KWS 3000-CML

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S&T Group

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▶   KWS 3000-CML - USER GUIDE

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Kontron S&T AG

Gutenbergstraße. 2
85737 Ismaning
Germany
www.kontron.com

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Revision History

Revision	Brief Description of Changes	Date of Issue	Author/ Editor
1.0	Initial version	2021-Oct-14	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 http://www.kontron.com/terms-and-conditions.

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Customer Support

Find Kontron contacts by visiting: https://www.kontron.de/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 https://www.kontron.de/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.
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-CML also known as product within this user guide, and informs users 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.

To access the latest version of this user guide, visit the KWS 3000-CML website.

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

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-CML complies with the relevant requirements and the approximation of the laws relating to the CE Mark for non-Wi-Fi variants (see Table 1) and CE Radio Equipment Directive (RED) for Wi-Fi variants (see Table 2), and the standards that are constitutional parts of the declaration.

Table 1: Compliance CE Mark

Europe – CE Mark (Conformité Européenne)		
Directives	**2014/30/EU:2014-02-26** Directive 2014/30/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to electromagnetic compatibility **2014/35/EU:2014-02-26** Directive 2014/35/EU of the European Parliament and of the Council of 26 February 2014 on the harmonization of the laws of the Member States relating to the making available on the market of electrical equipment designed for use within certain voltage limits **2011/65/EU:2011-06-08** Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment	CE
EMC	**EN 55032 :2015 / CISPR 32:2015** Electromagnetic compatibility of multimedia equipment- Emission Requirements (CISPR 32: 2015) **EN 61000-3-2:2014** Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) **EN 61000-3-3:2013** 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 55035:2017 /CISPR 35:2016** Electromagnetic compatibility of multimedia equipment - Immunity requirements (CISPR 35: 2016, modified)	
Safety	**EN 62368-1:2014** Audio/video, information and communication technology equipment - Part 1: Safety requirements (IEC 62368-1:2014, modified + Cor.:2015)	

Table 2: Compliance RED Mark

Europe – CE RED Mark (Conformité Européenne Radio Equipment Directive)		
Directives	**2014/53/EU** Directive 2014/53/EU of the European Parliament and of the Council of 16 April 2014 on the harmonization of the laws of the Member States relating to the making available on the market of radio equipment **2011/65/EU:2011-06-08** Directive 2011/65/EU of the European Parliament and of the Council of 8 June 2011 on the restriction of the use of certain hazardous substances in electrical and electronic equipment	**C E**
EMC	**EN 55032:2015 / CISPR 32:2015** Electromagnetic compatibility of multimedia equipment- Emission Requirements (CISPR 32: 2015) **EN 61000-3-2:2014** Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) **EN 61000-3-3:2013** 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 55035:2017 /CISPR 35:2016** 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	
Safety / Health and Safety	**EN 62368-1:2014** Audio/video, information and communication technology equipment - Part 1: Safety requirements (IEC 62368-1:2014, modified + Cor.:2015) **EN 62311:2008** Assessment of electronic and electrical equipment related to human exposure restrictions for electromagnetic fields (0 Hz - 300 GHz) (IEC 62311:2007, modified)	
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	

The KWS 3000-CML 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 62368-1:2014 and CAN/CSA-C22.2 No. 62368-1:2014** Audio/video, information and communication technology equipment - Part 1: Safety requirements	
UK CA (UK Conformity Assessed)		
EMC	**BS EN 55032:2015** Electromagnetic compatibility of multimedia equipment- Emission Requirements **BS EN 61000-3-2:2014** Electromagnetic compatibility (EMC) - Part 3-2: Limits - Limits for harmonic current emissions (equipment input current ≤ 16 A per phase) **BS EN 61000-3-3:2013** 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 **BS EN 55035:2017** Electromagnetic compatibility of multimedia equipment - Immunity requirements	
Safety	**BS EN 62368-1:2014/AC:2015** Audio/video, information and communication technology equipment - Part 1: Safety requirements	
CB scheme (For International Certifications)		
Safety	**IEC 62368-1:2014** Audio/video, information and communication technology equipment - Part 1: Safety requirements (IEC 62368-1:2014, modified + Cor:2015)	

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-CML conformity information, visit Kontron's Customer Section.

4/ Shipment and Unpacking

4.1. 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 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-CML	1	KWS 3000-CML 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 parts and accessories that can be purchased 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
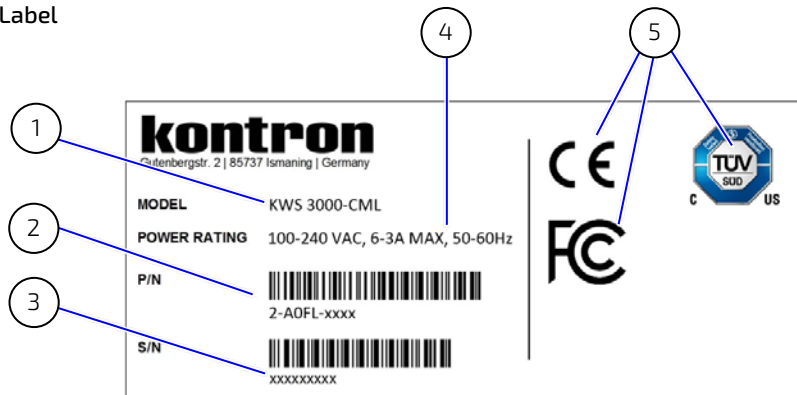
1	Model Name: KWS 3000-CML	4	Electrical specification/Power rating
2	Product number	5	Compliance
3	Serial number		

5/ Features

The KWS 3000-CML is a standalone highly expandable midi tower workstation designed for high performance, and reliability in industrial, medical and energy markets. With a Micro ATX motherboard and using the Intel® 10th Generation Core-i™ processor series, the KWS 3000-CML is highly expandable with storage, power, expansion cards and Wi-Fi configuration variants.

General features are:

- ▶ Micro ATX motherboard
- ▶ Supporting Intel® 10th Generation Core-i™ processor series
- ▶ Intel® Q470 Express chipset
- ▶ Up to 128 GB system memory with DDR4-3200 MHz
- ▶ Up to three displays (HDMI/DP/VGA)
- ▶ Expansion slots:
    - ▶ 1x PCIe x16 Gen 3
    - ▶ 1x PCIe x8 Gen 3
    - ▶ 2x PCIe x4 Gen 3
- ▶ Front panel mass storage options with 3.5" HDD/2.5" SDD (removable or fixed internal) and slimline CD/DVD
- ▶ External Interfaces: 2x USB 3.2 Gen 1, 2x USB 2.0, 4x USB 3.2 Gen 2, 1x DP 1.2 , 1x HDMI 2.0a, 1x VGA, 2x serial ports (RS232/422/485), 1x 1 GbE, 1x 2.5 GbE, 1x audio (Line-in, Line-out, Mic), 1x PS2 (keyboard/mouse)
- ▶ Active cooling with internal fans

Figure 2: KWS 3000-CML Series

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
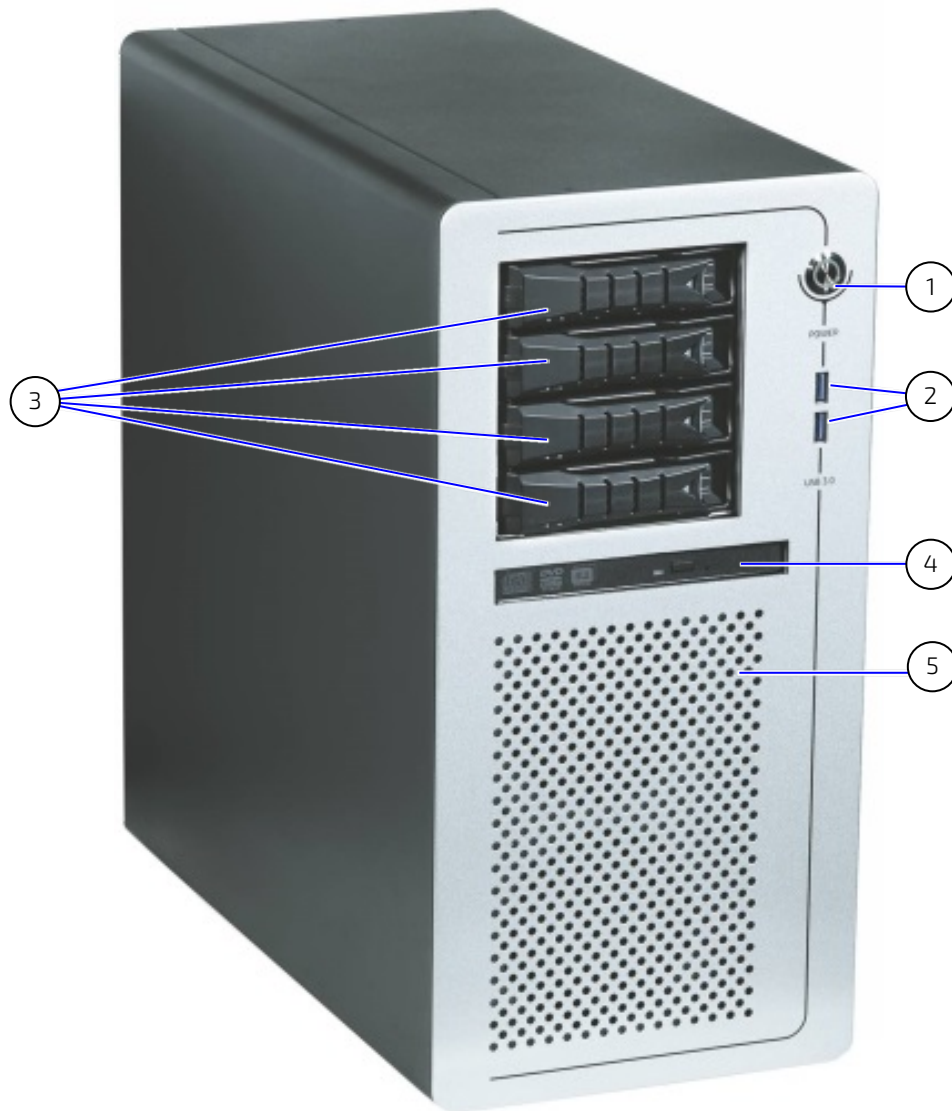
1	Power button	4	1x CD/DVD slimline drive
2	2x USB 3.2 Gen 1	5	Ventilation opening
3	4x Drive bays		

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 drives or fixed internal drives.

Figure 4: Storage Configurations

▶ Four removable drives

    ▶ Raid 0/1/5/10 option

▶ One CD/DVD slimline

▶ Two removable drives

    ▶ Raid 0/1/5/10 option

▶ Two fixed internal drives

▶ One CD/DVD slimline

▶ Four fixed internal drives

5.2. Rear Panel

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

Figure 5: Rear Panel
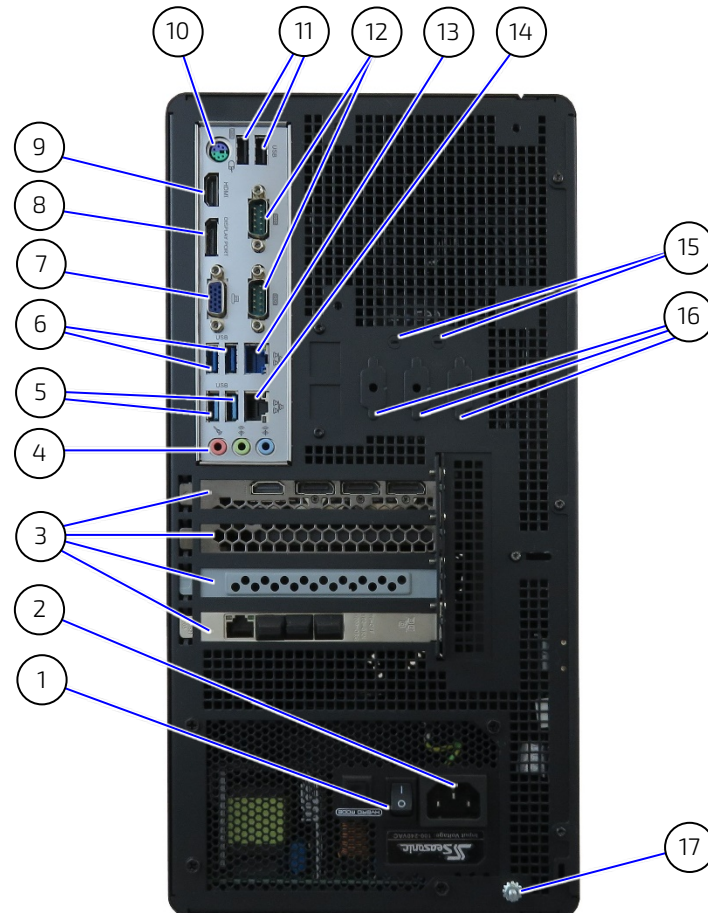
1	1x PSU Power switch	10	1x PS2 Keyboard/Mouse port
2	1x Input power socket	11	2x USB 2.0 (USB11, USB12)
3	4x PCIe Gen 3 slots	12	2x COM (RS 232/422/485)
4	1x Audio (line-in,line-out,mic)	13	1x 2.5 GBE (LAN2)
5	2x USB 3.2 Gen 2 (USB3_1, USB3_2)	14	1x 1 GBE (LAN1)
6	2x USB 3.2 Gen 2 (USB3_3, USB3_4)	15	2x Antenna breakouts
7	1x VGA	16	3x D-Sub 9 breakouts
8	1x HDMI 2.0a	17	1x Potential equalization stud
9	1x DP 1.2		

5.2.1. Wi-Fi Module

The Wi-Fi module features are:

▶ M.2 2230 key A-E

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

▶ Interface: PCIe x1

▶ Dual antenna

Figure 6: Wi-Fi Antenna
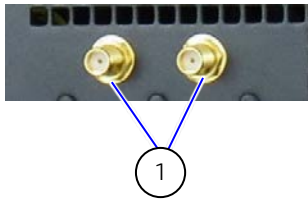
1	Dual Wi-Fi connectors	2	Dual hinged Wi-Fi antennas

5.2.2. Power Supply (PSU)

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

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 power button, PSU switch and 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		
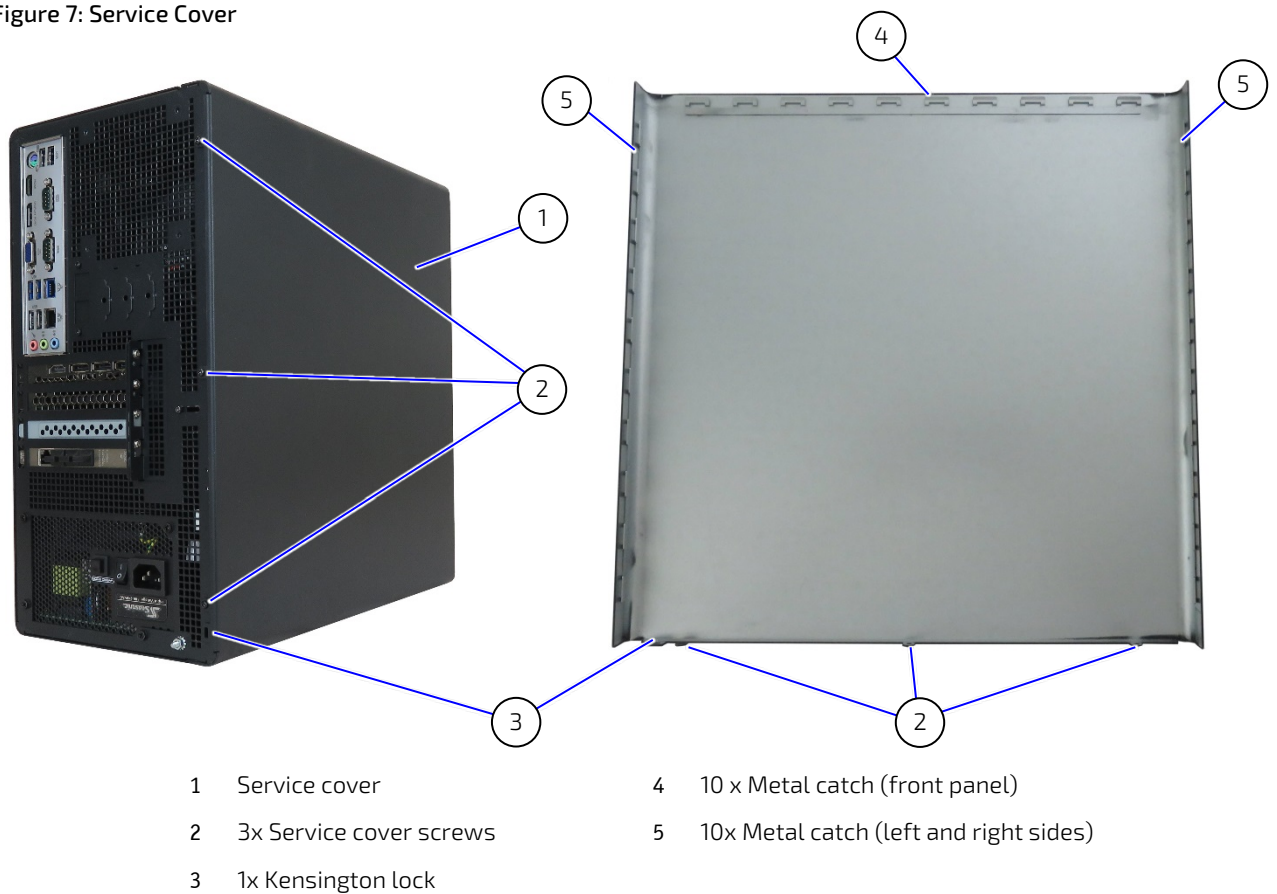
6/ Expansion

6.1. Before Expanding

Before expanding the product with external devices, 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

Additional storage is available using four drive bays populated with front panel removable drives within an open drive cage or fixed internal drives within a closed drive cage. The slimline CD/DVD is only front panel accessible. RAID support is available with a minimum of two 2.5" SDD/HDD removable drives.

Figure 8: Drive Bays
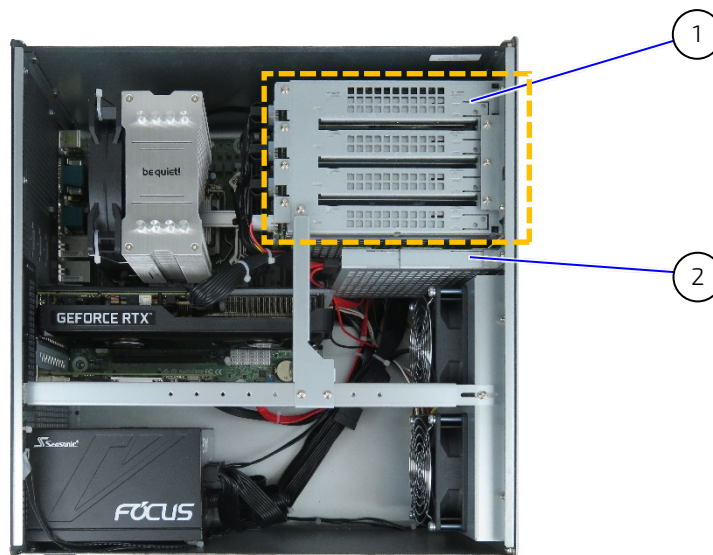
| 1 | 4x Drive bay (Top: drive bay 1 to Bottom: drive bay 4) | 2 | Slimline CD/DVD |

Table 6: 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

6.3. PCIe Expansion Cards

Additional features are achieved using four PCIe slots supporting PCIe Gen 3.0 expansion cards. Kontron supports reference Graphics, LAN, RAID controller PCIE cards. Others expansion options are available on request. For more information contact, , contact your local Kontron sales representative or Kontron Inside Sales.

Figure 9: PCIe Expansion Card Slot Location
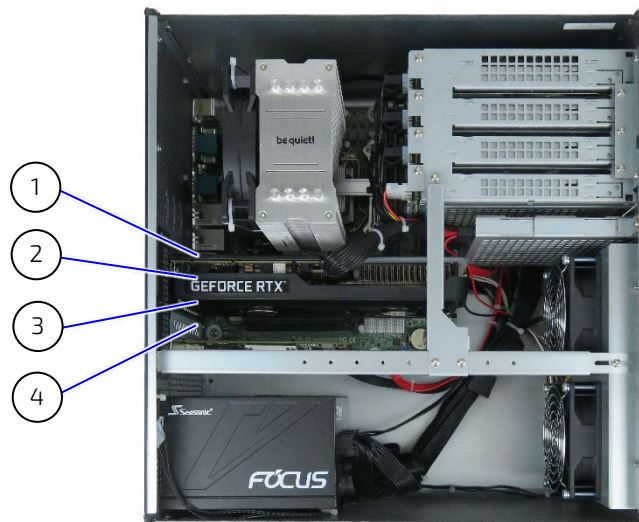
1	PCIe1 (slot 1)	3	PCIe3 (slot 3)
2	PCIe2 (slot 2)	4	PCIe4 (slot 4)

Table 7: PCIe Expansion Cards Slots [1,2,3,4]

Slot #	PCIe	Connector	Lanes	Comment
1	PCIe Gen 3.0	x16 lane	x16/x8	Lanes shared with slot 3 (prerequisite: PCIe x16 when slot 3 empty)
2		x4 lane	x4	
3		x 16 lane	–/x8	Lanes shared with slot 1 (prerequisite: PCIe x8 when slot 1 populate with PCIe x8)
4		x4 lane	x4	

> **i** If Slot 1 is populated with a x16 dual slot PCIe card both PCIe 2 and PCIe 3 are not available for expansion.

> **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.

6.4. M.2 SSD Module

Additional storage is available when the motherboard's M.2 2280 Key M socket is populated with a M.2 SSD module.

Figure 10: M.2 SSD Module Location

Table 8: 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** Due to the M.2 socket's location underneath the heatsink, the M.2 SSD module is factory installed

6.5. M.2 Wi-Fi Module

An additional Wi-Fi feature is available when the motherboard's M.2 2230 key E socket is populated with an M.2 Wi-Fi module.

Figure 11: M.2 Wi-Fi Module Location

Table 9: M.2 Wi-Fi Module Options

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

Due to the M.2 socket's location underneath the PCIe expansion cards, the M.2 Wi-Fi module is factory installed

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 1/ 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 power button, PSU switch and 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 power button, PSU 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.

Figure 12: Removing the Service Cover

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 sides of the chassis.

4. Lift the service cover upwards to remove.

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 front side of the service cover connect with the front panel's internal plate.

4. Secure the service cover 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 motherboard's connector slots interfaces and space requirements (see Table 7: PCIe Expansion Cards).

Figure 13: PCIe 3.0 Expansion Cards Slots

1	Slot bracket latches (Top: slot 1 to Bottom: slot 4)	3	Short bracket
		4	Long bracket
2	Slot bracket screws (Top: slot 1 to Bottom: slot 4)		

To install 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 size requires removal of the short bracket and/or long bracket, before removing the bracket(s) note the original position of the short and/or long bracket(s) and screws.

4. Remove the screws securing the short bracket to the drive cage and the long bracket. If removal of the long bracket is required, remove the screws securing the long bracket to the sides of the chassis. Retain the screws for later use.

5. Remove the screw for the PCIe slot bracket that corresponds to the required motherboard PCIe connector (see Table 7: PCIe Expansion Cards) and lift the PCIe slot bracket out of the latch. Retain the blank PCIe slot bracket with screw for later use.

6. Insert the PCIe card carefully into the corresponding motherboard PCIe connector (see Table 7: PCIe Expansion Cards) and positioning the PCIe card's brackets into the corresponding latch for the slot.

7. Secure the PCIe card with screw.

8. Re-install the short bracket and/or long bracket in the original position with the screws retained in step 4. Ensure that the elastics strip on the underside of the short bracket holds any 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 size requires removal of the short bracket and/or long bracket, before removing the bracket(s) note the original position of the short and/or long bracket(s) and screws.

4. Remove the screws securing the short bracket to the drive cage and the long bracket. If removal of the long bracket is required, remove the screws securing the long bracket to the side of the chassis. Retain the screws for later use.

5. Loosen and remove the PCIe cards screw (see Figure 13, pos. 2).

6. Remove the PCIe card carefully by pulling the PCIe card out of the corresponding motherboard connector and PCIe slot bracket latch (see Figure 13, pos. 1).

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.

8. Replace the short bracket and/or long bracket in the original position with the screws retained in step 4. Ensure that the elastics 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.

NOTICE	For chassis stability, before removing the short and/or long bracket, observe the original position. Before operation re-install the short and long brackets only in the original position.
i	Due to the size of the PCIe expansion card, before installing the PCIe expansion card users may be required to remove the short and/or long bracket.
i	Always insert a blank PCIe slot bracket into an empty rear panel PCIe slot and secure with screw.

7.2.2. Installing and Removing M.2 Modules

Figure 14: M.2 Modules Location

| 1 | M.2 SSD module location | 2 | M.2 Wi-Fi module location |

> **i** ▶ Due to the M.2 sockets location underneath the PCIe expansion cards and underneath the heatsink, the M.2 modules are factory installed.

To remove a M.2 module(s), 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. Release the screw fastening the M.2 module(s) to the motherboard. Retain the screw for later user.

4. Removed the M.2 module by carefully holding the sides of the M.2 module and pulling the M.2 module out of the socket. Retain the M.2 module with screw for reuse.

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

To insert a M.2 module(s), 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. Locate the corresponding M.2 socket and insert the new M.2 module(s) 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.

4. 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.

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

8/ Installing

8.1. Before Installing

Before positioning the product 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 positioning 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-CML is a standalone tower workstation that stands in the upright position on four chassis feet and no installation is required.

9/ Thermal Management

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-CML to power and starting up, read the instructions in this user guide and observe the safety instructions in Chapter 1/ 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, following proper cabling procedures and ensure that power is the last cable to be connected.

10.2. Operating System (OS) and Drivers

The KWS 3000-CML is pre-installed with OS and relevant drivers and fully operational when switched on for the first time.

If ordered without pre- installed OS, before starting the KWS 3000-CML, 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.

10.3. Starting Up

To start the KWS 3000-CML, perform the following:

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

2. Set the power supply's ON/OFF switch to the ON position.

3. Press the power button on the front panel. The power switch illuminates blue to indicate a powered 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!

10.4. 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!**

11 / BIOS

The KWS 3000-CML uses the uEFI BIOS supported by the motherboard. This chapter inform user 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. 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 <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 10.

Table 10: 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 the manufacturer's website for the installed motherboard (see Table 11, Type). During a BIOS update, do not switch off, reset or interrupt the process. If interrupted, the BIOS update process must be restarted.

To update the BIOS, perform the following:

1. Visit the manufacturer's website for the installed motherboard (see Table 11, Type). and click 'Support' then 'BIOS' to display a list of BIOS updates.

2. Download the BIOS update on to a Fat 32 format USB stick.

3. Start the BIOS, see Chapter 11.1: Starting the BIOS.

4. Insert the USB stick into a vacant USB port.

5. Enter **Advanced> UEFI Update Utility>Instant Flash**.

6. The BIOS scans for a USB stick and a command box displays 'BIOS Update File Name', 'Rescan Device', 'Enter Setup'.

7. Use the <↑> or <↓> keys to select the BIOS update file and press <Return> to flash the BIOS. A download bar displays the rate of completeness.

> **If more than one USB stick is connected or multiply files are on the USB stick, take care to select and flash the correct BIOS file.**

8. Press <Return > and reboot only after completion of the BIOS download.

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

> After a BIOS update If the product fails to boot, the updated BIOS maybe damaged.

12/ Technical Specifications

12.1. Block Diagram

Figure 15: Block Diagram

KWS-3000-CML

	Motherboard IMB-1313 Micro ATX	
1/2 x 2.5" SSD/HDD or 1x 3.5" HDD		1x Keyboard & Mouse
1/2 x 2.5" SSD/HDD or 1x 3.5" HDD		2x USB 2.0
1/2 x 2.5" SSD/HDD or 1x 3.5" HDD		1x HDMI 2.0a
1/2 x 2.5" SSD/HDD or 1x 3.5" HDD		1x DP 1.2 (DP++)
1x Slimline CD/DVD		2x COM Serial port
		2x USB 3.2 Gen 2
	M.2 2280 Key M SSD	2x LAN (1 & 2.5 GbE)
		2x USB 3.2 Gen 2
Power Switch		1x Line-in, Line- out, Mic
		2x Wi-Fi Antenna
2x USB 3.2 Gen 1		3x D-Sub breakouts
		PCIE1 x16 / PCIE1 x8
	M.2 2230 E Key Wi-Fi/ Bluetooth	PCIE2 x4
		PCIE3 x8
		PCIE4 x4
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 11: Hardware Specification

Product	KWS 3000-CML				
Motherboard					
Type	IMB-1313 (Micro ATX) from ASRock Industrial				
Form Factor	Micro ATX (244 mm x 244 mm/9.6" x 9.6")				
Processor	Intel® 10th Gen Core-i™ processor series				
	Processors	Cores	Base Freq.	Turbo Freq.	Memory
	i9-10900E	10	2.80 GHz	4.70 GHz	DDR4-2933
	i7-10700E	8	2.90 GHz	4.50 GHz	DDR4-2933
	i5-10500E	6	3.10 GHz	4.20 GHz	DDR4-2666
	i3-10100E	4	3.20 GHz	3.80 GHz	DDR4-2666
Chipset	Intel® Q470 Express				
Memory	128 GByte max. DDR4-3200 (unbuffered) 4x DIMM Sockets (type long) Capacity 16 GB (2x 8 GB), 32 GB (2x 16 GB) 64 GB (4x 16 GB) and 128 GB (4x 32 GB)				
Graphics	Intel® UHD Graphics				
Security	TPM V2.0				
Front I/O					
USB	2x USB 3.2 Gen 1				
Rear I/O					
USB	2x USB 2.0 4x USB 3.1 Gen2				
LAN	1x 1 GbE (10/100/1000 Mb/s) 1x 2.5 GbE (10/100/1000/2500 Mb/s)				
Displays	1x DP 1.2 (Resolution: 4096x2160 @60Hz max.) 1x HDMI 2.0a (Resolution: 4096x2160 @60Hz max.) 1x VGA (Resolution: 1920x1200 @60Hz max.) Up to three displays supported				
PS/2	Keyboard Mouse				
Audio	Line-in, Line-out, Mic-in				
Serial Port	2x COM (RS 232/422/485)				
Expansion					
PCIe Gen 3 Cards	Slot 1 PCIe1 x16, 16 lanes or PCIE x8, 8 lanes (prerequisite: PCIe x16 when slot 3 empty) Slot 2 PCIe2 x4, 4 lanes Slot 3 PCIe3 x8, 8Lane (prerequisite: slot 1 populate with PCIe x8 only) Slot 4 PCIe4 x4, 4 Lane				
M.2 Modules	1x 2280 Key M for SSD NVME module, Interface: PCIe Gen 3 x4				
	1x 2230 Key E for Wi-Fi/Bluetooth Wi-Fi: IEEE 802.11ac/a/b/g/n (2T2R) / Interface: PCIe x1 Bluetooth: V5.0, V4.2, V4.1, V4.0 LE, V3.0+HS, V2.1+EDR / Interface: USB 2.0				

Mass 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 SSD	1x 2280 Key M NVME module with Interface: SATA/PCIe x4
Fan	
System Fans	2x Fans (behind front panel)
Internal Fans	1x PSU (integrated in PSU) 1x CPU (heatsink with fan) Up to 4 Expansion cards (Integrated fans)

12.3. Software Specification

Table 12: 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-CML electrical specification is available on the product's type label (see Figure 1, pos.4).

Table 13: Electrical Specification

Power	Description
PSU Type	Industrial 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 14: Environmental Specification

Temperature		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, non-condensing (93% @ 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
Noise Level		35 dB @ 25 °C, standard condition and 1 m in all directions (35 dB @ 77 °F, standard condition and 3.28 ft. in all directions)

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 15: Mechanical Specification

Dimension	Description
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

Low-active signals are indicated by a minus sign.

13.1.1. USB 2.0 Port Pin Assignment (USB2_1/USB2_2)

Pin	Signal Name	USB 2.0 Type A Connector
1	VCC (+5V)[1]	
2	Data-	
3	Data+	
4	GND	

[1] fuse protected

13.1.2. USB 3.2 Gen 2 Port Pin Assignment (USB3_1, USB3_2, USB3_3, USB3_4)

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+	

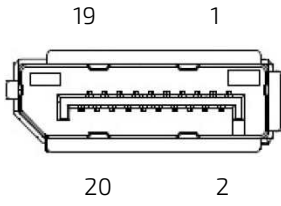[1] fuse protected

13.1.3. USB 3.2 Gen 1 Port Pin Assignment (USB3_7, USB3_8)

Pin	Signal Name	Pin	Signal Name	USB 3.2 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

13.1.4. DP 1.2 Port Pin Assignment (DP1)
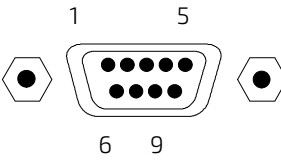
Pin	Signal Name	Pin	Signal Name	DP (V1.2) Connector
1	TX0+	11	GND	
2	GND	12	TX3–	
3	TX0–	13	DVI dongle detect/ GND	
4	TX1+	14	GND / CEC for HDMI	
5	GND	15	AUX+	
6	TX1–	16	GND	
7	TX2+	17	AUX–	
8	GND	18	Hotplug detect	
9	TX2–	19	GND	
10	TX3+	20	+3.3 V[1]	

[1] (fuse protected)

The DisplayPort is compatible with the following adapters: (Dual Mode/DisplayPort++)
DP to HDMI (passive + active), DP to DVI (passive + active) and DP to VGA (active).
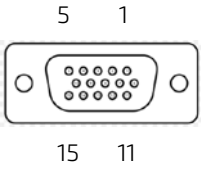
13.1.5. COM Port Pin Assignment (COM1, COM2)

Pin	RS232	RS422	RS485	Connector
1	DCD	Tx–	RTx–	
2	RxD	Rx+		
3	TxD	Tx+	TRx+	
4	DTR	Rx–		
5	GND	GND	GND	
6	DSR			
7	RTS			
8	CTS			
9	PWR	PWR	PWR	

COM1 and COM2 ports are RS232/422/485 ports and may be defined in the BIOS setup.

13.1.6. VGA Connector Pin Assignment (VGA1)

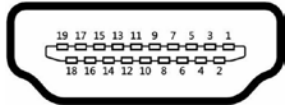| Pin	Signal Name	Description	D-Sub Connector (female)
1	Red	Red Video	
2	Green	Green Video	
3	Blue	Blue Video	
4	ID2	Monitor ID Bit 2	
5	GND for DCC	Ground	
6	RGND	Red ground	
7	GGND	Green ground	
8	BGND	Blue ground	
9	Key	Key (no pin)	
10	SGND	Sync ground	
11	ID0	Monitor ID Bit 0 GND=Color; NC=Mono	
12	ID1 or DDC/SDA	Monitor ID Bit 1 NC=Color; GND=Mono Some systems only uses ID0 for monitor ID	
13	HSync or CSync	Horizontal Sync (or Composite Sync)	
14	VSync	Vertical Sync (or data clock)	
15	ID3 or SCL	Monitor ID Bit 3	
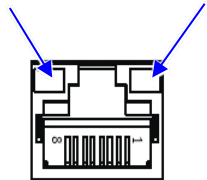
13.1.7. HDMI 2.0a Connector Pin Assignment (HDMI1)

Pin	Signal Name	Pin	Signal Name	HDMI 2.0a Connector (female)
1	TDMS Data 2+	11	TDMS Clock shield	
2	TDMS Data 2 shield	12	TDMS Clock -	
3	TDMS Data 2-	13	CEC	
4	TDMS Data 1+	14	NC	
5	TDMS Data 1 Shield	15	DCC Clock	
6	TDMS Data 1-	16	DDC Data	
7	TDMS Data 0+	17	GND	
8	TDMS Data 0 Shield	18	VCC (+5 V)	
9	TDMS Data 0-	19	Hot Plug Detect	
10	TDMS Clock+			

13.1.8. Audio Jack Connector Pin Assignment (Line-in, Line-out, Mic-in)
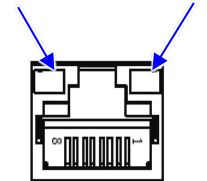
Jack	Position	Signal Name
Blue	Top	Line-in
Green	Middle	Line-out
Pink	Bottom	Microphone

13.1.9. 2.5 Gigabit LAN Connector Pin Assignment (LAN1)

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–		

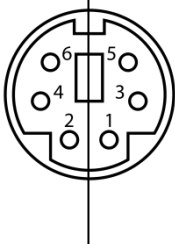| Link/Activity LED		Speed LED	
LED Status	Description	LED Status	Description
Off	No link	Off	10 Mbps connection
Blinking	Data activity	Orange	100 Mbps/1 Gbps connection
On	Link	Green	2.5 Gbps connection

13.1.10. 1 Gigabit LAN Connector Pin Assignment (LAN2)

Pin	Signal Name (10/100/1000)	Signal Name (10/100)	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
Off	No link	Off	10 Mbps connection
Blinking	Data activity	Orange	100 Mbps connection
On	Link	Green	1 Gbps connection

13.1.11. PS/2 Connector Pin Assignment (Keyboard, Mouse)

Pin	Signal Name (Keyboard & Mouse)	PS/2 Connector (female)	
		Purple	(Green)
1	Data		
2	NC		
3	GND		
4	VCC (+5V)[1]		
5	Clock		
6	NC		

[1] fuse protected

13.2. Jumpers

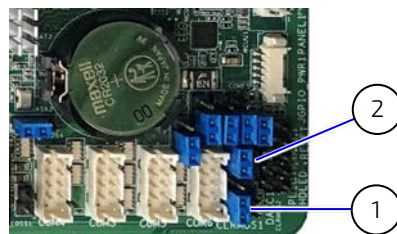The Jumpers are labelled on the motherboard.

> **i** For information regarding the position for the Clear CMOS jumpers (see Figure 16). For more detailed jumper information, refer to the motherboard's user manual.

> **i** For information regarding the installed motherboard, see Table 11, 'Type'.

Figure 16: Clear CMOS Jumpers (CLRMOST1, CLRMOS2)

1	Clear CMOS (CLRMOS1)	2	Clear CMOS (CLRMOS2)

13.2.1. Clear CMOS (CLRMOS1) Jumper

CLRMOS1 clears the data in CMOS.

Clear CMOS Jumper (CLRMOS1) 3-Pin Jumper

Pin 1-2	Pin 2-3	State	
x		Normal	
	x	Clear CMOS	1

x = short, jumper on pins

To set the jumper, perform the following:

1. Before setting the CMOS jumper the product must be switched off and disconnected from power by removing the power cable.

2. After 15 seconds, short pin-2 and pin-3 on CLRMOS1 for 5 seconds using a jumper.

3. After updating the BIOS, do not clear CMOS. If you need to clear CMOS after just finishing a BIOS update, boot up the product first, then shut the product down before clearing CMOS.

i	Placing the jumper on the pins is a short. If no jumper is placed on the pins, the jumper is open.

i	If the CMOS battery is removed, Password, date, time, user default profile and MAC address are cleared.

13.2.2. Clear CMOS (CLRMOS2) Jumper

CLRMOS2 clears data in CMOS automatically with AC power on.

Clear CMOS Jumpers (CLRMOS2) 2-Pin Jumper

Pin 1-2	State	
x	Normal	1
	Clear CMOS (Power off)	

x = short, jumper on pins

To set the jumper, perform the following:

1. Before setting the CMOS jumper the product must be switched off and disconnected from power by removing the power cable.

2. Use a jumper to shorted pin-1 and pin-2 on CLRMOS2, to clear CMOS automatically.

3. After updating the BIOS, do not clear CMOS. If you need to clear CMOS after just finishing a BIOS update, boot up the product first, then shut the product down before clearing CMOS.

| i	Placing the jumper on the pins is a short. If no jumper is placed on the pins, the jumper is open.

14/ Maintenance and Prevention

The KWS 3000-CML 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 the Product

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. 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.

⚠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.

Figure 17: System Fans

To remove a system fan for maintenance or replacement, 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.

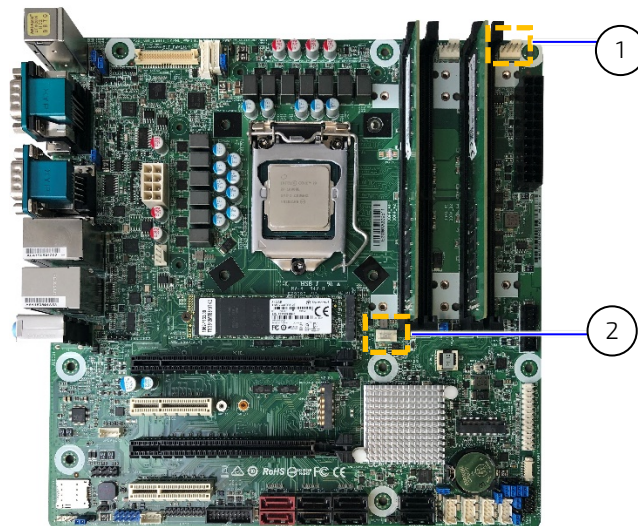2. Remove the service cover see Chapter 7.2: Opening and Closing the Service Cover.

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

3. Remove the fan's cable from the fan connector on the motherboard.

Figure 18: Fan Connectors

1	Chassis fan connector (4-pin) 12 V	2	Chassis fan connector (4-pin) 12 V

4. Release the screws holding the fan to the front panel frame and retain the screws for future use.

5. Clean the fan, spray using a compressed air. Ensure the fan turns when sprayed.

6. Position and fasten a new fan or re-install a cleaned fan firmly on to the front panel frame using the screws retained in step 4. Insert the fan's connectors in to the motherboard's fan connectors in step 3.

7. Closed the service cover.

14.4. Replacing the Lithium Battery

⚠ 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).

To replace the lithium battery on the motherboard, 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.

3. Release the clip holding the lithium battery to slide the battery out of the battery holder.

Figure 19: Battery Holder Location

4. Insert a new lithium battery in the battery holder, while paying attention to the polarity of the battery to ensure the positive (+) terminal side faces upwards.

Figure 20: Lithium Battery Polarity
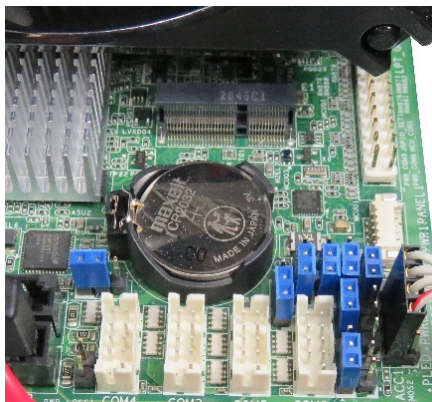
5. Close the service cover.

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 product 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 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.

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 A: List of Acronyms

Table 16: List of Acronyms

ATX	Advanced Technology eXtended
BIOS	Basic Input Output System
CE	Conformité Européenne
COM	Communication port
CPU	Central Processing Unit
DC	Direct Current
DDR	Double Data Rate
DHCP	Dynamic Host Configuration Protocol
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
NRTL	Nationally Recognized Test Laboratory
OS	Operating System
PCI	Peripheral Component Interconnect
PCIe	PCI-Express
PICMG®	PCI Industrial Computer Manufacturers Group
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
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

About Kontron – Member of the S&T Group

Kontron is a global leader in IoT/Embedded Computing Technology (ECT). As part of the S&T technology group, 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**

Global Headquarters

Kontron S&T AG

Gutenbergstraße 2
85737 Ismaning, Germany
Tel.: + 49 821 4086-0
Fax: + 49 821 4086-111
info@kontron.com