



KBox A-150-SKL

Doc. Rev. 1.0

Doc. ID: 1062-3588

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 KBOX A-150-SKL - USER GUIDE

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Revision History

Revision	Brief Description of Changes	Date of Issue	Author/ Editor
1.0	Initial version	2018-Oct-02	CW

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



HOT Surface!

Do NOT touch! Allow to cool before servicing.



Laser!

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



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

This symbol also indicates detail information about the specific product configuration.



This symbol precedes helpful hints and tips for daily use.

For Your Safety

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

High Voltage Safety Instructions

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

⚠ CAUTION

Warning

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

⚠ CAUTION



Electric Shock!

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

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

Special Handling and Unpacking Instruction

NOTICE



ESD Sensitive Device!

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

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

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

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

Lithium Battery Precautions

If your product is equipped with a lithium battery, take the following precautions when replacing the 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/ General Safety Instructions for IT Equipment

▲WARNING



Please read this chapter 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 nonobservance of the instructions Kontron 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 also to 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, ensure that if the product has ventilation openings the openings are not covered or blocked. If an air filter is provided, this should be cleaned regularly. Additionally, make sure the system is well ventilated by observing if heat-dissipating elements are covered/obstructed by objects as this can cause a build-up of heat and stop heat from being dispersed into the ambient environment.
- ▶ Do not place the system close to heat sources or damp places.
- ▶ Only products or parts which fulfill the requirements of SELV circuits (Safety Extra Low Voltage) as stipulated by IEC 60950-1 may be connected to the available interfaces.
- ▶ Before opening the product, make sure that the product is disconnected from the mains. Complete disconnection is only possible if the power cable is disconnected and removed. Ensure that there is free and easy access to enable disconnection.
- ▶ If the product is opened for the insertion or removal of expansion devices (depending on the configuration of the system), this may only be carried out by qualified persons.
- ▶ If extensions are made to the product, the following must be observed:
 - ▶ All effective legal regulations and all technical data for the expansion devices are adhered to.
 - ▶ The power consumption of any expansion devices does not exceed the specified limitations.
 - ▶ The current consumption of the system does not exceed the value stated on the product label.
- ▶ Only original accessories that have been approved by Kontron can be used.
- ▶ Please note: safe operation is no longer possible when any of the following applies:
 - ▶ Damage is visible.
 - ▶ The device no longer functions.

In these cases, the device must be switched off and it must be ensured that the device can no longer be operated.

Additional safety instructions for DC power supply circuits

- ▶ To guarantee safe operation of products with DC power supply voltages larger than 60 volts DC or a power consumption larger than 240 VA, please observe that:
 - ▶ The product is set up, installed and operated in a room or enclosure marked with "RESTRICTED ACCESS", if there are no safety messages on product as safety signs and labels on the product itself.
 - ▶ 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 product is used in the application (e.g. overcurrent protective product), if the product itself is not disconnectable
 - ▶ A disconnect product, if provided in or as part of the equipment, 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 EN60950-1 or VDE0100 or EN60204 or UL508 regulations.
- ▶ The product do not generally fulfill the requirements for "centralized DC power systems" (UL 60950-1, Annex NAB; D2) and therefore may not be connected to such products!

2/ Introduction

This user guide describes the KBox A-150-SKL. New users are recommended to study the installation instructions within this user guide before switching on the power.

Kontron's KBox A-150-SKL is developed specifically for control cabinet applications with flexible DIN rail mounting positions for use when space is limited. The fanless design ensures a significantly prolonged lifespan and high system availability.

The KBox A-150 SKL is a high-end industrial grade box PC based on the Intel® SKY Lake Core platforms designed for use in performance demanding applications. Due to the varied amount of onboard interfaces such as GbE, USB 3.0, Display port, HDMI and serial ports, the KBox A-150 SKL enables connectivity for nearly all applications and supports memory expandability via M.2 SSD memory expansion.

General features are:

- ▶ Intel® Core™ i5-6300U
- ▶ Up to 16 GB GB RAM with DDR4 SODIMM
- ▶ Up to 512 GB memory storage via Internal M.2 SSD (option)
- ▶ External 2.5" HDD/SSD drive bay (option)
- ▶ External Interfaces 1x HDMI, 1x DP, 2x GbE, 4x USB 3.0, 2x COM (RS232, RS422, RS485 configurable)
- ▶ Fanless passive cooling
- ▶ Supports Kontron's APPROTECT (option)

The KBox A-150-SKL is intended for 24/7 continuous operation and longtime industrial applications. All components are selected to ensure a long lifetime.

Figure 1: KBox A-150-SKL



NOTICE

The KBox A-150-SKL is factory configured to meet customer requirements. Kontron does not recommend opening the system as this may cause damage to internal components.

3/ Standards Certifications and Directives

The KBox A-150-SKL is currently in test and aims to comply with the requirements of the following standards.



If the user modifies the product, prerequisites for specific approvals such as CE conformity declaration (safety requirements) may no longer apply.

Table 1: Standards, Certifications and Directives Compliance

CE-Mark Compliant with EU Directives	Electromagnetic Compatibility	Directive 2014/30/EU
	Low Voltage	Directive 2014/35/EU
	Radio Equipment Directive (RED)	Directive 2014/53/EU
	RoHS II	Directive 2011/65/EU
EMC 2014/30/EU Emission	CISPR 11 EN 55011	Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement
EMC 2014/30/EU Immunity	EN 61000-6-2	Electromagnetic compatibility (EMC), part 6-2: Generic standards- Immunity for industrial environment
EMC 2014/53/EU	EN 301 489-1 V2.2.0	Electro-Magnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonized Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU and the essential requirements of article 6 of Directive 2014/30/EU
EMC 2014/53/EU	<i>EN 301 489-17 V3.1.1</i>	Electro-Magnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonized Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU
RF Spectrum Efficiency & Spurious Emission 2014/53/EU	EN 300 328 V2.1.1	Wideband transmission systems; Data transmission equipment operating in the 2,4 GHz ISM band and using wide band modulation techniques; Harmonized Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU
EMC CFR 47 Part 15, Subpart B	ANSI C63.4 CISPR 16 ICES-003	The American National Standards Institute standard ANSI C63.4 is the key standard for measuring electrical and electronic equipment for showing compliance to FCC and Industry Canada regulations.
Safety 2014/35/EU	IEC 61010-1 EN 61010-1 UL 61010-1	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements
	IEC 61010-2-201 EN 61010-2-201 UL 61010-2-201	Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-201: Particular requirements for control equipment
	EN 62311	Assessment of the compliance of low power electronic and electrical equipment with the basic restrictions related to human exposure to electromagnetic fields (10 MHz to 300 GHz)

WEEE 2002/96/EC	Waste Electrical and Electronic Equipment Directive (WEEE Directive)	Compliant with the Waste Electrical and Electronic Equipment (WEEE) directive to reduce waste of electrical and electronic equipment, encourage recycling and environmental disposal and increase the environmental awareness of producers
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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

Proceed as follows to unpack the unit:

1. Remove packaging.
2. Do not discard the original packaging. Keep it for future relocation or storage.
3. Check the delivery for completeness by comparing it with the original order.
4. Keep the associated paperwork. It contains important information for handling the unit.
5. Check the contents for visible shipping damage.
6. If you notice any shipping damage or inconsistencies between the contents and the original order, contact Kontron for help and information.

4.3. Scope of Delivery

Check that your delivery is complete, and contains the items listed below. If you discover damaged or missing items, contact your dealer.

Table 2: Scope of Delivery

Delivered Item	Description
KBox A-150-SKL	Corresponding to the ordered product configuration
POWER-SUBCON PSC 1,5/ 3-F, 3-pin plug	Mating connector for the front panel 3-pin DC power connector

4.3.1. Accessories

Table 3: Accessories

Part	Part Description
Power Supply	External power supply
Power Cord	230 V power Cord
7 mm – 9.5 mm Spacer	7 mm – 9.5 mm Spacer for 7 mm high 2.5 " SSD drives
Heatsink fins	Heatsink fins that are screwed on and turnable by 90° to suit each possible installation by remaining in a vertical position.

4.4. Optional Parts (System Expansion)

- ▶ 1x 2.5"HDD/SSD drive for memory expansion (external)
- ▶ 1x M.2 Key B socket for memory extension (internal)
- ▶ 1x mPCIe socket (Internal)

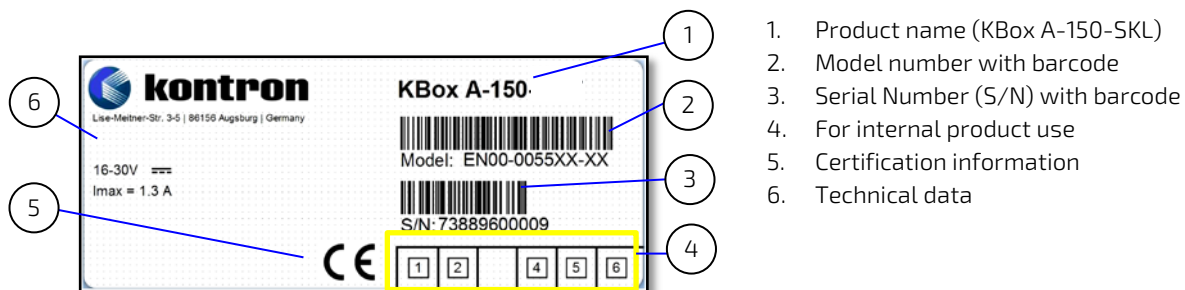
4.5. Kontron Optional mPCIe Modules

- ▶ APPROTECT mPCIe module
- ▶ WLAN mPCIe module

4.6. Type Label and Product Identification

The type label is position on contains the following information.

Figure 2: KBox A-150-SKL Type Label Example



5/ Product Overview

Before working with the KBox A-150-SKL, Kontron recommends that users take a few minutes to learn about the various parts of the KBox A-150-SKL.

The KBox A-150-SKL is flexible industrial grade box PC fanless device designed for use in performance demanding applications requiring a flexible rapid rail attachment solution. Based on the Intel® Core™ i5-6300U platform, the KBox A-150-SKL features long-term availability and supports a varied amount of onboard interfaces to enable connectivity to nearly all applications. An Internal M.2 key B sockets support memory expansion and an internal mPCIe sockets supports mPCIe expansion cards.

All variants are available in a robust steel chassis, designed for operation in a DIN rail environment using either a horizontal and vertical orientation. The chassis height differs depending on whether an external 2.5" HDD/SSD drive bay is installed on the side of the chassis, see Figure 3: KBox A-150-SKL Chassis Variants.

Figure 3: KBox A-150-SKL Chassis Variants



With external 2.5" HDD/SSD drive bay



No external drive bay



The KBox A-150-SKL is designed for operation in a DIN rail environment using either a horizontal and vertical orientation. For more information, see Chapter 9/ Installation Instructions.

5.1. Front Panel Views

The front panel includes all I/O connectors. The position of the protective earth stud bolt varies depending on whether an external 2.5" HDD/SSD drive bay is supported.

Figure 4: Front Panel View (External 2.5" HDD/SSD drive bay variant)

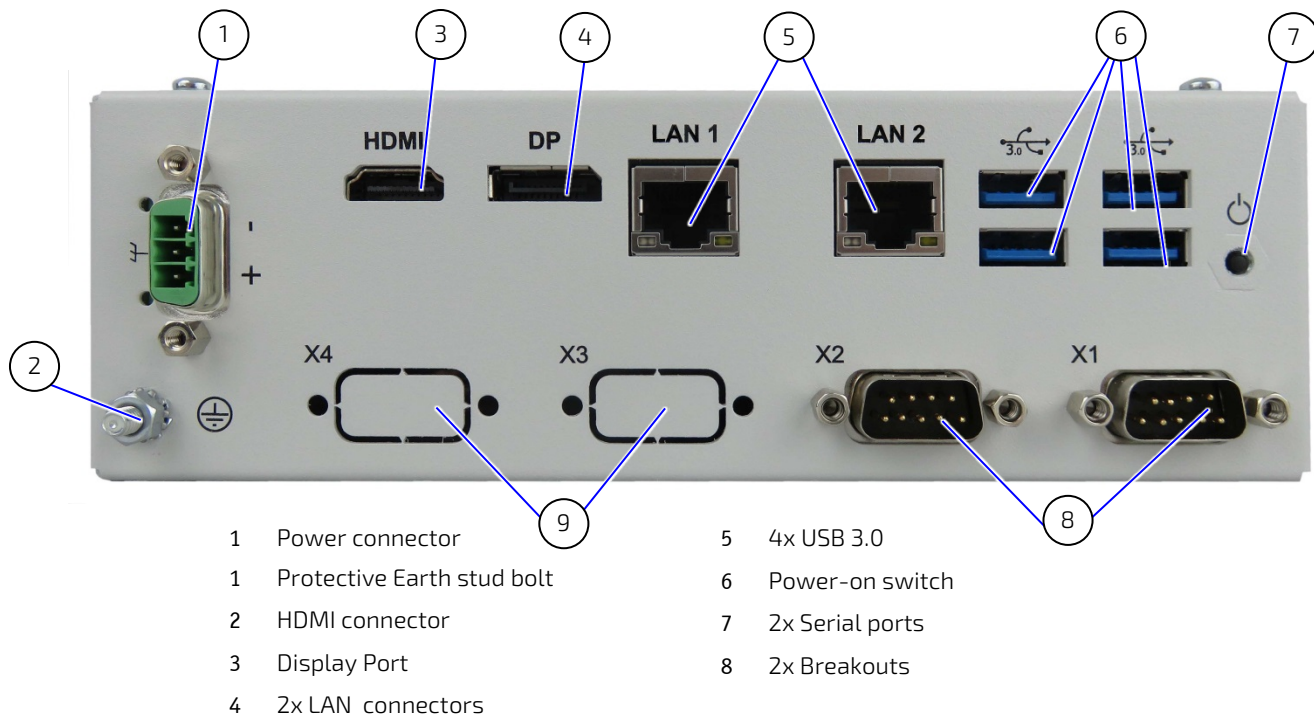
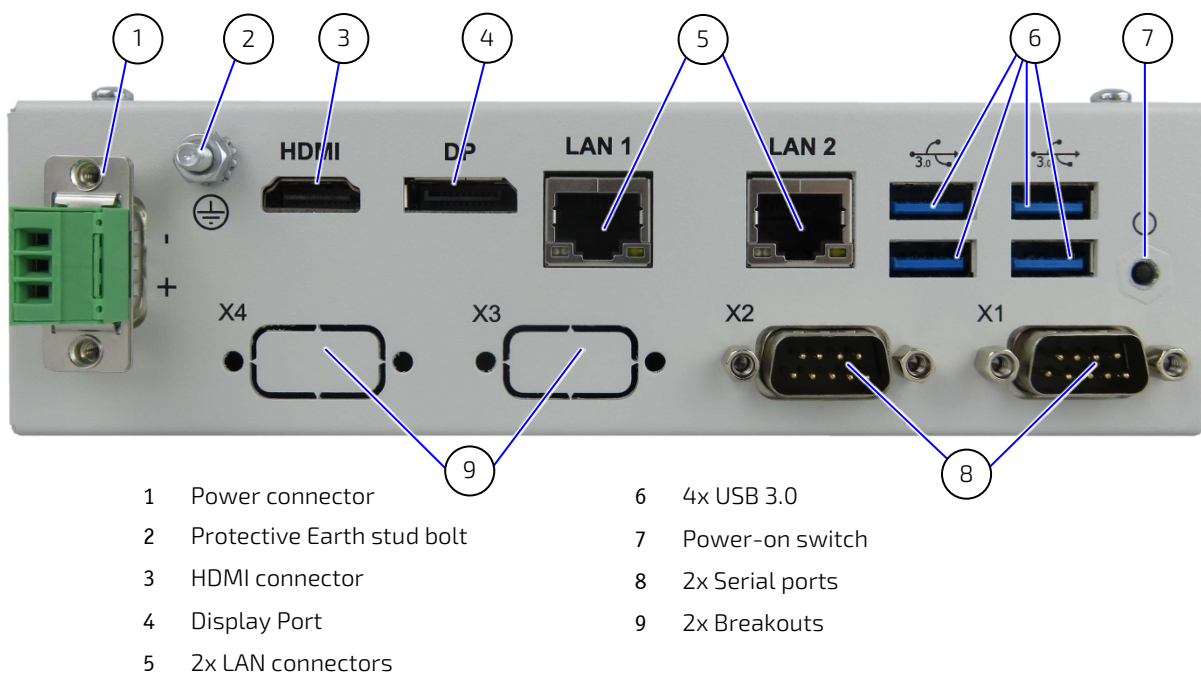


Figure 5: Front Panel View (No external 2.5" HDD/SSD drive bay variant)



5.1.1. Power Connector

There is one 3-pin Phoenix power connector on the front panel supporting an input DC voltage range of 9 VDC to 30 VDC, see Figure 4 (pos. 1). The mating connector required to connect the power connector to a DC main power source, is supplied with the KBox A-150-SKL, (refer to Chapter 4.3: Scope of Delivery). For information on how to connect the supplied mating connector to the front panel input power connector, refer to Chapter 9.2.1: Wiring the DC Mating Power Connector.

For the pin assignment of the Input power connector, refer to Chapter 12.2.1: Input Power Connector (PWR).

5.1.2. Protective Earth Stud Bolt

There is a protective earth stud bolt on the front panel connected to the chassis GND inside the system. The position of the protective earth stud bolt varies depending on whether the KBox A-150-SKL is delivered with a 2.5" HDD/SSD drive bay see Figure 4 (pos. 2) or without a 2.5" HDD/SSD drive bay, see Figure 5 (pos. 2).

5.1.3. HDMI (HDMI)

There is one HDMI 1.4 interface (3840 x 2160 @ 30Hz), for video/audio solutions, see Figure 4 (pos.3).

For the pin assignment of the HDMI connector, refer to Chapter 12.2.2: HDMI Connector (HDMI).

5.1.4. Display Port (DP)

There is one DP 1.2 interface (4096 x 2160 @ 60Hz) for video only, see Figure 4 (pos.4).

For the pin assignment of the DP connector, refer to Chapter 12.2.3: Display Port Connector (DP).

5.1.5. Ethernet (LAN1, LAN2)

There are two LAN ports LAN1 and LAN2 both supporting 10/100/100 Mbit Ethernet, see Figure 4 (pos.5).

For the pin assignment of the RJ45 Ethernet connectors, refer to Chapter 12.2.4: GbE LAN1 RJ45 Connectors (LAN1, LAN2)

5.1.6. USB 3.0

There is one USB 3.0 port allowing for the connection of a USB 3.0/USB 2.0 compatible device, see Figure 4 (pos.6).

For the pin assignment of the USB 3.0 connector, refer to Chapter 12.2.5: USB 3.0 Type-A Connector.

5.1.7. Power-On

There is a power-on switch on the front panel to apply power or perform an orderly shutdown, see Figure 4 (pos.7).

5.1.8. Serial Ports (X1, X2) and (option for X3, X4)

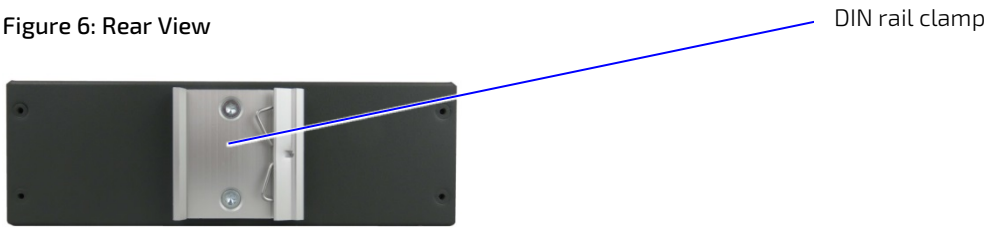
There are two serial ports X1 and X2 both supporting RS232/422/485, see Figure 4 (pos.8). The type of serial port is configured in the BIOS in **Super IO Configuration> Serial Port # Configuration> Serial Port # Type>**.

Additionally, there are two breakouts for optional RS232 only serial ports X3 and X4 see Figure 4 (pos.9).

For the pin assignment of the serial port connectors X1 and X2, refer to Chapter 12.2.6: Serial Port Connectors (X1, X2).

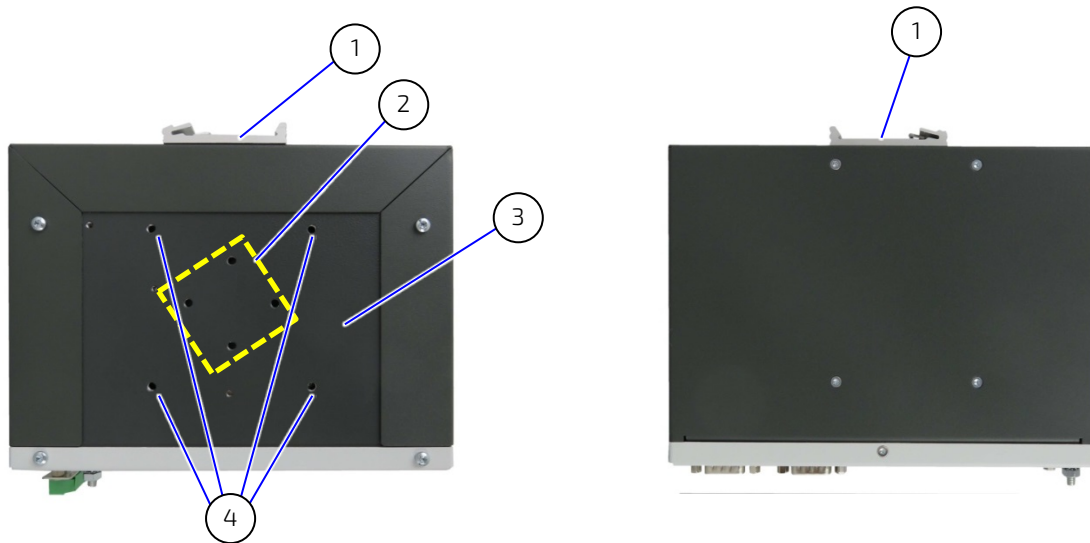
5.2. Rear View

Figure 6: Rear View



5.3. Top and Bottom View

Figure 7: Top and Bottom Views



- 1 Din rail clamp
- 2 2x Din rail mounting hole pairs for (horizontal and vertical) Max. M4 x 6 mm
- 3 Heat sink plate

- 4 4x Mounting holes for heat sink fins

5.4. Side Views

The 2.5" HDD/SSD drive bay is accessible on the side of the KBox A-150-SKL. The height of the chassis depending on whether the KBox A-150-SKL is supplied with or without the 2.5" HDD/SSD drive bay. The height of the side is 58 mm high with 2.5" HDD/SSD drive bay and 50 mm high without 2.5" HDD/SSD drive bay.

Figure 8: Side Views

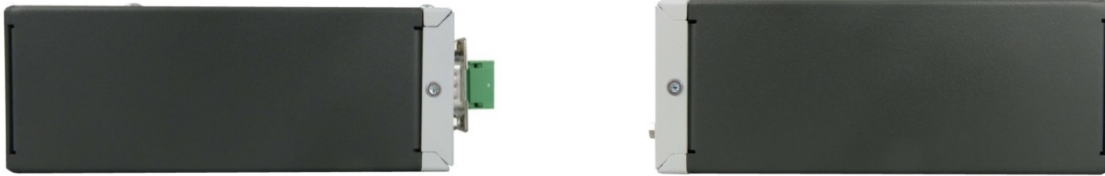


Figure 9: Side Views with 2.5" HDD/SSD Drive Bay



6/ System Extension



The KBox A-150-SKL is factory configured to meet customer requirements. Kontron does not recommend opening the system to install expansion cards as this may cause damage to internal components.

6.1. Storage



Pay attention to the manufacturer's lifespan specification. Due to the limited lifespan of HDD/SSD drives Kontron recommends checking the condition of installed HDD/SSD drives via S.M.A.R.T.regularly.

6.1.1. 2.5" HDD/SSD Drive Bay

To expand storage memory for variants with an external 2.5" HDD/SSD Drive Bay, use a 2.5" slim SSD. Before installing or removing an existing SSD, refer to Chapter 7.1: Accessing External Components.

6.1.2. M.2 SSD

There is one internal M.2 Key B socket for the installation of one M.2 SSD (42 mm). Kontron recommends the use of Kontron reference devices. For information regarding the pin assignment of the M.2 socket, refer Chapter 12.4.9: M.2 Key B Socket.

Before installing or removing an existing internal M.2 Key B card, refer to Chapter 7.2.2: Installing and Removing internal M.2 SSD.

6.2. Expansion

6.2.1. Mini PCIe card

There is one internal mini PCIe V 1.2 expansion socket. For information regarding the pin assignment of the mPCIe socket, refer Chapter 12.4.8: mPCIe Express V 1.2 Socket.

Before installing or removing an mPCIe expansion card, refer to Chapter 7.2.3: Installing and Removing mPCIe Expansion Cards.

7/ Accessing Components

This chapter contains important information that users must read before accessing components. Follow these procedures properly when accessing or installing component to extend the system.



The KBox A-150-SKL is factory configured to meet customer requirements. Kontron does not recommend opening the system as this may cause damage to internal components.

WARNING

The installation/removal of system components may only be performed by a qualified persons. Observe the "General Safety Instructions for IT-Equipment" and the "installation instructions" contained within this user guide.



ESD Sensitive

Follow the safety instructions for components that are sensitive to electrostatic discharge (ESD). Failure to observe this warning notice may result in damage to the product or/and internal components.



Because of the limited predetermined lifespan of expansion devices, Kontron recommends checking the condition of installed expansion devices regularly and to pay attention to the manufacturer specifications for lifespan.

7.1. Accessing External Components

7.1.1. 2.5" HDD/SSD Drive Bay

The KBox A-150-SKL with 2.5" HDD/SSD drive bay supports the use of 9.5 mm and 7 mm high SSD drives in the 2.5" HDD/SSD drive bay. To insure that 7 mm high SSDs are correctly connected and to avoid damage to the internal SATA connectors an spacer must be attached to 7 mm SSD drives to enable 7mm SSD drives to correctly align with the internal SATA data and SATA power connector mounting points.

To remove/install a removable 2.5" HDD/SSD drive, perform the following steps:

1. Press the HDD/SSD drive bay eject button, to remove an existing HDD/SSD drive from the drive bay. The drive bay springs open and the HDD/SSD drive automatically slides out a bit for removal.
2. Remove the drive by holding the sides of the drive and carefully pulling the drive out of the drive bay.



The 2.5" HDD/SSD drive bay allows for the installation of 9.5 mm or 7 mm high SSD drives. A 7 mm high SSD can only be used, when an spacer is attached to the SSD. The spacer ensures that a 7 mm high SSD drive aligns correctly with the internal SATA data and SATA power connector mounting points.

3. For 9.5 mm high SSDs, carefully push the SSD into the drive bay with the SSD contacts facing the drive bay until the connectors attach.

For 7 mm high SSD drives, attach the SSD to a 7 mm – 9.5 mm spacer, then carefully push the SSD with spacer into the drive bay with the SSD contacts facing the drive bay until the connectors attach.

4. The KBox A-150-SKL can now be powered up.

7.2. Accessing Internal Components

7.2.1. Opening the Chassis

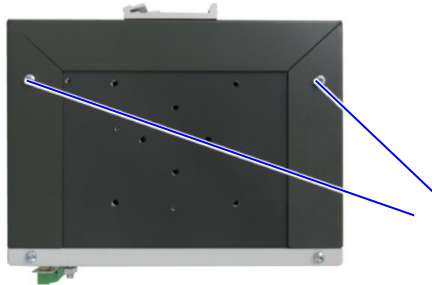
To access the internal component open the KBox A-150-SKL chassis as follows:



The KBox A-150-SKL is factory configured to meet customer requirements. Kontron does not recommend opening the system as this may cause damage to internal components.

1. Close all applications. Shut down the system properly and disconnect the power cord from the power source. Disconnect all peripherals.
2. Place on a flat, clean and ESD-safe surface.
3. The front panel is attached to the mainboard. To remove the front panel and open the chassis the mainboard must also be released. To release the mainboard remove the two screws shown in Figure 10: Mainboard Fastening Screws.

Figure 10: Mainboard Fastening Screws



A) Remove mainboard fastening screws

4. To release the front panel remove the five screws that fasten the front panel to the main chassis, see Figure 11: Front Panel Fastening Screws. One screw is located at the bottom of the front panel, two screws are located on the front panel's sides (right and left) and a further two screws are located on the front panel's top side. Retain all screws, to refasten the front panel to the main chassis.

Figure 11: Front Panel Fastening Screws



A) Remove front panel bottom side screw



B) Remove front panel right and left side screws

5. Once released, carefully move the front panel away from the main chassis while taking care not to damage the attached mainboard. Place the front panel plus mainboard construction on an ESD-safe surface.
6. To close the KBox A-150 SKL, proceed in the reverse order. Align the front panel with the main chassis and push backwards (towards the rear side of the chassis) while making sure that the front panel remains aligned and goes back as far as it will go. Secure the cover with the screws removed in step 4 and step 3.

7.2.2. Installing and Removing a M.2 SSD Card (42 mm)



The KBox A-150-SKL is factory configured to meet customer requirements. Kontron does not recommend opening the system as this may cause damage to internal components.

To install a M.2 SSD follow the steps below:

1. Close all applications; shut down the system properly and disconnect the connection to the power source. Disconnect all peripherals.
2. Open the chassis as described in Chapter 7.2.1: Opening the Chassis (steps 1-6).
3. Locate the M.2 sockets and the corresponding fastening screw.
4. Insert the M.2 SSD card into the corresponding socket, at an angle of approx. 30°. It might be required to move the M.2 SSD card slightly from side to side to help ease the card carefully into the socket.
5. Secure the M.2 SSD card by pressing down on the free end and carefully screw the M.2 SSD card to the board until the M.2 SSD card is flat with the mainboard.
6. To close the KBox A-150-SKL, proceed in reverse order (step 6 to 1) of Chapter 7.2.1: Opening the Chassis.

To remove a M.2 SSD follow the steps below:

1. Close all applications; shut down the system properly and disconnect the connection to the power source. Disconnect all peripherals.
2. Open the Chassis as described in the Chapter 7.2.1: Opening the Chassis (steps 1-6).
3. Locate the M.2 SSD card installed into your system.
4. Remove the fastening screw and the M.2 SSD springs up at an angle of approximately 30° at the free end.
5. Gently pull the M.2 SSD card out of the M.2 socket.
6. Keep the M.2 SSD card's fastening screw for further use.
7. To close the KBox A-150-SKL, proceed in reverse order (step 6 to 1) of Chapter 7.2.1: Opening the Chassis.

⚠ WARNING

After changing the M.2 SSD the partitioning of the memory maybe different.

7.2.3. Installing and Removing a mPCIe Expansion Card



The KBox A-150-SKL is factory configured to meet customer requirements. Kontron does not recommend opening the system as this may cause damage to internal components.

To install a mini PCIe (mPCIe) cards follow the steps below:

1. Close all applications; shut down the system properly and disconnect the connection to the power source. Disconnect all peripherals.
2. Open the device as described in the Chapter 7.2.1: Opening the Chassis (step 1-6).
3. Locate the mPCIe card socket and the corresponding fixing screw hole.
4. Insert the mPCIe card into the socket at an angle of approx. 30° and push it down until the fixing holes of the card are aligned with the mainboards fixing screw hole.
5. Secure the mPCIe by pressing down on the free end and carefully screw the mPCIe card to the mainboard until the mPCIe card is flat with the mainboard.
6. To close the KBox A-150-SKL, proceed in reverse order (step 6 to 1) of Chapter 7.2.1: Opening the Chassis.

To remove a mini PCIe (mPCIe) card follow the steps below:

1. Close all applications; shut down the system properly and disconnect the connection to the power source. Disconnect all peripherals.
2. Open the device as described in the Chapter 7.2.1: Opening the Chassis (step 1-6).
3. Locate the mPCIe card installed into your system.
4. Remove the fastening screw and the mPCIe card springs up at an angle of approximately 30° at the free end.
5. Gently pull the mPCIe card out of the socket.
6. To close the KBox A-150-SKL, proceed in the reverse order (step 6 to 1) of Chapter 7.2.1: Opening the Chassis.

8/ Thermal Considerations

⚠ WARNING

Hot Surface - heatsink

Danger of burns. Heatsink can get very hot. To avoid burns and personal injury:

- Do not touch the heatsink when the product is in operation
- Allow the product to cool before handling
- Wear protective gloves
- Always turn the product off when not in use

8.1. Heatsink Plate

The KBox A-150-SKL is a fanless and passively cooled using a heatsink plate to dissipate heat from within the chassis to the ambient environment. When mounting the KBox A-150-SKL in a DIN rail enclosure or housing take care not to obstruct the airflow over the heatsink plate, as this stops sufficient heat dispersing into the ambient environment and causes a build-up of heat.

Features of the heatsink plate are:

- ▶ Surface area of 171 mm x 105 mm

8.2. Heatsink Fins (option)

An optional turnable heatsink with cooling fins is available for installation on the heatsink plate. The heatsink cooling fins are tunable by 90° and can be fitted on the KBox A-150-SKL to suit each possible installation position by remaining in the vertical position to support the direction of the airflow within the DIN rail enclosure or housing. The heatsink supports the use of the DIN rail.

Figure 12: Heatsink Fin

A) Heatsink fin



B) Heatsink fin assembled with DIN rail



9/ Installation Instructions



Install expansion card before installing the KBox A-150-SKL in the control cabinet.

9.1. DIN Rail Mounting

The KBox A-150-SKL is a rail mount PC box designed for use in a DIN rail enclosure or housing by attaching a DIN rail mounting clamp. The DIN rail mounting clamp can be attached on:

- ▶ Top side of the chassis
- ▶ Heat sink on the top side of the chassis
- ▶ Rear side of the chassis

The position and direction of the clamp decides the orientation of the product within the DIN rail enclosure or housing. When deciding on the KBoxA-150-SKL's orientation consider access to the front panel and to the external 2.5" HDD/SDD drive bay, if available.

To attach the DIN Rail mounting clamp, follow the steps below:

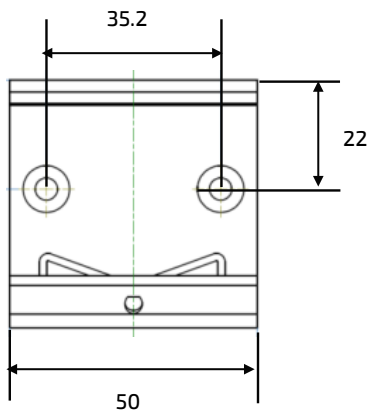
1. Make sure that the DIN Rail mounting clamp is in the upper position, for the required mounting option.

Figure 13: DIN Rail Mounting Clamp Upper Position



2. Fasten the DIN rail mounting clamp firmly to the chassis using the DIN rail mounting clamp screws.

Figure 14: DIN Rail Clamp Screw Dimensions (Measurements in mm)

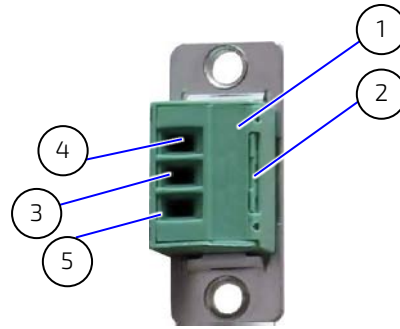


3. Clip the top of the DIN rail mounting clamp in to the DIN rail and push the bottom of the DIN rail firmly until it clamps on to the bottom of the DIN rail.

9.2. Power Connector

The KBox A-150-SKL is connected by the input power connector on the front panel to a DC power source via a DC power supply wiring consisting of the Phoenix power mating connector (3-pin Phoenix PSC 1,5/ 3-F) delivered with the KBox A-150-SKL and the assembled wires. For information on how to assemble the wires, see Chapter 9.2.1:Wiring the DC Power Connector.

Figure 15: Phoenix Power Mating Connector



- | | | | |
|---|--|---|---------------------------------------|
| 1 | 3-pin Phoenix plug terminal | 4 | Location for inserting the 0 V wire |
| 2 | Cover over the slotted pan head screws | 5 | Location for inserting the +24 V wire |
| 3 | Location for inserting the functional earth wire | | |

9.2.1. Wiring the DC Mating Power Connector

To wire the supplied 3-pin Phoenix PSC 1,5/ 3-F power mating connector, following the step below:

1. Cut three (1 mm²) AWG18 isolated wires to the required length and strip each end 5 mm – 7 mm.
2. Twist the striped wire-ends and provide them with ferrules.
3. Access the slotted pan head screws by opening the Phoenix Power Mating Connector cover (Figure 15, pos. 2).
4. Loosen the slotted pan head screws of the Phoenix power mating connector far enough so that you can insert the end of the prepared wires.
5. Insert the wires into the corresponding clamp of the Phoenix power mating connector. Make sure that you have the right polarity of the connection. For the pin assignment of the Input power connector, refer to Chapter 12.4.1: Input Power Connector.
6. Fasten the screws to secure the wires into the Phoenix power mating connector's clamps.
7. Close the Phoenix power mating connector cover (Figure 15, pos. 2).



The wires used for power connections must be clearly marked (+/-/functional earth) to ensure proper connection to the front panel input power connector and to the main power source. In addition, the cables must have some form of support to minimize the strain on the unit's connectors.

10/ Starting Up

Before using the system, become familiar with the system components and follow the startup instructions below.

10.1. Connecting to Power Supply

The KBox A-150-SKL connects to a DC main power supply via a Phoenix input power connector on the front panel and corresponding power cable.



When starting the KBox A-150-SKL, the functional earth connection must always be made first and disconnected last. Kontron recommended that the last connections attached to the system should be the power cable. Following a proper cabling procedure will prevent a false power-on condition, which could result in an operational failure.

CAUTION

The KBox A-150-SKL must be connected to a DC mains power supply complying with the SELV (Safety Extra Low Voltage) requirements of EN 60950-1 standard. It must be observed that wiring and short-circuit/overcurrent protection is performed according to the applicable standards, regulations and respect to the electrical specification of the KBox A-150-SKL. The disconnecting device (fuse/circuit breaker) rating must be in accordance with the KBox A-150-SKL's wire cross-section.

To start the KBox A-150-SKL, follow the steps below:

1. Ensure that the DC power source is switched off via a disconnecting device (circuit breaker), in order to ensure that no power is flowing from the external DC power source during the connection procedure.
2. Connect the protective earth stud bolt to an appropriate common earth connection point.
3. Connect the supplied Phoenix PSC 1,5/3-F power connector with wiring (refer to Chapter 9.1: DC Power Connector and Chapter 9.1.1: Wiring the DC Power Connector) to the Input power connector located on the front panel, see Figure 4: Front Panel View (pos. 1). Pay attention to the polarity of the connections. For more information on the input power connector's polarity, see Chapter 12.4.1: Input Power Connector.
4. Connect the other end of the DC power cable to the DC main power supply.
5. Switch on the disconnecting device (circuit breaker) in order to apply voltage to the KBox-A-150-SKL.

10.1.1. Power-On Switch

A Power-on switch is available on the front panel, to apply power or perform an orderly shutdown without data loss see Figure 4 (pos.7).

NOTICE

Do not disconnect the power from KBox A-150-SKL while KBox A-150-SKL is powered up! Performing a forced shutdown can lead to loss of data or other undesirable effects!

10.2. Operating System (OS) and Drivers

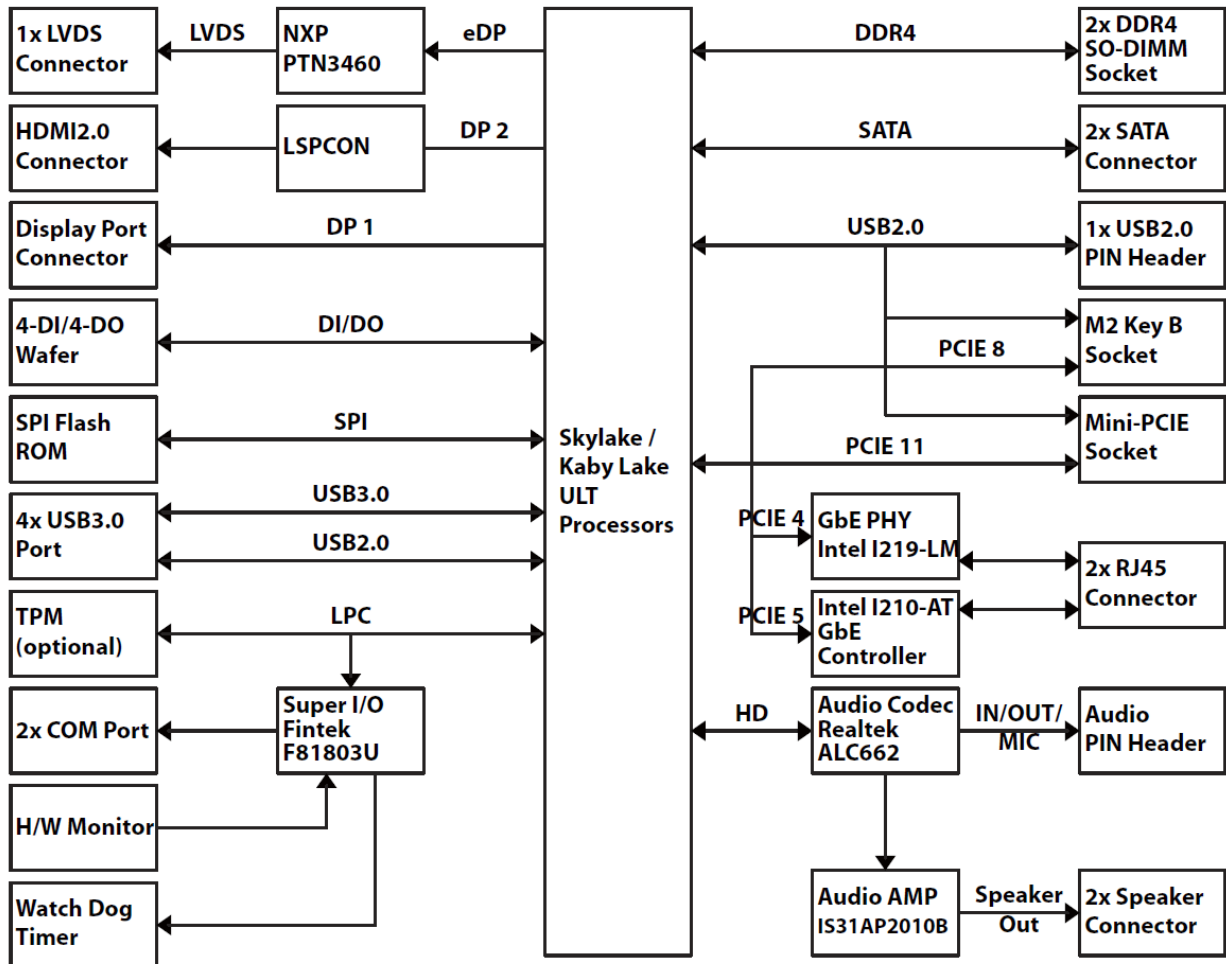
The standard KBox-A-150-SKL is fully operational when switched on for the first time with pre-installed OS and drivers. Drivers are available from Kontron's EMD customer section.

If ordered without pre-installed OS, before starting the KBox A-150-SKL the operating system and the appropriate drivers need to be installed for the ordered system configuration.

11/ Technical Data

11.1. Block Diagram

Figure 16: Block Diagram



11.2. Technical Specification

The KBox A-150- SKL implements the following mainboard technical specification.

Table 4: Technical Specification

Processor	Intel® Skylake ULT Core™ i5-6300U 2.4 GHz/3.0 GHz (Burst)
System Memory	Up to 16 GB Max. with 2x DDR4 2133 SODIMM
Storage	Up to 512 GB Max M.2 SSD 2.5" slim SSD drive bay (optional)
Graphics	Intel® HD Graphics 520
Audio	Optional
Interfaces	4x USB 3.0 2x LAN (GbE) 1x HDMI 1x DP 2x COM (RS 232, RS422, RS485, BIOS configurable)
Sockets	1x mPCIe
Power	9 VDC - 30 VDC Input

Table 5: Software Specification

Operating System (OS)	Windows 10 IoT Enterprise (64 bit) Linux Ubuntu 16.xx (64 bit) On request - Windows 7 Professional (32 bit/64bit), Windows 7 Ultimate (32 bit/64bit) and Windows 7 Embedded Standard (64bit)
BIOS	AMI uEFI BIOS, Aptio V5

11.3. Mechanical Specification

Table 6: Mechanical Specification

Dimensions	KBox A-150-SKL (with 2.5" HDD/SSD Drive Bay)	KBox A-150-SKL (without 2.5" HDD/SSD Drive Bay)
Width	180 mm (7.09")	180 mm (7.09")
Depth	134 mm (5.28")	134 mm (5.28")
Height	58 mm (2.28") without heatsink 76 mm (2.99") with heat sink	50 mm (1.97") without heatsink 68 mm (2.68") with heatsink
Weight (chassis only)	Approx. ~1 kg (~2.2 lbs.)	Approx. ~1 kg (~2.2 lbs.)
Construction	Steel chassis	Steel chassis
Mounting	DIN Rail	DIN Rail
Color	RAL7035 (Front panel) RAL7043 (Top cover and main chassis) Cooling fins, black	RAL7035 (Front panel) RAL7043 (Top cover and main chassis) Cooling fins, black

For more detailed mechanical information, refer to the outline dimensions drawings within this chapter. Each dimension drawing shows the main external mechanical features such as the position and size of mounting holes for the DIN rail retaining clamp.

The following outline dimensions drawings shows the main external mechanical features for the KBoxA-150-SKL with an external 2.5" HDD/SSD drive bay.

Figure 17: Front Panel Dimensions with HDD/SSD drive bay (Measurements in mm)

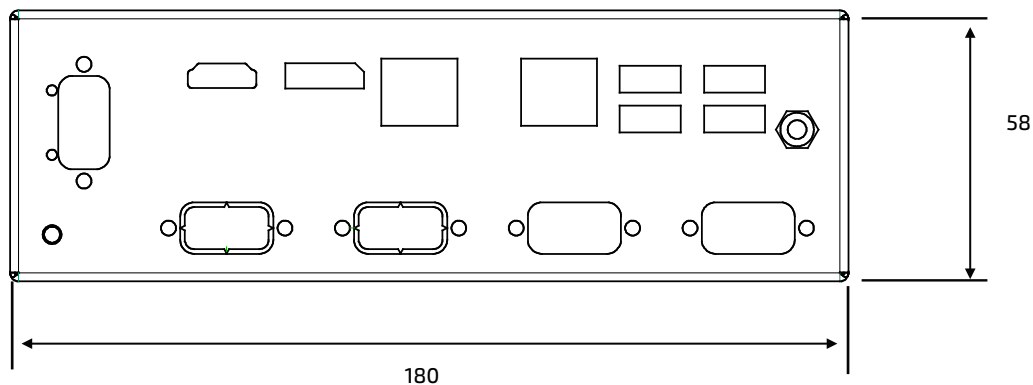


Figure 18: Rear Side Dimensions with HDD/SSD drive bay (Measurements in mm)

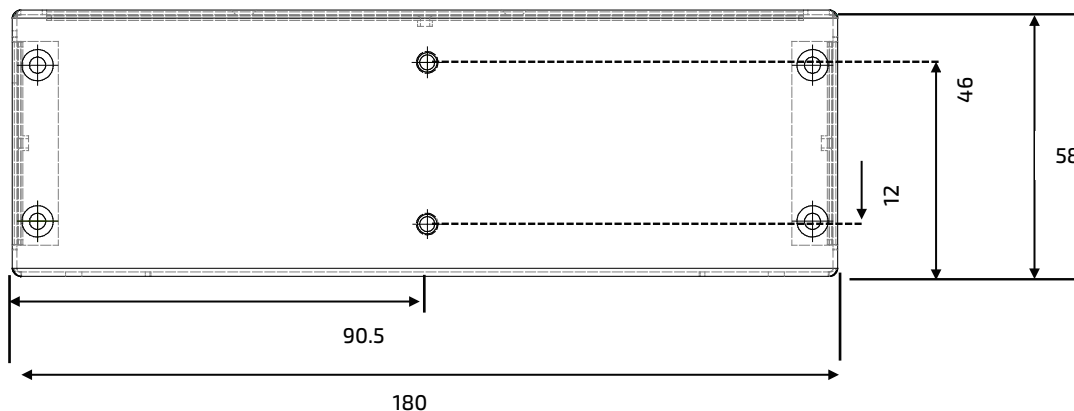


Figure 19: Top Side Dimensions HDD/SSD drive bay (Measurements in mm)

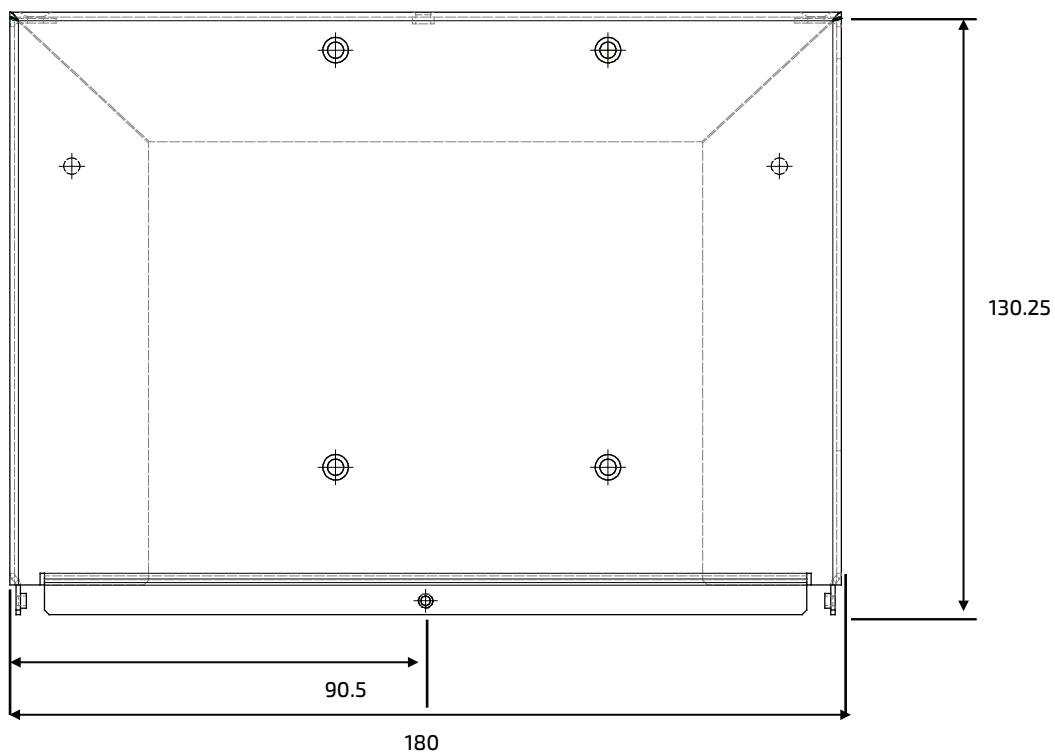
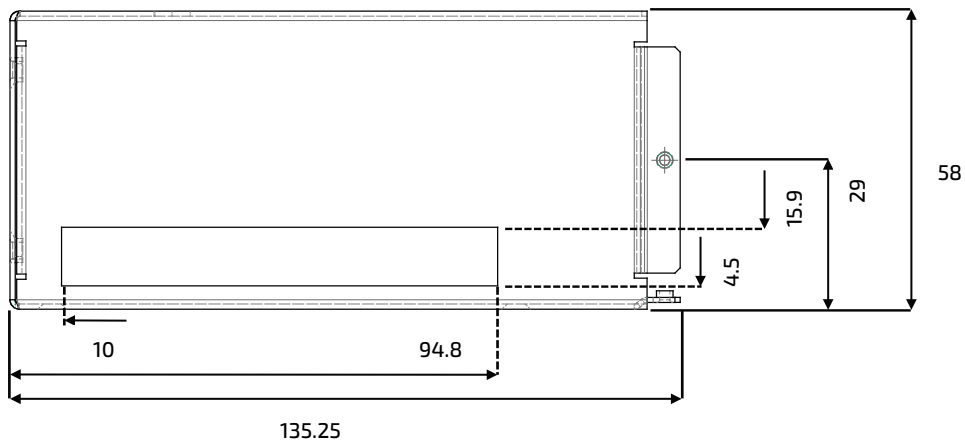


Figure 20: Side View Dimensions with HDD/SSD drive bay (Measurements in mm)



The following outline dimensions drawings shows the main external mechanical features for the KBoxA-150-SKL without an external 2.5" HDD/SSD drive bay.

Figure 21: Front Panel Dimensions without drive bay (Measurements in mm)

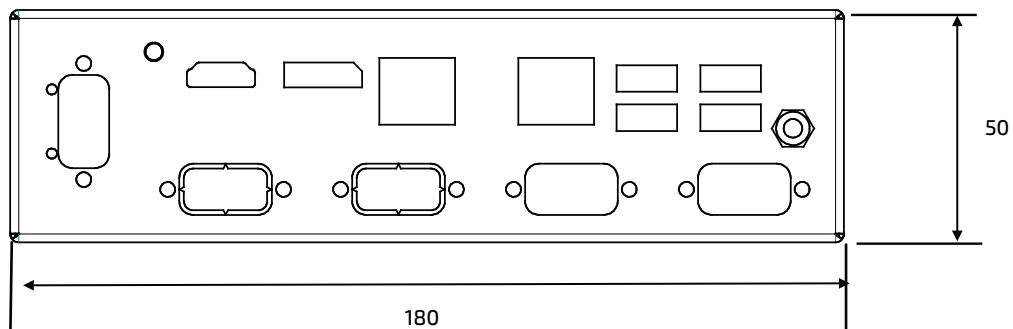


Figure 22: Rear Side Dimensions without drive bay (Measurements in mm)

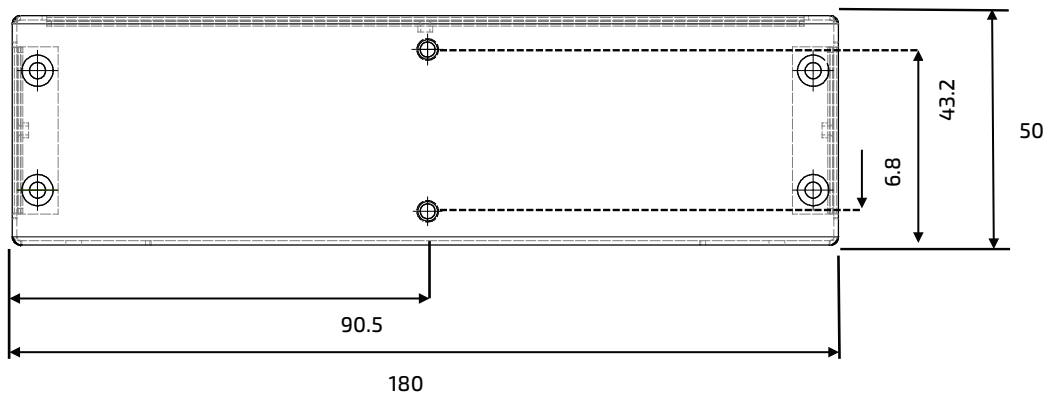


Figure 23: Top Side Dimensions without drive bay (Measurements in mm)

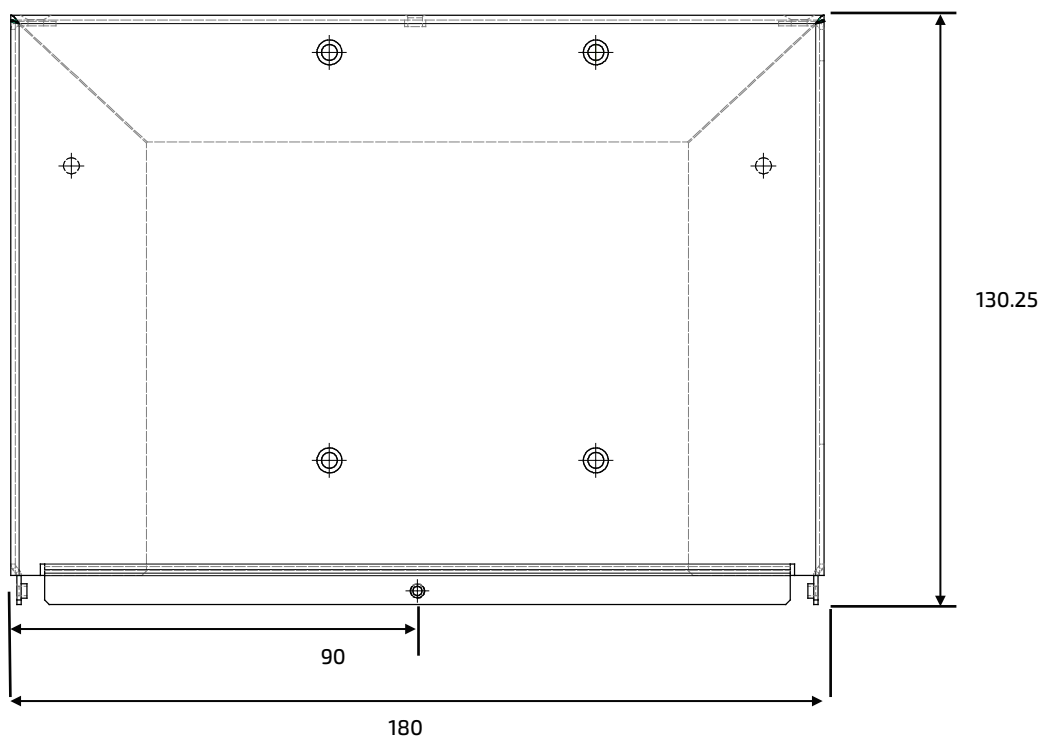
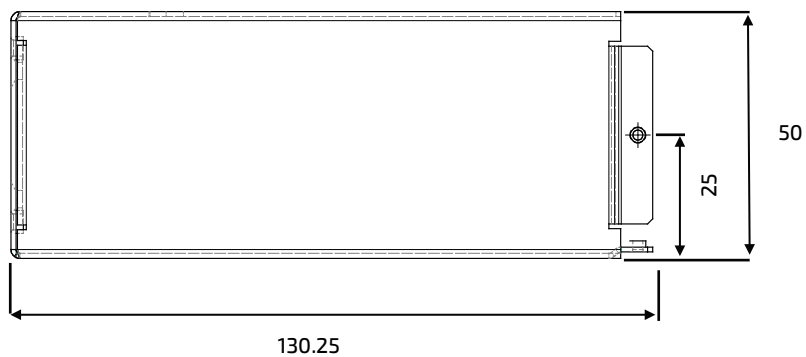


Figure 24: Side View Dimensions without drive bay (Measurements in mm)



11.4. Power Specification

The KBox A-150-SKL is powered by a 3-pin Input power connector on the front panel and has no internal power supply. The standard Input voltage of 24 V DC is converted internal to 12 VDC using a converter, to supply the mainboard with +12 V DC. The mainboard generates all other required voltages.

NOTICE

Hot Plugging the power supply is not supported. Hot plugging might damage the board.

Table 7: Power Specification

Nominal Input Voltage	24 V DC
Input Voltage Range	9 V DC to 30 V DC
Input Power Connector	3- pin Phoenix PSC 1.5/3-M

11.4.1. Power Consumption

The power consumption of the KBox A-150-SKL depends on the implemented mainboard capacity and external interfaces, for more information see Table 8: Power Consumption.

Table 8: Power Consumption

Power Consumption			Type Label Rating	
Mainboard (Burn-In)	External Interfaces	Total		
100% RAM, 100% CPU, 100% disk	4x USB 3.0 1x HDMI 1x DP	Mainboard + External Interfaces	Voltage	30 V to 9 V (Max. range)
			Current	4.4 A (Max.)
15 W	22.6 W	37.6 W	Power	39.5 W (37.6 W + 5%)

11.4.2. Protective Earth Stud Bolt

There is a protective earth stud bolt on the front panel connected to the chassis GND inside the system. The position of the protective earth stud bolt varies depending on whether the KBox A-150-SKL is delivered with an external 2.5" HDD/SSD drive bay see Figure 4 (pos. 2) or without an external 2.5" HDD/SSD drive bay, see Figure 5 (pos. 2).

11.5. Environmental Specification

Table 9: Environmental Specification

Temperature (Operating)	Standard (without heatsink)	0°C - 40°C ambient
	With heatsink	0°C - 50°C ambient
Relative Humidity (Operating)		10%-90% RH @ 39°C, non condensing

12/ Connector, Socket and Jumper Pin Assignments

Before changing any hardware setting read this chapter carefully. This chapter provided information for the front panel connectors and the relevant internal connectors, sockets and jumpers.

12.1. Front Panel Connectors

Figure 25: Front Panel Connectors

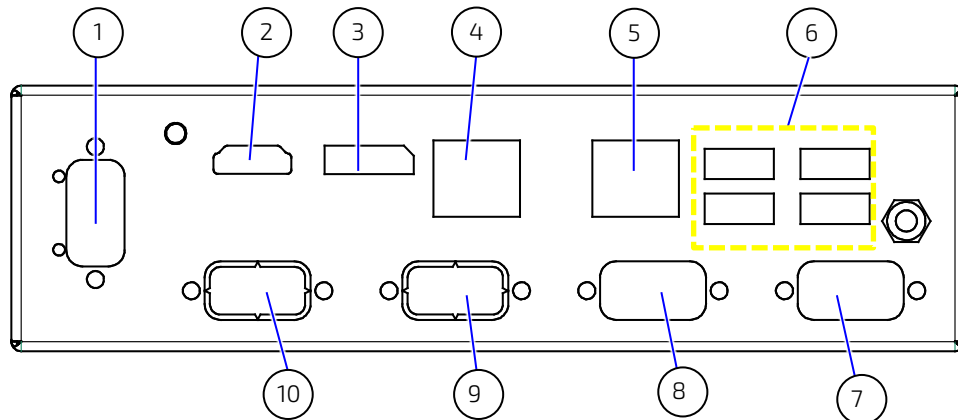


Table 10: Front Panel Connectors

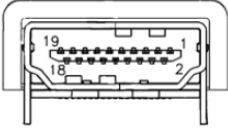
Item	Label	Function	See Chapter
1	PWR	DC Power Connector (3-pin Phoenix)	12.2.1
2	HDMI	HDMI Connector	12.2.2
3	DP	Display Port Connector	12.2.3
4	LAN 2	GbE LAN1 RJ-45 Connector	12.2.4
5	LAN 1	GbE LAN2 RJ-45 Connector	
6	USB	USB3.0 Port 0 Connector	12.2.5
7	X1	COM1	12.2.6
8	X2	COM2	
9	X3	COM3 (option)	
10	X4	COM4 (option)	

12.2. Front Panel Connector Pin Assignments

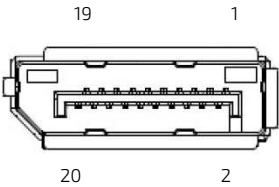
12.2.1. Input Power Connector

3-Pin Power		Pin	Signal Name
	Phoenix Contact PSC 1.5/3-M	1	GND
		2	Functional Earth
		3	VCC

12.2.2. HDMI Connector (HDMI)

19-pin HDMI	Pin	Signal Name
	1	TMDS Data2+
	2	GND
	3	TMDS Data2-
	4	TMDS Data1+
	5	GND
	6	TMDS Data1-
	7	TMDS Data0+
	8	GND
	9	TMDS Data0-
	10	TMDS Clock+
	11	GND
	12	TMDS Clock-
	13	CEC
	14	Reserved
	15	DDC_CLK
	16	DDC_DATA
	17	GND
	18	+5V Power
	19	Hot Plug Detect

12.2.3. Display Port Connector (DP)

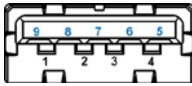
20-pin VGA	Pin	Signal Name	Pin	Signal Name
	1	TX0+	11	GND
	2	GND	12	TX3-
	3	TX0-	13	GND
	4	TX1+	14	GND
	5	GND	15	AUX+
	6	TX1-	16	GND
	7	TX2+	17	AUX-
	8	GND	18	HPD
	9	TX2-	19	GND
	10	TX3+	20	PWR

12.2.4. GbE RJ45 Connectors (LAN1, LAN2)

RJ45 (female)	Pin	Signal Name	Pin	Signal Name
	1	TX1+	5	TX3-
	2	TX1-	6	TX2-
	3	TX2+	7	TX4+
	4	TX3+	8	TX4-

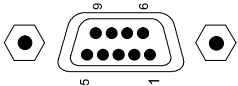
Left LED: Activity / Link		Right LED: Activity 10/100/1000	
Off	NO LAN connectivity	Off	10 Mbit
Yellow	Link	Green	100 Mbit
Blinking	Activity	Orange	1 GbE

12.2.5. USB 3.0 Type-A Connector

USB 3.0 Port	Pin	Signal Name	Pin	Signal Name
	1	+USB_VCC ⁽¹⁾	5	USB_RX-
	2	USB_D-	6	USB_RX+
	3	USB_D+	7	GND
	4	GND	8	USB_TX-
			9	USB_TX+

(1) The power source of +USBVCC can be selected by JP7

12.2.6. Serial Port Connectors (X1, X2)

Serial Port	Pin	RS232	RS422	RS 485 Half Duplex	RS 485 Full Duplex
	1	DCD	Tx-	Data-	Tx-
	2	RxD	Tx+	Data+	Tx+
	3	TxD	Rx+		Rx+
	4	DTR	Rx-		Rx-
	5	GND	GND	GND	GND
	6	DSR			
	7	RTS			
	8	CTS			
	9	RI			

12.3. Internal Connectors and Sockets

Figure 26: Internal Connectors Top View

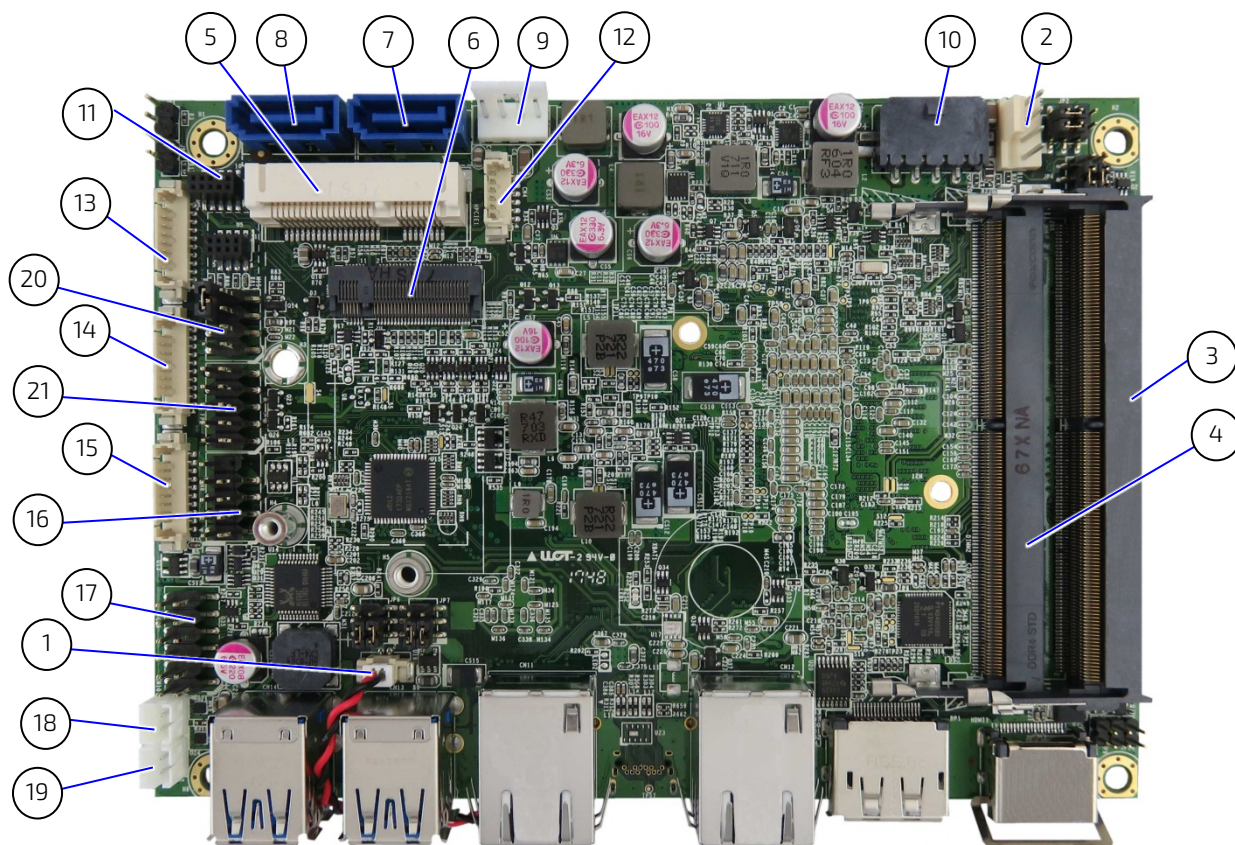


Table 11: Internal Connectors Top side

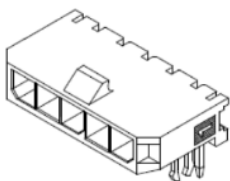
Item	Function
1	Battery power input
2	+12VDC CPU FAN
3	Primary DDR4 Memory SO-DIMM Socket
4	Secondary DDR4 Memory SO-DIMM Socket
5	Full Size Mini-PCI Express v1.2 Socket
6	NGFF M.2 Key-B Socket
7	Serial ATA Port-0 SATA Socket
8	Serial ATA Port-0 SATA Socket
9	HDD Power Output
10	DC12V Power Input
11	P80 Header
12	SIM Interface for MPCIE1/NGFF M.2
13	Digital Input / Output
14	Serial Port 1

15	Serial Port 2
16	USB 2.0 Port DN5,6 Pin Header
17	Audio Input / Output Pin Header
18	Left Channel 3W Audio AMP Output
19	Right Channel 3W Audio AMP Output
20	Front Panel 1 Pin Header
21	Front Panel 2 Pin Header
	LVDS Panel Connector (rear side)

12.4. Internal Connector and Socket Pin Assignments

12.4.1. 12 V DC Out Power Connector

An internal 24 V DC to 12 V DC converter board converts the nominal Input voltage of 24 V DC from the front panel Input power connector, to 12 V DC. System Internal component are supplied from the internal 4-pin 12 V DC out power connector.

4-pin Power	Pin	Signal Name
	1	+12 V
	2	GND
	3	GND
	4	+12V

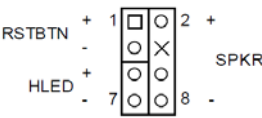
12.4.2. Battery Power Input Connector

	Pin	Signal Name
	1	+VBAT
	2	GND

12.4.3. HDD Power Output Connector

	Pin	Signal Name
	1	+12 V
	2	GND
	3	GND
	4	+5V

12.4.4. Front Panel 1-Pin Header

	Pin	Signal Name	Pin	Signal Name
	1	Reset Button +	2	Speaker+
	3	Reset Button -	4	NC
	5	HDD LED+	6	Internal Speaker-[¹]
	7	HDD LED-	8	Speaker- [¹]

[¹] Internal buzzer enabled by shorting pin 6 and pin 8.

12.4.5. Front Panel 2-Pin Header

	Pin	Signal Name	Pin	Signal Name
	1	Power LED +	2	Power Button +
	3	NC	4	Power Button -
	5	Power LED -	6	SMBALERT#
	7	BatLow#	8	SMBus DATA
	9	GND	10	SMBus Clock

12.4.6. Serial ATA Port 0 Connector

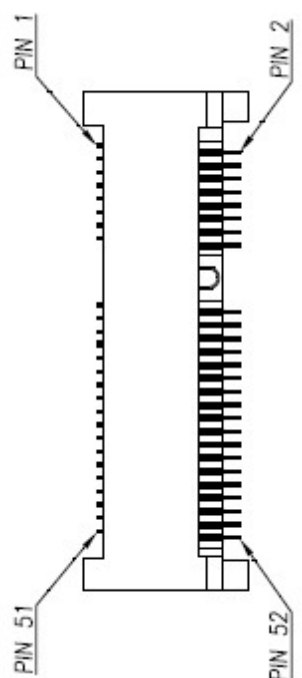
	Pin	Signal Name
	1	GND
	2	TX+
	3	TX-
	4	GND
	5	RX+
	6	RX-
	7	GND

12.4.7. USB 2.0 Port Pin Header (option)

	Pin	Signal Name	Pin	Signal Name
	1	+USBVCC ^[1]	2	+USBVCC ^[1]
	3	USB_A-	4	USB_B-
	5	USB_A+	6	USB_B+
	7	GND	8	GND
	9	KEY	10	GND

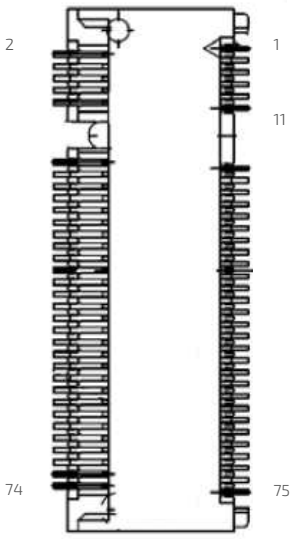
[1] Power source of +USBVCC can be selected by USB Power Selection jumper (JP7).

12.4.8. mPCIe Express V 1.2 Socket

	Signal Name	Pin	Pin	Signal Name
	WAKE#	1	2	+3.3 VSB
	Reserved	3	4	Ground
	Reserved	5	6	+1.5 V
	CLKREQ#	7	8	UIM_PWR*
	Ground	9	10	UIM_DATA*
	REFCLK-	11	12	UIM_CLK*
	REFCLK+	13	14	UIM_RESET*
	Ground	15	16	NUIM_VPP*
	Reserved	17	18	Ground
	Reserved	19	20	W_Disable#
	Ground	21	22	PERST#
	PERn0	23	24	+3.3 VSB
	PERp0	25	26	Ground
	Ground	27	28	+1.5 V
	Ground	29	30	SMB_CLK
	PETn0	31	32	SMB_DATA
	PETp0	33	34	Ground
	Ground	35	36	USB_D-
	Ground	37	38	USB_D+
	+3.3 VSB	39	40	Ground
	+3.3 VSB	41	42	LED_WWAN#
	Ground	43	44	LED_WLAN#
	Reserved	45	46	LED_WPAN#
	Reserved	47	48	+1.5 V
	Reserved	49	50	Ground
	Reserved	51	52	+3.3 VSB

[¹] These pins are connected to the SIM Interface wafer directly.

12.4.9. M.2 Key B Socket

		Signal Name	Pin	Pin	Signal Name
		CONFIG3	1	2	+3.3V
		GND	3	4	+3.3V
		GND	5	6	FULL CARD PWR OFF
		USB-D+	7	8	W DISABLE#1
		USB-D-	9	10	GPIO9
		GND	11	12	KEY B
		KEYB	13	14	KEY B
		KEYB	15	16	KEY B
		KEYB	17	18	KEY B
		KEYB	19	20	GPIO5
		CONFIO	21	22	GPIO6
		GPIO11	23	24	GPIO7
		GPIO12	25	26	GPIO10
		GND	27	28	GPIO8
		NC	29	30	UIM RESET ^[1]
		NC	31	32	UIM CLK ^[1]
		GND	33	34	UIM DATA ^[1]
		NC	35	36	UIM PWR ^[1]
		NC	37	38	DEVSLP
		+3.3V	39	40	GPIO0
		PETn0/SATAB+	41	42	GPIO1
		PETn0/SATAB-	43	44	GPIO2
		NC	45	46	GPIO3
		PETn0/SATAA-	47	48	GPIO4
		PETn0/SATAA+	49	50	PERST
		GND	51	52	CLKREQ
		REFCLKN	53	54	PEWAKE
		REFCLKP	55	56	MFG_DAT
		GND	57	58	MFGCLK
		ANTCTL	59	60	COEX
		ANTCTL	61	62	COEX
		ANTCTL	63	64	COEX
		ANTCTL	65	66	SIM DETECT
		PER1-	67	68	SUSCLK
		CONFIG1	69	70	+3.3V
		GND	71	73	+3.3V
		GND	73	75	+3.3V
		Config2	75		

[1] These pins are connected to the SIM Interface wafer directly.

12.5. Jumpers

Figure 27: Jumper Top View

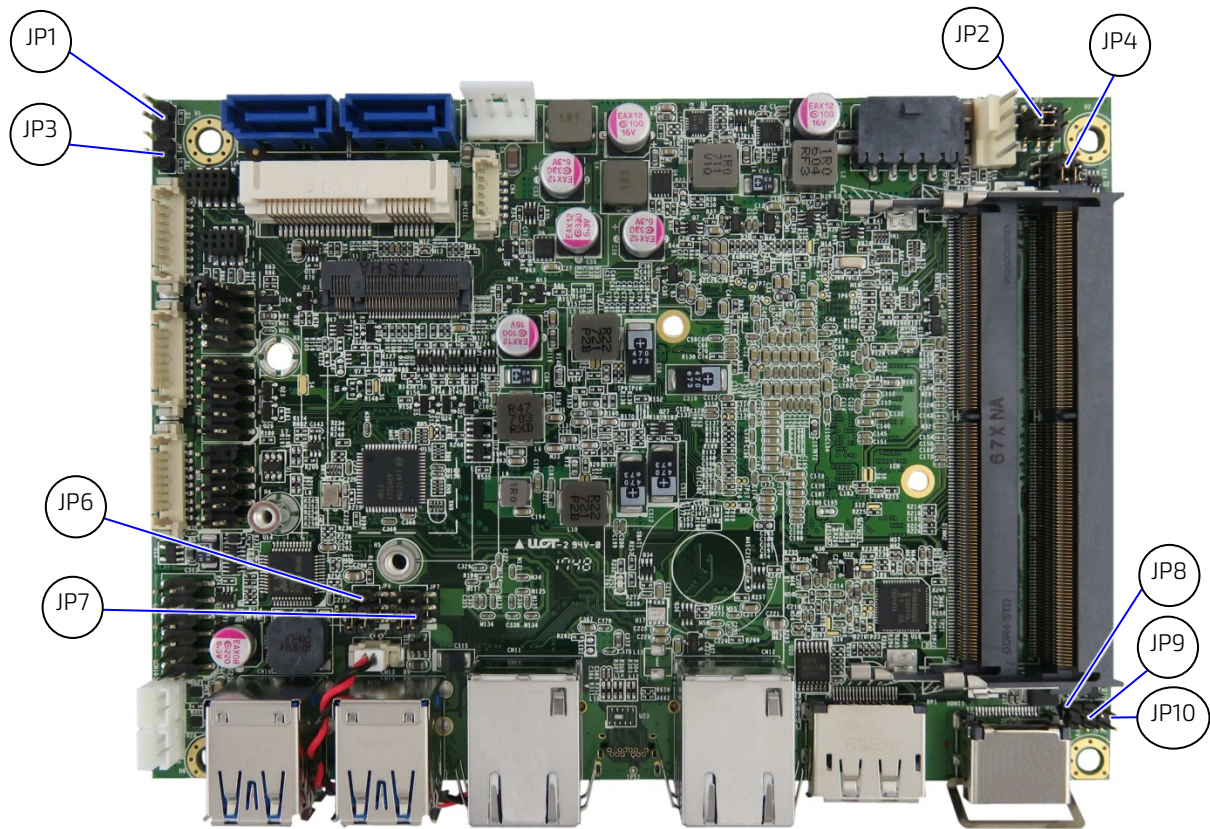


Table 12: Jumpers

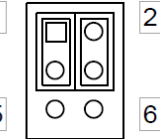
Label	Function
JP1	MPCIE1 Activity LED Pin Header
JP2	Panel & Backlight Power Selection for LVDS1
JP3	NGFF M.2 Activity LED Pin Header
JP4	Backlight Power Enable Selection for LVDS1
JP6	AT / ATX Power Mode and NGFF mSATA/mPCIe Selection
JP7	SIM Card and MPCIE mSATA/mPCIe Selection, USB Power Selection
JP8	Flash Descriptor Security Override Selection
JP9	RTC Reset Selection
JP10	Clear ME Register

12.6. Jumper Pin Assignments

12.6.1. MPCIE1 Activity LED (JP1) Pitch 2.54 mm

	Pin	Status
	1	LED+
	2	LED-

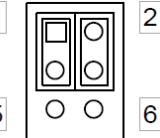
12.6.2. Panel & Backlight Power Selection for LVDS1 (JP2) Pitch 2.54 mm

	Jumper	Setting	Status
	1	1-3	Backlight Power = +12 V
		3-5	Backlight Power = +5 V
	2	2-4	Panel Power = +3.3 V
		4-6	Panel Power = +5 V

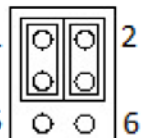
12.6.3. M.2 Activity LED Pin Header (JP3) Pitch 2.54 mm

	Pin	Status
	1	LED+
	2	LED-

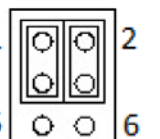
12.6.4. Backlight Power Enable Selection for LVDS1 (JP4) Pitch 2.0 mm

	Jumper	Setting	Status
	1	1-3	Backlight Enable Voltage = +3.3 V
		3-5	Backlight Enable Voltage = +5 V
	2	2-4	Active High
		4-6	Active Low

12.6.5. AT / ATX Power Mode and NGFF mSATA/mPCIe Selection (JP6) Pitch 2.0 mm

	Jumper	Setting	Status
	1	1-3 short	ATX mode
		3-5 short	AT mode
	2	2-4 short	NGFF select mSATA
		4-6 short	NGFF select mPCIe

12.6.6. SIM Card & MPCIE mSATA/mPCIe Selection, USB Power Selection (JP7) Pitch 2.0 mm

	Jumper	Setting	Status
	1	1-3 short	SIM card to NGFF
		3-5 short	SIM card to mPCIe
	2	2-4 short	S3 USB power support
		4-6 short	S5 USB power support

12.6.7. Flash Descriptor Security Override Selection (JP8) Pitch 2.0 mm

	Jumper	Status
	1-2 short	Enable
	1-2 open	Disable

12.6.8. RTC Reset Selection (J9) Pitch 2.0 mm

	Jumper	Status
	1-2 short	Enable Clear CMOS
	1-2 open	Disable

12.6.9. Clear ME Register (J10) Pitch 2.0 mm

	Jumper	Status
	1-2 short	Enable Clear CMOS
	1-2 open	Disable

13/ BIOS

The KBox-A-150-SKL uses the AMI uEFI BIOS supported by the mainboard and based on the Unified Extensible Firmware Interface (uEFI) specification and the Intel® Platform Innovation Framework for EFI. The AMI uEFI BIOS preferences are preset and do not require further adjustment for operation. The AMI BIOS setup menus and available selection may vary. The uEFI BIOS features enhanced functions specifically tailored to the KBox A-150-SKL's hardware features:

- ▶ Configurable COMs (RS232, RS422, RS485)
- ▶ Configurable power settings

For specific Information on the BIOS for your product, contact Kontron Support.



The BIOS Information covered in this document may not be for the latest version. The latest version may have certain differences to the BIOS options and features described in this chapter. For the BIOS Information specific for your product, contact Kontron Support.

13.1. Starting the uEFI BIOS

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

To start the uEFI BIOS Setup program, follow the steps below:

1. Power on the board.
2. Wait until the first characters appear on the screen (POST messages or splash screen).
3. Press the key.
4. If the uEFI BIOS is password-protected, a request for password will appear. Enter either the User Password or the Supervisor Password, press <RETURN>, and proceed with step 5.
5. The BIOS setup utility appears in the Main menu

Using the hot key navigation system users can navigate through the BIOS. The hot key legend bar is located at the bottom of the Setup screens. The following table provides a list of navigation hot keys available in the legend bar.

Table 13: Navigation Hot Keys Available in the Legend Bar

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

13.2. Setup Menus

The Setup utility features menus listed in the selection bar at the top of the screen are:

- ▶ Main
- ▶ Advanced
- ▶ Boot
- ▶ Security
- ▶ Save & Exit

The currently active menu and the currently active BIOS Setup item are highlighted in white. Use the left and right arrow keys to select the Setup menus.

Each Setup menu provides two main frames. The left frame displays all available functions. Configurable functions are displayed in blue. Functions displayed in grey provide information about the status or the operational configuration. The right frame displays an explanation of the respective function in a help window.

13.2.1. Main Setup Menu

Figure 28: Main Setup Menu Example

BIOS SETUP UTILITY						
Main	Advanced	Power	Boot	Security	Save & Exit	
Product Information					→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Product Name		ECX-SLU1				
BIOS Version		R0.05 (x64)				
BIOS Build Date		12/15/2016				
ME FW Version		11.0.0.1202				
CPU Information						
Intel® Core™ i7-6600U CPU @ 2.60GHz						
Microcode Revision		7C				
Processor Cores		2				
Memory Information						
Total Size		4096 MB (DDR4)				
Frequency		2133 MHz				
System Date		[Fri 01/01/2016]				
System Time		[00:16:42]				
Access Level		Administrator				
Version 2.17.1255. Copyright (C) 2016, American Megatrends, Inc.						

The Main Menu provides an overview of the system information and enables users to set the System date and time.

13.2.2. Advanced Setup Menu

Figure 29: Advanced Setup Menu Example

BIOS SETUP UTILITY					
Main	Advanced	Power	Boot	Security	Save & Exit
Onboard LAN1 Controller		[Enabled]		→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
Onboard LAN1 Boot		[Disabled]			
Onboard LAN2 Controller		[Enabled]			
Onboard LAN2 Boot		[Disabled]			
Audio Controller		[Enabled]			
> Display Configuration					
> Super IO Configuration					
> CPU Chipset Configuration					
> SATA Configuration					
> USB Configuration					
> TPM Configuration					
> DIO Configuration					
> H/W Monitor					
Version 2.17.1255. Copyright (C) 2016, American Megatrends, Inc.					

The following table gives more information for important setup options within the Advanced Menu. Default settings are displayed in **bold**.

Table 14: Advanced Menu

Sub-screen	Additional Sub-screens with Description	
Onboard LAN 1 Controller	[Enabled , Disabled]	
Onboard LAN 1 Boot	[Enabled, Disabled]	
Onboard LAN 2 Controller	[Enabled , Disabled]	
Onboard LAN 2 Boot	[Enabled, Disabled]	
Audio Controller	[Enabled , Disabled]	
Display Configuration	Primary Display	[Auto , IGFX, PCIE]
	UMA Frame Buffer Size	[128MB, 256MB , 512MB]
	DVMT Pre-Allocated	[32M , 64M, 96M, 128M, 160M, 192M, 224M, 256M, 288M, 320M, 352M, 384M, 416M, 448M, 480M, 512M, 1024;]
	DVMT Total Gfx Mem	[128M, 256M , MAX]
	Primary IGFX Boot Display	[VBIOS Default , DP, HDMI, LVDS]
	Active LVDS	[Enabled , Disabled]
	PWM Backlight Control	[By External , By Internal]
	LVDS Backlight Control- PWM	[0 .. 255]

Sub-screen	Additional Sub-screens with Description			
Display Configuration (continued)	LVDS Backlight Control-Voltage	[0.0V, 0.5V, 1.0V, 1.5V, 2.0V, 2.5V, 3.0V, 3.5V, 4.0V, 4.5V, 5.0V]		
	Additional information: Display Resolution: 10.4" > 800 x 600 12.1" > 800 x 600 / 1280x800 15" > 1024 x 768 15.6" > 1366 x 768 15.6" > 1920 x 1080 18.5" > 1366 x 768 21.5" > 1920 x 1080			
Super IO Configuration	Serial Port 1 Configuration	Serial Port	[Enabled , Disabled]	
		Device Settings	IO=3F8h; IRQ=4; IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12;	
		Change Settings	[Auto]	
		Serial Port 1 Type	[RS232 , RS422, RS485]	
	Serial Port 2 Configuration	Serial Port	[Enabled , Disabled]	
		Device Settings	IO=2F8h; IRQ=3; IO=3F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2F8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=3E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12; IO=2E8h; IRQ=3, 4, 5, 6, 7, 9, 10, 11, 12	
		Change Settings	[Auto]	
		Serial Port 2 Type	[RS232 , RS422, RS485]	
	CPU Chipset Configuration	EIST	[Enabled , Disabled]	
		Turbo Mode	[Enabled , Disabled]	
Hyper-Threading		[Enabled , Disabled]		
VT-d		[Enabled , Disabled]		
Active Processor Cores		[All , 1]		
Intel ® Virtualization Tech		[Enabled , Disabled]		
Intel ® TXT(LT) Technology		[Enabled, Disabled]		
C-State		[Enabled , Disabled]		
Tcc Activation Offset		0 .. 63 – Note: BIOS Default 10		

Sub-screen	Additional Sub-screens with Description	
SATA Configuration	Serial-ATA (SATA)	[Enabled , Disabled]
	SATA Mode	[Intel RST Premium, AHCI]
	Serial ATA Port 1	
	Port 1	[Enabled , Disabled]
	Serial ATA Port 2	
	Port 2	[Enabled , Disabled]
	M.2 Port 1	
	Port 1	[Enabled , Disabled]
USB Configuration	Legacy USB Support	[Enabled , Disabled, Auto]
	XHCI Legacy Support	[Enabled , Disabled]
	USB Mass Storage Driver Support	[Enabled , Disabled]
AMT Configuration	AMT BIOS Features	[Enabled, Disabled]
	Unconfigure ME	[Enabled, Disabled]
Trusted Computing	Security Device Support	[Enabled, Disabled] Note: Enabled is customer setting, Disabled is BIOS default
	Active PCR banks	SHA-1,SHA256
	Available PCR banks	SHA-1,SHA256
	SHA-1 PCR Bank	[Enabled , Disabled]
	SHA256 PCR Bank	[Enabled , Disabled]
	Pending Operation	[None , TPM Clear]
	Platform Hierarchy	[Enabled , Disabled]
	Storage Hierarchy	[Enabled , Disabled]
	Endorsement Hierarch	[Enabled , Disabled]
	TPM2.0 UEFI Spec Version	[TCG_1_2; TCG_2]
	Physical Presence Spec Version	[1.2, 1.3]
	TPM 20 InterfaceType TIS	TIS
Network Stack	Network Stack	[Enabled, Disabled]
	Ipv4 PXE Support	[Enabled , Disabled]
	Ipv6 PXE Support	[Enabled , Disabled]
DIO Configuration	User Configured	[Enabled, Disabled]
	DO-1 Value	[Output Low , Output High, Input]
	DO-2 Value	[Output Low , Output High, Input]
	DO-3 Value	[Output Low , Output High, Input]
	DO-4 Value	[Output Low , Output High, Input]
	DI-1 Value	[1]

Sub-screen	Additional Sub-screens with Description		
DIO Configuration (continued)	DI-2 Value	[1]	
	DI-3 Value	[1]	
	DI-4-Value	[1]	
	DO-1 Value	[0]	
	DO-2 Value	[0]	
	DO-3 Value	[0]	
	DO-4-Value	[0]	
H/W Monitor	Smart FAN Configuration	CPUFAN Setting	[Manual , Smart]
		Manual Duty	[255]
	Read only text CPU temperature, memory temperature, System temperature, CPU fan speed, +VCORE, +Vin, +3 VCC, +3 VSB, +VBAT, +5 VA, +3 VA		
Intel® I210 Gigabit Network Connection	NIC Configuration	Auto Negotiate	[Auto Negotiated, 10Mbps Half, 10 Mbps Full 100Mbps Half, 100Mbps Full]
		Wake On Lan	[Enabled , Disabled]
	Blink LEDS	0	
Intel® Ethernet Connection I219- LM	NIC Configuration	Auto Negotiated	[Auto Negotiated, 10Mbps Half, 10 Mbps Full 100Mbps Half, 100Mbps Full]
		Wake On Lan	[Enabled , Disabled]
	Blink LEDS	0	
Power Configuration	ACPI Sleep State		[S3 (Suspend to RAM)]
	Restore AC Power Loss		[Power Off , Power On, Last State]
	Power Saving Mode		[EUP Enabled, Disabled , DeepSx Enabled]
	Resume Event Control		
	Resume by LAN Device	[Enabled, Disabled]	
	Resume By PCIE Device	[Enabled, Disabled]	
	Resume By RTC Device	[Enabled, Disabled]	
	Resume By RTC Alarm	[Enabled, Disabled]	
	Watchdog Timer Configuration	WDT Function	[Enabled, Disabled]

13.2.3. Power Setup Menu

Figure 30: Power Setup Menu Example

BIOS SETUP UTILITY					
Main	Advanced	Power	Boot	Security	Save & Exit
Power Configuration					→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
ACPI Sleep State		[S3 (Suspend to RAM)]			
Restore AC Power Loss		[Power Off]			
Power Saving Mode		[Disabled]			
Resume Event Control					
Resume By LAN Device		[Disabled]			
Resume By PCI-E Device		[Disabled]			
Resume By Ring Device		[Disabled]			
Resume By RTC Alarm		[Disabled]			
>WatchDog Timer Configuration					
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The following table gives more information for important setup options within the Power Menu. Default setting are displayed in **bold**.

Table 15: Power Setup Menu Sub-screens and Functions

Function	Description	
ACPI Sleep State	[S3 (Suspend to RAM)]	
Restore AC Power Loss	[Power Off , Power On, Last State]	
Power Saving Mode	[EUP Enabled, Disabled , DeepSx Enabled]	
Resume Event Control		
Resume by LAN Device	[Enabled, Disabled]	
Resume By PCIE Device	[Enabled, Disabled]	
Resume By RTC Device	[Enabled, Disabled]	
Resume By RTC Alarm	[Enabled, Disabled]	
Watchdog Timer Configuration	WDT Function	[Enabled, Disabled]

13.2.4. Boot Setup Menu

Figure 31: Boot Setup Menu Example

BIOS SETUP UTILITY					
Main	Advanced	Power	Boot	Security	Save & Exit
Boot Configuration				→←: Select Screen	
Full Screen LOGO Display		[Disabled]		↑↓: Select Item	
Setup Prompt Timeout		1		Enter: Select	
Bootup NumLock State		[On]		+/-: Change Opt.	
CSM Support		[Enabled]		F1: General Help	
Boot Option Filter		[Legacy Only]		F2: Previous Values	
Boot Option Priorities				F3: Optimized Defaults	
				F4: Save & Exit	
				ESC: Exit	
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The following table gives more information for important setup options within the Boot Menu. Default settings are displayed in **bold**.

Table 16: Boot Setup Menu Sub-screens and Functions

Function	Description
Full Screen LOGO Display	Full Screen LOGO Display Options: [Disabled , Enabled]
Setup Prompt Timeout	Displays number of seconds that the firmware waits for setup activation key The value 65535(0xFFFF) means an indefinite wait. [1]
Bootup NumLock State	Selects keyboard NumLock state [ON , OFF]
CSM Support	[Enabled , Disabled]
Boot Option Filter	[UEFI and legacy , Legacy only, UEFI only]
Boot Option #1	Windows Boot manager

13.2.5. Security Setup Menu

Figure 32: Security Setup Menu Example

BIOS SETUP UTILITY					
Main	Advanced	Power	Boot	Security	Save & Exit
Password Description If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights The password length must be in the following range: Minimum Length 3 Maximum length 20 Administrator Password User Password				→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit	
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The following table gives more information for important setup options within the Security Menu. Default setting are displayed in **bold**.

Table 17: Security Setup Menu Sub-screens and Functions

Function	Description		
Administrator Password	Sets administrator password		
User Password	Sets user password		
Secure Boot Menu	System Mode	Set up	
	Secure Boot	Not active	
	Vendors Keys	Not active	
	Attempt Secure Boot	[Enabled , Disabled]	
	Secure Boot Mode	[Standard , Custom]	
	Key Management	Provision Factory Defaults	[Enabled, Disabled]
		Install Factory Default keys	
		Enroll Efi Image	
		Save all Secure Boot variables	
		Platform Key (PK)	
		Key Exchange Keys	
		Authorized Signatures	
		Forbidden Signatures	

Function	Description		
Secure Boot Menu (continued)	Key Management (continued)	Authorized TimeStamps	
		OsRecovery Signatures	
	Additional Information: Only If "Boot Option Filter = "UEFI only " or "UEFI and Legacy"		

13.2.6. Save and Exit Set up Menu

Figure 33: Save and Exit Set up Menu Example

BIOS SETUP UTILITY					
Main	Advanced	Power	Boot	Security	Save & Exit
Save Changes and Reset Discard Changes and Reset Save Options Save Changes Discard Changes Restore Defaults					→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
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The following table gives more information for important setup options within the Save and Exit Menu. Default settings are displayed in **bold**.

Table 18: Save and Exit Setup Menu Sub-screens and Functions

Function	Description
Save Changes and Reset	Exits system after saving changes Once you are finished making your selections, choose this option to ensure the values you selected are saved to the CMOS RAM. The CMOS RAM is sustained by an onboard backup battery and stays on even when the PC is turned off. When you select this option, a confirmation window appears. Select [Yes] to save changes and exit.
Discard Changes and Exit	Exits system setup without saving changes Select this option only if you do not want to save the changes that you made to the Setup program. If you made changes to fields other than system date, system time, and password, the BIOS will ask for a confirmation before exiting.
Save Options	Saves changes made so far for any setup options
Save Changes	Saves changes made so far for any setup options
Discard Changes	Discards changes made so far to any of the setup values This option allows you to discard the selections you made and restore the previously saved values. After selecting this option, a confirmation appears. Select [Yes] to discard any changes and load the previously saved values.
Restore Defaults	Restores/loads standard default values for all setup options <u>Load Optimal Default values for all the setup values</u> This option allows you to load optimal default values for each of the parameters on the Setup menus, that provides the best performance settings. The F9 key can be used for this operation. <u>Load Failsafe Default values for all the setup values</u> This option allows you to load failsafe default values for each of the parameters on the Setup menus, that provides the most stable performance settings. The F8 key can be used for this operation.

14/ Technical Support

For information on how to receive technical support, visit Kontron Support (<http://www.kontron.com/support>).

To request support via e-mail, report documentation errors, or general customer feedback, use Kontron's Contact Support Request Form by visiting:

<http://www.kontron.com/about-kontron/company-overview/contact-us/forms/contact-support>.

In case the request form does not work or you do not get a response within 48 hours, send a follow up email to support@kontron.com

Make sure you have the following product identification information on hand when you call:

- ▶ Product name,
- ▶ Product model number
- ▶ Serial number (SN) of the unit

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



The serial number can be found on the type Label on the system.

14.1. Returning Defective Merchandise

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

1. Visit the RMA Information website:



Kontron's RMA Information website can be found at:
<http://www.kontron.com/support-and-services/support/rma-information>

Download the RMA Request sheet for Kontron Europe GmbH - Augsburg 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 (product name, material number and serial-number). If more than one product is sent in a delivery. Fill out the above information in the RMA Request form for each product.

2. Send the completed RMA-sheet to the given fax- or email-address at Kontron Europe GmbH. Kontron Europe GmbH will provide an RMA-Number within one business day.
3. The goods for repair shall be packed properly for shipping, considering shock- and ESD-protection.



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

4. Add the RMA-sheet to the relevant delivery address and include the RMA-No with the shipping paperwork.
Sent the product to the following delivery address:

Kontron Europe GmbH

RMA Support

Lise-Meitner-Str. 3-5

86156 Augsburg

Germany

Phone: +49 (0) 821 4086-0

Fax: +49 (0) 821 4086 111

Email: service@kontron.com

5. After Kontron Europe GmbH receives the product, a confirmation of the order is sent via email to the address named on the RMA sheet.

15/ Storage, Transportation and Maintenance

15.1. Storage

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

15.2. Transportation

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

15.3. Maintenance

Maintenance or repair on the open product may only be carried out by qualified personnel authorized by Kontron. Cleaning:

- ▶ For light soiling, clean the product with a dry cloth.
- ▶ Carefully remove dust from the surface of the chassis and cooling fins using a clean, soft brush.
- ▶ Stubborn dirt should be removed using a mild detergent and a soft cloth

NOTICE

Do not use steel wool, metallic threads or solvents like abrasives, alcohol, acetone or benzene for cleaning the KBox A-150-SKL

15.3.1. Replacing the Lithium Battery

The lithium battery must only be replaced with the same type of battery or with a type of battery recommended by Kontron. If the on-board Lithium battery needs to be replaced, follow the steps below:

1. Remove the lithium battery from the holder by pulling it outwards.
2. Place a new lithium battery in the battery holder.
3. Pay attention to the polarity of the battery.

CAUTION

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



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. to the collecting points for dispose of batteries).

16/ Warranty

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.



The KBox A-150-SKL is factory configured to meet customer requirements. Kontron does not recommend opening the system as this may cause damage to internal components.

16.1. Limitation/Exemption from Warranty Obligation

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

- ▶ General safety instructions for IT equipment 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.

Within the warranty period, the product should only be opened by Kontron. Removing the protection label and opening the product within the warranty period exempts the product from the statutory warranty obligation.

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

17/ Disposal

Final disposal of this product after the product's service life must be accomplished in accordance with the applicable country, state, or local laws or regulations.



Kontron manufactures products to satisfy environmental protection requirements where possible. Many of the components used are capable of being recycled.

Kontron follows the Waste Electrical and Electronic Equipment (WEEE) Directive that aims to reduce waste arising from Electrical and Electronic waste and encourages customers to return Kontron products for proper disposal. For more information regarding WEEE compliance, see the Disposal and Recycling section at the start of this user guide.

Appendix A: List of Acronyms

Table 19: List of Acronyms (Example)

AC	Alternating Current
ACPI	Advanced Configuration Control Interface
CPU	Central Processing Unit
DC	Direct Current
DIO	Digital Input/Output
DP	Display Port
ECC	Error Checking and Correction
EHCI	Enhanced Host Controller Interface
ESD	Electrostatic Discharge
GbE	Gigabit Ethernet
GPU	Graphics Processing Unit
HD/HDD	Hard Disk /Drive
HDMI	High Definition Multimedia Interface
HPM	PICMG Hardware Platform Management specification family
H/W	Hardware
IOL	IPMI-Over-LAN
IOT	Internet of Things
KVM	Keyboard Video Mouse
LAN	Local Area Network
LVD	Low Voltage Device
M.2	Next smaller generation of mSATA
MEI	Management Engine Interface
mPCIe	Mini PCI-Express
mSATA	Mini SATA

OS	Operating System
PCIe	PCI-Express
RAM	Read Access Memory
RoHS	Restriction of the use of certain hazardous substances
RTC	Real Time Clock
SATA	Serial-ATA
SEL	System Event Log
SELV	Safety Extra Low Voltage
SIO	Super Input/output
SMBus	System Management Bus
SMWI	System Monitor Web Interface
SOL	Serial Over LAN
SSD	Solid State Drive
TPM	Trusted Platform Module
UEFI	Unified Extensible Firmware Interface
USB	Universal Serial Bus
VGA	Video Graphics Array
VLP	Very Low Profile
WEEE	Waste Electrical and Electronic Equipment
WLAN	Wireless LAN
XHCI	eXtensible Host Controller Interface



About Kontron

Kontron is a global leader in embedded computing technology (ECT). As a part of technology group S&T, Kontron offers a combined portfolio of secure hardware, middleware and services for Internet of Things (IoT) and Industry 4.0 applications. With its standard products and tailor-made solutions based on highly reliable state-of-the-art embedded technologies, Kontron provides secure and innovative applications for a variety of industries. As a result, customers benefit from accelerated time-to-market, reduced total cost of ownership, product longevity and the best fully integrated applications overall. For more information, please visit: www.kontron.com



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