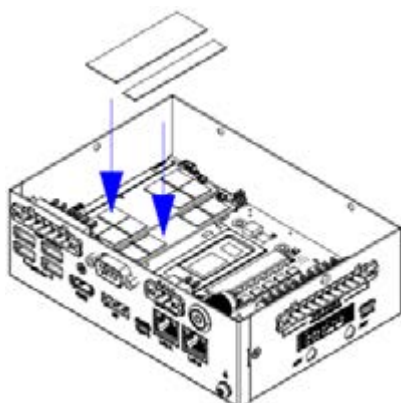
Paste Thermal pad (1990040197N020*1)



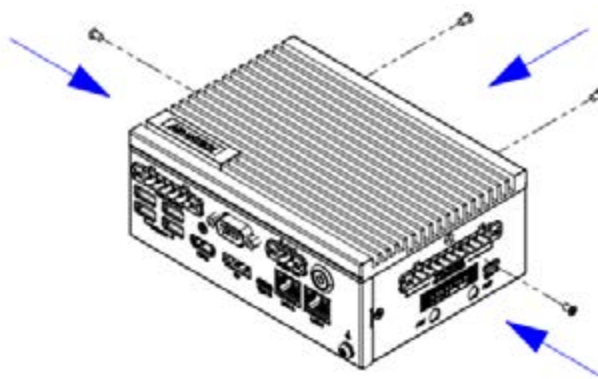
For DDR5 32G use

Paste Thermal pad (1990026727N010*1)

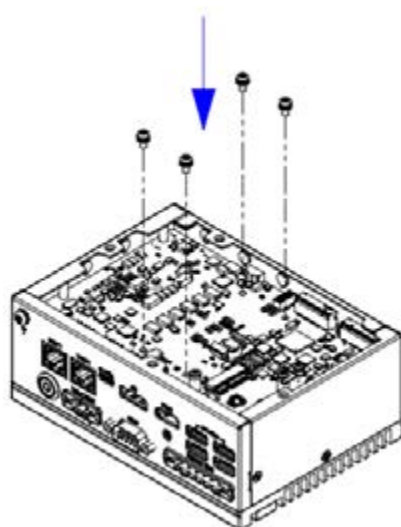
Paste Thermal pad (1990040197N000*1)



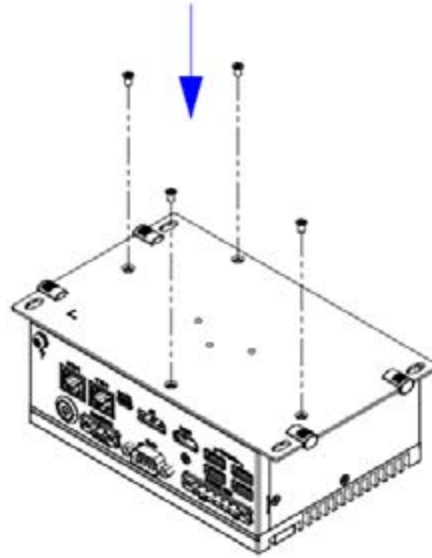
5. Install Top cover (1960098692T011*1) and Lock screw (1930001241-11*4).



6. Lock screw (1930004041*4).



7. Install BTM cover (1960098469N011*1) and Lock screw (1930001241-11*4).

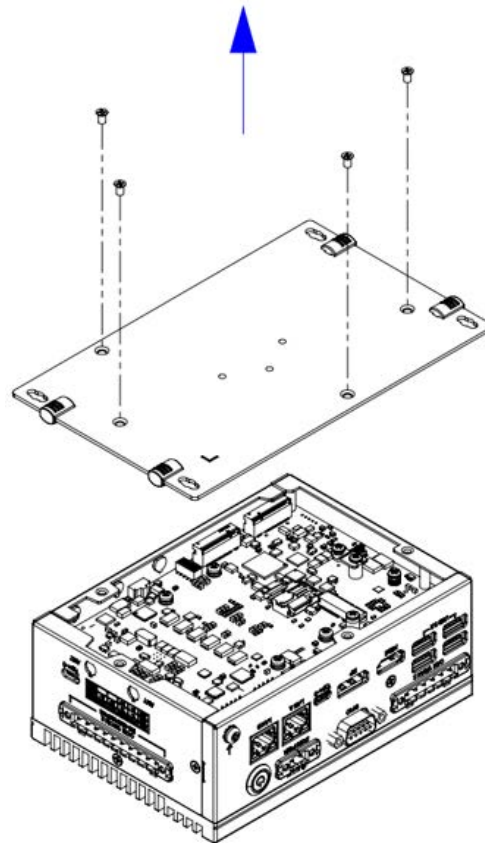


3.8 Din-Rail Installation Mounting

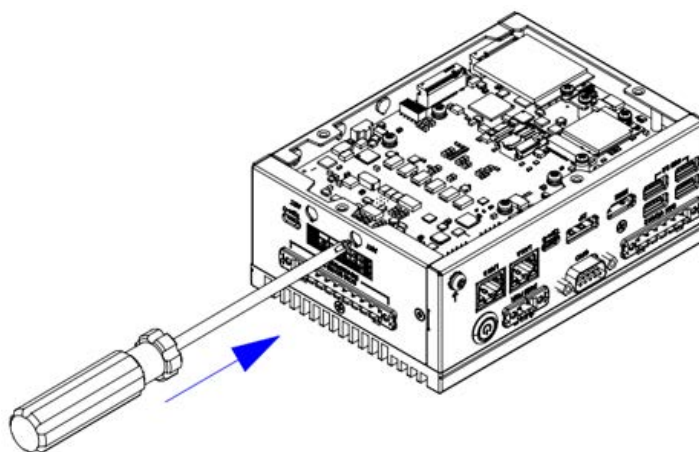
Please refer to UNO-238 V2 Startup Manual.

3.9 Install SMA

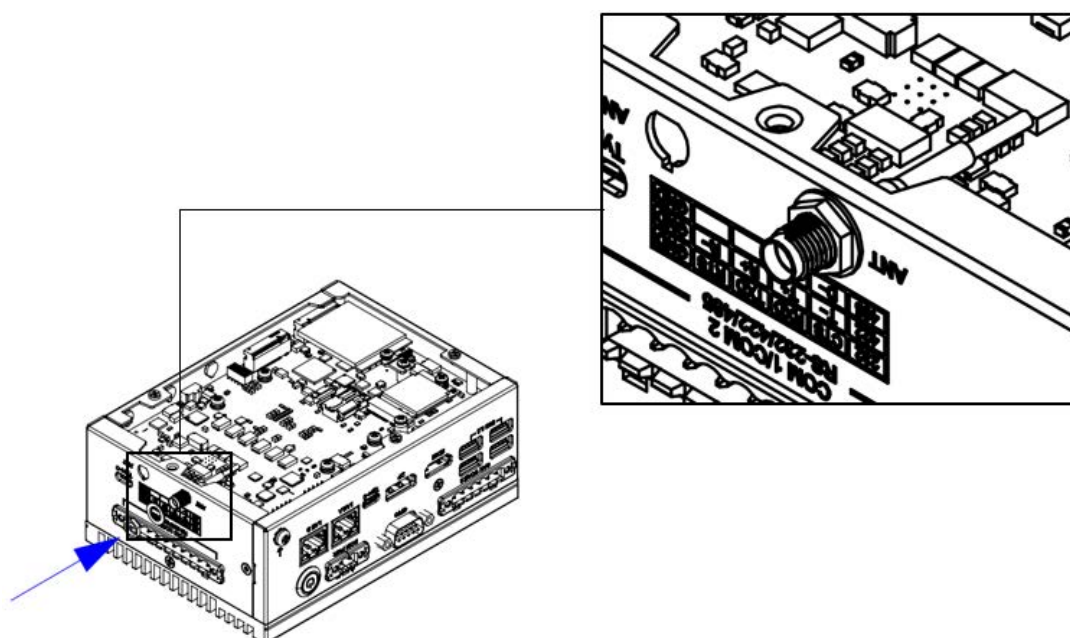
1. Unscrew (1930001241-11*4) and Remove BTM cover(1960098469N011*1).



2. Break open the ANT hole.



3. Install SMA cable.



3.10 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 **Del** 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 for more settings)

Appendix **A**

System Settings/Pin Assignments

A.1 M.2 Connector

A.1.1 M.2 B Key 2242/3042/3052 (M2_B1)



Table A.1: M.2 B Key

PIN	Signal Pin Definition (Key B)
1	M2B1_CFG3
2	+V3.3A_M.2_B
3	GND
4	+V3.3A_M.2_B
5	GND
6	M2B1_FULL_CARD_OFF#
7	USB_M2B1_P
8	M2B1_WDIABLE1#
9	USB_M2B1_N
10	M2B1_LED1#
11	GND
20	M2B1_PCIE_DIS

Table A.1: M.2 B Key	
21	M2B1_CFG0
22	M2B1_ANT_CFG
23	M2B1_WAKE_ON_WWAN#
24	M2B1_ANT_TUNER
25	M2B1_DPR
26	M2B1_W_DISABLE2#
27	GND
28	NC
29	NC
30	M2B1_UIM_RESET
31	NC
32	M2B1_UIM_A_CLK
33	NC
34	M2B1_UIM_DATA
35	NC
36	M2B1_UIM_PWR
37	NC
38	NC
39	GND
40	NC
41	43M2B1_PCIE_RX-
42	NC
43	43M2B1_PCIE_RX+
44	NC
45	GND
46	NC
47	M2B1_PCIE_TX-
48	NC
49	M2B1_PCIE_TX+
50	M2B1_PREST#
51	GND
52	M2B1_A_CLKREQ#
53	CLK100M_A_M2B1-
54	M2B1_PCIEWAKE#
55	CLK100M_A_M2B1+
56	NC
57	GND
58	NC
59	NC
60	NC
61	NC
62	NC
63	NC
64	NC
65	NC
66	NC
67	M2B1_A_RESET#

Table A.1: M.2 B Key

68	M2B1_SUSCLK
69	M2_SATA1B_PEDET
70	+V3.3_M.2_B
71	GND
72	+V3.3_M.2_B
73	GND
74	+V3.3_M.2_B
75	GND

A.1.2 M.2 E Key 2230 (M2_1)

**Table A.2: M.2 E Key**

PIN	Signal Pin Definition (Key E)
1	GND
2	+V3.3SB_M.2_E
3	USB6_Z_P+
4	+V3.3SB_M.2_E
5	USB6_Z_P-

Table A.2: M.2 E Key	
6	NC
7	GND
8	
9	
10	
11	
12	
13	NC
14	
15	
16	
17	
18	GND
19	
20	
21	
22	NC
23	
32	
33	GND
34	NC
35	PCIE_M2_Z_TX7+
36	NC
37	PCIE_M2_Z_TX7-
38	NC
39	GND
40	NC
41	PCIE_M2_RX11+
42	NC
43	PCIE_M2_RX11-
44	NC
45	GND
46	NC
47	CLK_M2E_Z_PCIE+
48	NC
49	CLK_M2E_Z_PCIE-
50	SUSCLK_Z_EKEY
51	GND
52	PLTRST_BUFFER#
53	PCIE_A_CLKREQ2
54	BT_DISABLE#
55	PCIE-WAKE#
56	WIFI_DISABLE
57	GND

Table A.2: M.2 E Key

58	
59	
60	NC
61	
62	
63	GND
64	
65	
66	NC
67	
68	
69	GND
70	
71	NC
72	+V3.3SB_M.2_E
73	NC
74	+V3.3SB_M.2_E
75	GND
H1	
H2	NC
H3	
H4	GND

A.1.3 M.2 M Key 2280 (M2_2)



Table A.3:

PIN	Signal Pin Definition (Key E)
1	GND
2	+V3.3_M.2
3	GND
4	+V3.3_M.2
5	PCIE4_KEY-M_RX3-
6	NC
7	PCIE4_KEY-M_RX3+
8	M.2 PLN#
9	GND
10	NC
11	PCIE4_KEY-M_A_TX3-
12	+V3.3_M.2
13	PCIE4_KEY-M_A_TX3+
14	+V3.3_M.2

Table A.3:

15	GND
16	+V3.3_M.2
17	PCIE4_KEY-M_RX2-
18	+V3.3_M.2
19	PCIE4_KEY-M_RX2+
20	NC
21	GND
22	NC
23	PCIE4_KEY-M_A_TX2-
24	NC
25	PCIE4_KEY-M_A_TX2+
26	NC
27	GND
28	NC
29	PCIE4_KEY-M_RX1-
30	NC
31	PCIE4_KEY-M_RX1+
32	NC
33	GND
34	NC
35	PCIE4_KEY-M_A_TX1-
36	NC
37	PCIE4_KEY-M_A_TX1+
38	NC
39	GND
40	NC
41	PCIE4_KEY-M_RX0-
42	NC
43	PCIE4_KEY-M_RX0+
44	NC
45	GND
46	NC
47	PCIE4_KEY-M_a_TX0-
48	NC
49	PCIE4_KEY-M_a_TX0+
50	PLTRST_MKEY_BUFFER#
51	GND
52	CLK2_M2MB_a_PCIE_REQ#
53	CK_100M_a_MKEY_N
54	M.2_PCIE_WAKE#
55	CK_100M_a_MKEY_P
56	NC
57	GND
58	NC
67	NC
68	PCH_SUSCLK_R_MKEY
69	NC

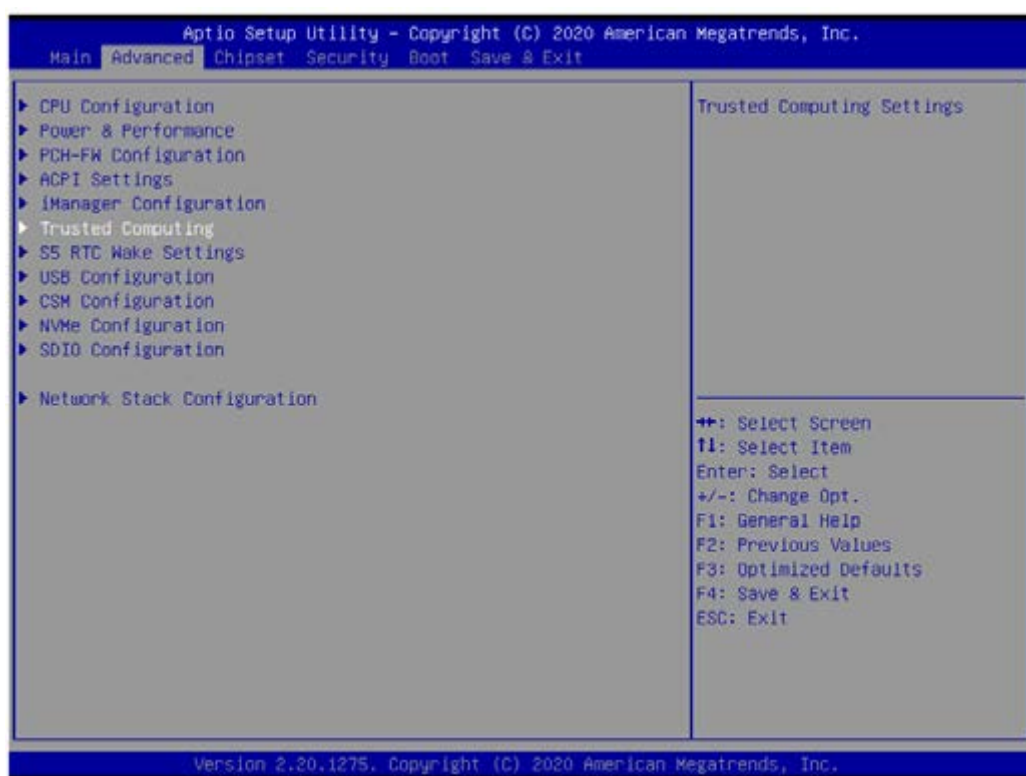
Table A.3:

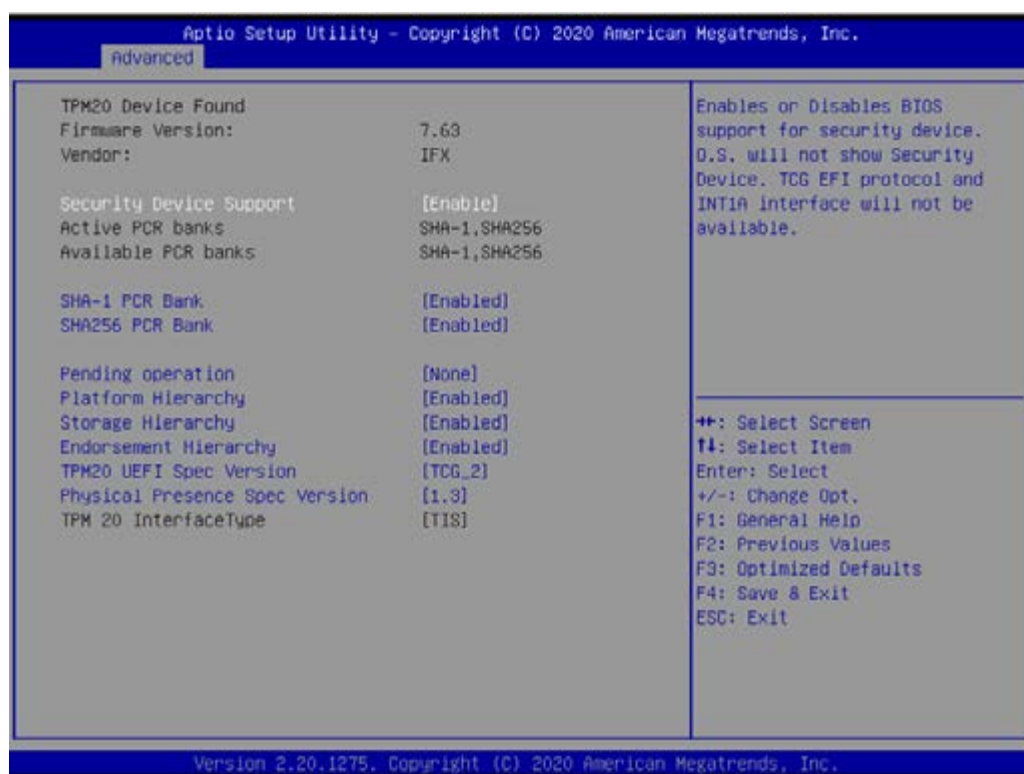
70	+V3.3_M.2
71	GND
72	+V3.3_M.2
73	GND
74	+V3.3_M.2
75	GND
H1	
H2	
H3	NC
H4	

A.2 TPM 2.0 BIOS Setting

UNO-238 V2 systems support TPM2.0 functionality. This can be enabled or disabled in the BIOS menu by following the instructions provided below.

1. Power on the UNO-238 V2 system and press “Delete” to enter the BIOS configuration menu.
2. On the “Advanced” tab, select the “Trusted Computing” item.

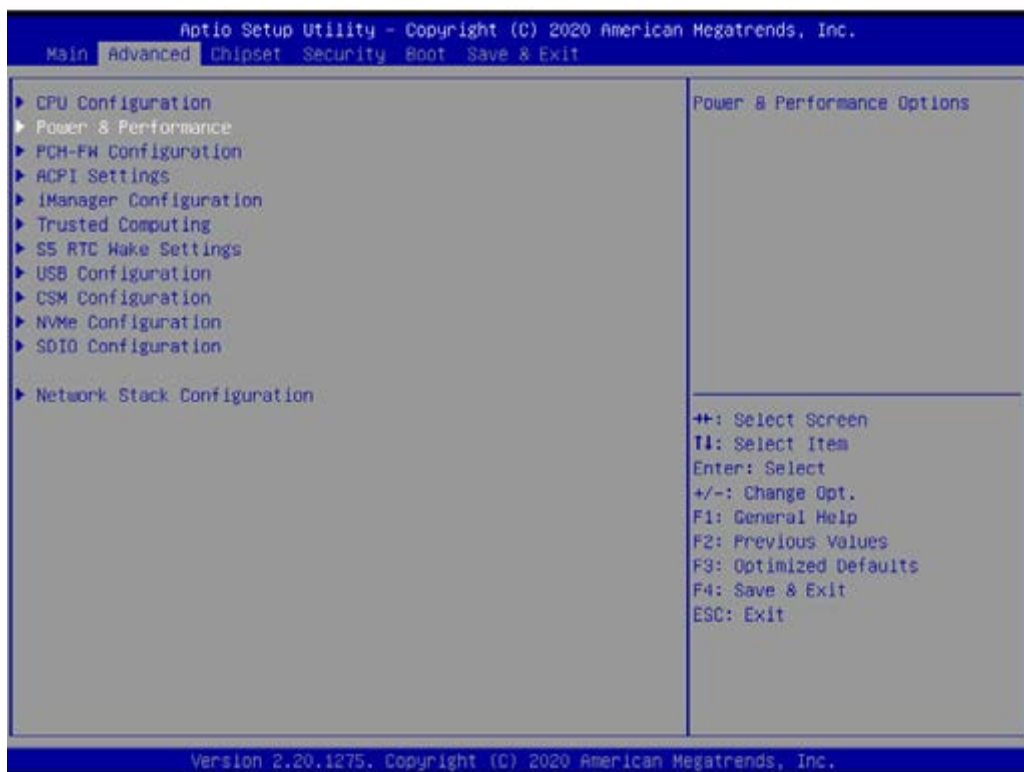


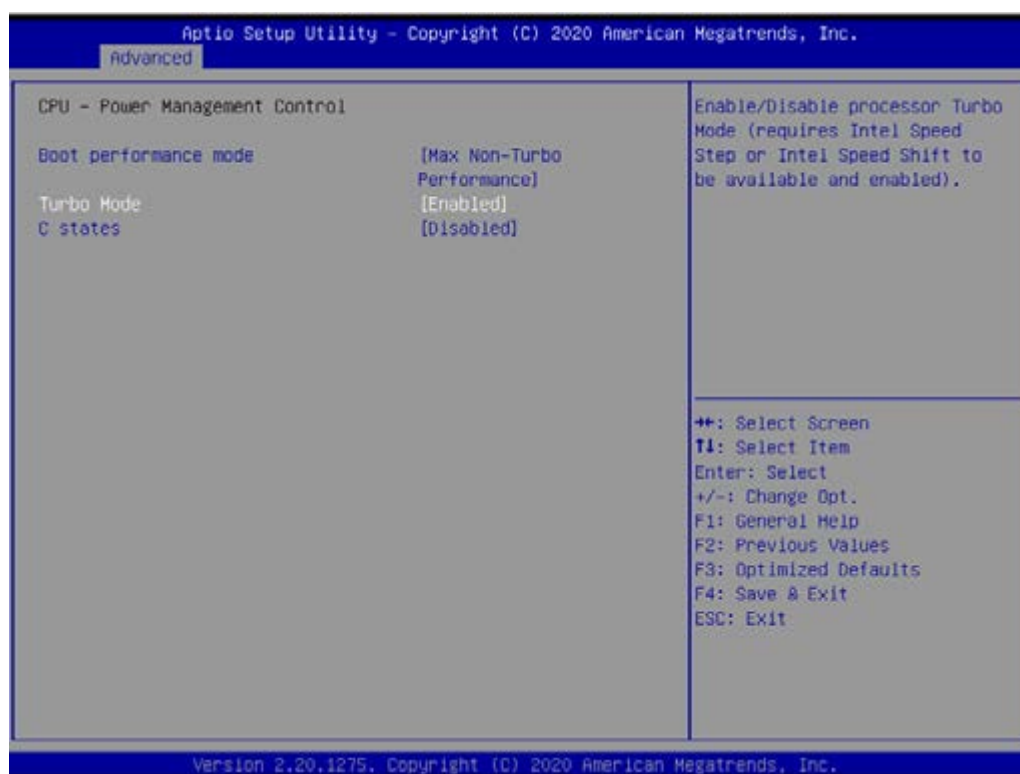


A.3 CPU Turbo mode BIOS Setting

The UNO-238 V2 systems support CPU Turbo mode. This can be enabled or disabled in the BIOS menu by following the instructions provided below

1. Power on the UNO-238 V2 system and press "Delete" to enter the BIOS configuration menu.
2. On the "Advanced" tab, select the "Power & Performance".
3. Then select the CPU - Power Management Control
4. Choose "enable/disable" to enable or disable the CPU Turbo mode

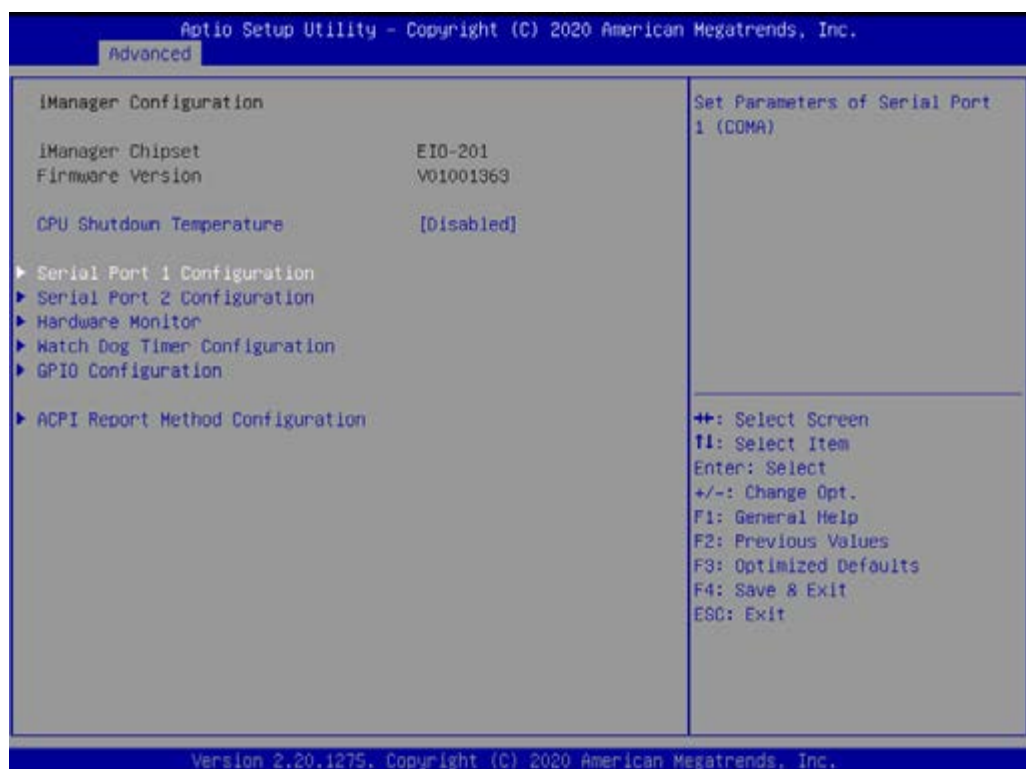
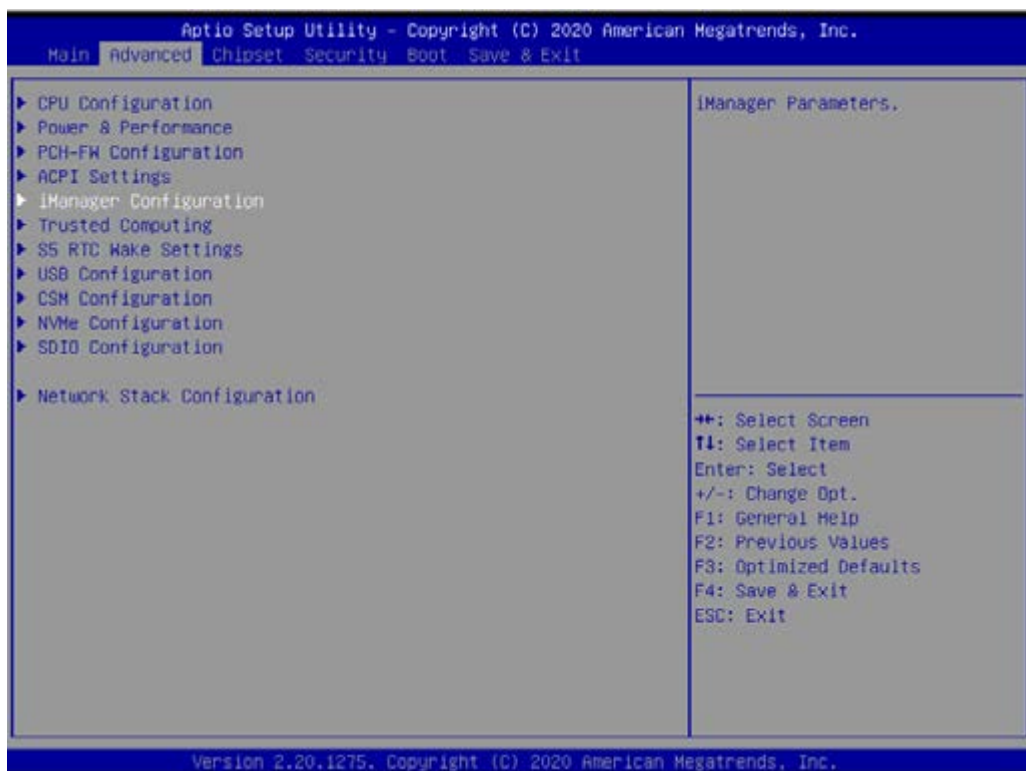


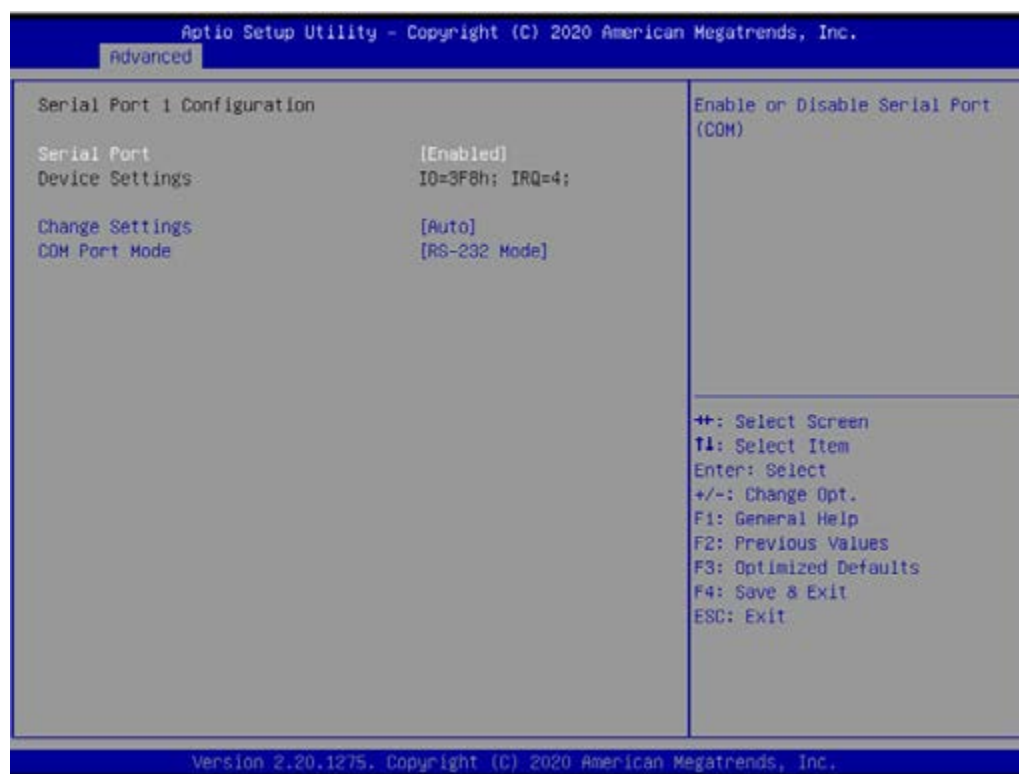


A.4 Serial Port 1 Configuration

The UNO-238 V2 systems support Serial port 1 RS-232/RS-422/RS-485 mode.

1. Power on the UNO-238 V2 system and press “Delete” to enter the BIOS configuration menu.
2. On the “Advanced” tab, select the “Serial Port 1 Configuration”.
3. Choose “RS-232 mode / RS-422 mode / RS-485 mode” to COM Port Mode

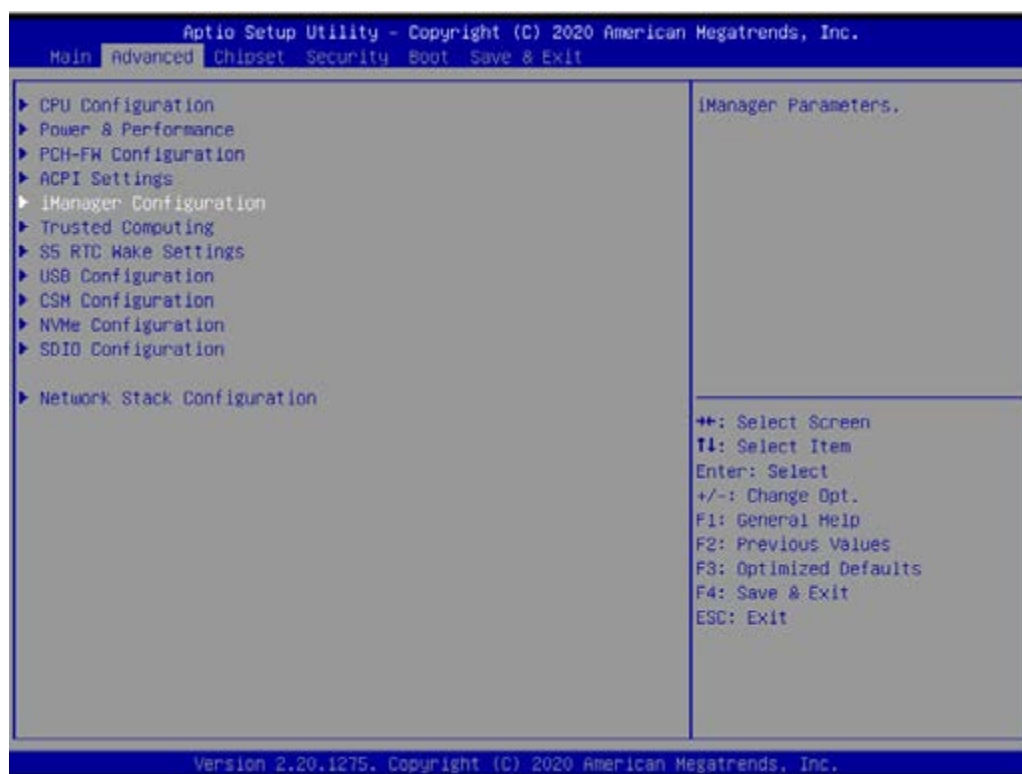


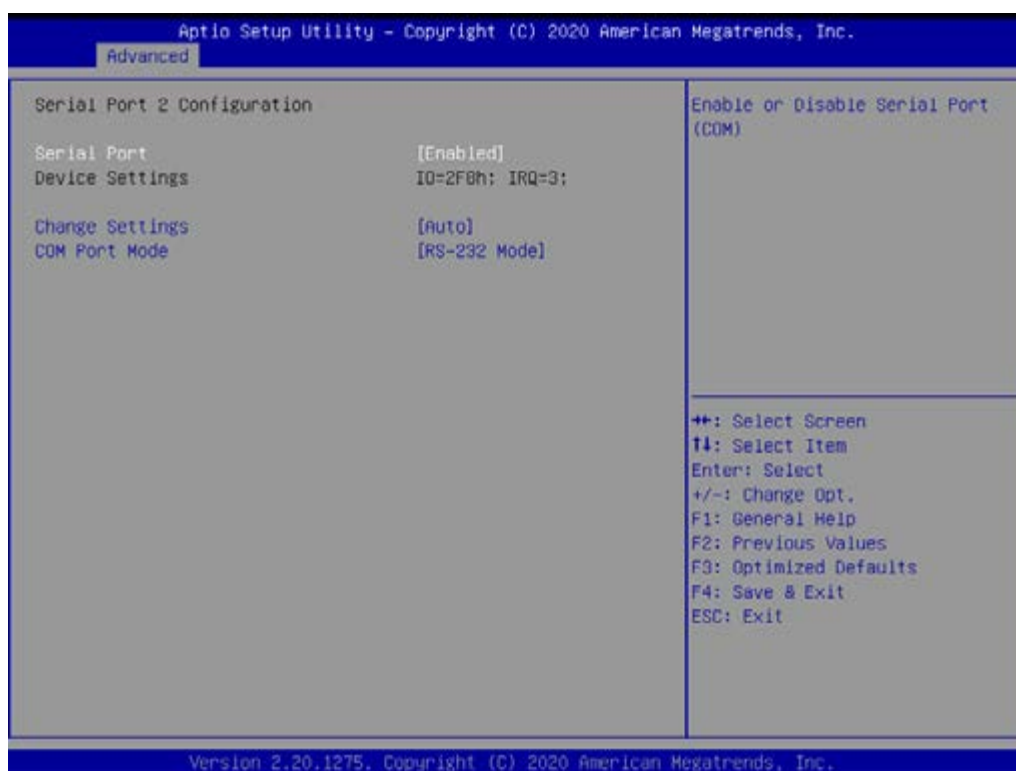
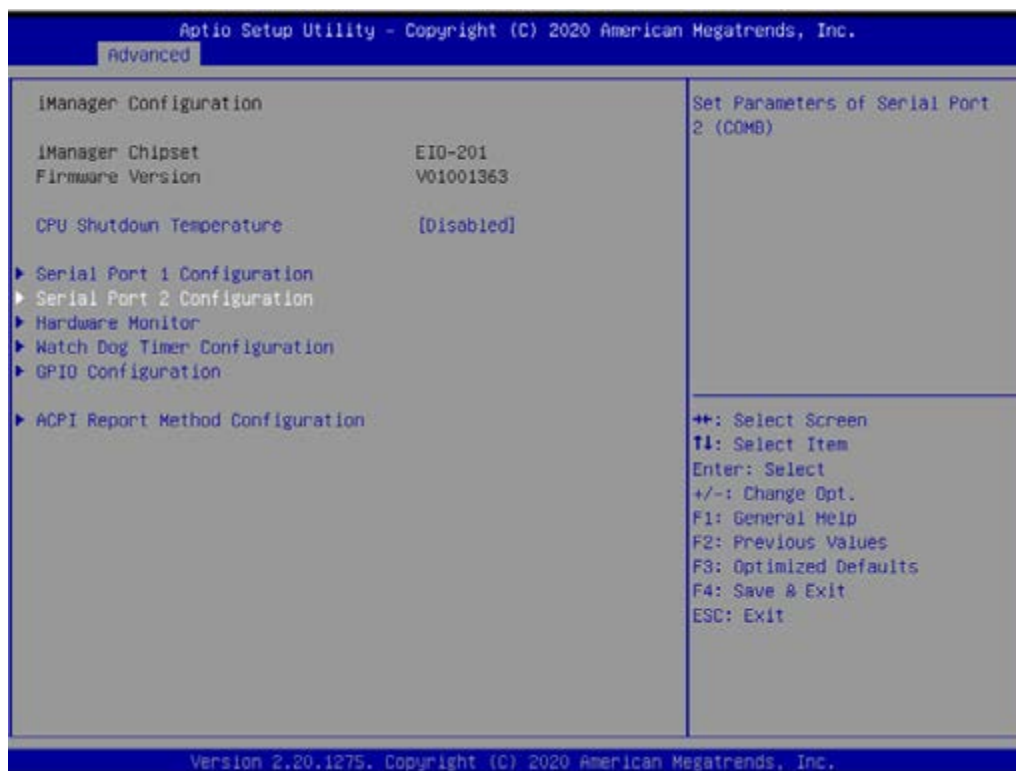


A.5 Serial Port 2 Configuration

The UNO-238 V2 systems support Serial port 2 RS-232/RS-422/RS-485 mode.

1. Power on the UNO-238 V2 system and press "Delete" to enter the BIOS configuration menu.
2. On the "Advanced" tab, select the "Serial Port 1 Configuration".
3. Choose "RS-232 mode / RS-422 mode / RS-485 mode" to COM Port Mode.

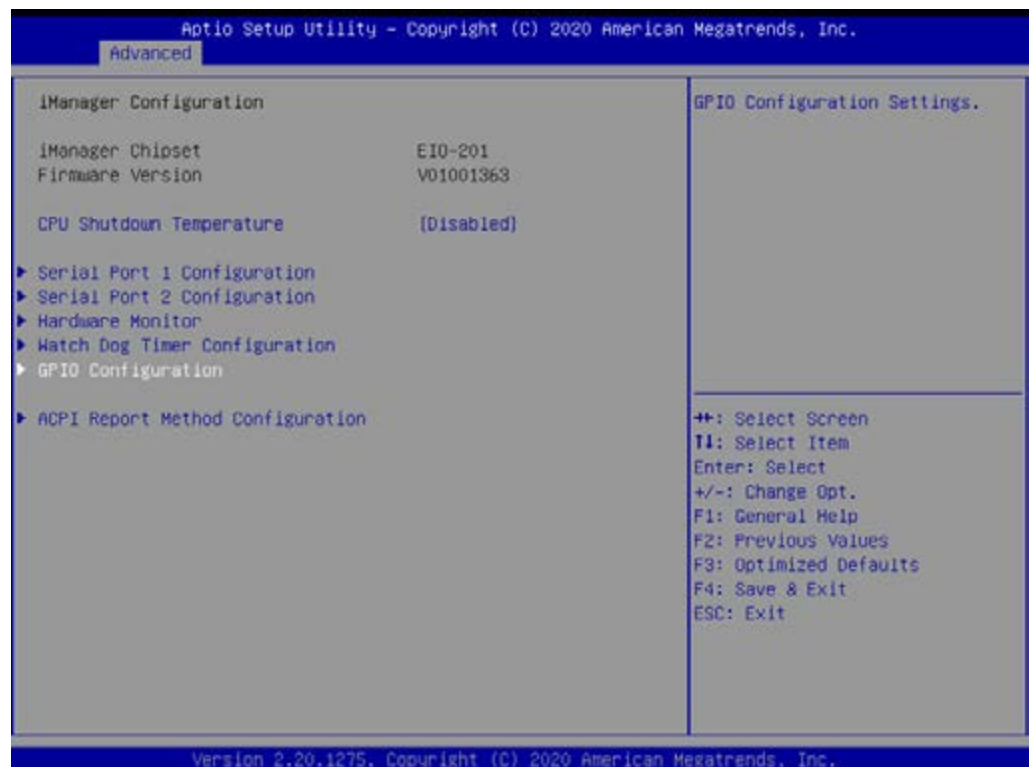
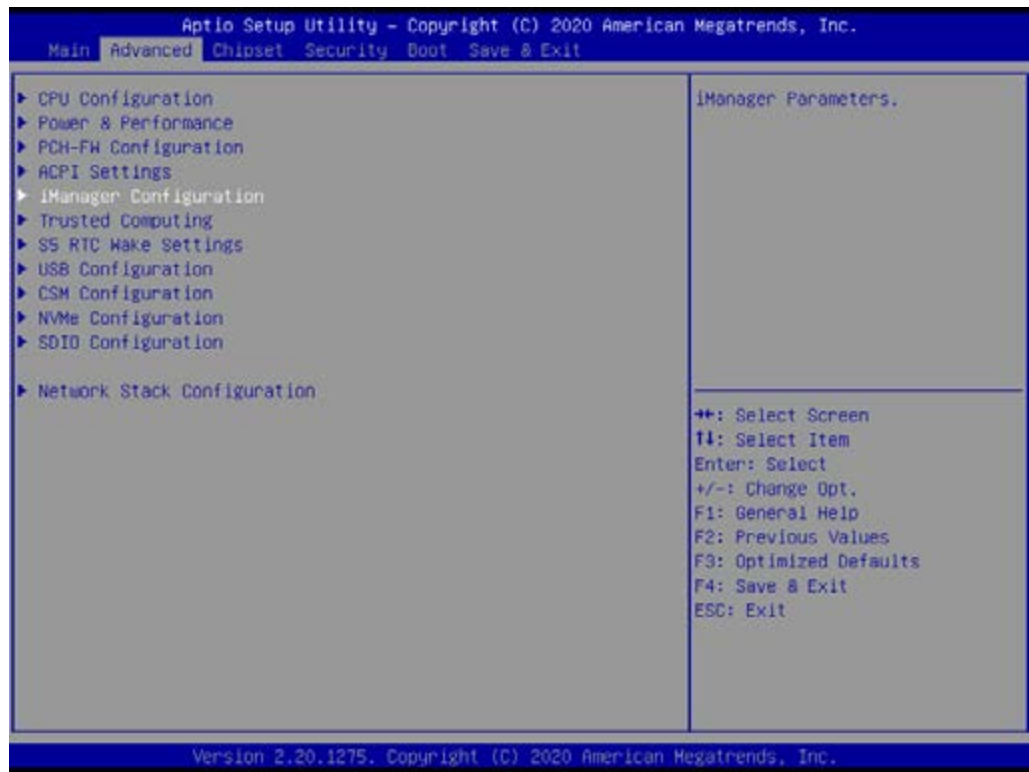




A.6 GPIO Configuration

The UNO-238 V2 systems support GPIO 0~7.

1. Power on the UNO-238 V2 system and press “Delete” to enter the BIOS configuration menu.
2. On the “Advanced” tab, select the “GPIO Configuration”.
3. Choose “Input / Output” to GPIO 0~7.

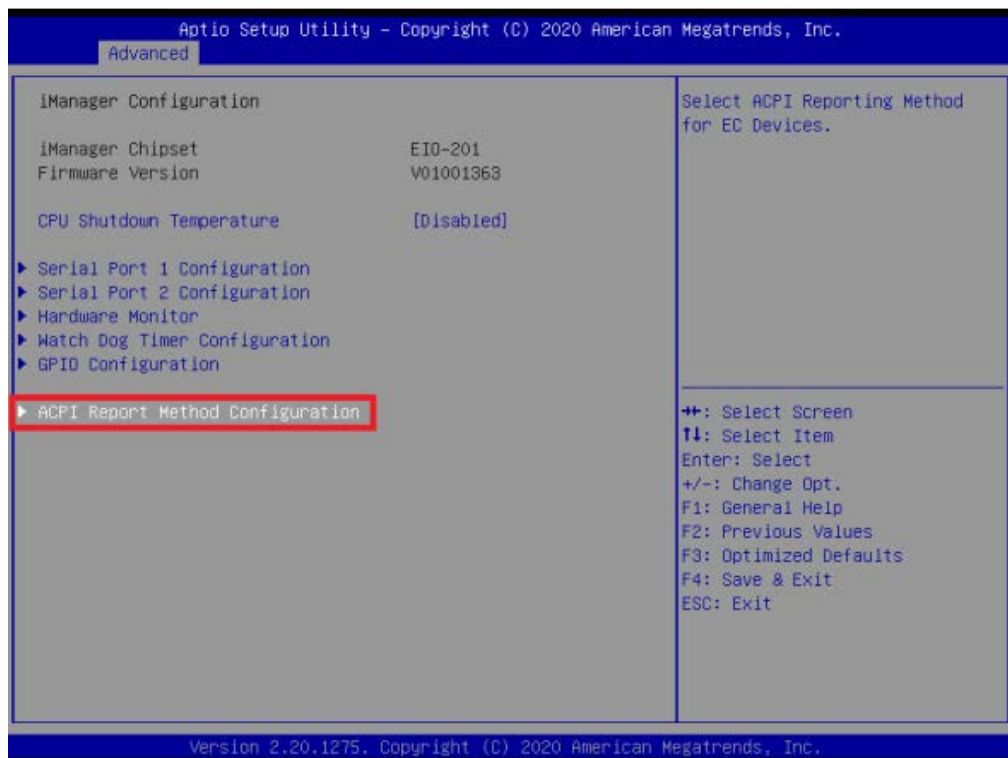
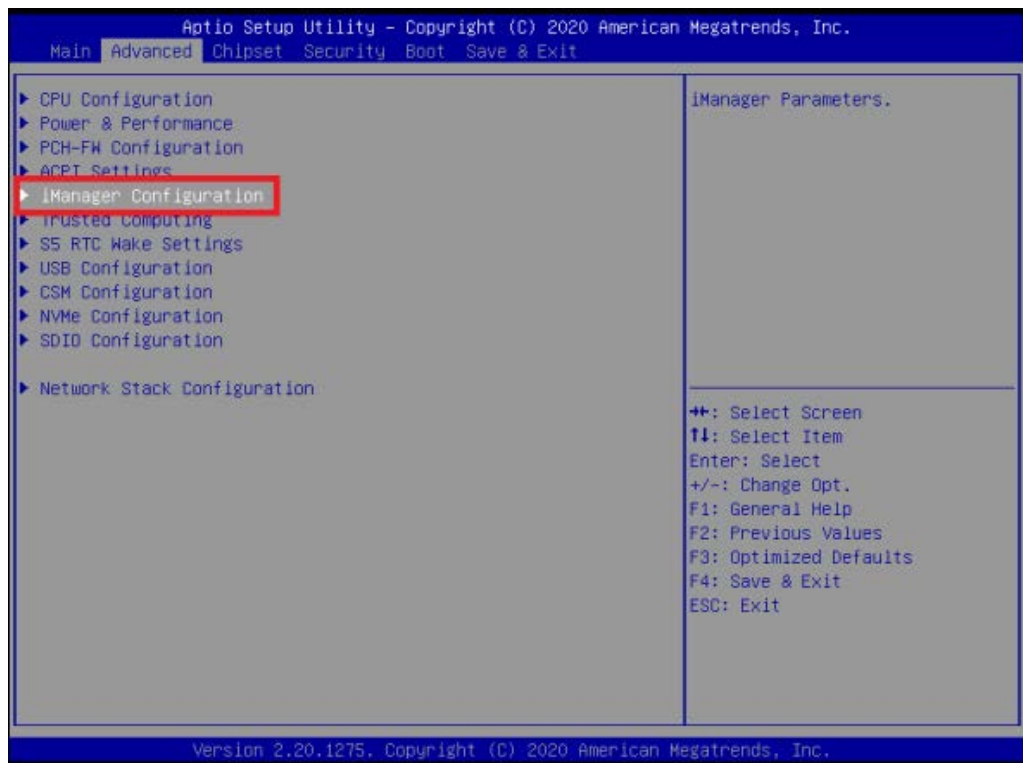


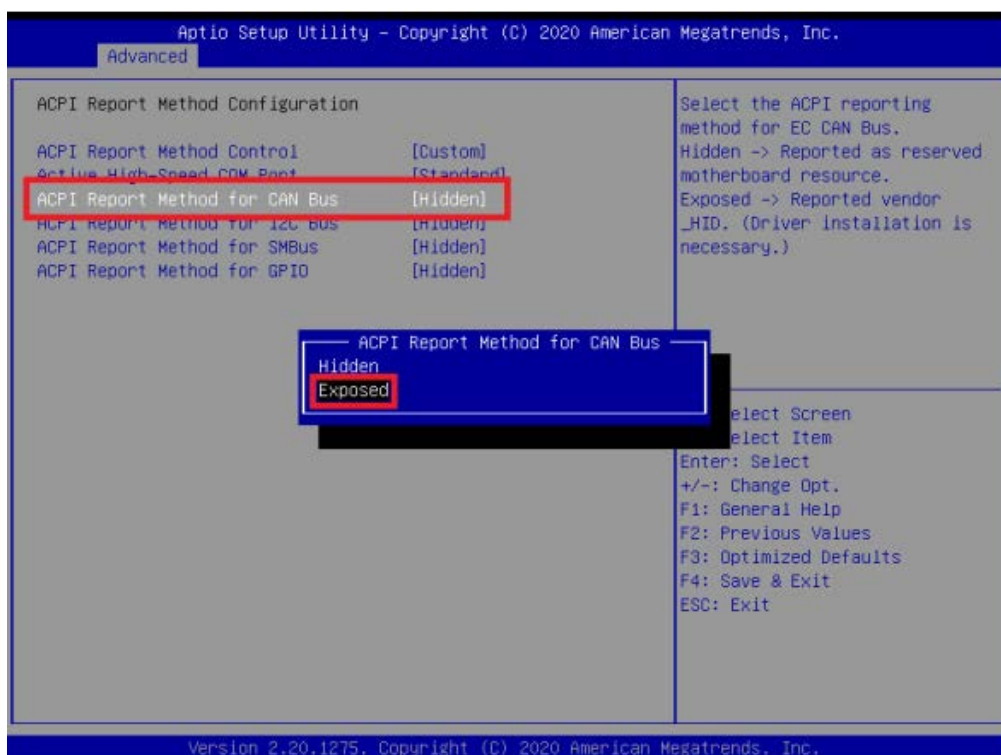
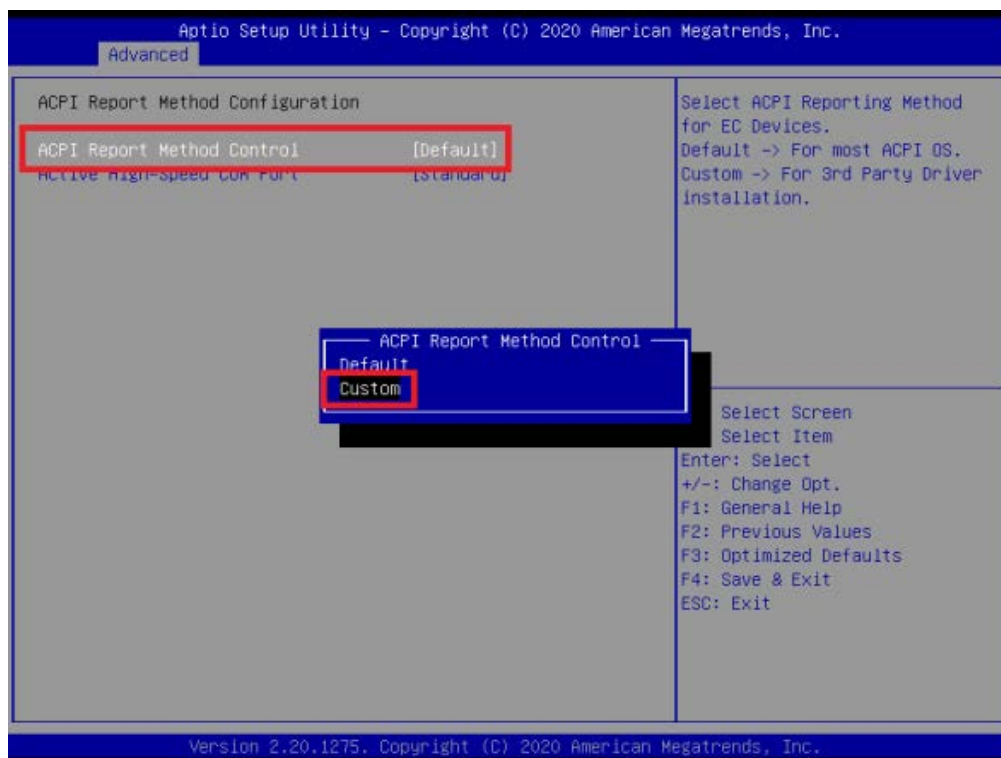


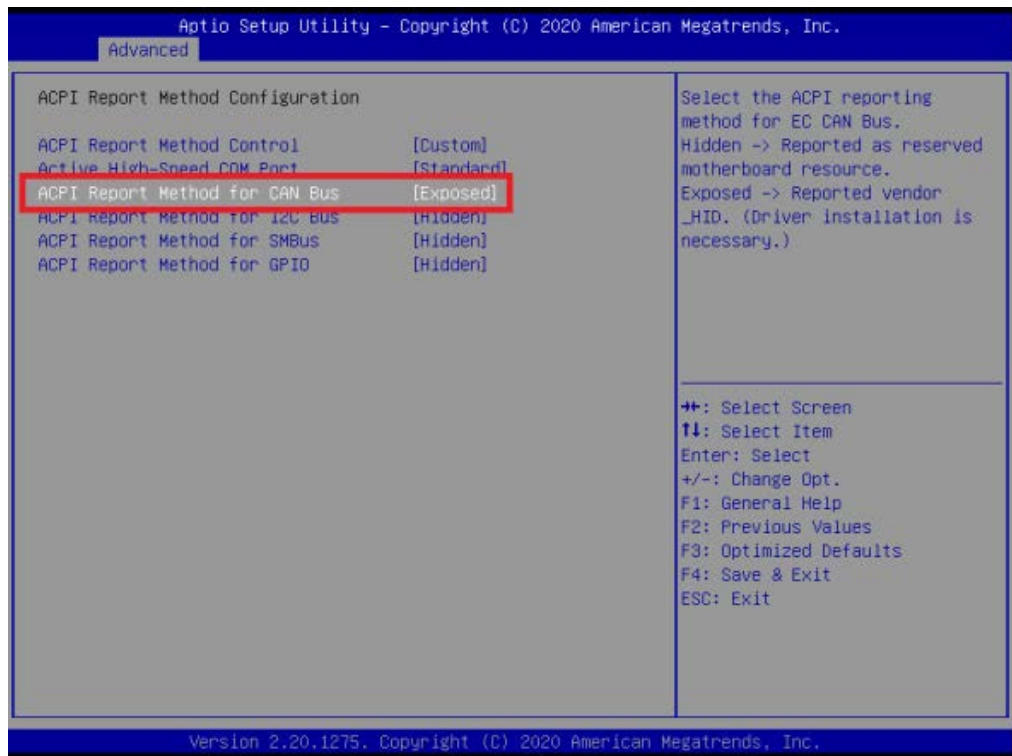
A.7 CANBus Configuration

The UNO-238 V2 systems support CANBus (Optional).

1. Power on the UNO-238 V2 system and press “Delete” to enter the BIOS configuration menu.
2. On the “Advanced” tab, select the “iManager Configuration”.
3. Select “ACPI Report Method Configuration”.
4. Select “ACPI Report Method Control”, choose “Custom”.
5. Select “ACPI Report Method for CANBus”, choose “Exposed”.







www.advantech.com

Please verify specifications before quoting. This guide is intended for reference purposes only.

All product specifications are subject to change without notice.

No part of this publication may be reproduced in any form or by any means, such as electronically, by photocopying, recording, or otherwise, without prior written permission from the publisher.

All brand and product names are trademarks or registered trademarks of their respective companies.

© Advantech Co., Ltd. 2023