



# KBox A-203

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 KBOX A-203 – USER GUIDE

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## Revision History

| Revision | Brief Description of Changes | Date of Issue | Author/<br>Editor |
|----------|------------------------------|---------------|-------------------|
| 1.0      | Initial Issue                | 2019-Jan-16   | MK                |

## Terms and Conditions

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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 incorrectly replaced. Examples that shall be considered include:

- ▶ Replacement of a battery with an incorrect type that can defeat a safeguard (e.g., in the case of some lithium battery types);
- ▶ Disposal of a battery into fire or a hot oven, or mechanically crushing or cutting of a battery, that can result in an explosion;
- ▶ Leaving a battery in an extremely high temperature surrounding environment that can result in an explosion or the leakage of flammable liquid or gas;
- ▶ A battery subjected to extremely low air pressure that may result in an explosion or the leakage of flammable liquid or gas.

In case of using an optional Lithium battery, please consider limited operating temperature to maximum 40°C.

## 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



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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, please ensure that the ventilation openings are not covered or blocked. If an air filter is provided, this should be cleaned regularly. Do not place the system close to heat sources or damp places. Make sure the system is well ventilated.
- ▶ Only devices 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 device, make sure that the device is disconnected from the mains.
- ▶ Switching off the device 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 device. Ensure that there is free and easy access to enable disconnection.
- ▶ The device may only be opened for the insertion or removal of add-on cards (depending on the configuration of the system). 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 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:
  - ▶ The device has visible damages.
  - ▶ The device is no longer functioning.

In this case 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 devices with DC power supply voltages larger than 60 volts DC or a power consumption larger than 240 VA, please observe that:**
  - ▶ the device 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 device 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 device is used in the application (e.g. overcurrent protective device), if the device itself is not disconnectable
  - ▶ a disconnect device, if provided in or as part of the equipment, shall disconnect both poles simultaneously
  - ▶ interconnecting power circuits of different devices 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 IEC 61010-1, IEC 61010-2-201, IEC60950-1 or VDE0100 or UL508 regulations.**
- ▶ **The devices 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 devices!**
- ▶ **Only certified at least IEC 60950-1 compliant main power supply unit shall be connected!**

## 1.1. Electrostatic Discharge (ESD)



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

---

Therefore proper packaging and grounding techniques are necessary precautions to prevent damage. Always take the following precautions:

1. Transport boards in ESD-safe containers such as boxes or bags.
2. Keep electrostatic sensitive parts in their containers until they arrive at the ESD-safe workplace.
3. Always be properly grounded when touching a sensitive board, component, or assembly.
4. Store electrostatic-sensitive boards in protective packaging or on antistatic mats.

### 1.1.1. Grounding Methods

By adhering to the guidelines below, electrostatic damage to the device can be avoided:

1. Cover workstations with approved antistatic material. Always wear a wrist strap connected to workplace. Always use properly grounded tools and equipment.
2. Use antistatic mats, heel straps, or air ionizers for more protection.
3. Always handle electrostatically sensitive components by their edge or by their casing.
4. Avoid contact with pins, leads, or circuitry.
5. Turn 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.
7. Use only field service tools which are conductive, such as cutters, screwdrivers, and vacuum cleaners.
8. Always place drives and boards PCB-assembly-side down on the foam.

## 2/ Electromagnetic Compatibility

For detailed information refer to section 9.3 "CE Directives and Standards".

### 2.1. Electromagnetic Compatibility (EU)

This product is intended only for use in industrial areas. The most recent version of the EMC guidelines (EMC Directive 2014/30/EU) and/or the German EMC laws apply. If the user modifies and/or adds to the equipment (e.g. installation of add-on cards) the prerequisites for the CE conformity declaration (safety requirements) may no longer apply.

#### **⚠ WARNING**

---

**This is a class A product. In domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.**

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### 2.2. FCC Statement (USA)

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

### 2.3. EMC Compliance (Canada)

The method of compliance is self-declaration to Canadian standard ICES-003:

(English): This Class A digital apparatus complies with the Canadian ICES-003.

(French): Cet appareil numérique de la class A est conforme à la norme NMB-003 du Canada.

## 3/ Shipment and Unpacking

Please check that your package is complete, and contains the items below (according to the ordered unit configuration). If you discover damaged or missing items, please contact your dealer.

### 3.1. Unpacking

Proceed as follows to unpack the unit:

1. Remove packaging.
2. Do not discard the original packaging. Keep it for future relocation.
3. Check the delivery for completeness by comparing it with your order.
4. Please 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 your order, please contact Kontron for help and information.

### 3.2. Scope of Delivery

#### 3.2.1. Standard

- ▶ KBox A-203 (corresponding to the ordered system configuration)
- ▶ Power connector, 2-pin plug (TE Connectivity 796859-2)
- ▶ General Safety Instructions for IT Equipment

#### 3.2.2. Optional Parts

- ▶ DIN rail mounting clip
- ▶ Mini PCIe WLAN (WiFi) card (always factory-installed if orderd) with three antennas (enclosed)
- ▶ KBox A-203 can optionally be ordered with a factory-installed SSD Kit
- ▶ Mini PCIe LTE card (always factory-installed if orderd) with one antenna (enclosed)
- ▶ SD card
- ▶ Bracket for wall/table mounting
- ▶ Vertical mounting plate for control cabinet mounting
- ▶ Rubber feet (self-adhesive)

### 3.3. Type Label and Product Identification

The type label (product name, serial number) of your KBox A-203 system are located on the bottom side of the device (refer to Figure 1 and Figure 7 pos. 1).

Figure 1: Type Label



## 4/ System Overview

The KBox A-203 expands the Kontron line of computers – KBox Series. It is a highly scalable and flexible industrial computer. Based on the latest Intel Atom® processor of the E3900 series the new wartungsfrei (maintenance-free), fanless and battery-free KBox A-203 was developed as an intelligent gateway for data-intensive IoT edge applications.

The KBox A-203 is one of the first Kontron products which is Microsoft® Azure certified. This means the hardware is tested and verified and can be integrated into Microsoft® Azure IoT Services.



**Refer to the information and technical data in the user manual of the installed SMARC sXAL Module.**

**The user's manual of the installed SMARC module can be downloaded from our web page <http://www.kontron.com> . Search for the name of the installed module.**

The compact KBox A-203 shows a broad range of interfaces which allow a connection on various communication levels. For local data collection, e.g. link to sensor and machine level, it offers up to two serial ports (RS232/485) and an optional fieldbus (e.g. Profi Bus). On project base the KBox A-203 can also support wireless standards such as LTE (4G), GSM (2G/3G) and in future the low-power standard LoRa.

The KBox A-203 supports Security Solution Kontron APPROTECT. It combines a software framework with an integrated security chip in addition to the TPM 2.0 (Trusted Platform Module) chip to provide comprehensive protection for the application software.

The KBox A-203 hardware system configuration and the robust construction with excellent mechanical stability offer the superior qualities of a computer designed for operation in harsh industrial environment. It is a fanless system based on a compact U-shaped aluminum chassis with cooling fins.

The rated voltage of the mains (+24 V DC) can be found on the type label. The type label is located at the bottom side of the device. The KBox A-203 may be optionally factory-equipped with an mPCIe WLAN card for two antennas. For the configuration of your KBox A-203 please follow the ordering options specified in "Configuration Guides – KBox Series" on our web site [www.kontron.com](http://www.kontron.com)

The following interfaces are available with the KBox A-203:

### Standard:

- ▶ 24 V DC input power (X101)
- ▶ DisplayPort (X103)
- ▶ 2x USB 3.0 (X104, X105)
- ▶ 2x Ethernet (X106, X107) : Gigabit Ethernet (10/100/1000)
- ▶ COM 1 (X102), RS232 (optional: RS422/485)
- ▶ Reset button
- ▶ Power LED, SSD LED and GP LED

### Optional:

- ▶ COM 2 (X202), RS232
- ▶ Fieldbus Connector (X203)

The device is designed to be operated in:

- ▶ Vertical position: (KBox A-203 configuration with vertical mounting plate) mounted inside a control cabinet or
- ▶ Vertical/horizontal: wall mounted (KBox A-203 configuration with wall mounting bracket) or
- ▶ Horizontal position: KBox A-203 as desktop unit (equipped with the supplied rubber feet) or
- ▶ Vertical/horizontal: KBox A-203 DIN Rail mounting (with DIN Rail mounting clip)

#### NOTICE



When powering on the KBox A-203, make sure that the cooling fins of the chassis (Figure 8, Figure 9 and Figure 10, pos. 6) are not obstructed (covered) by any objects.

To provide sufficient heat dissipation by the cooling of the device, do not cover the cooling fins of the

KBox A-203. Do not place any objects on the device. When installing the system, please note the clearance recommendation in the section 6.1 "System Mounting".

## 4.1. RTC

The KBox A-203 comprises a chipset external RTC. This RTC is connected to the SMBus of the processor module. A RTC of type RV-8564 or compatible is used. To provide a valid date and time when no power is connected to the KBox A-203, the RTC is equipped with a goldcap buffer.

### 4.1.1. RTC Buffer Time

The RTC buffer time is depending of the ambient temperature.

If the time is not valid this is indicated by a status bit in the RTC registers. For details see the RV-8564 application manual.



To get the maximum buffer time it is necessary to have the system a certain time powered on. This ensures that the buffer capacitors are fully loaded.

The buffer time depends on the ambient temperature and on how long the box is connected to its power supply.

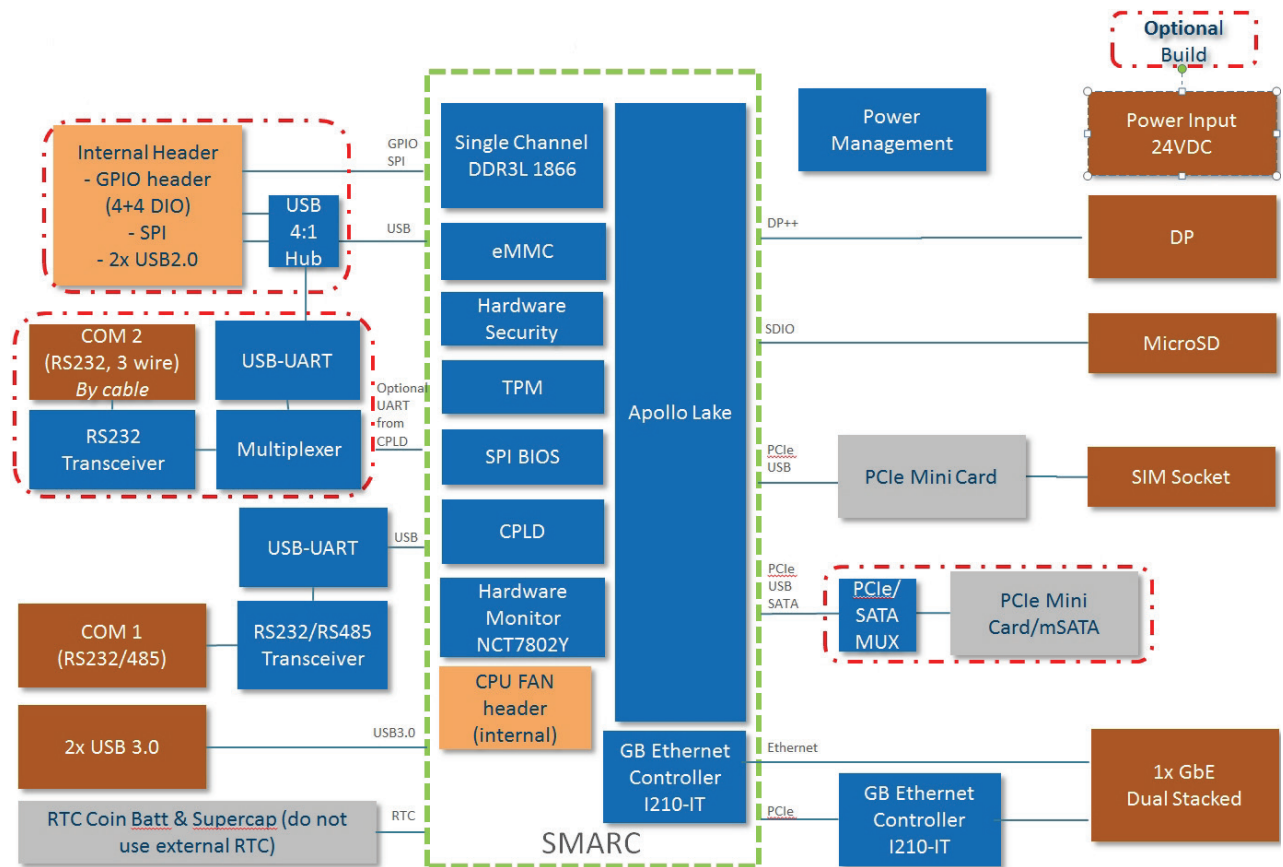
## 4.2. System Expansion Capabilities

The KBox A-203 is available in the configurations described in this manual.

If you are interested in a different, customer-specific configuration, feel free to contact Kontron and ask for your requirements. Contact information can be found on our web site [www.kontron.com](http://www.kontron.com).

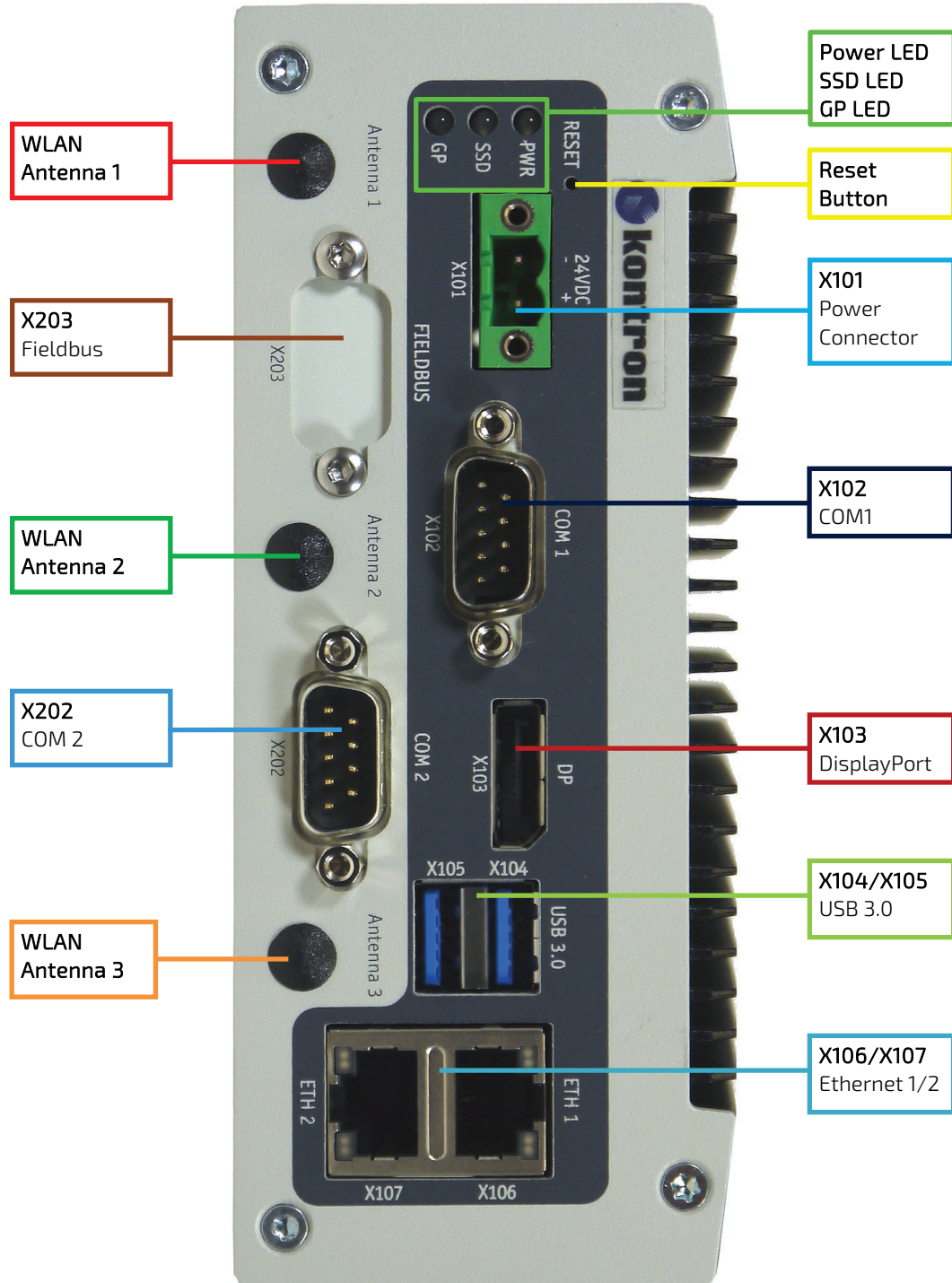
### 4.3. Block Diagram of the KBox A-203

Figure 2: Block Diagram of the KBox A-203



## 4.4. Front Side

Figure 3: KBox A-203 – Front View



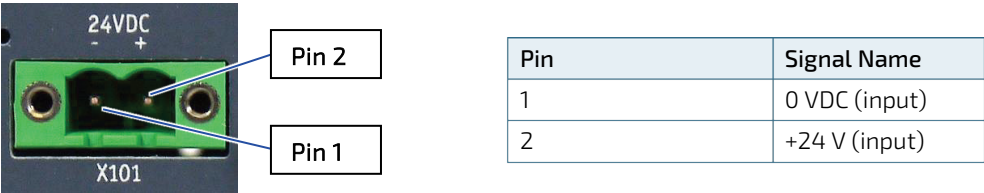
## 4.5. Front Interfaces of the KBox A-203

### 4.5.1. X101 - Power Input Connector

The 2-pin connector (X101, Figure 3) provides the power connection of the KBox A-203 to the appropriate DC main power supply. For pin assignments refer to the subsection 10.1.1.

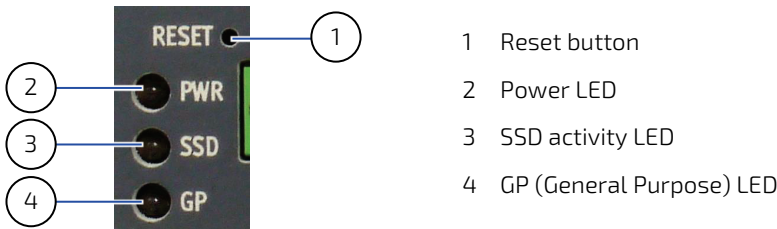
The external cable connector is a "TE Connectivity 796859-2" 2-pin plug. This power plug is delivered along with the KBox A-203. Please observe the section 7.1 "Connecting to DC Main Power Supply".

Figure 4: X101 - 24VDC power input connector



### 4.5.2. Controls and LED Indicators

Figure 5: Detail - Power button and LED indicators



|                    |                                                                                                                                                                                                                                         |
|--------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reset Button       | Press the reset button to restart your system. Use a pointed object (e.g. a pencil) to press the recessed reset button (Figure 5, pos. 1).                                                                                              |
| Power LED (green)  | <div>The power LED (marked PWR, Figure 3 and Figure 5, pos. 2) lights up green if the system powered on.</div> <div><b>Prerequisite:</b><br/>The system must be attached by means of the power cord to an appropriate mains (DC).</div> |
| SSD LED (orange)   | The SSD LED (marked SSD, Figure 3 and Figure 5, pos. 3) indicates storage (SATA/mSATA) activity.                                                                                                                                        |
| GP LED (red/green) | The General Pupose LED (marked GP, Figure 3 and Figure 5, pos. 4) is GPIO controlled. The PG LED lights up red when set to Low and green when set to High.                                                                              |

**⚠ WARNING**

Even when the system is turned off via the power button there is still a standby voltage on the baseboard. The unit is only completely disconnected from the DC mains, when the power is removed.



For preparing the power cable for the KBox A-203 by connecting appropriate wires to the Phoenix power terminal, refer to subsection 6.2.1 “Cabling”

### 4.5.3. X106/X107 – Ethernet Connectors (ETH)

These connectors (X106 as ETH 1 and X107 as ETH 2, Figure 3) are Gigabit Ethernet 10/100/1000 Mbit/s, IEEE 1588 capable interfaces. The connectors are standard 8-pin RJ45 type connectors with status LEDs:

- ▶ **Activity/link: green = link up; green blinking = activity.**
- ▶ **Speed: off, green, yellow (10/100/1000 MBit/s).**

For pin assignment refer to subsection 10.1.2.

### 4.5.4. X104/X105 – USB 3.0

The KBox A-203 provides two USB 3.0 interfaces. These connectors (X104, X105, Figure 3) allow connection of USB 3.0 or USB 2.0 compatible devices to the system. For pin assignment refer to subsection 10.1.3.

### 4.5.5. X103 – DisplayPort

This is a DisplayPort++ compliant interface realized using a standard DisplayPort connector. An external (digital) display can be connected to the DisplayPort connector (X103, Figure 3). For pin assignment refer to subsection 10.1.4.

### 4.5.6. X102 – Serial Port COM 1

This interface (X102, Figure 3) is provided as a 9-pin D-SUB connector; it is RS232 configured and allows the connection of a serial peripheral. Optionally, the COM1 port can be configured as RS422 or RS 485 port in the system BIOS. For pin assignment refer to subsection 10.1.5.

### 4.5.7. X202 – Serial Port COM 2 (Option)

This interface (X202, Figure 3) is provided as a 9-pin D-SUB connector; it is RS232 configured and allows the connection of a serial peripheral. For pin assignment refer to subsection 10.1.5.

### 4.5.8. X203 – Fieldbus Interface (Option)

This interface (X203, Figure 3) is provided as a 9-pin D-SUB connector.

**Figure 6: X203 – Optional FIELDBUS interface**

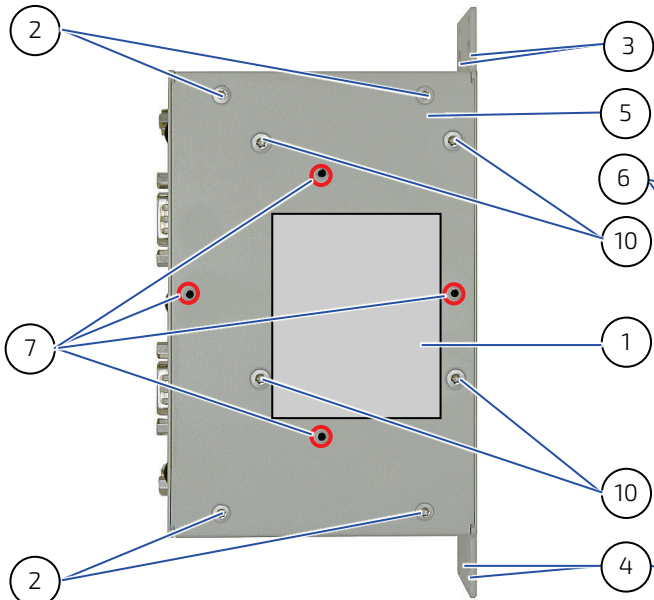


The optional Fieldbus interface (FIELDBUS) on the front side of the KBox A-203 (X203, Figure 3) is provided as a 9-pin D-SUB connector and must be ordered separately.

To expand KBox A-203 with an interface for FIELDBUS communication, the FIELDBUS additional card will be installed always into the second mPCIe slot on the bottom of the baseboard. This connection can be implemented at factory only.

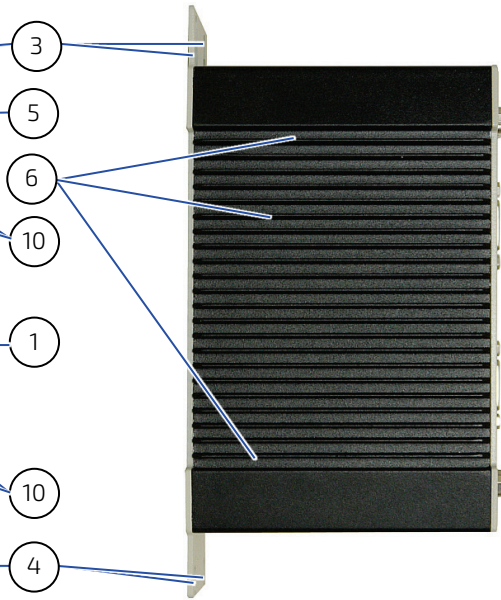
## 4.6. Left and Right Side View

Figure 7: Right side of the KBox A-203 system



- 1 Type label
- 2 4x torx screws (3x8) that secure the access cover
- 3 Upper side of the mounting plate with key holes
- 4 Lower side of the mounting plate with key holes
- 5 Access cover

Figure 8: Left side of the KBox A-203 system



- 6 Cooling fins on the left side of the U-shaped chassis
- 7 Threaded holes for mounting the DIN rail mounting clip
- 8 Cooling fins on the top side of the U-shaped chassis
- 9 Cooling fins on the bottom side of the U-shaped chassis
- 10 4x torx screws that secure the internal HDD/SSD drive

## 4.7. Top and Bottom Side View

Figure 9: Top side of the KBox A-203 system

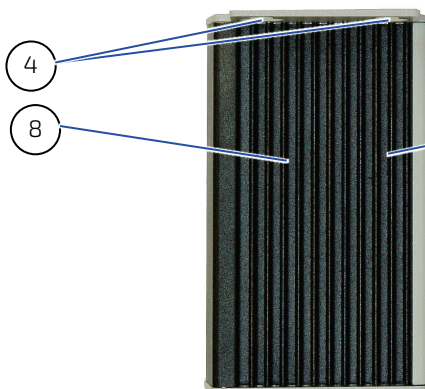
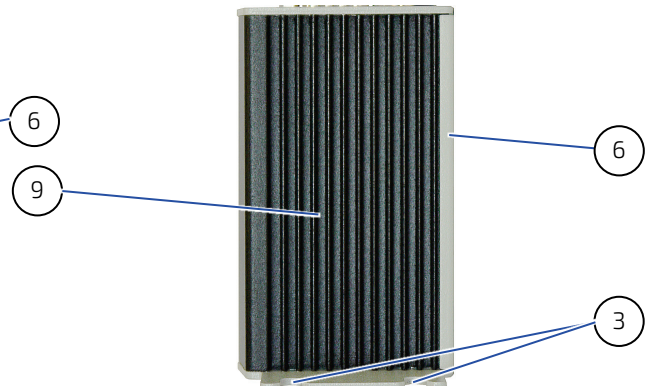


Figure 10: Bottom side of the KBox A-203 system



### NOTICE

To provide sufficient heat dissipation for the cooling of the KBox A-203 platform, never cover the cooling fins of the chassis. Do not place any objects onto the device.

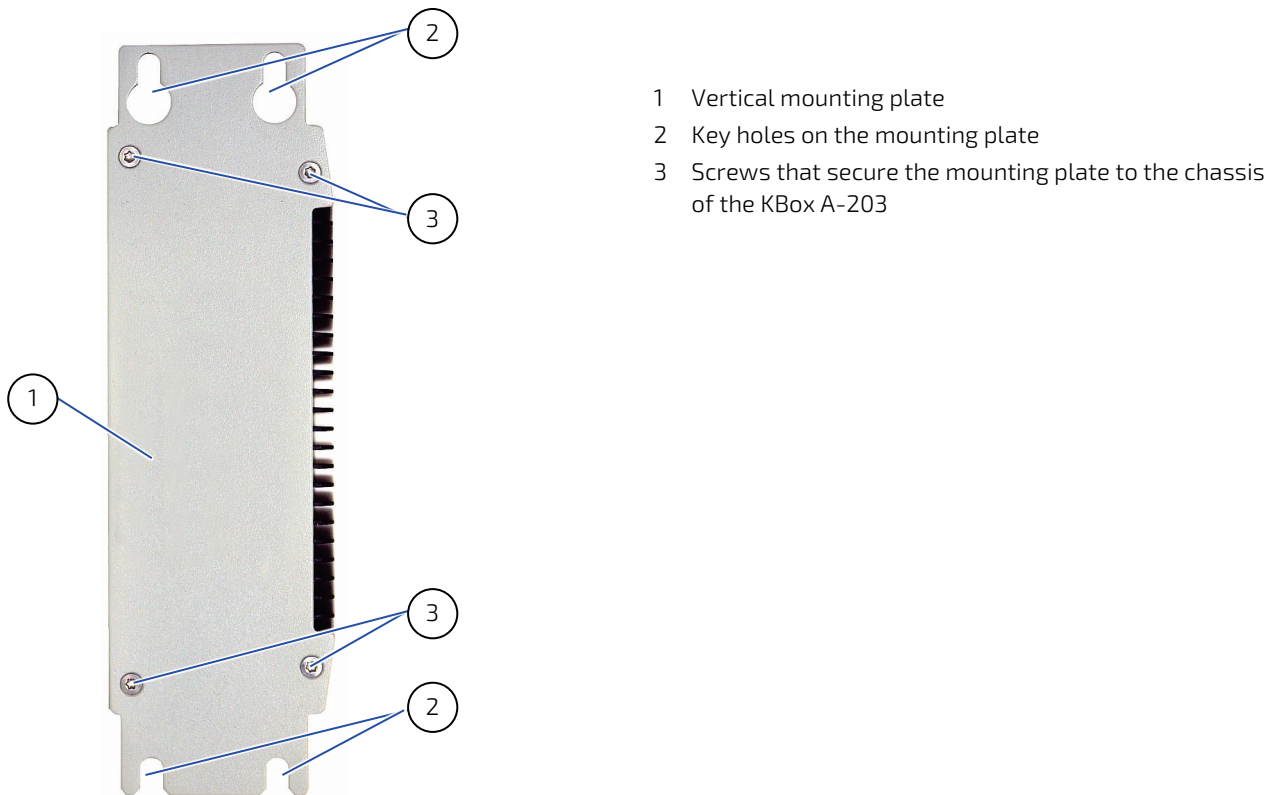
## 4.8. Rear Side View

### 4.8.1. Rear Side View of the KBox A-203 with Vertical Mounting Bracket

The KBox A-203 is designed for wall mounting, in vertical position inside of a control cabinet or as desktop.

Please observe the mounting instructions included in the section 6/ "Installation Instructions", and the outline dimensions in the subsection 9.1.2 "Mechanical Specifications of the KBox A-203 with Vertical Mounting Plate".

Figure 11: Rear side of the KBox A-203 system with vertical mounting plate



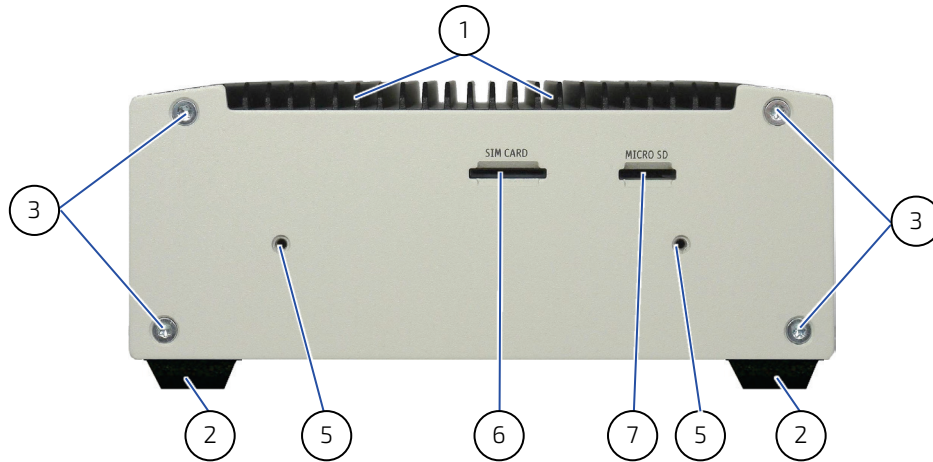
The vertical mounting plate is factory-installed (when KBox A-203 was ordered with vertical mounting plate).

If the vertical mounting plate was ordered later and is to be mounted subsequently, first remove the rear panel of the KBox A-203. Do not mount the vertical mounting plate on top of the rear panel!

To access the SIM card and the Micro SD card slot, the vertical mounting plate has to be removed!

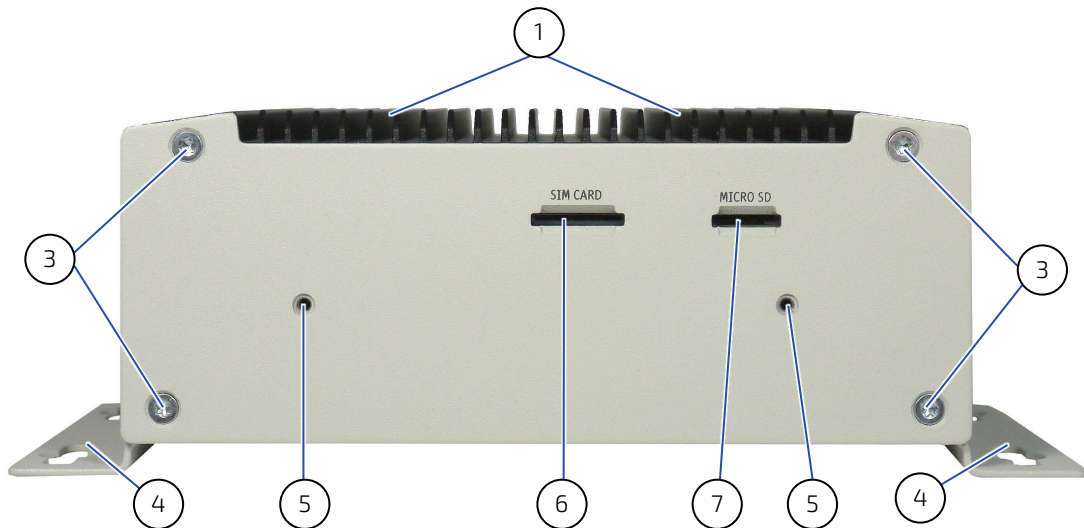
#### 4.8.2. Rear Side View of the KBox A-203 as Desktop with Rubber Feet

Figure 12: Rear side of the KBox A-203 (shown as desktop unit)



#### 4.8.3. Rear Side View of the KBox A-203 with Wallmount Bracket

Figure 13: Rear side of the KBox A-203 (shown with vertical/horizontal mounting brackets)



- |   |                                                                                                                                                   |   |                                                      |
|---|---------------------------------------------------------------------------------------------------------------------------------------------------|---|------------------------------------------------------|
| 1 | Cooling fins on the top side of the chassis                                                                                                       | 5 | Tapped holes for mounting the optional DIN Rail clip |
| 2 | Rubber feet                                                                                                                                       | 6 | SIM card slot                                        |
| 3 | Countersunk screws M3x8 ISO14581 torx                                                                                                             | 7 | Micro SD card slot                                   |
| 4 | Wall/table mount bracket with key holes (left and right) for horizontal or vertical (with interface sides downwards or upwards) mounting position |   |                                                      |

## 4.9. Optional Parts

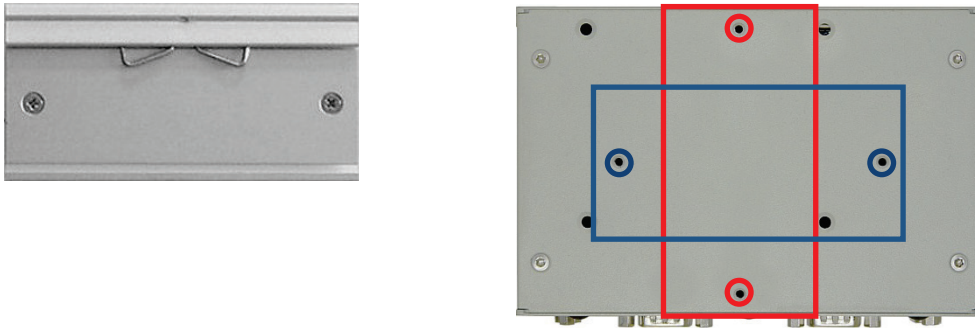
### 4.9.1. DIN Rail Clip (Option)

For DIN Rail mounting of the KBox A-203 a DIN Rail clip can be ordered (refer to subsection 3.2.2 "Optional Parts"). If ordered, you can adopt your system for mounting to a DIN rail.

#### 4.9.1.1. Mounting the DIN Rail Clip to the Access Cover

Tapped holes are provided on the access cover (Figure 7, pos. 7) for mounting the optional DIN Rail clip in vertical or horizontal orientation (Figure 14).

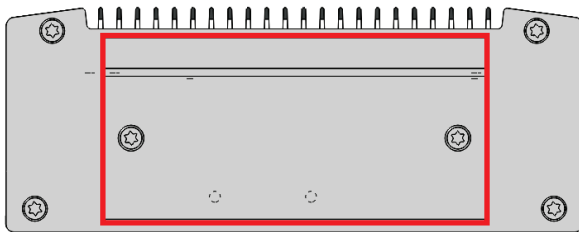
Figure 14: DIN rail clip mounted to the access cover



#### 4.9.1.2. Mounting the DIN Rail Clip to the Rear Plate

Tapped holes are provided on the rear plate (Figure 12, Figure 13, pos 5) for mounting the optional DIN Rail clip in horizontal orientation (Figure 14).

Figure 15: DIN rail clip mounted to the rear plate



### 4.9.2. WLAN (Option)

Depending on the ordered system configuration, the KBox A-203 system (only KBox A-203 used as desktop or KBox A-203 with vertical/horizontal wallmount brackets or with DIN Rail clip) can be equipped with WLAN (WiFi) hardware.

#### 4.9.2.1. WLAN Antenna

Depending on the ordered system configuration, the KBox A-203 system can be equipped with WLAN hardware. If you have ordered a system configuration including WLAN, Reverse (RP) SMA-connectors for screwing on the provided WLAN antennas are installed at the front side (Figure 3; "Antenna 1/Antenna2/Antenna3").

Figure 16: WLAN (WiFi) antenna



- 1 Reverse (RP) SMA antenna connector
- 2 Hinge for positioning the antenna

## 5/ Thermal Considerations

### 5.1. Available Processors

Please refer to the chapter 9/ "Technical Specifications".



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The list of processors is not complete and may be extended over the product lifetime.

---

### 5.2. Convection Cooling

The applied cooling method provides adequate cooling of the device during operation and performs a one-way thermal transfer to the chassis. Three sides of the KBox A-203 consist of a compact aluminum U-shaped chassis are with cooling fins. The cooling fins provide heat dissipation during operation.



---

To provide sufficient heat dissipation for the cooling of the KBox A-203, never cover the cooling fins of the chassis. Do not place any objects on the device.

---

### 5.3. Minimum System Clearance

To provide a maximum of airflow through and around the box, minimum distances to surrounding parts must be observed (please refer to the chapter 6.1 "System Mounting" and Figure 17).

### 5.4. Maximum Temperatures



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The maximum system ambient temperature depends mostly on the power consumption of the processor and the chipset.

---

For the temperature evaluation a specialised tool from Intel® was used to set the processor to a defined workload. Depending on the power consumption one or more cores were set to 75% workload. This includes the graphics core. The tool also handles the usage of the "Turbo Mode" of certain processor types.



---

The processor utilisation depends highly on the software used. Software using multicore feature will run on several cores whereas standard software will only utilise one core.

---

## 6/ Installation Instructions

The KBox A-203 system is designed for operating:

- ▶ installed onto a wall or within a control cabinet by use of the vertical mounting plate
- ▶ installed within a control cabinet by use of the DIN Rail mounting clip

### NOTICE

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 the system chassis.

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

Prior any installation work, ensure that there are no live wires on the installation site.

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

Do not operate the KBox A-203 with foreign objects inside the chassis.

Further do not insert any retrieval device into the device while it is connected to power.

Kontron rejects all liability for any and all damages resulting from operation of the unit with foreign objects inside the chassis.

The KBox A-203 has to be installed and operated only by trained and qualified personnel.

Only personnel with appropriate qualifications, trainings and authorization are permitted to install and work with the Kontron KBox A-203.

This device shall only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements.

The unit must be placed such that there is sufficient space in front of it for connecting the cables to the

I/O interface connectors and for operating the power button.

Leave sufficient free space around the unit to prevent the device from possibly overheating!

To ensure proper operation, we recommended free space as specified in

Figure 17 and Figure 18.

Refer also to section 9.1.2 "Mechanical Specifications".

The KBox A-203 must be firmly attached to a clean flat and solid mounting surface. Use proper fastening materials suitable for the mounting surface. Ensure that the mounting surface type and the used mounting solution safely support the load of the KBox A-203 and the attached components.

Please follow the local/national regulations for grounding.

The voltage feeds must not be overloaded. Adjust the cabling and the overcurrent protection to correspond with the electrical figures indicated on the type label.

The type label is located on the access cover of the system.

It is recommended that the last cable attached to the system should be the power cable!

Refer to the section 6.2 "DC Power Connectio" and chapter 7/ "Starting Up".

## 6.1. System Mounting

In order to adapt the KBox A-203 for mounting Kontron offers different mounting solution such as:

- ▶ KBox A-203 configuration with vertical mounting plate for installation into a control cabinet or to a wall
- ▶ KBox A-203 for DIN Rail mounting into a control cabinet
- ▶ KBox A-203 configuration with horizontal mounting brackets for installation into a control cabinet or to a wall
- ▶ KBox A-203 for desktop operation without mounting (with rubber feet)

Depending on the ordered KBox A-203 configuration, your system is supplied with the corresponding mounting plate, mounting brackets and/or DIN Rail clip.

The key holes of the vertical mounting plate (Figure 11, pos. 2) allow you to mount the KBox A-203 inside the control cabinet in vertical position.

The key holes of the mounting brackets (Figure 11, pos. 2) allow you to mount the KBox A-203 to a wall or table in vertical as well as in horizontal position.

Prepare the mounting surface with four screws and if necessary anchors corresponding to the mounting surface type (fire-resistant material). Please refer to the information for mounting in the section 9.1.2, "Mechanical Specifications of the KBox A-203 with Vertical Mounting Plate", 9.1.3 "Mechanical Specifications of the KBox A-203 with Wallmount Bracket", 9.1.1 "Mechanical Specifications of the KBox A-203 as Desktop" or refer to the drawings for KBox A-203 on our web site. The drawings can be downloaded from our web site [www.kontron.com](http://www.kontron.com) by selecting the product name.



For a sufficient air circulation around the device, we recommend not to mount or operate any other devices within the "Restricted Area" around the KBox A-203; refer to the red marked area in Figure 17, Figure 18.

Figure 17: Restricted area for mounting around KBox A-203 (desktop side view with antenna)

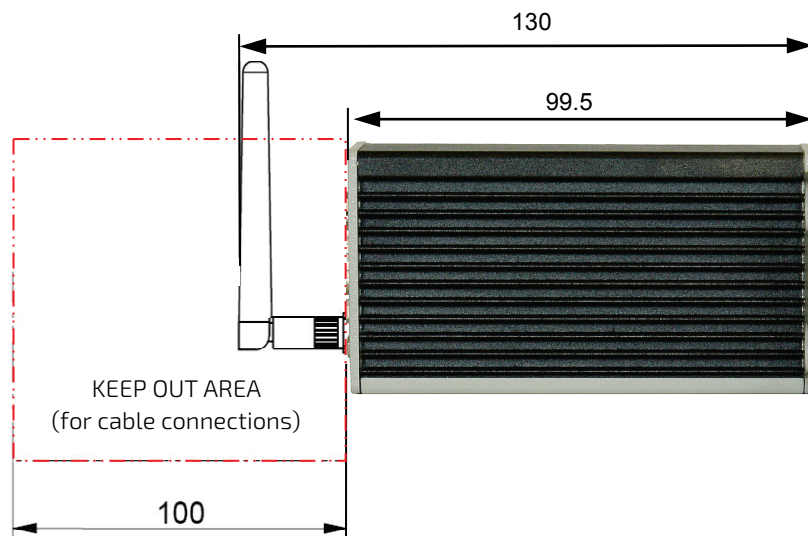
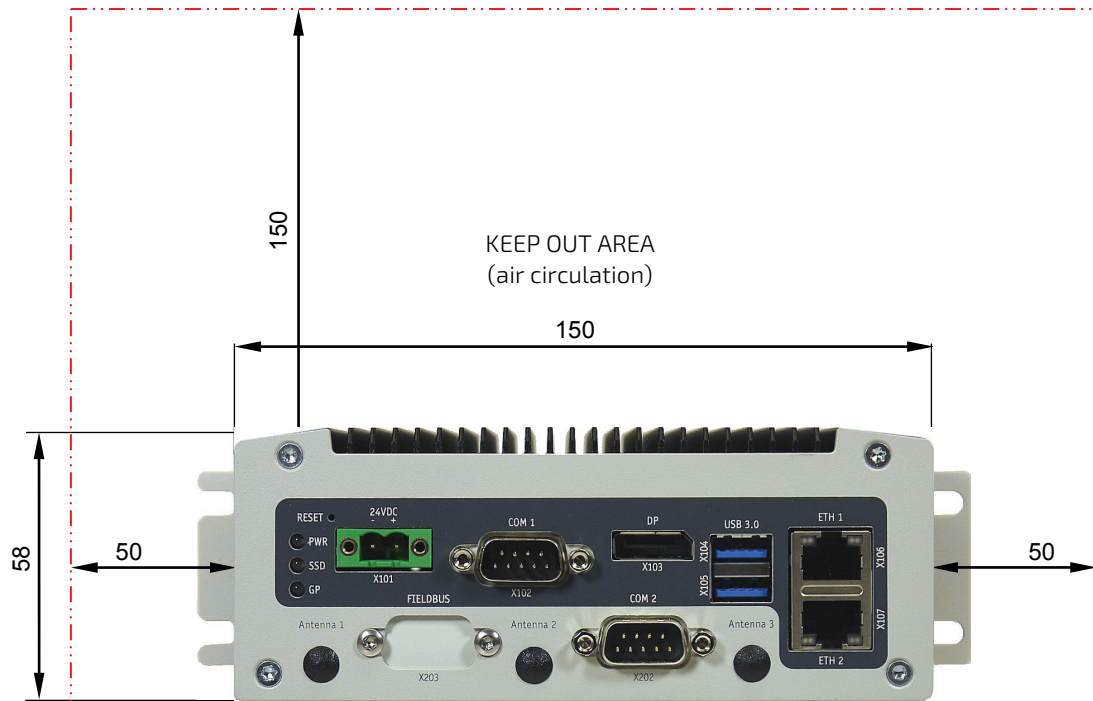


Figure 18: Restricted area for mounting around KBox A-203 (front view with vert./horiz. mounting brakets)

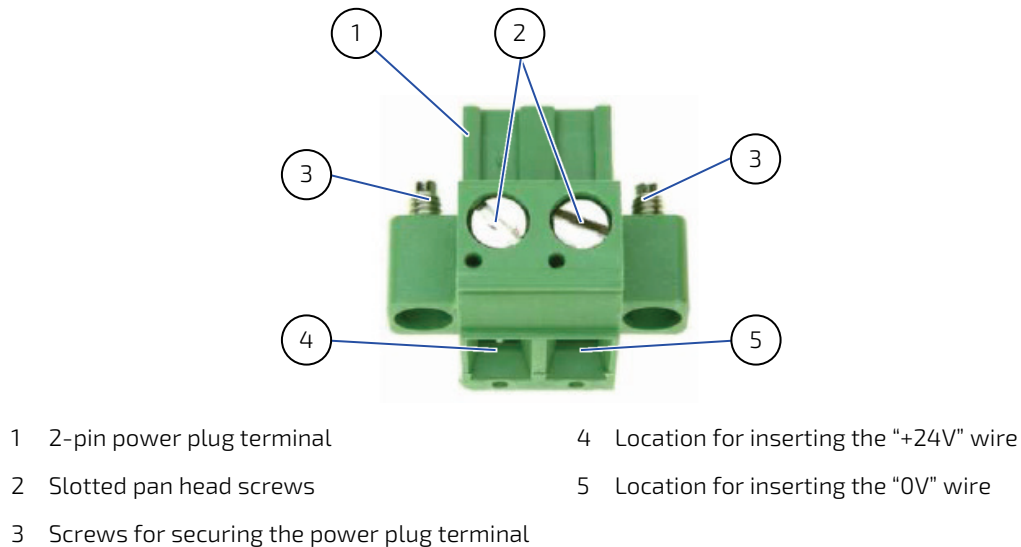


## 6.2. DC Power Connection

The KBox A-203 is connected by a power plug terminal ("TE Connectivity 796859-2") connector to a DC power source via a DC power supply wiring (only the power plug terminal is included).

The KBox A-203 is delivered with a DC power plug terminal (2-pin power connector). For DC connection, prepare the connecting wires using the supplied TE Connectivity plug terminal: 796859-2.

Figure 19: Power plug terminal



### 6.2.1. Cabling

For the pin assignment Phoenix power plug terminal refer to the subsection 4.5 "Front Interfaces of the KBox A-203 X101 - Power Input Connector".

1. Cut the required length three isolated wires (1 mm<sup>2</sup>) AWG18 and strip each end 5 – 7 mm.
2. Twist the striped wire-ends and provide them with ferrules.
3. Loosen the two slotted pan head screws (Figure 19, pos. 2) of the DC plug terminal far enough so that you can insert the end of the prepared wires.
4. Insert the wires into the corresponding clamp of the power plug terminal. Make sure that you have the right polarity of the connection [refer to Figure 19, Figure 4 or subsection 10.1.1, "(X101) Power Input Connector"].
5. Fasten the screws to secure the wires into the clamps of the plug terminal.

## 7/ Starting Up



The KBox A-203 must be only operated with the nominal voltage of 24V DC of type SELV. For details refer to the chapter 9/ "Technical Specifications".

### 7.1. Connecting to DC Main Power Supply

The DC input connector (Figure 3 and Figure 4, marked X101) is located on the front side of the KBox A-203. The KBox A-203 will be connected to a DC main power supply via the supplied power plug terminal (see Figure 19) and corresponding power wires (not included).



Before using your system, become familiar with the system components and check that everything is connected properly. Following a proper cabling procedure will prevent a false power-on condition, which could result in unit operational failure.

When you install/disconnect the unit, the functional earth connection must always be made first and disconnected last.

Also, it is recommended that the last connections attached to the system should be the power wires!

#### NOTICE

The KBox A-203 may not be connected to a central DC power supply.

The KBox A-203 must be connected 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-203.

Even when the system is turned off via the power button (Figure 3 and Figure 5, marked PWR) parts of the system are still energized.

The disconnecting device (fuse/circuit breaker) rating must be in accordance with the wire cross-section and the rated current of the KBox A-203.

When powered on, the KBox A-203 starts up automatically.



The wires used for power connections must be clearly marked (+/-/functional earth) to ensure that they will be properly connected to the DC IN connector of the KBox A-203 and to the main power source, corresponding to signals marked. Refer to Figure 4 and Figure 19.

In addition, the cables must have some form of support so as to minimize the strain on the unit's connectors.

To connect the KBox A-203 to a corresponding DC main power supply, please perform the following steps:

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 power terminal prepared as described in the subsection 6.2.1 "Cabling" to the DC input connector (Figure 3 and Figure 4 marked X101) of the KBox A-203. The DC input connector is located on the front side and is marked "24VDC".
3. Connect the other ends of the DC power wires to the connections of the DC main power supply. Pay attention to the polarity of the connections.
4. Switch on the disconnecting device (circuit breaker) in order to apply voltage to the terminals of the power wires.

## 7.2. Operating System and Hardware Component Drivers

Your system can be supplied optionally with a pre-installed operating system.

If you have ordered your KBox A-203 with a pre-installed operating system, all drivers are installed in accordance with the system configuration ordered (optional hardware components). Your system is fully operational when you switch it on for the first time. Please pay attention to the following note.



---

**Important information on the use of the pre-installed "WINDOWS 10 IOT FOR EMBEDDED SYSTEMS" operating system:**

The terms and conditions for the use of the pre-installed operating systems are specified in the document "MICROSOFT SOFTWARE LICENSE TERMS".

You can download this document from our web site [www.kontron.com](http://www.kontron.com) by selecting Product/Downloads tab/Windows.

---

If you have ordered The KBox A-203 without a pre-installed operating system, you will need to install the operating system and the appropriate drivers for the system configuration you have ordered (optional hardware components) yourself.



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You can download the relevant drivers for the installed hardware from our web site at [www.kontron.com](http://www.kontron.com) by selecting the product.

Pay attention to the manufacturer specifications of the operating system and the integrated hardware components.

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Latest Linux Distribution and Kernel shall be used in order to properly support the APL architecture (e.g. for Yocto)

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## 8/ Maintenance and Cleaning

Equipment from Kontron requires only minimum servicing and maintenance for proper operation.

- ▶ For light soiling, clean the KBox A-203 with a dry cloth.  
Carefully remove dust from the surface of the cooling fins of the chassis using a clean, soft brush.
- ▶ Stubborn dirt should be removed using a mild detergent and a soft cloth.



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Do not use steel wool, metallic threads or solvents like abrasives, alcohol, acetone or benzene for cleaning the KBox A-203.

---

## 9/ Technical Specifications

Table 1: Technical Specifications

|                                                |                                                                                                                                                                         |
|------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>KBox A-203</b>                              |                                                                                                                                                                         |
| <b>Installed CPU Module and Baseboard</b>      | Baseboard with SMARC sXAL Module module<br>Intel Atom® x5-E3930                                                                                                         |
| <b>RAM</b>                                     | up to 4 GB DDR3L                                                                                                                                                        |
| <b>BIOS</b>                                    | AMI® BIOS                                                                                                                                                               |
| <b>Interfaces<br/>(front side accessible)</b>  | 2x Ethernet (10/100/1000 Mbit/s)<br>2x USB 3.0<br>1x DisplayPort<br>1x COM 1 (RS232; optional: RS422/RS485)<br><i>Optional:</i><br>1x COM 2 (RS232)<br>1x Fieldbus Port |
| <b>Storage</b>                                 | 1x mSD card socket (accessible from rear)<br>up to 32 GByte onboard flash (eMMC)<br>1x mSATA socket<br>Drive Bay to install 1x 2.5" SATA SSD                            |
| <b>Expansion</b>                               | Up to 2x mPCIe sockets for full-size modules<br>(1x with SIM Card socket, 1x for Fieldbus expansion / shared with mSATA)                                                |
| <b>Controls<br/>(at the front side)</b>        | Reset button (RESET)                                                                                                                                                    |
| <b>Indicators<br/>(at the front side)</b>      | PWR (Power LED)<br>SSD (SSD activity LED)<br>GP (General Purpose LED)                                                                                                   |
| <b>DC IN Connector<br/>(at the front side)</b> | 2-pin DC input connector                                                                                                                                                |
| <b>Protection Class</b>                        | IP20                                                                                                                                                                    |
| <b>Rated Voltage (tolerance)</b>               | 24 VDC (+20%/-15%)                                                                                                                                                      |

## 9.1. Mechanical Specifications

Table 2: Mechanical Specifications

| Dimensions                                     | KBox A-203 with vertical mounting plate                                                                                                    | KBox A-203 with vert./horiz. mounting brackets | KBox A-203 as desktop      |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------|----------------------------|
| Height                                         | 266 mm (10.47")                                                                                                                            | 135.5 mm (5.33")                               | 65.6 mm (2.58")            |
| Width                                          | 58 mm (2.28")                                                                                                                              | 270 mm (10.63")                                | 210 mm (8.27")             |
| Depth                                          | 138 mm (5.43")                                                                                                                             | 65 mm (2.56")                                  | 140 mm (5.51")             |
| Weight (without packaging, without expansions) | Approx. 1.85 kg (4.08 lbs.)                                                                                                                | Approx. 2 kg (4.41 lbs.)                       | Approx. 1.8 kg (3.97 lbs.) |
| Chassis                                        | Cooling fins, black<br>Chassis: steel sheet, light grey (RAL 7035)<br>Side with External Interfaces : trim strips, traffic grey (RAL 7043) |                                                |                            |

### 9.1.1. Mechanical Specifications of the KBox A-203 as Desktop

Figure 20: Dimensions: Front as desktop

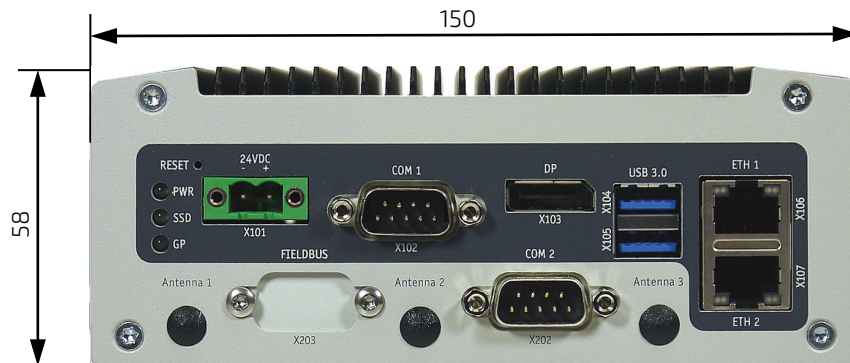
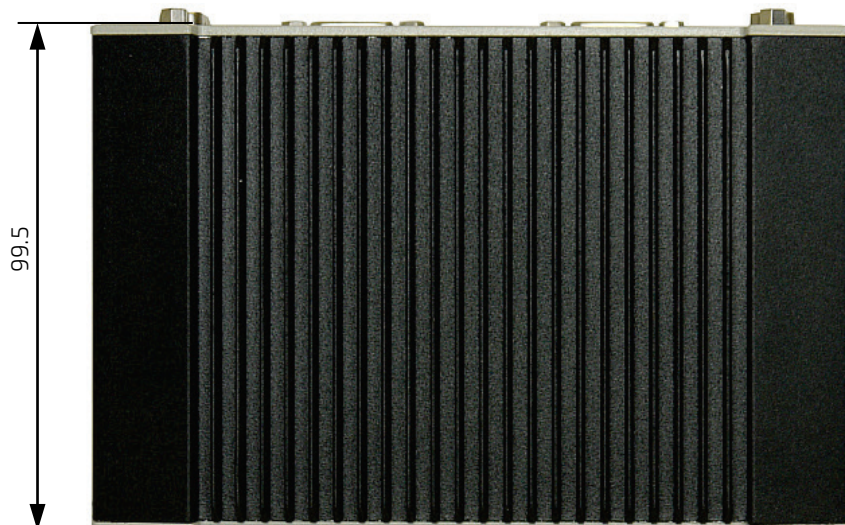


Figure 21: Dimensions: Front side with antennas and wall/table mounting brackets



## 9.1.2. Mechanical Specifications of the KBox A-203 with Vertical Mounting Plate

Figure 22: Dimensions: Left side



Figure 23: Dimensions: Rear side with vertical mounting plate

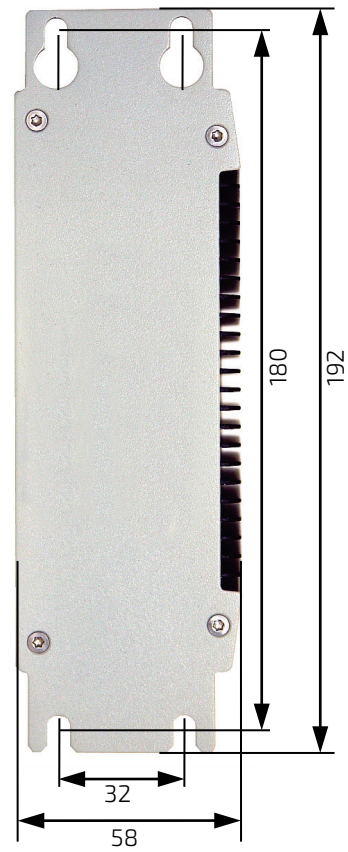
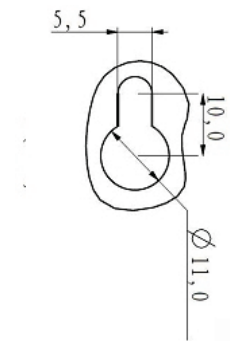


Figure 24: Dimensions: Detail key hole



### 9.1.3. Mechanical Specifications of the KBox A-203 with Wallmount Bracket

Figure 25: Dimensions: Top side (with wall/table mounting brackets)

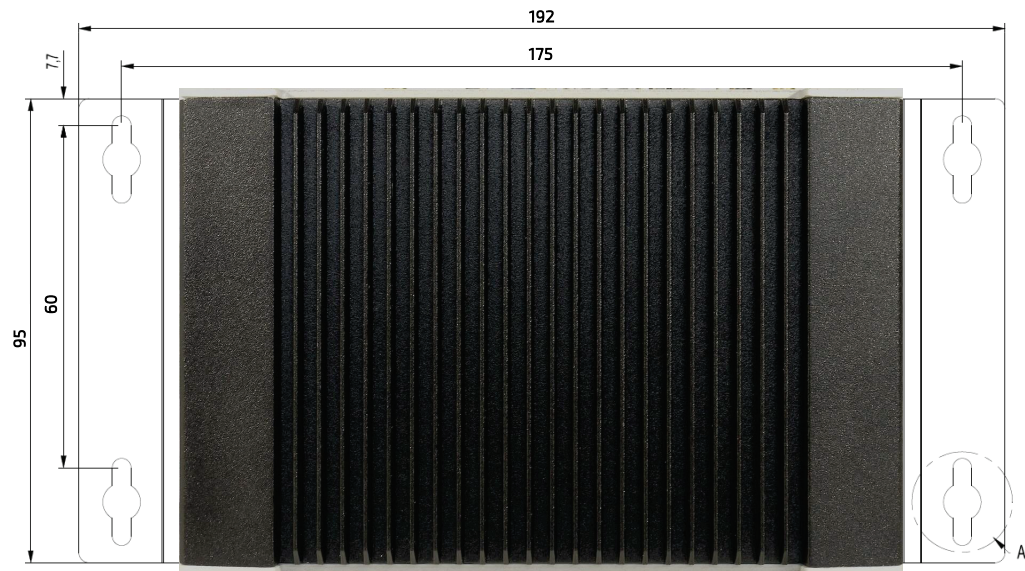


Figure 26: Dimensions: front side (with wall/table mounting brackets)

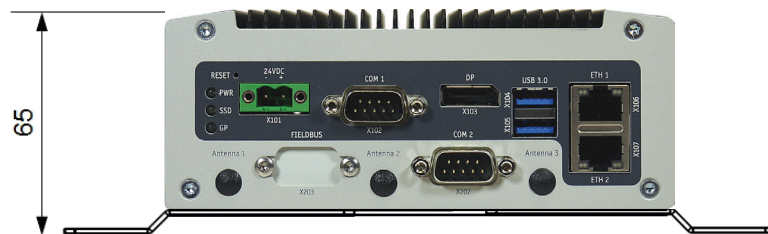
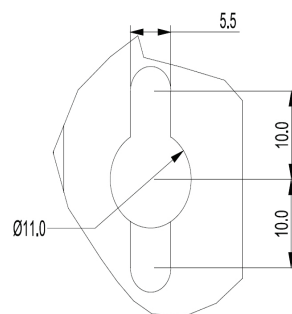


Figure 27: Detail mounting slide hole (wall/table mounting brackets)



## 9.2. Environmental Specifications

Table 3: Environmental Specifications

|                                       | KBox A-203 (Standard Version)                                   |
|---------------------------------------|-----------------------------------------------------------------|
| Thermal Management                    | Fanless cooling                                                 |
| Operating Temperature                 | 0°C ... +60°C (32 ... 140°F)                                    |
| Storage / Transit Temperature         | -40°C ... +85°C (-40°F ... +185°F)                              |
| Relative Humidity (Operating/Transit) | 93 % @ 40 °C (non-condensing) acc. to IEC 60068-2-78            |
| Max. Operation Altitude               | 2,000 m (6,560 ft)                                              |
| Max. Storage / Transit Altitude       | 10,000 m (32,810 ft)                                            |
| Operating Shock                       | 15 G, 11 ms, half sine, acc. to IEC 60068-2-27                  |
| Non-operating/Transit Shock           | 50 G, 11 ms, half sine (IEC 60068-2-27) no HDD and add on cards |
| Operating Vibration                   | 5 - 500 Hz, 1 G (IEC 60068-2-6)                                 |
| Non-operating/Transit Vibration       | 5 - 500 Hz, 2 G (IEC 60068-2-6)                                 |

## 9.3. CE Directives and Standards

Table 4: CE Directives and Standards

|                                                                   |                                                                          |                                                                                                                                                                                                                                                                                             |
|-------------------------------------------------------------------|--------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| CE-Mark<br>Compliant<br>with EU<br>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<br>2014/30/EU<br>Emission                                     | CISPR 11<br>EN 55011                                                     | Industrial, scientific and medical equipment - Radio-frequency disturbance characteristics - Limits and methods of measurement                                                                                                                                                              |
| EMC<br>2014/30/EU<br>Immunity                                     | EN 61000-6-2                                                             | Electromagnetic compatibility (EMC), part 6-2: Generic standards- Immunity for industrial environment                                                                                                                                                                                       |
| EMC<br>2014/53/EU                                                 | EN 301 489-1 V2.2.0                                                      | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements; Harmonised 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<br>2014/53/EU                                                 | <i>EN 301 489-17 V3.1.1</i>                                              | ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of article 3.1(b) of Directive 2014/53/EU                                      |
| RF Spectrum<br>Efficiency &<br>Spurious<br>Emission<br>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; Harmonised Standard covering the essential requirements of article 3.2 of Directive 2014/53/EU                                                      |
| EMC<br>CFR 47 Part<br>15, Subpart B                               | ANSI C63.4<br>CISPR 16<br>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<br>2014/35/EU                                              | IEC 61010-1<br>EN 61010-1<br>UL 61010-1                                  | Safety requirements for electrical equipment for measurement, control and laboratory use - Part 1: General requirements                                                                                                                                                                     |
|                                                                   | IEC 61010-2-201<br>EN 61010-2-201<br>UL 61010-2-201                      | Safety requirements for electrical equipment for measurement, control and laboratory use - Part 2-201: Particular requirements for control equipment                                                                                                                                        |
| Safety and<br>Health<br>2014/35/EU                                | 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<br>2002/96/EC                                                | The 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                                                  |

## 10/ Standard Interfaces – Pin Assignments

Low-active signals are indicated by a minus sign.

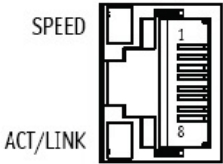
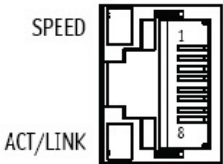
### 10.1.1. (X101) Power Input Connector

Table 5: (X101) Power Input Connector

| Pin | Signal Name     | 2-pin POWER SUBCON (male)                                                          |
|-----|-----------------|------------------------------------------------------------------------------------|
| 1   | +24 VDC (input) |  |
| 2   | 0V (input )     |                                                                                    |

### 10.1.2. (X106 as ETH 1 and X107 as ETH 2) Ethernet Connectors

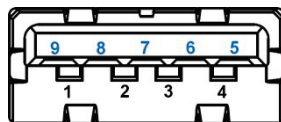
Table 6: (X106, X107) Ethernet Connectors

| Pin | Signal Name | ETH1, ETH2 (RJ45)                                                                                                                                                                                |
|-----|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | MDI0+       |  <p>X106</p>  <p>X107</p> |
| 2   | MDI0-       |                                                                                                                                                                                                  |
| 3   | MDI1+       |                                                                                                                                                                                                  |
| 4   | MDI2+       |                                                                                                                                                                                                  |
| 5   | MDI2-       |                                                                                                                                                                                                  |
| 6   | MDI1-       |                                                                                                                                                                                                  |
| 7   | MDI3+       |                                                                                                                                                                                                  |
| 8   | MDI3-       |                                                                                                                                                                                                  |

| Speed (Mbps) |        | LINK/ACT |                      |
|--------------|--------|----------|----------------------|
|              |        | LINK     | ACTIVE               |
| 10           | off    | on       | orange on (blinking) |
| 100          | green  | on       | orange on (blinking) |
| 1000         | orange | on       | orange on (blinking) |

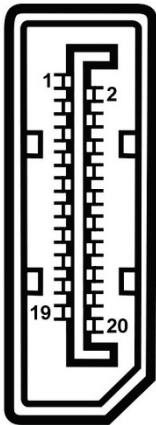
10.1.3. (X104, X105) USB 3.0 Ports

Table 7: (X104, X105) USB 3.0 Port

| Pin                  | Signal Name              | Pin                  | Signal Name | 9-pin USB Connector<br>Type A Version 3.0/2.0                                       |
|----------------------|--------------------------|----------------------|-------------|-------------------------------------------------------------------------------------|
| USB 2.0 contact pins |                          | USB 3.0 contact pins |             |                                                                                     |
| 1                    | VCC, fused (900 mA max.) | 5                    | StdA_SSRX-  |  |
| 2                    | Data-                    | 6                    | StdA_SSRX+  |                                                                                     |
| 3                    | Data+                    | 7                    | GND_DRAIN   |                                                                                     |
| 4                    | GND                      | 8                    | StdA_SSTX-  |                                                                                     |
|                      |                          | 9                    | StdA_SSTX+  |                                                                                     |

10.1.4. (X103) DisplayPort

Table 8: (X103) DisplayPort

| Pin | Signal Name     | DisplayPort                                                                        | Signal Name                             | Pin |
|-----|-----------------|------------------------------------------------------------------------------------|-----------------------------------------|-----|
| 1   | ML Lane 0 (p)   |  | GND (ML Lane 0)                         | 2   |
| 3   | ML Lane 0 (n)   |                                                                                    | Lane 1 (p)                              | 4   |
| 5   | GND (ML Lane 1) |                                                                                    | Lane 1 (n)                              | 6   |
| 7   | Lane 2 (p)      |                                                                                    | GND (ML Lane 2)                         | 8   |
| 9   | Lane 2 (n)      |                                                                                    | Lane 3 (p)                              | 10  |
| 11  | GND (ML Lane 3) |                                                                                    | Lane 3 (n)                              | 12  |
| 13  | AUX SEL#        |                                                                                    | Pull-down to GND                        | 14  |
| 15  | AUX CH (p)      |                                                                                    | GND (AUX CH)                            | 16  |
| 17  | AUX CH (n)      |                                                                                    | Hot Plug                                | 18  |
| 19  | GND (GND_DDC)   |                                                                                    | 3.3V (DDC EEPROM power<br>500 mA fused) | 20  |

### 10.1.5. (X102) Serial Interface COM 1 (RS232/485/422)

Table 9: (X102) Serial Interface COM 1 (RS232)

| Pin | RS232                 | RS485/422* Full Duplex | RS485/422* Half Duplex |
|-----|-----------------------|------------------------|------------------------|
| 1   |                       |                        |                        |
| 2   | RXD (Receive Data)    | RX+                    |                        |
| 3   | TXD (Transmit Data)   | TX-                    | Data-                  |
| 4   |                       |                        |                        |
| 5   | Ground                |                        |                        |
| 6   |                       |                        |                        |
| 7   | RTS (Request to Send) | TX+                    | Data+                  |
| 8   | CTS (Clear to Send)   | RX-                    |                        |
| 9   |                       |                        |                        |

\*Once configured to RS485 in BIOS, COM1 can work as 485 or 422



This port provides no internal termination in RS485/422 mode. If necessary, it has to be terminated externally.

### 10.1.6. (X202) Serial Interface COM 2 (RS232)

Table 10: (X202) Serial Interface COM 2 (RS232)

| Pin | Signal Name         | 9-pin D-SUB Connector (male) |
|-----|---------------------|------------------------------|
| 1   | NC                  |                              |
| 2   | RXD (Receive Data)  |                              |
| 3   | TXD (Transmit Data) |                              |
| 4   | NC                  |                              |
| 5   | GND (Signal Ground) |                              |
| 6   | NC                  |                              |
| 7   | NC                  |                              |
| 8   | NC                  |                              |
| 9   | NC                  |                              |

## 11/ uEFI BIOS

### 11.1. Starting the uEFI BIOS

The KBOX-A203 uses a Kontron-customized, pre-installed and configured version of Aptio® V uEFI BIOS based on the Unified Extensible Firmware Interface (uEFI) specification and the Intel® Platform Innovation Framework for EFI. This uEFI BIOS provides a variety of new and enhanced functions specifically tailored to the hardware features of the KBOX-A203.



The BIOS version covered in this document might not be the latest version. The latest version might have certain differences to the BIOS options and features described in this chapter.



Register for the EMD Customer Section to get access to BIOS downloads and PCN service.

The uEFI BIOS KBOX-A203 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. Switch on the board.
2. Wait until the first characters appear on the screen (POST messages or splash screen).
3. 3. Press the <DEL> key.
4. If the uEFI BIOS is password-protected, a request for password will appear. Enter either the User Password or the Supervisor Password (see Security Setup Menu), press <RETURN>, and proceed with step 5.
5. A Setup menu appears.

The KBOX-A203 uEFI BIOS Setup program uses a hot key navigation system. The hot key legend bar is located at the bottom of the Setup screens. The following table provides a list of navigation hot keys available in the legend bar.

**Table 11: 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<br>Pressing the <ESC> key in a sub-menu displays the next higher menu level |
| <RETURN>   | <RETURN> key executes a command or selects a submenu                                                                                          |

## 11.2. Setup Menus

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

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

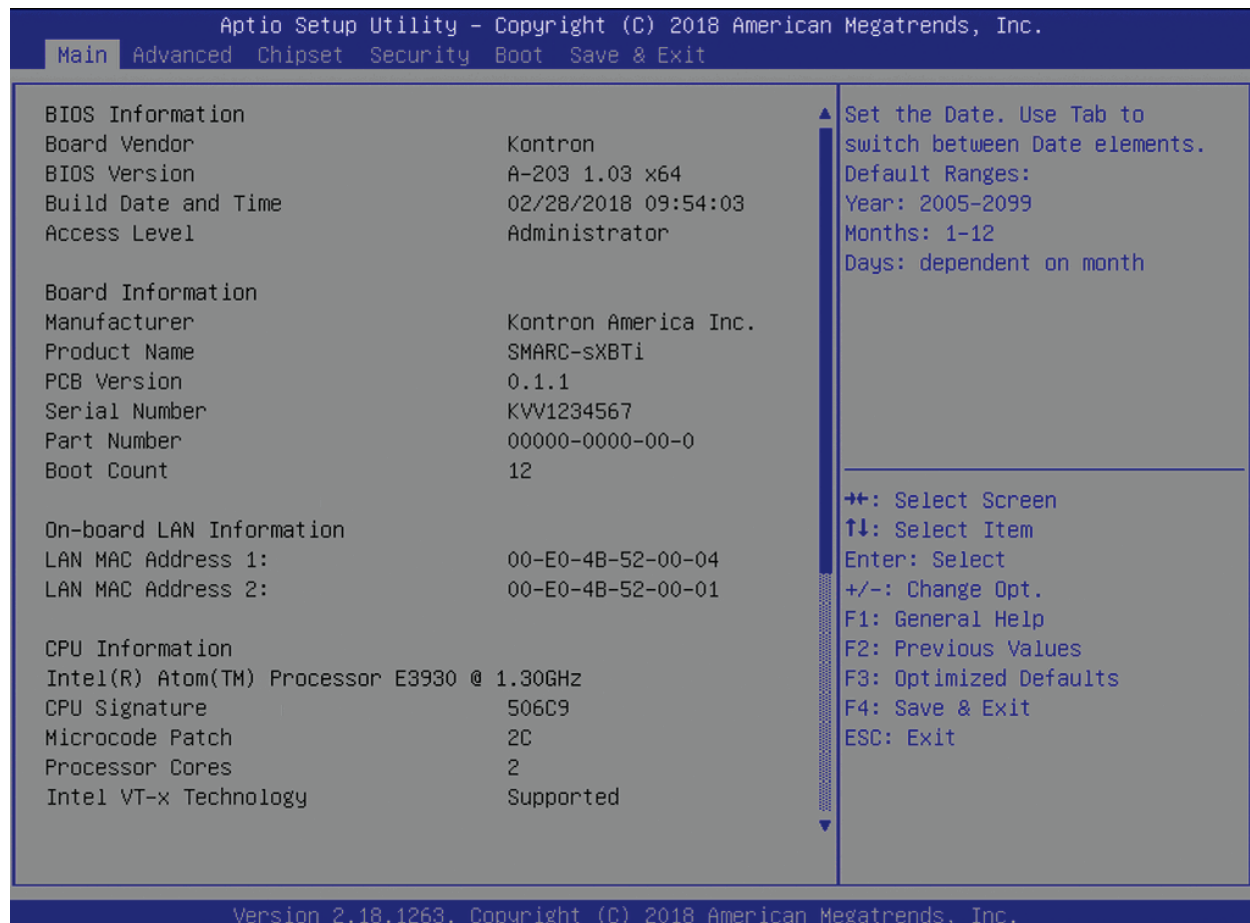
The currently active menu and the currently active uEFI BIOS Setup item are highlighted in white. Use the left and right arrow keys to select the Setup menus.

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 a Help window providing an explanation of the respective function.

### 11.2.1. Main Setup Menu

On entering the uEFI BIOS, the setup program displays the Main Setup menu. This screen lists the Main Setup menu sub-screens and provides basic system information as well as functions for setting the system language, time and date.

Figure 28: Main Setup Menu Initial Screen



The following table shows the Main Menu sub-screens and functions and describes the content.

**Table 12: Main Setup Menu Sub-screens and Functions**

| Sub-Screen                     | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| BIOS Information>              | Read only field<br>BIOS vendor, Core version, Compliancy, Project version, Build date and time, and Access level                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Bord Information               | Read only field<br>Manufacturer, Product name, PCB version, Serial number, Part number and Boot count                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| Onboard LAN Information>       | Read only field<br>LAN MAC Address<br><b>Additional information for MAC Address</b><br>The MAC address entry is the value used by the Ethernet controller and may contain the entry 'Inactive' - Ethernet chip is inactive. To activate the Ethernet chip set the following:<br>Advanced > Network Stack Configuration > Network Stack > Enable<br>88:88:88:88:87:88 is a special pattern that will be filled in by the Ethernet firmware if there is no valid entry in the firmware block of the BIOS SPI (i.e. the MAC address has been overwritten during the last attempt to flash the system). |
| CPU Information>               | Read only field<br>Processor Type, CPU signature, Microcode patch, CPU Speed, processor Core, intel VT-x technology                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| Memory Information>            | Read only field<br>Total memory and Memory speed                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| Platform Firmware Information> | Read only field<br><i>Module Information</i><br>BXT SOC, MRC Version, PUNIT FW, PMC FW, TXE FW, GOP, and CPLD rev                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| System Date>                   | Displays the system date [Week day mm/dd/yyyy]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      |
| System Time>                   | Displays the system time [hh:mm:ss]                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |

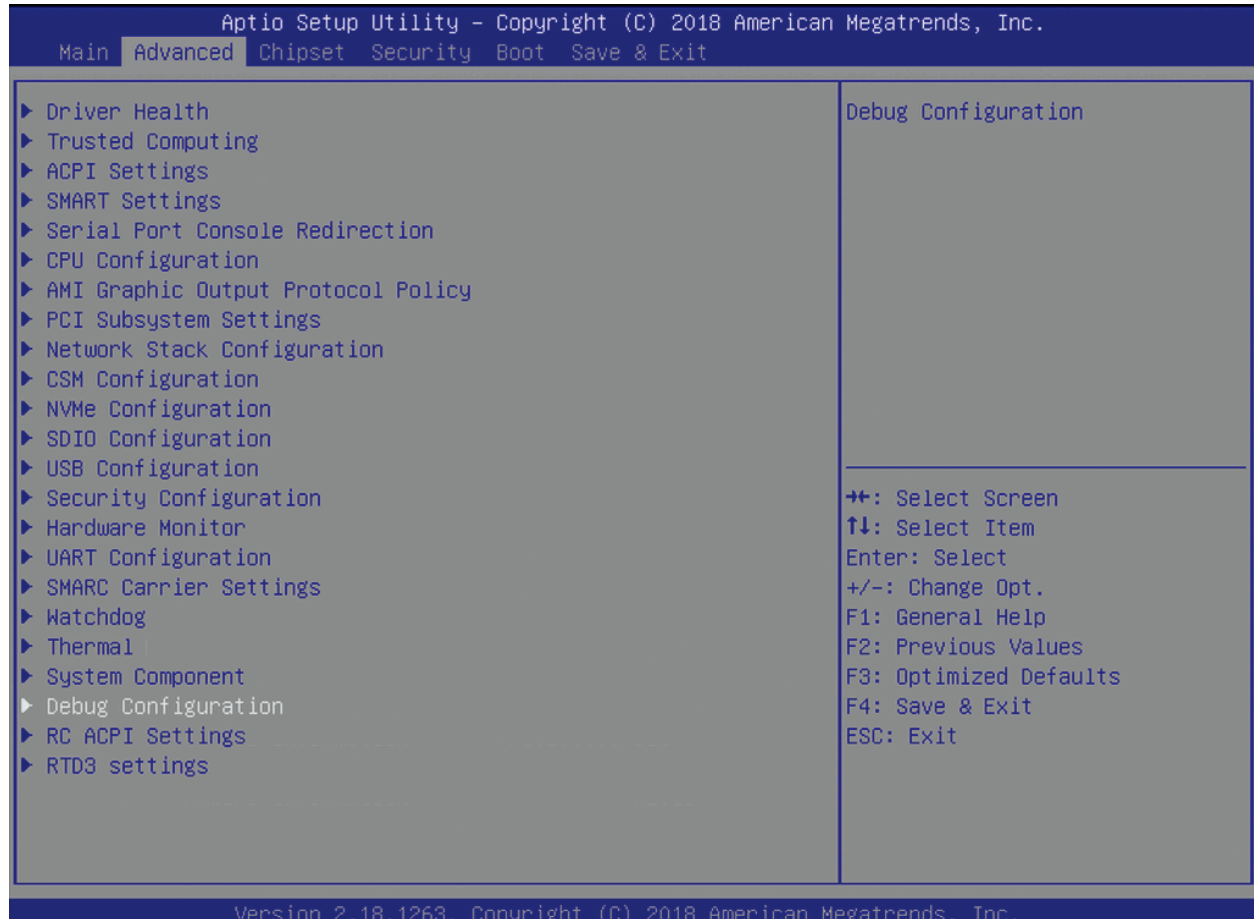
## 11.2.2. Advanced Setup Menu

The Advanced Setup menu displays sub-screens and second level sub-screens with functions, for advanced configurations.

### NOTICE

Setting items, on this screen, to incorrect values may cause system malfunctions.

Figure 29: Advanced Setup Menu Initial Screen



The following table shows the Advanced sub-screens and functions and describes the content. Default settings are in **bold** and for some functions, additional information is included.

Table 13: Advanced Setup menu Sub-screens and Functions

| Sub-Screen         | Function                                                                    | Second level Sub-Screen / Description                                                                                                                                                             |
|--------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Driver Health>     | Read only Information<br>Provides Health Status for the Drivers/Controllers |                                                                                                                                                                                                   |
| Trusted Computing> | Read only Information<br>TPM20 device Found, Vendor and Firmware version    |                                                                                                                                                                                                   |
|                    | Security Device Support>                                                    | Enables or disables BIOS support for security device<br>Operating System will not show security device, and TCG EFI protocol and INT1A interface are not available.<br><b>[Enabled, Disabled]</b> |
|                    | Active PCR Banks>                                                           | Read only field<br>Displays active PCR Banks                                                                                                                                                      |

| Sub-Screen                        | Function                               | Second level Sub-Screen / Description                                                                                                                                                                               |
|-----------------------------------|----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Trusted Computing><br>(continued) | Available PCR Banks>                   | Read only field<br>Displays available PCR Banks                                                                                                                                                                     |
|                                   | SHA-1 PCR Bank>                        | SHA-1 PCR Bank<br>[Enabled, Disabled]                                                                                                                                                                               |
|                                   | SHA256 PCR Bank>                       | SHA256 PCR Bank<br>[Enabled, Disabled]                                                                                                                                                                              |
|                                   | Pending Operation>                     | Schedules an operation for security device Note: Computer reboots on restart to change the state of the security device.<br>[None, TPM Clear]                                                                       |
|                                   | Platform Hierarchy>                    | Platform Hierarchy<br>[Enabled, Disabled]                                                                                                                                                                           |
|                                   | Storage Hierarchy>                     | Storage Hierarchy<br>[Enabled, Disabled]                                                                                                                                                                            |
|                                   | Endorsement Hierarchy>                 | Endorsement Hierarchy<br>[Enabled, Disabled]                                                                                                                                                                        |
|                                   | TPM2.0 UEFI Spec Version>              | Selects TCG2 Spec Version support<br>TCG_1_2: is compatible mode for Win8/Win10 and<br>TCG_2: supports TCG2 protocol and event format Win 10 or later.<br>[TCG_1_2, TCG_2]                                          |
|                                   | Physical Presence Spec Version>        | Select to inform OS to support either PPI Spec 1.2 or 1.3<br>Note: Some HCK tests might not support 1.3.<br>[1.2, 1.3]                                                                                              |
|                                   | TPM 20 InterfaceType>                  | Read only field                                                                                                                                                                                                     |
|                                   | Device Select>                         | Selects BIOS support for security devices.<br>Auto: supports both TPM 1.2 and TPM 2.0<br>TPM 1.2: restricts support to TPM 1.2 devices<br>TPM 2.0: restricts support to TPM 2.0 devices<br>[TPM 1.2, TPM 2.0, Auto] |
| ACPI Settings>                    | Enable ACPI Auto Configuration>        | Enables or disables BIOS ACPI auto configuration. If enabled, the system uses generic ACPI settings that may not fit the system best.<br>[Enabled, Disabled]                                                        |
|                                   | Enable Hibernation>                    | Enables or disables systems ability to hibernate (OS/S4 Sleep State)<br>This option may not be effective with some operating systems.<br>[Enabled, Disabled]                                                        |
|                                   | ACPI Sleep State>                      | Selects highest ACPI sleep state the system enters when the SUSPEND button is pressed<br>[Suspend Disabled, S3 Suspend to Ram]                                                                                      |
|                                   | Lock Legacy Resources>                 | Lock of legacy resources<br>[Enabled, Disabled]                                                                                                                                                                     |
| SMART Settings>                   | SMART Self Test>                       | Run SMART Self Test on all HDDs during POST<br>[Enabled, Disabled]                                                                                                                                                  |
| Serial Port Console Redirection>  | COM0 (Disabled)<br>Console Redirection | Port is Disabled                                                                                                                                                                                                    |

| Sub-Screen                                       | Function                                                                                                                                                                                                                                                                                                           | Second level Sub-Screen / Description                                                                                                                                                                      |                                                                                                       |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|
| Serial Port Console Redirection><br>(continued)  | <b>Additional Information COM # Console</b><br>If redirection is enabled then the port settings such as Terminal type, Bits per second, Data bits, Parity etc. can be adjusted here. On-module COM ports do not support flow control.<br>If the Port is disabled, the COM# port is displayed as a read only field. |                                                                                                                                                                                                            |                                                                                                       |
|                                                  | Legacy Console Redirection settings>                                                                                                                                                                                                                                                                               | Legacy Serial Redirection Port>                                                                                                                                                                            | Selects a COM port to display redirection of legacy OS and legacy OPROM messages<br>[COM0 (Disabled)] |
|                                                  | Serial Port for Out-of-Band Management / Windows EMS Console Redirection>                                                                                                                                                                                                                                          | Console Redirection Enabled or Disabled<br>[Enabled, Disabled]                                                                                                                                             |                                                                                                       |
| CPU Configuration>                               | Turbo Mode>                                                                                                                                                                                                                                                                                                        | Enables or disables processor turbo mode<br>Note: EMTTM must also be enabled.<br>Auto means enabled unless the max. turbo ratio is bigger than 16-SKL A0 W/A.<br>[Enabled, Disabled]                       |                                                                                                       |
|                                                  | Intel Virtualization Technology>                                                                                                                                                                                                                                                                                   | Enables VMM to utilize additional hardware capabilities provided by Vanderpool Technology<br>[Enabled, Disabled]                                                                                           |                                                                                                       |
|                                                  | VT-d>                                                                                                                                                                                                                                                                                                              | CPU VT-d<br>[Enabled, Disabled]                                                                                                                                                                            |                                                                                                       |
|                                                  | Monitor Mwait>                                                                                                                                                                                                                                                                                                     | Monitor Mwait<br>[Enabled, Disabled, Auto]                                                                                                                                                                 |                                                                                                       |
| AMI Graphic Output Protocol Policy>              | Read only field<br>AMI Graphic driver version                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                            |                                                                                                       |
|                                                  | Output Select>                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                            |                                                                                                       |
| PCI Subsystem Seettings>                         | Read only field<br>AMI PCI driver version                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                            |                                                                                                       |
|                                                  | Above 4G Decoding>                                                                                                                                                                                                                                                                                                 | 64 bit capable devices to be decoded in above 4G address space<br>[Enabled, Disabled]                                                                                                                      |                                                                                                       |
|                                                  | Hot-Plug Support>                                                                                                                                                                                                                                                                                                  | Hot-Plug support for the entire system<br>[Enabled, Disabled]                                                                                                                                              |                                                                                                       |
| Network Stack Configuration>                     | Network Stack>                                                                                                                                                                                                                                                                                                     | UEFI Network Stack<br>[Enabled, Disabled]                                                                                                                                                                  |                                                                                                       |
| Compatibility Support Module (CSM) Configuration | CSM Support>                                                                                                                                                                                                                                                                                                       | CSM Support<br>[Enabled, Disabled]                                                                                                                                                                         |                                                                                                       |
| NVMe Configuration>                              | Read only field<br>NVMe controller and driver version                                                                                                                                                                                                                                                              |                                                                                                                                                                                                            |                                                                                                       |
| SDIO Configuration>                              | SDIO Access Mode>                                                                                                                                                                                                                                                                                                  | Auto Option: Access SD device in DMA mode if controller supports it, otherwise in PIO mode. DMA option: Access SD device in DMA mode. PIO Option: Access SD device in PIO mode.<br>[Auto, ADMA, SDMA, PIO] |                                                                                                       |

| Sub-Screen                         | Function                                                                                    | Second level Sub-Screen / Description                                                                                                                                                          |
|------------------------------------|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SDIO Configuration><br>(continued) | Mass storage devices>                                                                       | Mass storage device emulation type.<br>[Auto, Floppy, Forced FDD, Hard Disk]                                                                                                                   |
| USB Configuration>                 | Read only fields<br>USB Configuration, UBS module Version, USB controllers, and USB devices |                                                                                                                                                                                                |
|                                    | Legacy USB Support>                                                                         | Enable- supports legacy USB<br>Auto- disables legacy support, if no USB devices are connected<br>Disable- keeps USB devices available for EFI applications only<br>[Enabled, Disabled, Auto]   |
|                                    | XHCI Hand-off>                                                                              | XHCI ownership change claimed by XHCI driver.<br>Note: This is a work around for OS(s) without XHCI hand-off support.<br>[Enabled, Disabled]                                                   |
|                                    | USB Mass Storage Driver Support>                                                            | Enables or disables USB mass storage driver support<br>[Enabled, Disabled]                                                                                                                     |
|                                    | USB Transfer Time-out>                                                                      | Displays timeout value for control, bulk and interrupt transfers<br>[1 sec, 5 sec, 10 sec, <b>20 sec</b> ]                                                                                     |
|                                    | Device Reset Time-out>                                                                      | Displays USB mass storage device start unit command time-out<br>[10 sec, <b>20 sec</b> , 30 sec, 40 sec]                                                                                       |
|                                    | Device Power-up Delay>                                                                      | Displays maximum time taken for the device to report itself to the host properly. Auto uses the default :root port 100 ms /hub port delay is taken from hub port descriptor.<br>[Auto, Manual] |
|                                    | Mass Storage Devices>                                                                       | Mass storage device emulation type<br>[Auto, Floppy, Forced FDD, Hard Disk, CD-ROM]                                                                                                            |
| Security Configuration>            | TXE HMRFP0>                                                                                 | TXE HMRFP0<br>[Enabled, <b>Disabled</b> ]                                                                                                                                                      |
|                                    | TXE EOP Message>                                                                            | Send EOP Message before enter OS<br>[Enabled, Disabled]                                                                                                                                        |
| Hardware Monitor>                  | CPU DTS Temperature (CPU MSR)>                                                              | Read only field<br>CPU temperature (°C)                                                                                                                                                        |
|                                    | PCB Temperature (TD1)>                                                                      | Read only field<br>PCB temperature (°C)                                                                                                                                                        |
|                                    | NCT7802Y Temperature>                                                                       | Read only field<br>NCT7802Y temperature (°C)                                                                                                                                                   |
|                                    | NCT7802Y Voltage>                                                                           | Read only field<br>NCT7802Y voltage (V)                                                                                                                                                        |
|                                    | RTC Voltage>                                                                                | Read only field<br>RTC Voltage (V)                                                                                                                                                             |
|                                    | DDR Voltage>                                                                                | Read only field<br>DDR Voltage (V)                                                                                                                                                             |
|                                    | Input Voltage>                                                                              | Read only field<br>Input Voltage (V)                                                                                                                                                           |

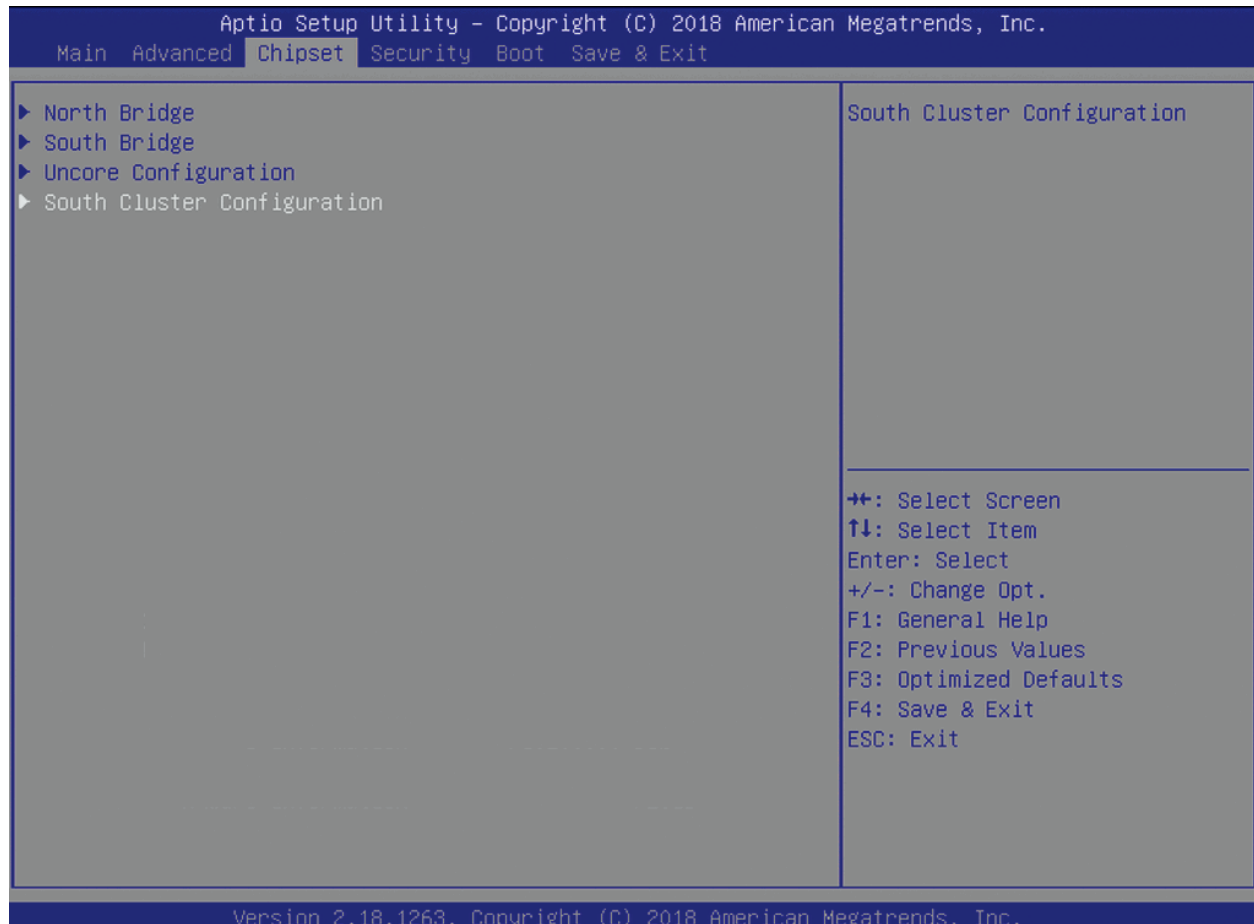
| Sub-Screen          | Function                                     | Second level Sub-Screen / Description                                                                                                                                                                                   |
|---------------------|----------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| UART Configuration> | RS232 Interface from CPLD>                   | Settings when RS232 connector (COM2) is configured to CPLD UART (On UART SELECT jumper, pin 1 & pin 2 are shorted)<br>[Enabled, <b>Disabled</b> ]                                                                       |
|                     | RS485/RS232 Connector (COM1)>                | Switch to configure RS232 or RS485 for RS485/RS232 Connector (COM1)<br>[ <b>RS232</b> , RS485]                                                                                                                          |
| Carrier Settings>   | Carrier I2C0/SMBUS>                          | Switch to select which controller (SMBUS or LPSS I2C0) own the I2C_PM_CK & I2C_PM_DAT pins.<br>[ <b>Use I2C0 Controller</b> , Use SMBUS Controller]                                                                     |
| Watchdog>           | Auto Reload>                                 | Enables automatic reload of watchdog timers on timeout<br>[Enabled, <b>Disabled</b> ]                                                                                                                                   |
|                     | Global Lock>                                 | Enable sets all Watchdog registers (except for WD_KICK) to read only, until the module is reset.<br>[Enabled, <b>Disabled</b> ]                                                                                         |
|                     | Stage 1 Mode>                                | Selects action for Watchdog stage 1<br>[ <b>Disable</b> , Reset, NIM, SCI, Delay, WDT Signal only]                                                                                                                      |
| Thermal>            | Automatic Thermal Reporting>                 | Configure _CRT, _PSV and _ACO automatically based on values recommended in BWG's Thermal Reporting<br>[Enabled, <b>Disabled</b> ]                                                                                       |
|                     | Critical Trip Point>                         | Configure temperature value of the ACPI Critical Trip Point – point which OS will shut the system off.<br>[15°C, 23°C, 31°C, 39°C, 47°C, 55°C, 63°C, 71°C, 79°C, 87°C, 95°C, 100°C, 103°C, 110°C, 119°C, <b>125°C</b> ] |
|                     | Passive Trip Point>                          | Configure temperature value of the ACPI Passive Trip Point – point which OS will begin throttling the processor.<br>[Disable, 15°C, 23°C, 31°C, 39°C, 47°C, 55°C, 63°C, 71°C, 79°C, 87°C, <b>95°C</b> , 103°C, 111°C]   |
|                     | Passive TC1 Value>                           | Sets the TC1 value for the ACPI Passive Cooling Formula. (Range: 1 – 6)                                                                                                                                                 |
|                     | Passive TC2 Value>                           | Sets the TC2 value for the ACPI Passive Cooling Formula. (Range: 1 – 16)                                                                                                                                                |
|                     | Passive TSP Value>                           | Sets the TSP value for the ACPI Passive Cooling Formula. (Range: 2 – 32)                                                                                                                                                |
|                     | OS Reset Selet>                              | Select the reset type in FACP table<br>[Warm Reset, <b>Cold Reset</b> ]                                                                                                                                                 |
| System Component>   | Spread Spectrum Clocking Configuration (SSC) |                                                                                                                                                                                                                         |
|                     | DDR SSC>                                     | Enable DDR SSC<br>[ <b>Enable</b> , Disable]                                                                                                                                                                            |
|                     | DDR SSC Selection Table>                     | Select the item in SSC selection table for DDR spread spectrum<br>[0% (No SSC), -0.1%, -0.2%, -0.3%, -0.4%, <b>-0.5%</b> ,]                                                                                             |
|                     | DDR Clock Bending Selection Table>           | Select Clock Bending<br>[1.3%, 0.6%, <b>0% (No Clock Bending)</b> , -0.9%]                                                                                                                                              |
|                     | HighSpeed SerialIO SSC>                      | Enable HighSpeed SerialIO SSC configuration<br>[ <b>Enable</b> , Disable]                                                                                                                                               |
|                     | HighSpeed SerialIO SSC Selection T>          | Select the item in SSC selection table for HighSpeed SerialIO spread spectrum<br>[0% (No SSC), -0.1%, -0.2%, -0.3%, -0.4%, <b>-0.5%</b> ,]                                                                              |

| Sub-Screen           | Function                           | Second level Sub-Screen / Description                                                                                                                                                           |
|----------------------|------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Debug Configuration> | Kernel Debugger Enable>            | Enable or disable support for a kernel debugger<br>[Enable, <b>Disable</b> ]                                                                                                                    |
|                      | APEI BERT>                         | Enable or disable APEI BERT<br>[ <b>Enable</b> , Disable]                                                                                                                                       |
|                      | ACPI Memory Debug>                 | Enable or disable ACPI Memory Debug<br>[Enable, <b>Disable</b> ]                                                                                                                                |
|                      | End Of Post (TXE Debug)>           | Disable to stop BIOS from sending End of Post Message<br>[ <b>Enabled</b> , Disabled]                                                                                                           |
|                      | Lock Directory (TXE Debug)>        | Enable BIOS to lock SETUP variable after end of post<br>[Enabled, <b>Disabled</b> ]                                                                                                             |
|                      | Suppress PTT Commands>             | Bypass TPM2 commands submitting to PTT FW<br>[Enabled, <b>Disabled</b> ]                                                                                                                        |
|                      | TDO GPIO Pin>                      | If select Auto, TDO will be disabled for A0 silicon only. For other steppings, TDO will be enabled.<br>[Enable, Disable, Auto]                                                                  |
|                      | Max Memory 2G>                     | Set Maximum Memory Size to 2 GB<br>[Enable, <b>Disable</b> ]                                                                                                                                    |
|                      | Persistent RAM size>               | Specify the amount of main memory to be reserved for Pram.<br>[4MB, 16MB, 64MB, <b>Disable</b> ]                                                                                                |
|                      | OS DnX focus entry>                | Enable OS Dnx<br>[Enable, <b>Disable</b> ]                                                                                                                                                      |
|                      | Processor Trace Memory Allocation> | Disable or Select Processor trace memory region size : from 4 KB to 128 MB<br>[ <b>Disabled</b> , 4KB, 8KB, 16KB, 32KB, 64KB, 128KB, 256KB, 512KB, 1MB, 2MB, 4MB, 8MB, 16MB, 32MB, 64MB, 128MB] |
|                      | CSE Data Clear>                    | Data Clear is for reset/clearing of the CSE data region                                                                                                                                         |
| RC ACPI Setting>     | Native PCIE Enable>                | Enable or disable PCI Express Native Control in Windows<br>[ <b>Enable</b> , Disable]                                                                                                           |
|                      | Native ASPM>                       | On enable, windows will control the ASPM support for the device. If disabled, the BIOS will<br>[ <b>Enable</b> , Disable]                                                                       |
| RTD3 Settings>       | RTD3 Support>                      | Enable or disable Runtime D3 support<br>[Enabled, <b>Disabled</b> ]                                                                                                                             |

### 11.2.3. Chipset Setup Menu

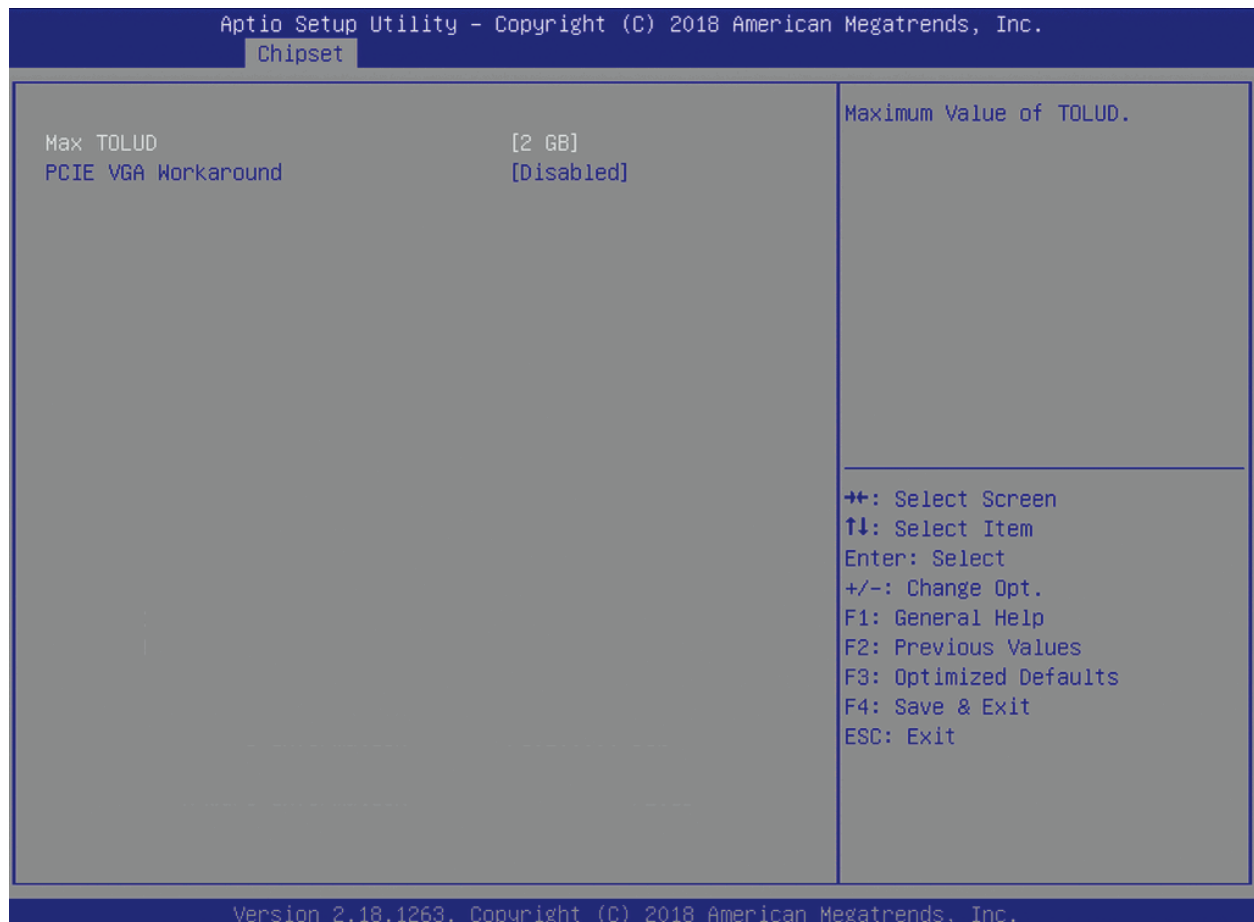
On entering the Chipset Setup menu, the screen lists four sub-screen options North bridge, South bridge, Uncore Configuration and South Cluster Configuration.

Figure 30: Chipset Setup Menu Initial Screen



### 11.2.3.1. Chipset> North Bridge

Figure 31: Chipset > North Bridge Menu Initial Screen



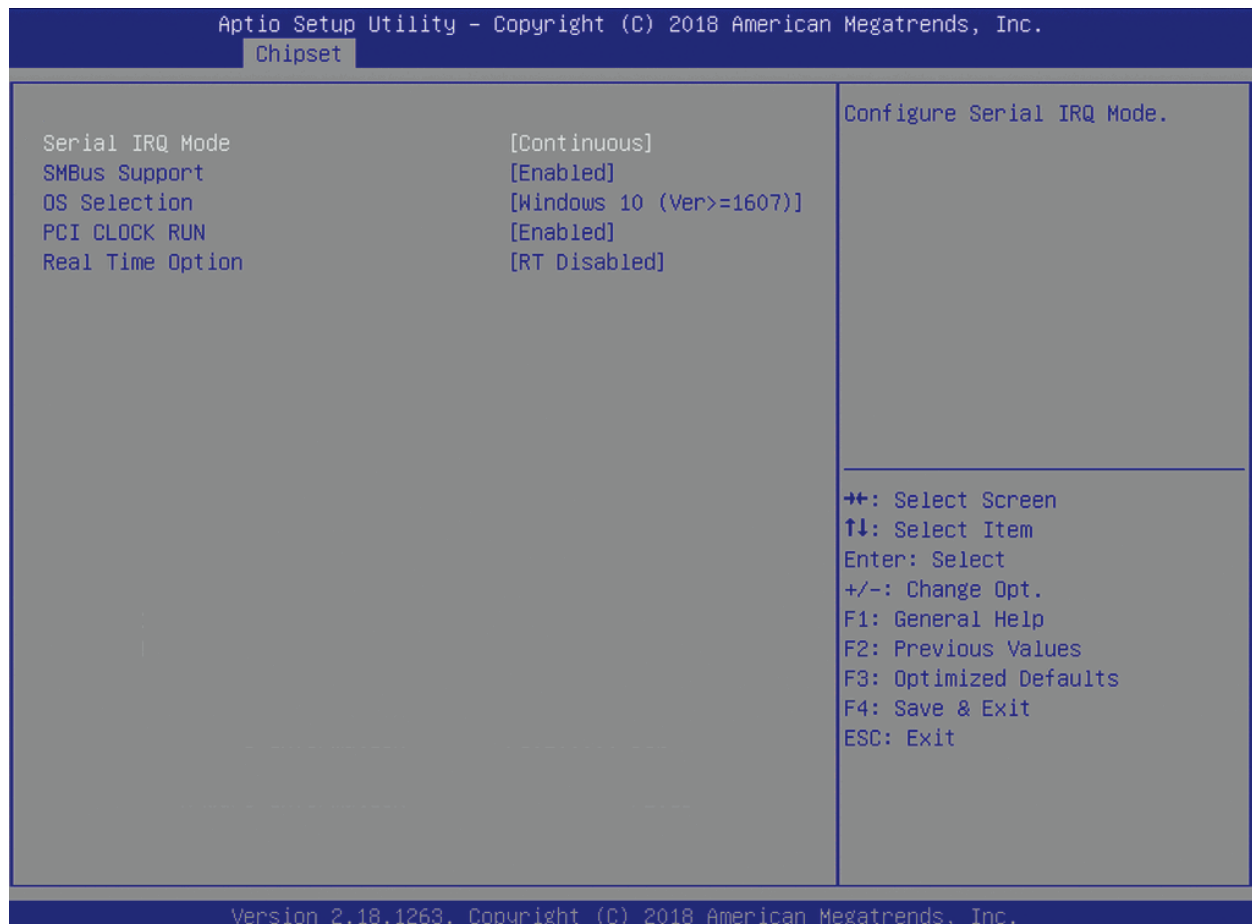
The following table shows the North bridge sub-screens and functions and describes the content. Default settings are in **bold**.

Table 14: Chipset Set > North Bridge Sub-screens and Function

| Function             | Second level Sub-Screen / Description                                                                                                                                                              |
|----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Max TOLUD>           | Sets the maximum TOLUD value. Dynamic assignment adjusts TOLUD automatically, based on largest MMIO length of the installed graphic controller.<br>[ <b>2 GB</b> , 2.25 GB, 2.5 GB, 2,75 GB, 3 GB] |
| PCIE VGA Workaround> | Enable If PCIe card cannot boot in DOS. For test purposes only.<br>[Enabled, <b>Disabled</b> ]                                                                                                     |

### 11.2.3.2. Chipset > South Bridge

Figure 32: Chipset>South Bridge Menu Initial Screen



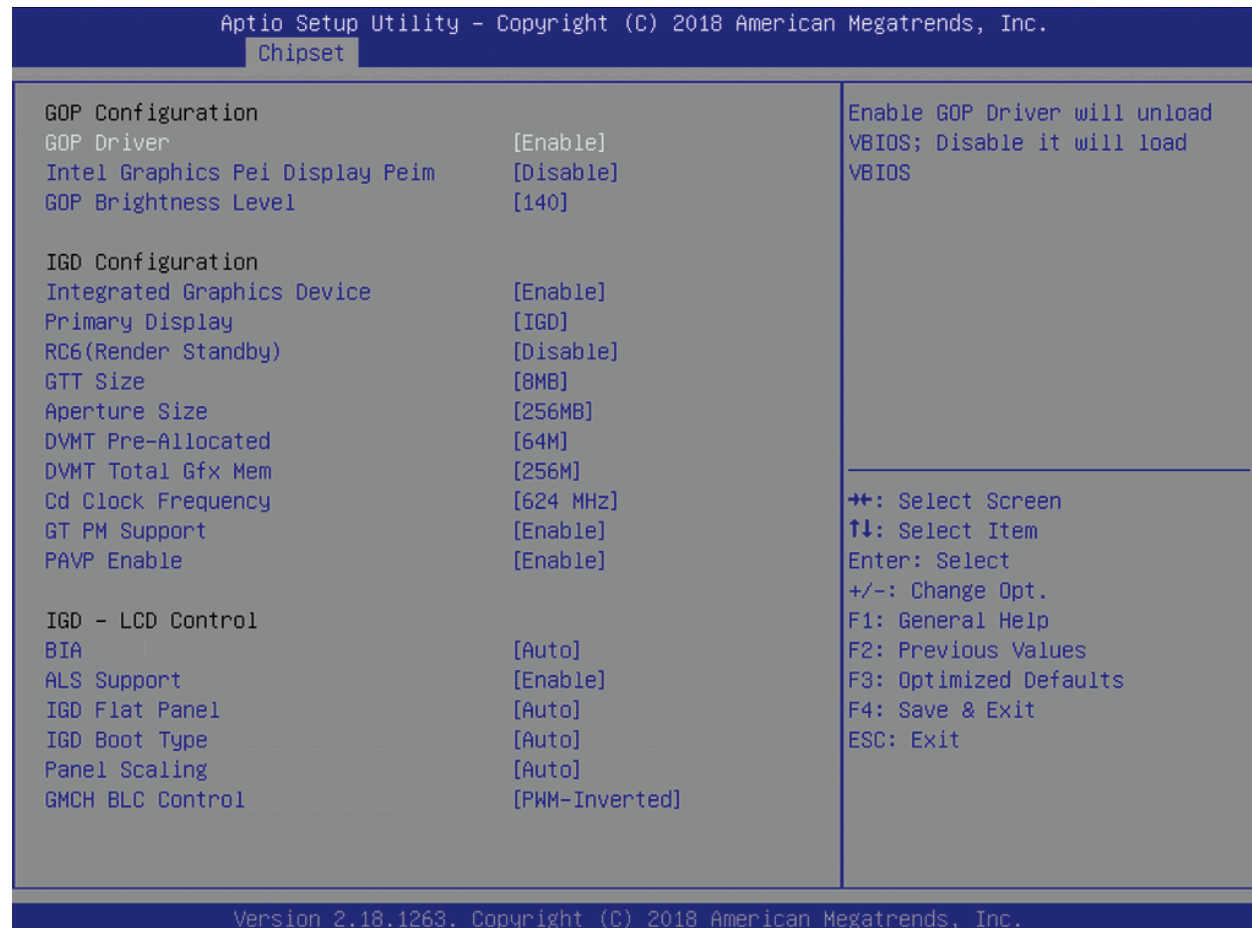
The following table shows the South Bridge sub-screens and functions, and describes the content. Default settings are in **bold**.

Table 15: Chipset Set> South Bridge Sub-screens and Functions

| Function          | Second level Sub-Screen / Description                                                                                                             |
|-------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|
| Serial IRQ Mode>  | Configure Serial IRQ Mode<br>[Quiet, <b>Continuous</b> ]                                                                                          |
| SMBus Support>    | Enable or disable SMBus Support<br>[ <b>Enabled</b> , Disabled]                                                                                   |
| OS Selection>     | Selects target OS.<br>[ <b>Windows 10 (Ver&gt;=1607)</b> , Intel Linux]                                                                           |
| PCI Clock Run>    | Enables CLKRUN# logic to stop PCI clocks<br>[ <b>Enabled</b> , Disabled]                                                                          |
| Real Time Option> | Select Read-Time Enable and IDI Agent Real-Time Traffic Mask Bits<br>[ <b>RT Disabled</b> , RT Enabled (Agent IDI1), RT Enabled (Agent Disabled)] |

### 11.2.3.3. Chipset> Uncore Configuration

Figure 33: Chipset>Uncore Configuration Menu Initial Screen



The following table shows the Uncore Configuration sub-screens and functions and describes the content. Default settings are in **bold**.

Table 16: Chipset Set> Uncore Configuration Sub-screens and Functions

| Function                         | Second level Sub-Screen / Description                                                                                      |
|----------------------------------|----------------------------------------------------------------------------------------------------------------------------|
| GOP Driver                       | Enable GOP Driver will unload VBIOS; Disable it will load VBIOS<br>[ <b>Enabled</b> , Disabled]                            |
| Intel Graphics Pei Display Peim  | Enable or disable Pei (Early) Display<br>[Enabled, <b>Disabled</b> ]                                                       |
| GOP Brightness Level             | Set GOP Brightness Level; (Range: 0 – 255)<br>[20, 40, 60, 80, 100, 120, <b>140</b> , 160, 180, 200, 220, 240, 255]        |
| Integrated Graphics Device (IGD) | Enable: Enable IGD when selected as the Primary Video Adaptor; Disable: Always disable IGD<br>[ <b>Enabled</b> , Disabled] |
| Primary Display                  | Select which of IGD/PCI Graphics device should be Primary Display<br>[ <b>IGD</b> , PCIe, HG]                              |

| Function              | Second level Sub-Screen / Description                                                                                                                                                                    |
|-----------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| RC6 (render Standby)> | Check to enable render standby support. IF SOix is enabled, RC6 should be enabled.<br>This function is read only if SOix is enabled.<br>[Enabled, <b>Disabled</b> ]                                      |
| GTT Size>             | Selects the GTT size<br>[2 MB, 4 MB, <b>8 MB</b> ]                                                                                                                                                       |
| Aperture Size>        | Selects the aperture size<br>[128 MB, <b>256 MB</b> , 512 MB]                                                                                                                                            |
| DVMT Pre-Allocated>   | Selects DVMT 5.0 pre-allocated (fixed) graphics memory size used by Internal graphics<br>[ <b>64 M</b> , 96 M, 128 M, 160 M, 192 M, 224 M, 256 M, 288 M, 320 M, 352 M, 384 M, 416 M, 448 M, 480M, 512 M] |
| DVMT Total Gfx Mem>   | Selects DVMT 5.0 total graphics memory size used by internal graphics device<br>[128 M, <b>256 M</b> , MAX]                                                                                              |
| Cd Clock Frequency>   | Selects the highest Cd clock frequency supported by the platform<br>[144 MHz, 288 MHz, 384 MHz, 576 MHz, <b>624 MHz</b> ]                                                                                |
| GT PM Support>        | GT PM Support<br>[ <b>Enabled</b> , Disabled]                                                                                                                                                            |
| PAVP Enable>          | PAVP<br>[ <b>Enabled</b> , Disabled]                                                                                                                                                                     |
| BIA>                  | Auto: GMCH uses VBIOS default<br>Level n: is enabled with selected aggressiveness level<br>[ <b>Auto</b> , Disabled, Level 1, Level 2, Level 3, Level 4, Level5]                                         |
| ALS Support>          | Valid only for ACPI<br>[ <b>Enable</b> , Disable]                                                                                                                                                        |
| IGD Flat Panel>       | [ <b>Auto</b> , 640x480, 800x600, 1024x768, 1280x1024, 1366x768, 1680x1050, 1920x1200, 1280x800]                                                                                                         |
| IGD Boot Type>        | Select preference for IGD display interface used when system boots.<br>[ <b>Auto</b> , VGA port, HDMI, DP Port B, Dp Port C, eDP, DSI Prt A, DSI Port C]                                                 |
| Panel Scaling>        | Sets Panel scaling<br>[ <b>Auto</b> , Centering, Stretching]                                                                                                                                             |
| GMCH BLC Control>     | Backlight control settings<br>[ <b>PWM-Inverted</b> , GMBus-Inverted, PWM-Normal, GMBus-Normal]                                                                                                          |

### 11.2.3.4. Chipset> South Cluster Configuration

Figure 34: Chipset>South Cluster Configuration Menu Initial Screen



The following table shows the South Cluster Configuration sub-screens and functions and describes the content. Default settings are in **bold** and for some functions, additional information is included.

Table 17: Chipset>South Cluster Configuration Sub-screens and Functions

| Function                   | Second level Sub-Screen / Description |                                                                             |
|----------------------------|---------------------------------------|-----------------------------------------------------------------------------|
| LPSS Configuration>        | Feature Connector I2C (D22:F3)>       | Enable/Disable Feature Connector I2C Support<br>[ <b>Enable</b> , Disable]  |
|                            | Feature Connector SPI (D25:F0)>       | Enable/Disable Feature Connector SPI Support<br>[ <b>Enable</b> , Disable]  |
| PCI Express Configuration> | PCI Express Clock Gating>             | PCI Express clock gating for each root port<br>[ <b>Enabled</b> , Disabled] |
|                            | Port8xh Decode>                       | PCI express port 8xh decode<br>[Enabled, <b>Disabled</b> ]                  |
|                            | Peer Memory Write Enable>             | Peer memory write<br>[Enabled, <b>Disabled</b> ]                            |
|                            | Compliance Test Mode>                 | Enable when using compliance load board<br>[Enabled, <b>Disabled</b> ]      |

| Function                                  | Second level Sub-Screen / Description                                                                                                  |                           |                                                                                                                                          |
|-------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| PCI Express Configuration><br>(continued) | PCIe # 4 Gbe LAN (Top)><br>or<br>PCIe #0 Gbe LAN (Bottom)><br>or<br>PCIe #1 mPCIe Slot (J7)><br>or<br>PCIe #2 mPCIe / mSATA Slot (J8)> | PCI Express Root Port[#]> | Controls the PCI Express port<br>Auto automatically disables the unused root port for optimum power saving.<br>[Auto, Enabled, Disabled] |
|                                           |                                                                                                                                        | ASPM>                     | Active State Power Management (ASPM) level settings<br>[Disabled, Auto, L0s, L1, L0sL1]                                                  |
|                                           |                                                                                                                                        | L1 Substates>             | PCI Express L1 substrates settings<br>[Disabled, L1.1, L1.2, L1.1 & L1.2]                                                                |
|                                           |                                                                                                                                        | ACS>                      | Access Control Service Extended Capability<br>[Enabled, Disabled]                                                                        |
|                                           |                                                                                                                                        | URR>                      | PCI Express unsupported request reporting<br>[Enabled, Disabled]                                                                         |
|                                           |                                                                                                                                        | FER>                      | PCI Express device fatal error reporting<br>[Enabled, Disabled]                                                                          |
|                                           |                                                                                                                                        | NFER>                     | PCI Express device non-fatal error reporting<br>[Enabled, Disabled]                                                                      |
|                                           |                                                                                                                                        | CER>                      | PCI Express device correctable error reporting<br>[Enabled, Disabled]                                                                    |
|                                           |                                                                                                                                        | CTO>                      | PCI Express completion timer (T0)<br>[Default Setting, 16-55 ms, 65-210 ms, 260-900 ms, 1-3.5 s, Disabled]                               |
|                                           |                                                                                                                                        | SEFE>                     | Root PCI Express System Error on Fatal Error<br>[Enabled, Disabled]                                                                      |
|                                           |                                                                                                                                        | SENE>                     | Root PCI Express System Error on non-Fatal Error<br>[Enabled, Disabled]                                                                  |
|                                           |                                                                                                                                        | SECE>                     | Root PCI Express System Error on correctable error<br>[Enabled, Disabled]                                                                |
|                                           |                                                                                                                                        | PME SCI>                  | PCI Express PME SCI<br>[Enabled, Disabled]                                                                                               |
|                                           |                                                                                                                                        | Hot Plug>                 | PCI Express hot plug<br>[Enabled, Disabled]                                                                                              |
|                                           |                                                                                                                                        | PCIe Speed>               | Configures PCIe speed<br>[Auto, Gen 1, Gen2]                                                                                             |
|                                           |                                                                                                                                        | Transmitter Half Swing>   | Transmitter half swing<br>[Enabled, Disabled]                                                                                            |
|                                           |                                                                                                                                        | Extra Bus Reserved>       | Extra bus reserved for bridges behind this root bridge. (0-7)                                                                            |
|                                           |                                                                                                                                        | Reserved                  | Reserved memory and prefetchable                                                                                                         |

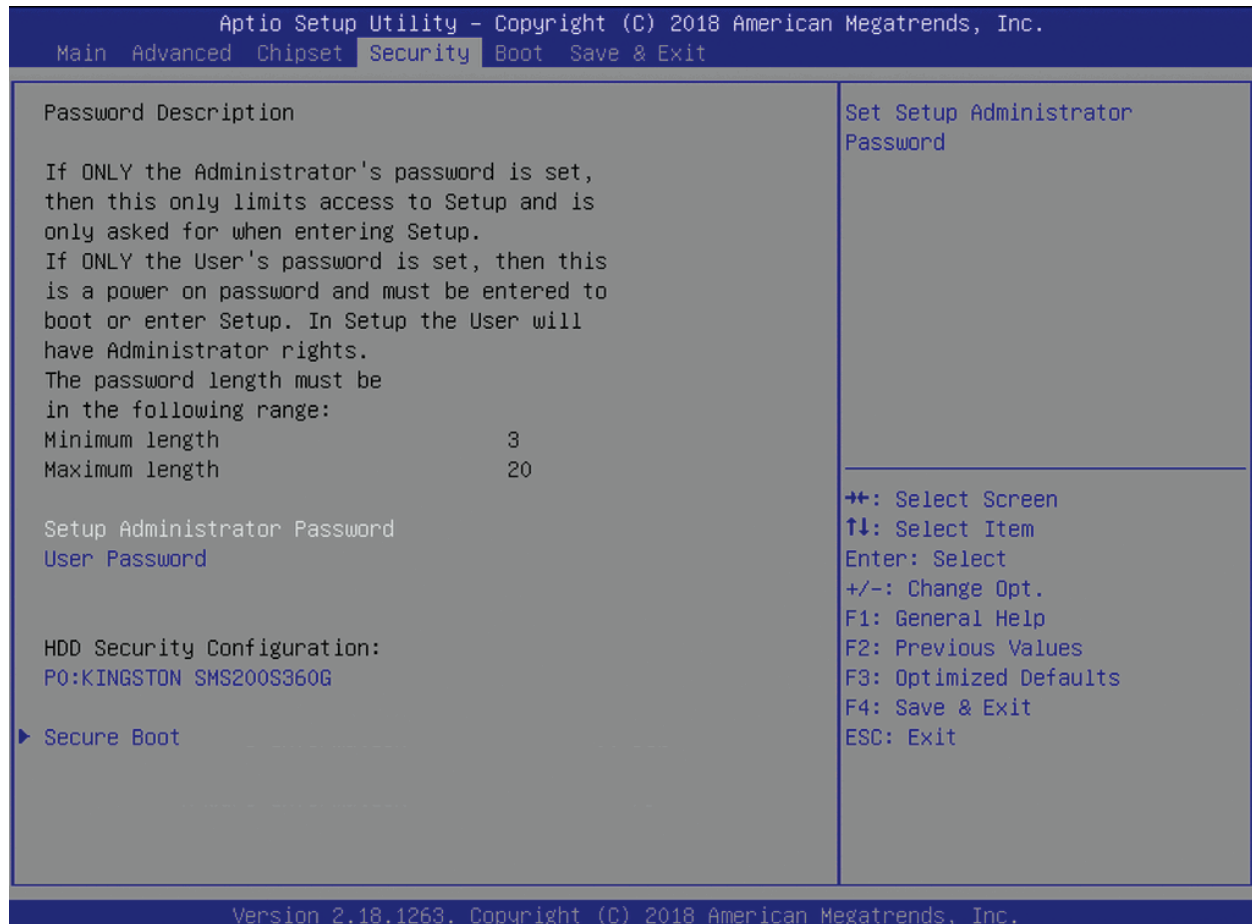
| Function                                  | Second level Sub-Screen / Description |                                                                                                                                               |                                                                                                                                                             |
|-------------------------------------------|---------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| PCI Express Configuration><br>(continued) |                                       | Memory>                                                                                                                                       | memory for this root bridge<br>Range: (1 MB-20 MB)                                                                                                          |
|                                           |                                       | Reserved I/O>                                                                                                                                 | Reserved I/O for this root bridge<br>Range: ( <b>4</b> k, 8 k, 12 k, 16 k, 20 k)                                                                            |
|                                           |                                       | PCH PCIE LTR>                                                                                                                                 | PCH PCIE latency reporting<br>[ <b>Enabled</b> , Disabled]                                                                                                  |
|                                           |                                       | Snoop Latency Override>                                                                                                                       | Snoop latency override or Non Snoop override for PCH PCIE.<br>Disabled: disables override                                                                   |
|                                           |                                       | Non Snoop Latency Override>                                                                                                                   | Manual: manually enters override values<br>Auto: maintains default BIOS flow.<br>[Disabled, Manual, <b>Auto</b> ]                                           |
|                                           |                                       | PCIE1 LTR Lock>                                                                                                                               | PCIE LTR configuration lock<br>[Enabled, <b>Disabled</b> ]                                                                                                  |
|                                           |                                       | PCIE Selectable De-emphasis>                                                                                                                  | Selects level of de-emphasis for an upstream component, if the Link operates at 5.0 GT/s speed.<br>1b – 3.5 dB<br>0b – 6 dB<br>[ <b>Enabled</b> , Disabled] |
| SATA Drives>                              | SATA Port 0>                          | SATA Port 0>                                                                                                                                  | Read only field<br>SATA port installed/Not Installed and software preserve                                                                                  |
|                                           |                                       | Port 0>                                                                                                                                       | SATA port 0<br>[ <b>Enabled</b> , Disabled]                                                                                                                 |
|                                           |                                       | SATA Port 0 Hot Plug Capability>                                                                                                              | Reports SATA port as being Hot Plug capable<br>[Enabled, <b>Disabled</b> ]                                                                                  |
| SCC Configuration>                        | SCC SD Card Support (D27:F0)>         | SCC card support<br>[ <b>Enabled</b> , Disabled]                                                                                              |                                                                                                                                                             |
|                                           | SCC eMMC Support (D28:F0)>            | SCC eMMC Support<br>[ <b>Enabled</b> , Disabled]                                                                                              |                                                                                                                                                             |
|                                           | eMMC Max Speed>                       | Selects the eMMC max. speed allowed<br>[HS400, <b>HS200</b> , DDR50]                                                                          |                                                                                                                                                             |
| USB Configuration>                        | USB Port Disable Override>            | Selectively enables or disables the corresponding USB port from reporting a device connection to the controller.<br>[Enable, <b>Disable</b> ] |                                                                                                                                                             |
|                                           | xDCI Support>                         | XDCI<br>[Enable, <b>Disable</b> ]                                                                                                             |                                                                                                                                                             |
|                                           | xHCI Disable Compliance Mode>         | xHCI Disable Compliance Mode<br>[ <b>FALSE</b> , TRUE]                                                                                        |                                                                                                                                                             |
|                                           | USB HW Mode AFE Comparators>          | USB HW mode AFE comparators<br>[Enabled, <b>Disabled</b> ]                                                                                    |                                                                                                                                                             |

| Function                     | Second level Sub-Screen / Description |                                                                                                                                                                                                                                                              |
|------------------------------|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Miscellaneous Configuration> | State After G3>                       | Specifies the state to go to if power is reapplied after power failure (G3 state)<br>S0 state: system boots directly as soon as power is applied.<br>S5 state: system remains in power-off states until the power button is pressed.<br>[S0 State, S5 State] |
|                              | Power Button Debounce Mode>           | Enable interrupt when PWRBTN# is asserted<br>[Enable, Disable]                                                                                                                                                                                               |
|                              | Wake On LAN>                          | Wake on LAN<br>[Enable, Disable]                                                                                                                                                                                                                             |
|                              | BIOS Lock>                            | Enable/Disable the SC BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash<br>[Enabled, Disabled]                                                                                                                              |
|                              | RTC Lock>                             | Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM<br>[Enabled, Disabled]                                                                                                                                                            |
|                              | TCO Lock>                             | Enable TCO and Lock Down TCO<br>[Enabled, Disabled]                                                                                                                                                                                                          |
|                              | DCI Enable (HDCIEN)>                  | If enabled the user is considered to have consented to enable DCI and allows debug over the USB 3 interface.<br>If disabled, the host controller does not enable the DCI feature.<br>[Enabled, Disabled]                                                     |
|                              | DCI Auto Detect Enable>               | If set, DCI Auto detects if DCI is connected during BIOS post time and enables DCI. If not set, DCI is disabled.<br>[Enabled, Disabled]                                                                                                                      |
|                              | GPIO Lock>                            | Enable to set GPIO Pad Configuration Lock for security<br>[Enabled, Disabled]                                                                                                                                                                                |

## 11.2.4. Security Setup Menu

The Security Setup menu provides information about the passwords and functions for specifying the security settings such as Hard Disk user and master passwords.

Figure 35: Security Setup Menu Initial Screen



The following table shows the Security sub-screens and functions and describes the content.

Table 18: Security Setup Menu Sub-screens and Functions

| Function                      | Description                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Setup Administrator Password> | Sets administrator password                                                                                                                                                                                                                                                                                                                                                                                                                       |
| User Password>                | Sets user password                                                                                                                                                                                                                                                                                                                                                                                                                                |
| HDD Security Configuration>   | <p>Read Only Information</p> <p>Allows access to set, modify and clear Hard Disk user and master passwords.</p> <p>User Passwords need to be installed for Enabling Security. Master Password can be modified only when successfully unlocked with the Master Password in Post.</p> <p>If the 'Set HDD Password' is grayed out, then power cycle to enable the option again.</p> <p>HDD Password Configuration</p> <p>Security supported: Yes</p> |

| Function                                   | Description                                                                                                                                  |                                                                                                                                                                                                                                                                                                                       |
|--------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| HDD Security Configuration><br>(continued) | Security Enabled: No<br>Security Locked: No<br>Security Frozen: No<br>HDD User Pwd Status: Not Installed<br>HDD Master Pwd Status: Installed |                                                                                                                                                                                                                                                                                                                       |
|                                            | Set User Password>                                                                                                                           | Sets HDD password.<br>Note: It is advisable to power cycle the system after setting Hard Disk passwords. The 'Discarding or Saving Changes' in the setup does not have an impact on HDD when the password is set or removed.<br>If the setup HDD user Password is grayed out, do power cycle enable the option again. |
| Secure Boot>                               | System Mode>                                                                                                                                 | Read only information.                                                                                                                                                                                                                                                                                                |
|                                            | Secure Boot>                                                                                                                                 |                                                                                                                                                                                                                                                                                                                       |
|                                            | Vendor Keys>                                                                                                                                 |                                                                                                                                                                                                                                                                                                                       |
|                                            | Attempt Secure Boot>                                                                                                                         | Secure Boot activated when Platform Key (PK) is enrolled, System mode is User/Deployed, and CSM function is disabled<br>[Enabled, <b>Disabled</b> ]                                                                                                                                                                   |
|                                            | Secure Boot Mode>                                                                                                                            | Set UEFI Secure Boot Mode to STANDARD mode or CUSTOM mode<br>[Standard, <b>Customized</b> ]                                                                                                                                                                                                                           |
|                                            | Key Management>                                                                                                                              | Enables expert users to modify Secure Boot Policy variables without full authentication                                                                                                                                                                                                                               |
|                                            |                                                                                                                                              | Provision Factory Default keys><br>Allow to provision factory default Secure Boot keys when System is in Setup Mode<br>[Enabled, <b>Disabled</b> ]                                                                                                                                                                    |
|                                            |                                                                                                                                              | Install Factory Default keys><br>Force System to User Mode – install all Factory Default keys                                                                                                                                                                                                                         |
|                                            |                                                                                                                                              | Enroll Efi Image><br>Allow the image to run in Secure Boot mode. Enroll SHA256 Hash Certificate of the Image into Authorized Signature Database (db)                                                                                                                                                                  |
|                                            |                                                                                                                                              | Platform Key (PK)><br>Enroll Factory Defaults or load certificates from a file:                                                                                                                                                                                                                                       |
|                                            |                                                                                                                                              | Key Exchange Keys><br>Public Key Certificate in:<br>EFI_SIGNATURE_LIST<br>EFI_CERT_X509 (DER encoded)                                                                                                                                                                                                                 |
|                                            |                                                                                                                                              | Authorized Signatures><br>EFI_CERT_RSA2048 (bin)                                                                                                                                                                                                                                                                      |

| Function                    | Description |                        |                                                                           |
|-----------------------------|-------------|------------------------|---------------------------------------------------------------------------|
| Secure Boot><br>(continued) |             | Forbidden Signatures>  | EFI_CERT_SHA256,385,512                                                   |
|                             |             | Authorized TimeStamps> | Authenticated UEFI Variable                                               |
|                             |             | OsRecovery Signatures> | EFI PE/COFF Image (SHA256)<br>Key Source : Default, External, Mixed, test |




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If only the administrator's password is set, then only access to setup is limited. The password is only entered when entering the setup.

If only the user's password is set, then the password is a power on password and must be entered to boot or enter setup. Within the setup menu the user has administrator rights. Password length requirements are maximum length 20 and minimum length 3.

---

## Remember the Password

It is recommended to keep a record of all passwords in a safe place. Forgotten passwords results in the user being locked out of the system. If the system cannot be booted because the User Password or the Supervisor Password are not known, clear the uEFI BIOS settings, or contact Kontron Support for further assistance.




---

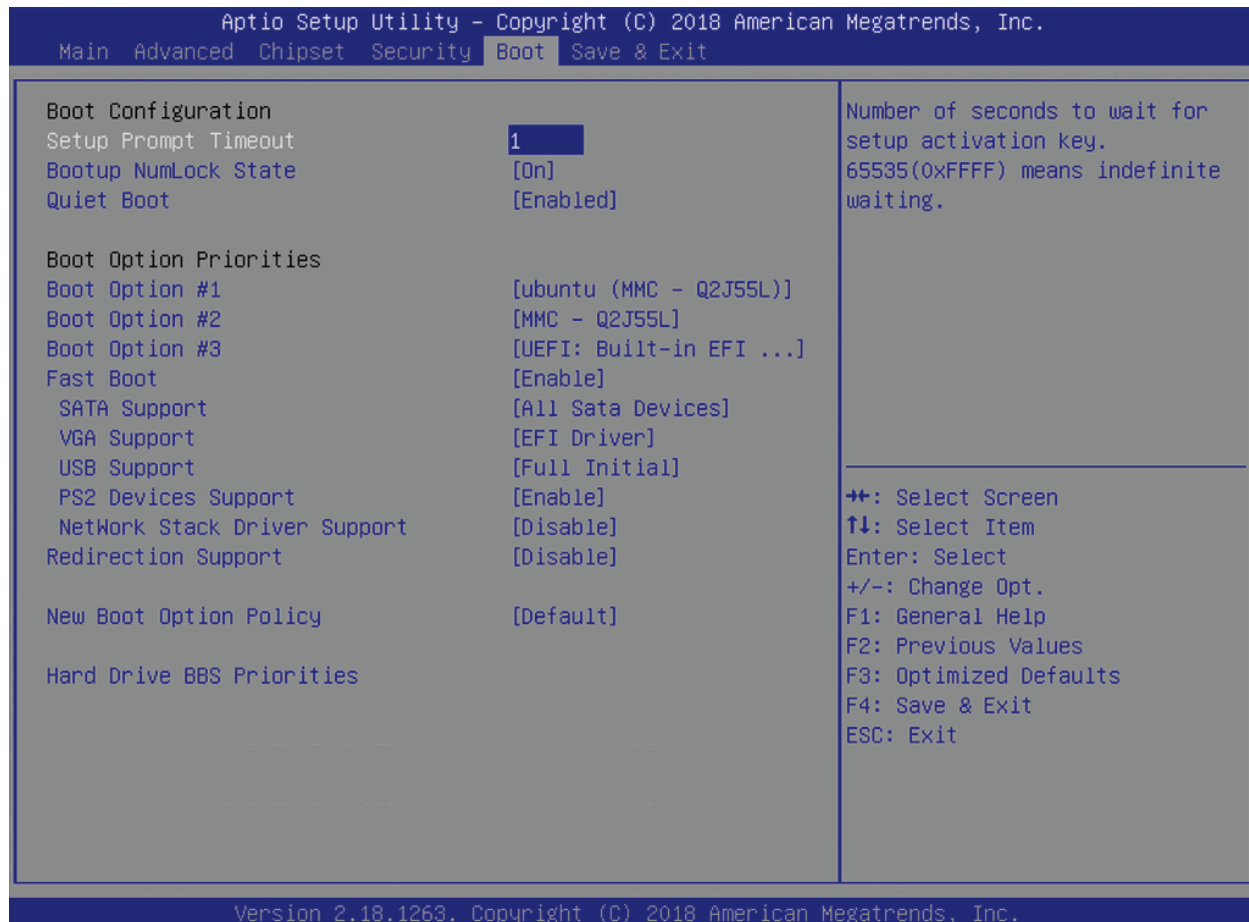
HDD security passwords cannot be cleared using the above method.

---

## 11.2.5. Boot Setup Menu

The Boot Setup menu lists the dynamically generated boot-device priority order.

Figure 36: Boot Setup Menu Initial Screen



The following table shows the Boot set up sub-screens and functions and describes the content. Default settings are in bold.

Table 19: Boot Setup Menu Sub-screens and Functions

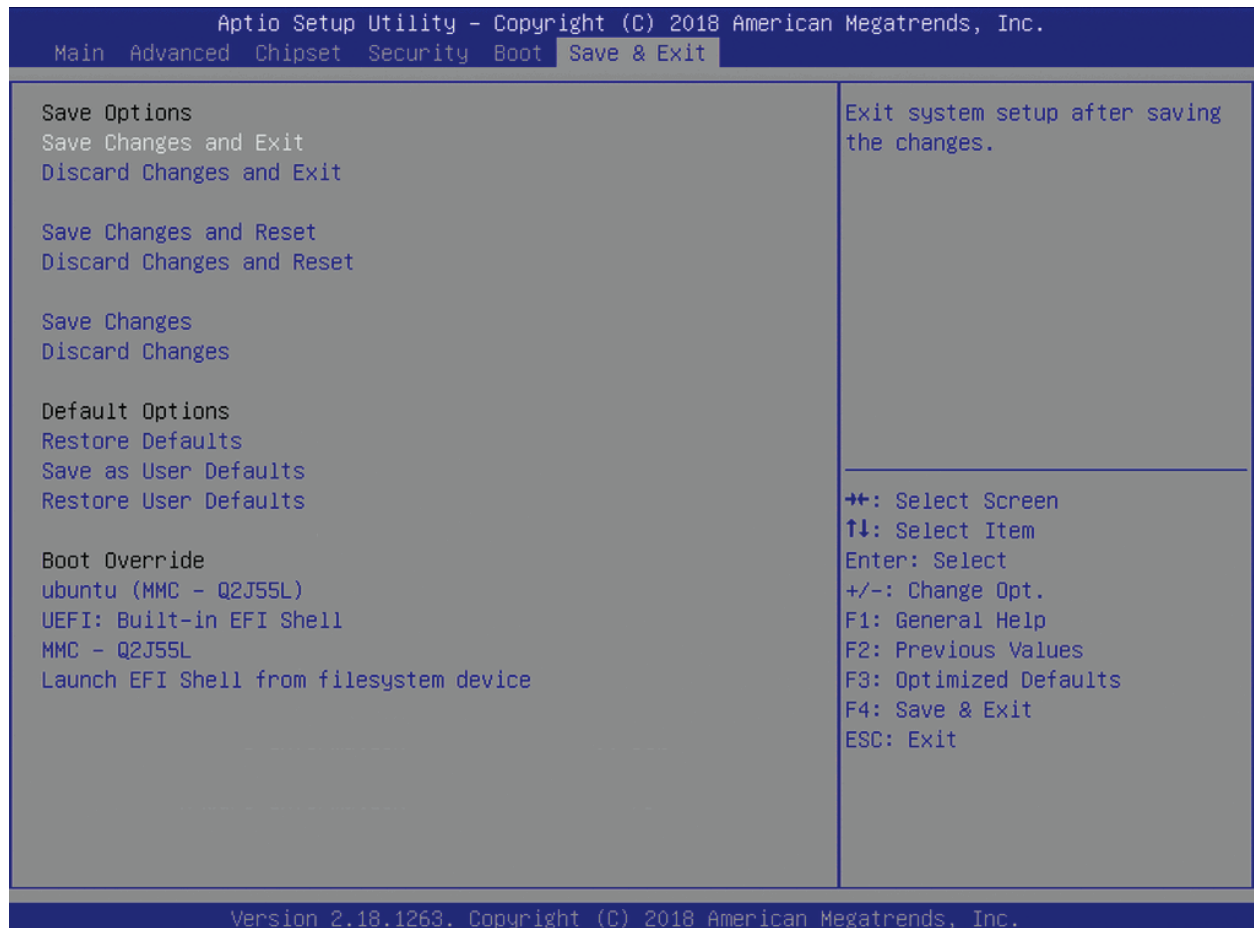
| Function              | Description                                                                                                                                |
|-----------------------|--------------------------------------------------------------------------------------------------------------------------------------------|
| Setup Prompt Timeout> | Displays number of seconds that the firmware waits for setup activation key<br>The value 65535(0xFFFF) means an indefinite wait.           |
| Bootup NumLock State> | Selects keyboard NumLock state<br>[ <b>ON</b> , OFF]                                                                                       |
| Quiet Boot>           | Quiet Boot<br>[Enabled, <b>Disabled</b> ]                                                                                                  |
| Boot Option #>        | Sets the system boot order                                                                                                                 |
| Fast Boot>            | Enables or disables FastBoot features<br>Note: Most probes are skipped to reduce time and cost during boot.<br>[Enabled, <b>Disabled</b> ] |

| Function                      | Description                                                                                                                                                                                                                                                                                              |
|-------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| SATA Support>                 | SATA Support<br>[Last Boot HDD only, <b>All Sata Devices</b> ]                                                                                                                                                                                                                                           |
| VGA Support>                  | If Auto, only install Legacy OpRom with Legacy OS and logo would NOT be shown during post. Efi driver will still be installed with EFI OS.<br>[Auto, <b>EFI Driver</b> ]                                                                                                                                 |
| USB Support>                  | If disabled, all USB devices will NOT be available untill after OS boot. If Partial Initial, USB Mass Storage and specific USB port/device will NOT be available before OS boot. If Full Initial, all USB devices will be available in OS and Post.<br>[ <b>Full Initial</b> , Partial Initial, Disable] |
| PS2 Support>                  | PS2 Support<br>[ <b>Enabled</b> , Disabled]                                                                                                                                                                                                                                                              |
| Netwrok Stack Driver Support> | Netwrok Stack Driver Support<br>[Enabled, <b>Disabled</b> ]                                                                                                                                                                                                                                              |
| Redirection Support>          | Redirection Support<br>[Enabled, <b>Disabled</b> ]                                                                                                                                                                                                                                                       |
| New Boot Option Policy>       | Controls the placement of newly detected UEFI boot options<br>[ <b>Default</b> , Place First, Place Last]                                                                                                                                                                                                |

## 11.2.6. Save and Exit Setup Menu

The Save and Exit Setup menu provides functions for handling changes made to the settings and exiting the program.

Figure 37: Save and Exit Setup Menu Initial Screen



The following table shows the Save and Exit sub-screens and functions and describes the content.

Table 20: Save and Exit Setup Menu Sub-screens and Functions

| Function                   | Description                                                  |
|----------------------------|--------------------------------------------------------------|
| Save Changes and Exit >    | Exits system after saving changes                            |
| Discard Changes and Exit>  | Exits system setup without saving changes                    |
| Save Changes and Reset>    | Resets system after saving changes                           |
| Discard Changes and Reset> | Resets system setup without saving changes                   |
| Save Changes>              | Saves changes made so far for any setup options              |
| Discard Changes>           | Discards changes made so far for any setup options           |
| Restore Defaults>          | Restores/loads standard default values for all setup options |
| Save as User Defaults>     | Saves changes made so far as user defaults                   |
| Restore User Defaults>     | Restores user defaults to all setup options                  |
| UEFI: Built in EFI Shell>  | Attempts to launch the boot option #1                        |

| Function                                  | Description                                                                                       |
|-------------------------------------------|---------------------------------------------------------------------------------------------------|
| Ubuntu (P1: WDC WDS120G1G0A-00SS50)>      | Attempts to launch the boot option #2                                                             |
| UEFI: SanDisk, Partition 1>               | Attempts to launch the boot option #3                                                             |
| Launch EFI Shell from File System Device> | Attempts to launch EFI Shell application (Shell.efi) from one of the available filesystem devices |

### 11.3. Firmware Update

Firmware updates are typically delivered as a ZIP archive containing only the firmware images. The content of the archive with the directory structure must be copied onto a data storage device with FAT partition.

#### Updating Procedure

BIOS can be updated with the Intel tool fpt.efi using the procedure below:

1. Copy these files to an USB stick.

flash.nsh (if available)

fpt.efi

fparts.txt

xxxx.bin (where xxxx stands for the bios name)

Start the system into setup.

2. Change the following setup items:

Chipset > South Cluster Configuration > Miscellaneous Configuration > BIOS Lock > Disabled

3. Save and Exit the BIOS setup.

4. On the next start, boot into shell.

5. Change to the drive representing the USB stick.

```
fsx: (x = 0,1,2,etc. represents the USB stick)
```

Change to the directory where you copied the flash tool.

```
cd <your_directory>
```

6. Start flash.nsh (if available) OR enter

```
fpt -F xxxx.bin
```

7. Wait until flashing is successful and then power cycle the board.



**Do not switch off the power during the flash process!**  
Doing so leaves your module unrecoverable.



**Changes made in step 3 above are only effective during the first boot after applying the changes. If you fail to flash during the next boot, then you might have to repeat steps 3.**

## Appendix A: List of Acronyms

Table 21: List of Acronyms (Example)

|        |                                                         |
|--------|---------------------------------------------------------|
| API    | Application Programming Interface                       |
| BMC    | Base Management Controller                              |
| CLI    | Command-Line Interface                                  |
| COM    | Computer-on-Module                                      |
| ECC    | Error Checking and Correction                           |
| FRU    | Field Replaceable Unit                                  |
| GPU    | Graphics Processing Unit                                |
| HD/HDD | Hard Disk /Drive                                        |
| HPM    | PICMG Hardware Platform Management specification family |
| IOL    | IPMI-Over-LAN                                           |
| IOT    | Internet of Things                                      |
| IPMI   | Intelligent Platform Management Interface               |
| KCS    | Keyboard Controller Style                               |
| KVM    | Keyboard Video Mouse                                    |
| MEI    | Management Engine Interface                             |
| NCSI   | Network Communications Services Interface               |
| PCIe   | PCI-Express                                             |
| PECI   | Platform Environment Control Interface                  |
| PICMG® | PCI Industrial Computer Manufacturers Group             |
| RTC    | Real Time Clock                                         |
| SEL    | System Event Log                                        |
| ShMC   | Shelf Management Controller                             |
| SMBus  | System Management Bus                                   |
| SMWI   | System Monitor Web Interface                            |
| SOL    | Serial Over LAN                                         |
| SSH    | Secure Shell                                            |
| TPM    | Trusted Platform Module                                 |
| UEFI   | Unified Extensible Firmware Interface                   |
| VLP    | Very Low Profile                                        |
|        |                                                         |
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## 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](http://www.kontron.com)

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