User Guide

KISS 4U V4 RPL

User Guide Rev. 1.0

Doc. ID: 1075-1709

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KISS 4U V4 RPL – User Guide

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Intended Use

This device and associated software are not designed, manufactured or intended for use or resale for the operation of nuclear facilities, the navigation, control or communication systems for aircraft or other transportation, air traffic control, life support or life sustaining applications, weapons systems, or any other application in a hazardous environment, or requiring fail-safe performance, or in which the failure of products could lead directly to death, personal injury, or severe physical or environmental damage (collectively, "high risk applications").

You understand and agree that your use of Kontron devices as a component in High Risk Applications is entirely at your risk. To minimize the risks associated with your products and applications, you should provide adequate design and operating safeguards. You are solely responsible for compliance with all legal, regulatory, safety, and security related requirements concerning your products. You are responsible to ensure that your systems (and any Kontron hardware or software components incorporated in your systems) meet all applicable requirements. Unless otherwise stated in the product documentation, the Kontron device is not provided with error-tolerance capabilities and cannot therefore be deemed as being engineered, manufactured or setup to be compliant for implementation or for resale as device in High Risk Applications. All application and safety related information in this document (including application descriptions, suggested safety measures, suggested Kontron products, and other materials) is provided for reference only.

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

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

Revision History

Revision	Brief Description of Changes	Date of Issue	Author
1.0	Initial version	05-Dec-2025	CW

Terms and Conditions

Kontron warrants products in accordance with defined regional warranty periods. For more information about warranty compliance and conformity, and the warranty period in your region, visit www.kontron.com/terms-and-conditions.
Kontron sells products worldwide and declares regional General Terms & Conditions of Sale, and Purchase Order Terms & Conditions. Visit www.kontron.com/terms-and-conditions.
For contact information, refer to the corporate offices contact information on the last page of this user guide or visit our website CONTACT US.

Customer Support

Find Kontron contacts by visiting www.kontron.com/support-and-services.

Customer Service

As a trusted technology innovator and global solutions provider, Kontron extends its embedded market strengths into a services portfolio allowing companies to break the barriers of traditional product lifecycles. Proven product expertise coupled with collaborative and highly-experienced support enables Kontron to provide exceptional peace of mind to build and maintain successful products.
For more details on Kontron's service offerings such as: enhanced repair services, extended warranty, Kontron training academy, and more visit www.kontron.com/support-and-services.

Customer Comments

If you have any difficulties using this user guide, discover an error, or just want to provide some feedback, contact Kontron support. Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised user guide on our website.

Symbols

The following symbols may be used in this user guide

⚠DANGER	**DANGER** indicates a hazardous situation which, if not avoided, will result in death or serious injury.
⚠WARNING	**WARNING** indicates a hazardous situation which, if not avoided, could result in death or serious injury.
⚠CAUTION	**CAUTION** indicates a hazardous situation which, if not avoided, may result in minor or moderate injury **ATTENTION** indique une situation dangereuse qui, si elle n'est pas évitée, peut entraîner des blessures mineures ou modérées.
NOTICE	**NOTICE** indicates a property damage message.
	**Electric Shock!** This symbol and title indicate hazards due to electrical shocks (> 60 V) when touching products or parts of products. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.
	**ESD Sensitive Device!** This symbol and title indicate that the electronic boards and their components are sensitive to static electricity. Care must be taken during all handling operations and inspections of this product to always ensure product integrity.
	**Caution: HOT Surface!** This symbol and title indicate a hot surface that must not be touched until it has cooled down. **Attention : Surface CHAUDE !** Ne pas toucher ! Laissez refroidir avant de procéder à l'entretien.
	**Caution: Laser!** This symbol and title indicate the risk of exposure to laser beam and light emitting devices (LEDs) from an electrical device. Eye protection per manufacturer notice shall review before servicing.
	**Caution: High Sound Pressure!** This symbol and title indicate that high sound pressure is possible with headphones. There is a risk of hearing damage. Do not listen at high volume levels for long periods of time.

Security

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

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

This symbol precedes helpful hints and tips for daily use.

For Your Safety

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

High Voltage Safety Instructions

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

⚠CAUTION

Warning

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

⚠CAUTION

Electric Shock!

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

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

Special Handling and Unpacking Instruction

NOTICE

ESD Sensitive Device!

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

⚠CAUTION

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

Do not handle this product out of the product's protective enclosure while the product is not used for operational purposes unless the product is otherwise protected.
Whenever possible, unpack or pack this product only at an EOS/ESD safe workplace. Where a safe workplace is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.
It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the product is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the product.

Lithium Battery Precautions

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

⚠CAUTION	Risk of Explosion if the lithium Battery is replaced by an incorrect Type. Dispose of used lithium batteries according to the instructions. Risque d'explosion si la pile au lithium est remplacée par une pile de type incorrect. Éliminez les piles au lithium usagées conformément aux instructions.

General Instructions on Usage

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

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

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

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

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

Quality and Environmental Management

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

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1/Introduction

This user guide focuses on describing the special features of the KISS 4U V4 RPL scalable 4U rackmount system also known as product within this user guide. This user guide includes detailed information and guidelines on how to set up, install, operate, maintain and dispose of the product properly. New operators are recommended to study the instructions and any warning notices within this user guide before handling or switching on the product.

The KISS 4U V4 RPL is designed for high performance, reliability and installation in a 19" industrial rack cabinet or flexibly installed in harsh industrial environments. Based on Kontron's industrial series of ATX motherboards, with Intel® Core™ 14th Generation i9/i7/i5/i3 processors the product supports multiple expansion capabilities and external interfaces.

Figure 1: KISS 4U V4 RPL

General KISS 4U V4 RPL features are:

- ATX motherboard, K3851-R ATX
  - Intel® Core™ (14th) Generation i9/i7/i5/i3 processors series
  - Intel® R680E chipset
- System memory
  - 4x DDR5-5600 MHz UDIMM
  - Up to 128 GB max. (with 8 GByte, 16 GByte, 32 GByte)
- Mass storage (internal)
  - 2x M.2 2280 SSD module with NVMe, RAID support (option)
  - 2x 2.5"SSD drives, with RAID support (option)
- Drive bays (front access or internal)
  - 4x Drive bays for 1x 3.5" HDD, 1x 2.5" SSD drive or 1x dual 2.5" SDD mobile rack (options)
  - 1x Slim drive bay for 1x DVD R/W slim (option)
  - RAID support (option)
- Expansion card slots
  - 6x PCIe slots (full size)
  - 1x PCI 32-bit slot (full size)
- Rear interfaces
  - 4x USB 3.2 Gen 1, 2x USB 3.2 Gen 2, 1x USB-C 3.2 Gen 2
  - 4x DP 1.4 @ 4K
  - 2x 2.5 Gb Ethernet, 1x 1 Gb Ethernet
  - 1x COM RS 232 serial port
  - 1x Audio (Line-in, Line-out, Mic-In)
  - 3x Breakouts for optional interfaces (type: 9-pin D-SUB connector)
- Front interfaces
  - 2x USB 3.2 Gen 1
  - Indicator LEDs (LAN1, LAN2, SYSID, SYSF2, SYSF1, PWR, HDD)

- Active cooling
- Power IN (240 VAC to 100 VAC):
  - 600 W (default)
  - 850 W (option)
  - 500 W redundant (option)

To ensure you have the latest version of this user guide, visit Kontron at Products | Kontron Embedded Computers 4U.

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 skilled personnel within a work place that is access controlled.
- CAUTION: Risk of explosion if the battery is replaced incorrectly (short-circuited, reverse-poled, wrong battery type). Dispose of used batteries according to the manufacturer's instructions.
- This product is not suitable for use in locations where children are likely to be present

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 protective earthing 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 disconnectable
- 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.

2.1. Instructions générales de sécurité

Veuillez lire attentivement ce passage et prendre bonne note des instructions, qui ont été compilées pour votre sécurité et pour assurer une application conforme aux réglementations prévues. Le non-respect des consignes de sécurité générales suivantes peut entraîner des blessures pour l'utilisateur et/ou des dommages pour le produit. En cas de non-respect des consignes, Kontron Europe est exonéré de la responsabilité en cas d'accident, ceci s'applique également pendant la période de garantie.
Le produit a été construit et testé conformément aux exigences de sécurité de base pour les applications basse tension (DBT) et a quitté le fabricant dans un état impeccable en matière de sécurité. Pour maintenir cet état et pour garantir également un fonctionnement sûr, l'opérateur doit non seulement respecter les conditions d'utilisation correctes du produit, mais aussi les consignes de sécurité générales suivantes :

- Le produit doit être utilisé conformément à la documentation du produit, dans laquelle sont décrites les instructions de sécurité pour le produit et pour l'opérateur. Celles-ci contiennent des directives pour la mise en place, l'installation et le montage, la maintenance, le transport ou le stockage.
- L'installation électrique sur place doit répondre aux exigences des réglementations locales spécifiques du pays.
- Si un câble d'alimentation est fourni avec le produit, seul ce câble doit être utilisé. N'utilisez pas de rallonge pour connecter le produit.
- Afin de garantir une circulation d'air suffisante pour refroidir le produit, veuillez vous assurer que les ouvertures de ventilation ne sont pas couvertes ou obstruées. Si un élément filtrant est fourni, celui-ci doit être nettoyé régulièrement. Ne placez pas le produit à proximité de sources de chaleur ou d'endroits humides. Veillez à ce que le produit soit bien ventilé.
- Ne connectez le produit qu'à une alimentation externe fournissant le type de tension (AC ou DC) et la puissance d'entrée (courant max.) spécifiés sur le Label Produit Kontron et répondant aux exigences de la source d'alimentation limitée (LPS) et de la source d'alimentation (PS2) de la norme UL/IEC 62368-1 .
- Seuls les produits ou les pièces qui répondent aux exigences de la source d'alimentation (PS1) de la norme UL/IEC 62368-1 peuvent être connectés aux interfaces (E/S) disponibles du produit.
- Avant d'ouvrir le produit, assurez-vous qu'il est bien débranché du secteur.
- Le fait d'éteindre le produit par son bouton de mise en marche ne le déconnecte pas du secteur. Une déconnexion complète n'est possible que si le câble d'alimentation est retiré de la prise murale ou du produit. Veillez à ce que l'accès soit libre et facile pour permettre la déconnexion.
- Le produit ne peut être ouvert que pour l'insertion ou le retrait de cartes supplémentaires (selon la configuration du produit). Cette opération ne peut être effectuée que par des opérateurs qualifiés.
- Si des extensions sont effectuées, les points suivants doivent être respectés :
  - toutes les réglementations légales en vigueur et toutes les données techniques sont respectées
  - la consommation électrique d'une carte supplémentaire ne dépasse pas les limites spécifiées
  - la consommation actuelle du produit ne dépasse pas la valeur indiquée sur l'étiquette du produit.
- Seuls les accessoires d'origine approuvés par Kontron Europe peuvent être utilisés.
- Veuillez noter que la sécurité des opérations n'est plus possible lorsque l'une des conditions suivantes s'applique.
  - le produit présente des dommages visibles ou
  - le produit ne fonctionne plus. Dans ce cas, le produit doit être éteint et il faut s'assurer que le produit ne puisse plus être utilisé.
- La manipulation et le fonctionnement du produit ne sont autorisés que pour le personnel formé dans un lieu de travail dont l'accès est contrôlé.

- ATTENTION: Risque d'explosion si la batterie est remplacée de manière incorrecte (court-circuit, inversion de polarité, mauvais type de batterie). Éliminez les piles 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 fiable à la terre de protection 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.

2.2. Electrostatic Discharge (ESD)

ESD

A sudden discharge of electrostatic electricity can destroy static-sensitive devices.

Proper packaging and grounding techniques are necessary precautions to prevent damage. Always observe the following precautions:

1. Transport ESD sensitive parts in ESD safe containers such as boxes or bags, until they arrive at an ESD safe workplace.
2. Always be properly grounded when touching sensitive components, or assembly.
3. Store ESD sensitive components in protective packaging or on antistatic mats.

2.3. Grounding Methods

To avoid electrostatic damage, observe the following grounding guidelines:

1. Cover workstations with approved antistatic material/mat. Always wear a wrist strap connected to workplace or heel straps.
2. Use properly grounded tools and equipment such as field service tools that are conductive.
3. Always handle ESD sensitive components by their edge or by their casing.
4. Avoid contact with pins, leads, or circuitry.
5. Switch off power and input signals before inserting and removing connectors or connecting test equipment.
6. Keep work area free of non-conductive materials such as ordinary plastic assembly aids and Styrofoam.

2.4. Instructions for the Lithium Battery

The product is equipped with a standard 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 lithium batteries according to the manufacturer's instructions.

When replacing the motherboard's lithium battery observe the instructions described in Chapter 13.5: Replacing the Lithium Battery.

⚠CAUTION

Danger of Explosion if the lithium battery is incorrectly placed!

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

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

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

PRECAUCION- Peligro de explosión si la batería se sustituye incorrectamente!

- Sustituya solamente por el mismo o tipo equivalente recomendado por el fabricante
- Disponga las baterías usadas según las instrucciones del fabricante

ADVARSEL- Lithiumbatteri -- Eksplosionsfare ved fejlagtig håndtering!

- Udskiftning må kun ske med batteri af samme fabrikat og type
- Levér det brugte batteri tilbage til leverandøren

ADVARSEL- Eksplosjonsfare ved feilaktig skifte av batteri!

- Benytt samme batteritype eller en tilsvarende type anbefalt av apparatfabrikanten
- Brukte batterier kasseres i henhold til fabrikantens instruksjoner

VARNING- Explosionsfara vid felaktigt batteribyte!

- nvänd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren
- assera använt batteri enligt fabrikantens instruktion

VAROITUS- Paristo voi räjähtää, jos se on virheellisesti asennettu!

- Vaihda paristo ainoastaan lalteval- mistajan suosittelemaan tyyppiln
- Hävitä käytetty paristo valmistajan ohjeiden mukaisesti

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

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

2.5. Operation of Laser Source Devices

The optional DVD drive contains light-emitting diodes (LEDs) (classified in accordance with IEC 60825-1:2007: LASER CLASS 1) and therefore must not be opened. If the enclosure of such a drive is opened, invisible laser radiation is emitted. Do not allow yourself to be exposed to this radiation.

The laser system meets the Code of Federal Regulations (CFR), Title 21, 1040 -Performance standards for light-emitting products.

Laser!

Risk of exposure to laser beam and light emitting devices (LEDs) from DVD

- Do not open DVD drive due to invisible laser radiation
- Check manufacture instructions eye protection maybe required

3/Shipment and Unpacking

3.1. Packaging

All parts are delivered together in a product specific cardboard package designed to provide adequate protection to absorb shock. Kontron recommends keeping the packaging, to store or transport the KISS 4U V4 RPL.

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 any shipping damage or inconsistencies between the contents and the original order, contact your dealer.

3.3. Scope of Delivery

Check that the delivery is complete. If damaged or missing items are discovered, contact your dealer.

Table 1: Scope of Delivery

Part	Qty	Part Description
KISS 4U V4 RPL	1	System configuration as ordered: KISS 4U V4 RPL
Power Cable	1	AC power cable with EU rating, other cable ratings are optional
Rubber feet	4	Four rubber feet
Safety instructions	1	General Safety Instructions

3.4. Accessories and Spare Parts

The parts and accessories that can be purchased for the product are described in Table 2: Accessories and Spares Parts.

Table 2: Accessories and Spares Parts

Part Number	Part Description
9-5000-1116	Slide Rails and Mounting Kit KISS 1U/2U/4U
0-0064-2173	Power Cable EU (Included in delivery)
0-0064-4173	Power Cable UK (option)
0-0064-4317	Power Cable US (option)
9-5000-1160	KIT FAN Assembly KISS-4U-V4 Includes: internal Fan assembly with two fans
9-5000-1161	KIT Filter Pad VE1 KISS-4U-V4 Includes: Filter Pad
9-5000-1162	KIT Front Flap w/mounting Kiss-4U-V4 Includes: Front flap and mounting material

3.5. Product Identification Type Label

The type label includes the electrical specification for your ordered variant

Figure 2: Type Label Example

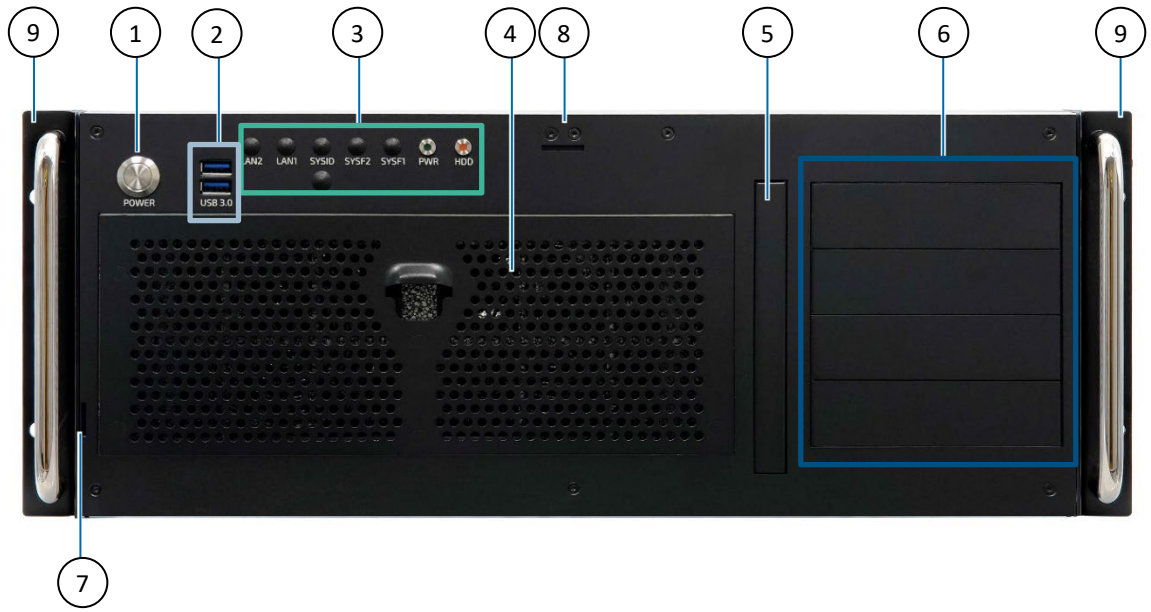
1. Model name
2. P/N: Specific product number
3. S/N: Specific serial number
4. Power rating PSU
5. Compliance symbols
6. Disposal symbols

4/Product Features

4.1. Front Panel

The front panel features a power button, two USB ports, indicator LEDs, filter pad door, four drive bays for internal or external options, and two handle brackets for 19” rack mounting. To stop unauthorized access an optional front flap is available, see Figure 4, pos. 1 and Table 2: Accessories and Spares Parts.

Figure 3: Front Panel

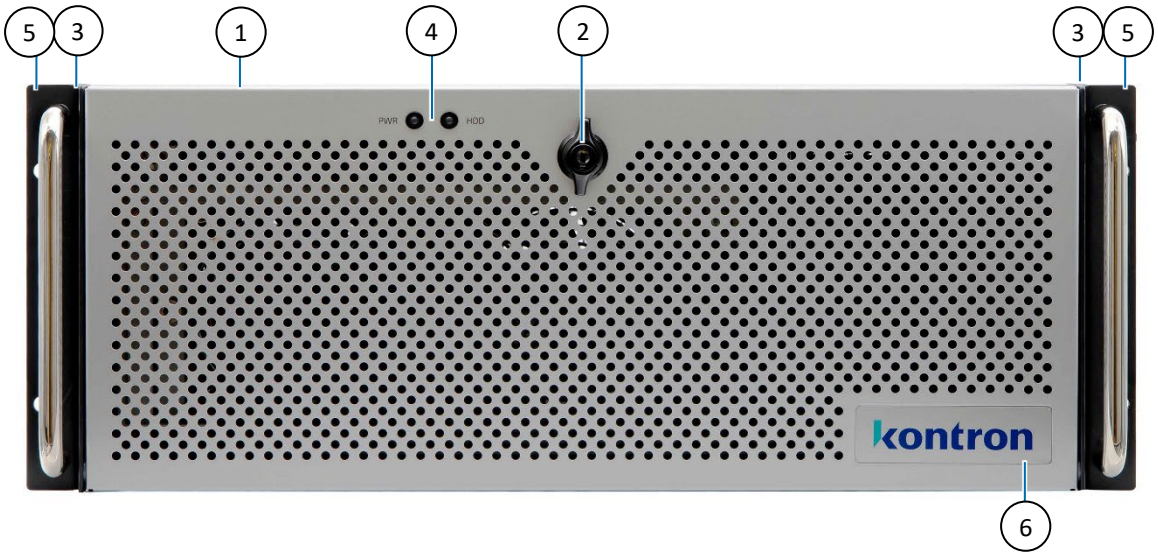


1. Power Button
2. 2x USB 3.2 Gen 1
3. 7x LED Indicators
4. Filter pad door
5. 1x DVD R/W slim (option)
6. 4x Drive bays (external or internal)
7. Front flap arm slit
8. Front flap lock slot
9. 2x Handle brackets

4.1.1. Front Flap

To protect against unauthorized access, an optional front flap is available, see Table 2: Accessories and Spares Parts.

Figure 4: Front Flap



1. Front flap
2. Front flap lock
3. Front flap side panels
4. 2x LED indicators (PWR & HDD)
5. 2x Handle brackets
6. Logo

When locked, the front flap only opens with a key and the power button, USB ports, external drives and fans are not accessible. To installed or removed the front flap, see Chapter 7.5: Installing and Removing the Front Flap.

Front flap Lock

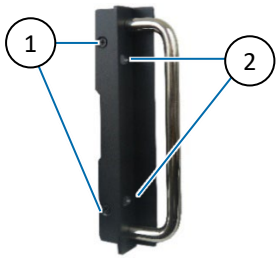
Use the front flap lock to protect against third party unauthorized access to sensitive data stored on the product. The front flap key must be kept safe and not be accessible to unauthorized persons.

If USB devices are connected to the USB ports on the front panel, the front flap cannot be closed and locked.

4.1.2. Handle Brackets

The product is delivered with two handle brackets attached. When mounting the product in a 19” rack always secure the product using both handle brackets and screws suitable for the mount environment (Figure 5, pos. 2).

Figure 5: Handle Brackets



1. Two handle bracket screws
2. Two 19” Rack mounting openings

⚠CAUTION

Verify Secure Mounting

To ensure a secure installation in a 19” rack cabinet always use two methods to secure the product such as handle brackets (both left and right side) and either slide rails or L-brackets.

4.1.3. Drive Bays 1 to 4 and Slim Bay

The four drives bays (Figure 3, Pos. 6) each supports one 3.5” HDD or 2.5” SSD (front access or internal) drives, or one dual 2.5” SSD mobile rack (front access) with or without a RAID. For additional RAID devices use the motherboard’s RAID with two drives of the same type and density, see Chapter 10.7: Configuring RAID in the BIOS.

The slim drive bay (Figure 3, Pos. 5) supports one optional slim line (Read/Write) DVD with front access.

For drive expansion information see Chapter 5/System Expansion.

The maximum number of connected SATA drives is limited to four.

For motherboard’s RAID uses Intel ® Rapid Storage Technology in the BIOS, see Chapter 10.7: Configuring RAID in the BIOS

Table 3: Drive Bay Configuration Options

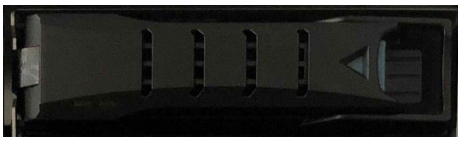
	Slim Drive Bay	Drive Bays 1 to 4	Drive Option Description
	1x DVD	1	1x 3.5” HDD (internal or removable) 1x 2.5” SSD (internal or removable) 1x Dual 2.5” SDD drive mobile rack (removable)
		2	1x 3.5” HDD (internal or removable) 1x 2.5” SSD (internal or removable) 1x Dual 2.5” SDD drive mobile rack (removable)
		3	1x 3.5” HDD (internal or removable) 1x 2.5” SSD (internal or removable) 1x Dual 2.5” SDD drive mobile rack (removable)
		4	1x 3.5” HDD (internal or removable) 1x 2.5” SSD (internal or removable) 1x Dual 2.5” SDD drive mobile rack (removable)

For additional storage, two M.2 2280 Key M SSD modules with NVMe RAID or two internal 2.5” SSD in drive bay 5 and 6 are available. For more information, see Chapter 5/ System Expansion.

4.1.3.1. Removable 3.5” HDD/2.5” SSD Drive Tray

The 3.5” drive tray supports the installation of one removable 3.5” HDD or 2.5” SSD drive on the drive tray.

Figure 6: 3.5” HDD/2.5” SSD Drive Tray (removable drive)



4.1.3.2. Removable Dual 2.5” SDD Drive Mobile Rack

The dual 2.5” SSD drive mobile rack supports the use of two 2.5” SSD with or without a RAID. The mobile rack with RAID requires only one SATA drive connection for the dual 2.5” SSDs. The mobile rack without RAID requires two SATA drive connections for the dual 2.5” SSDs.

When locked, the mobile rack only opens with a key and the dual 2.5” SSDs are not accessible.

Figure 7: Dual 2.5” SDD Drive Mobile Rack (removable drives)

Dual 2.5” SSD Mobile Rack Lock

Use the Dual 2.5” SSD Mobile Rack Lock to protect against third party unauthorized access to sensitive data stored on the product. The mobile rack key must be kept safe and not be accessible to unauthorized persons.

4.1.4. Fans Assembly

The two internal system fans are integrated in a user-friendly, replaceable, hot swap slide-in fan assembly located behind the filter pad door (Figure 3, pos. 4) on the front panel. The two system fans are temperature controlled via temperature sensors, to provide adequate airflow for optimal active cooling.

To change the fans, see Chapter 13.4: Replacing the System Fan Assembly

Fan Assembly

⚠CAUTION

Operation is permitted only with a functional fan assembly!
Only replace a defective fan assembly with an original fan assembly.

Fan Assembly Replaceable during Operation

⚠CAUTION

Replace fan only by skilled persons aware of the associated dangers. When removing the system fan assembly, keep hands and fingers away from rotating fan parts.

The fan assembly is hot-swappable, enabling the replacement of the fans even during operation and can be removed or installed without tools.

4.1.5. Filter Pad Door

The filter pad is located on the rear side of filter pad door (Figure 3, pos. 4) on the front panel. The filter pad protects the product from dust and dirt and will over a period of time become soiled by pollution. If heavily soiled, the filter pad can cause excessive heating of the product. Kontron recommends removing and cleaning the filter pad as often as necessary, see

For information on how to clean the filter pad, see Chapter 13.3: Cleaning or Replacing the Filter Pad.

Clean Filter Pad

⚠CAUTION

Clean the filter pad when the filter becomes clogged with contaminants to ensure adequate ventilation. The required regularity depends on the level of contamination within the operating environment.

The filter pad can be changed during operation.

The fan pad is secured on the filter pad door

4.1.6. Power Button

The power button is located on the front panel, behind the front flap and is used to switch on or switch off the product. Pressing the power button for longer than four seconds initiates a forced system shutdown before switching off the product. The power button illuminates blue to indicate the product is switched on.

Figure 8: Power Button

Disconnect the Power

⚠WARNING

The power button does not disconnect from the mains power supply. When switched off using the power button, there is still a standby voltage of 5 VSB on the motherboard.

The product is only completely disconnected from the mains power supply when the power cable is disconnected, from the mains power socket or the product's Input Power socket(s). If the end environment restricts access to the power cable, disconnection must be guaranteed using a separate cut-off fixture.

Forces Shutdown

NOTICE

Performing a forced shutdown by pressing the power button for longer than four seconds can lead to loss of data or other undesirable effects!

4.1.7. Indicator LEDs

The LED indicators are located on the front panel. Only the PWR LED and HDD LED are visible when the front flap is closed. The PWR LED illuminates (green) to identify the product is switched on and the HDD LED illuminates (orange) to indicate that the drives are active and transferring data.

Figure 9: LED Indicators

Table 4: LED Indicators

LED	Color	Description
LAN2	Green	Indicates LAN2 activity when Ethernet Link/Activity is established/detected.
LAN1	Green	Indicates LAN1 activity when Ethernet Link/Activity is established/detected.
SYSID	Green	Identifies the system in a multi-system environment if the SYSID Button is ON.
SYSF2	-	-
SYSF1	Red	Indicates system status and signalizes a signal failure: (LED OFF – OK and LED ON – fail)
PWR	Green	Indicates that the product is switched on via power button.
HDD	Yellow	Indicates drive activity (active and transferring data).

If the LED indicators (LAN2, LAN1, SYSID, SYSF2, SYSF1) are not required, they are closed as show in Figure 9: LED Indicators.

4.1.8. SYSID Button

The System Identification (SYSID) button is located below the SYSID indicator LED. The SYSID LED is used to identify the system by illuminating green for ease of identification in operating environments with multiple systems. Pressing the SYSID button switches the SYSID LED on or off.

Figure 10: SYSID Button

4.1.9. USB 3.0 Ports

The two USB ports on the front panel are (USB 3.2 Gen 1).

Figure 11: USB 3.2 Gen 1 Port

If USB devices are connected to the two USB ports on the front panel, the front flap cannot be closed and locked.

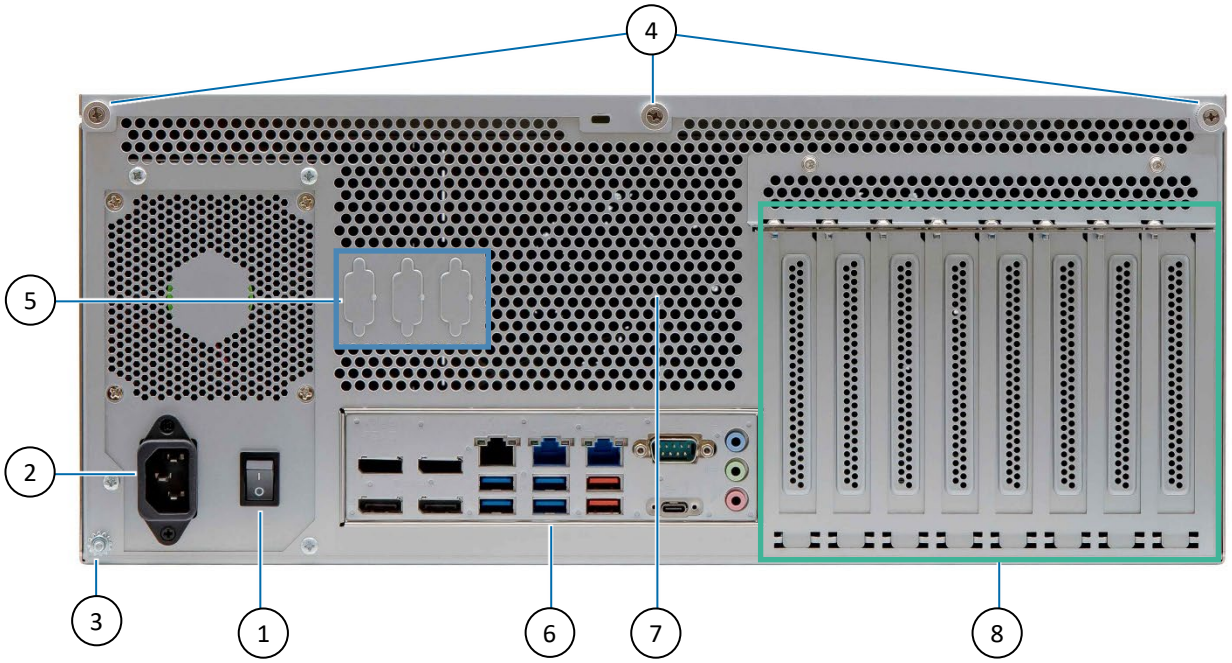
The two USB 3.0 connectors provide separate signal lines for USB 3.2 Gen 1 and are backwards compatible with earlier USB 3.0 versions and USB 2.0.

For cabling, use only Hi-speed USB cable as specified in the USB 3.2 Gen 1 standards.

4.2. Rear Panel

The rear panel features a PSU with switch, external I/O interfaces, expansion card slots, three breakouts for further I/O, three screws to fasten the cover and air exhaust ventilation openings,

Figure 12: Rear Panel

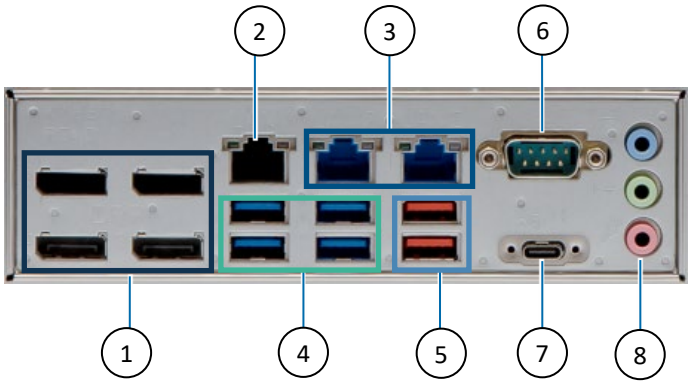


1. PSU On/Off switch
2. Input power supply socket
3. Potential equalization stud
4. Three knurled screws
5. Three breakouts (for COM 2/3/4)
6. Interface panel
7. Air exhaust ventilation openings
8. Eight PCIe/PCI Slots (from left to right)
   Slot 1: PCIex16, Gen 5, 16 lanes
   Slot 2: PCIe x1, Gen 3 (open slot)
   Slot 3: PCIe x16, Gen 4, 4 lanes
   Slot 4: PCIe x8, Gen 4, 4 lanes
   Slot 5: PCIe x8, Gen 4, 4 lanes (open slot)
   Slot 6: PCIe x1, Gen 3 (open slot)
   Slot 7: PCI 32 bit
   Slot 8: mechanical slot

4.2.1. Interface Panel

The interface panel (Figure 12, pos. 6) features the I/O interfaces.

Figure 13: Interface Panel



1. 4x DP 1.4 @ 4K (DPP3, DPP1) (DPP4, DPP2)
2. 1x 1.0 GbE (LAN1)
3. 2x 2.5 GbE (LAN2/3)
4. 4x USB 3.2 Gen 1
5. 2x USB 3.2 Gen 2
6. 1x COM (RS232)
7. 1x USB-C 3.2 Gen 2
8. 1x Audio (Line In, Line Out, Mic In)

4.2.1.1. DisplayPort (DP)

The four DisplayPorts are DP V1.4a @4K (Figure 13, pos. 1). All DisplayPort outputs are equivalent and compatible with DP++ and support a resolution of 4096x2160 @ 60Hz. The display resolution varies depending on the number of simultaneous displays.

Table 5: Display Resolution

Common Screen Resolution (max.)	Number of Simultaneous Displays
8k @ 60 Hz HDR / 5k @ 120 Hz HDR	1
8k @ 60 Hz SSR / 5k @ 60 Hz HDR	2
4k @ 60 Hz HDR	4

If the multi-monitor output is enabled, the screen output is shown on two displays simultaneous (clone view). Depending on the DP used, only two displays are selected if more than two monitors are connected. The lowest numerical “Priority” wins, as shown in Table 6: Display Order Priority.

Table 6: Display Order Priority

Priority	1	2	3	4	5	6
Primary Display	DP1	DP1	DP1	DP2	DP2	DP3
Secondary Display	DP2	DP3	DP4	DP3	DP4	DP4

Connection to either a VGA, DVI or HDMI video source is possible using either a passive or active adapter. The type of adapter depends on the signal type and if the connection is to a single device or multiple devices.

DP adapters:

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

4.2.1.2. USB 3.2 Gen 1 Ports

The four USB ports (Figure 13, pos. 4) 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.

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 cabling, use only Hi-speed USB cable as specified in the USB 3.2 Gen 1 standards.

4.2.1.3. USB 3.2 Gen 2 ports

The two USB ports (Figure 13, pos. 5) supports USB 3.2 Gen 2 Type-A ports. Kontron recommends the use of 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 cabling, use only Hi-speed USB cable as specified in the USB 3.2 Gen 2 standards.

4.2.1.4. USB-C 3.2 Gen 2 Port

The USB-C port (Figure 13, pos. 7) supports USB-C 3.2 Gen 2. Kontron recommends the use of USB-C 3.2 Gen 2 compliant devices or cables. Power delivery is not supported.

4.2.1.5. 2.5 GbE LAN

The two 2.5 GbE ports (Figure 13, pos. 3) implement the Intel® i226LM LAN controller and support (2500BASE-T, 1000BASE-T, 100BASE-Tx, 10BASE-TE) Ethernet, IEEE 1588 and Time Sensitive Networking (TSN).

To achieve the specified performance of the Ethernet port, Category 5 twisted pair cables must be used with 10/100 MByte and Category 5E, 6 or 6E with 1 GbE/2.5 GbE networks.

The 2.5 GbE LAN “Activity LED” remain active even if the LAN controller is disabled in the BIOS Setup.

The 2.5 GbE LAN Controller (Intel® i226) can experience sporadic networking connection drops with certain routers/switches when Energy Efficient Ethernet (EEE) is enabled. Intel is working to provide an updated driver. For customers experiencing this problem, Kontron recommends disabling the EEE mode in the Advanced Windows/Linux driver setting.

4.2.1.6. 1 GbE LAN

The 1 GbE port (Figure 13, pos. 2) implements the Intel® i219LM LAN controller and supports (1000BASE-T, 100BASE-TX, 10BASE-T) Ethernet and supports IEEE 1588.

To achieve the specified performance of the Ethernet port, Category 5 twisted pair cables must be used with 10/100 MByte and Category 5E, 6 or 6E with 1 GbE/2.5 GbE networks.

4.2.1.7. Serial Ports (COM)

The serial port (Figure 13, pos. 6) provides full RS232 support. Three additional RS232 serial ports can be routed from the motherboard to the rear panel to populate the available breakouts (Figure 12, pos. 5).

For technical data, refer to the motherboard's user guide K3851-R ATX.

4.2.1.8. Audio

The audio ports (Figure 13, pos. 8) support Line-in, Microphone and Headphone output.

For technical data, refer to the motherboard's user guide K3851-R ATX.

4.2.2. Power Supply Unit (PSU)

The Power Supply Unit (PSU) is located on the rear panel and supplies the required internal voltages using standard certified cables. For the PSU power specification, see Table 15: Electrical Specification. The default PSU is a single 600 W PSU with options for a single 850 W or a redundant 500 W PSU. All PSUs support a nominal input voltage of 240 VAC to 100 VAC.

WARNING

Energy Hazards - 240 VA present Inside the Chassis!

To ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).

WARNING

Easy Access to Power Cable and Input Power Socket

The power cable must always remain easily accessible. If the operating environment restricts power cable access, disconnection must be guaranteed using a separate cut-off fixture.

WARNING

Operate Closed

Operate only with a closed and secure cover, to ensure that operators do not have access to energized internal parts.

WARNING

AC Power Cable

Only use the AC power cable delivered with product and sufficiently rated for the implemented power supply.

WARNING

Main Power

Ensure that the mains power supply socket is grounded, and the power cable is in perfect condition with no visible damage. The rated mains voltage range must agree with the voltage specified on the type label.

NOTICE

Forces Shutdown

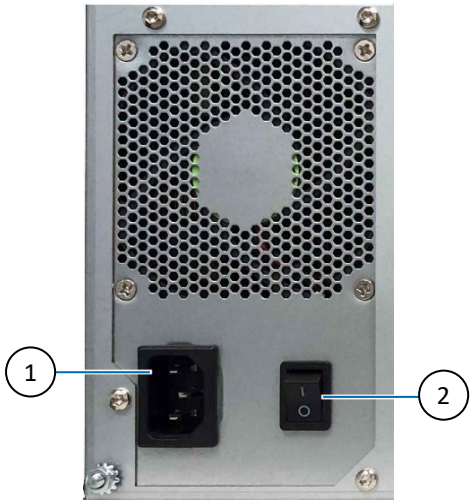
Do not disconnect the power from the product while the product is switched on!

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

4.2.2.1. PSU 600 W

The product is supplied with a 600 W PSU supporting a nominal input voltage of 240 VAC to 100 VAC (unless ordered otherwise). Use the supplied dedicated power cable to connect to the mains power supply.

Figure 14: PSU (600 W)

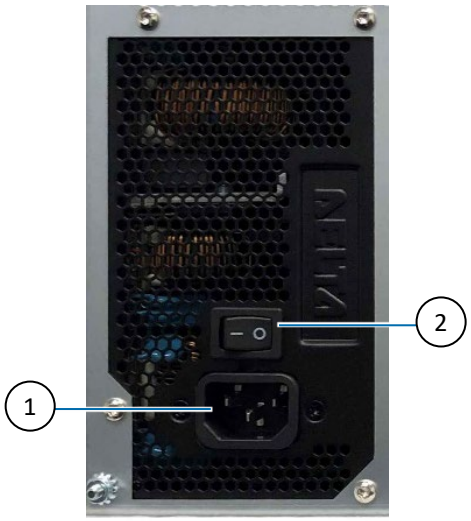


1. Input power socket
2. PSU On/Off switch

4.2.2.2. PSU 850 W (option)

The 850 W PSU supporting a nominal input voltage of 240 VAC to 100 VAC is an option for power intensive applications. Use the supplied dedicated power cable to connect to the mains power supply.

Figure 15: Single PSU 850 W

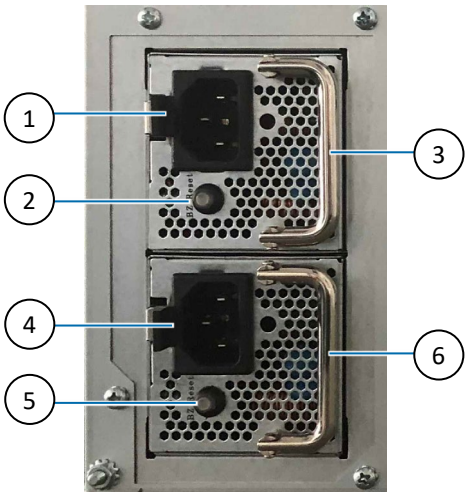


1. Input power socket
2. PSU On/Off switch

4.2.2.3. Redundant PSU 500 W (option)

The redundant PSU contains two separate PSUs each capable of powering the product alone with 500 W if one of the PSU fails. Use the supplied dedicated power cables to connect to the mains power supply. To ensure the power cables are not accidentally removed from the input power sockets, the power plug socket's clip holds the power connector firmly in place.

Figure 16: PSU, 500 W (redundant)



1. Input power socket with clip (1)
2. Buzzer Reset button with integrated PSU LED Power (1)
3. Removal and insertion handle (1)
4. Input power socket with clip (2)
5. Buzzer Reset button with integrated PSU LED Power (2)
6. Removal and insertion handle (2)

If a PSU fails, the faulty PSU unit shuts down and the PSU LED changes color from green (active) to Red (warning/failure), to indicate which PSU unit is faulty. In this case, the functional PSU unit takes over the full operation and the faulty PSU unit is replaced, see Chapter 13.6: Replacing a Faulty Redundant PSU Unit.

Table 7: Redundant PSU LED Description

PSU LED	Buzzer	Power Supply Description
Green	Off	AC power present and PSU output ON.
LED OFF	Off	No AC power to PSU.
Green (Flashing)	Off	AC power present and PSU off.
Red (Flashing)	Off	Warning: Power supply warning events where the power supply continues to operate, such as: high temperature, high power, high current, slow fan.
Red (flashing)	On	Failure: Main AC power cable unplugged, or AC power lost; with a second power supply in parallel with AC input power.
Red	On	Failure: Power supply critical event causing a shutdown.

4.2.3. Potential Equalization Stud

The potential equalization stud (Figure 12, pos. 3) 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.

4.2.4. Breakout Panels

The three breakout panels (Figure 12, pos. 5) support up to three additional COM RS232 ports, for the connection of a RS232 compatible serial device, see Chapter 4.2.1.7: Serial Ports (COM).

4.2.5. PCIE/PCI Expansion Card Slots

The expansion card slots (Figure 12, pos. 8) support six PCIe slots and one PCI slot, for expansion cards. The allocation of the expansion card slots depends on the overall product configuration.

For the PCIe/PCI slot allocation and a description of the limitations such as size and maximum load, see Table 10: PCIe/PCI Expansion Cards Slot Limitations.

For PCIe/PCI slot functionality information, refer to the K3851-R ATX User Guide

4.3. Sides

The sides feature six M4 threaded screw holes used for installation in a 19" industrial rack with slide rails.

Figure 17: Left Side

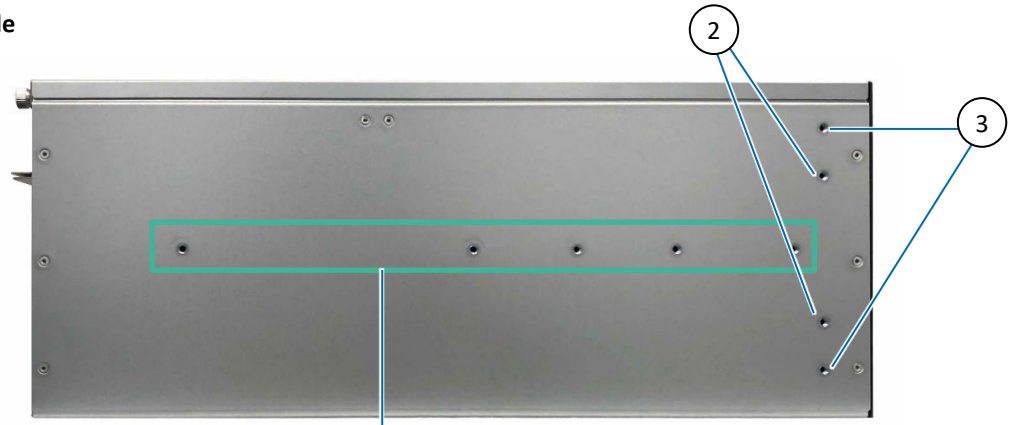
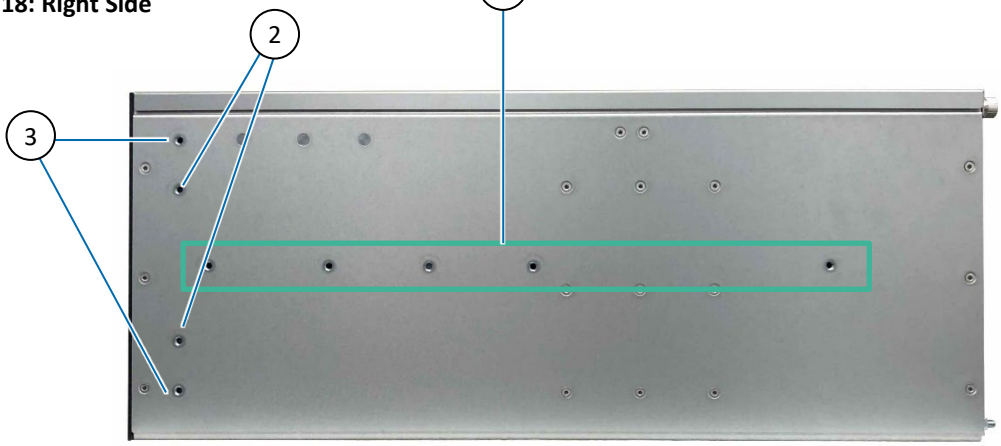


Figure 18: Right Side



1. 5x M4 threaded holes for slide rail
2. 2x M4 threaded holes for Front flap side-plate
3. 2x M4 threaded holes for Handle bracket

4.4. Cover

The cover ensures that operators do not have access to energized internal parts. The cover closes using a bracket on the front side of the cover and three knurled screws on the cover's rear side.

For information on how to open the cover, see Chapter 7.2: Opening and Closing the Cover.

Energy Hazards - 240 VA present Inside the Chassis!

WARNING

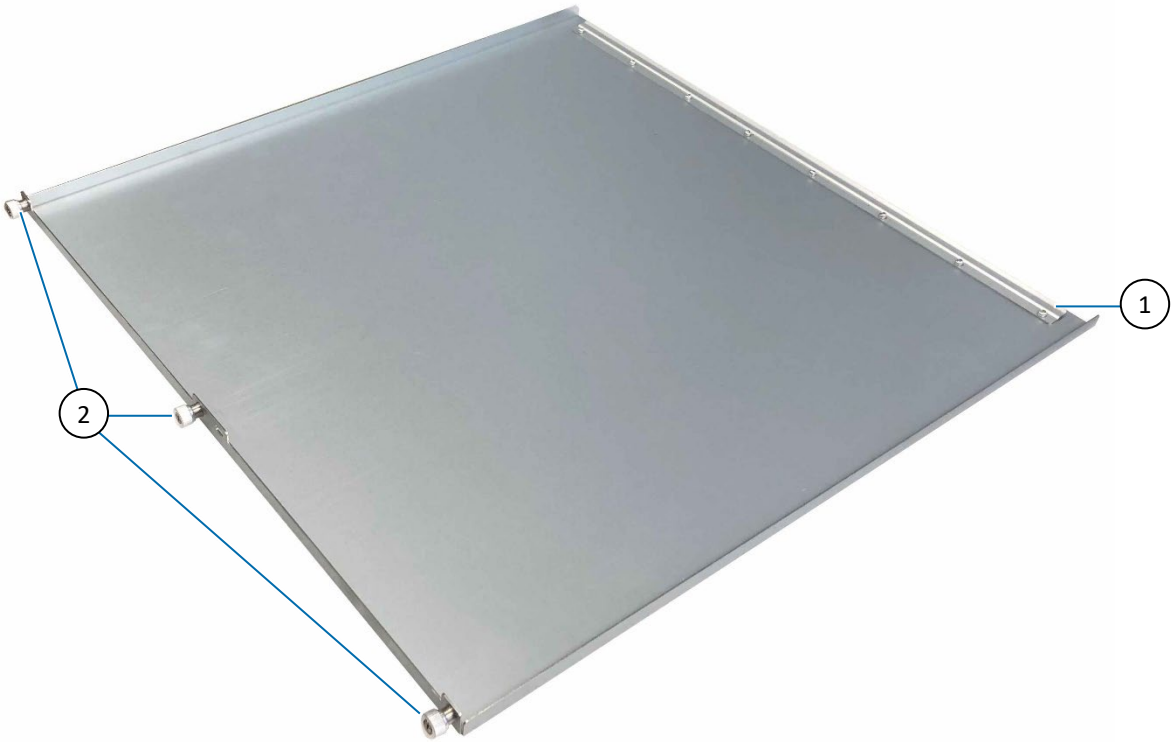
Before removing the top cover ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).

Intended Used is Closed

WARNING

Use only with a closed and secure cover, to ensure that operators do not have access to energized internal parts.

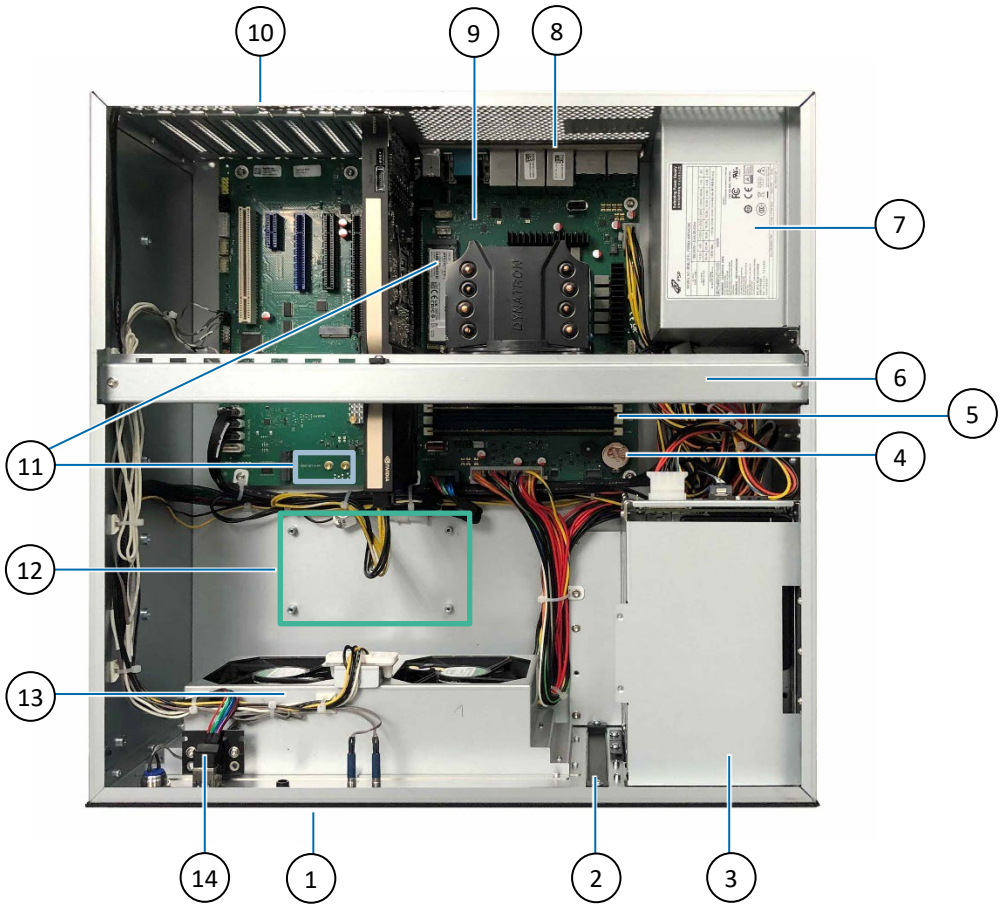
Figure 19: Cover (shown from inside)



1. Fixing bracket (on front side)
2. Three knurled screws (on rear side)

4.5. System Configuration

Figure 20: KISS 4U V4 RPL Internal Configuration



1. Front panel with filter pad door
2. 1x slim DVD Drive
3. Drives bays 1 to 4
4. Lithium battery CR2032
5. 4x DIMM slots
6. Long bracket to stabilize PCIe/PCI expansion cards
7. PSU
8. External interface connectors
9. Motherboard
10. 8x PCIe Expansion slots (6x PCIe & 1x PCI, 1x mechanical)
11. 2x M.2 2280 SSD modules sockets
12. Drive bays 5 & 6 (internal 2.5” SSD(s))
13. Fan assembly with two fans
14. 2x USB 3.2 Gen 1 (front panel)

5/System Expansion

This chapter contains important information on how to expand the KISS 4U V4 RPL with storage and expansion cards.

5.1. Before Expanding

Before expanding the product with storage and expansion cards, consider the maximum power consumption allowed by the power supply.

Due to the limited lifespan of expansion devices, Kontron recommends checking the condition of any installed expansion devices regularly and to pay attention to the manufacturer's lifespan specifications.

The maximum number of connected SATA drives (3.5" HDD, 2.5" SSD, DVD and mobile rack with dual 2.5" SSDs) is restricted to four. The mobile rack with dual 2.5" SSDs requires only one SATA drive connection when used with RAID and two SATA connections when used without RAID.

The maximum number of connected SATA drives is limited to four.

5.2. Mass Storage (internal)

The internal motherboard supports up to two M.2 2280 SSD modules installed on the motherboard and including NVMe RAID. The M.2 2280 SSD module(s) use the PCIe Gen 4x4 interface and do not impact the maximum number of four connected SATA drives. To implement a RAID (0/1) array use NVMe RAID and two M.2 2280 SDD modules of the same density.

The internal only drive bays 5 and 6 support up to two 2.5" SSD(s) using the SATA III interface. When installed the 2.5" SSD drives are included in the number of connected SATA drives. The maximum number of connected SATA drives is four. To implement a RAID (0/1) array use the motherboard's RAID and two 2.5" SDD drives, of the same density.

Table 8: Mass Storage (internal)

Mass Storage Device	Quantity (max).	Interface	Density (per device)	RAID
M.2 2280 Key M SSD	2	NVMe PCIe Gen 4x4	Up to 4 TByte	NVMe RAID Prerequisite: Two M.2 2280 SSD modules of the same density.
2.5" SSD	2	SATA III 6 Gbps	Up to 4 TByte	Motherboard RAID Prerequisite: Two 2.5" SSDs of the same density.

RAID requires two drives of the same type and density.

For motherboard RAID information, refer to Intel ® Rapid Storage Technology in the BIOS, see Chapter 10.7: Configuring RAID in the BIOS.

5.3. Drive Bays 1 to 4 (front panel or internal)

The drive bays 1 to 4 are populated with front accessible removable drives or internal drives with no front access. The drive bay 1 to 4 options include a 3.5” HDD, 2.5” SSD and dual 2.5” SSD drive mobile rack.

The maximum number of connected SATA drives is four, this includes 2.5” SSDs installed on the internal drive bays 5 & 6 and the optional DVD. The dual 2.5” SSD drive mobile rack with RAID requires only one SATA drive connection and two SATA drive connections without RAID.

Table 9: Drive Bays 1 to 4

Access	Front Access Drive Bay			Internal Drive Bay	
Type	Removable drive			Fixed drive	
Size	2.5“		3.5“	2.5”	3.5“
SSD/HDD	SSD		HDD	SSD	HDD
#Drives	1x	2x	1x	1x	1x
RAID	x	√			
Density	256 GByte 512 GByte 1 TByte 2 TByte 4 TByte		4 TByte 6 TByte 12 TByte	256 GByte 512 GByte 1 TByte 2 TByte 4 Tbyte	4 TByte 6 TByte 12 TByte

The maximum number of connected SATA drives is limited to four.

RAID requires two drives of the same type and density.

For motherboard RAID information, refer to Intel ® Rapid Storage Technology in the BIOS, see Chapter 10.7: Configuring RAID in the BIOS.

5.4. Slim Drive Bay (option)

The slim drive bay (Figure 3, pos. 5) supports the installation of a removable R/W DVD. The DVD in the slim drive bay must be included in the number of connected SATA drives. The maximum number of connected SATA drives is four

5.5. PCIe/PCI Expansion Cards

The PCIe/PCI slot allocation for full size expansion cards is described below.

Table 10: PCIe/PCI Expansion Cards Slot Limitations

Slots #	Expansion Card	Size	Slot	Slot Type	Max. Load	Description
1	PCIe	Full height & Full length	Dual/ Single	PCIex16 (Gen 5)	75 W	Default slot: Graphic Lane split (x16 or x8+x8)
2			Single	PCIe x1 (Gen 3, open)	10 W/ 25 W[1]	
3			Single	PCIe x16 (4 lanes Gen 4)	75 W	Default slot: LAN
4			Single	PCIe x8 (4 lanes, Gen 3)	25 W	
5			Single	PCIe x8 (4 lanes, Gen 4, open)	25 W	
6			Single	PCIe x1 (Gen 3, open)	10 W/ 25 W[1]	
7	PCI		Single	PCI 32 bit (33 MHz, Rev. 2.3)	25 W	
8	-	-	-	-	-	Mechanical slot for future use only

[1] 10 W max. load card length ≤ 168 mm and 25 W max. load card length ≥ 178 mm

For PCIe/PCI slot functionality, refer to the motherboard's User Guide, K3851-R ATX.

Before expanding the product with additional PCIe/PCI card(s), observe that the specified maximum power consumption supported by the PSU is not exceeded.

5.5.1. Reference PCIe Expansion Cards

Kontron offers reference PCIe expansion cards for Ethernet (1 GbE/10 GbE) and Graphics (4x DisplayPort). For reference card information, refer to Table 11: Reference KISS 4U V4 RPL PCIe Expansion Cards. Other PCIe/PCI expansion card options are available on request. For more information, contact Kontron Support.

Table 11: Reference KISS 4U V4 RPL PCIe Expansion Cards

References Card	Description
LAN Dual 1.0 GbE	Device: LR-Link LREC9712HT Speed: 10/100/1000Mbps Bus type: PCIe* V2.1 (5 GT/S) Form factor: full height Slot: single slot Bus width: x4-lane PCIe (operable in x4, x8 and x16 slots) Ethernet controller: Intel® I350 Connector: 2x RJ45 (copper) Power consumption: 6 W

References Card	Description
LAN Dual 10 GbE	Device: LR-Link LRES1012PT Speed: 100/1000MbE/2.5/5/10GbE Bus type: PCIe v3.0 x8 Form factor: full height Slot: single slot Bus width: operable in x8 and compatible with x16 slots Ethernet controller: Intel X710 Connector: 2x RJ45 (Copper) Power consumption: 9.6 W(max.) LEDS: Link 10GbE Green LED / Activity- Green LED flashing Link 5/2.5 Yellow LED + /Activity- Green LED flashing Link 100/1000 Mbps - no LED / Activity- Green LED flashing
LAN Quad 1 GbE	Device: LR-Link LREC9714HT Speed: 10/100/1000Mbps Bus type: PCIe V2.1 (5 GT/S) Form factor: full height Slot: Single slot Bus width: x4-lane PCIe (operable in x8 and x16 slots) Ethernet controller: Intel® I350 Connector: 4x RJ45 Power consumption: 5.04 W LEDS: Link 100Mbps Orange LED / Activity- Green LED flashing Link 10/100 Mbps - no LED / Activity- Green LED flashing
Graphics Card Quad DP	Device: NVIDIA RTX A 400 Connectors: 4x mDP 1.4a Interface: PCIe 4.0 x8 Form factor: 6.9 cm H /16.3 cm L (2.7” H /6.4” L) Slot. Single slot Power consumption: 50 W Max. simultaneous displays: › 4x 4096 x 2160 @ 120Hz › 4x 5120 x 2880 @ 60Hz
Graphics Card Quad DP	Device: NVIDIA RTX 4000 Ada SFF Connectors: 4x mDP 1.4a Interface: PCIe 4.0 x16 Form factor: 11.2 cm H /24.13 cm L (4.4” H /9.5” L) Slot: Single slot Power consumption: 130 W Max. simultaneous displays: › 4x 4096 x 2160 @ 120Hz › 4x 5120 x 2880 @ 60Hz › 2x 7680 x 4320 @ 60Hz **Prerequisite**: Installation requires a dual slot.

6/Thermal Management

This chapter contains important information on how to manage KISS 4U V4 RPL thermal considerations.

6.1. Active Cooling

The two system fans within the fan assembly force air to flow through the ventilation openings from the front to the rear of the chassis. The processor and expansion cards have integrated cooling solutions or are equipped with corresponding cooling devices.

The fan assembly's filter pad protects against contaminates such as dust and dirt entering the product and will become clogged overtime. When clogged, the filter pad restricts the amount of air entering the product thus causing excessive heating. Kontron recommends cleaning the filter pad as often as necessary, see Chapter 13.3: Cleaning or Replacing the Filter Pad.

⚠CAUTION	**Clean Filter Pad** Clean the filter pad when the filter becomes clogged with contaminants to ensure adequate ventilation. The required regularity depends on the level of contamination within the operating environment.

⚠CAUTION	**Functional Fans** Operation is permitted only with functional system fans! Replace a defective fan only with a Kontron fan spare part.

	The two system fans are hot-swappable, enabling the tool less replacement of the fans even during operation.

6.2. Temperature Sensor

The temperature conditions of the product depend on the environmental temperature and the load. Two internal temperature sensors detect the temperature and control the speed of the system fans accordingly.

6.3. Minimum Thermal Clearance

Before installing the product in the end environment, take thermal considerations such as minimum clearance, airflow obstructions and the correct mount orientation into account.

To provide maximum airflow observe a minimum clearance at the front and rear sides of the product to the surrounding environment and ensure that ventilation openings are not covered or blocked by surrounding parts.

⚠CAUTION	**Ensure Sufficient Airflow.** Ensure that the 19" industrial rack cabinet is well ventilated and does not prevent the product from drawing in air at the front and exhausting air at the rear.

⚠CAUTION	**Clearance** Leave sufficient clearance to ensure maximum airflow and prevent overheating!

⚠CAUTION	**Environment** Do not place the product close to heat sources or damp places.

There are no ventilation restrictions above and below the product.

6.4. Third Party Components

When expanded with third party components, such as PCIe/PCI expansion cards, M.2 SSD modules, DIMMs and drives (3.5” HDD, 2.5” SSD, DVD), take into consideration that there is an increase in air temperature inside the chassis and the air temperature in the chassis is higher than the ambient air temperature around the product.

7/Assembly

This chapter contains important information on the mechanical assembly and working safely with internal components. Follow these instructions when handling KISS 4U V4 RPL internal components and observe the corresponding safety instruction included in Chapter 2/ General Safety Instructions.

7.1. Before Assembling the Product

Before installing/removing internal components ensure the product is switched off properly using the power button and disconnect the power cable from the mains power supply. Consult the documentation provided by the external components manufacturer and instructions within this Chapter.

Energy Hazards - 240 VA present Inside the Chassis!

⚠WARNING

Before removing the top cover ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).

Intended used is Closed

⚠WARNING

Use only with a closed and secure cover, to ensure that operators do not have access to energized internal parts. Close properly using all three rear panel knurled screws

Skilled Personnel only

⚠WARNING

Activities requiring internal access must be performed by skilled personnel aware of the associated dangers!

ESD Sensitive Device!

Follow the safety instructions for components that are sensitive to electrostatic discharge (ESD). Failure to observe this warning notice can result in damage to the components.

7.2. Opening and Closing the Cover

To open the cover no tools are required. The cover is secured using three rear panel knurled screws.

To open and close the cover, proceed as follows:

1. Switch off and disconnect the product from the mains power supply.
2. Loosen the three knurled screws that secure the cover to the rear panel.
3. Pull the cover out slightly to release the cover’s fixing bracket from the front panel.
4. Lift the cover up (on the rear edge) and remove the cover.
5. To close and secure the cover, proceed in the reverse order.

7.3. Installing and Removing PCIe/PCI Expansion Cards

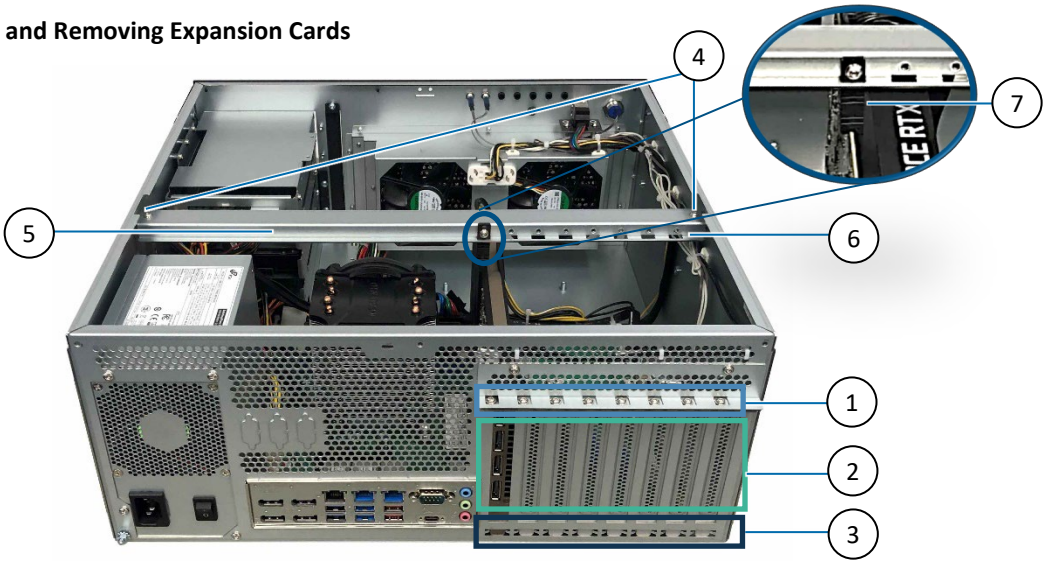
Before Installing or removing a PCIe/PCI expansion card, consult the expansion card's manufacturer for instructions.

ESD Sensitive Device!

Follow the safety instructions for components that are sensitive to electrostatic discharge (ESD). Failure to observe this warning notice can result in damage to the components

Insert a blank slot bracket into an empty expansion card slot and secure with screw.

Figure 21: Installing and Removing Expansion Cards



1. 8x Slot brackets screws
2. 8x Blank slot brackets
3. 8x Slot bracket latches
4. 2x Long bracket screw
5. 1x Long bracket
6. 8x long bracket openings for PCB holder for PCIe/PCI cards
7. 1x PCB holder (with adjustable break off ridges)

To install a PCIe/PCI expansion card, perform the following:

1. Switch off and disconnect the product from the mains power supply.
2. Remove the cover as described in Chapter 7.2: Opening and Closing the Cover.
3. Remove the long bracket (Figure 21, pos. 5), by removing the two screws (Figure 21, pos. 4). Retain the long bracket and screws for later use.
4. Remove the slot bracket screw (Figure 21, pos. 1) from the corresponding motherboard's PCIe/PCI connector and lift the slot bracket (Figure 21, pos. 2) out of the slot bracket latch (Figure 21, pos. 3). Retain the blank slot bracket with screw for later use.
5. Insert the PCIe/PCI expansion card carefully into the corresponding motherboard's PCIe/PCI slot connector and position the expansion card's brackets in the empty slot bracket latch. Secure the expansion card with the slot bracket's screw removed in step 4.
6. Reinstall the long bracket, using the two screws removed in step 3.
7. Insert a PCB holder (Figure 21, pos. 7) through the PCB holder opening on the long bracket (Figure 21, pos. 6) and secure the PCB holder with the screw provided. If the PCB holder is too long, shorten the PCB holder by breaking off one or more of the lower ridges.
8. Close and secure the cover as described in Chapter 7.2: Opening and Closing the Cover.

To remove a PCIE/PCI expansion card, perform the following:

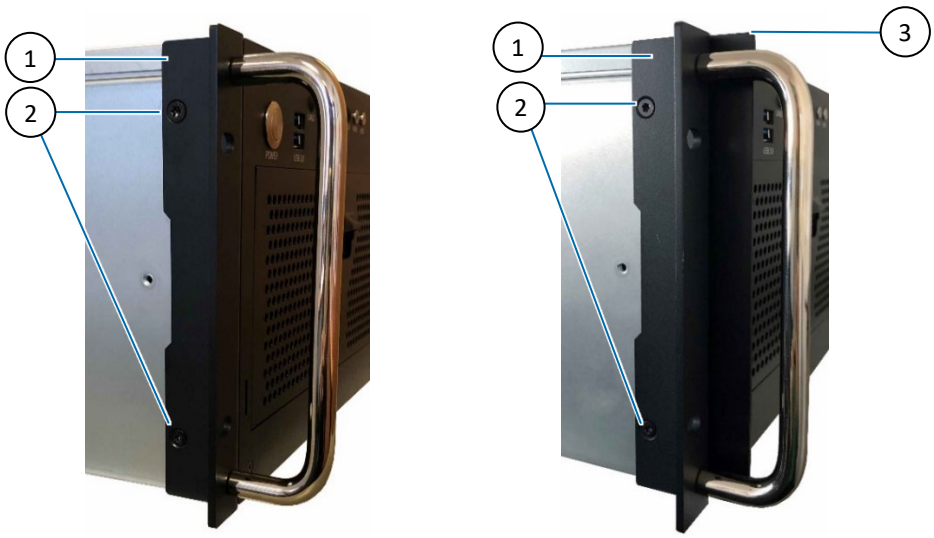
1. Switch off and disconnect the product from the mains power supply.
2. Remove the cover as described in Chapter 7.2: Opening and Closing the Cover.
3. Remove the long bracket (Figure 21, pos. 5), by removing the two screws (Figure 21, pos. 4). Retain the long bracket and screws for later use. If no longer required, remove the PCB hold (Figure 21, pos. 7) from the long bracket.
4. Remove the PCIe/PCI expansion card screw (Figure 21, pos. 1) and lift the expansion card out of the slot bracket latch (Figure 21, pos. 3) and the motherboard's PCIe/PCI slot connector. Retain the PCIe/PCI expansion card and screw for later use.
5. Insert a new PCIe/PCI Expansion card carefully into the corresponding motherboard PCIe/PCI connector and position the expansion card's brackets in the slot bracket latch. Secure the expansion card with the slot bracket screw removed in step 4. If no new PCIe/PCI expansion card is to be installed, close the empty expansion card slot with the blank slot bracket and secure with the slot brackets screw removed in step 4.
6. Reinstall the long bracket to stabilize the installed expansion cards, using the two screws removed in step 3.
7. Insert a new PCB holder (Figure 21, pos. 7) through the PCB holder opening on the long bracket (Figure 21, pos. 6) if one is not already secured to the long bracket.
8. Close and secure the cover as described in Chapter 7.2: Opening and Closing the Cover.

7.4. Removing the Handle Brackets

The product is delivered with two handle brackets installed on the sides of the product. If the front flap option is installed, the handle brackets have to be removed and reinstalled with the front flap side plate.

If both the front flap side-plates and handle brackets are installed. Fasten the front flap side-plate first and the handle bracket second.

Figure 22: Handle Bracket Installed without and with Front Flap Side-plate



1. Handle bracket
2. 2x M4 screws
3. Front flap side-plate

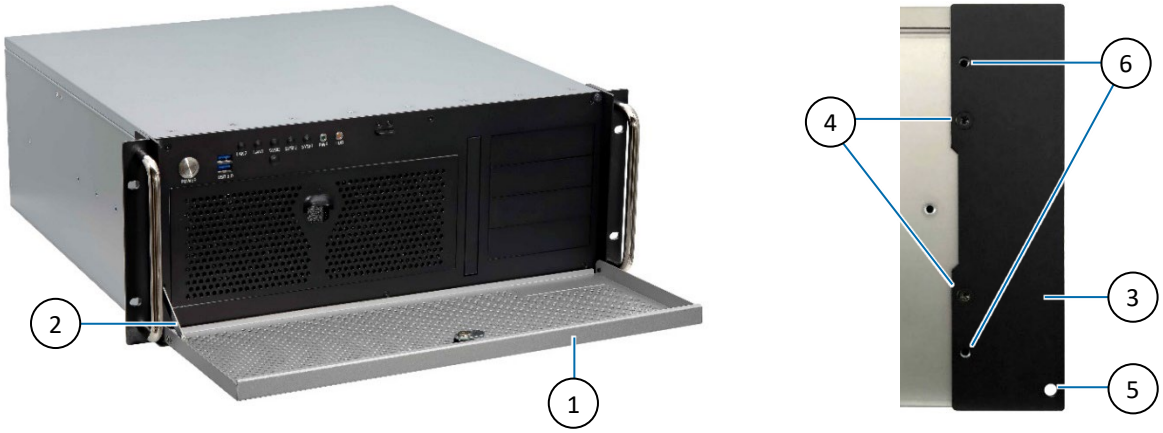
To remove the handle brackets, proceed as follows:

1. To remove the handle brackets (Figure 22, pos. 1), loosen the two screws (Figure 22, pos. 2) that securely fasten the handle brackets to the left and right sides of the product. Retain the two screws with the handle brackets for later use.

7.5. Installing and Removing the Front Flap

If both the front flap side-plates and handle brackets are installed. Fasten the front flap side-plate first and fasten the handle bracket second.

Figure 23: Front Flap and Front Flap Side-plate



1. Front flap
2. Front flap arm
3. Front flap side-plate
4. 2x M4 screws (front flap to chassis)
5. Opening for the front flap
6. 2x M4 threaded screw holes (handle bracket to chassis)

To install or remove the front flap, proceed as follows:

1. Remove the two screws securing each of the handle bracket. Retain the screws for later use.
2. Fasten the front flap side-plates loosely with the two screws (Figure 23, pos. 4) provided to the left and right sides of the product.
3. Positioning the front flap (Figure 23, pos. 1)in the allocated opening (Figure 23, pos. 5) on the front flap side-plates and guiding the front flat arm (Figure 23, pos. 2) into the corresponding slit on the front panel.
4. When the front flap is in position, fasten the two screws (Figure 23, pos. 4) to secure the front flap side-plates.
5. Fasten the handle brackets on top of the front flap side-plate (Figure 22, pos. 2), with the two screws removed in step 1.
6. To remove the front flap, perform in the reverse order.

7.6. Installing the Rubber Feet

To install the supplied four rubber feet:

1. Switch off the product and disconnect the product from the mains power supply. Disconnect all peripherals.
2. Ensure that all components are securely installed and that the cover is closed and secured.
3. Lie the product upside down (bottom side facing upwards) on a soft ESD mat.
4. Remove the protective film from the four self-adhesive rubber feet and attach each self-adhesive rubber foot to the four corners of the product's bottom side.
5. Return the product to the upright position (cover facing upwards).

Always Install all four rubber feet.

Rubber feet are not required when installing the product in a 19" Industrial rack cabinet.

7.7. Installing Slide Rails

Kontron offers 4U compatible slide rails and mounting kit. The slides rails are identical and attach to the left and right sides of the product. For more information, see Table 2: Accessories and Spares Parts.

⚠CAUTION

Secure Mounting:

To support the product's weight, two separate fixation methods must be used:

- Front handle brackets (left side, right side)
- Slide rails or L brackets or a 19" industrial rack rear side fixation

Only use the specified screws to attach the telescope slide rails to the product.

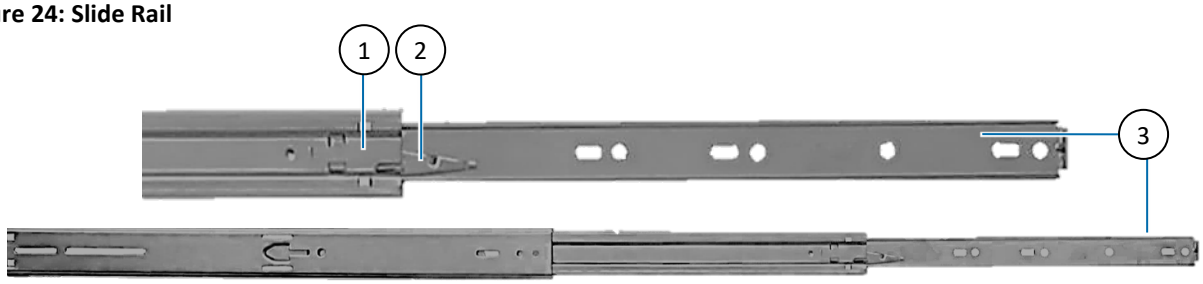
⚠CAUTION

Verify Secure Mounting

Mount using the slides rails on both the left and right sides and ensure the front handle brackets are fastened to the left and right sides of the 19" industrial rack cabinet.

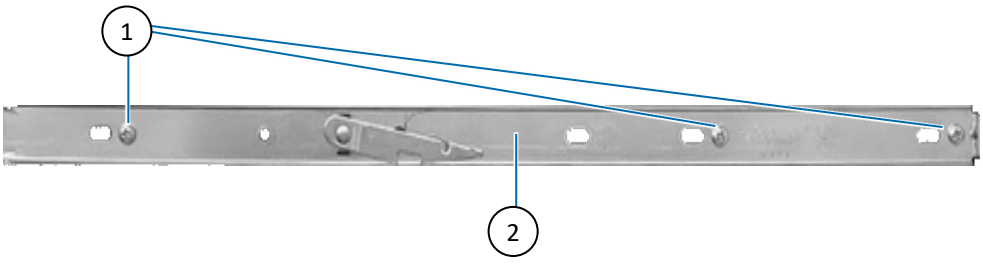
To release the locking lever, push the left and the right locking lever in opposite directions.

Figure 24: Slide Rail



1. Outer slide rail part
2. Lock lever
3. Inner slide rail part

Figure 25: Attached Inner Slide Rail



1. 3x M4 Screws
2. Inner slide rail part

To install the telescopic slide rails, perform the following:

1. Remove the inner part of the telescopic slide rail by releasing the locking lever (Figure 24, pos. 2) and pulling out the inner part of the slide rail.
2. Attach the removed inner part of the telescopic slide rail to the left and right sides of the product using the supplied three screws (M4x6) screws (Figure 25, pos. 1).

8/Mounting

This chapter contains important information on how to mount the KISS 4U V4 RPL in a 19” industrial rack and in customer specific environments.

8.1. Before Mounting

Before mounting the product, read the instructions in this chapter and observe the information in Chapter 2/: General Safety Instructions. Due to possible access restrictions, install all expansion cards before mounting the product.

⚠WARNING	**Handling** The product must be installed only by skilled personnel aware of the associated dangers.
⚠CAUTION	**Ensure Sufficient Airflow.** Ensure that the product is well ventilated and can draw in sufficient air at the front and exhaust air at the rear.
⚠CAUTION	**Clearance** Leave sufficient clearance to ensure maximum airflow and prevent overheating!
⚠CAUTION	**Heavy Product** The product is heavy and installing the product alone can result in product damage or personal injury.
⚠CAUTION	**Environmental Requirements** Do not place the product close to heat sources or damp places.
⚠CAUTION	**Orientation** The product is designed for horizontal operation. Vertical operation is possible.
⚠CAUTION	**Cable Procedures** When connecting the cables, following proper cable procedures: › Grounding pin is connected first and disconnected last. › Connect all interface cables. › Power connection is the last connection. Before connecting I/O cables. Ensure that the product is switched off and the power cable is disconnected from the Input power socket or mains power plug.
	Due to possible access restrictions, before installing the product install all expansion cards and connect required peripherals to the corresponding connectors and ports.

8.2. Mounting in a 19” Industrial Rack Cabinet

The product is designed for horizontal installation in a 19” industrial rack cabinet with the top cover facing upwards. There are no ventilation openings on the product’s top and bottom sides making the product idea for mounting directly on top of or below another other systems in the 19” industrial rack cabinet.

Ensure the 19” industrial rack cabinet is well ventilated and does not prevent the product from drawing in air at the front and exhausting air at the rear.

⚠CAUTION	**19” Rack Two Fixation Methods** To support the product’s weight in a 19” Industrial rack, two separate fixation methods must be used: › Front handle brackets (right side and left side) › Slide rails or L brackets or a 19” rack rear side fixation Only use the specified screws to attach the telescope slide rails to the product.

⚠CAUTION	**19” Rack Ventilation** Ensure that the 19” industrial rack cabinet is well ventilated and does not prevent the product from drawing in air at the front and exhausting air at the rear.

⚠CAUTION	**19” Rack Installation Procedures** Mount only in a stable 19" industrial rack and use proper installation procedures: › Mount systems from the bottom up. › Place heavy systems lower down. › Bolt the cabinet to the floor or anchor the cabinet to the wall.

To install the KISS 4U V4 RPL in a 19” industrial rack, proceed as follows

1. Switch off using the power button and disconnect the product properly from the mains power supply.
2. Install the inner slide rails to the product, see Chapter 7.7: Installing Slide Rails.
3. Attach the rack mount brackets (from Kontron’s slide Rail kit) to the left and right front and rear posts of the 19” industrial rack cabinet using the supplied four plates and 4 screws (M4x10). Ensure that the mounting brackets are mounted in the same vertical position on all 4 posts in the 19 Industrial rack cabinet.
4. Attach the outer parts of the slide rails to the left and right posts of the 19" industrial cabinet using the rack mounting brackets. Mount the outer part of the slide rail using two countersunk head screws (M4x10) first at the front and then using two countersunk head screws (M4x10), at the rear of the 19" industrial cabinet.
5. Install the two handle brackets if not already assembled, see Chapter 7.4: Removing the Handle Brackets.
6. Insert the product’s inner slide rails onto the mounted outer slide rails until the inner slide rail stops and a clicking sound is audible. During insertion, the locking lever must be unlocked! To unlock the locking lever push it up on the left side and push it downwards on the right side.
7. Secure the handle bracket to the front side posts of the 19" industrial rack cabinet with four cage nuts and screws (not included in the delivery). Always use four screws to provide full support, due to the product’s weight.
8. Verify that the product is securely mounted using two fixation methods.

8.3. Mounting on a Desktop

The product is designed for horizontal installation on a desktop. To avoid scratching the installation surface, using the delivered rubber feet.

To install the product in a desktop environment, proceed as follows:

1. Add the rubber feet as described in Chapter 7.6: Installing the Rubber Feet.
2. Remove the handle brackets as described in Chapter 7.4: Removing the Handle Brackets.
3. If the lockable front panel is not required, remove the front flap and two side panel plates as described in Chapter 7.5: Installing and Removing the Front Flap.

9/Starting Up

This chapter contains important information on how to connect to a power supply and start the KISS 4U V4 RPL.

9.1. Before Starting

Before starting up observe the instructions within this chapter and refer to Chapter 2/ General Safety Instructions.

⚠WARNING	**Energy Hazards - 240 VA present Inside the Chassis!** To ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).
⚠WARNING	**Easy Access to AC Power Cable and Power Connectors** The power cable must always remain easily accessible. If the operating environment restricts power cable access, disconnection must be guaranteed using a separate cut-off fixture.
⚠WARNING	**Operate Closed** Operate only with a closed and secure cover, to ensure that operators do not have access to energized internal parts.
⚠WARNING	**AC Power Cable** Only use the AC power cable delivered with product and sufficiently rated for the power supply (as specified on the type label). Before using the product, ensure the power cable is in perfect condition with no visible damage.
⚠WARNING	**Mains Power** Ensure that the mains power supply socket is grounded and that overcharge protection corresponds with the electrical data indicated on the product's type label.
NOTICE	**Forced shut down** Do not disconnect the power while the product is in operation. Performing a forced shut down can lead to loss of data or other undesirable effects!

9.2. Connecting to the Power Supply

The power supply (600 W or 850 W) connects to the mains power supply using a dedicated power cable. The power cable attaches to the input power socket. The power supply switched on using the power supply switch.

To connect the power, perform the following:

1. Connect the supplied AC power cable to the input power socket (Figure 14, pos. 1 and Figure 15, pos. 1) and to the mains power supply socket using the electrical plug for your region.
2. Switch on the power supply by pressing the power switch to position "1", (Figure 14, pos. 2 and Figure 15, pos. 2).

9.3. Connecting to the Redundant Power Supply (option)

The redundant 500 W power supply contains two separate power supplies, where each power supply can power the product alone. Each power supply connects to the mains power supply using a dedicated power cable. The power cables attach to the two input power sockets, with cable clips holding each power cable firmly in place.
If a power supply fails, the faulty power supply shuts down and the functioning power supply takes over full operation, until the faulty power supply is replaced, see Chapter 13.6: Replacing a Faulty Redundant PSU Unit.

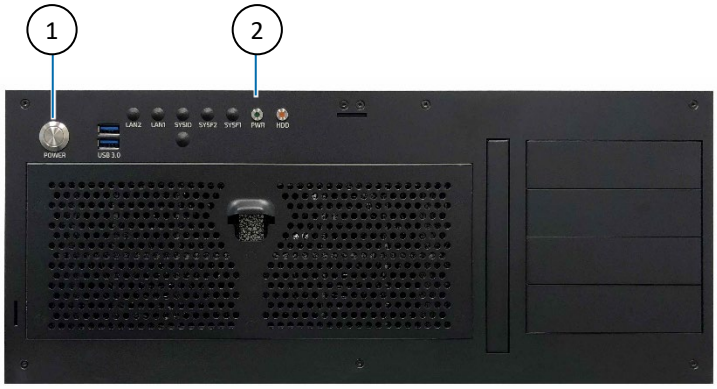
To connect to the redundant 500 W power supply, perform the following:

1. Connect both supplied AC power cables to the two Input power sockets (Figure 16, pos. 1 and pos. 3) and to the mains power supply sockets using the electrical plug for your region.
2. Secure the AC power cables to the Input Power sockets using the socket clip.

9.4. Switching On

To switch on the product, press the power button and the PWR LED illuminates green to verify the product is active.

Figure 26: Power Button



1. Power button
2. Power LED

To switch on, perform the following:

1. Press the power button (Figure 26, pos. 1).
2. The PWR LED (Figure 26, pos. 2) illuminates green to verify the product is active

9.5. Operating System and Hardware Component Drivers

The product is fully operational when switched on for the first time with pre-installed Operating System (OS) Windows 10 IoT x64 or Linux and with all required drivers. Drivers are available from Kontron's Customer Section.

If ordered without pre-installed OS, before starting the product install the OS and the appropriate drivers for the system configuration. Consider the manufacturer's specifications for the OS and the integrated hardware components.

To download the relevant drivers for the installed hardware, visit Kontron's Customer Section.

Pay attention to the installed hardware component manufacturer's OS specification.

10/ BIOS

The KISS 4U V4 RPL uses the uEFI BIOS supported by the motherboard. This chapter informs operators how to start the BIOS and use the BIOS setup to configure the BIOS and perform a BIOS update.

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

Only use the Kontron provided tools!

10.1. Starting the BIOS

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

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

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

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
- Security
- Power
- Event Logs
- Boot
- MEBx
- Save & 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 uses a hot key navigation system. The hot key legend bar is located at the bottom of the BIOS setup screen and displays a list of keys used to move the cursor and select functions.

Table 12: Navigation Hot Keys in the Legend Bar

Key	Description
<F1>	Displays the 'General Help' window
<->	Selects the next lower value within a field
<+>	Selects the next higher value within a field
<F2>	Loads previous values
<F3>	Loads optimized defaults
<F4>	Saves and exits
<→> or <←>	Moves cursor left or right to select the setup menu
<↑> or <↓>	Moves cursor up or down to select setup function or sub-screen
<ESC>	Exits a setup menu, enters the Exit setup menu or in a sub-menu enters the higher-level menu
<RETURN>	Executes a command or selects a submenu

10.4. BIOS Update

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

10.5. Updating the BIOS

Before updating the BIOS, Kontron recommends making a backup of the current BIOS setting.

After a BIOS update, additional modifications must be made manually.

After a BIOS update If the product fails to boot, the updated BIOS may be damaged.

To update the BIOS, visit the implemented motherboards website and click on BIOS UPDATES to be forwarded to Kontron's FTP server. The FTP server provides operators with BIOS release notes and downloads of the latest BIOS version.

Operators can choose the preferred method to update the BIOS and follow the instructions provided.

For the latest BIOS updates and BIOS release information, visit the motherboard's homepage K3851-R ATX (kontron.com) or Kontron's Customer section.

10.6. Recover BIOS

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

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

If you experience any problems after a BIOS flash, try if “Load Optimized Default Values” (F3) in BIOS Setup solves the problem.

To recover BIOS, perform the following:

1. Copy the complete content of BIOS ZIP package (K3851-R1.ROM file) to a FAT32 formatted USB drive/stick.
2. Connect the prepared drive (USB stick) to the product. Disconnect all other drives.
3. Change the recovery jumper to “Recovery position, orange”.
4. After switching on the product, the BIOS bootloader automatically initiates recovery and restores the BIOS contents from the ROM file.
5. The product enters a “BIOS setup”-like user interface. Confirm “Proceed with flash update” message.
6. Wait until “Updating main firmware” finishes.
7. Set the recovery jumper back to the default position.
8. Press any key to reset and check if the BIOS is working properly.
9. Reconnect all drives and switch on the product.
10. Reconfigure the BIOS with your requirements.

10.7. Configuring RAID in the BIOS

To enable RAID support and configure a RAID volume in the BIOS, use the VMD Configuration in the Advanced setup menu, to create NVMe and SATA based RAID Volumes.

It is only possible to map drives of the same type to a single RAID volume.

To set up a RAID Volume in the BIOS, perform the following:

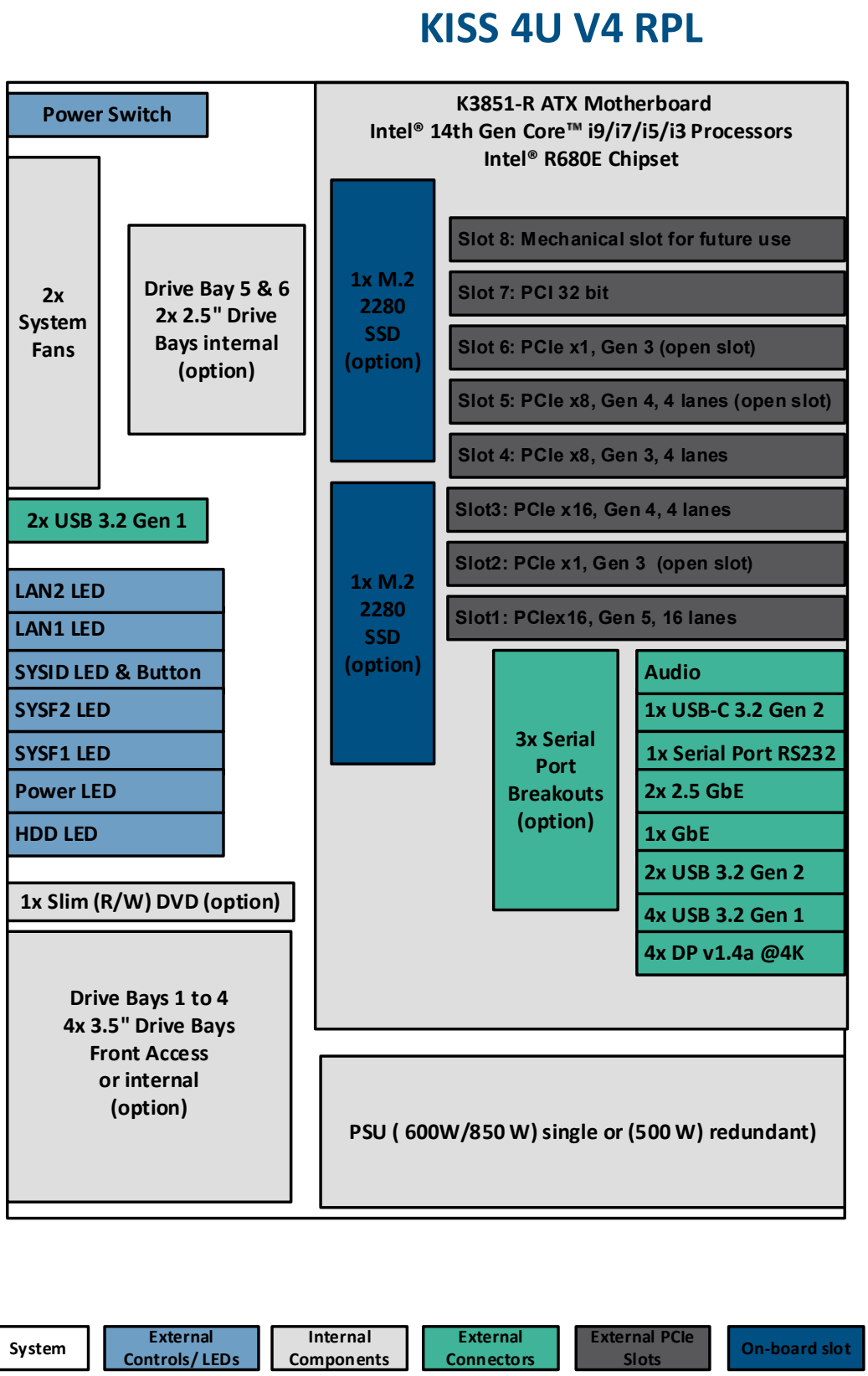
1. In the BIOS **Advanced** setup menu select **VMD Configuration** and set **Enable VMD Controller** to [**Enabled**].
2. Set **Enable VMD Global Mapping** to [**Enabled**] and map the dedicated Root ports (for M.2 CPU/PCH and/or SATA) under VMD.
3. Enter the **Advanced** setup menu and select the newly created **Intel® Rapid Storage Technology** that provides an overview of the existing disks.
4. Select **Create RAID Volumes** to configure the RAID Volume and give the RAID Volume a **Name**, **RAID Level** and to select the RAID Volume disks. You can only select two disks of the same type
5. Click on **Create Volume** to complete the RAID Volume.
6. The new RAID Volume is available in the BIOS **Boot Option** list.

11/ Product Specification

This chapter described the technical specifications of the KISS 4U V4 RPL.

11.1. Block Diagram

Figure 27: Block Diagram KISS 4U V4 RPL



11.2. Hardware Specification

Table 13: Hardware Specification

KISS 4U V4 RPL	Description				
Motherboard					
Type	K3851-R ATX				
Processor	Intel® Core™ (14th Gen) i9/i7/i5/i3 Processors				
	Processor	**Cores**	**Performance. Core Base Frequency**	**Max. Turbo Frequency**	**Base Power**
	i9-14900	24	3.2 GHz	6 GHz	125 W
	i7-14700	20	2.1 GHz	5.4 GHz	65 W
	i5-14500	14	2.6 GHz	5 GHz	65 W
	i3-14100	4	3.5 GHz	4.7 GHz	60 W
Chipset	Intel® R680E				
System Memory	4x DIMM DDR5-5600 128 GByte (max.) Up to 4 channels Unbuffered, ECC support				
Graphics	Intel® UHD Graphics 770 (i9, i7 und i5) Intel® UHD Graphics 730 (i3)				
Mass Storage	Up to 2x M.2 2280 Key M NVMe SSDs Up to 4 TByte (per M.2 2280 SSD) Located: Motherboard Interface: PCIe Gen 4x4 RAID: NVMe RAID support				
	Up to 2x 2.5” SSDs Up to 4 TByte (per 2.5” SSD) Located: Internal bracket Interface: SATA III 6 Gbps RAID: Motherboard RAID				
Security	TPM V2.0 (Intel® integrated)				
RTC	CR2032 battery (typical lifetime 5 years)				
Front I/O					
USB	2x USB 3.2 Gen 1				
Front Indicator LED					
LAN	LAN2, LAN1				
Failure	SYSID, SYSF2, SYSF1				
Power	PWR				
Drives	HDD				
Drives					
Drive Bays	4x Drive Bays	Each 3.5” drive bay supports one of the following options: 1x 3.5” HDD (up to 12 TByte, SATA III 6 Gbyte) **or** 1x 2.5” SSD (up to 4 TByte, SATA III 6 GByte) **or** 2x 2.5” SSD (up to 4 TByte, SATA III 6 GByte, RAID Support)			
	1x Slim Drive Bay	DVD (Read/Write) slim (option) Interface: SATA			

KISS 4U V4 RPL	Description
Rear I/O	
USB	4x USB 3.2 Gen 1 2x USB 3.2 Gen 2 1x USB-C 3.2 Gen 2
LAN	1x 1 GbE (i219LM, with 10/100/1000 Mb/s, iAMT features) 2x 2.5 GbE (i226LM, with 10/100/1000/25000 Mb/s)
Display	4x DP V1.4a @4K
Audio	Line In Line Out Mic In
Serial Port	1x RS232 3x RS232 (option)
Fan	
System Fan	2x System fans (removable and replaceable)
Internal Fans	1xPSU (integrated in PSU) 1xCPU (heatsink with fan)
Expansion Cards	
PCIe /PCI card Slots	Slot 1 PCIe x16 (Gen 5) › Supporting lane slit (x16 (default) or x8/x8 (option)) Slot 2 PCIe x1 (Gen 3, open) Slot 3 PCIe x16 @ 4 lanes (Gen 4) Slot 4 PCIe x8 @ 4 lanes (Gen 3) Slot 5 PCIe x8 @ 4 lanes (Gen 4, open) Slot 6 PCIe x1 (Gen 3, open) Slot 7 PCI 32 Bit Slot 8 (mechanical slots and not relevant for this product. For future use only.)

11.3. Software Specification

Table 14: Software Specification

Software	Description
BIOS	AMI Aptio 5.x UEFI BIOS
Operating System	Windows 11 IoT Enterprise LTSC (64-bit) Linux Debian
Drivers	Windows and Linux drivers are provided for all expansion cards.

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

11.4. Power Specification

Before connecting the product to power, ensure that the power connection meets the required electrical specification as specified on the type label, see Figure 2: Type Label Example.

Table 15: Electrical Specification

	PSU 600 W (default)	PSU 850 W (option)	PSU 500 W (option)
PSU Type	Single Industrial switching AC/DC	Single Industrial switching AC/DC	Redundant Industrial switching AC/DC
Output Power	600 W (max. load)	850 W (max. Load)	500 W (max. load)
Input Voltage	240 VAC to 100 VAC	240 VAC to 100 VAC	240 VAC to 100 VAC
Input Current	4 A to 8 A max.	5 A to 10 A max.	4 A to 8 A max.
PSU Inrush Current	80 A @ 230 VAC 40 A @ 115 VAC	140 A max. @ 264 VAC	80 A @ 230 VAC 40 A @ 115 VAC
Ground (GND)	Signal ground connected to internal chassis ground		

Energy Hazards - 240 VA present Inside the Chassis!

⚠WARNING

To ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).

Power Cable

⚠WARNING

Only use the AC power cable delivered with product and sufficiently rated for the implemented power supply. Ensure that the power cable is in perfect condition with no visible damage.

Disconnection

⚠WARNING

The power cable must always remain easily accessible. If the end environment restricts access to power cable, disconnection must be guaranteed by using a separate cut-off fixture.

Operate Closed

⚠WARNING

Operate only when the cover is closed and secured, to ensure that operators do not have access to energized internal parts.

Electrical Specification

NOTICE

There are different power options. Ensure that the rated mains voltage range meets the Electrical specification on the type label.

Forced Shutdown

NOTICE

To avoid a forced shutdown do not disconnect the power from the product while the product is switched on! Performing a forced shutdown may lead to loss of data or other undesirable effects! Switch off using the power button to perform an orderly shutdown without data loss.

11.5. Environmental Specification

Table 16: Environmental Specification

Temperature		Description
Temperature	Operating	0°C to +50°C (0°F to 122°F)
	Non-operating	-20°C to +70°C (-4°F to 158°F)
Relative Humidity	Operating	93 % @ 40° C, non-condensing
	Non-operating	
Altitude	Operating	2,000 m max. (6,560 ft.)
		10,000 m max. (32,8069ft.)
Shock according to EN 60068-2-27	Operating	15 g, 11 ms, Half sine, 3 axes
	Non-operating	30 g, 11 ms, Half sine, 3 axes
Vibration according to EN 60068-2-6	Operating	10–150 Hz, 1 g, Sinus, 3 axes
	Non-operating	10– 50 Hz, 2 g, Sinus, 3 axes
MTBF		82461.75 hours @ 30°C Ground Benign (GB) (2-A0FP-XXXX KISS-4UV4-ADL-BAA-3120-000000-0000-5-0) KISS 4U V4, with i3-14100 processor, 16 GByte DDR5 & M.2 SSD 512 GByte)
Noise		35 dB(A)

11.6. Mechanical Specification

Table 17: Mechanical Specification

Mechanical	Description
Form Factor	4U, 19” rack mount
Dimension (H x W x D)	177 mm x 482 mm x 430 mm (4U x 19” x 16.9”) Note: The front flap adds a further 20 mm (0.80”) to the overall depth. The handles add a further 50 mm (1.97”) to the overall depth.
Material	Hot-dip zinc coated cold-rolled steel sheet
Weight	7.4 kg approx. (16.3 lbs approx.) with no expansion. 20 kg approx. (44 lbs approx.) with maximum configuration
Color	Front flap: Silver (RAL 9022) lockable Front Black (RAL 7021)

For detailed mechanical dimensions, visit Kontron’s Customer Section.

When installing the product with the front flat and/or handles there is an increase in the overall depth.

11.7. Compliance

The KISS 4U V4 RPL complies with the relevant requirements and the approximation of the laws relating to the CE Mark certifications and the standards (or later thereof) that are constitutional parts of the declaration.

Table 18: CE Compliance

Europe – CE Mark and UKCA	
Directives	**2014/30/EU** Directive relating to electromagnetic compatibility **2014/35/EU** Directive relating to making available on the market of electrical equipment designed for use within certain voltage limits **2011/65/EU** Directive relating to the restriction of the use of certain hazardous substances in electrical and electronic equipment
EMC	**EN 55032** Electromagnetic compatibility of multimedia equipment- Emission Requirements **EN 61000-3-2** Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) **EN 61000-3-3** Electromagnetic compatibility (EMC) - Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current ≤ 16 A per phase and not subject to conditional connection **EN 55035** Information technology equipment- Immunity characteristics
Safety	**EN 62368-1** Audio/video, information and communication technology equipment - Part 1: Safety requirements

The KISS 4U V4 RPL complies with the relevant requirements and the approximation of the laws relating to the following international certifications

Table 19: International Compliance

USA/CANADA-NRTL MARL	
EMC	**FCC 47 CFR Part 15B and ICES-003** Federal Communications Commission (FCC) rules and regulations regarding unlicensed transmissions
Safety	**UL 62368-1 and CAN/CSA-C22.2 No. 62368-1** Audio/video, information and communication technology equipment - Part 1: Safety requirements

International Certifications	
EMC	**IEC/EN 61000-3-2** Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) **IEC/EN 61000-6-2** Electromagnetic compatibility (EMC) - Part 6-2: Generic standards - Immunity standard for industrial environments **IEC/EN 61000-6-3** Electromagnetic compatibility (EMC) - Part 6-3: Generic standards - Emission standard for equipment in residential environments

International Certifications	
Safety	**IEC 62368-1 (CB Scheme Test Certificate)** Audio/video, information and communication technology equipment - Part 1: Safety requirements

For the product Document of Conformity (DOC), visit the product area within Kontron's Customer Section.

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

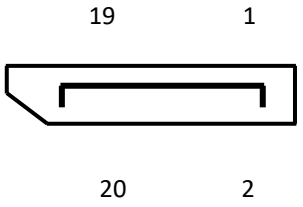
Kontron is not responsible for any radio television interference caused by unauthorized modifications of the delivered product or the substitution or attachment of connecting cables and equipment other than those specified by Kontron. The correction of interference caused by unauthorized modification,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

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

12/ Standard Interfaces- Pin Assignment

12.1. DP++ Port Pin Assignment

Table 20: DP V1.4a Pin Assignment

Pin	Signal Name	Pin	Signal Name	DPP (V1.4) Connector
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 (for HDMI)	
15	AUX+	16	GND	
17	AUX-	18	Hotplug detect	
19	GND (Return)	20	+3.3 V [1]	

[1] Fuse protected

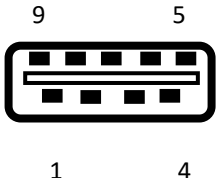
All DP output ports are equivalent and support DP++.

DisplayPort adapters:

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

12.2. USB 3.2 Gen 2/1 Pin Assignment

Table 21: USB 3.2 Gen 1/2 Pin Assignment

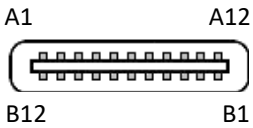
Pin	Signal Name	Pin	Signal Name	USB 3.2 Gen 2 Type A Connector
1	VCC (+5V)[1]	5	USB3_RX-	
2	USB2_D-	6	USB3_RX+	
3	USB2_D+	7	GND	
4	GND	8	USB3_TX-	
		9	USB3_TX+	

[1] fuse protected with a 2 A common fuse, with a max. current of 900 mA per port

USB 3.2 Gen 1/2 ports are backwards compatible with USB 2.0

12.3. USB-C 3.2 Gen 2 Port Pin Assignment

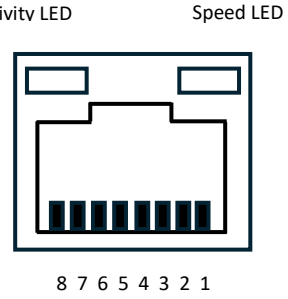
Table 22: USB 3.2 Gen 2 Type C Pin Assignment

Pin-A	Signal Name	Pin-B	Signal Name	USB 3.2 Gen 2-C Type Connector
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

12.4. 2.5 GbE/1.0 GbE Pin Assignment

Table 23: LAN (RJ45) Connector Pin Assignment

Pin	Signal Name (10/100/1000/2500 Mbps)	Signal Name (10/1000 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		Speed LED	
LED Status	Description	LED Status	Description
Green	Link	Off	100 Mb or 10 Mb
Green (blinking)	Activity	Yellow	1.0 GbE
		Green	2.5 GbE

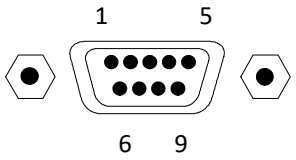
The 2.5 GbE LAN “Activity LED” remains active even if the LAN controller is disabled in the BIOS Setup.

LAN Cabling requirements:

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

12.5. COM Port Pin Assignment

Table 24: RS232 Connector Pin Assignment

Pin	RS232	D89 Connector
1	DCD	
2	RxD	
3	TxD	
4	DTR	
5	GND	
6	DSR	
7	RTS	
8	CTS	
9	RI	

Signal Name	Description
DCD	Data Carrier Detect
RxD+/-	Receive Data receives data from the communications link
TxD+/-	Transmitted Data sends data to the communications link.
DTR	Data Terminal Ready indicates that the on-board UART is ready to establish communication link
GND	Ground Signal
DSR	Data Set Ready, indicates that the modem etc. is ready to establish a communications link
RTS	Request To Send, indicates to the modem etc. that the on-board UART is ready to
CTS	Clear to send
RI	Ring Indicator, indicates that the modem has received a ringing signal from the telephone line

12.6. Audio Jack Connector Pin Assignment (Line-in, Line-out, Mic-in)

Table 25: Audio Jack Pin Assignment

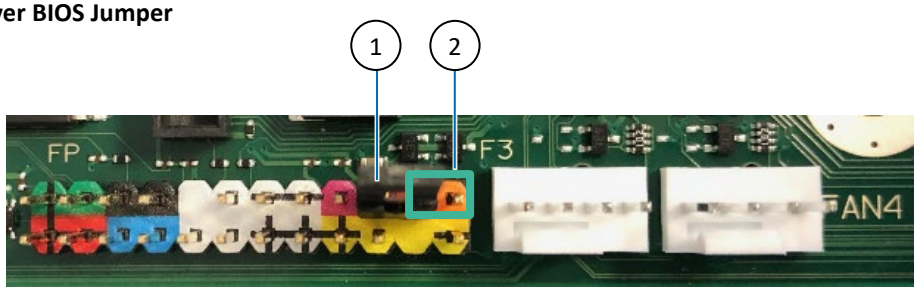
Jack	Position	Signal Name	Description
Blue	Top	Line-in	Line input
Green	Middle	Line-out	Headphone output
Pink	Bottom	Mic-in	Microphone input

12.7. Jumpers

12.7.1. Recover BIOS Jumper

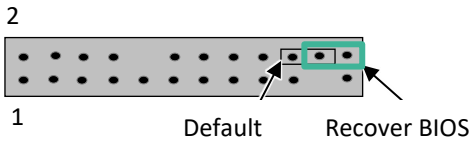
The recover BIOS Jumper is located on the motherboard's front panel header. To recover the BIOS, move the recover BIOS jumper from the default position (Figure 28, pos. 1) to the recover BIOS position (Figure 28, pos. 2) on the front panel header.

Figure 28: Recover BIOS Jumper



1. Default jumper setting
2. Recover position (orange)

Table 26: Recover BIOS Jumper

Pins	State	24-pin Front Panel Header
20-22	Default	
22-24	Recover BIOS	

For further motherboard information, visit the motherboard's homepage K3851-R ATX

13/ Maintenance and Prevention

The KISS 4U V4-RPL requires only minimal maintenance and care to operate correctly. Before removing the cover to maintain the product, switch off the product properly and disconnect the product from the mains power supply.

Energy Hazards - 240 VA present Inside the Chassis!

⚠WARNING

To ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).

Maintenance or repair may only be carried out by Kontron authorized qualified personnel.

Skilled Personnel only

⚠WARNING

Activities requiring internal access must be performed by skilled personnel aware of the associated dangers!

13.1. Cleaning the Product

To clean the product, wipe the product with a soft dry cloth and if required to remove persistent dirt use a soft, damp cloth (only use a mild detergent).

NOTICE

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

13.2. Recovering the BIOS

To recover the BIOS see Chapter 10.6: Recover BIOS, within this user guide's BIOS Chapter, for instruction on how to recover the BIOS and see Chapter 12.7.1: Recover BIOS Jumper, for information regarding the front panel header with the Recover BIOS jumper.

For the latest BIOS updates and BIOS release information for the KISS V4 4U-RPL, visit the motherboard's homepage K3851-R ATX.

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

If you experience any problems after a BIOS flash, try if "Load Optimized Default Values" (F3) in BIOS Setup solves the problem.

13.3. Cleaning or Replacing the Filter Pad

The filter pad can be clean during operation by removing the filter pad door without removing the cover. Clean the filter pad regularly (as often as necessary) to prevent the filter pad from clogging with dust or dirt as this prevents adequate ventilation. How often the product requires cleaning depends on the level of contamination within the operating environment and can therefore not be specified within this user guide.

⚠CAUTION

Filter Pad Cleaning during Operation

The filter pad can be cleaned or replaced by skilled personnel only, aware of the associated dangers during operation.

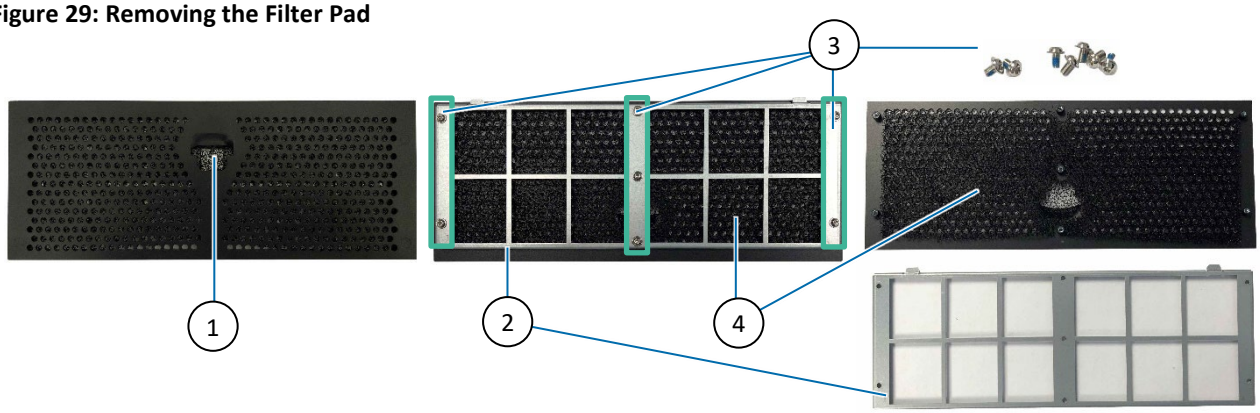
NOTICE

Kontron Filter Pad

To ensure that enough air enters the product, replace the filter pad only with a Kontron filter pad accessory, see Table 2: Accessories and Spares Parts.

No tools are required to remove the filter pad for cleaning. The filter pad door is magnetic and clicks into place requiring no assembly.

Figure 29: Removing the Filter Pad



1. Finger opening
2. Removable rear panel
3. 7x Screws
4. Filter pad

To remove and clean or replace the filter pad, perform the following:

1. Release the filter pad door from the front panel by placing a finger in the finger opening on the filter pad door (Figure 29, pos. 1) and pulling the door away from the front panel.
2. Lie the filter pad door down on a soft ESD mat to avoid scratching.
3. Remove the seven screws (Figure 29, pos. 3) securing the removable rear panel (Figure 29, pos. 2) on the filter pad door.
4. Remove the filter pad (Figure 29, pos. 4) from the filter pad door.
5. Clean the filter pad by performing the following instructions:
   - › Rinse the filter pad in water (up to approx. 40°C/104°F; with a mild commercial detergent or degreaser.).
   - › Alternatively, suction clean the filter pad, or gentle blast the filter pad with warm compressed air.
   - › Do not clean the filter pad with a piercing jet of water.
6. Dry the filter pad by air (do not wring out the filter pad) before inserting the filter pad into the filter pad door.
7. Insert the cleaned filter pad or replacement filter pad into the magnetic filter pad door.
8. Reinstall the filter pad door on the main chassis, the door is magnetic and requires no assembly.

13.4. Replacing the System Fan Assembly

⚠CAUTION

Operation is permitted only with functional fans!

Replace a faulty system fan assembly only with an original Kontron spare part, see Table 2: Accessories and Spares Parts.

⚠CAUTION

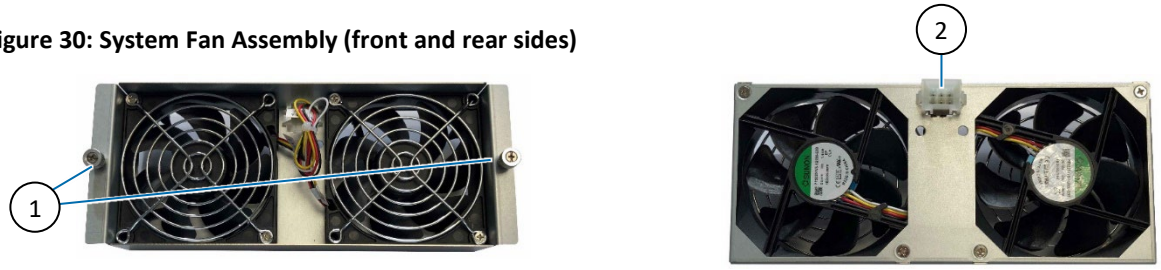
Fan Replacement during Operation

The system fan assembly is hot-swappable, enabling the replacement during operation.

Replace the system fan assembly by skilled persons aware of the associated dangers. When removing and installing the system fan assembly, keep hands and fingers away from rotating fan parts.

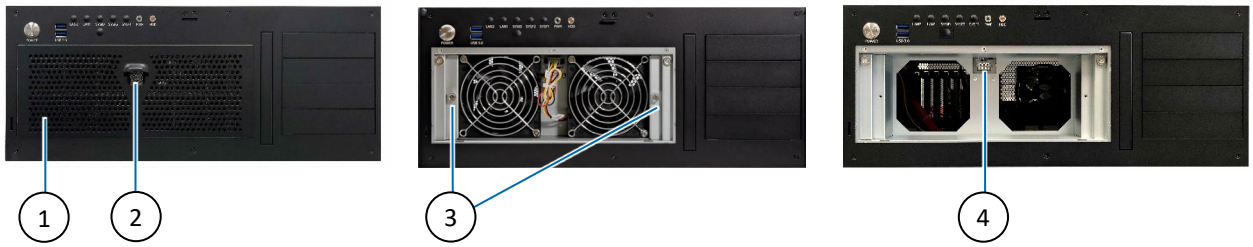
No tools are required to replace the system fans.

Figure 30: System Fan Assembly (front and rear sides)



1. Fan assembly two knurled screws
2. Connector

Figure 31: Removing the System Fan Assembly



1. Filter pad door
2. Finger opening
3. Two knurled screws
4. Internal connector

To replace the factory installed system fan assembly, perform the following:

1. Release the magnetic filter pad door (Figure 31, pos. 1) from the front panel by placing a finger in the finger opening (Figure 31, pos. 2) on the filter pad door and pulling the door away from the front panel.
2. Loosen the two knurled screws (Figure 31, pos. 3) on the fan assembly.
3. Remove the faulty fan assembly by pulling the fan assembly outwards to release the fan assembly connector (Figure 30, pos. 2) from the internal connector (Figure 31, pos. 4) and lifting out of the fan compartment.
4. Replace the fan assembly with a Kontron spare part by inserting the new fan assembly into the fan compartment and pushing the fan assembly connector (Figure 30, pos. 2) carefully on to the internal connector (Figure 31, pos. 4). The internal connector supplies power and control signals to the two fans, and the fans start to operate automatically if the product is switched on.
5. Secure the fan assembly by tightening the two knurled screws (loosen in step 2).
6. Reinstall the filter pad door on the front panel, the door is magnetic and requires no assembly.

13.5. Replacing the Lithium Battery on the Motherboard

Energy Hazards - 240 VA present Inside the Chassis!

⚠WARNING

To ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).

CAUTION: Risk of Explosion

⚠CAUTION

If the lithium battery is replaced by an incorrect type. Dispose of used lithium batteries according to the 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 disposal of batteries).

Figure 32: Lithium Battery (CR2032)

Replace the lithium battery only with the same type of battery or with a type of battery recommended by Kontron.

To replace the factory installed lithium battery (CR2032) on the motherboard, perform the following:

1. Switch off and disconnect the product properly from the mains power supply.
2. Open the cover see Chapter 7.2: Opening and Closing the Cover.
3. Locate the Lithium battery (see Figure 329 and observe the polarity of the battery.
4. Remove the lithium battery from the battery holder by pushing the ejector spring outwards. If required lift out of battery holder using a non-metallic implement.
5. Place the new lithium battery in the battery holder while paying attention to the polarity.
6. Close the cover see Chapter 7.2: Opening and Closing the Cover.

13.6. Replacing a Faulty Redundant PSU Unit

AC Power Cable

⚠WARNING

Only use the AC power cable(s) delivered with product and sufficiently rated for the implemented power supply.

The redundant PSU enables hot swap of faulty PSU units.

Figure 33: Redundant PSU Replacement

If one of the two redundant PSUs fails, the faulty PSU shuts down and the indication LED changes color from green (active) to red (faulty). The functional PSU takes over the full operation of the product until the faulty PSU is replaced.

To replace a failed or faulty redundant PSU unit, perform the following:

1. Locate the faulty PSU (see Figure 33) unit with the illuminated indication LED and consider the fault, see Table 7: Redundant PSU LED Description.
2. Remove the faulty PSU unit's power cable from the socket by pushing the cable holder clip slightly to the side and pulling out the power connector.
3. Remove the faulty PSU unit by pulling out the faulty PSU using the unit's handle.
4. Insert the replacement PSU unit using the unit's handle.
5. Insert the power cable removed in step 2, into the new PSU unit's socket until the cable holder clip clicks to indicate that the cable is firmly in place.
6. Check that the indication LED indicates active operation and not a fault.

13.7. Replacing a M.2 SSD Module on the Motherboard

Energy Hazards - 240 VA present Inside the Chassis!

WARNING

To ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).

Screw Torque

NOTICE

Exceeding the maximum torque may damage the motherboard's nut.

Recommended torque for 0.2 Nm for screw, and 0.3 Nm for the nut.

After installing or removing an SSD drive, memory partitioning may be different and require repartitioning.

Figure 34: M.2 2280 SSDs

To replace a factory installed M.2 SSD module, perform the following:

1. Switch off and disconnect the product properly from the mains power supply.
2. Open the cover, see Chapter 7.2: Opening and Closing the Cover.
3. Locate the M.2 SSD module, there are two possible sockets, on the motherboard (see Figure 34).
4. Release the screw fastening the M.2 SSD module to the motherboard's nut. Retain the screw for later use.
5. Removed the M.2 SSD module by carefully holding the module's sides while pulling the module out of the socket.
6. Insert a new M.2 SSD module by carefully holding the module's sides while pushing the module into the socket at an angle (approx. 30°).
7. Fasten the M.2 SSD module by pushing down on the module's free end until the module's screw hole aligns with the motherboard's nut and secure with the screw removed in step 4. The recommended torque for the M.2 screw is 0.2 Nm, and 0.3 Nm for the nut. Exceeding the maximum torque may damage the motherboard's nut.
8. Close and secure the cover, see Chapter 7.2: Opening and Closing the Cover.

13.8. Replacing a 2.5” SSD in the Dual Drive Mobile Rack

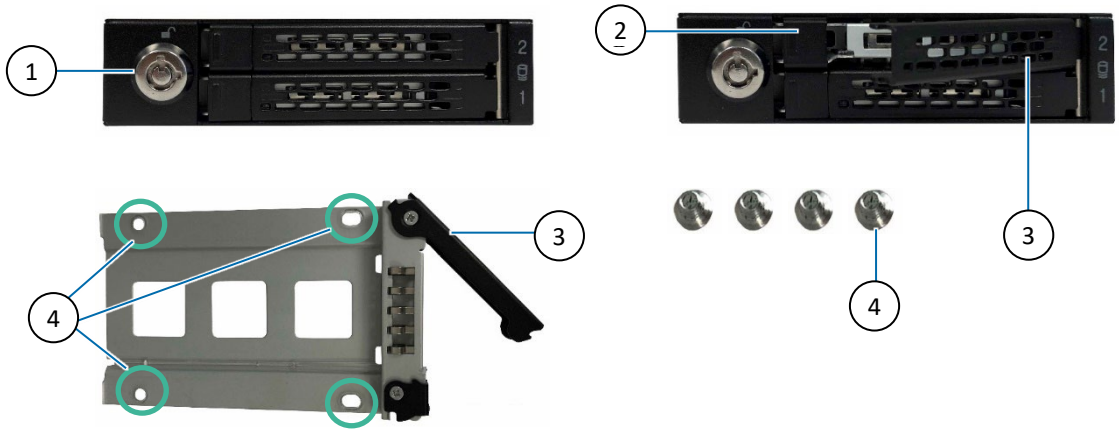
Mobile Rack Lock

Use the Dual 2.5” SSD Mobile Rack Lock to protect against third party unauthorized access to sensitive data stored on the product. The mobile rack key must be kept safe and not be accessible to unauthorized persons.

After installing or removing a 2.5” SSD drive, memory partitioning maybe different and require repartitioning.

The mobile rack support two 2.5” SSD drives up to 9.5 mm in height.

Figure 35: Mobile Rack with Dual 2.5” SSD Drive



1. Mobile rack lock
2. Press to open drive door
3. Drive tray with door and 4 screw openings
4. 4x M3x4 flat head screws

To replace or exchange a 2.5” SSD drive from the dual 2.5” SSD drive mobile rack, perform the following:

1. Switch off and disconnect the product properly from the mains power supply.
2. Unlock the mobile rack using the key provided (Figure 35, see, pos. 1).
3. Press down on the left edge of the drive bay door to release the door (Figure 35, pos. 2) and extract the 2.5” SSD drive tray Figure 35, pos. 3) with drive.
4. Dismantle the drive from the tray by removing the four M3x4 flat head screws on the underside of the drive tray (Figure 35, pos. 4)
5. Attach a new 2.5” SSD drive in the drive tray with the connectors facing the rear side, using the four M3x4 flat head screws removed in step 4.
6. Insert the drive tray with 2.5” SSD facing upwards and the door facing forwards into the empty drive bay. Ensure the drive attaches to the SATA data and SATA power connectors on the drive bays internal connector board.
7. Close the drive bay door by pressing down on the door’s left edge.
8. Lock the mobile rack, the mobile rack key must be kept safe and not be accessible to unauthorized person(s).

13.9. Replacing a Removable 3.5” HDD/2.5” SSD Drive in Drive Bay 1 to 4

After installing or removing a 3.5” HDD or 2.5” SSD drive, memory partitioning maybe different and require repartitioning.

Figure 36: Removable Drive Tray (3.5” HDD/2.5” SSD)

To replace or exchange a factory installed internal 3.5” HDD/2.5” SSD drive from the drive bay, perform the following:

1. Switch off and disconnect the product properly from the mains power supply.
2. Release the drive bay tray, by pressing the blue button (see Figure 36) to release the handle and pull out the tray with installed 3.5” HDD or 2.5” SSD drive.
3. Remove the screws securing the 3.5” HDD or 2.5” SSD to the tray. Retain the screws for later use.
4. Position the new 3.5” HDD or 2.5” SSD drive in the tray and secure with the screws retained in step 3.
5. Slide the tray into the drive bay firmly, to ensure the drive attaches to the SATA data and SATA power connectors on the drive bay’s internal connector board.

13.10. Replacing an Internal 3.5” HDD/2.5” SSD Drive in Drive Bays 1 to 4

Energy Hazards - 240 VA present Inside the Chassis!

WARNING

To ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).

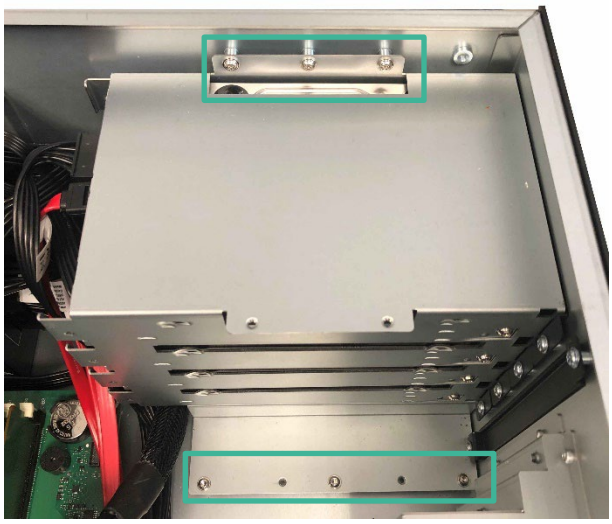
Secure the Drive Bay

NOTICE

When installed with drives the drive bay can be heavy. Always fasten the drive bay securely using all six screws provided.

After installing or removing a SSD drive, memory partitioning may be different and require repartitioning.

Figure 37: Drive Bay 1 to 4



To replace a factory installed internal 3.5” HDD/2.5” SSD drive from the drive bays 1 to 4; the drive bay assembly must be removed. To remove the drive bay assembly, perform the following:

1. Switch off and disconnect the product properly from the mains power supply.
2. Open the cover, see Chapter 7.2: Opening and Closing the Cover.
3. Disconnect the drives SATA data and SATA power cables from all the drives.
4. Remove the drive bay assembly by removing the three side panel screws and the three bottom side screws (see Figure 37). Retain the six screws for later use.
5. Lift the drive bay assembly out of the chassis.
6. Remove the required 3.5” HDD or 2.5” SSD be removing the screws on both sides of the corresponding drive bay. Retain the screws for later use.
7. Insert the new drive 3.5” HDD or 2.5” SSD and secure with the screws removed in step 6.
8. Position the drive bay assembly in the chassis and secure with the six screws removed in step 4.
9. Reconnect the SATA data and SATA power cables disconnected in the previous step 3.
10. Close the cover see Chapter 7.2: Opening and Closing the Cover.

13.11. Replacing a 2.5” SSD Drive in Drive Bay 5 or 6

The drive bays 5 and 6 supports two stacked 2.5” SSD drives in an internal bracket. To replace a 2.5” SSD drive, the internal bracket must be removed from the chassis to unscrew the 2.5” SSD drive from the internal bracket.

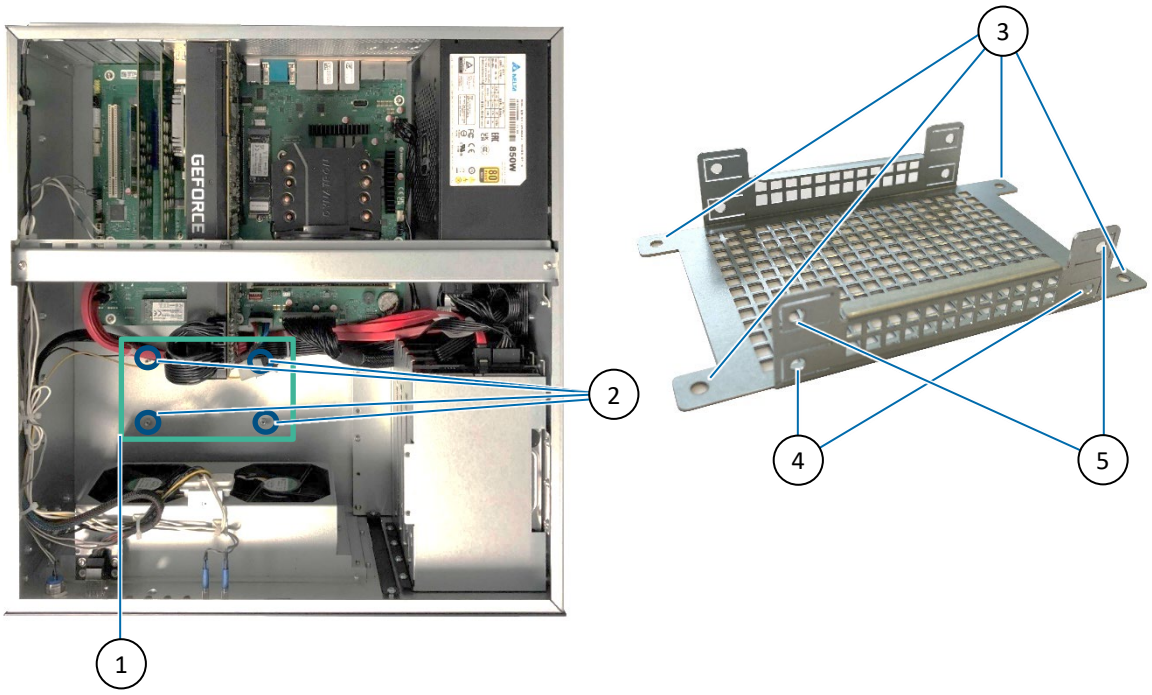
Energy Hazards - 240 VA present Inside the Chassis!

WARNING

To ensure there are no energized internal parts. Switch off the product properly by using the power button on the front panel and disconnecting the power cable(s) from the input power socket(s) or mains power supply socket(s).

After installing or removing an 2.5” SSD drive, memory partitioning may be different and require repartitioning.

Figure 38: Drive Bay 5 & 6 Internal Bracket



1. Drive bays 5&6 location
2. 4x Chassis internal bolts
3. 4x Screw openings internal bracket
4. 4x Screw openings drive bay 5 (L&R internal bracket sides)
5. 4x Screw openings drive bay 6 (L&R internal bracket sides)

To replace a factory installed 2.5” SSD in drive bay 5 and 6, perform the following:

1. Switch off and disconnect the product properly from the mains power supply.
2. Open the cover, see Chapter 7.2: Opening and Closing the Cover.
3. Locate drive bays 5 and 6 in the chassis.
4. Disconnect the SATA data and SATA power cables from the required 2.5” SSD drive(s).
5. Release the four screws securing the internal bracket to the chassis. Retain the screw for later use.
6. Remove the internal bracket by carefully lifting the bracket upwards.
7. Remove the required 2.5” SSD(s) by removing the two screws on both sides of the internal bracket. Retain the screws for later use.
8. Insert the new 2.5” SSD(s) and secure with the screws removed in step 7.

9. Position the internal bracket in the chassis and secure with the four screws removed in step 5.
10. Reconnect the SATA data and SATA power cables disconnected in the previous step 4.
11. Close and secure the cover, see Chapter 7.2: Opening and Closing the Cover.

14/ 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 side.

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

14.1. 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: http://www.kontron.com/support-and-services/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.
3. Send the completed RMA-Request form to the fax or email address given below at Kontron Europe GmbH. Kontron will provide an RMA-Number.
4. Kontron Europe GmbH
   RMA Support
   Phone: +49 (0) 821 4086-0
   Fax: +49 (0) 821 4086 111
   Email: service@kontron.com
5. 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.

6. 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.

15/ Storage and Transportation

15.1. Storage

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

15.2. Transportation

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

16/ 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 CMOS battery, for example. Kontron defines product warranty in accordance with regional warranty definitions. Claims are at Kontron's discretion and limited to the defect being of a material nature.

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

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

16.1. Limitation/Exemption from Warranty Obligation

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

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

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

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

17/ Disposal

17.1. Disposal

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

When disposing of the product

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

17.2. 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.

17.3. Data Sanitization

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

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

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

Data Sanitization

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

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

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

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

Dismantle Removable Memory

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

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

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

Erase Data

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

- Use an accredited third-party software tool, with an audit trail, capable of performing a complete data clean including areas such as hidden data and bad blocks not accessed by general service-based utilities.
- Use the manufacture's data erasure tool or return to factor default command designed to fulfil data sanitization 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 positioned on the rear side.
- Use a third-party destruction company providing certificates for confirmation.

17.4. Erase Disk

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

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

For more information, visit Kontron’s Customer Section.

17.5. Statement of Memory Volatility

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

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

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

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

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

Table 27: Statement of Memory Volatility

Memory Type	Ref. # / Location	Memory Size	Volatility	Retain Data when Power Off	Alterable in Field [2]	Battery Backed Up	Data Type	Write Protected	Emergency Erase	Process to Clear
VCCORE and VCCGT Voltage Regulator controller MP2960	120U00	256 Byte	Non-volatile	Yes	No	No	VR Config.	No	No	NA
VCCIN_AUX Voltage Regulator controller MP2940	140U00	256 Byte	Non-volatile	Yes	No	No	VR Config.	No	No	NA
DDR5 UDIMM	150J00	Up to 32 GB	Volatile	No	Yes	No	User Data	No	No	Disconnect from power
DDR5 UDIMM	151J00	Up to 32 GB	Volatile	No	Yes	No	User Data	No	No	Disconnect from power
DDR5 UDIMM	160J00	Up to 32 GB	Volatile	No	Yes	No	User Data	No	No	Disconnect from power
DDR5 UDIMM	161J00	Up to 32 GB	Volatile	No	Yes	No	User Data	No	No	Disconnect from power

Memory Type	Ref. # / Location	Memory Size	Volatility	Retain Data when Power Off	Alterable in Field [2]	Battery Backed Up	Data Type	Write Protected	Emergency Erase	Process to Clear
Power Sequencing Controller NUC029TAN	360U10	32 KB	Non-volatile	Yes	No	No	PSC Config.	Yes	No	NA (Board will not operate with modified data)
RTC RAM	400U00	256 Byte	Volatile	Yes	Yes	Yes	CMOS RTC	No	No	Perform BIOS update
FLASH SPI	450U50	256 Mbit	Non-volatile	Yes	Yes	No	EFI Boot	Yes (SW)	No	Perform BIOS recovery
Embedded Controller MEC1521	760U10	Code Storage: 480 KB (Code + Data) Data RAM: 32 KB	Non-volatile (Code storage) Volatile (RAM)	Yes	Yes	No	Emb. Controller Config.	Yes	No	Perform EC FW update
EEPROM I2C	764U55	64 Kbit	Non-volatile	Yes	Yes	No	Module ID Data	Yes	No	NA (Device will not operate with modifed data)
Ethernet SPI FLASH	810U81	16 Mbit	Non-volatile	Yes	Yes	No	GbE FW	No	No	NA (Nic will not operate with modified data)
Ethernet SPI FLASH	820U81	16 Mbit	Non-volatile	Yes	Yes	No	GbE FW	No	No	NA (Nic will not operate with modified data)
M.2 2280 SSD[1]	Mother-board M.2 socket	Up to 4 TByte	Non-volatile	Yes	Yes	No	User data	No	No	Remove or use BIOS Erase Disk or 3rd party overwrite tool
3.5”HDD[1]	Drive bay	Up to 12 TByte	Non-volatile	Yes	Yes	No	User data	No	No	Remove or use BIOS Erase Disk or 3rd party overwrite tool
2.5” SSD[1]	Drive bay or Mobile Rack in Drive bay	Up to 4 TByte	Non-volatile	Yes	Yes	No	User data	No	No	Remove or use BIOS Erase disk or 3rd party overwrite tool
DVD (W/R)[1]	Drive bay	CD/DVD is user provided	Non-volatile	Yes	Yes	No	User data	No	No	Remove and destruct

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

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

18/ Cyber Security

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

Security White Paper

For cyber security guidelines to protect your Kontron product from potential cyber security threats, refer the Kontron Security Guideline Whitepaper.

Security Measures

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

18.1. Security Defense Strategy

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

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

Appendix: List of Acronyms

ATX	Advanced Technology eXtended
BIOS	Basic Input Output System
COM	Communication port
CPU	Central Processing Unit
DC	Direct Current
DDR	Double Data Rate
DIMM	Dual Inline Memory Module
DP	DisplayPort
DVD	Digital Video Device
DVI	Digital Video Interface
ECC	Error Checking and Correction
EMC	Electromagnetic Compatibility
ESD	ElectroStatic Dischange
GB	Ground Benign (GB)
GbE	Giga bit Ethernet
HD/HDD	Hard Disk /Drive
IOT	Internet of Things
LAN	Local Area Network
LED	Light-Emitting Diode
LVD	Low Voltage Directive
ATX	Advanced Technology eXtended
OCP	Over Current protection
OS	Operating System
OVP	Over Voltage Protection
PCI	Peripheral Component Interconnect
PCIe	PCI-Express
PICMG®	PCI Industrial Computer Manufacturers Group
PSU	Power Supply Unit
PXE	Pre eXecution Environment
RAM	Random Access memory
REACH	Registration, Evaluation, Authorization and restriction of Chemicals
RMA	Return of Material Authorization
RTC	Real Time Clock
SBC	Single Board Computer

SSH	Secure Shell
TCG	Trusted Computer Group
TFTP	Trivial File Transfer Protocol
TPM	Trusted Platform Module
UDIMM	Unbuffered DIMM
UEFI	Unified Extensible Firmware Interface
USB	Universal Serial Bus
UVP	Under Voltage Protection
WEEE	Waste 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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The Power of IoT