KWS 3000-ADL

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▶ KWS 3000-ADL - USER GUIDE

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

NOTICE This product is not 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/ Editor
1.0	Initial Version	2023-Feb-20	CW
1.1	Removed Ubuntu	2023-Sept-06	CW
1.2	Added 13th Gen Core Intel processors	2023-Oct-06	CW

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Find Kontron contacts by visiting: https://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.

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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.
NOTICE	NOTICE indicates a property damage message.
⚠CAUTION	CAUTION indicates a hazardous situation which, if not avoided, may result in minor or moderate injury.

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

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

	HOT Surface!
	Do NOT touch! Allow to cool before servicing.

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

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

	This symbol precedes helpful hints and tips for daily use.

For Your Safety

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

High Voltage Safety Instructions

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

⚠ CAUTION	**Warning**
	All operations on this product must be carried out by sufficiently skilled personnel only.

⚠ CAUTION	**Electric Shock!**
	Before installing a non hot-swappable Kontron product into a system always ensure that your mains power is switched off. This also applies to the installation of piggybacks. Serious electrical shock hazards can exist during all installation, repair, and maintenance operations on this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing any work on this product.
	Earth ground connection to the product's chassis or a central grounding point shall remain connected. The earth ground cable shall be the last cable to be disconnected or the first cable to be connected when performing installation or removal procedures on this product.

Special Handling and Unpacking Instruction

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

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

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

Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the operator 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 battery.

⚠ CAUTION	Danger of explosion if the battery is replaced incorrectly.
	▶ Replace only with same or equivalent battery type recommended by the manufacturer.
	▶ Dispose of used batteries according to the manufacturer's instructions.

General Instructions on Usage

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

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

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

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

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

Quality and Environmental Management

Kontron aims to deliver reliable high-end products designed and built for quality, and aims to complying with environmental laws, regulations, and other environmentally oriented requirements. For more information regarding Kontron's quality and environmental responsibilities, visit http://www.kontron.com/about-kontron/corporate-responsibility/quality-management.

Disposal and Recycling

Kontron's products are manufactured to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled. Final disposal of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

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 become 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.

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1/ Introduction

This user guide describes the features of the KWS 3000-ADL also known as product within this user guide, and informs operators how to assemble, install, operate and maintain the product properly.

Kontron recommends new operators to take a few minutes to learn about the product's various parts and study the instructions within this user guide before switching on the power.

2/ General Safety Instructions

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

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

▶ The product must be used as specified in the product documentation, in which the instructions for safety for the product and for the operator are described. These contain guidelines for setting up, installation and assembly, maintenance, transport or storage.

▶ The on-site electrical installation must meet the requirements of the country's specific local regulations.

▶ If a power cable comes with the product, only this cable should be used. Do not use an extension cable to connect the product.

▶ To guarantee that sufficient air circulation is available to cool the product, please ensure that the ventilation openings are not covered or blocked. If a filter mat is provided, this should be cleaned regularly. Do not place the product close to heat sources or damp places. Make sure the product is well ventilated.

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

▶ Only products or parts that meet the requirements for Power Source (PS1) of UL/IEC 62368-1 may be connected to the product's available interfaces (I/O).

▶ Before opening the product, make sure that the product is disconnected from the mains.

▶ Switching off the product by its power button does not disconnect it from the mains. Complete disconnection is only possible if the power cable is removed from the wall plug or from the product. Ensure that there is free and easy access to enable disconnection.

▶ The product may only be opened for the insertion or removal of add-on cards (depending on the configuration of the product). This may only be carried out by qualified operators.

▶ If extensions are being carried out, the following must be observed:
   ▶ all effective legal regulations and all technical data are adhered to
   ▶ the power consumption of any add-on card does not exceed the specified limitations
   ▶ the current consumption of the product does not exceed the value stated on the product label

▶ Only original accessories that have been approved by Kontron Europe can be used.

▶ Please note: safe operation is no longer possible when any of the following applies:
   ▶ the product has visible damages or
   ▶ the product is no longer functioning
     In this case the product must be switched off and it must be ensured that the product can no longer be operated.

▶ Handling and operation of the product is permitted only for trained personnel within a work place that is access controlled.

▶ CAUTION: Risk of explosion if the 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. Electrostatic Discharge (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.

2.2. 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.

2.3. Instructions for the Lithium Battery

Due to the tolerances of the installed battery, the effective battery lifetime may be in the range of 4.5 years to 6 years. When replacing the motherboard's lithium battery, observe the instructions described in this user guide.

⚠CAUTION

Danger of explosion when replaced with wrong type of battery
Replace only with the same or equivalent type recommended by the manufacturer.
The lithium battery type must be UL recognized.

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

3/ Compliance

The KWS 3000-ADL complies with the relevant requirements and the approximation of the laws relating to the CE Mark (see Table 1) or CE Radio Equipment Directive (RED) (see Table 2), and the standards that are constitutional parts of the declaration.

Table 1: Compliance CE Mark

Europe – CE Mark	
Directives	2014/30/EU Electromagnetic compatibility 2014/35/EU Voltage limits 2011/65/EU (RoHS) Restriction of the use of certain hazardous substances in electrical and electronic equipment
EMC	EN 55032 / CISPR 32 Electromagnetic compatibility of multimedia equipment- Emission Requirements (CISPR 32: 2015) 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 /CISPR 35 Electromagnetic compatibility of multimedia equipment - Immunity requirements (CISPR 35: 2016, modified)
Safety	EN 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements (IEC 62368-1:2014, modified + Cor.:2015)

Table 2: Compliance CE RED Mark

Europe – CE RED Mark	
Directives	**2014/53/EU** Radio equipment **2011/65/EU** (RoHS) Restriction of the use of certain hazardous substances in electrical and electronic equipment
EMC	**EN 55032 / CISPR 32** Electromagnetic compatibility of multimedia equipment- Emission Requirements (CISPR 32: 2015) **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 /CISPR 35** Electromagnetic compatibility of multimedia equipment - Immunity requirements (CISPR 35: 2016, modified) **ETSI EN 301 489-1 V2.2.3** Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements **ETSI EN 301 489-17 V3.2.4** Electromagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems **ETSI EN 303 446-2 V1.2.1** Electromagnetic Compatibility (EMC) standard for combined and/or integrated radio and non-radio equipment - Part 2: Requirements for equipment intended to be used in industrial locations
Radio	**ETSI EN 300 328 V2.2.2** Wideband transmission systems - Data transmission equipment operating in the 2,4 GHz band - Harmonized Standard for access to radio spectrum
Safety Health and Safety	**EN 62368-1** Audio/video, information and communication technology equipment - Part 1: Safety requirements (IEC 62368-1:2014, modified + Cor.:2015) **EN 62311** Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz) (IEC 62311:2007, modified)

The KWS 3000-ADL complies with the following country specific certifications:

Table 3: Country 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
UK CA (UK Conformity Assessed)	
EMC	EN 55032 / CISPR 32 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 / CISPR 35 Electromagnetic compatibility of multimedia equipment - Immunity requirements
Safety	EN 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements
CB scheme (For International Certifications)	
Safety	IEC 62368-1 Audio/video, information and communication technology equipment - Part 1: Safety requirements

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 user's responsibility.

For additional KWS 3000-ADL conformity information, visit Kontron's Customer Section.

4/ Shipment and Unpacking

4.1. Packaging

All parts of the KWS 3000-ADL 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 product.

4.2. 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.

4.3. Scope of Delivery

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

Table 4: Scope of Delivery

Part	Qty.	Part Description
KWS 3000-ADL	1	KWS 3000-ADL factory configured as ordered
AC power cable	1	AC power cable with corresponding power rating
General Safety instructions	1	General Safety Instructions

4.4. Accessories and Spare Parts

The available parts and accessories for the product are:

Table 5: Accessories and Spares Parts

Part Number	Part Description
1068-5044	Fan with 500 mm (19.69") cable

4.5. Product Identification Type Label

The type label includes the product's electrical specification.

Figure 1: Type Label Example

1	Model Name: KWS 3000-ADL	4	Serial number and bar code
2	Product power rating	5	Compliance
3	Part number and bar code		

5/ Features

The KWS 3000-ADL is a standalone midi tower workstation designed for high performance, and reliability in industrial, medical and energy markets. With a micro ATX industrial motherboard and using the Intel® 12th/13th Generation Core-i™ processor series, the KWS 3000-ADL is highly expandable with storage, power, expansion cards and Wi-Fi configuration variants.

Figure 2: KWS 3000-ADL Series

General features are:

- micro ATX motherboard
- Intel® 12th /13thGeneration Core-i™ processor series
- Intel® Q670E chipset
- Up to 128 GB system memory with DDR5-4800 MHz
- Up to four DP V1.4a displays (optional: VGA extension card)
- Expansion slots:
    - 1x PCIe x16 Gen 5 (16 lanes)
    - 1x PCIe x 1 Gen 3 (open slot)
    - 1x PCIe x16 Gen 4 (4 lanes)
    - 1x PCIe x1 Gen 3 (closed slot)
- Front panel mass storage options with 3.5" HDD/2.5" SSD (removable or fixed internal) and slimline CD/DVD
- Rear Interfaces:
    - 4x USB 3.2 Gen 1
    - 2x USB 3.2 Gen 2
    - 1x USB-C 3.2 Gen 2
    - 4x DP V1.4a @4K
    - 1x RS232 serial port
    - 1x 1 GbE
    - 2x 2.5 GbE
    - 1x audio (Line-in, Line-out, Mic-in)
- Front interfaces:
    - 2x USB 3.2 Gen 1
- Active cooling with internal fans

5.1. Front Panel

The front panel features a power button, two USB 3.2 Gen 1 ports, up to four 3.5" HDD or 2.5" SSD/HDD drive bays (removable or fixed internal), and a slimline DVD/CD drive bay.

Figure 3: Front Panel
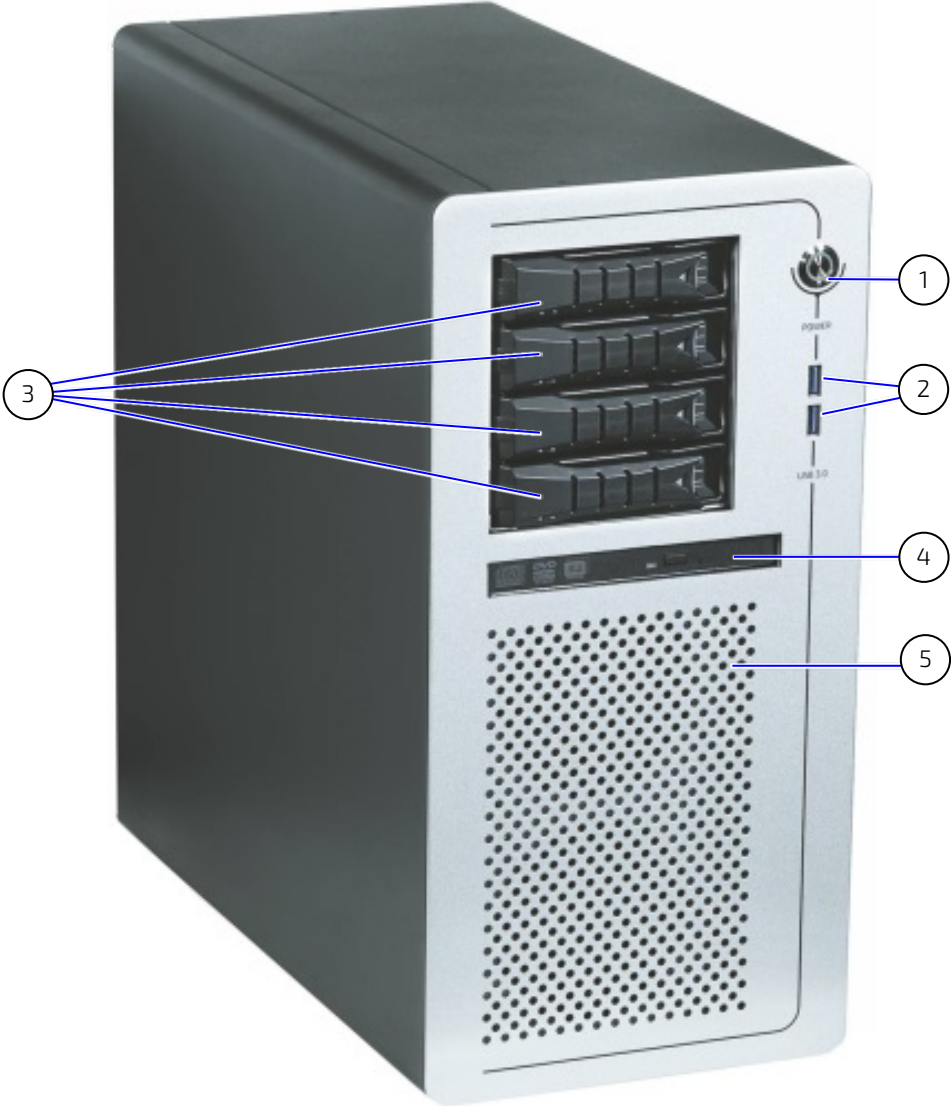
1	Power button	4	1x CD/DVD slimline drive
2	2x USB 3.2 Gen 1	5	Ventilation openings
3	4x Drive bays		

5.1.1. Drive Bays

The front panel varies depending on the specified storage configuration. The four available drive bays may be configured as removable or fixed internal drives. The three standard storage variants are shown in Figure 4: Storage Configurations.

Figure 4: Storage Configurations

▶ Four removable drives
  ▶ RAID 0/1/5/10 possible
▶ One CD/DVD slimline

▶ Two removable drives
  ▶ RAID 0/1 possible
▶ Two fixed internal drives
▶ One CD/DVD slimline

▶ Four fixed internal drives

5.2. Rear Panel

The rear panel features the external interfaces, PCIe expansion card slots and input power socket and power switch.

Figure 5: Rear Panel
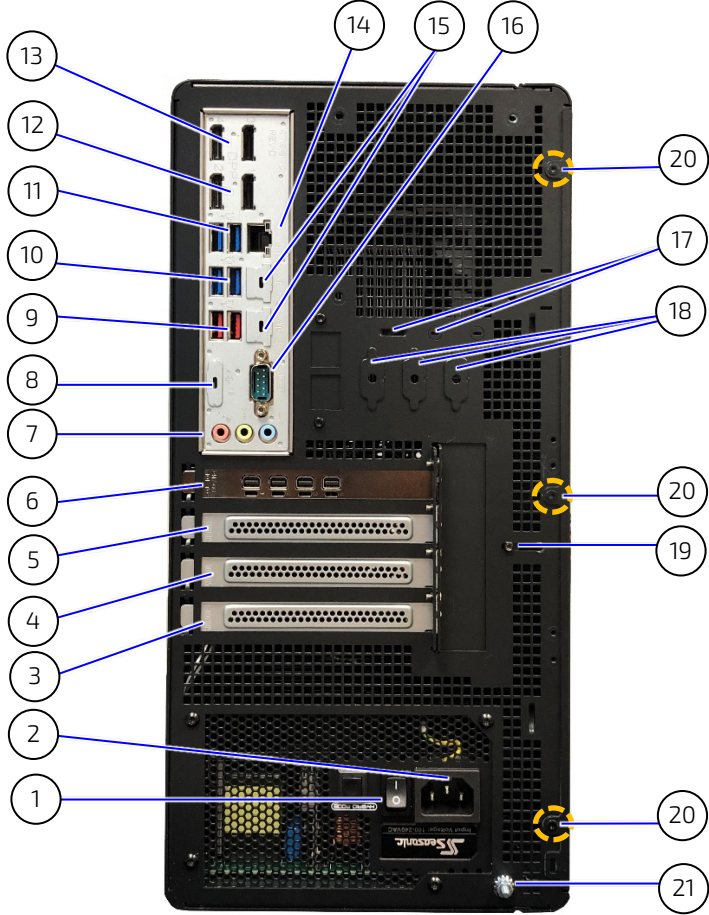
1	1x PSU Power switch	11	2x USB 3. 2 Gen 1
2	1x Input power socket	12	2x DP 1.4a (right DP 1, left DP2)
3	1x PCIe x1 Gen 3 (closed slot)	13	2x DP 1.4a (right DP3, left DP4)
4	1x PCIe x16 Gen 4 (4 lanes)	14	1x 1 GBE (LAN1)
5	1x PCIe x1 Gen 3 (open slot)	15	2x 2.5 GBE (LAN2/LAN3)
6	1x PCIe x16 Gen 5 (16 lanes)	16	1x RS 232 serial port (COM1)
7	1x Audio (Line-in, Line-out, Mic-in)	17	2x Antenna breakouts
8	1x USB-C 3.2 Gen 2 (shown not populated)	18	3x D-Sub 9 breakouts
9	2x USB 3.2 Gen2	19	1x PCIe card bracket screw
10	2x USB 3.2 Gen 1	20	3x Service cover screws
		21	1x Potential equalization stud

5.2.1. USB 3.2

All USB 3.2 connectors provide separate signal lines for USB 3.2 and USB 2.0.

5.2.2. LAN

The 1 GbE i219LM LAN port complies with the IEEE 802.3 specification for 1000BASE-T, 100BASE-TX, 10BASE-T and features:

▶ iAMT features

▶ Wake on LAN

▶ Link Status change and Magic Packets™, PXE support

▶ BIOS MAC address display

▶ Teaming support

The two 2.5 GbE i225LM LAN ports comply with the IEEE 802.3 specification for 2500BASE-T, 1000BASE-T, 100BASE-Tx, 10BASE-TE and feature:

▶ TSN support

▶ Wake on LAN

▶ Link Status change and Magic Packets™

▶ PXE support

▶ BIOS MAC address display

▶ Teaming support

i	Due to an internal bug of the i225 LAN controller, the "Activity LED" of LAN2 and LAN3 are still active even if the LAN controller is disabled in BIOS Setup.

i	If LAN2 AND LAN3 are enabled, shutdown or suspend with Linux this may result in a CAT Error, that is related to the PTM function of the Ethernet controller i225. For more information, contact Kontron Support.

5.2.3. Display Port (DP)

The four DP V1.4a @4K DisplayPort outputs are equivalent and compatible with dual mode display port (DP++) and support a resolution of 4096x2160 @ 60Hz max.

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.

i	DP adapters:
	• DP to HDMI (passive/active)
	• DP to DVI (passive/active)
	• DP to VGA (active)

The display resolution depends on the number of simultaneous displays.

Table 6: Display Resolution

Screen Resolution (max.)	Number of Simultaneous Displays
8k @ 60 Hz High Dynamic Range Video 5k @ 120 Hz High Dynamic Range Video	1
8k @ 60 Hz Standard Dynamic Range Video 5k @ 60 Hz High Dynamic Range Video	2
4k @ 60 Hz High Dynamic Range Video	4

5.2.3.1. Display Output Order

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 7: Display Order Priority.

Table 7: 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

5.2.4. Wi-Fi

The Wi-Fi module features are:

▶ IEEE 802.11ac/a/b/g/n (2T2R) compliant

▶ Interface: PCIe x1

▶ Dual antenna

Figure 6: Wi-Fi Antenna

1	Dual Wi-Fi SMA connectors	2	Dual hinged Wi-Fi antennas

5.2.5. Power Supply (PSU)

The power supply (PSU) options are a single 400 W or 750 W power supply with input voltages of 100 VAC/240 VAC at 60Hz/50Hz frequency. For more information, see Chapter 12.4: Power Specification.

5.2.6. Potential Equalization Stud

The potential equalization stud is not a ground connection. The potential equalization stud ensures that all connected systems share a common potential, even if positioned in a different location.

> **i** The potential equalization stud ensures that all connected systems share a common potential and is not a ground connection!

5.3. Service Cover

The service cover features three screws located on the rear panel used to open and secure the service cover, and a Kensington lock to limit internal access to authorized personnel only. The underside of the service cover features ten metal catches on the front, left and right sides to hold the service cover securely in place.

⚠ **WARNING**	**Energy hazards present** Before removing the service cover, shut down the product properly using the power button, PSU's power switch and by disconnect the power cable from the input power socket or mains power outlet.
⚠ **WARNING**	**Intended used is closed** Use only with a closed and secured service cover, to ensure that operators do not have access to energized internal parts.

Figure 7: Service Cover

1	Service cover	4	10 x Metal catch (front panel)
2	3x Service cover screws	5	10x Metal catch (left and right sides)
3	1x Kensington lock		

5.4. Internal Features

Figure 8: Internal Features
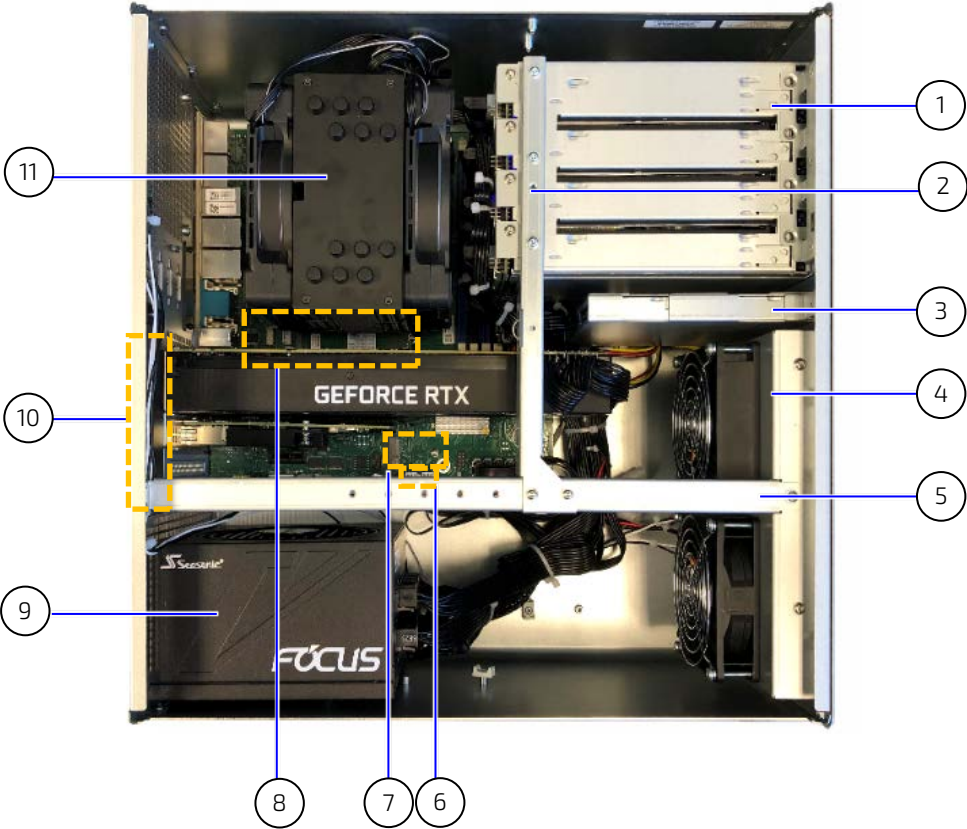
1	4x Drive bay	7	M.2 module location for Wi-Fi
2	Short bracket	8	M.2 module location for SSD memory
3	CD/DVD slimline bay	9	PSU
4	Fan assembly	10	4x PCIe card slots
5	Long bracket	11	Processor with heatsink and fan
6	2x Fan connectors		

⚠ WARNING — **Energy hazards present**

Before removing the service cover, shut down the product properly using the power button, PSU's power switch and by disconnect the power cable from the input power socket or mains power outlet.

ESD Sensitive Device

Electronic components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections. A sudden discharge of electrostatic electricity can destroy static-sensitive devices.

6/ Expansion

6.1. Before Expanding

Before expanding the KWS 3000-ADL with external devices to support additional storage and features, consider the PSU's maximum allowed power consumption.

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

6.2. Drive Bays

The four drive bays (top: drive bay 1 to bottom: drive bay 4) can be populated with front panel removable drives within an internal open drive-cage or fixed internal drives within an internal closed drive-cage. The slimline CD/DVD is location below drive bay 4 and is only front panel accessible. RAID support requires a minimum of two 2.5" SDD/HDD removable drives.

Table 8: Drive Bay [1,2,3,4] Options

Access	Front Panel							Internal				
Type	Removable drive							Fixed drive				
Size	2.5"						3.5"	2.5"				3.5"
SSD/HDD	SSD			HDD			HDD	SSD		HDD		HDD
#Drives	1x	2x	2x	1x	2x	2x	1x	1x	2x	1x	2x	1x
RAID			√			√						
Capacity	256 GB 512 GB 1 TB 2 TB			1 TB			2 TB 4 TB 6 TB 12 TB	256 GB 512 GB 1 TB 2 TB		1TB		2 TB 4 TB 6 TB 12 TB

> All drives are factory installed.

> RAID support requires a minimum of two 2.5" SDD/HDD removable drives.

6.3. PCIe Expansion Cards

The four PCIe slots support Graphics, LAN and RAID controller reference PCIe Gen 3.0 expansion cards. Others expansion options are available on request. For more information, contact Kontron Support.

Table 9: PCIe Expansion Cards Slots [1,2,3,4]

Slot #	PCIe	Connector	Lanes	Comment
1	Gen 5	x 16	16 lanes	
2	Gen 3	x 1		Open slot
3	Gen 4	x 16	4 lanes	
4	Gen 3	x 1		Closed slot

> **i** Before expanding the product, ensure the PSU is able to supply the required total power consumption with all expansion devices, see Chapter 12.4: Power Specification.

> **i** Option: Slot 1 supports bifurcation PCIe x16 or 2x PCIe x8 for a dual slot riser card.

6.4. M.2 SSD Module

The M.2 SSD module populates the M.2 2280 key M socket.

Table 10: M.2 SSD Module Options

Storage Device	Interface	Capacity/Power Consumption			
M.2 SSD 2280 key M	PCIe Gen 3 x4	256 GB / 4 W max.	512 GB / 4.1 W max.	1 TB / 4.7 W max.	2 TB / 4.9 W max.

> **i** The M.2 SSD module is factory installed, due to the M.2 socket's location underneath the PCIe expansion cards.

6.5. M.2 Wi-Fi Module

The M.2 Wi-Fi module populates the M.2 2230 key E socket.

Table 11: M.2 Wi-Fi Module Options

Wi-Fi/Bluetooth Device	Interface	Description
M.2 2230 key E	Wi-Fi: PCIe x1 Bluetooth: USB 2.0	Wi-Fi: IEEE 802.11ac/a/b/g/n (2T2R) Bluetooth: V5.0, V4.2, V4.1, V4.0 LE, V3.0+HS, V2.1+EDR

> **i** The M.2 Wi-Fi module is factory installed, due to the M.2 socket's location underneath the PCIe expansion cards.

7/ Assembly

7.1. Before Opening the Service Cover for Assembly

Before opening the service cover to assemble and handle internal components, observe the safety instructions in Chapter 2/General Safety Instructions and consult the documentation provided by the components manufacturer.
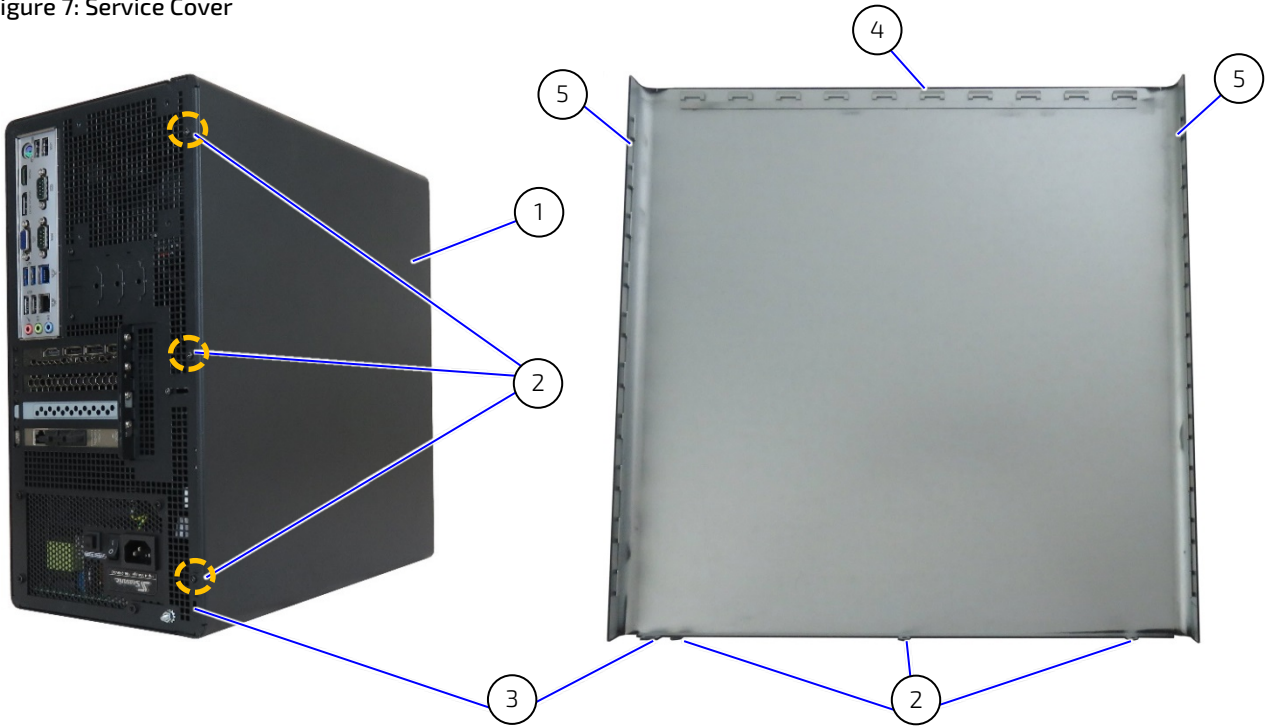
⚠️ **WARNING**	**Energy hazards present** Before removing the service cover, shut down the product properly using the power button, PSU's power switch and by disconnect the power cable from the input power socket or mains power outlet.

	ESD Sensitive Device Electronic components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections. A sudden discharge of electrostatic electricity can destroy static-sensitive devices.

7.2. Opening and Closing the Service Cover

To open the service cover to gain access to internal components, perform the following:

1. Shut down the product properly using the power button, PSU's power switch and disconnect the power cable from the input power socket or mains power outlet.

2. Remove the three service cover screws (screwdriver: torque 10) on the rear panel, and retain for later use.

3. Slide the service cover away from the front panel by approximately 20 mm to release the metal catches on the underside of the service cover from the front panel's internal plate and the left and right sides of the chassis.

4. Lift the service cover upwards to remove.

Figure 9: Removing the Service Cover
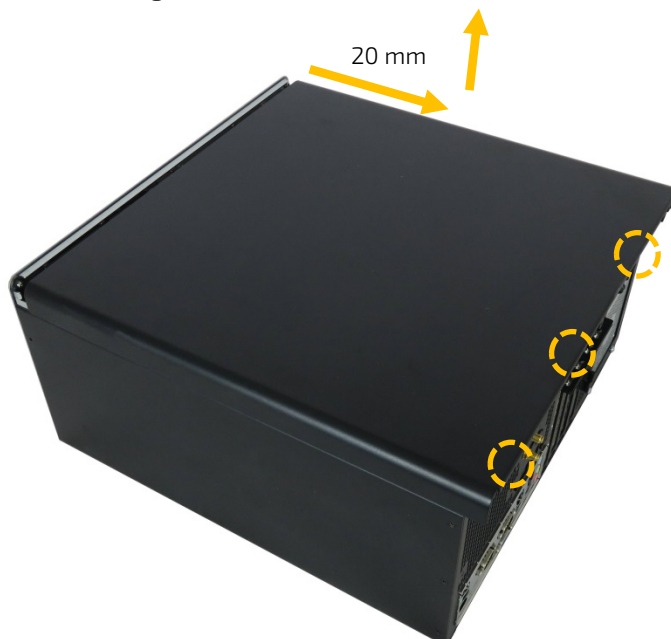
To close and secure the service cover, perform the following:

1. Position the service cover above the main chassis approximately 20 mm away from the front panel.

2. Lower the service cover to rest on the main chassis.

3. Slide the service cover carefully towards the front panel until the metal catches on the service cover's front side connect with the front panel's internal plate.

4. Secure the service cover on the rear panel using the three screws retained in the previous step 2.

7.2.1. Installing and Removing PCIe Cards

Before installing a PCIe expansion card consider the available PCIe slots, interfaces and the PCIe cards space requirements, see Table 9: PCIe Expansion Cards Slots [1,2,3,4].

Installing or removing a PCIe card may require the removal of the internal short and/or long brackets. The short and long brackets are required for chassis stability and if removed they must be re-installed in the original positions.

NOTICE	For chassis stability, before removing either the short and/or long bracket, observe the short and long bracket's positions; re-install and fasten only in the original position.

i	Kontron recommends the use of Kontron reference PCIe cards only.

To install a PCIe expansion card, perform the following:

1. Shut down the product properly using power button, PSU power switch and disconnect the power cable from the input power socket or mains power outlet

2. Open the service cover, see Chapter 7.2: Opening and Closing the Service Cover.

3. If the PCIe card's length requires removal of the short bracket, before removing the short bracket, note the screw holes used to fasten the short bracket to the long bracket.

4. Remove the two screws securing the short bracket to the long bracket and the three screws securing the short bracket on the drive-cage, as shown in Figure 10. Retain the screws for later use.

Figure 10: PCIe Cards and Short Bracket

Figure 11: PCIe Card Slots
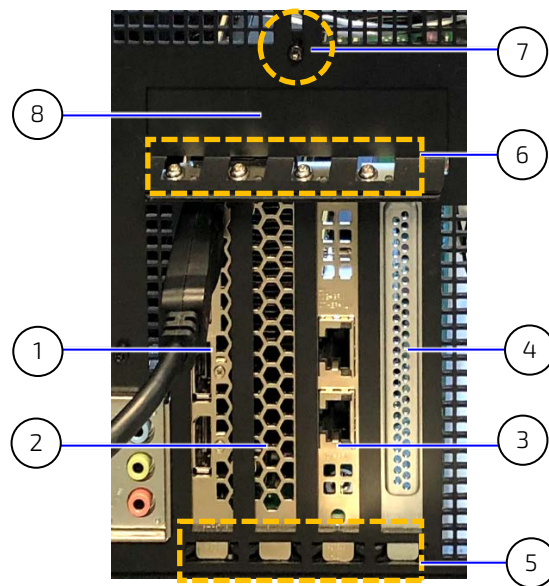
1	Slot 1 (PCIe x16 Gen 5)	5	4x PCIe card bracket latches
2	Slot 2 (PCIe x1 Gen 3)	6	4x PCIe card bracket screws
3	Slot 3 (PCIe x16 Gen 4)	7	1x Holding bracket screw
4	Slot 4 (PCIe x1 Gen 3)	8	1x Holding bracket

5. Remove the blank slot bracket by loosening the holding bracket screw (Figure 11, pos. 7) and moving the holding bracket (Figure 11, pos. 8) upwards. Then remove the blank slot bracket's screw that corresponds to the required motherboard PCIe slot, (Figure 11, pos. 6) and lift the blank slot bracket out of the latch (Figure 11, pos. 5). Retain the blank slot bracket with screw for later use.

6. Insert the PCIe card carefully into the corresponding motherboard PCIe slot while simultaneously positioning the PCIe card's bracket into the designated latch (Figure 11, pos. 5).

7. Secure the PCIe card with screw (Figure 11, pos. 6); and move the holding bracket downwards (Figure 11, pos. 8) and secure with the holding bracket screw (Figure 11, pos. 7).

8. Re-install the short bracket in the original position with the screws retained in step 4. Ensure that the foam strip on the underside of the short bracket holds any installed PCIe card(s) securely.

9. Close and secure the service cover, see Chapter 7.2: Opening and Closing the Service Cover

To remove a PCIe expansion card, perform the following:

1. Shut down the product properly using power button, PSU switch and disconnect the power cable from the input power socket or mains power outlet

2. Open the service cover, see Chapter 7.2: Opening and Closing the Service Cover.

3. If the PCIe card's length requires removal of the short bracket, before removing the short bracket note the screw holes used to fasten the short bracket to the long bracket.

4. Remove the two screws securing the short bracket to the long bracket and the three screws securing the short bracket on the drive-cage, as shown in Figure 10. Retain the screws for later use.
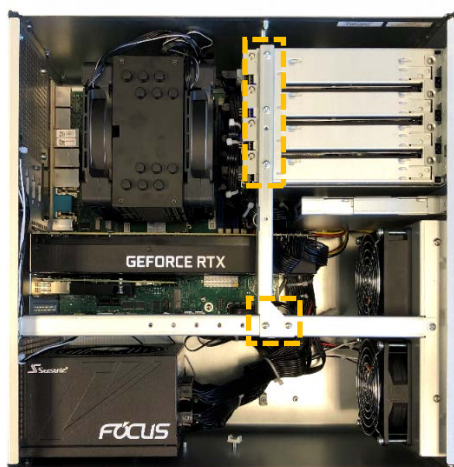
5. Loosen the holding bracket screw (Figure 11, pos. 7) and move the holding bracket upwards (Figure 11, pos. 8). Then remove the PCIe card's bracket screw (Figure 11, pos. 6). Retain the screw for later use.

6. Remove the PCIe card carefully by pulling the PCIe card out of the motherboard PCIe slot and the corresponding PCIe card's bracket latch (Figure 11, pos. 5).

7. Insert a blank slot bracket into the empty PCIe card slot's latch on the rear side of the chassis and secure with screw (Figure 11, pos. 6).

8. Re-install the short bracket in the original position with the screws retained in step 4. Ensure that the foam strip on the underside of the short bracket holds any installed PCI card(s) securely.

9. Close and secure the service cover, see Chapter 7.2: Opening and Closing the Service Cover.

> **i**   Always install a blank slot bracket in an unpopulated rear panel PCIe slot.

7.2.2. Installing and Removing M.2 Modules

Figure 12: M.2 Modules Sockets
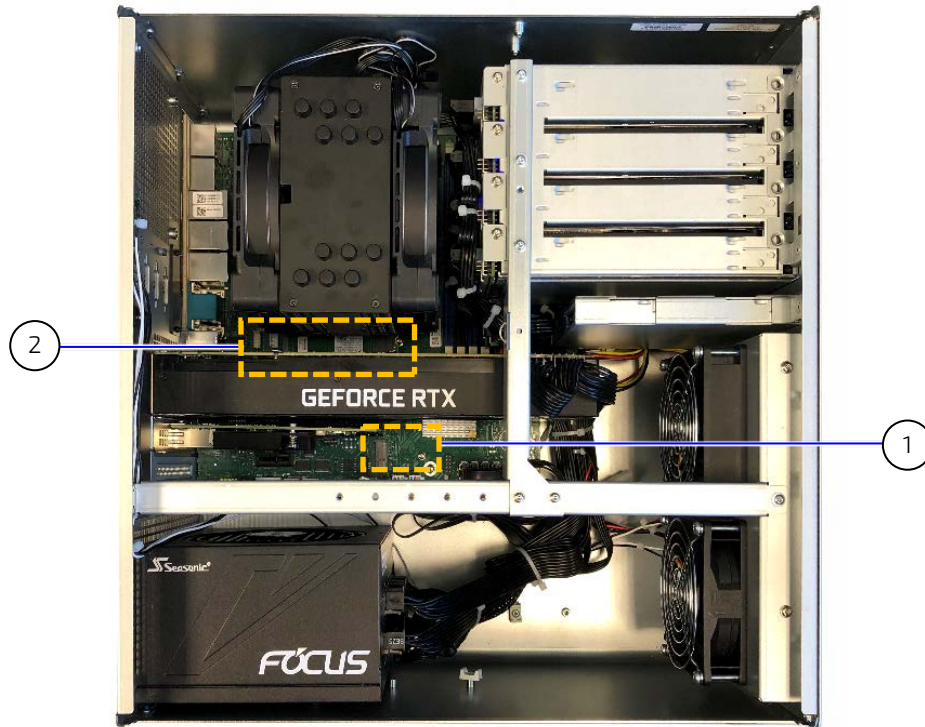
| 1 | M.2 Wi-Fi module | 2 | M.2 SSD module |

NOTICE The recommended torque when fastening the M.2 screw is 0.2 Nm, and 0.3 Nm for the nut. Exceeding the maximum torque, may damage the motherboard's solder nuts.

---

i Due to the M.2 sockets location underneath the PCIe expansion cards, the M.2 modules are factory installed. To remove or replace the M.2 module may require the removal of one or more PCIe expansion cards.

---

i Kontron recommends the use of Kontron reference M.2 Modules only.

To remove a M.2 module, perform the following:

1. Shut down the product properly using power button, PSU power switch and disconnect the power cable from the input power socket or mains power outlet

2. Open the service cover, see Chapter 7.2: Opening and Closing the Service Cover.

3. Locate the corresponding M.2 module, see Figure 12. If the location of the M.2 module requires the removal of a PCIe card to enable access to the M.2 module, see Chapter 7.2.1: Installing and Removing PCIe Cards.

4. Release the screw fastening the M.2 module to the motherboard. Retain the screw for later user.

5. Removed the M.2 module by carefully holding the sides while pulling the M.2 module out of the socket. Retain the M.2 module with screw for later use.

6. Re-install any PCIe cards removed in step 3 and see Chapter 7.2.1: Installing and Removing PCIe Cards.

7. Close and secure the service cover, see Chapter 7.2: Opening and Closing the Service Cover.

To insert a M.2 module, perform the following:

1. Shut down the product properly using power button, PSU power switch and disconnect the power cable from the input power socket or mains power outlet

2. Open the service cover, see Chapter 7.2: Opening and Closing the Service Cover.

3. Locate the corresponding M.2 socket see Figure 12. If the M.2 socket is under a PCIe card, see Chapter 7.2.1: Installing and Removing PCIe Cards.

4. Insert the new M.2 module into the socket at an angle (approx. 30°). If required move the M.2 module slightly from side to side to ease the module carefully into the socket.

5. Fasten the M.2 module by pushing down on the M.2 module's free end until the M.2 module's screw hole aligns with the screw hole on the motherboard and fasten the screw to secure the M.2 module.

6. Re-install any PCIe cards removed in step 3 and see Chapter 7.2.1: Installing and Removing PCIe Cards.

7. Close and secure the service cover, see Chapter 7.2: Opening and Closing the Service Cover.

NOTICE	The recommended torque when fastening the M.2 screw is 0.2 Nm, and 0.3 Nm for the nut. Exceeding the maximum torque, may damage the motherboard's solder nuts.

8/ Installing

8.1. Before Installing

Before installing, the KWS 3000-ADL in the operating environment ensure that the operating environment meets the specification stated within this user guide. Due to possible access restrictions in the operating environment, Kontron recommends installing all expansion cards and peripherals before installing the product in the operating environment.

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

> **⚠CAUTION**   Ensure Sufficient Airflow.
>
> Operate only in a well-ventilated environment that does not prevent the product from drawing in air at the front and exhausting air at the rear.

8.2. Installing

The KWS 3000-ADL is a standalone upright tower workstation, with four installed chassis feet and has no installation requirements.

9/ Thermal Management

The KWS-3000-ADL is thermally managed using two system fans, additional critical component and sufficient ventilation openings to actively cool the product.

9.1. Active Cooling

Two easily replaceable system fans behind the front panel force air to flow from the front to the back. Additionally, the processor and high performance expansion cards have integrated cooling solutions or are equipped with corresponding cooling devices that help to maintain the ambient temperature.

Replacing a defective fan only with an original fan, see Table 5: Accessories and Spares Parts.

⚠CAUTION	Operation is permitted only with functional fans! Replace a defective fan only with an original fan.

9.2. Minimum Thermal Clearance

To guarantee that sufficient air flows from the front to the back, ensure that ventilation openings are not covered or blocked by surrounding parts.

⚠CAUTION	Ensure Sufficient Airflow.
	Operate only in a well-ventilated environment that does not prevent the product from drawing in air at the front and exhausting air at the rear.

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

9.3. Third Party Components

Use of third party components, such as expansion cards, increases the air temperature inside the chassis. The air temperature in the chassis is higher than the ambient air temperature around the product.

10/ Starting Up

10.1. Before Starting Up

Before connecting the KWS-3000-ADL to power and starting up, read the instructions in this user guide and observe the safety instructions in Chapter2/: General Safety Instructions.

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

⚠ WARNING	Operate only using a grounded mains power supply socket and a power cable in perfect condition with no visible damage.

⚠ CAUTION	Operation is permitted only with functional fans! Replace a defective fan only with an original fan.

⚠ CAUTION	When connecting I/O cables follow proper cabling procedures and ensure that power is the last cable to be connected.

10.2. Starting Up

To start the product, perform the following:

1. Connect the supplied AC power cable to the input power socket and to the mains power outlet.

2. Press the PSU power switch (Figure 5, pos. 1) to position [1].

3. Press the power button on the front panel. The power button illuminates blue to indicate the power-on state.

NOTICE	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!

10.3. Operating System (OS) and Drivers

The product is pre-installed with OS and relevant drivers and operational when switched on for the first time.

If ordered without pre-installed OS, before starting the product, install the OS and relevant drivers for the installed hardware. Consider the hardware manufacturer's specifications for the OS.

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

11/ BIOS

The KWS 3000-ADL uses the uEFI BIOS supported by the motherboard. This chapter inform operators how to start the BIOS, use the BIOS setup to configure, and perform a BIOS update.

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

11.1. Starting the BIOS

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

1. Start-up the product.

2. Wait until the first characters appear during the Power On Self-Test (POST) messages or splash screen.

3. Press the <DEL> or <F2> keys during the POST.

4. If the BIOS is password protected, enter the User Password or Supervisor Password, and press <RETURN> to start the BIOS.

5. The BIOS displays the Main setup menu.

> **i** If the <DEL> or <F2> key is not pressed the POST continues with the test routines.

11.2. BIOS Setup Menus

The uEFI BIOS comes with a setup program that provides quick and easy access to the individual function settings for control or modification of the BIOS configuration. The setup program allows for access to various menus that provide functions or access to sub-menus with further specific functions. At the top of the displayed BIOS screen is the menu bar to the setup menus:

▶ Main
▶ Advanced
▶ H/W Monitor
▶ Security
▶ Boot
▶ Exit

To navigate between the setup menus use the BIOS navigation keys described in Chapter 11.3: BIOS Navigation.

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

11.3. 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.

For a list of the navigation hot keys in the legend bar, see Table 12: Navigation Hot Keys in the Legend Bar.

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

11.4. 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.

11.4.1. Before Updating the BIOS

Before updating the BIOS, make a backup of the current BIOS setting.

11.4.2. Updating the BIOS

To check if a BIOS update is available, visit Kontron's Customer Section website. During a BIOS update, do not switch off, reset or interrupt the process. If interrupted, the BIOS update process must be restarted.

> For BIOS Update, visit Kontron's Customer Section.

12/   Technical Specifications

12.1. Block Diagram

Figure 13: Block Diagram KWS 3000-ADL

KWS 3000-ADL

	Motherboard K3841-Q Micro ATX	
1/2 x 2.5" SSD/HDD or 1x 3.5" HDD		4x DPP 1.4
1/2 x 2.5" SSD/HDD or 1x 3.5" HDD	USB 3.2 Gen1	1 GbE
1/2 x 2.5" SSD/HDD or 1x 3.5" HDD	USB 3.2 Gen1	2.5 GbE
1/2 x 2.5" SSD/HDD or 1x 3.5" HDD	USB 3.2 Gen2	2.5 GbE
1x Slimline CD/DVD	USB-C 3.2 Gen2	1x COM1 RS232

- Power Switch
- 2x USB 3.2 Gen 1
- M.2 2230 E Key Wi-Fi/ Bluetooth
- 1x Line-in, Line- out, Mic
- Wi-Fi Antenna breakouts
- 3x D-Sub breakouts
- PCIE x16
- PCIE x1 (open)
- M.2 2280 Key M SSD
- PCIE x16
- PCIE x1 (closed)
- 2x System Fans
- Power Supply (400 W / 750 W)

Legend

External or Internal Drives	External Controls /LEDs	Internal Components	External Connectors	PCIe/PCI Slots	Internal slots

12.2. Hardware Specification

Table 13: Hardware Specification

Product		KWS 3000-ADL				
Motherboard	Type	K3841-Q micro ATX				
	Processor	Intel® 12th/13th Gen Core™ processor series				
		Processors	Cores	Base Freq.	Turbo Freq.	Base Power
		i9-12900E	16	2.3 GHz	5.0 GHz max.	65 W
		i7-12700E	12	2.10 GHz	4.80 GHz max.	65 W
		i5-12500E	6	2.9 GHz	4.50 GHz max.	65 W
		i3-12100E	4	3.20 GHz	4.20 GHz max.	60 W
		i9-13900E	24	1.8 GHz	5.2 GHz max.	65 W
		i7-13700E	16	1.9 GHz	5.1 GHz max.	65 W
		i5-13500E	14	2.4 GHz	4.6 GHz max.	65 W
		i3-13100E	4	3.3 GHz	4.4 GHz max.	65 W
	Chipset	Intel® Q670 Express				
	Memory	128 GByte max. (with 16 GByte (2x 8 GByte), 32 GByte (2x 16 GByte), 64 GByte (4x 16 GByte) and 128 GByte (4x 32 GByte) 4x DIMM sockets DDR5-4800 Dual Channel, unbuffered, non ECC Max Memory speed according to intel spec: ▶ 1x DIMM per channel = DDR5-4400 ▶ 2x DIMM per channel(single rank) = DDR5-4000 ▶ 2x DIMM per channel (dual rank) = DDR5-3600				
	Graphics	Intel® UHD Graphics 7xx (depends on the installed processor)				
	Security	TPM V2.0 (integrated)				
Front I/O	USB	2x USB 3.2 Gen 1				
Rear I/O	USB	1x USB-C 3.2 Gen 2 2x USB 3.2 Gen 2 4x USB 3.1 Gen1				
	LAN	1x 1 GbE (10/100/1000 Mbps) 1x 2.5 GbE (10/100/1000/2500 Mbps)				
	Displays	4x DP V1.4a @4K Resolution: 4096x2160 @ 60Hz max. supporting up to four displays				
	Audio	Line-in, Line-out, Mic-in				
	Serial Port	2x COM (RS 232)				
Expansion	PCIe Gen 3 Cards	Slot 1	PCIe x16, Gen 5 (16 lanes)			
		Slot 2	PCIe x 1 Gen 3 (open slot)			
		Slot 3	PCIe x16 Gen 4 (4 lanes)			
		Slot 4	PCIe x1 Gen 3 (Closed slot)			
	M.2 Module (Wi-Fi)	1x 2230 Key E Interface: PCIe x1 / Wi-Fi IEEE: 802.11ac/a/b/g/n (2T2R) Interface: USB 2.0 / Bluetooth: V5.0, V4.2, V4.1, V4.0 LE, V3.0+HS, V2.1+EDR				

Product		KWS 3000-ADL
Storage	Drive Bays	1x 3.5" HDD or 1/2x 2.5" HDD/SSD (RAID, removable or fixed)
		1x 3.5" HDD or 1/2x 2.5" HDD/SSD (RAID, removable or fixed)
		1x 3.5" HDD or 1/2x 2.5"HDD/SSD (RAID, removable or fixed))
		1x 3.5" HDD or 1/2x 2.5"HDD/SSD (RAID, removable or fixed)
		1x DVD/CD slimline
	M.2 Module (SSD)	1x 2280 Key M Interface: PCIe x4, NVME module
Cooling	System Fans	2x Fans (behind front panel)
	Internal Fans	1x PSU (integrated in PSU) 1x Processor (heatsink with fan) Up to 4 Expansion cards (Integrated fans)

12.3. Software Specification

Table 14: Software Specification

Software	Description
BIOS	AMI SPI 256 Mbit
Operating System	Windows 10, 64 bit
Drivers	Necessary drivers provided by the 3rd party device supplier

> **i** UEFI only! No legacy support and no Master Boot Repair (MBR) installation.

12.4. Power Specification

The KWS 3000-ADL's electrical specification is available on the product's type label (see Figure 1, pos.2).

Table 15: Electrical Specification

Power	Description
PSU Type	AC/DC
Output Power	400 W single or 750 W single
Input Voltage	100 VAC to 240 VAC (60Hz to 50 Hz)
Input Current	6 A to 3 A

> **NOTICE** Do not disconnect the power from your product while the product is in the powered on state! Performing a forced shutdown can lead to loss of data or other undesirable effects!

12.5. Environmental Specification

Table 16: Environmental Specification

Environment		Description
Temperature	Operating	0°C to +45 °C (32°F to 113°F)
	Non-operating	-25°C to +70°C (-13°F to 158°F)
Relative Humidity	Operating	93 % @ 40° C /(104°F), non-condensing
	Non-operating	
Altitude	Operating	5,000 m max. with 750 W power supply (16400 ft. max.)
		2,000 m max. with 400 W power supply (6560 ft. max.)
Shock (according to IEC 60068-2-27)	Operating	10 g, 11 ms, half sine
	Non-operating	20 g, 11 ms, half sine
Vibration (according to IEC 60068-2-6)	Operating	10 – 150 Hz, 0.5 g /3 axis
	Non-operating	10 – 150 Hz, 1.0 g/3 axis

12.6. Mechanical Specification

The main chassis is the same for all product variants, only the front panel varies depending on the drive bay configuration.

Table 17: Mechanical Specification

Mechanics	Description
Dimensions (Width, Depth, Height)	190 mm x 380 mm x 380 mm (7.48" x 14.96" x 14.96")
Material	Front panel Aluminum Main chassis: Hot-dip zinc coated cold-rolled steel sheet 1.2 mm max. (0.05" max)
Weight	13 kg (approx.) (28.66 lbs.)
Color	Front: RAL 9022 Main Chassis: RAL 7021

13/ Standard Interfaces – Pin Assignments

13.1. Connectors

> [i] Low-active signals are indicated by a minus sign.

13.1.1. USB-C 3.2 Gen 2 Port Pin Assignment

Table 18: USB 3.2 Gen 2 Type C Pin Assignment

Pin-A	Signal Name	Pin-B	Signal Name	USB-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

13.1.2. USB 3.2 Gen 2 / USB 3.2 Gen 1 Port Pin Assignment

All USB3 connectors provide separate signal lines for USB3.2 and USB2.0.

Table 19: USB Type A Pin Assignment

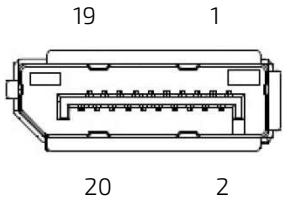| Pin	Signal Name	Pin	Signal Name	USB 3.1 Type A Connector
1	VCC (+5V)[1]	5	USB3_RX-	
2	USB2_Data-	6	USB3_RX+	
3	USB2_Date+	7	GND	
4	GND	8	USB3_TX-	
		9	USB3_TX+	

[1] fuse protected

> [i] All fused ports provide max. 500mA (USB 2.0) resp. 900mA (USB 3.2 Gen1/Gen2) for each port.

13.1.3. 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: DPP1/DPP2: Common PTC fuse (1500mA); DPP3/DPP4: Common PTC fuse (1500mA)

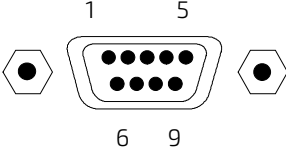i All DP output ports are equivalent.

i Display Port adapters:
- DP to HDMI (passive / active)
- DP to DVI (passive / active)
- DP to VGA (active)

13.1.4. COM Port Pin Assignment

Table 21: RS232 Connector Pin Assignment

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

13.1.5. Audio Jack Connector Pin Assignment

Table 22: Audio Jack (Line-in, Line-out, Mic-in) Pin Assignment

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

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

13.1.6. 2.5 GBE/1 GBE Pin Assignment
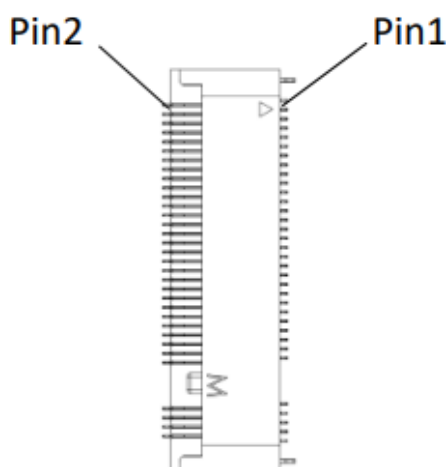
Table 23: LAN (RJ45) Connector Pin Assignment

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

Link/Activity LED		Speed LED	
LED Status	Description	LED Status	Description
Green	Link	Green	2.5 GBE
Green Flashing	Activity	Yellow	1 GBE
		Off	10/100 Mbps

13.1.7. M.2 Key M (NVME SSD) Socket Pin Assignment

Table 24: M.2 Key M Socket Pin Assignment

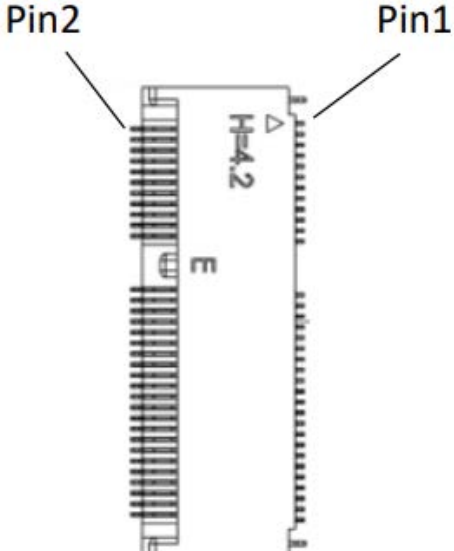| Pin	Signal Name	Pin	Signal Name	M.2 Key M
1	GND	2	+3.3V	
3	GND	4	+3.3V	
5	PCIe RX 3–	6	NC	
7	PCIe RX 3+	8	NC	
9	GND	10	LED SSD	
11	PCIe TX 3–	12	+3.3V	
13	PCIe TX 3+	14	+3.3V	
15	GND	16	+3.3V	
17	PCIe RX 2–	18	+3.3V	
19	PCIe RX 2+	20	NC	
21	GND	22	NC	
23	PCIe TX 2–	24	NC	
25	PCIe TX 2+	26	NC	
27	GND	28	NC	
29	PCIe RX 1–	30	NC	
31	PCIe RX 1+	32	NC	
33	GND	34	NC	
35	PCIe TX 1–	36	NC	
37	PCIe TX 1+	38	NC	
39	GND	40	NC	
41	PCIe RX 0–	42	NC	
43	PCIe RX 0+	44	NC	
45	GND	46	NC	
47	PCIe TX 0–	48	NC	
49	PCIe TX 0+	50	PERST#	
51	GND	52	CLKREQ#	
53	REFCLK–	54	(reserved)	
55	REFCLK+	56	NC	
57	GND	58	NC	
59-65	**Key M (no pin)**	60-66	**Key M (no pin)**	
67	NC	68	NC	
69	NC	70	+3.3V	
71	GND	72	+3.3V	
73	GND	74	+3.3	
75	GND			

Supports PCIe x4 (Gen4) for NVME SSD modules, with mechanical support for 2230, 2242, and 2280 modules. SATA mode is not supported!

13.1.8. M.2 Key E (Wi-Fi/Bluetooth) Socket Pin Assignment

Table 25: M.2 Key E Socket Pin Assignment

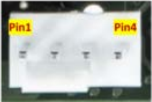| Pin	Signal Name	Pin	Signal Name	M.2 Key M
1	GND	2	P3V3P_STBY	
3	USB Data +	4	P3V3P_STBY	
5	USB Data -	6	N.C.	
7	GND	8	N.C.	
9	SDIO_CLK	10	RST_CNV_RF_X_L	
11	SDIO_CMD	12	N.C.	
13	SDIO_Data0	14	REQ_CLK_M2E_MODEM_X_L	
15	SDIO_Data1	16	N.C.	
17	SDIO_Data2	18	GND	
19	SDIO_Data3	20	NC	
21	SDIO_Wake#	22	CNV_BRI_RSP	
23	SDIO_Reset#	24-30	**Key E (no pin)**	
25-31	**Key E (no pin)**	32	CNV_RGI_DT	
33	GND	34	CNV_RGI_RSP	
35	PET0_P	36	CNV_BRI_DT_R	
37	PET0_N	38	CLINK_RST_PCH_L	
39	GND	40	CLINK_DATA_PCH_H	
41	PER0_P	42	CLINK_CLK_PCH_H	
43	PER0_N	44	N.C.	
45	GND	46	N.C.	
47	REFCLK0_P	48.	N.C.	
49	REFCLK0_N	50	CLK_32K_M2_KEYE_H	
51	GND	52	PERST#	
53	CLKREQ#	54	DISABLE_M2_BT_L	
55	DISABLE_M2_WLAN_L	56	DISABLE_M2_WLAN_L	
57	GND	58	NC	
59	RSVD/PET1_P	60	NC	
61	RSVD/PET1_N	62	NC	
63	GND	64	NC	
65	RSVD/PER1_P	66	NC	
67	RSVD/PER1_N	68	NC	
69	GND	70	NC	
71	RSVD/REFCLK1_P	72	P3V3P_STBY	
73	RSVD/REFCLK1_N	74	P3V3P_STB	
75	GND			

The M.2 2230 socket supports PCIe x1 and USB 2.0 for Wi-Fi and Bluetooth modules and CNVi modules. Mechanical support for 2230 modules only.

Note: M.2 2230 SSD modules cannot be used!

13.1.9. Fan On-board Connectors Pin Assignment

Table 26: Fan Connector Pin Assignment

Pin	Signal	Description	4-Pin Header
1	GND	Ground	
2	VCC-Fan	Input Voltage 12 V	
3	Fan sense		
4	Fan PWM	Fan speed control	

NOTICE

Remove or connect fans only when product is powered off!

Fans must never be attached or removed while the product is powered, this may damaged the motherboard. Do not attach more than one fan per connector!

NOTICE

When replacing a fan:

- Use Kontron's reference fan, see Table 5: Accessories and Spares Parts.
- Always check the fan specification according to the limitations of the supply current and supply voltage (12 V supply voltage at fan current max. 2 A continuous /4 A peak)

i

Mating connectors:

Housing Molex 47054-1000 or equivalent

Terminal: Molex 08-50-0113 or equivalent

13.2. Jumpers

13.2.1. Recover BIOS

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 14, pos. 1) to the recover BIOS position (Figure 14, pos. 2) on the front panel header.

Figure 14: Recover BIOS Jumper
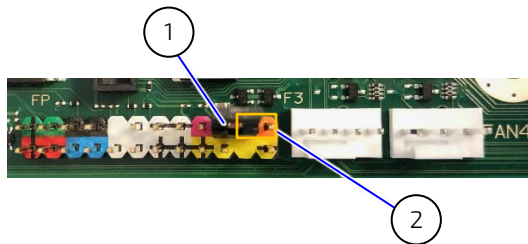
| 1 | Default jumper setting | 2 | Recover BIOS jumper setting |

Table 27: Recover BIOS Jumper

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

> The Front Panel header is located next to the motherboard's on-board fan connector (see Figure 14: Recover BIOS Jumper).
>
> For more detailed or further motherboard information, visit the motherboard's website at: https://www.kontron.com/en/products/k3841-q-uatx/p172727.

14/ Maintenance and Prevention

The KWS 3000-ADL requires minimal maintenance and care to maintain correct operation. Maintenance or repair on the open product must only be carried out by qualified personnel authorized by Kontron.

14.1. Before Maintaining

Before opening the service cover to maintain the product, shut down the product properly using the power button, PSU switch and disconnect the power cable from the input power socket or mains power outlet.

⚠ WARNING	Energy hazards present!
	Before removing the service cover, shut down the product properly using the power button, PSU power switch and by disconnecting the power cable.

14.2. Cleaning

For general product cleaning, wipe the product with a soft dry cloth and remove persistent dirt using a soft, slightly damp cloth (only use a mild detergent).

NOTICE	Do not use steel wool, metallic threads or solvents like abrasives, alcohol, acetone or benzene to clean the product.

14.3. Cleaning or Replacing the Fans

The internal system fans are located behind the ventilation openings on the front panel. To clean the fans, always remove the fans. Replace a defective fan only with an original fan (see Table 5: Accessories and Spares Parts).

⚠ CAUTION	Operation is permitted only with functional fans! Replace a defective fan only with an original fan.

⚠ CAUTION	Only trained personnel aware of the associated dangers may replace a fan. Before removing a fan, wait until the fan has stopped. Keep hands and fingers away from rotating fan parts at all times.

NOTICE	For chassis stability, before removing either the short and/or long bracket, observe the short and long bracket's positions; re-install and fasten only in the original position.

NOTICE	Remove or connect fans only when product is powered off!
	Fans must never be attached or removed while the product is powered, this may damaged the motherboard. Do not attach more than one fan per connector!

NOTICE	When replacing a fan, Kontron recommends using Kontron's reference fan, see Table 5: Accessories and Spares Parts. Always check the fan specification according to the limitations of the supply current and supply voltage.

To remove the two front panel system fans for maintenance or replacement, perform the following:

1. Shut down the product properly using power button, PSU power switch and disconnect the power cable from the input power socket or mains power outlet.

2. Remove the service cover see Chapter 7.2: Opening and Closing the Service Cover.

| **NOTICE**	For chassis stability, before removing either the short and/or long bracket, observe the short and long bracket's positions; re-install and fasten only in the original position.

3. Remove the short bracket by removing the two screws securing the short bracket to the long brackets and the three screws securing the short bracket to the drive-cage, as shown in Figure 15. Retain the screws for later use.

Figure 15: Short Bracket Screws
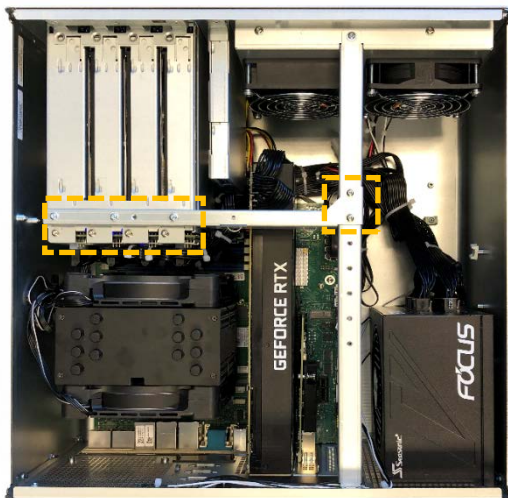
4. Remove the long bracket be removing the one screw securing the long bracket to the fan assembly and the two screws securing the long bracket to the rear panel, as shown in Figure 16. Retain the screws for later use.

Figure 16: Long Bracket Screws
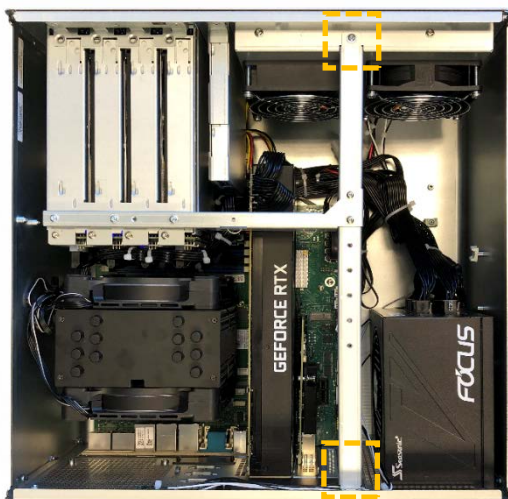
5. Remove the fan cables from the two 4-pin motherboard fan connectors, as shown in Figure 17.

Figure 17: Fan Connectors
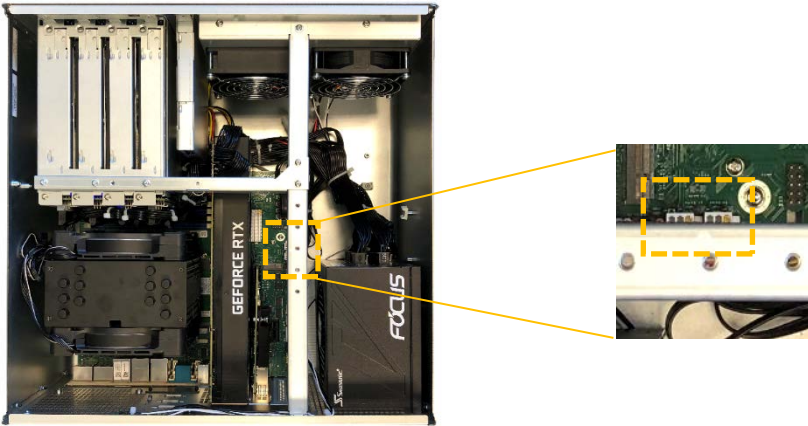
⚠️ **A sudden discharge of electrostatic electricity can destroy static-sensitive devices.**

6. Release the screws on the underside of the fan assembly (Figure 18, pos. 2) that fasten the fan assembly to the front panel frame. Retain the screws for future use.

7. Push the fan assembly to the left to release the top of the fan assembly from the two riveted bolts (Figure 18, pos. 1).

Figure 18: System Fans
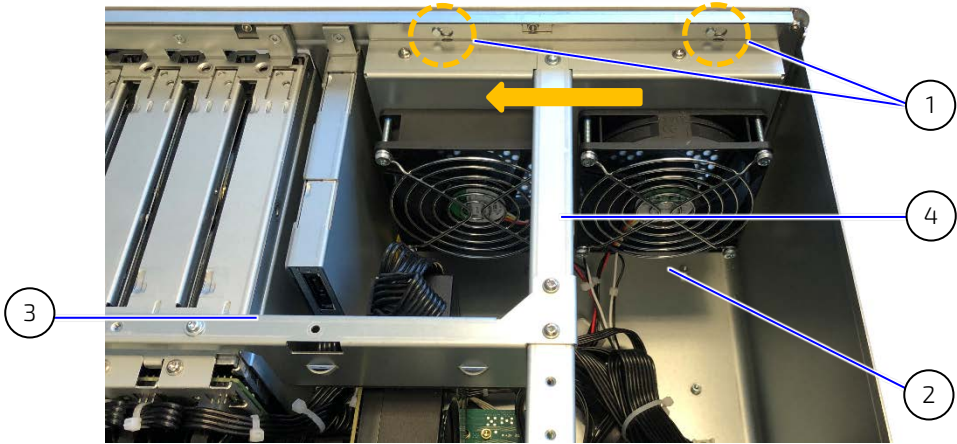
1	2x Riveted bolts	3	Short bracket
2	2x Screws (indicates position)	4	Long bracket

8. To clean the fans spray with compressed air. Ensure the fan turns when sprayed.

9. To replace the fan or re-install a cleaned fan, position and push the fan assembly firmly on to the two riveted bolts in step 7. Fasten the fan assembly to the front panel frame securely using the screws retained in step 6. Insert the fan cables in to the motherboard's fan connectors in step 5.

10. Re-install the short and long brackets in their original positions.

11. Close and secure the service cover, see Chapter 7.2: Opening and Closing the Service Cover.

14.4. Replacing the Lithium Battery

During the product's lifetime, the lithium battery may require replacement. Due to tolerances, the effective battery lifetime is in the range of 4.5 years to 6 years. Due to the position of the lithium battery underneath the drive- cage, Kontron recommends returning the product to Kontron to replace the lithium battery, see Chapter 15.1: Returning Defective Merchandise.

⚠CAUTION	Due to the position of the lithium battery underneath the drive-cage, Kontron recommends returning the product to Kontron to replace the lithium battery, see Chapter 15.1: Returning Defective Merchandise.

	Removing the battery clears the password, date, time, user default profile and MAC address.

15/   Technical Support

For technical support contact our Support Department:

▶ Email: 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 product's Type Label, see Figure 1, pos. 3.

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

15.1. Returning Defective Merchandise

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

1. Visit the RMA Information website: https://www.kontron.com/en/support/rma-information.

2. Download the RMA Request sheet for **Kontron Europe GmbH** and fill out the form. Take care to include a short detailed description of the observed problem or failure and to include the product identification Information (Name of product, Product number and Serial number). If a delivery includes more than one product, fill out the above information in the RMA Request form for each product.

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.

    Kontron Europe GmbH
    RMA Support
    Phone: +49 (0) 821 4086-0
    Fax: +49 (0) 821 4086 111
    Email: service@kontron.com

4. The goods for repair must be packed properly for shipping, considering shock and ESD protection.

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

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

16/ Storage and Transportation

16.1. Storage

If the KWS 3000-ADL is not in use for an extended period time, disconnect the power cable from the mains power outlet. If it is necessary to store the product, 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.

16.2. Transportation

To ship the KWS 3000-ADL, 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.

17/   Warranty

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

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, following 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.

17.1. Limitation/Exemption from Warranty Obligation

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

▶   General safety instructions 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.

Appendix: List of Acronyms

Table 28: List of Acronyms

AC	Alternating Current
ATX	Advanced Technology eXtended
BIOS	Basic Input Output System
CD	Compact Disk
CE	Conformité Européenne
COM	Communication port
CPU	Central Processing Unit
DC	Direct Current
DDR	Double Data Rate
DIMM	Dual Inline Memory Module
DP	Display port
DVD	Digital Video Device
DVI	Digital Video Interface
ECC	Error Checking and Correction
EMC	Electromagnetic Compatibility
ESD	ElectroStatic Dischange
GbE	Gigabit Ethernet
GPSD	General Product Safety Directive
GPU	Graphics Processing Unit
HD/HDD	Hard Disk /Drive
IOT	Internet of Things
KBD	Keyboard
LAN	Local Area Network
LED	Light-Emitting Diode
LVD	Low Voltage Directive
M-ATX	Micro Advanced Technology eXtended
MBR	Master Boot Record
NRTL	Nationally Recognized Test Laboratory
NVMe	NonVolatile Memory Express
OS	Operating System
PCI	Peripheral Component Interconnect
PCIe	PCI-Express
PICMG®	PCI Industrial Computer Manufacturers Group
PN	Product Number
POST	Power On Self-Test
PSU	Power Supply Unit
PXE	Pre eXecution Environment
RAM	Random Access memory
RDIMM	Registered DIMM

REACH	Registration, Evaluation, Authorization and restriction of Chemicals
RED	Radio Equipment Directive
RMA	Return of Material Authorization
RTC	Real Time Clock
SBC	Single Board Computer
SDA	Serial Data
SMA	SubMinature version A
SN	Serial Number
SSD	Solid State Drive
TCG	Trusted Computer Group
TFTP	Trivial File Transfer Protocol
TPM	Trusted Platform Module
UDIMM	Unregisterd DIMM
UEFI	Unified Extensible Firmware Interface
UKCA	UK Conformity Assessed
USB	Universal Serial Bus
VGA	Video Graphics Array
WEEE	Waste Electrical and Electronic Equipment

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About Kontron

Kontron is a global leader in IoT/Embedded Computing Technology (ECT). Kontron 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.

For more information, please visit: **www.kontron.com**

▼

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