



KBox B-204-RPL

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KBox B-204-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
0.1	Initial hardware information	27-Jan-2025	CW
0.2	No PE used potential equalization , removed holdup table, updated RAID and power connector information,aligned with KBox B 204 and new block diagram.	21-Feb-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.



NOTICE indicates a property damage message.



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.



Electric Shock!

This symbol and title warn of 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 inform that the electronic boards and their components are sensitive to static electricity. Care must therefore be taken during all handling operations and inspections of this product in order to ensure product integrity at all times.



Caution: HOT Surface!

Do NOT touch! Allow to cool before servicing.

Attention : Surface CHAUDE !

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



Caution: Laser!

This symbol inform of 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.



High sound pressure!

High sound pressure 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 indicates general information and guidelines regarding security/cyber security to ensure installation, operation, maintenance and disposal of the product meet the required guidelines within the user's end environment.



This symbol indicates general information about the product and the user guide.
This symbol also indicates detail information about the specific product configuration.



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 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 work place that is access controlled. Follow the "General Safety Instructions" supplied with the product.

Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station 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 taken into account.

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 it in the same manner as it was 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 complying with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit www.kontron.com/about-kontron/corporate-responsibility/quality-management.

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1/Introduction

This user guide describes the KBox B-204 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-204 RPL



At the heart of the KBox B-204-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 a fast SSD support for mass storage.

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 Display Ports enable the connection of up to four simultaneous displays. The product is power by an AC/DC (150 W or 240 W) power supply provided by Kontron in the delivery, an optional 24 VDC power variant for direct connection to an external 24 VDC power supply or an optional AC IN power connection.

The two expansion bays on the product's rear panel support various configuration of expansion options for GFX cards, LAN cards, I/O card, internal or external storage and an AC IN power connector.

The product's compact design supports the thermal concept with a low noise level 'Whisper Quiet Operation' 34 dB(A) maximum to ensures 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

- › Kontron 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
- › 1x Audio
- › 1x COM RS232 (option)
- › 1x Breakout panel (COM RS232 option)
- › S/PDIF (option)
- › GPIO (option)

Front Interfaces:

- › 2x USB 3.2 Gen 1

System Expansion

- › Wi-Fi 6E/Bluetooth (option)
- › Storage (1x M.2 2280 NVMe SSD) (option)

Expansion Bays 1 and 2, for configuration of allowed combinations of:

- › GFX cards
- › LAN cards
- › I/O card
- › Internal or external storage (with or without RAID support)
- › AC IN 100/240 VAC AC power supply

Software

- › Windows 11
- › Linux (Debian)

Power

- › DC IN
 - › 12 VDC (AC/DC PSU, 150 W)
 - › 12 VDC (AC/DC PSU, 240 W) (option: prerequisite for high power Graphics or LAN card)
 - › 24 VDC, 160 W (option)
- › AC IN (option in Expansion Bay 2)

Installation

- › Desktop
- › Wall 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

Veillez 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 manufacture'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 dispose of batteries).

3/ Shipment and Unpacking

3.1. Packaging

The KBox B-204-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-204-RPL	1	KBox B-204-RPL factory configured with all ordered options: <ul style="list-style-type: none"> ➤ System memory ➤ Storage M.2 SSD ➤ Wi-Fi/BT® ➤ Bay 1/2: Graphics, LAN; I/O, Storage drives and 240 VAC power options ➤ Power option: DC IN (150 W), DC IN (240 W), DC IN 24 VDC or AC IN 100/240 VAC Delivered with four adhesive rubber feet and the power cord for your region or mating power connector for 24 VDC

3.4. Accessories and Spare Parts

Table 2: List of Accessories and Spare Parts

Part	Order Information	Description
	Manufacturer: Kontron Article Number: 0-0062-3268	Phoenix 3-pin power connector (PSC 1.5/3-F)
	Manufacturer: Kontron Article Number: TBD	External AC/DC (150 W) power supply (100/240 VAC to 12 VDC)
	Manufacturer: Kontron Article Number: TBD	External AC/DC (240 W) power supply (100/240 VAC to 12 VDC)
	Manufacturer: Kontron Article Number: 0-0064-2173	Power Cable EU Euro (Type-A), 2.5 m
	Manufacturer: Kontron Article Number: 0-0064-4173	Power Cable UK UK (Type-C), 2.5 m
	Manufacturer: Kontron Article Number: 0-0064-4317	Power Cable US US, 2 m
	Manufacturer: Kontron Article Number: TBD	The wall mount bracket kit includes: <ul style="list-style-type: none"> ▶ One bracket ▶ Four M3x6 screws
	Manufacturer: Kontron Article Number: 0-0067-006	Chassis feet <ul style="list-style-type: none"> ▶ Four round adhesive rubber feet
	Manufacturer: SparkLan Article Number: R3410A10050	Product Name: AD-501AX Connector: RP-SMA 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

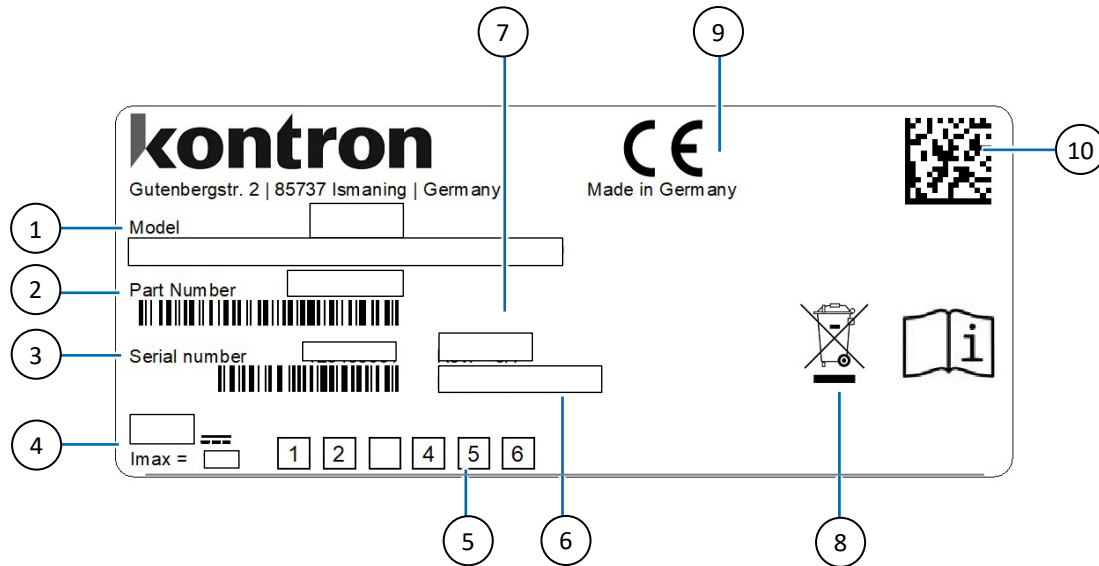


For reference expansion device information, see Table 8: Reference Expansion Devices.

3.5. Type Label and Product Identification

The type label contains specific product identification information and KBox B-204 RPL technical information.

Figure 2: **Type Label Example**



- | | |
|-------------------------------|-------------------------|
| 1. Product family | 6. Production date |
| 2. Part Number | 7. Revision |
| 3. Serial Number and bar code | 8. Disposal Information |
| 4. Electrical specification | 9. Compliance |
| 5. For Internal use [1 to 6] | 10. QR-Code |

CAUTION

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

4/Product Features

Before using the KBox B-204-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.

Figure 3: Front Panel



1. 2x USB 3.2 Gen 1 ports
2. 1x Power Button with LED

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 shutdown, and switches the product from the 'on' to the 'off' state.

NOTICE

Performing a forced shut down can lead to loss of data or other undesirable effects!
To shutdown 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.



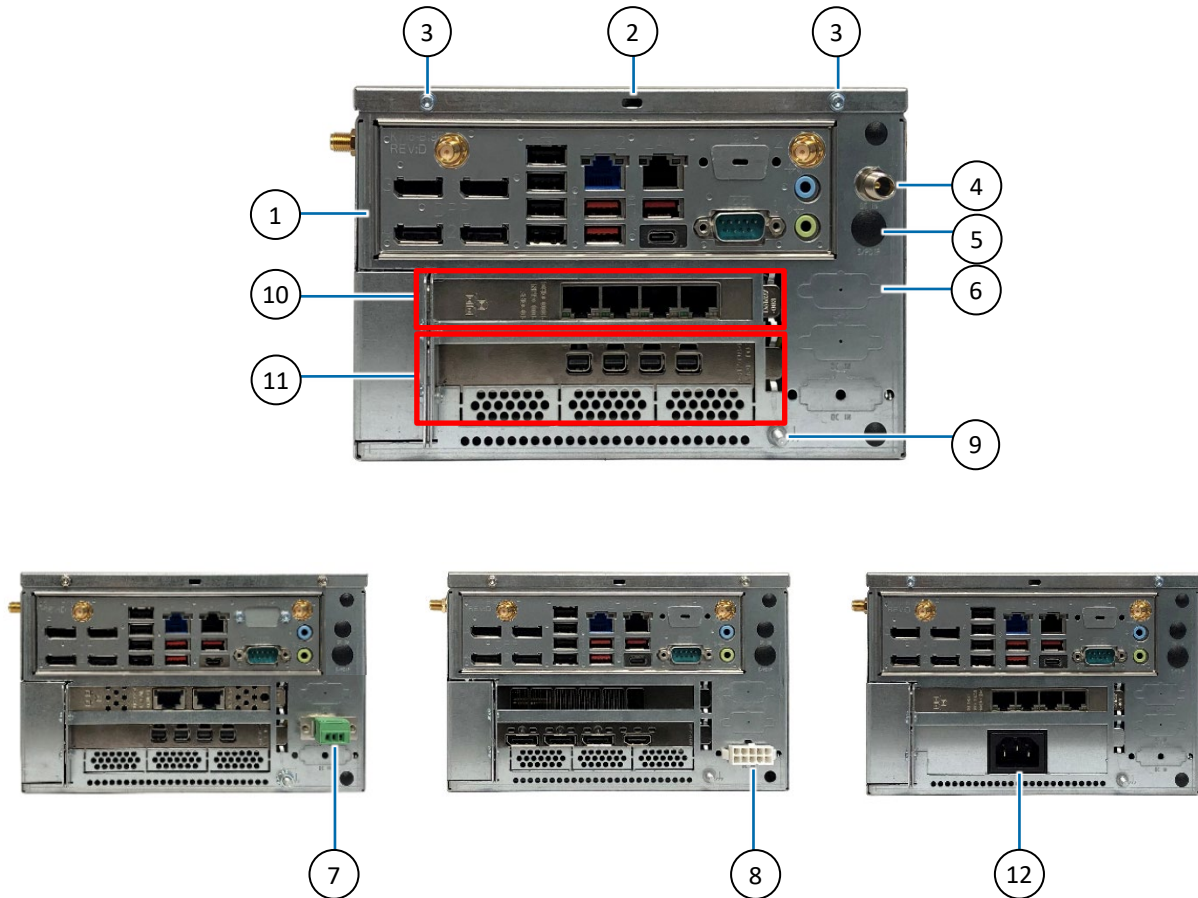
The two USB 3.2 Gen 1 ports are backwards compatible with earlier USB 3.0 versions and USB 2.0.

For the USB 3.2 Gen 2 pin assignment, see Chapter 13.5: USB 3.2 Gen 2/1 Port Pin Assignment.

4.2. Rear Panel

The rear panel features the main I/O interfaces, one power connector (12 VDC (150 W or 240 W), 24 VDC or 240 VAC), two RP-SMA antenna connectors (option), potential equalization stud, Kensington lock, two top cover fastening screws to secure the top cover and two expansion bays.

Figure 4: Rear Panel



- | | |
|--------------------------------------|---|
| 1. 1x Interface panel | 7. 24 VDC DC IN 3-pin connector (option) |
| 2. 1x Kensington lock | 8. 12 VDC DC IN 10-pin connector (option) |
| 3. 2x Cover fastening screws | 9. 1x Potential equalization stud |
| 4. 12 VDC DC IN Power Jack (default) | 10. Expansion bay 1 |
| 5. 1x S/PDIF output (option) | 11. Expansion bay 2 |
| 6. 1x GPIO (option) | 12. AC IN 3-pin connector (option) |

4.2.1. Power Connector

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 12.4: Power Specification.

CAUTION

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

For the pin assignment, see Chapter 13.1: 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 12.4: Power Specification.

The 3-pin mating power connector delivered with the product must be wired suitably by the user as described in Chapter 9.2.3.1: Wiring the 3-pin Mating Power Connector.

CAUTION

When connecting the user wired 3-pin mating power connector (PSC 1.5/3-F) to the DC IN 24 VDC 3-pin power connector and securing with the two bolts provided. Pay attention to the polarity of the connections (Right: +24 VDC & Left: Ground).

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 13.2: 24 VDC DC IN 3-Pin Connector Pin Assignment (option).

4.2.1.3. 12 VDC DC IN (240 W) (option)

The 12 VDC DC IN 10-pin connector connects directly to the supplied external AC/DC 240 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 12.4: Power Specification.

This 12 VDC option is a requirement for high performance configuration options with Graphics and LAN cards.

CAUTION

Power the product with the supplied external AC/DC (240 W) power supply only.

For the pin assignment, see Chapter 13.3: 12 VDC DC IN 10-Pin Power Connector Pin Assignment (option).

4.2.1.4. AC IN (100/240 VAC) (option)

The AC IN 3-pin power connector connects directly to the mains power supply for your region (100/240 VAC) using the power cord supplied by Kontron and delivered with the product.



Power the product with the delivered AC power cable.

For the pin assignment, see Chapter 13.4: AC 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. S/PDIF (option)

The S/PDIF output connector is a digital audio optical output supporting 5.1 Multichannel. For direct connection of digital audio devices.



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

For the pin assignment of the S/PDIF connector, see Chapter 13.13: S/PDIF Pin Assignment (option).

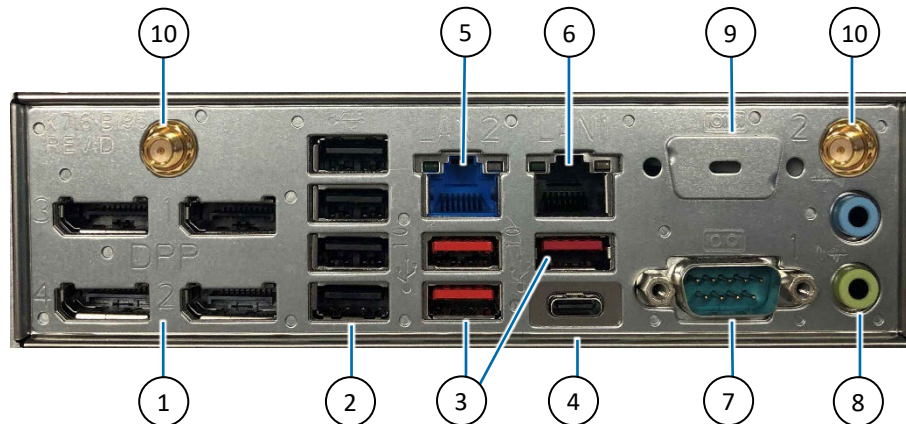
4.2.5. GPIO (option)

The GPIO port breakout enables the installation of a used defined GPIO port connector.

For more information, contact your Kontron sales representative.

4.2.6. Interface Panel

Figure 5: Interface Panel



- | | |
|---------------------------|-------------------------------------|
| 1. 4x DPP (DPP1-DPP4) | 6. 1x 1 GbE (LAN1) |
| 2. 4x USB 2.0 (↔) | 7. 1x COM RS232 (1) |
| 3. 3x USB 3.2 Gen 2 (↔) | 8. 1x Audio (Line-In & Line-Out) |
| 4. 1x USB-C 3.2 Gen 2 (↔) | 9. 1x Breakout Panel (option) |
| 5. 1x 2.5 GbE (LAN2) | 10. 2x Wi-Fi/BT® antenna connectors |

4.2.6.1. 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 0:

CAUTION

Only connect the product to a main power outlet using the power cable supplied by Kontron for your region.

USB 3.2 Gen 2/1 Port Pin Assignment.

4.2.6.2. USB-C 3.2 Gen 2 Port

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

For the pin assignment, see Chapter 0:

USB-C 3.2 Gen 2 Port Pin Assignment.

4.2.6.3. 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 13.7: USB 2.0 Pin Assignment .

4.2.6.4. Display Port (DPP)

The four DP V1.4a ports (Figure 5, pos. 1) are Display Port ++ 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 13.8: Display Port (DP) V1.4a Pin Assignment.

4.2.6.5. 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 “EEE” mode in the Advanced Windows/ Linux driver setting.

For the pin assignment, see Chapter 13.9: LAN 2.5 GbE/1 GbE Connector Pin Assignment.

4.2.6.6. 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 13.11: COM Port Pin Assignment (option).

4.2.6.7. 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: electret 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 13.10: Audio (Line-In & Line-Out) Connector Pin Assignment.

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

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

⚠ CAUTION

Avoid RF antenna exposure by:

- › 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

NOTICE

RP-SMA and SMA Antenna are not Interchangeable!

RP-SMA and SMA antenna are not electrically compatible and not interchangeable. Ensure you have 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 13.12: Antenna Wi-Fi/BT® Pin Assignment.

4.2.6.9. Breakout Panel

The breakout panel supports an additional COM RS232 port, for RS232 compatible serial device.

For more information, see Chapter 4.2.6.6: COM Port (option).

4.3. Left and Right Side

The right side features two possible Wi-Fi/BT® antenna connector type RP-SMA female to support Wi-Fi 6E/BT 5.3 and a removable expansion door for PCIe cards insertion and removal. Alternatively, two Wi-Fi/BT® antenna connectors are available on the rear panel.

Avoid RF antenna exposure by:

⚠ 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. Ensure you have 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 13.12: Antenna Wi-Fi/BT® Pin Assignment.

Figure 6: Left and Right Sides

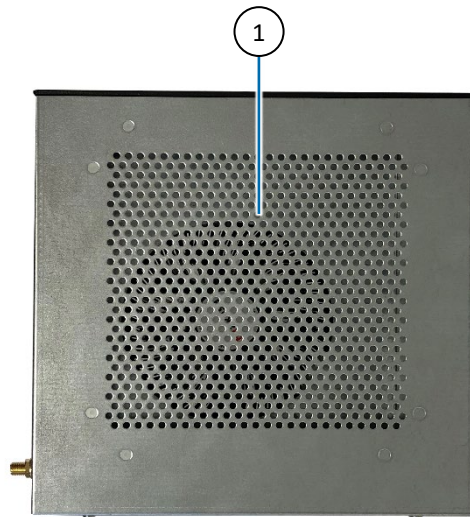


1. 2x Wi-Fi-antenna (RP-SMA female)
2. Expansion door with ventilation openings
3. Ventilation openings (right side)

4.4. Top Cover and Bottom Sides

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



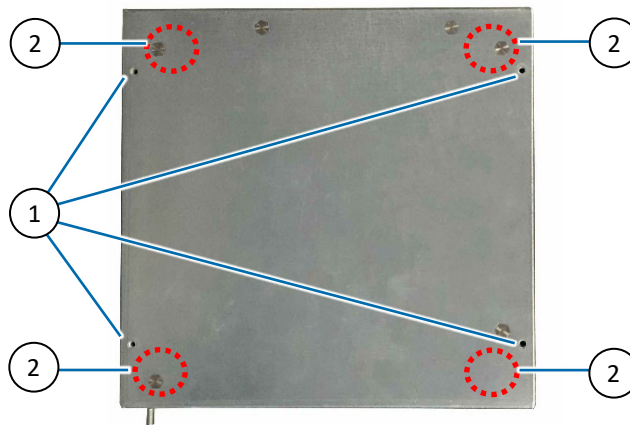
1. Ventilation openings (air-intake)

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 screw 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-204-RPL supports maximum expandability in a compact design and is factory configured according to the users ordered hardware configuration. Users may expand the product to meet further requirements using the free sockets, slots or bays. Kontron recommends the use of Kontron’s reference devices when expanding 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.

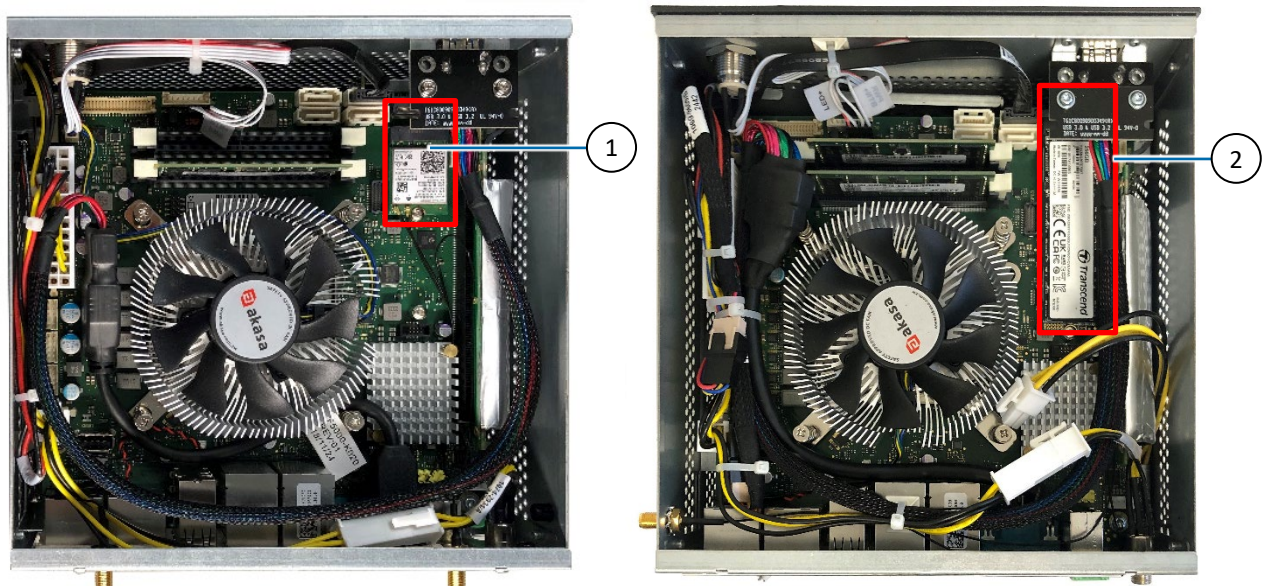
The product supports two internal stacked M.2 sockets for Wi-Fi/BT® and storage SSD. Additionally, two expansion bays supporting various PCIe card, storage and power configuration options are available



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

5.2. Internal M.2 Sockets

Figure 9: M.2 Sockets (stacked)



1. M.2 Wi-Fi/BT® (lower socket)

2. M.2 SSD (upper socket)

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 M.2 modules.

Table 5: Wi-Fi/BT Option

Motherboard Socket	Interface	Quantity	Expansion Device
M.2 2230 Key E (lower socket)	PCIe x1/ USB 2.0	1	M.2 2230 Wi-Fi 6E, 6 GHz (Gig+) / Bluetooth® 5.3 Interfaces: Wi-Fi – PCIe and BT® - USB 2.0

5.2.2. Storage

The storage option populates the upper M.2 2280 Key M socket. When populated with an M.2 module, the socket is not available for other M.2 modules.

Table 6: Storage option

Motherboard Socket	Interface	Quantity	Expansion Device
M.2 2242/2280 Key M (upper Socket)	PCIe x4	1	M.2 2280 NVMe SSD (up to 4 TByte)



No support for SATA based M.2 modules.

5.3. Expansion Bays

The two expansion bay are accessible to the user for configuration of PCIe cards (LAN cards & GFX cards), internal and external storage (3.5" HDD & 2.5" SSDs) and an AC IN 100/240 VAC power option.

The two PCIe slots are PCIe Gen 4 and support lane splitting (x16 or x8+x8), to install either one PCIe card x16 (single or double) or two PCIe cards x8 (single). The internal storage devices and the AC IN 100/240 VAC power option are secured on internal brackets and are factory installed options only.

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

⚠ CAUTION

Some high power PCIe expansion card(s) combinations may require additional hardware such as an extra internal system fan.

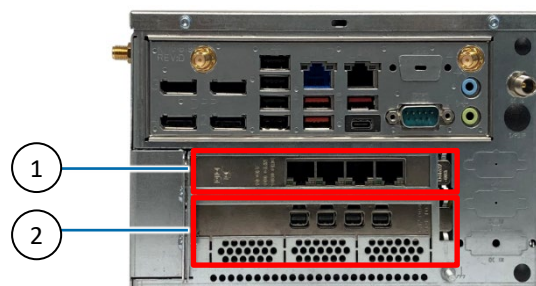


When installing PCIe cards users must adhere to the manufactures requirements and any prerequisite requirements stated within this user guide.



Use the lock available on the externally accessible removable SSD drives to prevent 3rd party access to possible sensitive data stored on the product.

Figure 10: Expansion Bays



1. Expansion bay 1

2. Expansion bay 2

The following table shows the possible expansion bay 1 and expansion bay 2 maximum configuration combinations.

Table 7: Expansion Bay Configuration Combinations

Expansion Bay Configuration Combination						
Bay 1		PCIe x8 single slot card	PCIe x8/16 single slot card	PCIe x8/16 single slot card	PCIe x8/16 single slot card	PCIe x8/16 single slot card
Bay2	PCIe x16 dual slot card ^[1]	PCIe x8 single slot card	1x 2.5" SSD ^[2] up to 4 TByte	3.5" HDD up to 12 TByte	SSD mobile rack 2x 2.5" SSD RAID ^[3]	AC IN power connector
	1x 2.5" SSD up to 4 TByte	1x 2.5" SSD up to 4 TByte	1x 2.5" SSD ^[2] up to 4 TByte	1x 2.5" SSD up to 4 TByte	1x 2.5" SSD up to 4 TByte	1x 2.5" SSD up to 4 TByte

^[1] Dual PCIe cards only in expansion bay 2's PCIe x16 slot. With the prerequisite that expansion bay 1 is free.

^[2] Chipset RAID software configured: prerequisite both 2.5"SSDs must be the same density.

^[3] Integrated RAID controller: prerequisite both removable 2.5"SSDs must be the same density.

5.4. Reference Expansion Devices

When installing a reference M.2 module or PCIe card adhere to the manufactures requirements and the prerequisite requirements stated in

Table 8: Reference Expansion Devices.

CAUTION

Installation of the reference dual LAN 10 GbE single slot PCIe expansion card is permitted only with a factory installed internal fan assembly.

NOTICE

When installing expansion devices users must adhere to the 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.



Others PCIe expansion card options are available on request. For more information, contact [Kontron Support](#).

Table 8: Reference Expansion Devices

Expansion Device	Description
M.2 Key E WI-Fi/BT [®] Module	Manufacturer: Intel [®] Article Number: AX210.NGWG.II Intel [®] Wi-Fi 6E AX210 (Gig+) Extended Temperature Industrial Module WI-FI 6E/BT 5.3 Form factor: M.2 key E Interface: PCIe (Wi-Fi) and USB 2.0 (BT)
Wi-Fi/BT [®] Antenna	Manufacturer: SparkLan Article Number: R3410A10050 Product Name: AD-501AX

Expansion Device	Description
	Connector: RP-SMA plug (male) Type: Dipole Antenna Frequency: 2.4 GHz/5 GHz/6 GHz Peak gain: 3.7dbi/5dBi/5dBi Dimensions: (LxWxT): 162 x 22 x 13.6 mm and hinge: 0° to 90° Impedance: 50 ohms
M.2 Key M SSD Module	Manufacturer: Transcend Article Number: TS256GMTE760T (246 GByte) TS512GMTE720T (512 GByte) TS1TMTE720T (1 TByte) TS2TMTE720T (2 TByte) TS4TMTE720T (4 TByte) Form factor: M.2 2280 Key M SSD Module Interface: NVMe PCIe Gen 4x4
Dual LAN 1 GbE Single Slot	Device: LREC9712HT Speed: 10/100/1000 Mbps Bus type: PCIe* V2.1 (5 GT/S) Bus width: 4-lane PCIe (operable in x4, x8 and x16 slots) Ethernet controller: Intel® I350 Connector: 2x RJ45 Power consumption: 6 W
Dual LAN 10 GbE Single Slot	Device: LREC9812BT Speed: 10GbE/1GbE /100MbE Bus type: PCIe V3.0 (8.0 GT/S) (2.0 and 1.1 compatible) Bus width: 4-lane PCIe (operable in x8 and x16 slots) Ethernet controller: X550AT Connector: 2x RJ45 Power consumption: 13 W Prerequisite: Installation permitted only with a factory installed internal fan assembly.
Quad LAN 1 GbE Single Slot	Device: LREC9714HT Speed: 10/100/1000 Mbps Bus type: PCIe V2.1 (5 GT/S) Bus width: x4-lane PCIe (operable in x8 and x16 slots) Ethernet controller: Intel® I350 Connector: 4x RJ45 Power consumption: 5.04 W
Graphics Card 4x mini DP Single Slot	Device: Nvidia T1000 Single slot Power consumption: 50 W Max. Interface: PCIe 3.0 x 16 Max. simultaneous displays with resolution: <ul style="list-style-type: none"> ➤ 4x 3840x2160@120Hz ➤ 4x 5120x2880@60Hz ➤ 2x 7680x4320@60Hz

Expansion Device	Description
Graphics Card 3x DP, 1x HDMI Dual Slot	Device: GeForce RTX 3050 Power Consumption: 130 W max. Interface: PCIe 4.0 Resolution: 7680x4320@60H Integrated Fan Prerequisite: Installation requires a dual slot

6/Thermal Management

6.1. Active Cooling

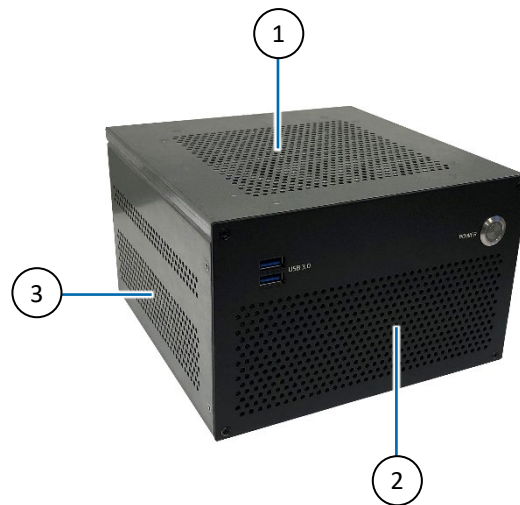
The KBox B-204-RPL is actively fan cooled. An internal processor fan draws in air through the top cover's ventilation openings and distributes the incoming air over critical internal components before exiting through ventilation openings on the right side, left side and front panel.

⚠ CAUTION

Obstructing ventilation openings may cause overheating

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

Figure 11: Ventilation Openings



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

6.2. Mount Orientation

Mount the product horizontally with the cover facing upward or vertical in 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 is a possible fire hazard due to hot substances exiting through the cover's ventilation opening.

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 (Keep out Area)

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

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

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, PCIe expansion cards, drives (HDD/SSD), an approximate internal temperature rise is given and must be taken into consideration.

7/Assembly

7.1. Before Assembling

Before opening the KBox B-204-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.

⚠ WARNING

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.

⚠ CAUTION

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



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 and Closing the Product

⚠ WARNING

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.



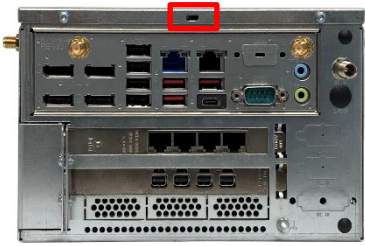
Kensington Lock

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

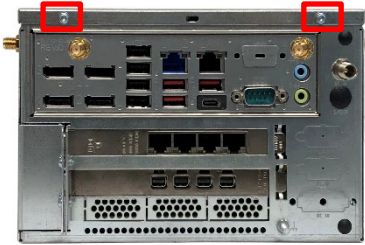
To open the KBox B-204-RPL to gain access to internal components, perform the following:

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 (or AC IN option) power connector. Disconnect all peripherals.
2. Place the product on a flat, clean and ESD-safe surface.

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



- Remove the two top cover screws on the rear panel. Retain the screws for later use.



- Lift the top cover a few centimeters at the rear of the chassis and pull the top cover gently away from the front panel.
- Lift the top cover vertically to avoid damaging the internal fan assembly. Do not slide the top cover off the chassis!
- 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 M.2 module in both sockets install the M.2 Wi-Fi/BT® module in the lower socket first.

NOTICE

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

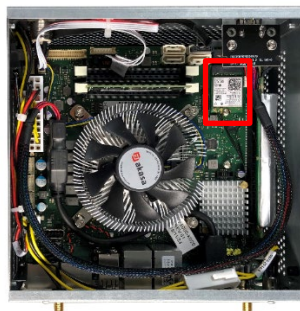


The M.2 socket is a stacked socket. The lower module must be installed first and can only be accessed by removing the upper SSD module.



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

Figure 12: M.2 Wi-Fi/BT® Socket



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

1. Open the product, as described in Chapter 7.2: Opening and Closing 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. Note that if an M.2 2280 Key M SSD module populates the upper socket, 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].
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 product's antenna connectors are not installed:
 - › Open the required antenna connector breakouts (on the rear panel or the left side)
 - › 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.
 - › Attach the antenna connector's internal cable to the M.2 module's antenna connectors [1] and [2]
6. To remove a M.2 Wi-Fi/BT® module, from the M.2 2230 Key E socket, perform the steps 2 to 4 in the reverse order.
7. Close the top cover, as described in Chapter 7.2: Opening and Closing the Product, step 7.
8. Screw the delivered Wi-Fi/BT® antenna on to the Wi-Fi/BT® antenna connector
9. Position the Wi-Fi/BT® antenna, using the antenna's hinge, in the direction required or allowed for by the installation environment.

Avoid RF antenna exposure by:

⚠ 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 modules. When installing modules in both sockets install the lower module first and then installing the M.2 SSD module in the upper socket.

NOTICE

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.

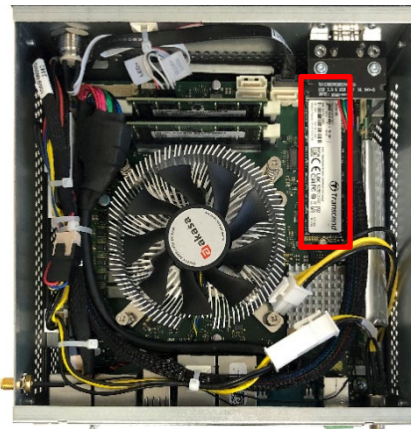


The M.2 socket is a stacked socket. The lower module must be installed first and can only be accessed by removing the upper module.



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

Figure 13: M.2 2280 NVMe SSD Socket



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

1. Open the product, as described in Chapter 7.2: Opening and Closing the Product, steps 1 to 6.
2. Locate the M.2 stacked socket 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 the steps 2 to 3 in the reverse order.
5. Close the top cover, as described in Chapter 7.2: Opening and Closing the Product, step 7.

7.3. Opening the Expansion Door

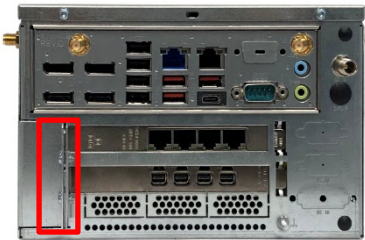
Before opening the expansion door, observe the safety instructions within this chapter.

WARNING

Operate only when the expansion door is closed and secured; to ensure that users do not have access to internal components during operation.

To open the expansion door, perform the following:

1. Close all applications shut down the product properly using the power button and disconnect the power cable. Disconnect all peripherals.
2. Place the product on a flat, clean and ESD-safe surface with the left side facing upwards.
3. Loosen the two screws holding the expansion door. Retain the screws for later use.

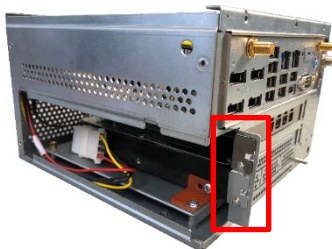


4. Move the expansion door outwards at the free end and slide in the direction of the rear panel to release the holding plate on the expansion door.
5. Close the expansion door, by proceeding in the reverse order (steps 4 to 3).

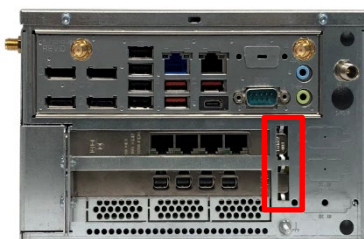
7.3.1. Installing and Removing PCIe Cards

To install a PCIe card in expansion bay 1 or Bay 2, perform the following:

1. Open the expansion door as described in Chapter 7.3: Opening the Expansion Door, and retain the two screws for later use.
2. To install a PCIe expansion card, in expansion bay 1 or expansion bay 2 PCIe slot, remove the slot bracket by releasing the slot bracket from the front pin.



3. Sliding the slot bracket's front end out of the holding latch.



- To install a PCIe expansion card, align the expansion card with the corresponding internal PCIe slot. Push the expansion card carefully into the PCIe slots connector, while ensuring the expansion card's bracket inserts into the holding latch. Position the other end of the expansion card's bracket on the corresponding front pin.
- Secure the expansion door by positioning the holding plate in the inside of the chassis.



- Push the door until the two screw holes align with the screw holes on the chassis.



- Close and secure the door with the screws retained in step 1.

To remove a PCIe expansion card, perform the following:

- Open the expansion door as described in Chapter 7.3: Opening the Expansion Door and retain the two screws for later use.
- Remove the expansion card by releasing the expansion card's bracket from the front pin and sliding the expansion card's front end out of the holding latch. Continue to pull the expansion card outward to remove the expansion card from the PCIe slot.
- Place the PCIe expansion card on an ESD-safe surface.
- Insert an empty slot bracket if the PCIe slot is to remain unused, else install a new PCIe expansion card.
- Secure the expansion door by positioning the holding plate in the inside of the chassis. Push the door until the two screw holes align with the screw holes on the chassis.
- Close and secure the door, with the screws retained in step 1.

7.4. Installing or Removing a Removable 2.5" SSD

The externally accessible 2.5" SSD drives are fasten onto the dual drive's tray and inserted into one of the dual drive's slots. The externally accessible lock enables users to lock both drive slots to prevent third party access to possible sensitive data stored on the product.



Use the lock available on the externally accessible removable SSD drives to prevent 3rd party access to possible sensitive data stored on the product.

To install a 2.5" Removable SSD, perform the following:

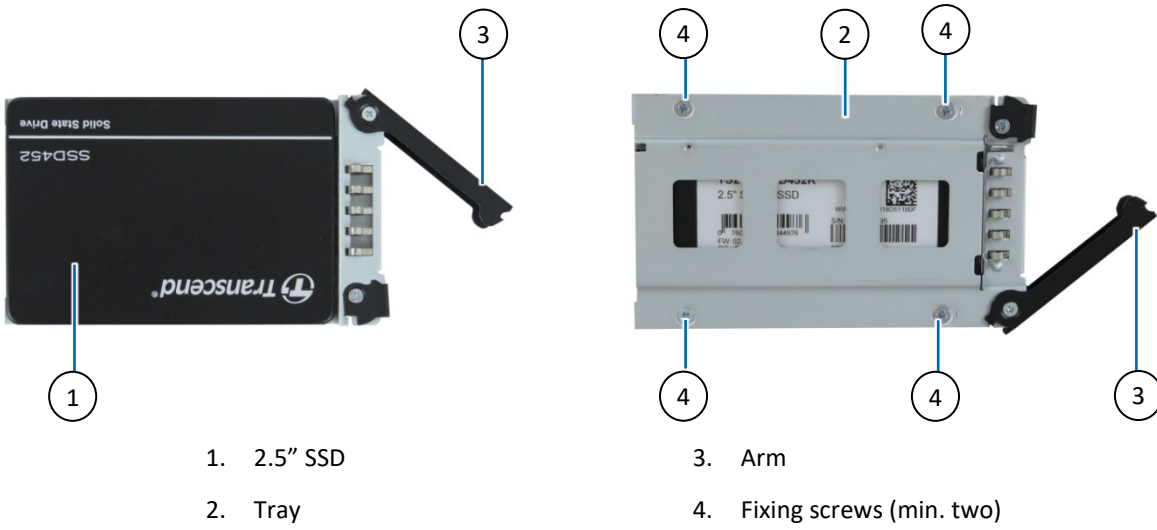
- Unlock the storage bay using the key supplied.
- Press the tab on the left side of the tray arm towards the left and the arm swings open.



- Pull out the empty tray.
- Position and fasten the 2.5" SDD to the tray using four screws.

5. Push the tray with installed 2.5" SSD into the empty storage bay and press the arm to close.
6. Remove a 2.5" SSD, by proceeding in the reverse order.

Figure 14: 2.5" SSDs (removable)



8/Installation

8.1. Before Installing

Before installing the KBox B-204-RPL in the operating environment, ensure that the operating environment meets the specification stated within this user guide, and that there is sufficient access to the product's power connector (DC IN or AC 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 with the top side facing 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 (Keep out Area).

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

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

⚠ CAUTION

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

Obstructing the ventilation openings may cause overheating:

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

⚠ CAUTION

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



Ensure there is enough clearance for users to:

- Connect cables on the rear I/O panel
- Access the power-on 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 use in desktop environments 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 required clearance around the product to ensure air-intake is not restricted.

⚠ CAUTION

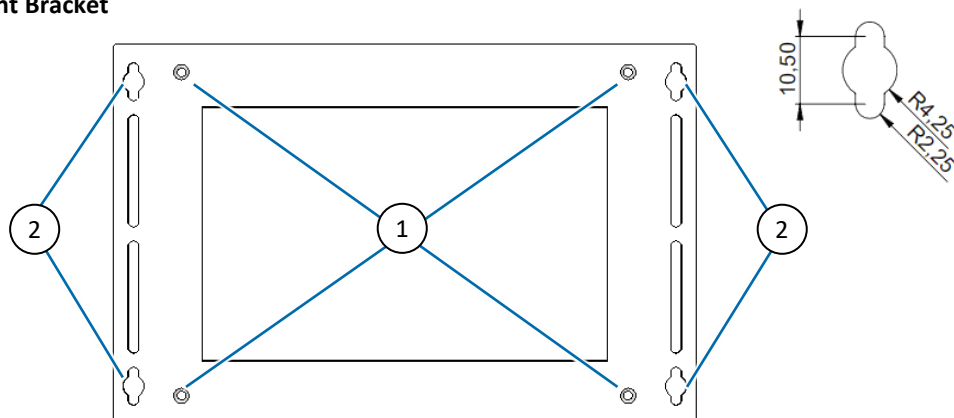
Weight

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 15: Wall Mount Bracket

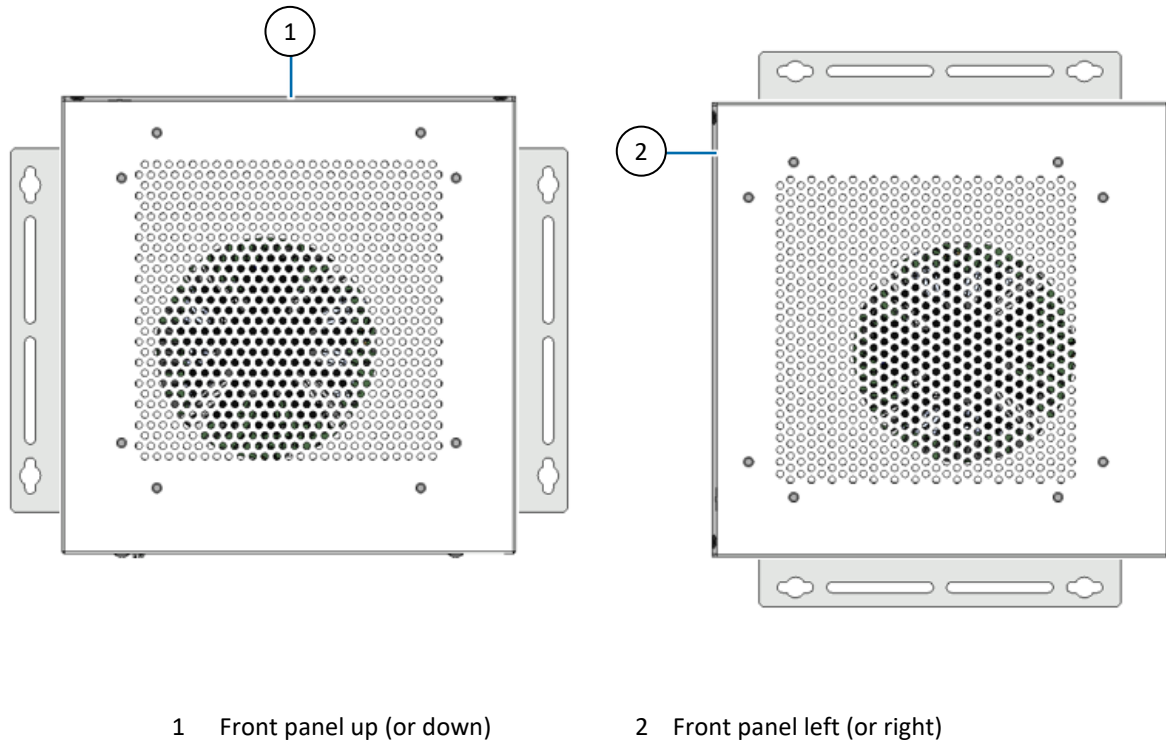


1 4x Mounting holes

2 4x Keyhole openings for wall mount

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 enables mounting with the front panel up (or down) or with the front panel left (or right).

Figure 16: 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 to 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.

9/Starting Up

9.1. Before Starting

Before connecting the KBox B-204-RPL to power, read the instructions in this user guide and observe the safety instructions in Chapter 2/General Safety Instructions

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

Operate in the closed condition only

⚠ 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.

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 (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**

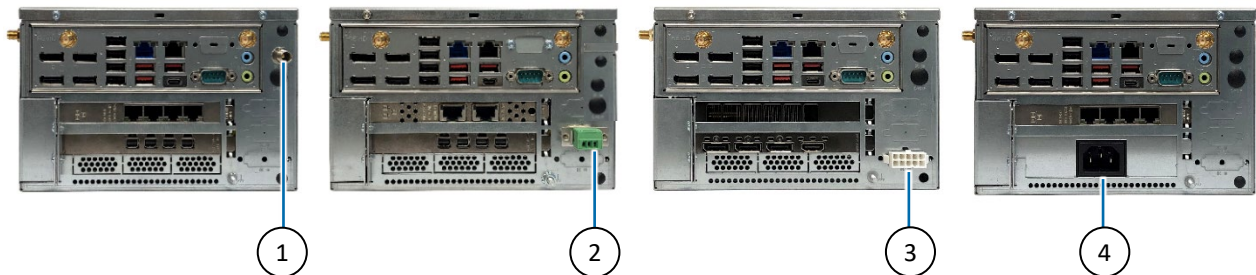
Support the power and I/O cables to minimize the strain on the product's connectors.

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 shutdown 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 include in the delivery. The following chapter describes how to connect the various power connector options to a power source.

Figure 17: Power Connectors

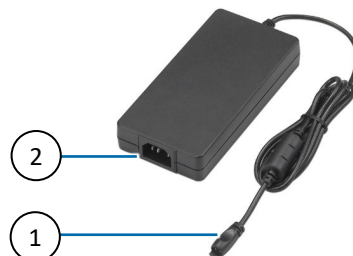
1. 12 VDC DC IN Power Jack (default)
2. 24 VDC DC IN 3-pin connector (option)
3. 12 VDC DC IN 10-pin connector (option)
4. AC IN 100/240 VAC 3-pin connector (option)

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 0: Power Specification.

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 18: 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 (see Figure 17, 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 product's 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. 12 VDC DC IN 10-Pin Power Connector (option)

The 12 VDC DC IN 10-pin power connector connects to the external AC/DC 240 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 0: Power Specification.

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 19: External AC/DC (240 W) Power Supply



1 10-pin DC IN power connector

2 Main power cable connector

To connect the supplied external AC/DC (240 W) power supply to the 12 VDC DC IN 10-pin power connector (see Figure 17, pos. 3), perform the following:

1. Ensure the product is closed securely and connect the potential equalization stud to an appropriate common earth connection.
2. Connect the power supply's DC cable to the Product's 12 VDC DC IN 10-pin power connector.
3. Connect the other end of the power supply to the mains power outlet using the correct plug for your region.

9.2.3. 24 VDC DC IN 3-pin Power Connector (option)

The 24 VDC DC IN 3-pin, power connector connects to the supplied 3-pin mating power connector (PSC 1.5/ 3-F). The external 24 VDC power supply must automatically recover from AC power loss and startup under peak loading.

⚠ 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.

Disconnection Device

⚠ 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.

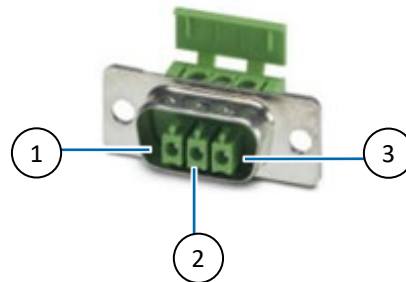


To connect to the 3-pin DC IN power connector only use the 3-pin mating power connector (supplied by Kontron and included in the delivery).

9.2.3.1. Wiring the 3-pin Mating Power Connector

The user is responsible for wiring the product correctly to an external 24 VDC power supply. Kontron recommends marking the wires clearly with (+/-) to ensure the correct connection to the DC IN 3-pin power connector. For the pinout of the DC IN 24 VDC 3-pin connector, see Chapter 13.2: 24 VDC DC IN 3-Pin Connector Pin Assignment (option).

Figure 20: 3-pin Mating Power Connector



1 +24 VDC wire clamp

3 GND (-) wire clamp

2 NC

NOTICE

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 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.
- 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.

9.2.3.2. Connecting to an External 24 VDC Power Supply

CAUTION

When connecting the 3-pin mating power connector (PSC 1.5/3-F) to the 24 VDC DC IN connector, securing with the two bolts provided and pay attention to the polarity of the connections.

To connect the 24 VDC DC IN 3-pin connector (see Figure 17, 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 (PSC 1.5/3-F) as described in Chapter 9.2.3.1: 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 product's 24 VDC 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.

9.2.4. AC IN 100/240 VAC

The AC IN 100/240 VAC 3-pin power connector connects directly to the mains power outlet for your region. Use the cable (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 0: Power Specification.

To connect the AC IN 3-pin connector (Figure 17, pos. 4) to a mains power socket, perform the following:

1. Connect the potential equalization stud to an appropriate common earth connection.
2. Connect the supplied AC cable to the 3-pin AC-IN connector on the rear panel.
3. Connect the other end of the power supply to the mains power outlet for your region.

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 powered on state.

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

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 power connector (DC IN or AC IN), the product restarts by pressing the power button.

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 shutdown 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 with 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 for the first time. Pay attention to the manufacturer's OS specifications for integrated hardware components.

For information regarding supported software, see Chapter 12.3: 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/ BIOS

The KBox B-204-RPL uses the AMI Aptio 5.x (uEFI) BIOS supported by the motherboard. This chapter informs user 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.



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



Only use the Kontron provided tools!

10.1. 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 or <F2> keys 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 or <F2> key is not pressed the POST continues with the test routines.

10.2. 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. At the top of the displayed BIOS screen is the menu bar to the setup menus:

- › Main
- › Advanced
- › H/W Monitor
- › Security
- › Boot
- › Exit

To navigate between the setup menus use the BIOS navigation keys described in Chapter 10.3: BIOS Navigation.



Observe that setting wrong values within the Advanced setup menu may cause the product to operate incorrectly.

10.3. 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 9: Navigation Hot Keys Available in the Legend Bar

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 selects 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

10.4. Updating the BIOS

Before updating the BIOS, Kontron's recommends making a backup of the current BIOS setting. For the latest BIOS updates, visit Kontron's Customer Section and access the motherboard's (mini-ITX K3836-Q) FTP server information and follow the instructions provided.



For the latest BIOS updates and BIOS release information, visit Kontron's [Customer Section](#).



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.



After a BIOS update If the product fails to boot, the updated BIOS maybe damaged, see Chapter 10.5: Recover BIOS.

Figure 21: BIOS FTP Server Example

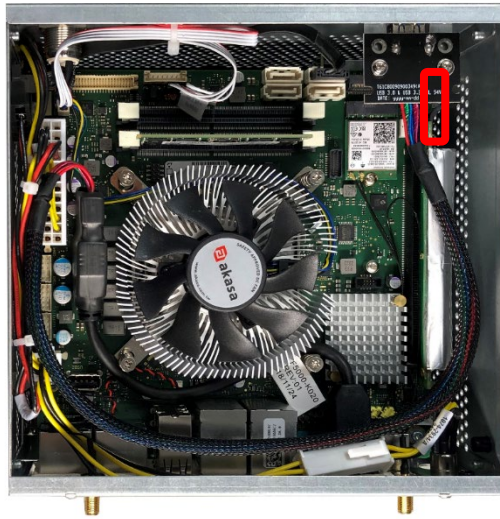
kontron

Name	Size	Modified	File Download Link
Approvals_Testreports	-	2024-03-11 13:06:36	-
BIOS	-	2024-03-11 13:06:53	-
Documentation	-	2024-09-11 10:30:21	-
Drivers_ADL.html	91.5 KB	2024-08-13 20:32:02	Download
Mechanics_3D	-	2024-09-18 11:48:54	-
PCN	-	2024-03-11 13:06:37	-

10.5. Recover BIOS

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

Figure 22: Configure 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!

To recover the BIOS, perform the following:

1. Open the product, as described in Chapter 7.2: Opening and Closing 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 10: Configuration Jumper Pin Assignment

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

11/ RAID

To support RAID 0/RAID 1 the KBox B-204-RPL must be configured with two 2.5" SSD of the same density either in two internal drive bays or in the dual 2.5" SSD mobile rack.

Table 11: RAID Options

Drive Type	Quantity	Interface	Position	RAID Description
2.5" SSD	Up to 2	SATA III 6 Gb/s	Internal 2.5" drive bays (no external access)	Chipset RAID (software configured) using the Intel® RST interface to view drive health, configure RAID settings (RAID 0/RAID 1) and optimize performance.
2.5" SSD	Up to 2	SATA III 6 Gb/s	Dual mobile rack (external access)	Integrated hardware RAID controller for (RAID 0/RAID 1) configuration and front LED to indicate drive power, access, fail and RAID 1 rebuilds status.



Both RAID options support SATA SSD RAID.

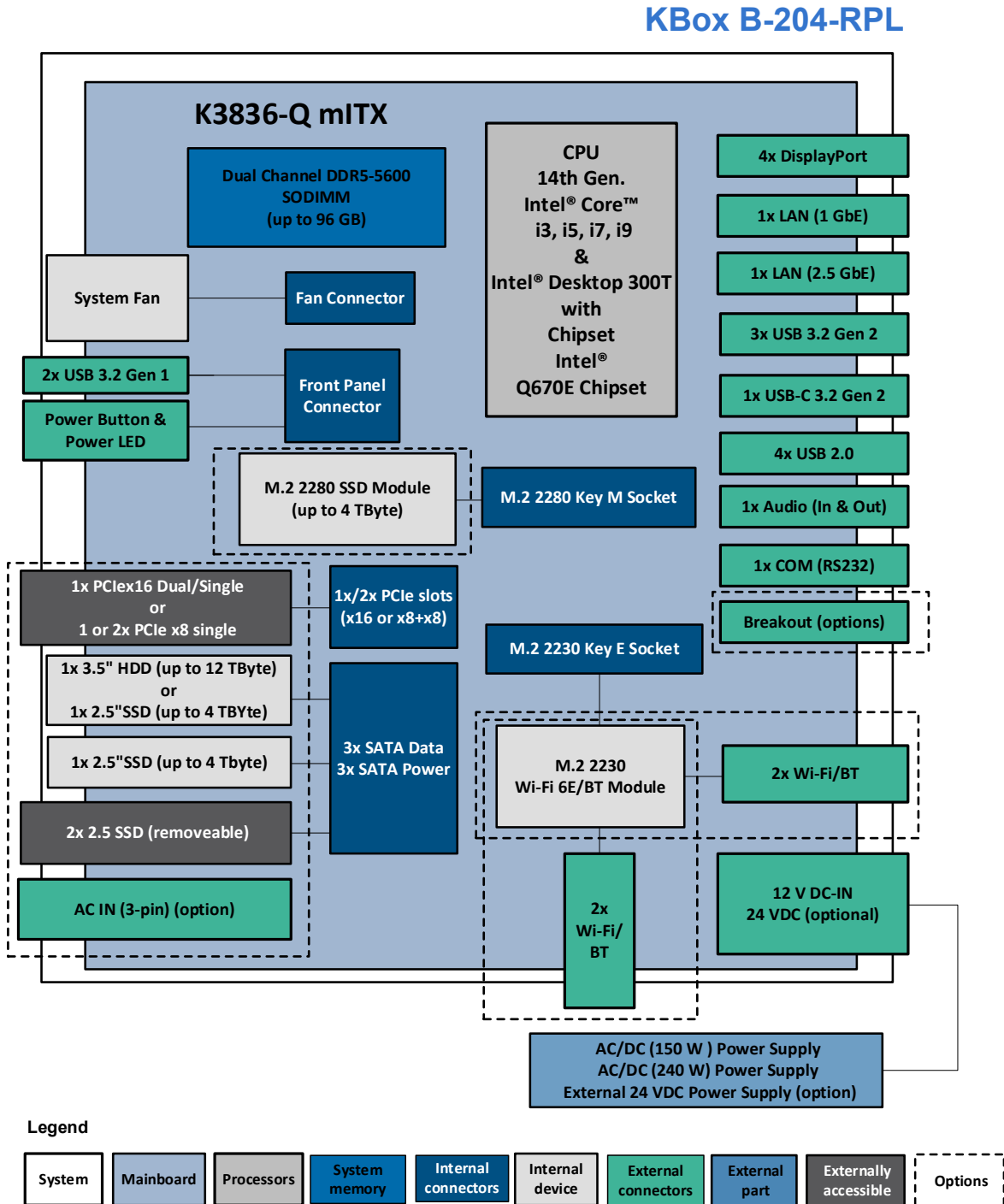


For RAID support the two 2.5" SSDs must have the same density.

12/ Product Specifications

12.1. Block Diagrams

Figure 23: Block Diagram KBox B-204-RPL



For more information regarding compatible Expansion Bay 1 and 2 configurations, see Chapter 5.3: Expansion Bays.

12.2. Hardware Specification

Table 12: Hardware Specification

KBox B-204-RPL		Description					
Motherboard	Type	K3836-Q mini-ITX					
	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 Interfaces	USB	2x USB 3.2 Gen 1					
	Button/LED	Power Button with integrated power LED					
Rear panel Interfaces	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					
	S/PDIF	Digital audio optical output, supporting 5.1 Multichannel					
	Breakout Panel	1x COM RS232					
	Power	12 VDC AC/DC, 150 W(default) 12 VDC AC/DC, 240 W(option) 24 VDC Connector (option: connects to an external 24 VDC power supply) 100/240 VAC AC IN (option: in expansion bay 2)					
Expansion	Internal M.2	1x M.2 2280 Key M SSD 512 GByte, 1 TByte, 2 TByte or 4 TByte Interface: PCIe/NVME					
		1x M.2 2230 Key E Wi-Fi 6E (6 GHz), Bluetooth® 5.3 Interface: Wi-Fi: PCIe x1/Bluetooth: USB 2.0					
	Expansion Bay 1	(empty)	PClex8 Single card	PClex8/16 Single card	PClex8/16 Single card	PClex8/16 Single card	PClex8/16 Single card
	Expansion Bay 2	PClex16 Dual card ^[1]	PClex8 Single card	1x 2.5" SSD RAID ^[2]	1x 3.5" HDD	SSD mobile rack 2x2.5" SSD RAID ^[3]	AC IN
1x 2.5" SSD			1x 2.5" SSD	1x 2.5" SSD RAID ^[2]	1x 2.5" SSD	1x 2.5" SSD	1x 2.5" SSD

^[1] Dual PCIe cards only in Expansion bay 2's PCIe x16 slot. With the prerequisite that expansion bay 1 is empty.

^[2] Chipset RAID (software configured): prerequisite SDDs must be the same density.

^[3] Integrated RAID (RAID controller): prerequisite SDDs must be the same density.

12.3. Software Specification

Table 13: Software Specification

KBox B-204-RPL	Description
Operating System (OS)	Windows® 11 IoT and Linux (Debian)
BIOS	AMI Aptio 5.x (UEFI)



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

12.4. Power Specification

The KBox B-204-RPL connects to power using the power solution included in the delivery that meets the product's electrical specification, and power consumption, power limitation and power protection requirements.

⚠ CAUTION

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

12.4.1. 12 VDC DC IN Power Jack 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 14.

Table 14: 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

⚠ CAUTION

Only connect the product to the external AC/DC power supply supplied by Kontron and 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.

12.4.2. 12 VDC DC IN 10-pin Power Connector Electrical (option)

The 12 VDC DC IN 10-pin power connector option connects to the AC/DC, 240 W (100/240 VAC (50/60 Hz) $\pm 10\%$) power supply, supplied by Kontron in the delivery. The AC/DC 240 W power supply supplies the 12 VDC DC IN 10-pin power connector with the electrical specification on the product's type label and in Table 15.

Table 15: 12 VDC DC IN 10-pin Power Connector Electrical Specification

DC IN	Description
Output Voltage	12 VDC
Output Current	6.5 A (20 A max.)
Power Rating	240 W

CAUTION

Only connect the product to the external AC/DC power supply supplied by Kontron and 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.



The DC IN AC/DC (240 W) power supply is a prerequisite for product configurations with high power consumption PCIe card(s).

12.4.3. 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 supplied by Kontron 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 16.

Table 16: 24 VDC DC IN Electrical Specification (option)

DC IN	Description
Input Voltage	24 VDC (Range: 19 VDC to 36 VDC)
Input Current	8.5 A max. (fuse protected)
Power Rating	160 W

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.

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

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

NOTICE

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

12.4.4. AC IN and Mains Power Connection (option)

The AC-IN 3-pin power connector option connects directly to a mains power outlet using the AC Power cable supplied by Kontron in the delivery.

Table 17: AC-IN Electrical Specification (option)

AC IN	Description
Input Voltage Range	100/240 VAC (50/60 Hz)
Input Current	2 A
Power Rating	150 W

CAUTION

Only connect the product to a main power outlet using the power cable supplied by Kontron for your region.

12.4.5. Power Protection

The DC IN AC/DC (150 W/240 W) power supply(s) and the AC IN 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 help to ensure operation without loss of data or damage to the product.

NOTICE

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 an 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.

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.

12.4.6. 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 and cards. The overall power consumption must not exceed the product's maximum power supply rating.

If the use of system expansion devices/cards increases the total power consumption above the maximum power rating of the power supply, contact [Kontron Support](#). The DC IN AC/DC (240 W) power supply is a prerequisite for product configurations with integrated high power consumption PCIe card(s).

Table 18: Power Consumption Estimation

KBox B-204-RPL	Power Consumption
Load	TBD
Idel	TBD
Shutdown	TBD

12.4.7. 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.



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

12.5. Environmental Specification

Table 19: Environmental Specification

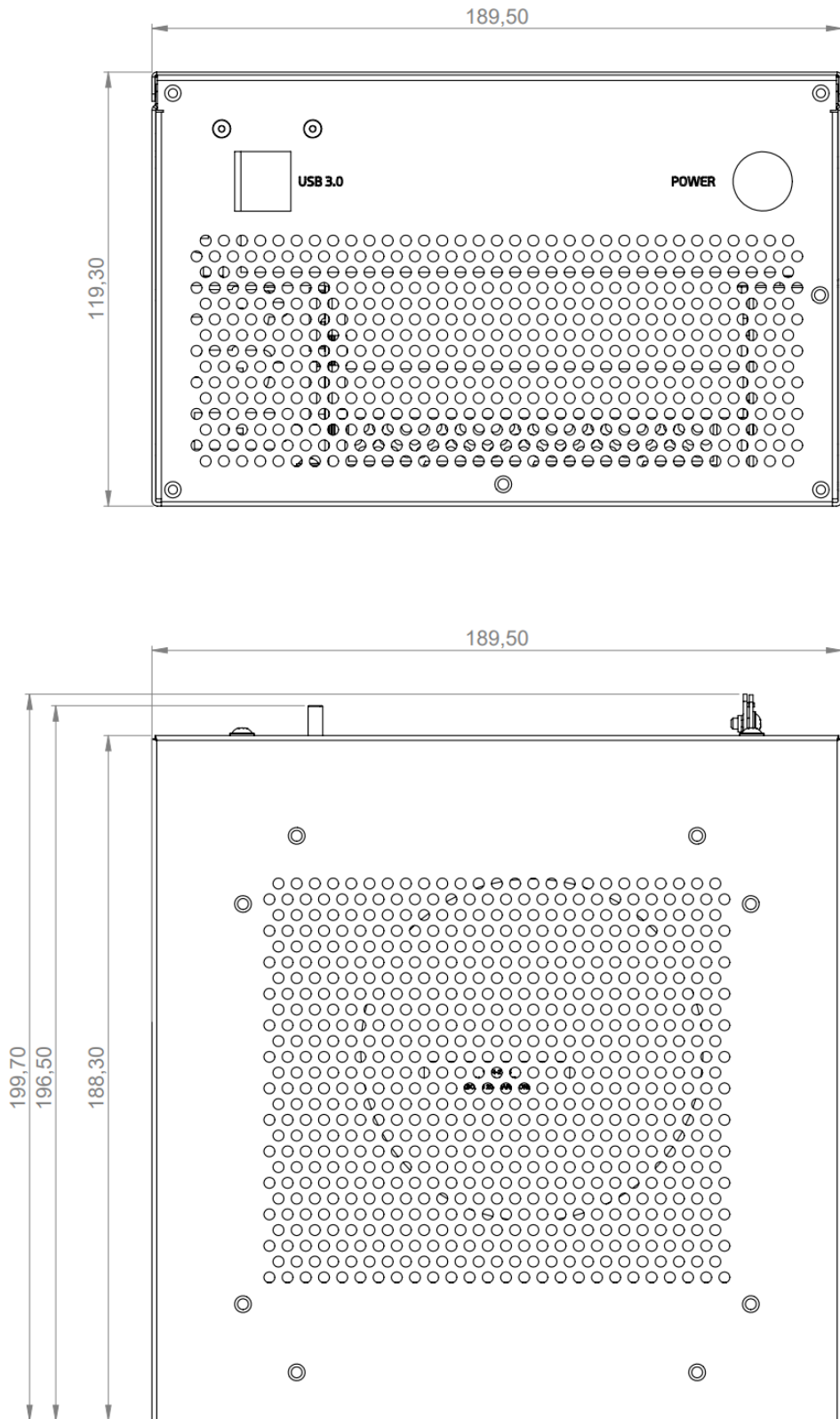
KBox B-204-RPL		Description
Temperature (according to IEC 60068-2-2 & IEC 60068-2-1)	Operating	0°C to +50°C (32°F to 122°F)
	Non-operating	-25°C to 70°C (-13°F to 158°F)
Relative Humidity (according to IEC 60068-2-78)	Non-operating	93% RH @ 40°C (104°F), non-condensing
Altitude (according to EN 60068-2-13)	Operating	5,000 m max. (16,400 ft. approx.)
Noise		35 dB (A)
Shock (Operating) (according to IEC 60068-2-27)	Operating	10 g, 11 ms
	Non-operating	30 g, 11 ms
Vibration (Operating) (according to IEC 60068-2-6)	Operating	2 G, 10-150 Hz
	Non-operating	1 G, 10-150 Hz
MTBF		TBD hr.

12.6. Mechanical Specification

Table 20: Mechanical Specification

KBox B-204-RPL		Description
Dimensions (W x D x H)		189.5 mm x 119.3 mm x 199.7 mm (7.46" x 4.70" x 7.86")
Weight		2.2 kg (4.85 lbs.) approx. (with Expansion Bay 1 and Bay 2 empty)
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" 0.08") Screw openings: width 214 mm and depth 120 mm apart

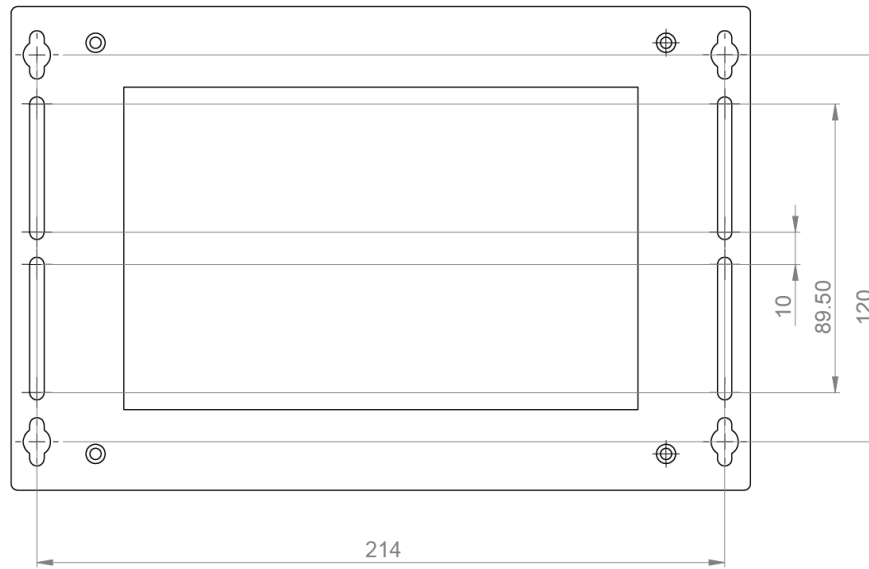
12.6.1. Dimension Diagrams KBox B-204-RPL



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

12.6.2. Dimension Diagrams Wall Mount

Figure 24: Wall Mount Dimensions (mm)



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

12.7. Compliance

The KBox B-204-RPL **plans to comply** with the relevant requirements and the approximation of the laws relating to the CE Mark for non-Wi-Fi/BT® variants and CE Radio Equipment Directive (RED) for Wi-Fi/BT® variants, and the standards that are constitutional parts of the declaration.

The KBox B-204-RPL **plans to comply** with the following CE certifications.

Table 21: Compliance CE

Europe CE Mark	
Directive	2014/30/EU Electromagnetic compatibility 2014/35/EU Low Voltage 2011/65/EU RoHS II
EMC	EN 55032 Class B Electromagnetic compatibility of multimedia equipment - Emission Requirements Class B device: Requirements for residential environments 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
Safety	EN 62368-1 Audio/video, information and communication technology equipment – Safety requirements

The KBox B-204-RPL **plans to comply** with the following CE RED Mark certifications.

Table 22: Compliance CE RED and United Kingdom

Europe CE RED Mark	
Directives	2014/53/EU Radio Equipment Directive (RED) 2011/65/EU RoHS II
EMC	EN 55032 Class B Electromagnetic compatibility of multimedia equipment - Emission Requirements Class B device: Requirements for residential environments 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 ETSI EN 301 489-1 V2.2.3 Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements

Europe CE RED Mark	
	<p>ETSI EN 301 489-17 V3.2.4 Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems</p> <p>ETSI EN 303 446-2 V1.2.1 ElectroMagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment - Part 2: Requirements for equipment intended to be used in industrial locations</p>
Radio	<p>ETSI 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</p> <p>ETSI EN 301 893 V2.1.1 5 GHz RLAN; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU</p> <p>ETSI EN 303 687 V1.0.0 6 GHz WAS/RLAN; Harmonised Standard for access to radio spectrum</p> <p>EN 62311:2008 Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz)</p>
Safety	<p>EN 62368-1 Audio/video, information and communication technology equipment – Safety requirements</p>

The KBox B-204-RPL **plans to comply** with the following international specific certifications.

Table 23: Compliance International

USA/ Canada FCC and NRTL Mark	
EMC	<p>FCC 47 CFR Part 15B and ICES-003 Complies with part 15 FCC rules and regulations of title 47 of the CFR rules for class B products; under which an unintentional radiator may be operated, administrated and other conditions relating to the marketing of part 15 devices.</p>
Safety	<p>UL 62368-1 and CSA-C22.2 No. 62368-1 Audio/video, information and communication technology equipment – Safety requirements</p>

UK UKCA Mark (UK Conformity Assessed)	
Directives	<p>S.I. 2016 No. 1091 Electromagnetic Compatibility Regulations 2016</p> <p>S.I. 2016 No. 1101 Electrical Equipment (Safety) Regulations 2016</p> <p>S.I. 2012 No. 3032 The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012</p> <p>S.I. 2017 No. 1206 Radio Equipment Regulations 201</p>
EMC	CE test reports accepted (see Table 21: Compliance CE.9)
Safety	CE test reports accepted (see Table Table 21: Compliance CE.)

International (IEC)	
EMC	IEC 61000-6-2 Electromagnetic compatibility (EMC) – Part 6-2: Generic standards – Immunity standard for industrial environments
Safety	IEC 62368-1 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.


13/ Connectors and LEDS



Low-active signals are indicated by a minus sign.

13.1. 12 VDC DC IN Power Jack Pin Assignment (default)

Table 24: 12 VDC DC IN Power Connector 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

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

13.2. 24 VDC DC IN 3-Pin Connector Pin Assignment (option)

Table 25: 24 VDC DC IN 3-pin Connector Pin Assignment

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

CAUTION

When connecting the user wired 3-pin mating power connector (PSC 1.5/3-F) to the DC IN 24 VDC 3-pin power connector and securing with the two bolts provided. Pay attention to the polarity of the connections.

CAUTION

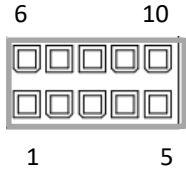
Only connect the product to an external 24 VDC power supply providing the input power (max. current) specified on the Kontron Product Label and meeting the requirements of the Limited Power Source (LPS) and Power Source (PS2) of UL/IEC 62368-1.

NOTICE

Mark the supply wires (+/-) clearly to ensure a safe connection from the supplied 3-pin mating power connector to the DC power supply, when using an external 24 VDC power supply.

13.3. 12 VDC DC IN 10-Pin Power Connector Pin Assignment (option)

Table 26: 12 VDC DC IN 10-Pin Power Connector Pin Assignment


Pin	Signal Name	Pin	Signal name	10-pin Power Connector
1	+12 VDC	5	Ground	
2		6		
3		7		
4		8		
		9		

⚠ CAUTION

Power the product with the supplied external AC/DC 240 W power supply only.

13.4. AC IN 3-pin Power Connector Pin Assignment (option)

Table 27: AC IN Power Connector Pin Assignment

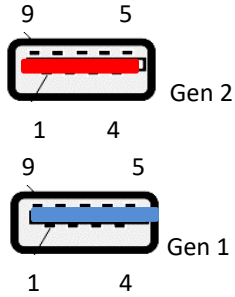
Signals	3-Pin AC Connector
3-pin standard connector	

⚠ CAUTION

Only connect the product to a main power outlet using the power cable supplied by Kontron for your region.

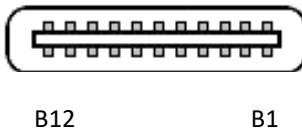
13.5. USB 3.2 Gen 2/1 Port Pin Assignment

Table 28: 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 (fused protected)	5	RX-	
2	Date-	6	RX+	
3	Data+	7	GND	
4	GND	8	TX-	
		9	TX+	

13.6. USB-C 3.2 Gen 2 Port Pin Assignment

Table 29: 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	
2	USB3_TX1+	11	USB3_RX+	
3	USB3_TX1-	10	USB3_RX1-	
4	VCC	9	VCC	
5	CC1[1]	8	SBU2[2]	
6	USB2_Data1+	7	USB2_Data2-	
7	USB2_Data1-	6	USB2_Data2+	
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

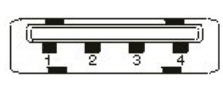
[2] Sideband use



Power delivery not supported.

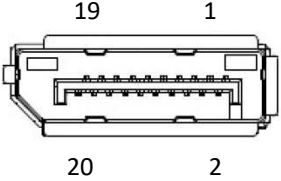
13.7. USB 2.0 Pin Assignment

Table 30: USB 2.0 Port (Type-A) Pin Assignment

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

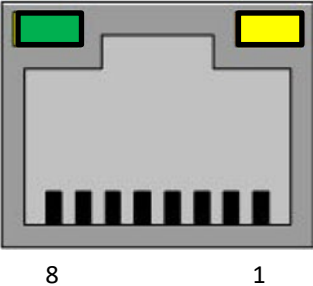
13.8. Display Port (DP) V1.4a Pin Assignment

Table 31: Display Port (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)	

13.9. LAN 2.5 GbE/1 GbE Connector Pin Assignment

Table 32: 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

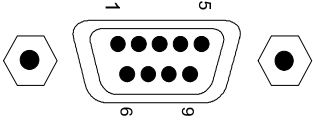
13.10. Audio (Line-In & Line-Out) Connector Pin Assignment

Table 33: Audio (Line-In & Line-Out) Pin Assignment

Jack	Signal Name
Blue	Line input (Line-In)
Green	Headphone output (Line-Out)

13.11. COM Port Pin Assignment (option)

Table 34: COM (RS232) Connector Pin Assignment

Pin	Signal Name	Pin	Signal name	9-pin USB 3.2 (Type-A) Port
1	DCD	6	DSR	
2	RxD	7	RTS	
3	TxD	8	CTS	
4	DTR	9	RI	
5	GND			

13.12. Antenna Wi-Fi/BT® Pin Assignment

Table 35: 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 have 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.

13.13. S/PDIF Pin Assignment (option)

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

13.14. GPIO (option)

The GPIO port breakout enables the installation of a user defined GPIO port.

For more information, contact your Kontron sales representative.

14/ Maintenance

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.

⚠ CAUTION

Handling and operation of the product is permitted only for trained personnel aware of the associated dangers, within a work place that is access controlled and fulfills all necessary technical and environmental requirements.

14.1. Cleaning the Product

NOTICE

Do not use steel wool, metallic threads or solvents like abrasives, alcohol, acetone or benzene when cleaning the product.

NOTICE

When using a damp cloth, only use a mild detergent.

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 power connector (DC IN or AC IN) 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 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 manufacture'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 dispose 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 three Volt lithium battery must be replaced with an identical three Volt lithium battery or a Kontron recommended lithium battery.

Table 36: Battery Header

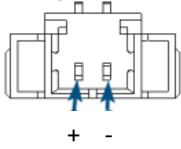
Pins	Signal	2-pin BAT header
1	VBAT +	
2	GND	

Table 37: CR2032 Lithium Battery with Connector

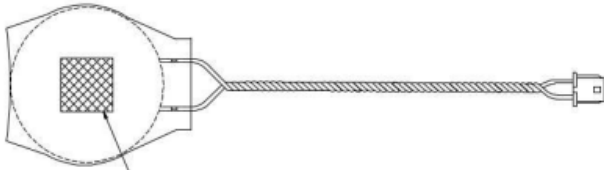
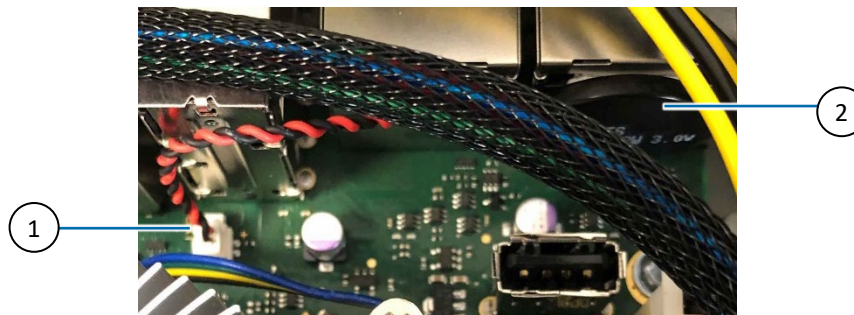
Pins	Signal	3V CR2032
Red	+	
Black	-	

Figure 25: CR2032 Lithium Battery and BAT header

1 BAT header on motherboard

2 CR2032 battery with cable

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 and Closing 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 Display Port connector's rear side.
5. Insert the new lithium battery connector into the motherboard's BAT header. Ensure correct polarity, see Table 36: Battery Header and Table 37: CR2032 Lithium Battery with Connector.
6. Attach the new lithium battery to the internal Display Port connector with a new adhesive pad.
7. Close the product, see Chapter 7.2: Opening and Closing the Product, step 7.

14.3. BIOS Recovery Jumper

To recover the BIOS, refer to Chapter 10.5: 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 products 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.

18/ Disposal

18.1. Disposal

Disposal of the product in accordance with country, state, or local regulations and requirements as part of your disposition and decommissioning policies or recycle the product or parts of the product for re-use after performing data sanitation to erase the data stored on the product.

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.
- › Consider your company's environmental requirements and the requirements of Waste Electrical and Electronic Equipment (WEEE) directive.
- › Before removing the product from the operating environment, consider if there is data stored on the product that can only be removed securely when the product is connected to power.
- › Use data sanitation 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 sanitation method that stops the data from being retrieved or reconstructed after deletion or by destruction of the part, see Chapter 18.3: Data Sanitation.

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 Sanitation

Data sanitation 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 product the user must plan for data sanitation and designing in memory devices that are easier to sanitize, memory devices from manufacturers that provide an effective data erasure tool or memory devices from manufacturers that support a return to factory default command.

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



Data Sanitation

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

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

General guidelines when performing data sanitation on the product:

- › Before powering down, consider if power is required to perform data sanitation on the product's memory devices. When disconnected from the power source, dismantle all removable memory devices from the product.
- › For memory devices containing data sensitive to your business and/or confidential/proprietary data, use the data sanitation method most suitable for memory device type to be erased. Consider the memory device's volatility. Volatile memory devices only store data temporarily and their data can be erased easily by disconnecting the power/removing the battery for approximately 24 hours. However, non-volatile memory devices store data permanently and retains information when disconnected to power and must be actively erased using an accredited third party software tool or manufacture's data erasure tool or return to factor default command, or destructed.
 - › Use an accredited third party software tool on memory devices. The accredited third party software tool must provide an audit trail, be capable of performing a complete data clean including areas such as hidden data and bad blocks not accessed by general service-based utilities.
 - › Use physically destruction methods on memory devices that cannot be securely software erased. The aim of the destruction is to break the silicon die within the chips package into two or more parts to prevent reading data from the die. Fragments should be no longer than 6 mm. 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 factor default command (if provided by the manufacturer). The manufactures tools and commands have been designed to fulfil the data sanitation requirement of the manufacture's specific memory device(s).
- › Verify that all sensitive data has been effectively sanitized.



Dismantle Removable Memory

Dismantle all removable memory devices from the product. For reuse erase the data using:

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

If not reused physically destruct the memory device according to data sanitation guidelines.



Erase Data

To ensures that forensic tools cannot be used to recovered 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 factor default command designed to fulfil the data sanitation requirement of the manufacture'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 position on the rear side.
- › Use a third party destruction company providing destruction certificates for confirmation.

18.4. 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.

Table 38: Statement of Memory Volatility (Example)

Memory Type	Volatility	Location	Memory Size	Alterable in Field	Battery Backed Up	Data Type	Write Protection	Emergency Erase	Process to Clear
M.2 2280 NVMe ^[1]	Non Volatile	Mainboard	256 GByte 512 GByte 1 Tbyte 3TByte 4 TByte	-	No	Storage	No	No	ATA Secure Erase and/or 3 rd party overwrite data tool
SODIMM DDR5 5600 ^[1]	Volatile	Mainboard	8 Gbyte 16 Gbyte 32 Gbyte 64 Gbyte	-	No	System memory	No	No	Remove from power.
2.5" SSD ^[1]	Non Volatile	Expan. Bay internal	256 GByte 512 GByte 1TByte 2TByte 4Tbyte	-	No	Storage	No		ATA Secure Erase and/or
3.5" HDD ^[1]	Non Volatile	Expan. Bay Internal	4Tbyte 6TByte 12TBYte	-	No	Storage	No		3 rd party overwrite data tool
2.5" SSD ^[1]	Non Volatile	Expan. Bay external	1TByte 2TByte 4TByte	-	No	Storage	No		ATA Secure Erase and/or

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

^[2] in some cases special tools and/or software is necessary to access the memory

19/ Cyber Security

Cyber security is an important aspect to consider when installing, operating, maintaining and disposing 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 to Kontron's Security White paper.



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 when available 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	Display Port
DPP	Display Port Plus
DVI	Digital Visual Interface
eDP	Embedded Display Port
EEE	Energy Efficient Ethernet
EMC	ElectroMagnetic compatibility
ESD	ElectroStatic Discharge
FCC	Federal Communications Commission
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
LPC	Limited Power Source
LVDS	Low Voltage Differential Signaling
MBR	Master Boot Record
MDI	Media Dependent Interface
MTBF	Mean Time Before Failure
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
TSN	Time Sensitive Network
TPM	Trusted Platform Module
UEFI	Unified Extensible Firmware Interface
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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