



KBox B-203-RPL

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KBox B-203-RPL – User Guide

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NOTICE

You find the most recent version of the “General Safety Instructions” online in the download area of this product.

NOTICE

This product is not intended for use or suited for storage or operation in corrosive environments, in particular under exposure to sulfur and chlorine and their compounds. For information on how to harden electronics and mechanics against these stress conditions, contact Kontron Support.

Revision History

Revision	Brief Description of Changes	Date of Issue	Author
1.0	Initial version	14-Oct-2025	CW
1.1	Changes made to Table 8 Reference Expansion devices and Chapter 9.2.2: 24 VDC wiring information.	29.10.2025	CW

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Symbols

The following symbols may be used in this user guide



DANGER indicates a hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury

ATTENTION indique une situation dangereuse qui, si elle n'est pas évitée, peut entraîner des blessures mineures ou modérées.



NOTICE indicates a property damage message.



Electric Shock!

This symbol and title indicate hazards due to electrical shocks (> 60 V) when touching products or parts of products. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.



ESD Sensitive Device!

This symbol and title indicate that the electronic boards and their components are sensitive to static electricity. Care must be taken during all handling operations and inspections of this product to always ensure product integrity.



Caution: HOT Surface!

This symbol and title indicate a hot surface that must not be touched until it has cooled down.

Attention : Surface CHAUDE !

Ne pas toucher ! Laissez refroidir avant de procéder à l'entretien.



Caution: Laser!

This symbol and title indicate the risk of exposure to laser beam and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.



Caution: High Sound Pressure!

This symbol and title indicate that high sound pressure is possible with headphones. There is a risk of hearing damage. Do not listen at high volume levels for long periods of time.

**Security**

This symbol and title indicate general information and guidelines regarding the product's cyber security to ensure secure installation, operation, maintenance and disposal of the product within the user's end environment.



This symbol indicates information about the product and the user guide.



This symbol precedes helpful hints and tips for daily use.

For Your Safety

Your new Kontron product was developed and tested carefully to provide all the features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

High Voltage Safety Instructions

As a precaution and in case of danger, the power connector must be easily accessible. The power connector is the product's main disconnect device.

⚠ CAUTION

Warning

All operations on this product must be carried out by sufficiently skilled personnel only.

⚠ CAUTION



Electric Shock!

Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.

Earth ground connection to vehicle's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instruction

NOTICE



ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

⚠ CAUTION

Handling and operation of the product is permitted only for trained personnel within a workplace that is access controlled. Follow the "General Safety Instructions" supplied with the product.

Do not handle this product out of the product's protective enclosure while the product is not used for operational purposes unless the product is otherwise protected.

Whenever possible, unpack or pack this product only at an EOS/ESD safe workplace. Where a safe workplace is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.

It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the lithium battery.

⚠ CAUTION

Risk of Explosion if the lithium Battery is replaced by an incorrect Type. Dispose of used lithium batteries according to the instructions.

Risque d'explosion si la pile au lithium est remplacée par une pile de type incorrect.

Éliminez les piles au lithium usagées conformément aux instructions.

General Instructions on Usage

In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the product, that are not explicitly approved by Kontron and described in this user guide or received from Kontron Support as a special handling instruction, will void your warranty.

This product should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This also applies to the operational temperature range of the specific board version that must not be exceeded. If batteries are present, their temperature restrictions must be considered.

In performing all necessary installation and application operations, only follow the instructions supplied by the present user guide.

Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the product then re-pack the product as delivered.

Special care is necessary when handling or unpacking the product. See Special Handling and Unpacking Instruction.

Quality and Environmental Management

Kontron aims to deliver reliable high-end products designed and built for quality, and aims to comply with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit [Quality | Kontron](#) and [Material Compliance | Kontron](#).

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1/Introduction

This user guide describes the KBox B-203 RPL, part of the KBox B industrial Box PC series, also known as product within this user guide. This user guide focuses on describing the product's special features and how to assemble, install, operate, maintain and dispose of the product properly. New users are recommended to study the instructions within this user guide before switching on the product.

Figure 1: KBox B-203 RPL



At the heart of the KBox B-203-RPL is the Kontron mITX motherboard K3836-Q, designed and manufactured in Germany that supports 14th Generation Intel® Core™ i3/i5/i7/i9 and Intel® Desktop 300T Processors. The motherboard is equipped with the Intel® Q670E chipset and offers two SODIMM sockets for high-performance DDR5 system memory with up to 96 GBytes and storage with up to two fast SSDs supporting RAID.

With product ensures high data throughput and connectivity with one 2.5 GbE port, one 1 GbE, up to two COM ports, ten USB ports (including one USB-C) and optional fast wireless connection with Wi-Fi and Bluetooth®. The four DisplayPorts enable the connection of up to four simultaneous displays. The product is powered by an AC/DC (150 W) power supply provided by Kontron in the delivery or optionally a 24 VDC power variant for direct connection to an external 24 VDC power supply.

The product's compact design supports the thermal concept with a low noise level 'Whisper Quiet Operation' 34 dB(A) maximum to ensure smooth operation at temperatures up to +45°C and thus permanent, high availability use around the clock. The product's flexible mounting options support desktop and wall mounting with attachable brackets.

General features overview:

Motherboard

- mITX K3836-Q

Processors

- Intel Core™ Processors series i9/i7/i5/i3 14th Generation
- Intel® Desktop 300T

Chipset

- Intel® Q670E

System Memory

- 2x SODIMM sockets for DDR5 up to 96 GB

Rear Interfaces:

- 4x DP
- 3x USB 3.2 Gen 2
- 1x USB-C 3.2 Gen 2

- 4x USB 2.0
- 1x 2.5 GbE
- 1x 1 GbE
- Audio (1x Line-In, 1x Line-Out)
- 1x COM RS232 (option)
- 1x Breakout panel (COM RS232 or S/PDIF option)

Front Interfaces:

- 2x USB 3.2 Gen 1

System Expansion

- Wi-Fi 6E/Bluetooth® (option)
- Storage (2x M.2 2280 NVMe SSD with RAID support) (option)

Software

- Windows 11
- Linux (Debian)

Power DC IN

- 12 VDC (AC/DC PSU, 150 W)
- 24 VDC (160 W) (option)

Installation

- Desktop
- Wall mount
- VESA 100 Mount

2/General Safety Instructions

Please read this passage carefully and take careful note of the instructions, which have been compiled for your safety and to ensure to apply in accordance with intended regulations. If the following general safety instructions are not observed, it could lead to injuries to the operator and/or damage of the product; in cases of non-observance of the instructions Kontron Europe is exempt from accident liability, this also applies during the warranty period.

The product has been built and tested according to the basic safety requirements for low voltage (LVD) applications and has left the manufacturer in safety-related, flawless condition. To maintain this condition and to also ensure safe operation, the operator must not only observe the correct operating conditions for the product but also the following general safety instructions:

- The product must be used as specified in the product documentation, in which the instructions for safety for the product and for the operator are described. These contain guidelines for setting up, installation and assembly, maintenance, transport or storage.
- The on-site electrical installation must meet the requirements of the country's specific local regulations.
- If a power cable comes with the product, only this cable should be used. Do not use an extension cable to connect the product.
- To guarantee that sufficient air circulation is available to cool the product, please ensure that the ventilation openings are not covered or blocked. If a filter mat is provided, this should be cleaned regularly. Do not place the product close to heat sources or damp places. Make sure the product is well ventilated.
- Only connect the product to an external power supply providing the voltage type (AC or DC) and the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1 .
- Only products or parts that meet the requirements for Power Source (PS1) of UL/IEC 62368-1 may be connected to the product's available interfaces (I/O).
- Before opening the product, make sure that the product is disconnected from the mains.
- Switching off the product by its power button does not disconnect it from the mains. Complete disconnection is only possible if the power cable is removed from the wall plug or from the product. Ensure that there is free and easy access to enable disconnection.
- The product may only be opened for the insertion or removal of add-on cards (depending on the configuration of the product). This may only be carried out by qualified operators.
- If extensions are being carried out, the following must be observed:
 - all effective legal regulations and all technical data are adhered to
 - the power consumption of any add-on card does not exceed the specified limitations
 - the current consumption of the product does not exceed the value stated on the product label
- Only original accessories that have been approved by Kontron Europe can be used.
- Please note: safe operation is no longer possible when any of the following applies:
 - the product has visible damages or
 - the product is no longer functioning
 In this case the product must be switched off and it must be ensured that the product can no longer be operated.
- Handling and operation of the product is permitted only for trained personnel within a work place that is access controlled.
- CAUTION: Risk of explosion if the lithium battery is replaced incorrectly (short-circuited, reverse-poled, wrong lithium battery type). Dispose of used lithium batteries according to the manufacturer's instructions.
- This product is not suitable for use in locations where children are likely to be present

2.1. Additional Safety Instructions for DC Power Supply Circuits

- To guarantee safe operation, please observe that:
 - the external DC power supply must meet the criteria for LPS and PS2 (UL/IEC 62368-1)
 - no cables or parts without insulation in electrical circuits with dangerous voltage or power should be touched directly or indirectly
 - a reliable functional earth connection is provided
 - a suitable, easily accessible disconnecting device is used in the application (e.g. overcurrent protective device), if the product itself is not disconnect able
 - a disconnect device, if provided in or as part of the product, shall disconnect both poles simultaneously
 - interconnecting power circuits of different products cause no electrical hazards
- A sufficient dimensioning of the power cable wires must be selected – according to the maximum electrical specifications on the product label – as stipulated by EN62368-1 or VDE0100 or EN60204 or UL61010-1 regulations.

For the General Safety Instruction in German or French, visit Kontron's product web page> Downloads> Manuals> General Safety Instructions.

2.2. Instructions générales de sécurité

Veuillez lire attentivement ce passage et prendre bonne note des instructions, qui ont été compilées pour votre sécurité et pour assurer une application conforme aux réglementations prévues. Le non-respect des consignes de sécurité générales suivantes peut entraîner des blessures pour l'utilisateur et/ou des dommages pour le produit. En cas de non-respect des consignes, Kontron Europe est exonéré de la responsabilité en cas d'accident, ceci s'applique également pendant la période de garantie.

Le produit a été construit et testé conformément aux exigences de sécurité de base pour les applications basse tension (DBT) et a quitté le fabricant dans un état impeccable en matière de sécurité. Pour maintenir cet état et pour garantir également un fonctionnement sûr, l'opérateur doit non seulement respecter les conditions d'utilisation correctes du produit, mais aussi les consignes de sécurité générales suivantes :

- Le produit doit être utilisé conformément à la documentation du produit, dans laquelle sont décrites les instructions de sécurité pour le produit et pour l'opérateur. Celles-ci contiennent des directives pour la mise en place, l'installation et le montage, la maintenance, le transport ou le stockage.
- L'installation électrique sur place doit répondre aux exigences des réglementations locales spécifiques du pays.
- Si un câble d'alimentation est fourni avec le produit, seul ce câble doit être utilisé. N'utilisez pas de rallonge pour connecter le produit.
- Afin de garantir une circulation d'air suffisante pour refroidir le produit, veuillez vous assurer que les ouvertures de ventilation ne sont pas couvertes ou obstruées. Si un élément filtrant est fourni, celui-ci doit être nettoyé régulièrement. Ne placez pas le produit à proximité de sources de chaleur ou d'endroits humides. Veillez à ce que le produit soit bien ventilé.
- Ne connectez le produit qu'à une alimentation externe fournissant le type de tension (AC ou DC) et la puissance d'entrée (courant max.) spécifiés sur le Label Produit Kontron et répondant aux exigences de la source d'alimentation limitée (LPS) et de la source d'alimentation (PS2) de la norme UL/IEC 62368-1 .
- Seuls les produits ou les pièces qui répondent aux exigences de la source d'alimentation (PS1) de la norme UL/IEC 62368-1 peuvent être connectés aux interfaces (E/S) disponibles du produit.
- Avant d'ouvrir le produit, assurez-vous qu'il est bien débranché du secteur.
- Le fait d'éteindre le produit par son bouton de mise en marche ne le déconnecte pas du secteur. Une déconnexion complète n'est possible que si le câble d'alimentation est retiré de la prise murale ou du produit. Veillez à ce que l'accès soit libre et facile pour permettre la déconnexion.
- Le produit ne peut être ouvert que pour l'insertion ou le retrait de cartes supplémentaires (selon la configuration du produit). Cette opération ne peut être effectuée que par des opérateurs qualifiés.

- Si des extensions sont effectuées, les points suivants doivent être respectés :
 - toutes les réglementations légales en vigueur et toutes les données techniques sont respectées
 - la consommation électrique d'une carte supplémentaire ne dépasse pas les limites spécifiées
 - la consommation actuelle du produit ne dépasse pas la valeur indiquée sur l'étiquette du produit.
- Seuls les accessoires d'origine approuvés par Kontron Europe peuvent être utilisés.
- Veuillez noter que la sécurité des opérations n'est plus possible lorsque l'une des conditions suivantes s'applique.
 - le produit présente des dommages visibles ou
 - le produit ne fonctionne plus. Dans ce cas, le produit doit être éteint et il faut s'assurer que le produit ne puisse plus être utilisé.
- La manipulation et le fonctionnement du produit ne sont autorisés que pour le personnel formé dans un lieu de travail dont l'accès est contrôlé.
- ATTENTION: Risque d'explosion en cas de remplacement incorrect de la pile au lithium (court-circuit, inversion de polarité, mauvais type de pile au lithium). Éliminez les piles au lithium usagées conformément aux instructions du fabricant.
- Ce produit n'est pas adapté à une utilisation dans des endroits où des enfants sont susceptibles d'être présents
- Instructions de sécurité supplémentaires pour les circuits d'alimentation en courant continu
- Pour garantir un fonctionnement sûr, veuillez observer ce qui suit:
 - l'alimentation électrique externe en courant continu doit répondre aux critères des LPS et PS2 (UL/IEC 62368-1)
 - aucun câble ou pièce non isolée dans les circuits électriques ayant une tension ou une puissance dangereuse ne doit être touché directement ou indirectement
 - une connexion à la terre fonctionnelle fiable est fournie
 - un dispositif de déconnexion approprié et facilement accessible est utilisé dans l'application (par exemple, un dispositif de protection contre les surintensités), si le produit lui-même n'est pas en mesure d'être déconnecté.
 - un dispositif de déconnexion, s'il est prévu dans le produit ou s'il en fait partie, doit déconnecter les deux pôles simultanément
 - l'interconnexion des circuits électriques de différents produits ne présente aucun risque électrique
- Un dimensionnement suffisant des fils du câble d'alimentation doit être choisi - en fonction des spécifications électriques maximales figurant sur l'étiquette du produit - comme stipulé par les réglementations EN62368-1 ou VDE0100 ou EN60204 ou UL61010-1.

2.3. Electrostatic Discharge (ESD)

A sudden discharge of electrostatic electricity can destroy static-sensitive devices or micro-circuitry. Therefore, proper packaging and grounding techniques are necessary precautions to prevent damage.

Always take the following precautions:



ESD Sensitive Device!

Keep electrostatic sensitive parts in their containers until they arrive at the ESD-safe workplace. Always be properly grounded when touching a sensitive board, component, or assembly.

For more Information, see the Special Handling and Unpacking Instruction within this user guide and Chapter 2.4: Grounding Methods.

2.4. Grounding Methods

The following measures help to avoid electrostatic damages to the device:

- › Cover workstations with approved antistatic material. Always wear a wrist strap connected to the workplace, as well as properly grounded tools and equipment.
- › Use antistatic mats, heel straps, or air ionizers for more protection.
- › Always handle electrostatically sensitive components by their edge or by their casing.
- › Avoid contact with pins, leads, or circuitry.
- › Switch off power and input signals before inserting and removing connectors or connecting test equipment.
- › Keep the work area free of non-conductive materials such as ordinary plastic assembly aids and styrofoam.
- › Use field service tools such as cutters, screwdrivers, and vacuum cleaners that are conductive.
 - › Always place drives and boards with the PCB-assembly-side down on the foam.

2.5. Instructions for Lithium Battery

The product is equipped with a lithium battery, there is a risk of explosion if the lithium battery is replaced incorrectly (short-circuited, reverse-poled, wrong lithium battery type). Dispose of used batteries according to the manufacturer's instructions. For more information, see Chapter 14.2: Replacing Lithium Battery.

⚠ CAUTION

Danger of Explosion if the lithium battery is incorrectly placed!

- › Replace only with the same or equivalent type recommended by the manufacturer
- › Dispose of used batteries according to the manufacturer's instructions

ATTENTION- Risque d'explosion avec l'échange inadéquat de la batterie!

- › Remplacement seulement par le même ou un type équivalent recommandé par le producteur
- › L'évacuation des batteries usagées conformément à des indications du fabricant

VORSICHT- Explosionsgefahr bei unsachgemäßem Austausch der Batterie!

- › Ersatz nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ
- › Entsorgung gebrauchter Batterien nach Angaben des Herstellers



The product is not designed to operate without a lithium battery. If the lithium battery is empty or disconnected, the BIOS settings will be set to the factory defaults.



Do not dispose of lithium batteries in general trash collection. Dispose of the lithium battery according to the local regulations dealing with the disposal of these special materials, (e.g. to the collecting points for disposal of batteries).

3/ Shipment and Unpacking

3.1. Packaging

The KBox B-203-RPL is packaged together with all parts, in a product specific cardboard package designed to provide adequate protection and absorb shock.

3.2. Unpacking

To unpack the product, perform the following:

1. Remove packaging.
2. Do not discard the original packaging. Keep the original packaging for future transportation or storage.
3. Check the delivery for completeness by comparing the delivery with the original order.
4. Keep the associated paperwork. It contains important information for handling the product.
5. Check the product for visible shipping damage.

If you notice shipping damage or inconsistencies between the contents and the original order, contact your dealer.

3.3. Scope of Delivery

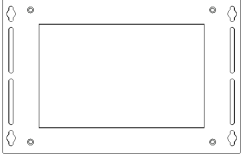
This scope of delivery describes the parts included in your delivery. Check that the delivery is complete, and contains the items listed. If damaged or missing items are discovered, contact your dealer.

Table 1: Scope of Delivery

Part Number	Quantity	Part Description
KBox B-203-RPL	1	KBox B-203-RPL factory configured with all ordered options: ➤ System memory ➤ Storage M.2 SSD (RAID support) ➤ Wi-Fi/BT® ➤ Power options: DC IN 12 VDC (150 W) or DC IN 24 VDC Delivered with four adhesive rubber feet, and the power cable for your region or mating power connector for 24 VDC variant.

3.4. Accessories and Spare Parts

Table 2: List of Accessories and Spare Parts

Part	Order Information	Description
	Order Number: 0-0062-3268	Phoenix 3-pin power connector (PSC 1.5/3-F)
	Order Number: 1064-8948	External AC/DC (150 W) power supply (100/240 VAC to 12 VDC)
	Order Number: 0-0064-2173	Power Cable EU Euro (Type-A), 2.5 m
	Order Number: 0-0064-4173	Power Cable UK UK (Type-C), 2.5 m
	Order Number: 0-0064-4317	Power Cable US US, 2 m
	Order Number: 9-4700-0337	The wall mount bracket kit includes: ➤ One bracket ➤ Four M3x6 screws
	Order Number: 0-0067-006	Chassis feet ➤ Four round adhesive rubber feet
	Manufacturer: SparkLan Article Number: R3410A10050	Product Name: AD-501AX Connector: RPSMA plug (male) Type: Dipole Antenna Frequency: 2.4 GHz/5 GHz/6 GHz Peak gain: 3.7dbi/5dBi/5dBi Hinge: 0° to 90° Impedance: 50 ohms Dimensions: (LxWxT): 162 x 22 x 13.6 mm



For reference expansion device information, see to Table 7: Reference Expansion Devices.

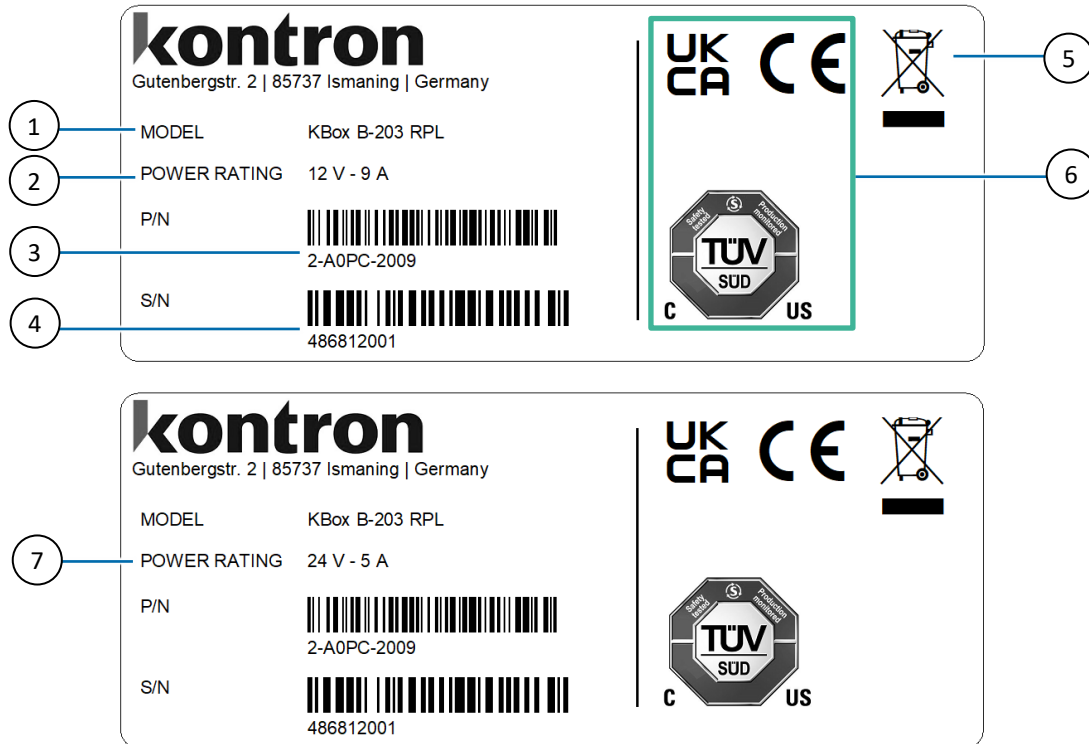
3.5. Type Label and Product Identification

The type label contains specific product identification information and KBox B-203 RPL technical information.



For the electrical specification of your product, refer to the product's Type Label.

Figure 2: Type Label Example



- | | |
|---|--------------------------------------|
| 1. Product name (model) | 5. Dispose properly |
| 2. Electrical specification (12 VDC, 150 W) | 6. Compliance |
| 3. Part number and bar code | 7. Electrical Specification (24 VDC) |
| 4. Serial number and bar code | |

4/Product Features

Before using the KBox B-203-RPL, Kontron recommends new users to take a few minutes to learn about the product's various features.

4.1. Front Panel

The front panel features the power button, two USB 3.2 Gen 1 ports, and ventilation openings for air-output. The front can be ordered as blank metal with stamped lettering or with an installed black plate with lettering.

Figure 3: Front Panel



4.1.1. Power Button (POWER)

The power button switches on or switches off the product and includes an integrated power LED that illuminates blue in the 'on' state. Pressing the power button for longer than four seconds initiates a forced system shut down and switches the product from the 'on' to the 'off' state.

NOTICE

Avoid Data Loss

Performing a forced shut down can lead to loss of data or other undesirable effects!
To shut down without data loss, use the power button.

4.1.2. USB 3.2 Gen 1 Ports (USB 3.0)

The two front panel USB ports are USB 3.2 Gen 1 Type-A ports. Kontron recommends the use of USB 3.2 Gen 1 compliant devices or cables only. The use of devices and cables that violate the USB 3.2 Gen 1 specification may cause conditions such as non-recognition of the device or read/write errors. Further USB ports are available on the rear panel.



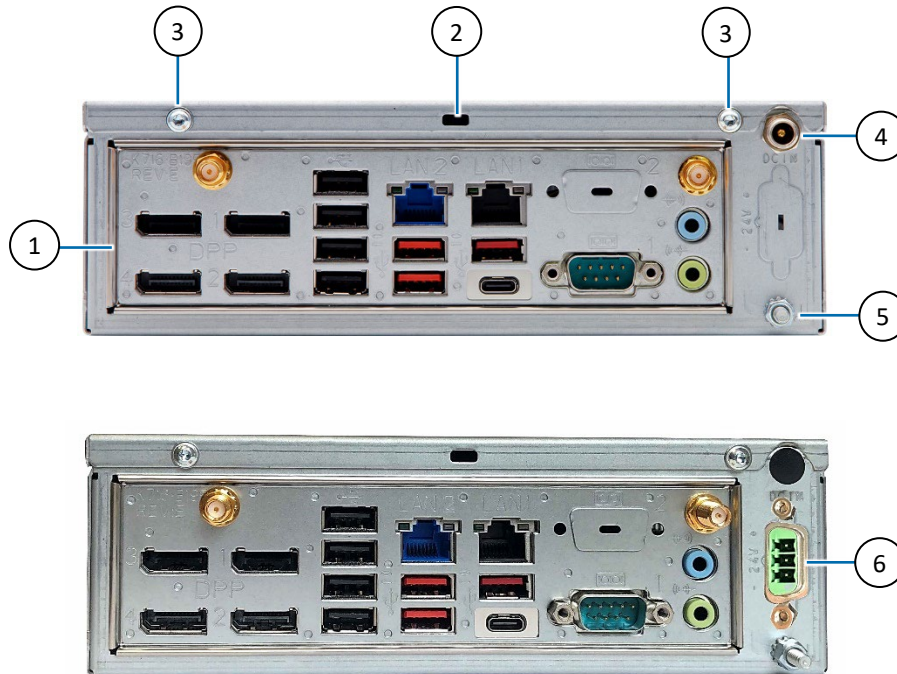
USB 3.2 Gen 1 ports are backwards compatible with earlier USB 3.0 versions and USB 2.0.

For the USB 3.2 Gen 1 pin assignment, see Chapter 11.3: USB 3.2 Gen 2/1 Port Pin Assignment.

4.2. Rear Panel

The rear panel features the main I/O interfaces, power connector (12 VDC or 24 VDC), two RP-SMA antenna connectors (option), potential equalization stud, Kensington lock, and two top cover fastening screws.

Figure 4: Rear Panel



- | | |
|-----------------------|--|
| 1. 1x Interface Panel | 4. 12 VDC DC IN Power Jack (default) |
| 2. 1x Kensington lock | 5. 1x Potential equalization stud |
| 3. 2x Cover screws | 6. 24 VDC DC IN 3-pin connector (option) |

4.2.1. Power Connector (DC IN)

4.2.1.1. 12 VDC DC IN (150 W) (default)

The 12 VDC DC IN power jack connects to the AC/DC 150 W PSU (100/240 VAC to 12 VDC) delivered with the product and chosen to meeting the power specification stated on the product's type label and in Chapter 10.4: Power Specification.

CAUTION

Supplied PSU only

Power the product with the supplied external AC/DC (150 W) PSU only.

For the pin assignment, see Chapter 11.1: 12 VDC DC IN Power Jack Pin Assignment.

4.2.1.2. 24 VDC DC IN (option)

The 24 VDC DC IN 3-pin power connector connects to an external 24 VDC power supply that meets the power specification stated on the product's type label and in Chapter 10.4: Power Specification.

The 3-pin mating power connector delivered with the product must be wired suitably by the user as described in Chapter 9.2.2.1: Wiring the 3-pin Mating Power Connector.

Secure Power Connector

CAUTION

Secure the 3-pin mating power connector (PSC 1.5/3-F) with the two bolts provided. Pay attention to the polarity of the connections.

Protection

CAUTION

Only connect to an external 24 VDC power supply that meets the product's electrical specification displayed on the product type label, and the power consumption, power limitation and power protection requirements specified in this user guide. The 24 VDC power supply must automatically recover from AC power loss and startup under peak loading.

For the pin assignment, see Chapter 11.2: 24 VDC DC IN 3-Pin power Connector Pin Assignment (option).

4.2.2. Potential Equalization Stud

The potential equalization stud ensures that all connected systems share a common potential. When connecting cables, always connect the potential equalization stud first.



The potential equalization stud ensures that all connected systems share a common potential.

4.2.3. Kensington Lock

The Kensington lock slot supports the installation of a standard Kensington lock system that provides an added level of security to prevent theft and third-party access to internal sensitive data stored on the product.



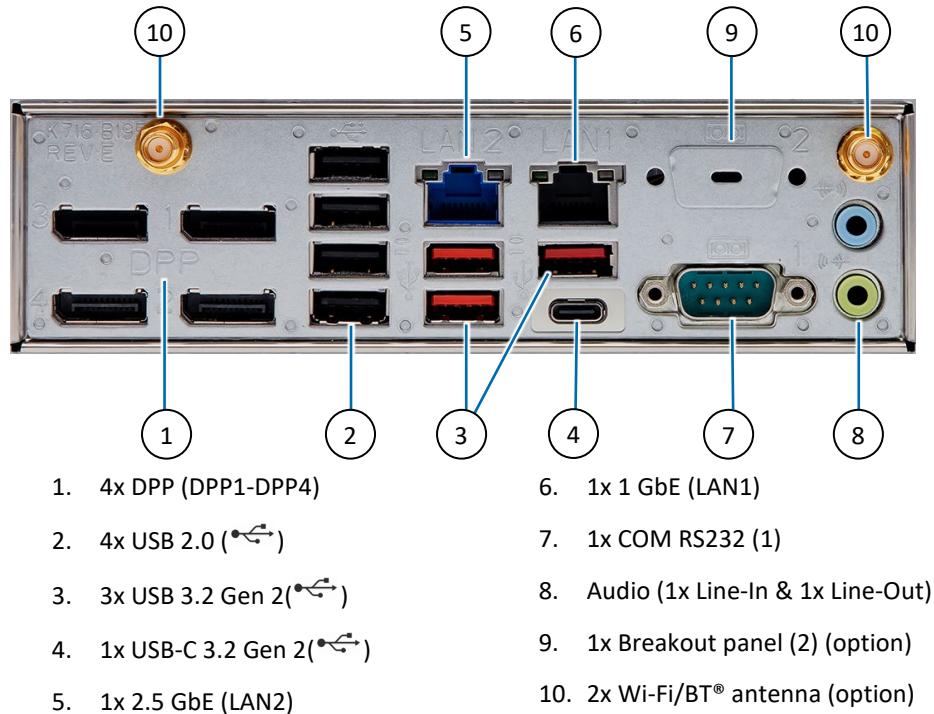
Kensington Lock

Use the Kensington lock to prevent theft and third-party access to sensitive data stored on the product.

4.2.4. Interface Panel

The interface panel features the motherboard I/O interfaces.

Figure 5: Interface Panel



4.2.4.1. USB 3.2 Gen 2 Ports

The three USB ports (Figure 5, pos. 3) are USB 3.2 Gen 2 Type-A ports. Kontron recommends the use on USB 3.2 Gen 2 compliant devices or cables only. The use of devices and cables that violate the USB 3.2 Gen 2 specification may cause conditions such as non-recognition of the device or read/write errors.



All USB 3 connectors provide separate signal lines for USB 3.2 and USB 2.0 and are backwards compatible with earlier USB 3.0 versions and USB 2.0.



For USB 3.2 Gen 2 cabling, use only Hi-Speed USB cable as specified in the USB 3.2 Gen 2 standards.

For the pin assignment, see Chapter 11.3: USB 3.2 Gen 2/1 Port Pin Assignment.

4.2.4.2. USB-C 3.2 Gen 2 Port

The USB Type-C port (Figure 5, pos. 4) is a USB 3.2 Gen 2 port. Power delivery is not supported.

For the pin assignment, see Chapter 11.4: USB-C 3.2 Gen 2 Port Pin Assignment.

4.2.4.3. USB 2.0 Ports

The four USB ports (Figure 5, pos. 2) are USB 2.0 ports. The USB 2.0 ports connect to USB 2.0 devices only.

For the pin assignment, see Chapter 11.5: USB 2.0 Pin Assignment.

4.2.4.4. DisplayPort (DP)

The four DP V1.4a ports (Figure 5, pos. 1) are DisplayPort ++ compatible with a maximum resolution of 3840 x 2160 @ 60 Hz and enable the connection of up to four simultaneous digital displays directly or with an adapter.

Using an adapter to convert a DP signal to DVI or HDMI may cause disturbance.



It is possible to use an adapter:

- › DP to HDMI (passive / active)
- › DP to DVI (passive / active)
- › DP to VGA (active)

Depending on the required resolution, the following maximum number of simultaneous displays can be supported.

Table 3: Display Resolution

Display Resolution	Number of Simultaneous Displays	Display Resolution
8k @ 60Hz HDR or	1 port / 1 pipe, = High Dynamic Range Video	8k @ 60Hz HDR or
5k @ 120Hz HDR	2 (simultaneous), = High Dynamic Range Video	5k @ 120Hz HDR
8k @ 60Hz SDR	4 (simultaneous), = Standard Dynamic Range Video	8k @ 60Hz SDR

Table 4: Display Order Priority Chain

Order of Priority	Priority 1	Priority 2	Priority 3	Priority 4	Priority 5
Display Type	eDP/LVDS	DP1	DP2	DP3	DP4

For the pin assignment, see Chapter 11.6: DisplayPort (DP) V1.4a Pin Assignment.

4.2.4.5. LAN Ports

The LAN ports supports one 2.5 GbE port (Figure 5, pos. 5) implemented using the Intel® i226LM Ethernet controller and one GbE port (Figure 5, pos. 6) implemented using the Intel® i219LM Ethernet controller. The RJ45 LAN connectors include speed and link activity status LEDs, and support Teaming and Time Sensitive Networking (TSN).



Use Shielded LAN cable to meet CE Class B and FCC/B requirements.



The Intel® Ethernet i226 LAN Controller series experiences sporadic networking connection drops with certain routers/switches when Energy Efficient Ethernet (EEE) is enabled. For users experiencing this problem, disable the “EEE” mode in the Advanced Windows/ Linux driver setting.

For the pin assignment, see Chapter 11.7: LAN 2.5 GbE/1 GbE Connector Pin Assignment.

4.2.4.6. COM Port (option)

The COM port (Figure 5, pos. 7) enables the connection of a RS232 compatible serial device.

For the pin assignment, see Chapter 11.9: COM Port Pin Assignment (option).

4.2.4.7. Audio (Line-In, Line-Out)

The audio jacks line input (Line-In /MIC) and headphone output (Line-Out) (Figure 5, pos. 8) enable the connection of full High Definition (HD) devices. For Audio configuration, the Microsoft Windows Control Panel 'Sound' option can be used to choose the input and output HD audio device and set the volume level.



Line-Input Supports:

- › Line: stereo max. 1.3 Vrms (Gain=0 dB) input voltage
 - › Microphone: electric microphones with 1.3 Vrms (Gain=0 dB) or 0.13 Vrms (Gain=20 dB)
- Headphone Output Supports
- › Stereo max. 1.2 Vrms output voltage at 32 Ohm load



Install the audio cable before setting up the audio device in MS Windows.

If MS Windows is installed before the audio cable is connected remove the HD audio device within Windows device Manager. After automatic re-installation, audio works as expected.

For the pin assignment, see Chapter 11.8: Audio (Line-In & Line-Out) Connector Pin Assignment.

4.2.4.8. Wi-Fi/BT® Antenna Connectors (option)

The two antenna connectors (Figure 5, pos. 10) are type RP-SMA female and support Wi-Fi 6E and BT 5.3. The product is delivered with Kontron reference antenna (type: RP-SMA male). Alternatively, the two Wi-Fi/BT® antenna connectors may be positioned on the product's right side.

Avoid RF Antenna Exposure

To avoid exposure:

⚠ CAUTION

- › Avoid placing the antenna near people, minimum distance 20 cm
- › Avoid pointing the antenna at people
- › Keep a safe distance from the antenna especially when transmitting

RP-SMA and SMA Antenna are not Interchangeable!

NOTICE

RP-SMA and SMA antenna are not electrically compatible and not interchangeable. Use the correct antenna type. If the RP-SMA connector is mixed with an SMA antenna, the connector's center pin may be damaged.



Kontron recommends the use of Kontron's Wi-Fi/BT® antenna chosen to meet RF requirements and with a nominal impedance of 50 ohms, see Table 2: List of Accessories.

For the pin assignment, see Chapter 11.10: Antenna Wi-Fi/BT® Pin Assignment (option).

4.2.4.9. Breakout Panel (option)

The breakout panel (Figure 5, pos. 9) supports an additional COM RS 232 port for a RS232 compatible serial device or a S/PDIF output for a digital audio optical output supporting 5.1 Multichannel and the direct connection of digital audio devices.



S/PDIF

To achieve high quality data transfer, Kontron recommends the use of optical cables.

For the pin assignment, see Chapter 11.9: COM Port Pin Assignment or Chapter 11.11: S/PDIF Pin Assignment (option).

4.3. Left and Right Sides

The right side (as seen from the front) features two possible Wi-Fi/BT® antenna connectors of type RP-SMA female supporting Wi-Fi 6E/BT® 5.3. Alternatively, two Wi-Fi/BT® antenna connectors are available on the rear panel.

Avoid RF Antenna Exposure

To avoid exposure:

⚠ CAUTION

- Avoid placing the antenna near people, minimum distance 20 cm
- Avoid pointing the antenna at people
- Keep a safe distance from the antenna especially when transmitting

RP-SMA and SMA Antenna are not Interchangeable!

NOTICE

RP-SMA and SMA antenna are not electrically compatible and not interchangeable. Use the correct antenna type. If the RP-SMA connector is mixed with an SMA antenna, the connector's center pin may be damaged.



Kontron recommends the use of Kontron's Wi-Fi/BT® reference antenna chosen to meet RF performance requirements and with a nominal impedance of 50 ohms, see Table 2: List of Accessories.

For the pin assignment, see Chapter 11.10: Antenna Wi-Fi/BT® Pin Assignment (option).

Figure 6: Left and Right Sides

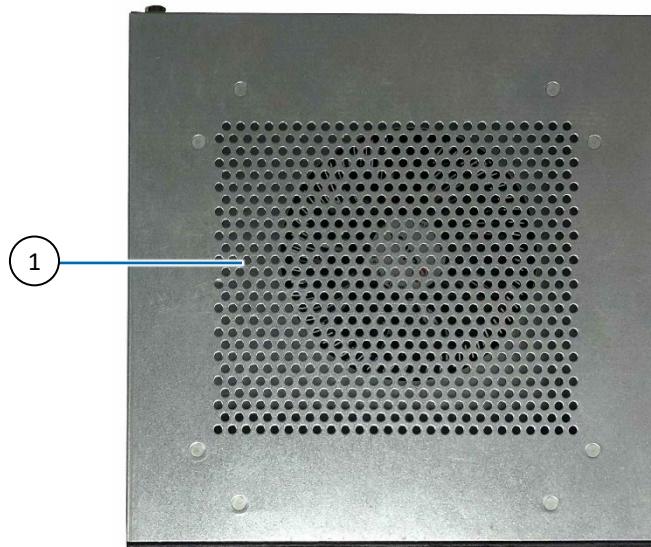


- | | |
|--------------------------------------|--------------------------------------|
| 1. 2x Wi-Fi/BT® antenna (right side) | 2. Ventilation openings (air-output) |
|--------------------------------------|--------------------------------------|

4.4. Top Cover and Bottom Side

The top cover features ventilation openings. An internal processor fan draws in air through the top cover's ventilation openings and distributes the incoming air over critical internal components.

Figure 7: Top Cover



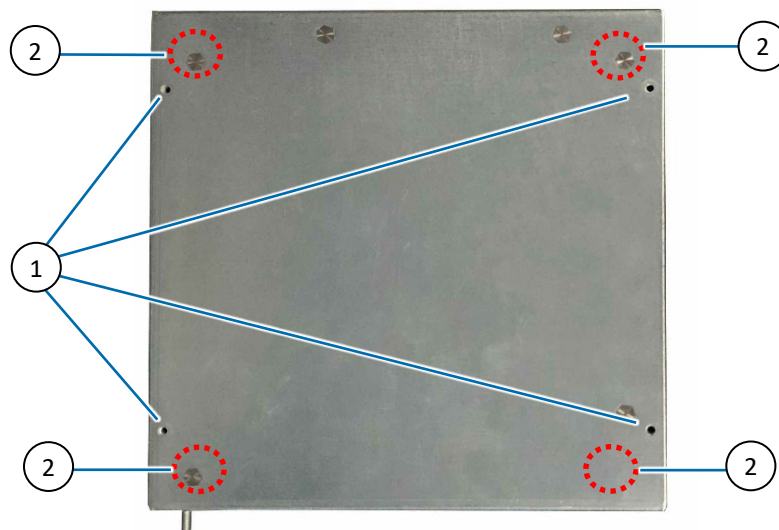
1. Ventilation openings (air-intake)

The bottom side features four threaded screw holes used to fasten the wall mount bracket to the product. For desktop use attach the four chassis feet, delivered with the product, to each corner on the bottom side to ensure stability. Care must be taken not to position the chassis feet over the four threaded screws holes required when installing the wall mount bracket.



Before installing the wall mount bracket remove the four chassis feet if previously installed.

Figure 8: Bottom Side



1. 4x Threaded screw holes
2. 4x Chassis feet (position)

5/System Expansion

5.1. Before Expanding

The KBox B-203-RPL supports expandability in a compact design and is factory configured according to the ordered hardware configuration. Users may expand the product to meet further requirements using free sockets and slots. Kontron recommends the use of Kontron's reference devices to expand the product. Users are responsible for considering the product's maximum allowed power consumption and must take cooling into consideration. Pay attention to the manufacturer's OS specifications for integrated hardware components.

5.2. Internal M.2 Sockets

The product supports two internal stacked M.2 sockets for Wi-Fi/BT® and storage (SSD).

Expansion Devices (stacked M.2 sockets)

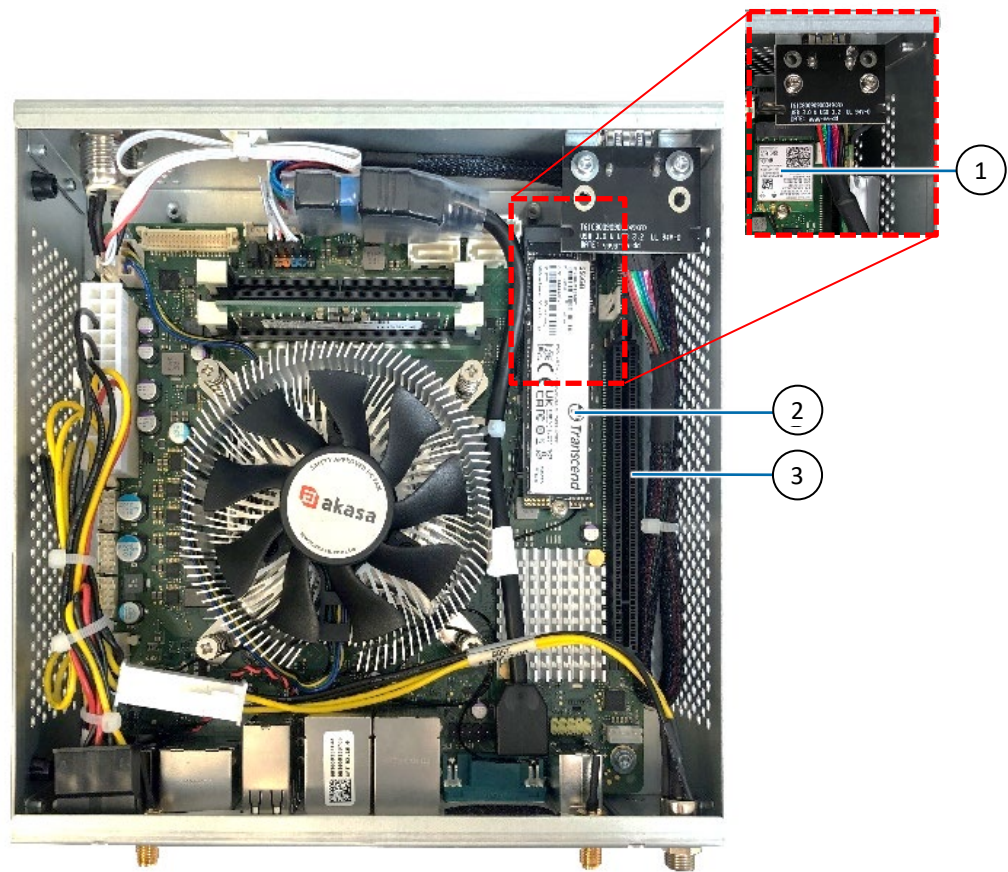
⚠ CAUTION

Kontron is not responsible for problems occurring after the installation of M.2 modules that have not been factory installed and configured by Kontron.



The lower socket's module can only be accessed by removing the upper socket's module.

Figure 9: M.2 Sockets (stacked)



1. M.2 Wi-Fi/BT® (lower socket)
2. M.2 SSD (upper socket)
3. PCIe slot for PCIe to M.2 adapter with M.2 2280 NVMe SSD

5.2.1. Wi-Fi/BT® (option)

The M.2 Wi-Fi/BT® module option populates the lower M.2 2230 Key E socket. When populated with an M.2 module, the socket is not available for other expansion options.

Table 5: Wi-Fi/BT® (option)

Motherboard Socket	Interface	Quantity	Expansion Device
M.2 2230 Key E (M.2 lower socket)	PCIex1/ USB 2.0	1	M.2 2230 Wi-Fi 6E, 6 GHz (Gig+) / Bluetooth® 5.3 Interfaces: PCIe (Wi-Fi) USB 2.0 (BT®)

5.2.2. Storage (option)

The initial M.2 SSD module populates the upper M.2 2280 Key M socket and the motherboard's PCIex16 slot may be populated with a PCIe to M.2 Card, to enable the implementation of an additional M.2 SSD module.

Support for NVMe RAID 0/RAID 1 is available with two M.2 Key M NVMe SSDs (PCIex4) modules of the same density. For more RAID information, see Chapter 13/: RAID.

Table 6: Storage (options)

Motherboard Socket/Slot	Density	Quantity	Expansion Device	Raid
M.2 2242/2280 Key M (M.2 upper socket)	up to 4 TByte	1	M.2 2280 NVMe SSD Interface: PCIex4	NVMe RAID (software config.)
PCIe x16 Gen 5 slot	up to 4 TByte	1	PCIe to M.2 adapter with M.2 2280 NVMe SSD Interface: PCIex4	NVMe RAID (software config.)



No support for SATA based M.2 modules.



For RAID support, the two M.2 2280 NVMe SSDs must have the same density.

5.3. Reference Expansion Devices

When installing a reference M.2 module adhere to the device's manufactures requirements and any Kontron prerequisite requirements stated in Table 7: Reference Expansion Devices, or within this user guide.

⚠ CAUTION

Expansion Device

Kontron is not responsible for problems occurring after the installation of M.2 modules that have not been factory installed and configured by Kontron.

NOTICE

Manufacturer's Instructions

When installing expansion devices, users must adhere to the device's manufactures requirements and any prerequisite requirements stated within this user guide.



Kontron is not responsible for problems occurring after the installation of expansion devices that have not been factory installed and configured by Kontron.

Table 7: Reference Expansion Devices

Expansion Device	Description
M.2 2230 Key E Wi-Fi /BT® Module	Manufacturer: Intel® Article Number: AX210.NGWG.II Product Name: Intel® Wi-Fi 6E AX210 (Gig+) Extended Temperature Industrial Module Function: Wi-Fi 6E Dual band 2x2 160 MHz /Bluetooth® 5.3 Form factor: M.2 2230 Key E Interface: PCIe (Wi-Fi) and USB 2.0 (BT®)
PCIe to M.2 Adapter board	Manufacturer: DELOCK Article Number: 90300 Function: DELOCK PCI Express x16 card for 1 x NVMe M.2 Key M
M.2 2280 Key M NVME SSD Module	Manufacturer: Transcend Article Number: TS256GMTE760T (256 GByte) TS512GMTE720T (512 GByte) TS1TMTE720T (1 TByte) TS2TMTE720T (2 TByte) TS4TMTE720T (4 TByte) Form factor: M.2 2280 Key M Interface: PCIe Gen 4x4

6/Thermal Management

6.1. Active Cooling

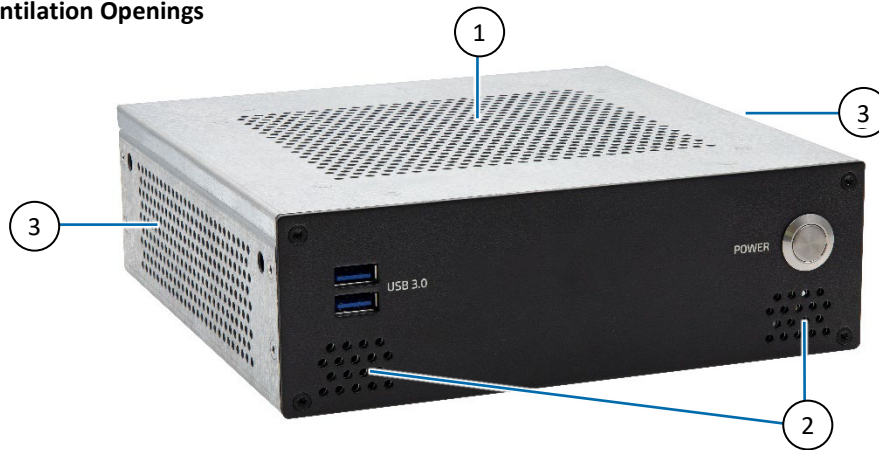
The KBox B-203-RPL is fan cooled. An internal processor fan draws in air through the top cover's ventilation openings and distributes the incoming air over critical internal components before exiting through ventilation openings on the right side, left side and front panel.

Obstructing Ventilation Openings May Cause Overheating

⚠ CAUTION

Do not place items directly in front of the top cover ventilation openings and observe that all ventilation openings are not covered or obstructed.

Figure 10: Ventilation Openings



- | | |
|--|---|
| 1 Top cover ventilation (air-intake) | 3 Left and right sides ventilation (air-output) |
| 2 Front panel ventilation (air-output) | |

6.2. Mount Orientation

Mount the product horizontally with the cover facing upward or vertical in all directions. Mounting the product with the top cover facing downwards is not permitted. If the top cover faces downwards, not enough air enters the product to cool the processor adequately. This may cause overheating or melting and poses a possible fire hazard, as hot substances can escape through the cover's ventilation openings.

Danger of Fire

Mounting the product with the top cover facing downward is not permitted and may cause overheating or melting and hence may cause a fire hazard or personal injury.

To avoid risk of fire and personal injury, observe the following:

⚠ WARNING

- Do not mount with the top cover facing downward
 - Only use the permitted mount orientations:
 - Horizontally (only top cover facing upwards)
 - Vertically (all mount orientations)
-

6.3. Minimum Clearance

To provide maximum airflow through and around the product a minimum distance to the surrounding environment must be observed known as keep out area in this user guide. Before installing the product, ensure that the keep out areas have been observed.

Additionally, users must consider clearance requirements due to installed Wi-Fi/BT® antennas on the rear panel or right side, where the antenna hinge clearance is approximately 45 mm in depth and 130 mm in height.

Clearance

Leave sufficient clearance (keep out area) to prevent the product from overheating!

To ensure proper operation use the specified recommended keep out areas of:

CAUTION

- Top cover: 10 mm (0.394")
 - Left and right sides: 10 mm (0.394")
 - Front and rear panel: 10 mm (0.394")
 - Bottom side: (no restriction)
-

6.4. Third-Party Components

When configuring the product with third-party components such as M.2 modules, an approximate internal temperature rise is given and must be taken into consideration.

7/Assembly

7.1. Before Assembling

Before opening the KBox B-203-RPL to access internal components, observe the safety instructions within this chapter and the safety instructions in Chapter 2/General Safety Instructions.

Before installing or removing third-party products, consult the documentation provided by the components manufacturer.

Kontron recommends expanding the product before installation.

Handling and Operation

CAUTION

Handling and operation of the product is permitted only for skilled personnel aware of the associated dangers, within an access-controlled workplace that fulfills all necessary technical and environmental requirements.



ESD

Follow the safety instructions for components that are sensitive to Electrostatic Discharge (ESD) and use a clean, flat and ESD-safe surface when handling the product. Failure to observe this warning notice may result in damage to the product or/and internal components.

7.2. Opening the Product

WARNING

Disconnect from Power

Before opening the product, make sure that the product is disconnected, by disconnecting the power cable from the DC IN power connector or the power source.

NOTICE

Do not slide the Top Cover!

To avoid contact and/or possible damage between the top cover and the internal fan, do not slide the top cover along the chassis. Always move the top cover vertically upwards or downwards on to or away from the chassis.



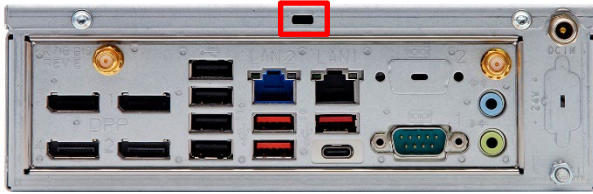
Kensington Lock

Use the Kensington lock to prevent theft and third-party access to sensitive data stored on the product.

To open the KBox B-203-RPL, perform the following:

1. Close all applications. Shut down the product properly using the power button and disconnect the power cable from the power source or the DC IN power connector. Disconnect all peripherals.
2. Place the product on a flat, clean and ESD-safe surface.

3. Unlock and remove the Kensington lock (if installed).



4. Remove the two screws that fasten the top cover to the rear panel. Retain the screws for later use.



5. Lift the top cover a few centimeters at the rear of the chassis and pull the top cover gently away from the front panel.
6. Lift the top cover vertically to avoid damaging the internal fan assembly. Do not slide the top cover off the chassis!
7. Close the top cover, by proceeding in the reverse order (steps 6 to 3).

7.2.1. Installing and Removing an M.2 Wi-Fi/BT® Module

When installing modules in both sockets, install the M.2 Wi-Fi/BT® module in the lower socket first.

NOTICE

Motherboard Nut Torque

Do not use force when fastening the M.2 module to the motherboard. Too much force may damage the motherboard nut. Recommended torque for the M.2 screw is 0.2 Nm.



The M.2 socket is a stacked socket. The lower module must be installed first and can only be accessed by removing the upper module.



If the M.2 SSD has to be removed, after reinstalling the M.2 SSD the partitioning of the memory may be different.

To install or remove the M.2 2230 Wi-Fi/BT® module in the lower socket of the M.2 stacked socket, perform the following:

1. Open the product, as described in Chapter 7.2: Opening the Product, steps 1 to 6.
2. Locate the M.2 stacked socket and the corresponding M.2 2230 key E nut on the motherboard (Figure 9, pos. 1). Note that if an M.2 2280 Key M SSD module populates the upper socket (Figure 9, pos. 2), this module must be removed first.
3. Attach the antenna connector's internal cable to the M.2 module's antenna connectors [1] and [2]. If the antenna connectors are not attached, see step 5.
4. Insert the M.2 Wi-Fi/BT® module into the corresponding lower M.2 2230 Key E socket gently and at an angle, until the hole on the M.2 module aligns with the corresponding motherboard's nut. Secure the M.2 Wi-Fi/BT® module by pressing down on the free end and carefully securing with a screw until flat with the motherboard.
5. If the antenna connectors on the rear panel or right side are not installed:

- Open the required antenna connector breakouts.
 - Insert the antenna connector with cable through the breakout opening from inside the chassis to the outside.
 - Secure the antenna connector on the outside with the provided washer and nut.
6. To remove a M.2 Wi-Fi/BT® module, from the M.2 2230 Key E socket, perform steps 2 to 4 in the reverse order.
 7. Close the top cover, as described in Chapter 7.2: Opening the Product, step 7.
 8. Fix the two Wi-Fi/BT® antenna included in the delivery on to the antenna connector.
 9. Position the two Wi-Fi/BT® antenna, using the antenna's hinge.

Avoid RF Antenna Exposure

To avoid exposure:

⚠ CAUTION

- Avoid placing the antenna near people, minimum distance 20 cm
 - Avoid pointing the antenna at people
 - Keep a safe distance from the antenna especially when transmitting
-



When installing Wi-Fi/BT® antennas, consider the increase of the minimum clearance to 45 mm and 130 mm.



Kontron recommends the use of Kontron's Wi-Fi/BT® reference antenna chosen to meet RF performance requirements and with a nominal impedance of 50 ohms, see Table 2: List of Accessories.

7.2.2. Installing and Removing an M.2 SSD Module

The M.2 socket is a stacked socket whereby the upper M.2 socket is a M.2 2280 Key M socket for a M.2 SSD module. When installing modules in both sockets install the module in the lower socket before installing the M.2 SSD module in the upper socket.

The product supports the addition of a PCIe to M.2 adapter installed on the motherboard's PCIe16 Gen 5 slot to provide a second M.2 SSD module. For RAID support M.2 SSDs with the same density must be installed.

Motherboard Nut Torque

NOTICE

Never use force when fastening the M.2 module to the motherboard. Too much force may damage the motherboard nut. Recommended torque for the M.2 screw is 0.2 Nm.



For RAID, two M.2 SSDs with the same density must be installed.



The M.2 socket is a stacked socket. The lower module must be installed first and can only be accessed by removing the upper module.



After installing or removing a M.2 SSD module the memory partitioning may be different.

To install or remove the M.2 2280 SSD module in the motherboard's M.2 stacked M.2 2280 Key M upper socket, perform the following:

1. Open the product, as described in Chapter 7.2: Opening the Product, steps 1 to 6.
2. Locate the M.2 stacked socket (Figure 9, pos. 2) and corresponding M.2 2280 key M nut.
3. Insert the M.2 SSD module into the corresponding upper M.2 2280 Key M socket gently and at an angle, until the hole on the M.2 module aligns with the corresponding motherboard's nut. Secure the M.2 SSD module by pressing down on the free end and carefully securing with a screw until the M.2 SSD module is flat with the motherboard.
4. To remove the M.2 SSD module, perform steps 2 to 3 in the reverse order.
5. Close the top cover, as described in Chapter 7.2: Opening the Product, step 7.

To install or remove the PCIe to M.2 Adapter with M.2 2280 SSD module in the motherboard's PCIe x16 slot, perform the following:

1. Open the product, as described in Chapter 7.2: Opening the Product, steps 1 to 6.
2. Insert the M.2 2280 SSD module into the M.2 2280 Key M socket on the PCIe to M.2 adapter gently and at an angle, until the hole on the M.2 SSD module aligns with the corresponding adapter board's nut. Secure the M.2 SSD module by pressing down on the free end and carefully securing with a screw until the m.2 SSD module is flat with the PCIe to M.2 adapter board.
3. Insert the PCIe to M.2 adapter board with M.2 SSD module into the PCIe x16 slot on the motherboard by pressing down gently until the PCIe to M.2 adapter board snaps into place.
4. To remove the M.2 SSD module, perform steps 2 to 3 in the reverse order.
5. Close the top cover, as described in Chapter 7.2: Opening the Product, step 7.

8/Installation

8.1. Before Installing

Before installing the KBox B-203-RPL in the operating environment, ensure that the operating environment meets the specification as stated within this user guide, and that there is sufficient access to the product's power connector (DC IN), and the front and rear panel I/O interface connectors. Kontron recommends expanding the product with expansion cards and storage, before installing the product in the end environment.

Install and operate the product only horizontally with the top side facing upward or vertically in all directions. It is not permitted to operate the product when the top side faces downwards. Leave sufficient clearance (keep out area) to prevent the product from overheating by using the minimum clearance distances specified in this user guide, see Chapter 6.3: Minimum Clearance.

Danger of Fire

It is not permitted to mount the product upside down! Mounting the product with the top cover facing downward may cause overheating or melting and hence is a fire hazard or may cause personal injury.

⚠ WARNING

To avoid risk of fire and personal injury, observe the following:

- DO NOT mount horizontally with the top cover facing downward
 - Only use the allowed mount orientations:
 - Horizontally (only top cover facing upwards)
 - Vertically (all mount orientations)
-

⚠ CAUTION

Damage Free Use Only

Do not handle the product if there is any visible damage.

⚠ CAUTION

Protection

Prior to installation, ensure that there are no live wires on the installation site and follow the local/national regulations for grounding. The voltage feeds must not be overloaded. Adjust the cabling and the overcurrent protection to correspond with the electrical specification on the type label.

⚠ CAUTION

Obstruction Free Installation

Obstructing the ventilation openings may cause overheating:

- Do not place items directly in front of the top cover ventilation openings
 - Observed that all ventilation openings are not covered or obstructed by objects
-

⚠ CAUTION

Clearance

Leave sufficient clearance (keep out area) to prevent the product from overheating! To ensure proper operation use the specified recommended keep out areas of:

- Top cover: 10 mm (0.394")
 - Left and right sides: 10 mm (0.394")
 - Front and rear panel: 10 mm (0.394")
 - Bottom side: (no restriction)
-

NOTICE**Support cables**

Support the power and I/O interface cables to minimize strain on the product's connectors.



Ensure there is enough clearance for users to:

- › Connect cables on the rear panel
- › Access the power button on the front panel
- › Install Wi-Fi/BT® antenna on rear panel or right side (clearance 45 mm and 130 mm from hinge)

8.2. Chassis Feet

To operate in a desktop environment, install the four self-adhesive rubber chassis feet on the product's bottom side.

To install the supplied four self-adhesive rubber chassis feet, perform the following:

1. Ensure that the bottom surface is clean and free from dust and dirt.
2. Remove the paper cover from the back of each of the self-adhesive rubber chassis feet and carefully press the rubber chassis feet onto the bottom side.



To improve stability, position the rubber chassis feet between the mounting hole and the outside edge of the corners.

8.3. Wall Mount

To mount on a flat surface, use the wall mount bracket, see Table 2: List of Accessories. When mounting, provide the specified minimum clearance around the product to ensure air-intake and extraction is not restricted. Additionally, users may need to consider the mount orientation due to the Wi-Fi/BT® antenna positioning.

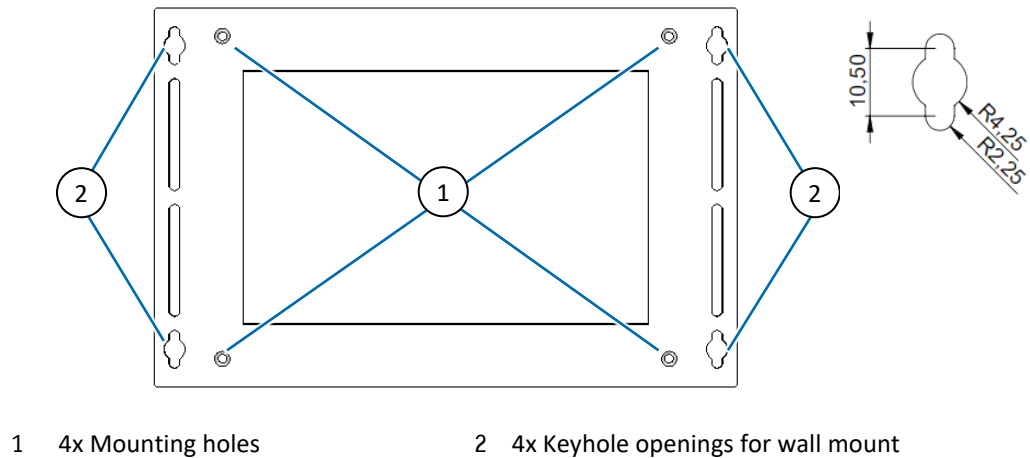
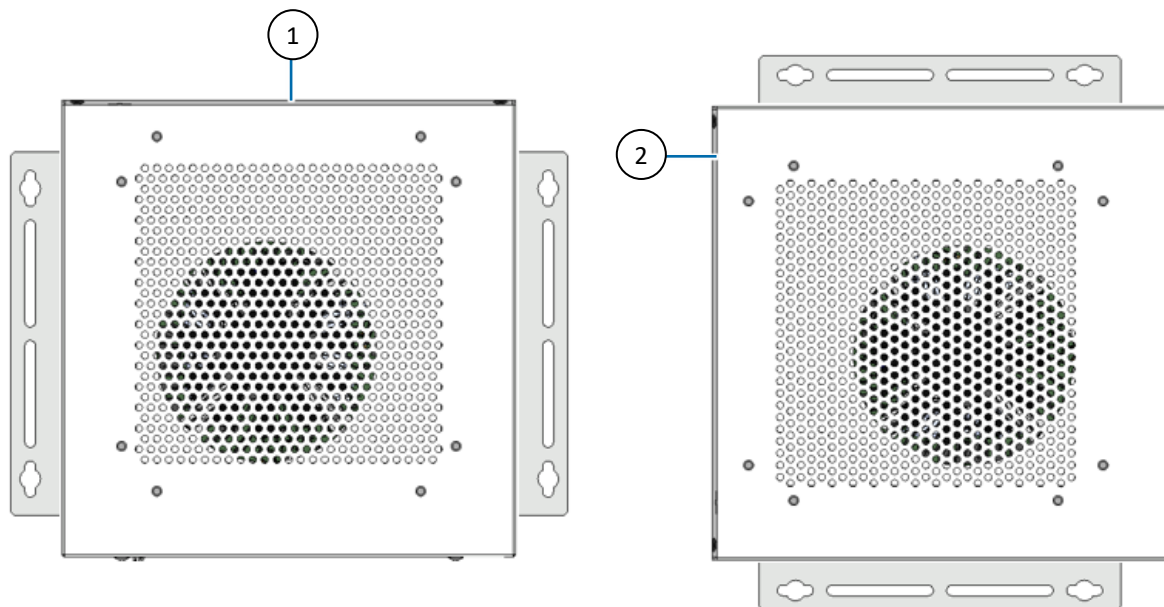
The wall mount brackets enable mounting with the front panel up (or down) or with the front panel left (or right).

⚠ CAUTION**Weight**

Ensure the mount surface can support the product's weight. Always use four screws to mount the bracket on the wall, with a suitable screw length for the thickness of the wall.



Install the mounting brackets on the product before mounting on the mount surface.

Figure 11: Wall Mount Bracket**Figure 12: Wall Mount Bracket Orientation**

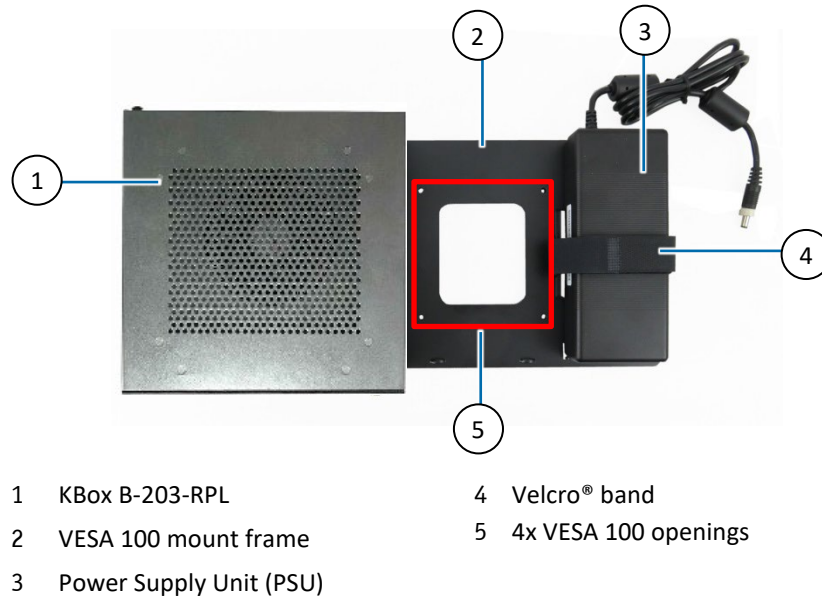
To install the wall mount bracket on the product and mount on a wall, perform the following:

1. Fasten the wall mount bracket to the bottom side of the product using the four M3x6 screws provided with the wall mount bracket and a torx (08x60) screwdriver.
2. Mark the position for the screws using the keyhole mounting openings. Screw four screws suitable for the thickness of the wall, into the wall while leaving a gap of (> 2 mm) between the top of the screw and the wall.
3. Slide the wall mount bracket with the product attached on the screws and pull slightly downwards or to the side, to enable the bracket to sit in the narrow gap.
4. Tighten each of the four screws.

8.4. VESA 100 Mount Assembly Kit

The VESA 100 mount assembly kits mounts the product and the external power supply on the rear side of a VESA 100 monitor. The VESA 100 Mount assembly kits installs directly on the monitor's rear side or using the monitor's VESA 100 Stand.

Figure 13: VESA 100 Mount Assembly



The VESA 100 mount assembly kit contains the VESA 100 mounting frame, Velcro® band, four M3x 8 mm screw to attach the KBox B-203 to the frame and four M4x20 screws with four 4 mm spacers to attach the frame to the rear side of the monitor.

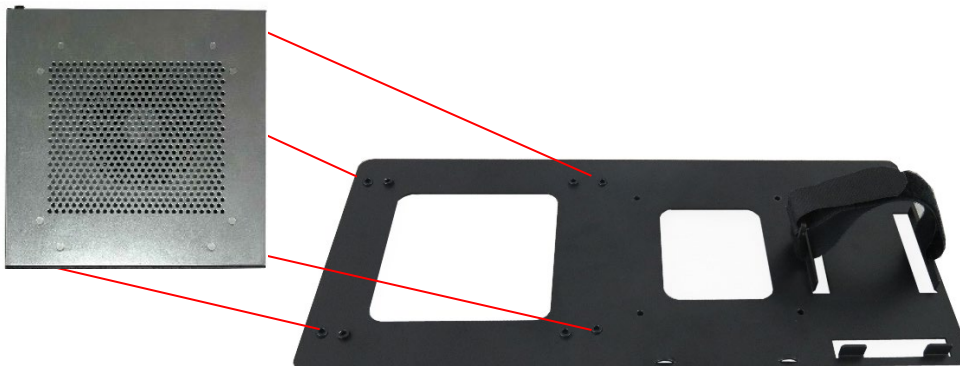


Using the VESA 100 mount assembly, only vertical mounting is possible.

To assemble the product and power supply on the VESA 100 mounting frame, perform the following:

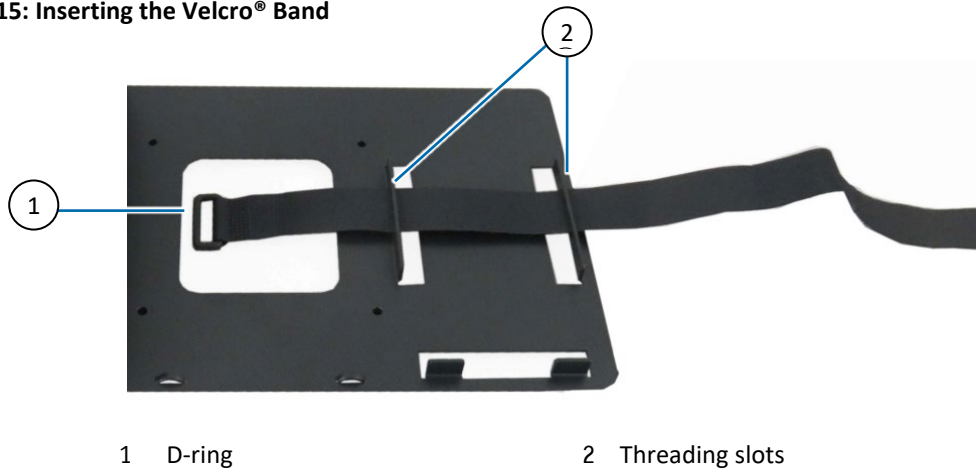
1. Ensure that the self-adhesive rubber chassis feet are not installed on the bottom side of the product. If the feet are installed, remove the feet before mounting the product on the VESA 100 mounting frame.
2. Align the four mounting holes on the bottom side of the product with the four mounting holes on the VESA 100 mounting frame.

Figure 14: KBox B-203-RPL Mounting Position



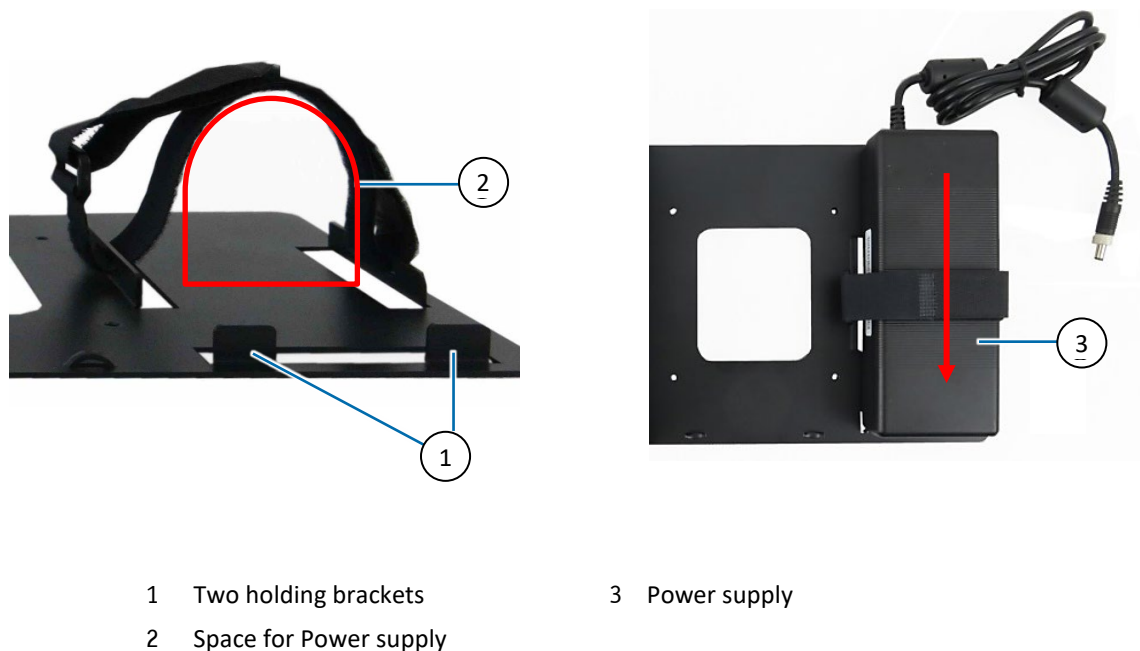
3. Insert the supplied four M3x 8 mm screws into the rear side of the VESA 100 mounting frame and using a Torx screwdriver (10) fasten the product to the VESA 100 mounting frame.
4. Open the flexible Velcro® band to the band's full length and with the rough fastening side facing downward feed the band through the threading slots on the left and right aligning brackets.

Figure 15: Inserting the Velcro® Band



5. Double back with the flexible Velcro® band and feed the rough end through the band's D-ring. Pull the band through the D-ring and press approximately 30 mm to 50 mm of the self-gripping sides together to form a loose loop. Lift the bottom part of the loop to meet the top part to form a space for the power supply between the band and the VESA 100 mounting frame.

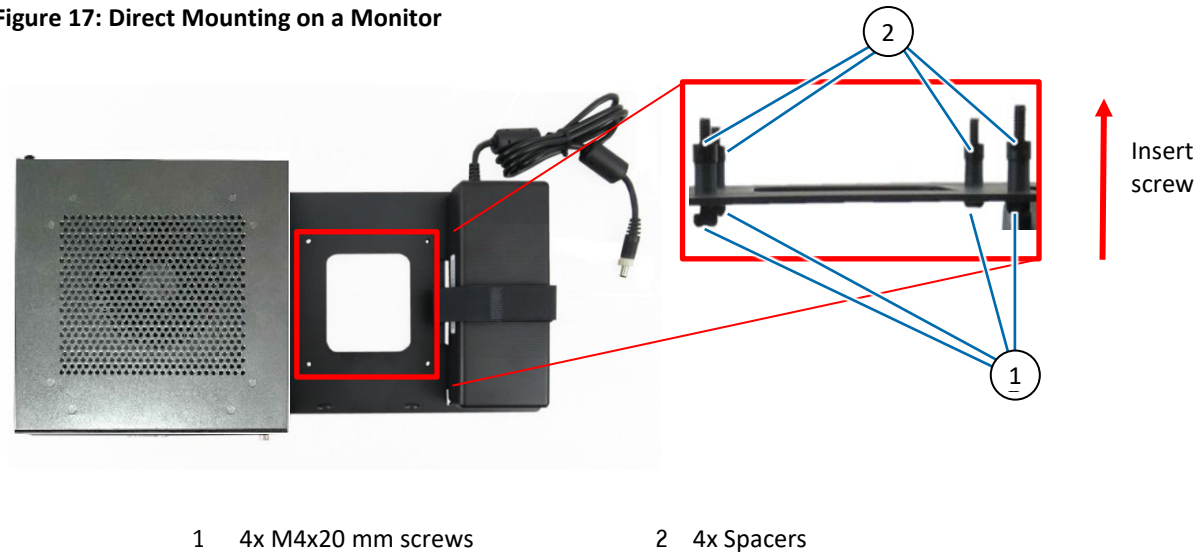
Figure 16: Positioning the Power Supply



6. Slot the power supply, with the 3-pin AC connector facing towards the two holding brackets, into the gap made in step 5 and push down until the power supply rests on the two holding brackets.
7. Secure the power supply by opening the self-gripping sides and pulling the band away from the D-ring as far as possible and securing the band tightly.

8.4.1. Mounting Directly on a Monitor

Figure 17: Direct Mounting on a Monitor



To mount the VESA 100 assembly directly onto the rear side of a monitor, perform the following:

1. Feed the four (M4x 20 mm) screws through the four VESA 100 openings on the VESA 100 mount frame and attach one of the supplied spacers on the screw's free end.
2. Insert the free end of the screw (with spacer) into the VESA 100 threaded screw openings on the monitor's rear side.
3. Fasten all four screws to secure the VESA 100 mount assembly.

NOTICE

Use four VESA Screws

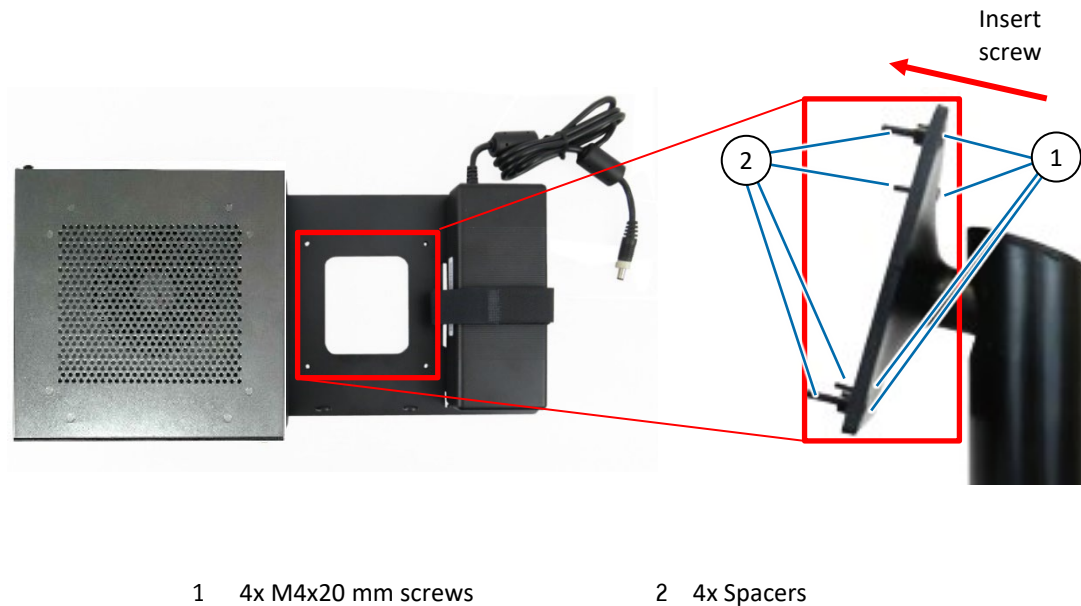
Always use all four screw and spacers when securing the VESA 100 mount assembly to the rear side of the monitor.



Using the VESA 100 mount assembly, only vertical mounting is possible.

8.4.2. Mounting using the Monitor's VESA 100 Stand

Figure 18: Mounting with a VESA Stand on the Monitor



To mount the VESA 100 assembly on to the monitor's rear side using the monitor's VESA 100 stand, perform the following:

1. Feed the four (M4x 20 mm) screws through the four VESA 100 openings on the monitor's stand and attach one of the supplied spacers to each screw's free end.
2. Insert the screw's free end (with spacer) through the four VESA 100 openings on the VESA 100 mount frame and then onto the VESA 100 threaded screw opening on the mount hole on the monitor's rear side.
3. Fasten all four screws to secure the VESA 100 mount assembly.

Use four VESA Screws

NOTICE

Always use all four screw and spacers when securing the VESA 100 mount assembly with stand to the rear side of the monitor.



Using the VESA 100 mount assembly, only vertical mounting is possible.

9/Starting Up

9.1. Before Starting

Before connecting the KBox B-203-RPL to power, read the instructions in this user guide and observe the safety instructions in Chapter 2/General Safety Instructions

The product is delivered hardware configured, and on request with a pre-installed Operating System (OS) and all the necessary drivers (in accordance with the hardware configuration ordered). No further internal configuration is required, enabling full operation when connected to power and switched on for the first time.

Operate only Closed

⚠ CAUTION

Ensure the product is closed (top cover secured with the two screws) before connecting the power. It is only ensured that users do not have access to internal components during operation when the product is closed.

Switching Off

⚠ CAUTION

Even when switched off using the power button, parts of the product are still energized. The product is only completely switched off when switched off using the power button and the power cable is disconnected from either the DC IN power connector or the power source.

External Power Supply

⚠ CAUTION

Only connect the product to the supplied external power solution providing the voltage type (AC or DC) and the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1.

Disconnection Device (24 VDC option)

⚠ CAUTION

The disconnection device (fuse/circuit breaker) rating must support the product's wire cross-section. Observed that wiring and short-circuit/overcurrent protection is performed according to the applicable standards, regulations and the product's electrical specification.

Damage

⚠ CAUTION

Ensure that the power supply and power cables/wires have no visible damage before switching on the product.

Handling the Product

⚠ CAUTION

Operate the product only by trained and skilled personnel within an environment that fulfills all necessary technical and environmental requirements.

Following proper cabling procedure

NOTICE

To prevent a false power-on condition that could result in operational failure ensure that:

- Make the potential equalization stud connection first and disconnect last.
 - The last connection made to the product is the power.
-

NOTICE**Minimize Cable Strain**

Support the power and I/O cables to minimize the strain on the product's connectors.

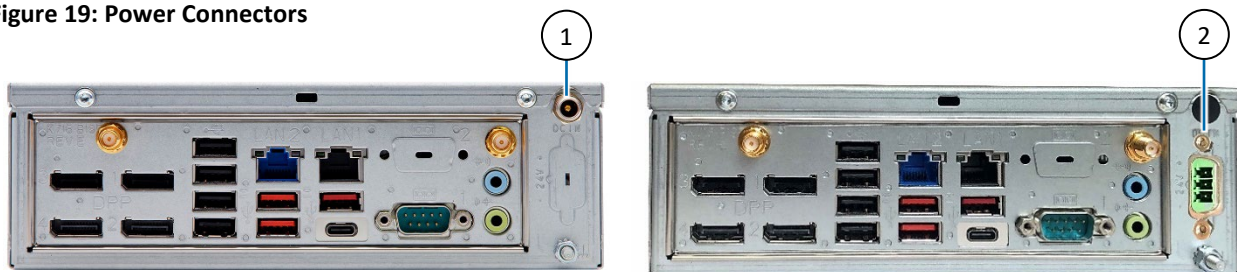
NOTICE**Do not Disconnect the Power Cable During Operation**

Performing a forced shut down can lead to loss of data or other undesirable effects!
To shut down without data loss, use the power button.

9.2. Connecting to the Power Connector

The necessary items required to connect the product to power are included in the delivery. The following chapter describes how to connect the various power connector options to a power source.

Figure 19: Power Connectors



1. 12 VDC DC IN Power Jack (default)
2. 24 VDC DC IN 3-pin connector (option)

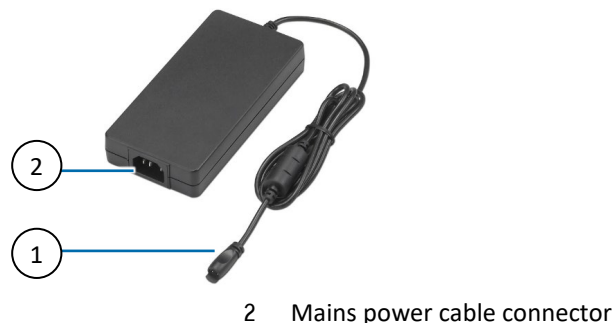
9.2.1. 12 VDC DC IN (150 W) Power Jack

The 12 VDC DC IN power jack connects to the external AD/DC 150 W (100/240 VAC/12 VDC) power supply (included in the delivery) that meets the product's electrical specification as stated on the type label and provides the required safety and protection features, see Chapter 10.4: Power Specification.

External Power Supply**CAUTION**

Only connect the product to the supplied external power supply providing the voltage type (AC or DC) and the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1.

Figure 20: External AC/DC, (150 W) Power Supply



- 1 12 VDC connector

- 2 Mains power cable connector

To connect the supplied external AC/DC (150 W) power supply to the 12 VDC DC IN Power Jack (Figure 19, pos. 1), perform the following:

1. Ensure the product is closed securely and connect the potential equalization stud to an appropriate common earth connection.
2. Screw the power supply's cable to the 12 VDC DC IN power jack.
3. Connect the other end of the power supply to the mains power outlet using the correct plug for your region.

9.2.2. 24 VDC DC IN 3-pin Power Connector (option)

The 24 VDC DC IN 3-pin power connector connects to the 3-pin mating power connector (PSC 1.5/ 3-F) included in the delivery. The 3-pin mating power connector (Figure 21) must be wired suitably by the user to a power cable provided by the user for connection to the user's external 24 VDC power supply. The external 24 VDC power supply must automatically recover from AC power loss and startup under peak loading.

⚠ CAUTION

External Power Supply

Only connect the product to the supplied external power solution providing the voltage type (AC or DC) and the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1.

⚠ CAUTION

Disconnection Device

The disconnection device (fuse/circuit breaker) rating must support the product's wire cross-section. Observed that wiring and short-circuit/overcurrent protection is performed according to the applicable standards, regulations and the product's electrical specification.



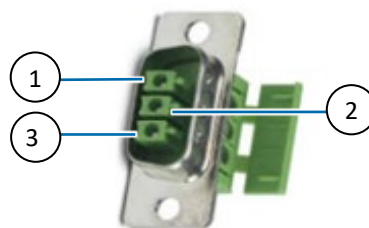
To connect to the 3-pin DC IN power connector only use the 3-pin mating power connector (supplied by Kontron and included in the delivery).

9.2.2.1. Wiring the 3-pin Mating Power Connector

When wiring the 3-pin mating power connector (Figure 21), Kontron recommends marking the power cables wires clearly with (+/-) to ensure the correct connection to the 24 VDC DC IN power connector.

For the pin assignment of the 24 VDC DC IN power connector, see Chapter 11.2: 24 VDC DC IN 3-Pin power Connector Pin Assignment (option).

Figure 21: 3-pin Mating Power Connector



1 +24 VDC wire clamp

2 NC

3 GND (-) wire clamp

NOTICE**Mark Supply Wires Clearly**

Wire the mating power connector clearly by marking the supply wires (+/-) to ensure a safe connection between the 24 VDC DC IN connector and the external 24 VDC power supply.



The power cable for wiring is not part of the delivery and must be provided by the user.

- Use copper wire only if the field wiring terminal is for copper wire connection only.
- The minimum temperature rating of the field wiring terminals is 75° C.

To wire the supplied 3-pin mating power connector (PSC 1.5/ 3-F) perform the following:

1. Cut three (1 mm²) AWG18 isolated wires to the required length and strip each end 5 mm to 7 mm.
2. Twist the striped wire-ends and provide them with ferrules.
3. Access the slotted pan head screws by opening the mating power connector's cover.
4. Loosen the slotted pan head screws far enough so that you can insert the end of the prepared wires.
5. Insert the wires into the corresponding clamp of the mating power connector. Make sure that you have the right polarity of the connection.
6. Fasten the screws to secure the wires into the mating power connector's clamps.
7. Close the mating power connector's cover.

9.2.2.2. Connecting to an External 24 VDC Power Supply

CAUTION**Secure Power Connector**

Secure the 3-pin mating power connector (PSC 1.5/3-F) with the two bolts provided. Pay attention to the polarity of the connections.

To connect the 24 VDC DC IN 3-pin connector (see Figure 19, pos. 2) to an external 24 VDC power supply, perform the following:

1. Ensure the product is closed securely and connect the potential equalization stud to an appropriate common earth connection.
2. Wire the supplied 3-pin mating power connector/terminal (PSC 1.5/3-F) as described in Chapter 9.2.2.1: Wiring the 3-pin Mating Power Connector.
3. Switch off the external 24 VDC power supply via a disconnecting device (fuse/circuit breaker), to ensure that no power flows during the connection procedure.
4. Connect the wired 3-pin mating power connector (PSC 1.5/3-F) to the 3-pin DC IN power connector and secure with the two bolts provided. Pay attention to the polarity of the connections.
5. Connect and secure the other end of the wired 3-pin mating power connector to the external 24 VDC power supply.

9.3. Switching On/Off

To switch on, connect to the power source as described in this user guide, and briefly press the power button. The power button illuminates blue to indicate the product is switched on.

To switch off, close all open applications and briefly press the power button. The power button dims to indicate the product is switched off. The product is only completely switched off when the power cable is disconnected from the DC IN power connector or the main power source.

Switch Off Completely

⚠ CAUTION

Even when switched off using the power button, parts of the product are still energized. The product is only completely switched off when switched off using the power button and the power cable is disconnected from either the DC IN power connector or the power source.

9.4. Forced Shutdown

Pressing the power button for longer than four seconds initiates a forced system shutdown, before switching off the power. If power is still applied to the DC IN connector, the product restarts by pressing the power button.

Do not disconnect the power cable during operation

NOTICE

Performing a forced shut down can lead to loss of data or other undesirable effects!
To shut down without data loss, use the power button.

9.5. Operating System (OS) and Hardware Component Drivers

The product supports flexible software options and is supplied with pre-installed OS and all appropriate drivers (according to the ordered hardware configuration) and is fully operational when switched on for the first time.

When ordered without a pre-installed OS, users must install the OS and the appropriate drivers (in accordance with the ordered hardware configuration) before switching on the product for the first time. Pay attention to the manufacturer's OS specifications for integrated hardware components.

For information regarding supported software, see Chapter 10.3: Software Specification.



To download relevant drivers for hardware components, visit Kontron's [Customer Section](#).

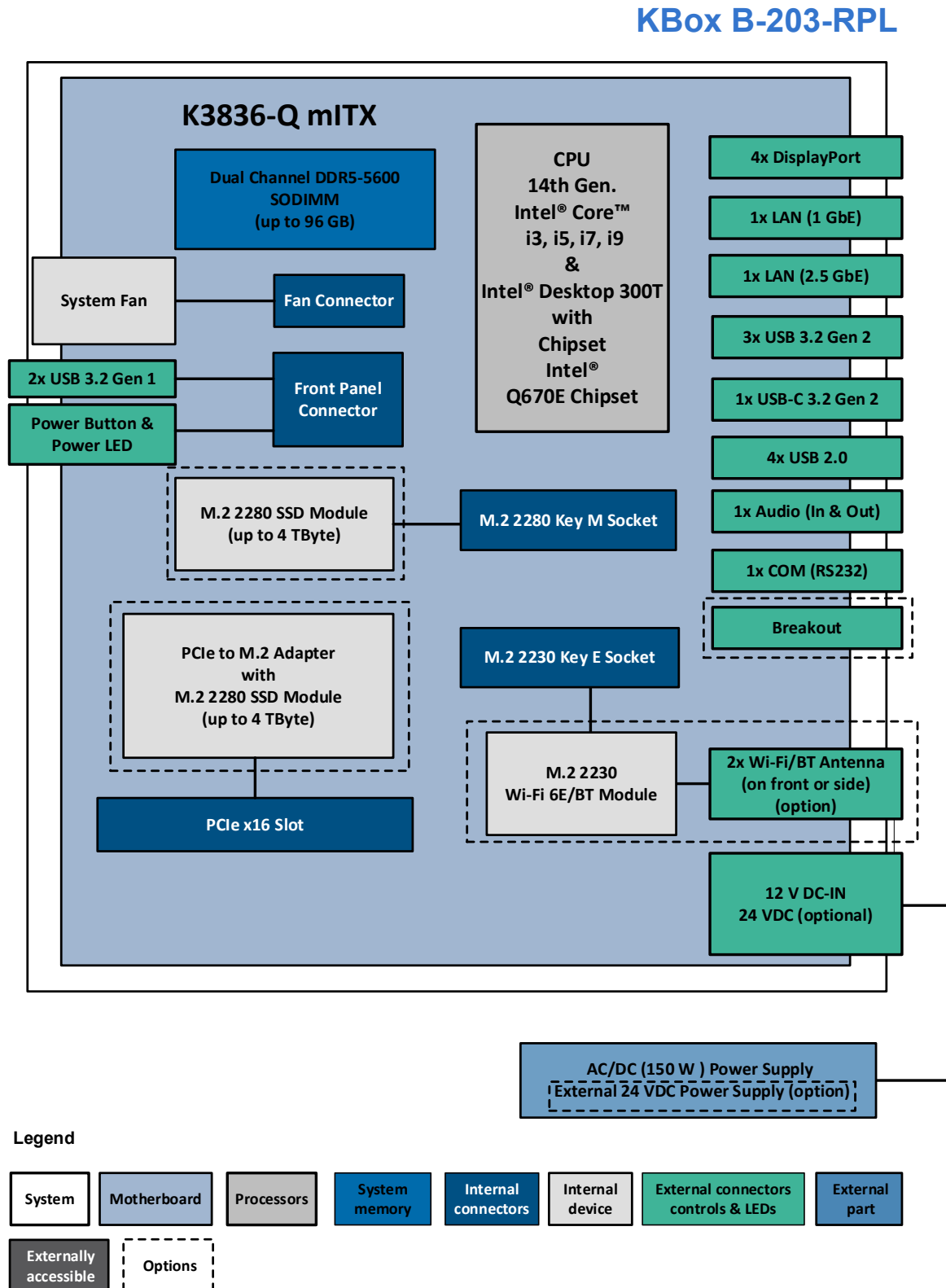


Pay attention to the manufacturer OS specifications relating to integrated hardware components.

10/ Product Specifications

10.1. Block Diagrams

Figure 22: Block Diagram KBox B-203-RPL



10.2. Hardware Specification

Table 8: Hardware Specification

KBox B-203-RPL		Description
Motherboard	Type	Kontron mini-ITX K3836-Q
	Processors	Intel® Core™ processor series i9/i7/i5/i3 (Gen. 14 th) & Intel® Desktop 300T TDP 35 W (max.)
	Chipset	Intel® Q670E
	Graphic	Gen12 UHD Graphics – driven by Xe® architecture (up to 32EU)
	System Memory	2x DDR5 SODIMMs Up to 96 GBytes (with 8 Gbyte, 16 Gbyte, 32 GByte und 48 Gbyte)
Front panel	USB	2x USB 3.2 Gen1
	Button/LED	Power Button with integrated power LED
Rear panel	USB	1x USB-C 3.2 Gen 2, 3x USB 3.2 Gen 2, 4x USB 2.0
	LAN	1x 2.5 GbE (10/100/1000/2500 Mbps), with Intel® i226LM 1x 1 GbE (10/100/1000 Mbps), with Intel® i219LM
	Displays	4 x DP V1.4a @4K
	Audio	Line-In, Line-Out
	COM	1x RS232
	Breakout Panel	1x COM RS232 or 1x S/PDIF Digital audio optical output, supporting 5.1 Multichannel
	Power	12 VDC AC/DC (150 W) PSU (default) 24 VDC connector (option: connects to an external 24 VDC power supply)
Expansion	Internal M.2 Socket	1x M.2 2280 Key M SSD 512 GByte, 1 TByte, 2 TByte or 4 TByte ^[1] Interface: PCIe
		1x M.2 2230 Key E Wi-Fi 6E (6 GHz), Bluetooth® 5.3 Interface: Wi-Fi: PCIe x1/Bluetooth: USB 2.0
	Internal PCIe slot	1x PCIe to M.2 Adapter board (PCIe x16 Gen 5) 1x M.2 2280 SSD Key M (512 GByte, 1 TByte, 2 TByte or 4 TByte) ^[1] Interface: PCIe/NVME with PCIe to M.2 adapter

^[1] For RAID support, the two M.2 2280 SSDs must have the same density.

10.3. Software Specification

Table 9: Software Specification

KBox B-203-RPL	Description
Operating System (OS)	Windows® 11 IoT Linux (Debian)
BIOS	AMI Aptio 5.x (UEFI) UEFI only. No legacy support and no Master Boot Record (MBR) installation.

10.4. Power Specification

The KBox B-203-RPL connects to power using the power solution included in the delivery that meets the product's electrical specification, power consumption, power limitation and power protection requirements.



For the electrical specification of your product, see Chapter 3.5: Type Label and Product Identification and refer to the product's Type Label.

10.4.1. 12 VDC DC IN Electrical Specification

The 12 VDC DC IN Power Jack connects to the AC/DC 150 W (12 VDC to 100/240 VAC, (50/60 Hz) $\pm 10\%$) power supply, supplied by Kontron in the delivery. The AC/DC 150 W power supply supplies the 12 VDC DC IN power jack with the electrical specification on the product's type label and in Table 10.

Table 10: 12 VDC DC IN Power Jack Electrical Specification

DC IN	Description
Input Voltage	12 VDC
Input Current	9 A (12.5 A max.)
Power Rating	150 W

External Power Supply

⚠ CAUTION

Only connect the product to the external AC/DC power supply supplied by Kontron providing the voltage type (AC or DC) and the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1.

10.4.2. 24 VDC DC IN Electrical Specification (option)

The 24 VDC DC IN 3-pin power connector option connects to an external 24 VDC power supply supplied by the user, using the 3-pin mating power connector included in the delivery and wired by the user using a suitably rated wiring. The external 24 VDC power supply must automatically recover from AC power loss and startup under peak loading and must supply the 24 VDC DC IN power connector with the electrical specification on the product's type label and in Table 11.

Table 11: 24 VDC DC IN Electrical Specification (option)

DC IN	Description
Input Voltage	24 VDC (Range: 19 VDC to 36 VDC)
Input Current	5 A
Power Rating	160 W

External Power Supply

⚠ CAUTION

Only connect the product to an external 24 VDC power supply providing the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1.

Disconnection Device (24 VDC option)**⚠ CAUTION**

The disconnection device (fuse/circuit breaker) rating must support the product's wire cross-section. Observed that wiring and short-circuit/overcurrent protection is performed according to the applicable standards, regulations and the product's electrical specification.

NOTICE**Follow Manufactures Instructions**

Ensure that the external 24 VDC power supply is used according to the manufacturer's instructions.

NOTICE**Power Cable Diameter**

To protect the product and any connected peripherals, make sure that the power cables have the right diameter to withstand the maximum available current.

10.4.3. Power Protection

The AC/DC (150 W) power supply incorporates protection and supply features such as short circuit, over voltage, over temperature and brownout protection. Brownout protection protects the product against fluctuations and interruptions in the delivered mains power supply and helps to ensure operation without loss of data or damage to the product.

Brownout

If there is an unintentional voltage drop in the mains power supply for longer than the specified holdup time (brownout), all supply voltages should be shut down and remain in the off state long enough to allow internal voltages to discharge sufficiently. During the off state time do not disconnect or add cables to/from the I/O connectors. Failure to observe the off state time means that parts of the product or attached peripherals may work incorrectly or suffer a reduction of MTBF.

NOTICE

The minimum off state time, to allow internal voltages to discharge, depends on the power supply used and additional electrical factors. To determine the required off state time, each case must be considered individually. For more information, contact Kontron Support.

10.4.4. Power Consumption

The chosen power supply option must provide the level of power required to meet the product's maximum power consumption. The total power consumption depends on the motherboard capacity, system memory, storage, and system expansion devices. The overall power consumption must not exceed the product's maximum power supply rating.

If the use of system expansion devices increases the total power consumption above the maximum power rating of the default 150 W power supply, contact [Kontron Support](#).

Table 12: Power Consumption Estimation

KBox B-203-RPL	Power Consumption
Shutdown	1.6 W
Idel	12 W to 16 W
Maximum Load	83 W to 86 W

10.4.5. Potential Equalization

The potential equalization stud ensures that all connected systems share a common potential. When connecting cables, always connect the potential equalization stud first.



Potential equalization stud ensures that all connected systems share a common potential.

10.5. Environmental Specification

Table 13: Environmental Specification

KBox B-203-RPL		Description
Temperature (according to IEC 60068-2-2 & IEC 60068-2-1)	Operating	0°C to 50°C (32°F to 122°F)
	Non-operating	-25°C to 70°C (-13°F to 158°F)
Relative Humidity (according to IEC 60068-2-78)	Non-operating	93% RH @ 40°C (104°F), non-condensing
Altitude (according to EN 60068-2-13)	Operating	5,000 m max. (16,400 ft. approx.)
Noise		35 dB (A)
Shock (according to IEC 60068-2-27)	Operating	10 g, 11 ms
	Non-operating	30 g, 11 ms
Vibration (according to IEC 60068-2-6)	Operating	2 G, 10-150 Hz
	Non-operating	1 G, 10-150 Hz
MTBF		95601.04 hours @ 30°C GB Ground Benign (GB) Intel® 300T processor, 8 GB SODIMM, 256 GB NVME Storage and Wi-Fi.
		97149.56 hours @ 30°C Ground Benign (GB) Intel® i9-14900T processor, 16 GB SODIMM and 2 TB NVME Storage.

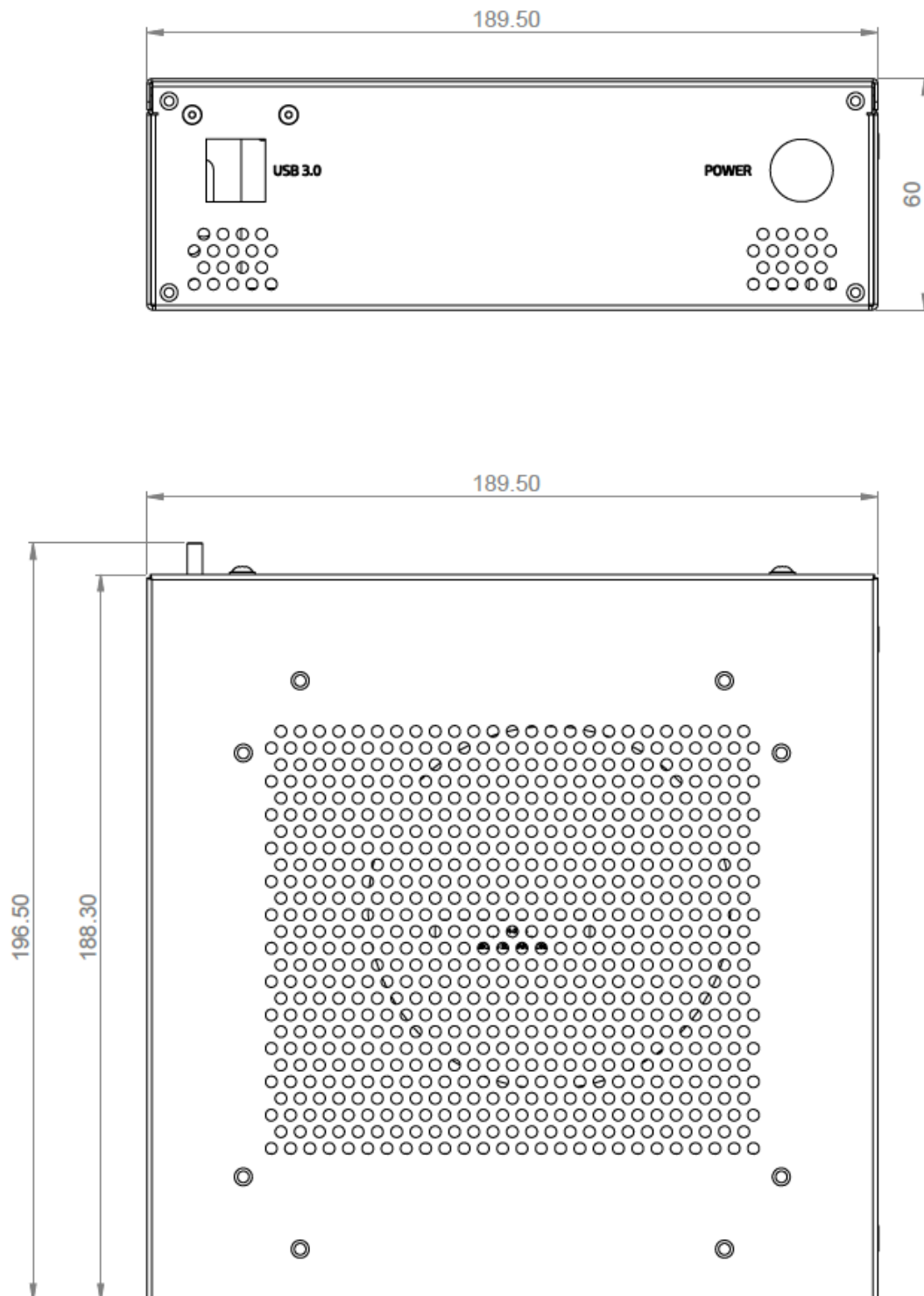
10.6. Mechanical Specification

Table 14: Mechanical Specification

KBox B-203-RPL		Description
Dimensions (W x H x D)		189.5 mm x 60 mm x 196.5 mm (7.46" x 2.36" x 7.74")
Weight		2 kg (4.4 lbs.) approx.
Chassis		Zinc coated steel sheet
Front Panel		Painted front panel (optional)
Cooling		Fan cooled, axial fan, silent fan
IP Class		IP 20
Mounting	Wall mount bracket (W x H x D)	230 mm x 150 mm x 2 mm (9.06" x 5.91" x 0.08") Screw openings: width 214 mm and depth 120 mm apart
	VESA 100 Mount (W x H x D)	402.86 mm x 180 mm x 11.63 mm (15.86" x 7.09" x 0.46") Screw openings: VESA 100

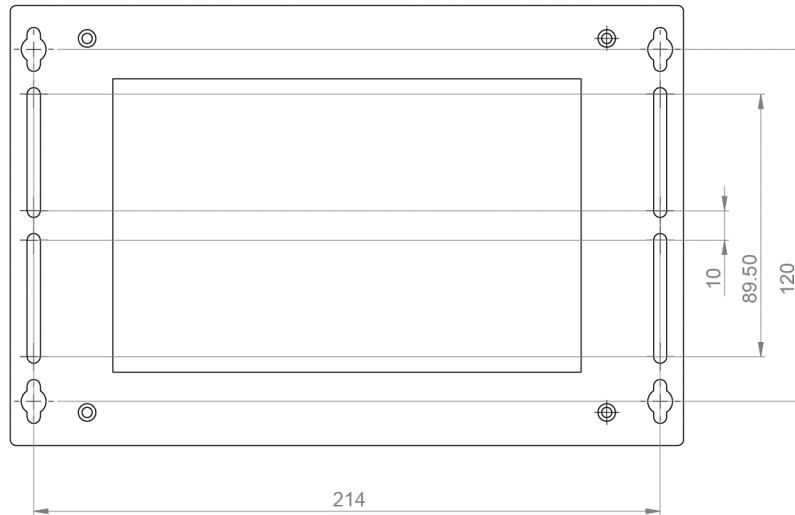
10.6.1. Dimension Diagrams KBox B-203-RPL

Figure 23: KBox B-203-RPL Dimensions



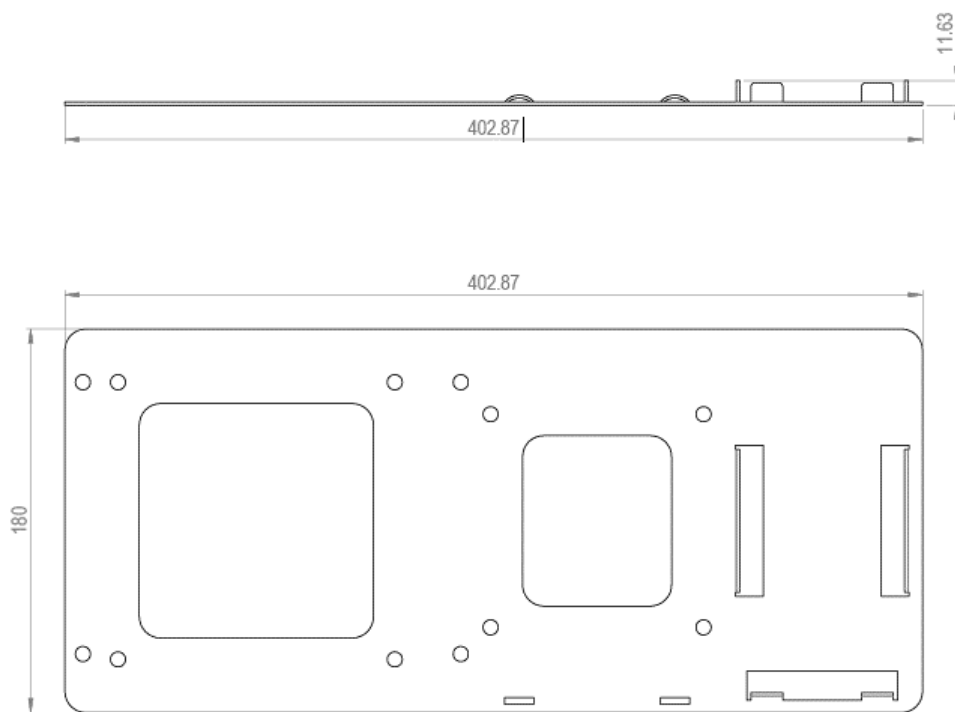
10.6.2. Dimension Diagrams Wall Mount

Figure 24: Wall Mount Dimensions (mm)



10.6.3. Dimension Diagrams VESA 100 Mount

Figure 25: VESA 100 Mount Dimensions (mm)



For the products 3D STEP data, visit Kontron's [Customer Section](#).

10.7. Compliance

The KBox B-203-RPL complies with the relevant requirements and the approximation of the laws relating to the CE Mark certifications, and the standards that are constitutional parts of the declaration.

Table 15: Compliance CE

Europe CE Mark and UKCA	
Directive	2014/30/EU Electromagnetic compatibility 2014/35/EU Low Voltage 2011/65/EU RoHS II
EMC	EN 55032 Electromagnetic compatibility of multimedia equipment - Emission Requirements EN 55035 Electromagnetic compatibility of multimedia equipment - Immunity Requirements EN 61000-6-2 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments EN 61000-3-2 Electromagnetic compatibility (EMC) - Part 3-2: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) EN 61000-3-3 Electromagnetic compatibility (EMC) - Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.
Safety	EN 62368-1 Audio/video, information and communication technology equipment – Safety requirements

The KBox B-203-RPL with Wi-Fi complies with the relevant requirements and the approximation of the laws relating to the CE RED Mark certifications and the standards that are constitutional parts of the declaration.

Table 16: Compliance CE RED

Europe CE RED Mark and UKCA	
Directives	2014/53/EU Radio Equipment Directive (RED) 2011/65/EU RoHS II
EMC	EN 55032 Electromagnetic compatibility of multimedia equipment - Emission Requirements EN 55035 Electromagnetic compatibility of multimedia equipment - Immunity Requirements EN 61000-6-2 Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments EN 61000-3-2 Electromagnetic compatibility (EMC) - Part 3-2: Limits for harmonic current emissions (equipment input current ≤ 16 A per phase)

Europe CE RED Mark and UKCA	
	EN 61000-3-3 Electromagnetic compatibility (EMC) - Part 3-3: Limits – Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection.
Radio	EN 301 489-1 V1.9.2 Electromagnetic Compatibility and Radio spectrum matters (ERM) EN 301 489-1 V2.2.3 Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements EN 300 328 V2.2.2 Wideband transmission systems - Data transmission equipment operating in the 2.4 GHz band - Harmonised Standard for access to radio spectrum EN 301 893 V2.1.1 5 GHz RLAN
Safety	EN 62368-1 Audio/video, information and communication technology equipment – Safety requirements EN 62311 Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz to 300 GHz)

The KBox B-203-RPL complies with the relevant requirements and the approximation of the laws relating to the following international certifications.

Table 17: Compliance International

USA/ Canada (NRTL) Mark	
EMC	FCC 47 CFR Part 15B and ICES-003 Federal Communications Commission (FCC) rules and regulations regarding unlicensed transmissions
Safety	UL 62368-1 and CSA C22.2 No. 62368-1 Audio/video, information and communication technology equipment – Safety requirements
International (IEC)	
EMC	IEC 61000-6-2 Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments
Safety	IEC 62368-1 (CB Scheme) Audio/video, information and communication technology equipment – Safety requirement



For the product's Declaration of Conformity (DoC), visit Kontron's [Customer Section](#).



If the product is modified, the prerequisites for specific approvals may no longer apply.



Kontron is not responsible for any radio television interference caused by unauthorized modifications of the supplied product or the substitution or attachment of connecting cables and equipment other than those specified by Kontron. The correction of interference caused by unauthorized modification, substitution or attachment is the user's responsibility.



Use shielded I/O cables when connecting to peripheral or host devices.
Failure to do so may violate FCC/ICES rules.

11/ Connectors and LEDS



Low-active signals are indicated by a minus sign.

11.1. 12 VDC DC IN Power Jack Pin Assignment (default)

Table 18: 12 VDC DC IN Power Jack Pin Assignment

Pin	Signal Name	Barrel Jack (5.5 mm/ 2.5 mm) with Center Pole
Centre pole	+12 VDC	
Outer ring	Ground	
Mating Power Connector		Power jack on AC/DC 150 W power supply

⚠ CAUTION

Supplied Power Supply only

Power the product with the supplied external AC/DC 150 W power supply only.

11.2. 24 VDC DC IN 3-Pin power Connector Pin Assignment (option)

Table 19: 24 VDC DC IN 3-pin Power Connector Pin Assignment

Pin	Signal Name	3-Pin Phoenix PSC 1.5/3-M
1	24 VDC (+)	
2	NC	
3	Ground (-)	
Mating Power Connector		PSC 1.5/ 3-F (included with the delivery)

⚠ CAUTION

Secure Power Connector

Secure the 3-pin mating power connector (PSC 1.5/3-F) with the two bolts provided. Pay attention to the polarity of the connections.

⚠ CAUTION

External Power Supply

Only connect the product to an external 24 VDC power supply providing the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1.

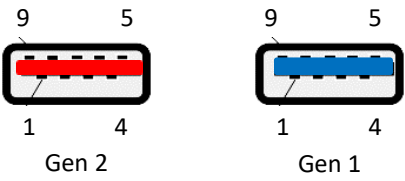
NOTICE

Mark Supply Wires Clearly

Wire the mating power connector clearly by marking the supply wires (+/-) to ensure a safe connection between the 24 VDC DC IN connector and the external 24 VDC power supply.

USB 3.2 Gen 2/1 Port Pin Assignment

Table 20: USB 3.1 Gen 2/1 Port (Type-A) Pin Assignment

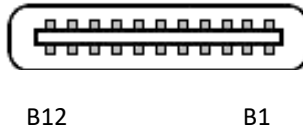
Pin	Signal Name	Pin	Signal name	9-pin USB 3.2 (Type-A) Port
1	+5V	5	USB3 RX-	 Gen 2 Gen 1
2	USB2 D-	6	USB3 RX+	
3	USB2 D+	7	GND	
4	GND	8	USB3 TX-	
		9	USB3 TX+	



All USB3 connectors provide separate signal lines for USB 3.2 and USB 2.0!

11.3. USB-C 3.2 Gen 2 Port Pin Assignment

Table 21: USB-C 3.2 Gen 2 Port Pin Assignment

Pin-A	Signal Name	Pin-B	Signal name	9-pin USB 3.2 (Type-A) Port
1	GND	12	GND	 A1 A12 B12 B1
2	USB3 TX1+	11	USB3 RX+	
3	USB3 TX1-	10	USB3 RX1-	
4	VCC	9	VCC	
5	CC1 ^[1]	8	SBU2 ^[2]	
6	USB2 D1+	7	USB2 D2-	
7	USB2 D1-	6	USB2 D2+	
8	SBU1 ^[2]	5	CC2 ^[1]	
9	VBUS Power	4	VBUS Power	
10	USB3_RX2-	3	USB3 TX2-	
11	USB3_RX2+	2	USB3 TX2+	
12	GND	1	GND	

^[1] Configuration channel. Used for USB Power Delivery (PD) communication.

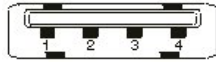
^[2] Sideband use



Power delivery not supported.

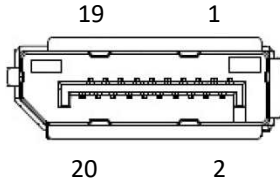
11.4. USB 2.0 Pin Assignment

Table 22: USB 2.0 Port Pin Assignment

Pin	Signal Name	4-pin USB 2.0 (Type-A) Connector
1	+5 V	
2	USB2 D-	
3	USB2 D+	
4	GND	

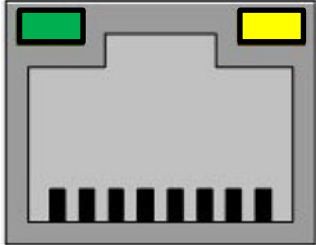
11.5. DisplayPort (DP) V1.4a Pin Assignment

Table 23: DisplayPort (DP) Connector Pin Assignment

Pin	Signal Name	Pin	Signal name	DP Connector (standard)
1	Link0+	2	GND	
3	Link0-	4	Link1+	
5	GND	6	Link1-	
7	Link2+	8	GND	
9	Link2-	10	Link3+	
11	GND	12	Link3-	
13	DVI dongle detect	14	CEC (not supported)	
15	AUX+	16	GnD	
17	AUX-	18	Hotplug detect	
19	GND (Return)	20	+3.3 V (fuse protected)	

11.6. LAN 2.5 GbE/1 GbE Connector Pin Assignment

Table 24: LAN (2.5 GbE/1 GbE) Connector Pin Assignment

Pin	Signal Name (10/100/1000/2500Mbps)	Signal Name (10/100 Mbps)	RJ45 (female) Connector
1	MX1+	TX+	
2	MX1-	TX-	
3	MX2+	RX+	
4	MX3+		
5	MX3-		
6	MX2-	RX-	
7	MX4+		
8	MX4-		

Link/Activity LED Status (left)	Description	Speed LED Status (right)	Description
Green	Link	Green	2.5 GbE
Green Flashing	Activity	Yellow	1 GbE
		Off	100 Mbps or 10 Mbps



LAN Cabling requirements:

- 1000Base-T CAT 5E/6 or higher up to 100m
- 100Base-T CAT 5/5E/6 or higher up to 100m
- 10Base-T CAT 3/4/5/5E/6 or higher up to 100m

11.7. Audio (Line-In & Line-Out) Connector Pin Assignment

Table 25: Audio (Line-In & Line-Out) Pin Assignment

Jack	Signal Name
Light blue	Line input (Line-In or MIC)
Lime	Headphone output (Line-Out)



Line: Stereo max. 1.3 Vrms (Gain=0 dB) input voltage

Microphone: Supports electret microphones 1.3 Vrms (0 dB gain) or 0.13 Vrms (20 dB gain)

Headphone: Stereo max. 1.2 Vrms output voltage @ 32Ω load

Connecting an output device (Headphones, HiFi Amp etc.) mutes other outputs according to the following rule:

- RearOut mutes MonoOut/StereoOut (internal system speaker)

11.8. COM Port Pin Assignment (option)

Table 26: COM (RS232) Connector Pin Assignment

Pin	Signal Name	Pin	Signal name	9-pin D-Sub
1	DCD	6	DSR	
2	RxD	7	RTS	
3	TxD	8	CTS	
4	DTR	9	RI	
5	GND			

11.9. Antenna Wi-Fi/BT® Pin Assignment (option)

Table 27: Antenna Wi-Fi/BT®

Antenna Connector	Description	RP-SMA
Antenna	RP-SMA (female) With center Pin and outer thread	 RP-SMA (female)
Mating Antenna	 RP-SMA (male)	

RP-SMA and SMA Antenna are not Interchangeable!

NOTICE

RP-SMA and SMA antenna are not electrically compatible and not interchangeable. Ensure you use the correct antenna type. If the RP-SMA connector is mixed with an SMA antenna the connector's center pin may be damaged.



Kontron recommends the use of Kontron's Wi-Fi/BT® reference antenna chosen to meet RF performance requirements and with a nominal impedance of 50 ohms, see Table 2: List of Accessories.

11.10. S/PDIF Pin Assignment (option)

The two-pole S/PDIF connector connects to a 2-pole coaxial or optical cable.

12/ BIOS

The KBox B-203-RPL uses the AMI Aptio 5.x (uEFI) BIOS supported by the motherboard. This chapter informs users how to start the BIOS, use the BIOS setup to configure, and perform a BIOS update. Note that BIOS features are open to change and may not be available in the latest version of the motherboard's BIOS.



For further BIOS information visit the motherboard's [mITX K3836-Q](#) webpage



uEFI only! No legacy support and no Master Boot Record (MBR) installation.



Only use the Kontron provided tools!

12.1. Starting the uEFI BIOS

The uEFI BIOS comes with a setup program that provides quick and easy access to the individual function settings for control or modification of the uEFI BIOS configuration. The setup program allows for access to various menus that provide functions or access to sub-menus with further specific functions of their own.

To start the uEFI BIOS setup program, perform the following:

1. Power-up the product.
2. Wait until the first characters appear during the Power On Self-Test (POST) messages or splash screen.
3. Press the <F2> key during the POST.
4. If the BIOS is password protected, enter the User Password or Supervisor Password, and press <RETURN> to start the BIOS.
5. The BIOS displays the Main setup menu.



If the <F2> key is not pressed the POST continues with the test routines.

12.2. BIOS Setup Menus

The uEFI BIOS comes with a setup program that provides quick and easy access to the individual function settings for control or modification of the BIOS configuration. The setup program allows for access to various menus that provide functions or access to sub-menus with further specific functions. To navigate between the setup menus, use the BIOS navigation keys described in Chapter 12.3: BIOS Navigation.

The BIOS screen setup menu bar includes:

- › Main
- › Advanced
- › Security
- › Power
- › Event Logs
- › Boot

- › MEBx
- › Save & Exit



Setting wrong values in the Advanced setup menu may cause the product to operate incorrectly. Kontron recommends users to make changes only when sure of the impact.

12.3. BIOS Navigation

The uEFI BIOS setup program uses a hot key navigation system. The hot key legend bar is located at the bottom of the setup screens. The following table provides a list of navigation hot keys available in the legend bar.

Table 28: Navigation Hot Keys

Hot Key	Description
<F1>	<F1> key invokes the General Help window
<->	<Minus> key selects the next lower value within a field
<+>	<Plus> key selects the next higher value within a field
<F2>	<F2> key loads previous values
<F3>	<F3> key loads optimized defaults
<F4>	<F4> key Saves and Exits
<→> or <←>	<Left/Right> arrows select major Setup menus on menu bar, for example, Main or Advanced
<↑> or <↓>	<Up/Down> arrows select fields in the current menu, for example, Setup function or sub-screen
<ESC>	<ESC> key exits a major Setup menu and enters the Exit Setup menu Pressing the <ESC> key in a sub-menu displays the next higher menu level
<RETURN>	<RETURN> key executes a command or selects a submenu

12.4. Updating the BIOS

The version number of the current BIOS Main setup menu is available in Main > System Information. Before updating the BIOS, Kontron's recommends making a backup of the current BIOS settings. For the latest BIOS updates, visit Kontron's [Customer Section](#), and access Motherboards & SBC > Mini-ITX > K3836-Q/R mITX > and click on >> [Link to Kontron FTP Server](#).

Figure 26: BIOS Information



Name	Size	Modified	File Download Link
↶ ..			
📁 Approvals_Testreports	-	2023-01-24 09:25:56	-
📁 BIOS_K383x	-	2023-01-13 14:44:37	-
📁 Documentation	-	2025-06-10 13:15:56	-
Drivers_ADL.html	107.6 KB	2025-02-03 22:29:15	Download
📁 Mechanics_3D	-	2023-04-26 15:45:42	-
📁 PCN	-	2024-12-19 15:30:05	-

To ensure compatibility with new OS, hardware, software or to integrate new BIOS functions, Kontron recommends regular BIOS updates. Additionally, if a problem cannot be solved using a new driver, Kontron recommends updating the BIOS.



During a BIOS update, do not switch off, reset or interrupt the process. If interrupted, the BIOS update process must be restarted.



After a BIOS update, additional modifications must be made manually. If the product fails to boot, the updated BIOS may be damaged, see Chapter 12.5: Recover BIOS.

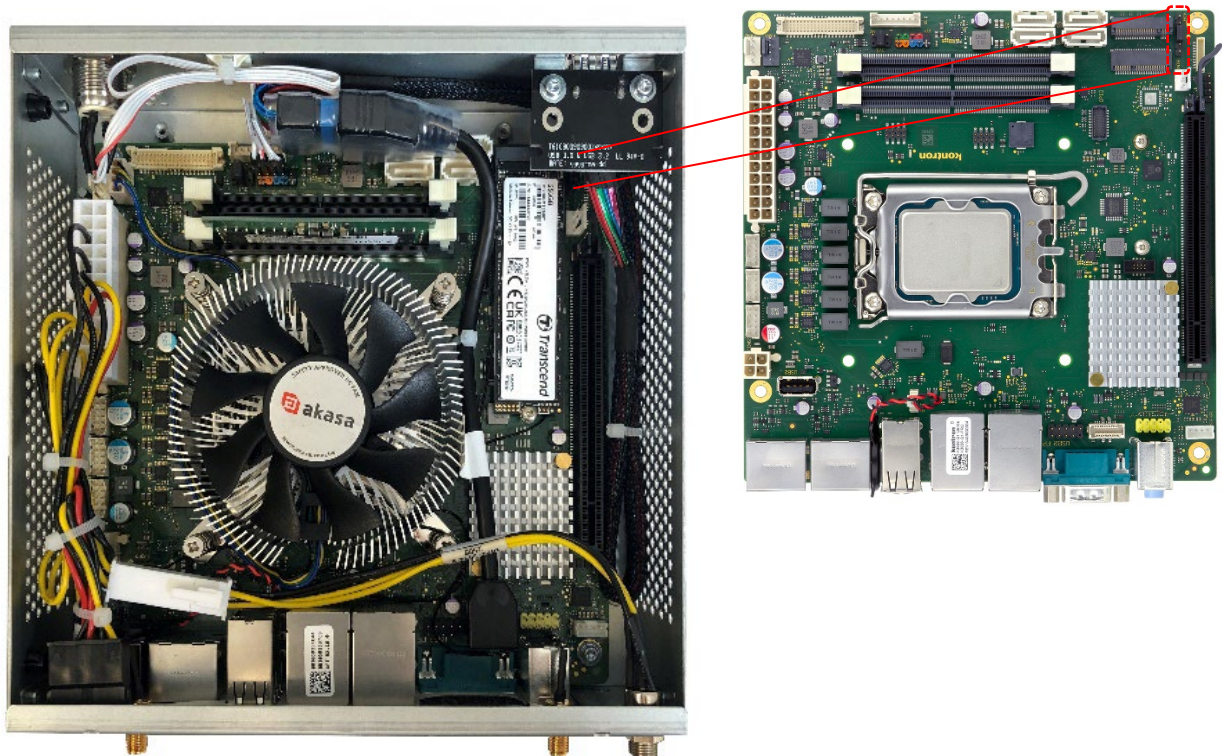


The version number of the current BIOS is located in the BIOS Main setup menu.

12.5. Recover BIOS

The recover BIOS jumper is located on the motherboard's configuration jumper header.

Figure 27: Configuration Jumper Header



For further motherboard information, visit Kontron's [mitX K3836-Q](https://www.kontron.com/mitx-k3836-q) website.



All the BIOS Settings and some data is lost during the BIOS recovery process!



IMPORTANT: Do not interrupt power or press any key during update!

To recover the BIOS using the 'recover BIOS jumper' on the 'configuration header', perform the following:

1. Open the product, as described in Chapter 7.2: Opening the Product, steps 1 to 6.
2. Locate the motherboard's 'configuration header'.
3. Move the 'recover BIOS jumper' from the default position (pins 4 and 5) to the recover position (pins 5 and 6).
4. Do not switch off the product, while the BIOS is recovering.
5. After BIOS recovery, return the 'recover BIOS jumper' to the default position.

Table 29: Configuration Jumper Pin Assignment

Pins	Signal Name	Configuration Jumper (RCV)
1	Ground	
2	Reserved	
3	BIOS reserved Mode A	
4	BIOS Reserved Mode B	
5	BIOS Recovery -	
6	BIOS Recovery +	

13/ RAID

The KBox B-203-RPL supports RAID (Redundant Array of Independent Disks) arrays. The RAID array combines two M.2 SSDs for increased performance and/or data redundancy.

RAID 0 splits data evenly across the two storage devices, allowing the computer to read and write data more quickly and increases performance. RAID 0 does not support data redundancy.

RAID 1 mirrors the data on the two storage devices, supporting data redundancy for increased data protection. RAID 1 does not increase performance.

The supported RAID arrays are RAID 0/RAID 1. The two M.2 Key M NVMe SSDs must support PCIe mode (PCIe4) and have the same density, see Table 6: Storage (options),



For RAID support, the product must be configured with two M.2 Key M NVMe SSDs with the same density and supporting PCIe mode.



RAID Array support for SATA SSD RAID only.

13.1. Enable RAID Array Support

The two internal M.2 Key M NVMe SSDs are configured using the motherboard's RAID controller by navigating within the BIOS setup menus to RAID and setting the RAID array type (RAID 0, RAID 1) and density for the storage devices.

NOTICE

Do not reset the RAID array without considering if a data backup is required.

NOTICE

Users must ensure that important data is backup from your current drive(s) before configuring the RAID array.

To configure the RAID array, perform the following:

1. Ensure compatible M.2 Key M NVMe SSDs are installed with a PCIe4 interface and the same density.
2. Enter the BIOS setup menu.
3. Set up the RAID array in the BIOS.
4. Navigate to the Advanced > VMD Configuration and set [Enabled].
5. Navigate to Save & Exit > Save Changes and Exit.
6. On completion Enter the BIOS again.
7. Navigate to Advanced > Intel® Rapid Storage Technology and set the RAID level to either [RAID 0, RAID 1].
8. Navigate to Save & Exit > Save Changes and Exit.

14/ Maintenance and Prevention

Kontron products require only minimum servicing and maintenance for problem-free operation. Product maintenance or repair may only be carried out by skilled personnel authorized by Kontron.

Handling and Operation

⚠ CAUTION

Handling and operation of the product is permitted only for skilled personnel aware of the associated dangers, within an access-controlled workplace that fulfills all necessary technical and environmental requirements.

14.1. Cleaning the Product

Avoid Erasing Lettering

NOTICE

Do not use steel wool, metallic threads or solvents like abrasives, alcohol, acetone or benzene when cleaning the product. This could remove the lettering on the black front panel plate if installed).

To clean the product's surface, perform the following:

1. Close all applications. Shut down properly using the power button and disconnect the power cable from the DC IN power connector or the power source. Disconnect all peripherals.
2. Allow the product to cool before handling.
3. Remove dust using a clean, soft brush.
4. Wipe the product with a soft and dry cloth.
5. Remove stubborn dirt using a mild detergent and a soft cloth.

14.2. Replacing Lithium Battery

⚠ CAUTION

Danger of Explosion if the lithium battery is incorrectly placed!

- Replace only with the same or equivalent type recommended by the manufacturer
- Dispose of used batteries according to the manufacturer's instructions



Do not dispose of lithium batteries in general trash collection. Dispose of the lithium battery according to the local regulations dealing with the disposal of these special materials, (e.g. to the collecting points for the disposal of batteries).



The product is not designed to operate without a lithium battery. If the lithium battery is empty or disconnected, the BIOS settings will be set to the factory defaults.

The CR2032 lithium battery must be replaced with an identical three Volt lithium battery or a Kontron recommended lithium battery. The lithium battery is wired and connects to a pin header on the motherboard.

Table 30: Battery Header

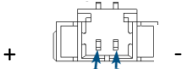
Pins	Signal	2-pin BAT header
1	VBAT +	
2	GND	

Table 31: CR2032 Lithium Battery with Connector

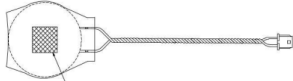
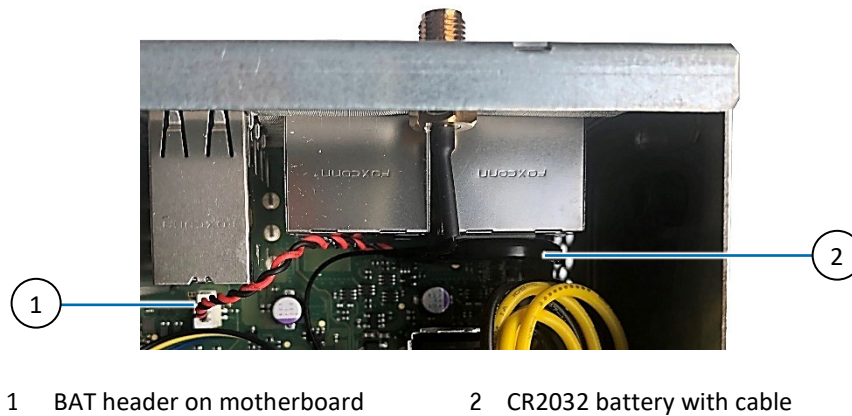
Pins	Signal	3V CR2032
Red	+	
Black	-	

Figure 28: CR2032 Lithium Battery and BAT header



The lithium battery is wired and connects to the BAT pin header on the motherboard.

To replace the lithium battery, perform the following:

1. Close all applications. Shut down properly using the power button and disconnect the power cable from the DC IN connector or the power source. Disconnect all peripherals.
2. Open the product, see Chapter 7.2: Opening the Product, steps 1 to 6.
3. Remove the lithium battery connector from the BAT header on the motherboard.
4. Pull firmly to detach the adhesive pad on the lithium battery from the DisplayPort connector's rear side.
5. Insert the new lithium battery connector into the motherboard's BAT header. Ensure correct polarity, see Table 30: Battery Header and Table 31: CR2032 Lithium Battery with Connector.
6. Attach the new lithium battery to the internal DisplayPort connector with a new adhesive pad.
7. Close the product, see Chapter 7.2: Opening the Product, step 7.

14.3. BIOS Recovery Jumper

To recover the BIOS, refer to Chapter 12.5: Recover BIOS.



All the BIOS settings and some data is lost during the BIOS recovery process!

15/ Storage and Transportation

15.1. Storage

If the product is not in use for an extended period time, disconnect the power plug from the power supply. If it is necessary to store the product then re-pack the product as originally delivered to avoid damage. The storage facility must meet the product's environmental storage requirements as stated within this user guide. Kontron recommends keeping the original packaging material for future storage or warranty shipments.

15.2. Transportation

To ship the product, use the original packaging, designed to withstand impact and adequately protect the product. When packing or unpacking products, always take shock and ESD protection into consideration and use an EOS/ESD safe working area.

16/ Technical Support

For technical support contact our Support Department:

- › E-mail: support@kontron.com
- › Phone: +49-821-4086-888

Make sure you have the following information available when you call:

- › Product ID Number (PN)
- › Serial Number (SN)



The serial number can be found on the Type Label, located on the product's rear panel.

Be ready to explain the nature of your problem to the service technician.

16.1. Returning Defective Merchandise

All equipment returned to Kontron must have a Return of Material Authorization (RMA) number assigned exclusively by Kontron. Kontron cannot be held responsible for any loss or damage caused to the equipment received without an RMA number. The buyer accepts responsibility for all freight charges for the return of goods to Kontron's designated facility. Kontron will pay the return freight charges back to the buyer's location in the event that the equipment is repaired or replaced within the stipulated warranty period. Follow these steps before returning any product to Kontron.

1. Visit the RMA Information website: <https://www.kontron.com/en/support/rma-information>
2. Download the RMA Request sheet for Kontron Europe GmbH and fill out the form. Take care to include a short detailed description of the observed problem or failure and to include the product identification Information (Name of product, Product number and Serial number). If a delivery includes more than one product, fill out the above information in the RMA Request form for each product. Send the completed RMA-Request form to the fax or email address given below at Kontron Europe GmbH. Kontron will provide an RMA-Number.
3. Kontron Europe GmbH
RMA Support
Phone: +49 (0) 821 4086-0
Fax: +49 (0) 821 4086 111
Email: service@kontron.com
4. The goods for repair must be packed properly for shipping, considering shock and ESD protection.



Goods returned to Kontron Europe GmbH in non-proper packaging will be considered as customer caused faults and cannot be accepted as warranty repairs

5. Include the RMA-Number with the shipping paperwork and send the product to the delivery address provided in the RMA form or received from Kontron RMA Support.

17/ Warranty

Due to their limited service life, parts that by their nature are subject to a particularly high degree of wear (wearing parts) are excluded from the warranty beyond that provided by law. This applies to the lithium battery, for example.



If there is a protection label on your product, then the warranty is lost if the product is opened.

Kontron defines product warranty in accordance with regional warranty definitions. Claims are at Kontron's discretion and limited to the defect being of a material nature.

To find out more about the warranty conditions and the defined warranty period for your region, follow the steps below:

1. Visit Kontron's Term and Conditions webpage: <https://www.kontron.com/en/terms-and-conditions>
2. Click on your region's General Terms and Conditions of Sale.

17.1. Limitation/Exemption from Warranty Obligation

In general, Kontron shall not be required to honor the warranty, even during the warranty period, and shall be exempted from the statutory accident liability obligations in the event of damage caused to the product due to failure to observe the following:

- › General safety within this user guide
- › Warning labels on the product and warning symbols within this user guide
- › Information and hints within this user guide

Additionally, alterations or modifications to the product that are not explicitly approved by Kontron, described in this user guide, or received from Kontron Support as a special handling instruction will void your warranty.

Due to their limited service life, parts that by their nature are subject to a particularly high degree of wear (wearing parts) are excluded from the warranty beyond that provided by law.

18/ Disposal

18.1. Disposal

Dispose of the product in accordance with country, state, or local regulations and requirements as part of your disposal and decommissioning policies or recycle the product or parts of the product for re-use after performing data sanitization to erase sensitive data stored on the product's memory devices.

When disposing of the product

- › Remove any product labels from the product that could indicate ownership and provide a clue to the type of data stored on the memory device.
- › Comply with your company's environmental requirements and the requirements of Waste Electrical and Electronic Equipment (WEEE) directive.
- › Use data sanitization guidelines to ensure that data sensitive to your business and/or confidential or proprietary data and software is removed from the product using a data sanitization method that stops the data from being retrieved or reconstructed.

18.2. WEEE Compliance

The Waste Electrical and Electronic Equipment (WEEE) Directive aims to:

- › Reduce waste arising from electrical and electronic equipment (EEE).
- › Make producers of EEE responsible for the environmental impact of their products, especially when the product becomes waste.
- › Encourage separate collection and subsequent treatment, reuse, recovery, recycling and sound environmental disposal of EEE.
- › Improve the environmental performance of all those involved during the lifecycle of EEE.



Environmental protection is a high priority with Kontron.
Kontron follows the WEEE directive
You are encouraged to return our products for proper disposal.

18.3. Data Sanitization

Data sanitization is the process of permanently erasing or destroying sensitive data on the product's memory devices to prevent unauthorized access to data sensitive to your business and/or confidential/proprietary data stored on the memory devices.

When designing a system, users must plan for data sanitization and design in memory devices that are easier to sanitize, memory devices from manufacturers that provide an effective data erasure tool or a return to factory default command.

When performing data sanitization, the user must consider if the product's memory devices contain sensitive data and develop a data sanitization plan to erase all sensitive data in accordance with country, state, or local data sanitization regulations and requirements or as part of your disposal and decommissioning policies.



Data Sanitization

Users are responsible for erasing sensitive data on memory devices in accordance with country, state, or local data sanitization regulations and requirements, or as part of your disposal and decommissioning policies.

Kontron recommends performing data sanitization when reusing the product in a different user environment, sending the product in for repair, disposing of the product or decommissioning the product.

General guidelines when performing data sanitization on memory devices containing data sensitive to your business and/or confidential/proprietary data:

- › Before powering down, consider if power is required to perform data sanitization on the product's memory devices.
- › When disconnected from the power source, dismantle all removable memory devices from the product and erase sensitive data.
- › Volatile memory devices only store data temporarily. Data on volatile memory can be erased easily by disconnecting the power/removing the battery for approximately 24 hours.
- › Non-volatile memory devices store data permanently and retain information when disconnected from power. Data on non-volatile memory, and must be actively erased using one of the following methods:
 - › Use an accredited third-party software tool that provides an audit trail, capable of performing a complete data clean including areas such as hidden data and bad blocks not accessed by general service-based utilities.
 - › Use the physical destruction method on memory devices that cannot be securely erased using software. The aim of the destruction is to break the silicon die within the chips package to prevent reading data from the die. If this service is performed by a third-party, obtain destruction certificates for confirmation.
 - › Use the manufacture's data erasure tool for sanitization or return to factory default command (if provided by the manufacturer). The manufacturer's tools and commands have been designed to fulfil the data sanitization requirement of the manufacturer's specific memory device(s).
- › Always verify that all sensitive data has been effectively sanitized.



Dismantle Removable Memory

Dismantle all removable memory devices and erase sensitive data for reuse by using:

- › An accredited third-party software tool.
- › Manufacture's data erasure tool' or 'return to factory default command'. (if provided)

If the removable memory is not for reuse, physically destruct the memory according to data sanitization guidelines.



Erase Data

To ensure that forensic tools cannot be used to recover sensitive data:

- › Use an accredited third-party software tool, with an audit trail, capable of performing a complete data clean including areas such as hidden data and bad blocks not accessed by general service-based utilities.
- › Use the manufacture's data erasure tool or return to factory default command designed to fulfil data sanitization requirement of the manufacturer's specific memory device(s).



Physical Destruction

When physically destructing the memory:

- › Follow proper safety protocols.
- › Break the chip packaged silicon die into two or more parts, fragments ≤ 6 mm.
- › Check both sides as memory devices may be positioned on the rear side.
- › Use a third-party destruction company providing certificates for confirmation.

18.4. Erase Disk

The BIOS includes an “Erase Disk” feature for easy and secure deletion of user data on HDD and SSD memory devices.

Erase Disk is a Kontron feature embedded in the system firmware (UEFI: Unified Extensible Firmware Interface) to erase all data from SATA or NVMe drives. The main purpose of this feature is to irretrievably delete all data from built in SATA hard disk(s) or external SATA hard disk(s) using the eSATA port before disk(s) will be discarded or the complete computer system will be sold. It also can be used whenever hard disk(s) should be deleted completely, e.g. before installing a new operating system.



For more information, visit Kontron’s [Customer Section](#).

18.5. Statement of Memory Volatility

The product’s statement of memory volatility provides the user with a detailed list of the product’s memory devices and their volatility, to enable the user to develop a suitable data sanitation plan.

Note that not all memory devices may be part of your delivered product. Some memory devices are options chosen by the user. Users are responsible for considering the memory devices installed on the product and must take appropriate action to clear the memory if required.

Third-party expansion card(s) such as PCIe cards installed on the product may include memory devices and must be removed by the user before disposing of the product. It is the responsibility of the user to observe the data sanitization plan as stated by the third-party expansion card(s) manufacture.



In some cases, special tools and/or software are necessary to access the memory



The Statement of Volatility list is an overview of all the known possible memory devices and due to configuration options may differ from your delivered product.

Table 32: Statement of Memory Volatility

Memory Type	Ref Des/ Location	Memory Size	Volatility	Retains Data when Power Off	Alterable in Field ^[2]	Battery Backed Up	Data Type	Write Protection	Emergency Erase	Process to Clear
VCCORE and VCCGT Voltage Regulator controller MP2960	120U00	256 Byte	Non-volatile	Yes	No	No	VR Config.	No	No	NA
VCCIN_AUX Voltage Regulator controller MP2940	140U00	256 Byte	Non-volatile	Yes	No	No	VR Config.	No	No	NA
DDR5 SO-DIMM	150J00	Up to 48 GB	Volatile	No	Yes	No	User Data	No	No	Disconnect from power
DDR5 SO-DIMM	160J00	Up to 48 GB	Volatile	No	Yes	No	User Data	No	No	Disconnect from power

Memory Type	Ref Des/ Location	Memory Size	Volatility	Retains Data when Power Off	Alterable in Field ^[2]	Battery Backed Up	Data Type	Write Protection	Emergency Erase	Process to Clear
Power Sequencing Controller NUC029NAN	360U10	64 KB	Non-volatile	Yes	No	No	PSC Config.	Yes	No	NA (Board will not operate with modified data)
RTC RAM	400U00	256 Byte	Volatile	Yes	Yes	Yes	CMOS RTC	No	No	Perform BIOS update
FLASH SPI	450U50	256 Mbit	Non-volatile	Yes	Yes	No	EFI Boot	Yes (SW)	No	Perform BIOS recovery
Embedded Controller MEC1521	760U10	Code Storage: 480 KB (Code + Data) Data RAM: 32 KB	Non-volatile (Code storage) Volatile (RAM)	Yes	Yes	No	Embed-controller config.	Yes	No	Perform EC FW update
Ethernet SPI FLASH	810U81	16 Mbit	Non-volatile	Yes	Yes	No	GbE FW	No	No	NA (NIC will not operate with modified data)
M.2 2280 NVMe SSD ^[1]	Mother-board M.2 socket	Up to 4 TByte	Non-volatile	Yes	Yes	No	Storage	No	No	Remove or use BIOS Erase disk or 3rd party overwrite tool
M.2 2280 NVMe SSD ^[1]	PCIe to M.2 Adapter card in Mother-board PCIe16 Gen 5 slot	Up to 4 TByte	Non-volatile	Yes	Yes	No	Storage	No	No	Remove or use BIOS Erase disk or 3rd party overwrite tool

^[1] Memory is an option and may not be included in your configuration.

^[2] In some cases special tools and/or software are necessary to access the memory.

19/ Cyber Security

Cyber security is an important aspect to consider when installing, operating, maintaining and disposing of the product. This chapter provides cyber security guidelines for the user.



Security White Paper

For cyber security guidelines to protect your Kontron product from potential cyber security threats, refer the [Kontron Security Guideline Whitepaper](#).



Security Measures

Kontron is not aware of the final target end user environment in which the product operates. It is not possible for Kontron to provide precise instructions for your cyber security measures. Kontron strives to provide hints for considerations for your threat analysis and to point out particular security mechanisms implemented in Kontron products.

19.1. Security Defense Strategy

When developing your security defense strategy consider implementing the following guidelines to help you effectively secure the product:

- › Policies and procedures developed in association with the product's/end environment's security.
- › Instructions and recommendations for periodic security maintenance activities and reporting product security incidents.
- › Security network controls/setting such as firewall rules.
- › Third-party software tools that further protect the product.
- › Authentication to access the product, limit user privileges and managing user accounts.
- › Data encryption.
- › Reduced number of potential security entry points.
- › BIOS/OS and security updates that do not compromise the product's operation or defense in depth strategy.
- › User accounts with length and complexity requirements.
- › Supplied default passwords are changed.
- › Limited network access (IP address range).
- › Installation of anti-virus and malware software.
- › Network access requirements such as VPN.

Appendix: List of Acronyms

AC	Alternating Current
BIOS	Basic Input Output System
BT	Bluetooth
CE	Conformité Européenne
COM	Communication port
DC	Direct Current
DP	DisplayPort
DPP	DisplayPort Plus
DVI	Digital Visual Interface
eDP	Embedded DisplayPort
EEE	Energy Efficient Ethernet
EMC	ElectroMagnetic compatibility
ESD	ElectroStatic Discharge
FCC	Federal Communications Commission
GB	Ground Benign
GbE	Giga Bit Ethernet
GND	Ground
GPIO	General Purpose Input Output
HD	High Definition
HDD	Hard Disk Drive
HDMI	High Definition Multimedia Interface
HDR	High Dynamic Range
IOT	Internet of Things
LAN	Local Area Network
LED	Light Emitting Diode
LPS	Limited Power Source
LVDS	Low Voltage Differential Signaling
MBR	Master Boot Record
MDI	Media Dependent Interface
MTBF	Mean Time Before Failure
NRTL	Nationally Recognized Testing Laboratory
NVMe	Non Volatile Memory Express
OS	Operational System
PS	Power Source
PSU	Power Supply Unit
RAID	Redundant Array of Independent Disks
RMA	Return of Material Authorization
RoHS	Restriction of Hazardous Substances

RTC	Real Time Clock
SATA	Serial ATA
SD Card	Secure Digital Card
SDR	Standard Dynamic Range
SSD	Solid State Drive
S/PDIF	Sony/Philips Digital Interface
TPM	Trusted Platform Module
UEFI	Unified Extensible Firmware Interface
UKCA	UK Conformity Assessed
UL	Underwriters Laboratories
USB	Universal Serial Bus
VGA	Video Graphics Array
VESA	Video Electronics Standards Association
WEEE	Waste from Electrical and Electronic Equipment



About Kontron

Kontron is a global leader in IoT/Embedded Computing Technology (ECT) and offers individual solutions in the areas of Internet of Things (IoT) and Industry 4.0 through a combined portfolio of hardware, software and services. With its standard and customized products based on highly reliable state-of-the-art technologies, Kontron provides secure and innovative applications for a wide variety of industries. As a result, customers benefit from accelerated time-to-market, lower total cost of ownership, extended product lifecycles and the best fully integrated applications.

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