# PKX-SP2-KL Series

Open-Frame Panel PC

**User's Manual**



| | |
|---|---|
| **Manual Rev.:** | 1.0 |
| **Revision Date:** | Nov. 8, 2023 |
| **Part No:** | 50M-P1200-1000 |

LEADING EDGE COMPUTING

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# Revision History

| Revision | Release Date | Description of Change(s) |
|---|---|---|
| 1.0 | 2023-11-08 | Initial release |


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# Preface

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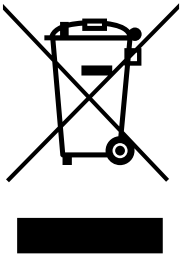
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### Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.

NOTE: Additional information, aids, and tips that help users perform tasks.

CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.
*ATTENTION: Informations destinées à prévenir les blessures corporelles mineures, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche.*

WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.
*AVERTISSEMENT: Informations destinées à prévenir les blessures corporelles graves, les dommages aux composants, la perte de données et/ou la corruption de programme lors de l'exécution d'une tâche spécifique.*

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# 1 Introduction

## 1.1 Overview

The PKX-SP2-KL Series open-frame panel PC is based on the ultra-low-power 7th Generation Intel® Core™ i7/i5/i3 processors (formerly Kaby Lake) featuring flexible IO options. The PKX-SP2-KL Series features powerful computing capabilities and compact size that are easy to integrate with kiosk and panel PC applications.

## 1.2 Features

- 7th Generation Intel® Core™ i7/i5/i3 processors (formerly Kaby Lake-U)
- Extensive I/O and functional expansion through wire-to-board connectors and custom function module
- Extensive expansion and customization options for fast and easy integration with all form factors, kiosks and all-in-one panel PC applications
- Enhanced data integrity and protection in case of sudden power outage with support for optional back-up battery
- Low-risk cost-effective choice with pre-compliance EMC testing and high ESD tolerance
- Default 12V input, with optional 9-36V voltage range


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## 1.3 Packing List

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from your dealer before returning any product to ADLINK. Ensure that the following items are included in the package.

- 1x PKX-SP2-KL Smart Panel

## 1.4 Optional Accessories

- Panel-mount clip kit
- VESA kit
- Rear cover
- Active sink
- Wi-Fi module
- 4G/5G module
- 84W power supply (12V/7A)
- 160W power supply (24V/6.67A)
- Power cable (PKX-SP2-KL to power supply)
- Cables for internal IO expansion
- Function Modules
  - SP FM
  - Titan FM
  - USB FM
  - Railway FM


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# 2 Specifications

## 2.1 PKX-SP2-KL Series Specifications

| Model | PKX-SP2-KL-10 | PKX-SP2-KL-15 | PKX-SP2-KL-21 |
|---|---|---|---|
| Processor | Standard:<br>Intel® Core™ i3-7100U Processor, 2.4GHz, 3MB,15W (2C)<br>Intel® Core™ i5-7300U Processor, 2.6 (3.5)GHz, 3MB,15W(25W MAX) (2C)<br>Intel® Core™ i7-7600U Processor, 2.8 (3.9)GHz, 4MB,15W(25W MAX) (2C) | | |
| Memory | 1x SODIMM socket, DDR3L 1600MHz (Up to 8GB) | | |
| Storage | 1x M.2 SATA 6 Gbps port, M-key 2280<br>1x 2.5” SSD/HDD SATA 6 Gbps port (optional) | | |
| **Display and Touch** | | | |
| Size | 10.1" | 15.6” | 21.5” |
| Resolution | 1280 x 800 | 1920 x 1080 | 1920 x 1080 |
| Contrast Ratio | 800:1 | 1000:1 | 1000:1 |
| Brightness (Nits) | 400 cd/m$^2$ (typ.) | 420 cd/m$^2$ (typ.) | 400 cd/m$^2$ (typ.) |
| Backlight Life (hrs) | 50,000 | | |
| Viewing Angle (U/D/R/L) | 89/89/89/89 | | |
| Touch Points | 10 points | | |
| Touch Structure | Glass/Glass | | |
| Surface Hardness | 7H | | |
| Surface Treatment | AS coating | | |
| **External I/O** | | | |
| Ethernet | 2x GbE (Intel® I225), RJ45, WOL (up to 2.5 Gb/s) | | |
| Serial Port | 2x RS-232/422/485 programmable, auto-flow | | |
| USB Ports | 1x USB 2.0, Type-A, OCP, 1000mA<br>1x USB 3.2, 5 Gbps, Type-A, OCP, 1600mA | | |
| DisplayPort | 1x DisplayPort, DP++, supports DP 1.2, resolutions up to 5120x3200@60Hz 24bpp<br>1x MiniDisplayPort, DP++, supports DP 1.2, resolutions up to 5120x3200@60Hz 24bpp | | |

**Table 2-1: PKX-SP2-KL Series Specifications**


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| Model | PKX-SP2-KL-10 | PKX-SP2-KL-15 | PKX-SP2-KL-21 |
|---|---|---|---|
| **Internal I/O with Wire to Board Connectors** | | | |
| USB Port | 2x USB 2.0 client | | |
| $I^2C$ | 2x for $I^2C$ client | | |
| Audio | 1x for 2x stereo speaker (2 watts)<br>1x Mic-in and Line-out<br>1x buzzer | | |
| Keys | 1x for 32 physical keys (BOM optional),<br>1x LCD backlight up/down and volume up/down (BOM optional) | | |
| COM port | 2x RS-232/422/485 programmable, auto-flow | | |
| GPIO | 1x 8-pin GPIO | | |
| PCIe slot | 1x PCIe Gen 3 x4 (optional) | | |
| Mini PCIe | 1x mPCIe slot (Wi-Fi/Bluetooth/4G) | | |
| SIM | 1x SIM slot for 4G/5G communication | | |
| **Power** | | | |
| Power Input | AT/ATX (default: AT mode)<br>12V ±5%, (optional: 9-36VDC), both with OVP/UVP protection | | |
| Power Connector | 1x 4-pin power connector | | |
| Power/Fail Reset | 1x wafer supports system reset, power button and power LED | | |
| Backup Battery | 1x wafer for UPS kit to back up data when AC shuts down (optional) | | |
| **Environmental** | | | |
| Operating Temperature (Standard) | 0°C to 60°C | | |
| Storage Temperature | -20°C to 70°C | | -20°C to 60°C |
| Humidity | 10% to 95% | | |
| Vibration | OP 1 Grms, 5-500Hz w/ SSD, (IEC60068-2-64)<br>X, Y, Z axes, 60 min/axis | | |
| Shock | OP 20G peak acceleration, 11 ms (IEC60068-2-64)<br>±X, ±Y, ±Z, 3 shocks/axis | | |
| IP Rating | IP65 front panel | | |
| ESD | Air: ±15kV, Contact: ±8kV | | |
| EMC/Safety Compliance | EMI*: IEC/EN 61000-3-2, IEC/EN 61000-3-3, EN 61000-6-4, EN 55032<br>EMS*: EN 55035, EN 61000-6-2,<br>EMC*: CE, FCC Class B, IEC 60601-1-2:2014/EN60601-1-2:2015, UNECE R10, EN 50121-3-2<br>Safety*: Compliant with 60601-1/61010-1/62368-1<br>*PKX-SP2-KL has passed pre-compliance testing of EMI, EMS, EMC, and Safety. | | |

**Table 2-1: PKX-SP2-KL Series Specifications**


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| Model | PKX-SP2-KL-10 | PKX-SP2-KL-15 | PKX-SP2-KL-21 |
|---|---|---|---|
| **Software** | | | |
| SEMA | SEMA 4.0 | | |
| Watchdog Timer | Supported | | |
| Operating Systems | Windows® 10 IoT Enterprise 64-bit<br>Linux Ubuntu 20.04 LTS | | |
| **Mechanical** | | | |
| Size | 10.1” | 15.6” | 21.5” |
| Construction | SGCC | | |
| Dimensions (HxWxD) | 249.66 x 168.3 x 64.4 ±2mm | 383.56 x 232.99 x 65.1 ±2mm | 517.46 x 309.19 x 67.6 ±2mm |
| Weight | 2.06 ±0.2kg | 3.02 ±0.2kg | 4.85 ±0.2kg |
| Mounting (Optional) | Panel Mounting<br>VESA mounting (requires optional rear cover) | | |

**Table 2-1: PKX-SP2-KL Series Specifications**


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## 2.2 PKX-SP2-KL Series Block Diagram

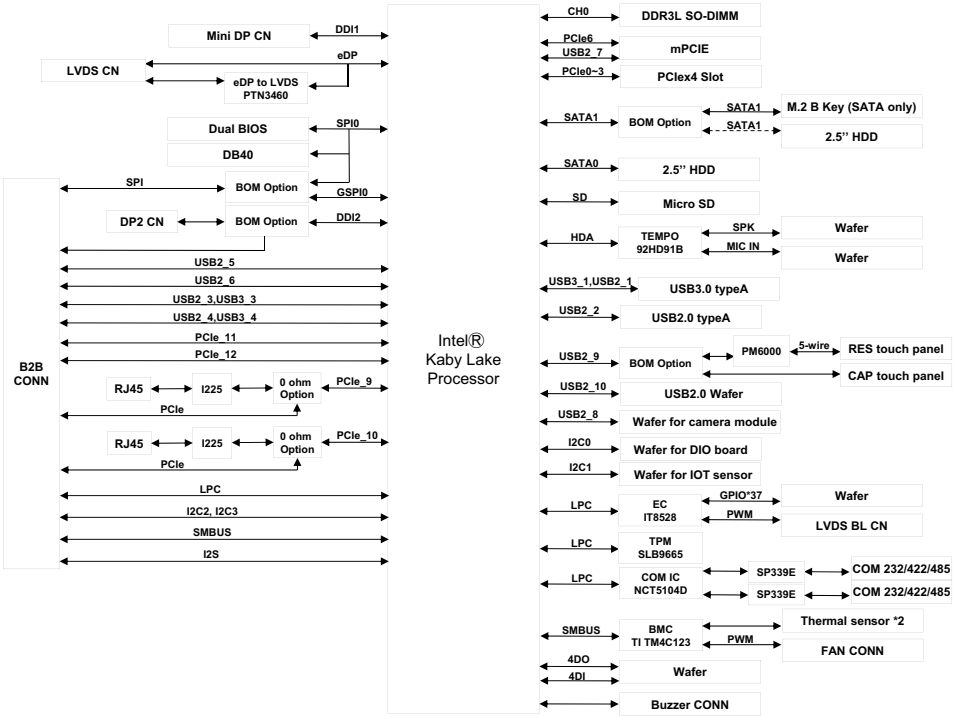



**Figure 2-1: PKX-SP2-KL Series Block Diagram**



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## 2.3 Power

Power supply options:

- 160W (24V/6.67A)
- 120W (12V/10A)
- 84W (12V/7A)

### 2.3.1 DC Input Options

12V DC (default) or 9-36V DC (optional) input are supported.



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## 2.4 Mechanical Dimensions

NOTE:

All dimensions are in millimeters, unless noted.

### 2.4.1 PKX-SP2-KL-10 Dimensions

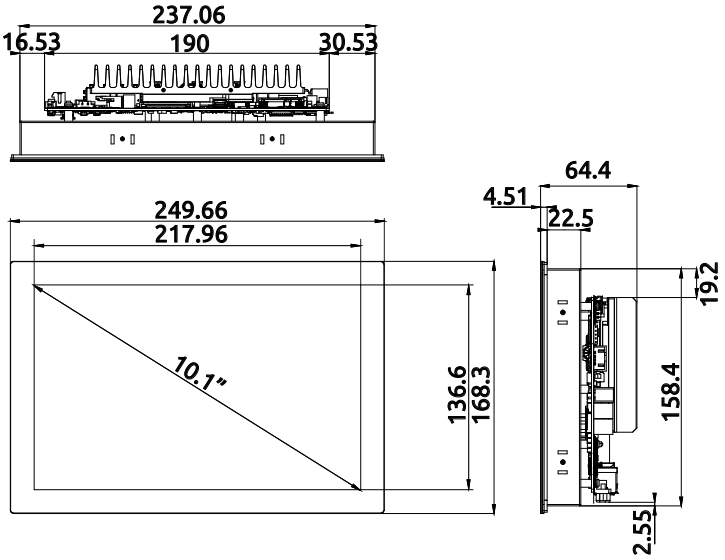



**Figure 2-2: PKX-SP2-KL-10 Dimensions**



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### 2.4.2 PKX-SP2-KL-15 Dimensions

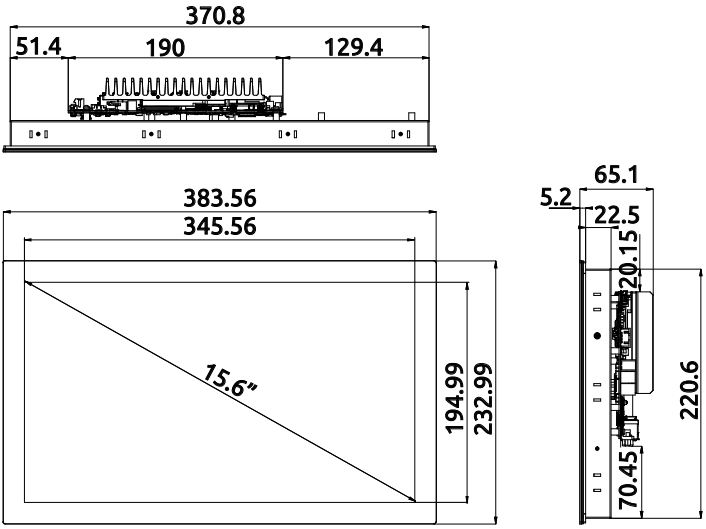



**Figure 2-3: PKX-SP2-KL-15 Dimensions**


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### 2.4.3 PKX-SP2-KL-21 Dimensions

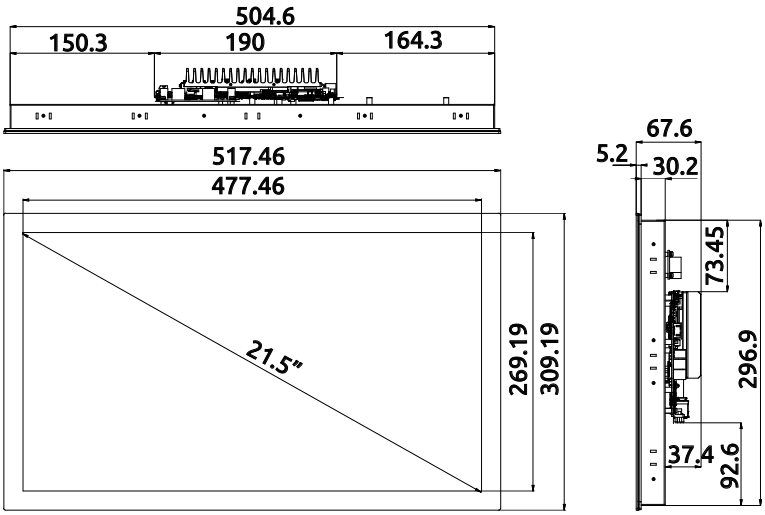



**Figure 2-4: PKX-SP2-KL-21 Dimensions**


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## 2.5 Thermal Options

### 2.5.1 Active Cooling Heat Sink

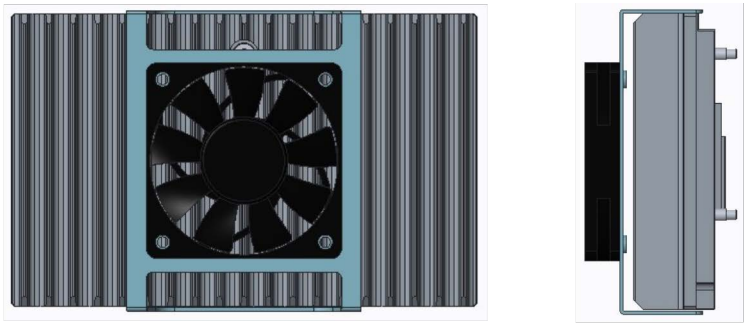



**Figure 2-5: Active Cooling Heat Sink**


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| No. | Description | Part Number | Material | Dimensions | Remarks |
|---|---|---|---|---|---|
| 1 | TIM | N/A | PCM4988 | 25x15x0.2mm | |
| 2 | Heat Sink | 32-20614-4000-A0 | AL6063 | 143x90x27.6mm | |
| 3 | Fan Bracket | 34-35121-0000-A0 | SGCC | 92.4x72x25mm | |
| 4 | Fan | 32-00086-3000-A0 | Plastic | 60x10mm | Axial Fan |

**Table 2-2: Heat Sink Components**

### 2.5.2 Heat Sink Dimensions

NOTE: All dimensions are in millimeters, unless noted.

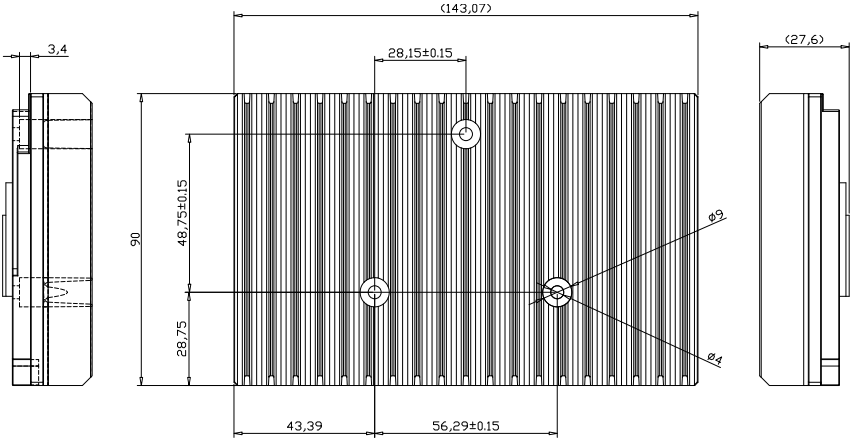



**Figure 2-6: Heat Sink Dimensions**


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### 2.5.3 Cable Routing Considerations for Heat Sinks

Cable routing should avoid high temperature areas as shown.

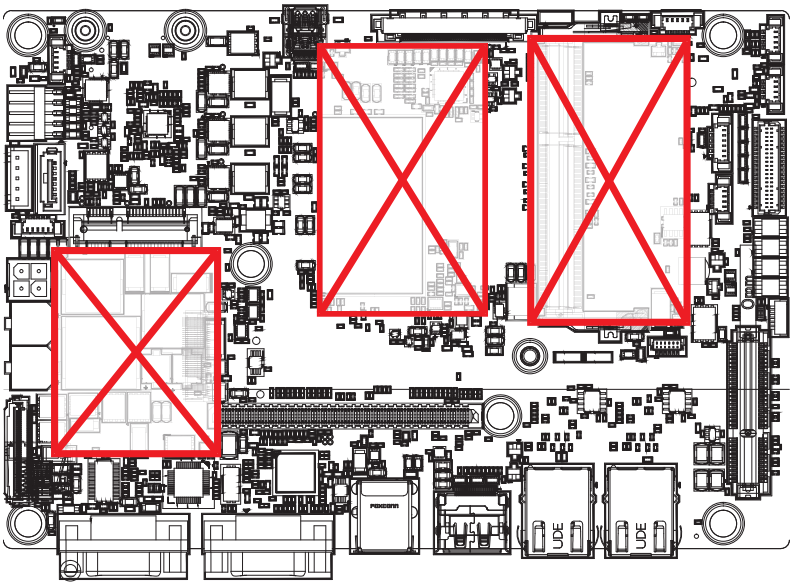


**Figure 2-7: Cable Routing Considerations for Heat Sinks**

NOTE:

Heat sink design optimized for open-frame installations, such as a kiosk.

For panel PCs, a different design may be required. Consult your ADLINK sales representative for guidance.

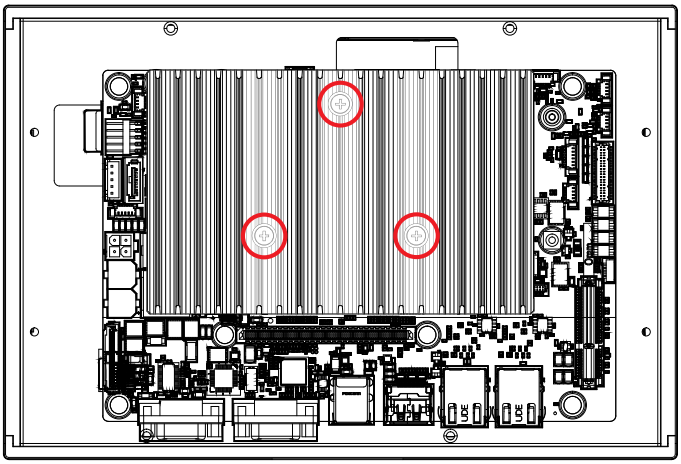


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## 2.6 Adding or Changing Memory

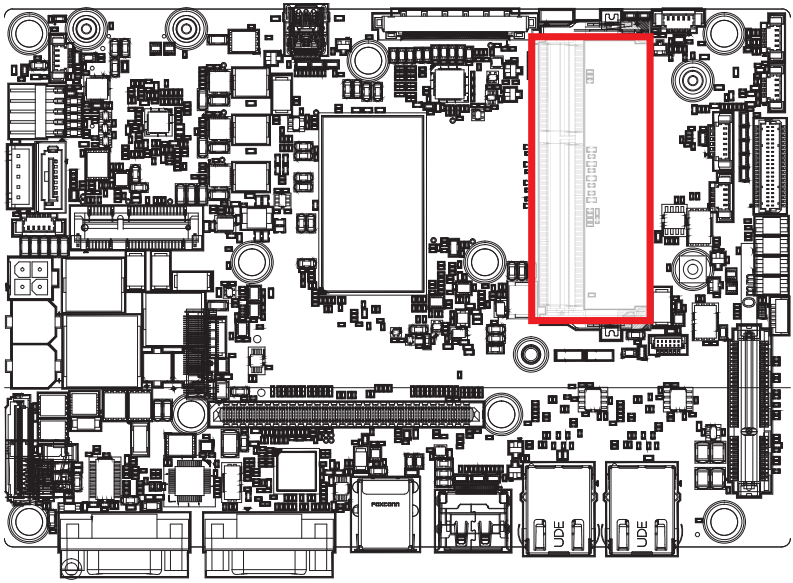
Follow these steps to add or change memory modules.

1. Remove the 3 screws that attach the heat sink to the mainboard and remove the heat sink.




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2. Install or swap the memory module in the SODIMM socket as necessary.



3. Reattach the heat sink to the mainboard with the previously removed screws.



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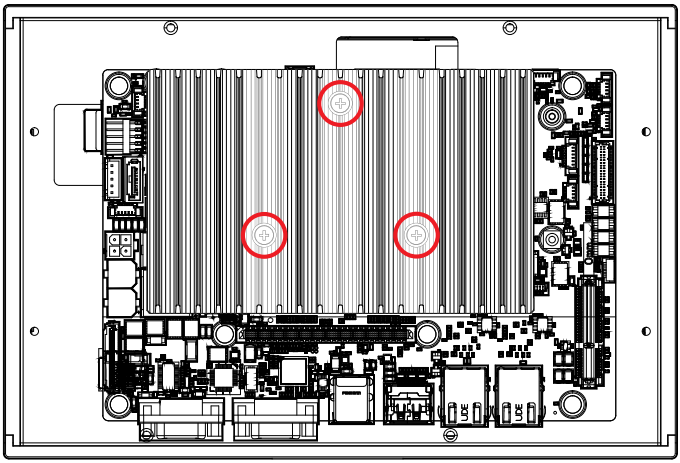
## 2.7 Installing a Wi-Fi Module

Follow these steps to add or change a Wi-Fi modules.

NOTE:

In the default configuration, only one PCI slot is available. Choose either a Wi-Fi module or a 4G/5G module.

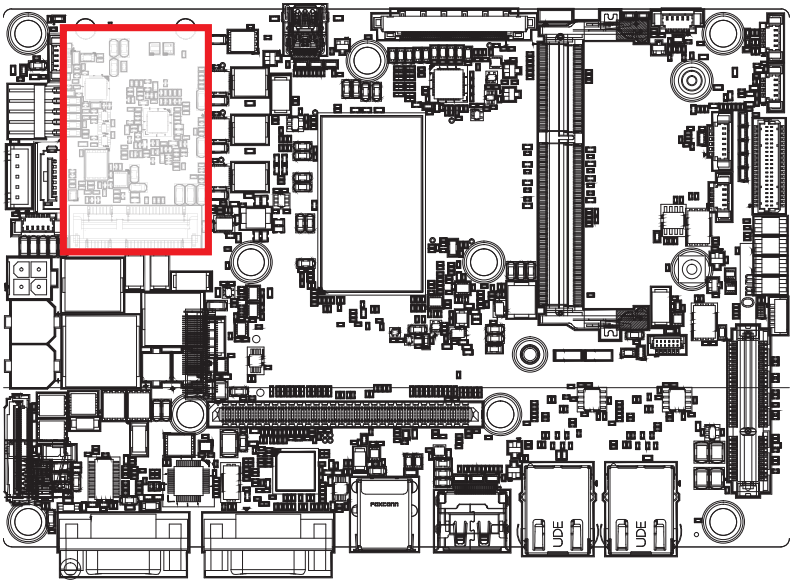
1. Remove the 3 screws that attach the heat sink to the mainboard and remove the heat sink.





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2. Install the Wi-Fi module.



3. Reattach the heat sink to the mainboard with the previously removed screws.

NOTE:

Wi-Fi antennas must be installed on the PKX-SP2-KL Series housing in order for Wi-Fi to function properly.



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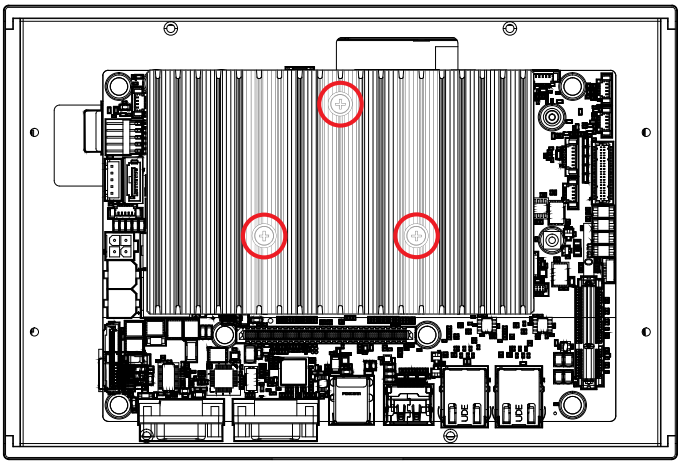
## 2.8 Installing a 4G/5G Module

Follow these steps to add or change 4G/5G modules.

NOTE:

In the default configuration, only one PCI slot is available. Choose either a WiFi module or a 4G/5G module.

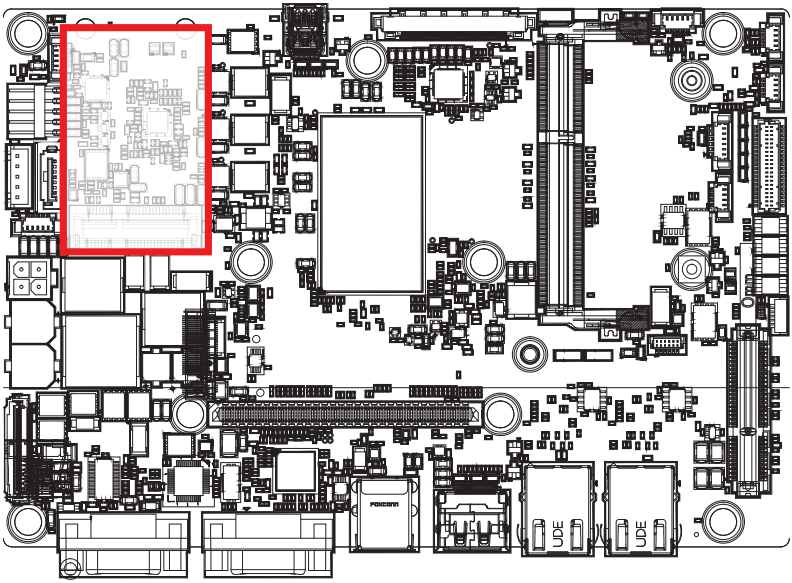
1. Remove the 3 screws that attach the heat sink to the mainboard and remove the heat sink.





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2. Install the 4G/5G module.



3. Reattach the heat sink to the mainboard with the previously removed screws.

NOTE:

Antennas must be installed on the PKX-SP2-KL Series housing in order for 4G/5G to function properly.



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## 2.9 Mounting

This section includes details for panel and VESA mounting options.




*Risk of physical injuries and / or property damage:*
When mounting the device, use the screws to mount the VESA bracket to the rear of the device. Tighten all four screws firmly to support the weight of the device. Make sure that the suspension system is capable of carrying the device!




*Risk of burns to the user caused by hot surfaces:*
Turn off power and allow the device to cool down prior to performing any mounting or demounting operations. Do not touch the enclosure for over 10 seconds when the device is in operation or is still hot from previous use.




All dimensions are in millimeters, unless noted.


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### 2.9.1 Panel Mounting

The PKX-SP2-KL Series can be panel mounted with 14 mounting clips (optional items sold separately). Make sure there is adequate space behind the panel for ventilation, and that the panel material and thickness can support the weight of the device.

**Step 1**: Cut the panel opening using the appropriate cutout dimensions.

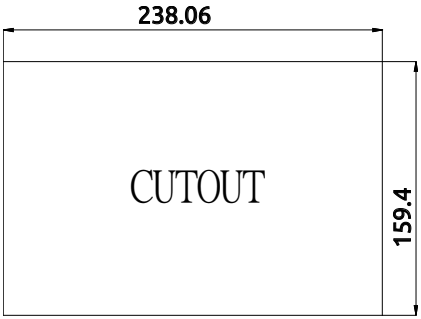



**Figure 2-8: PKX-SP2-KL-10 Cutout Dimensions**

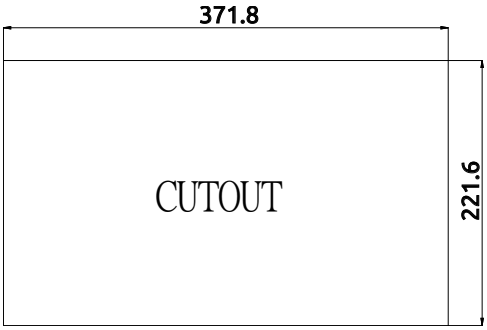



**Figure 2-9: PKX-SP2-KL-15 Cutout Dimensions**


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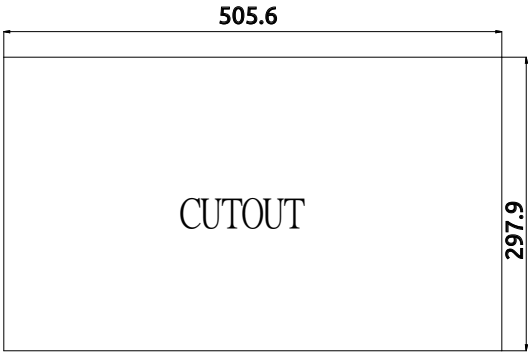
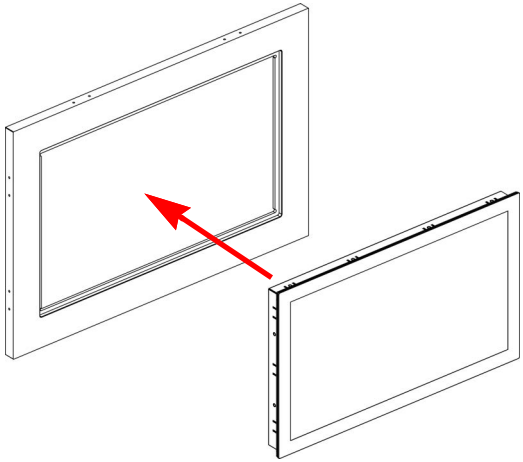



**Figure 2-10: PKX-SP2-KL-21 Cutout Dimensions**

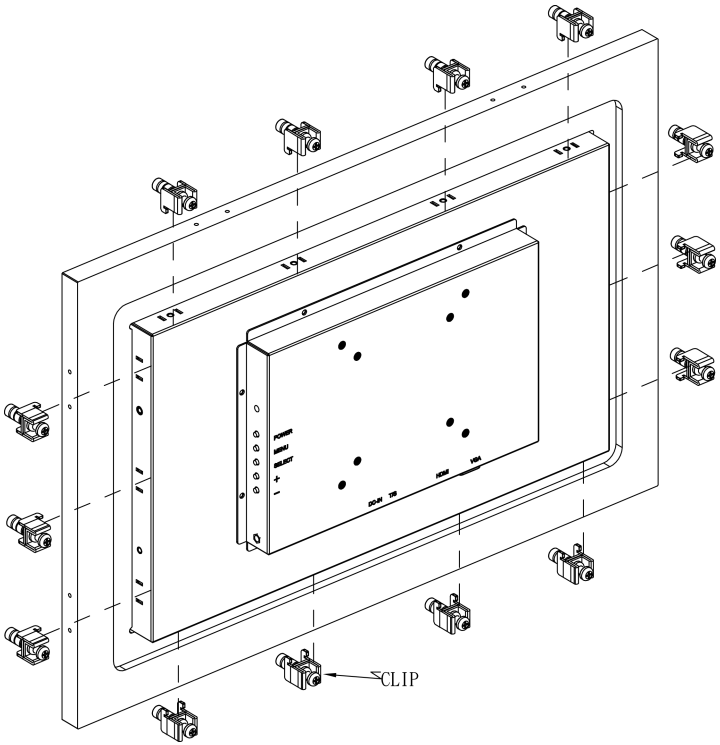
**Step 2**: Attach I/O cables to the device before installing into the panel if rear access will be limited after installation.

**Step 3**: Place the device into the panel cutout.




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**Step 4**: Insert the mounting clips into the slots on the sides of the device as shown. Hand-tighten the mounting clips with a Phillips-head screwdriver to secure it to the panel. Do not overtighten the clips to avoid damaging the device enclosure.




NOTE:

Optional mounting clips sold separately. Contact your ADLINK reseller for details.



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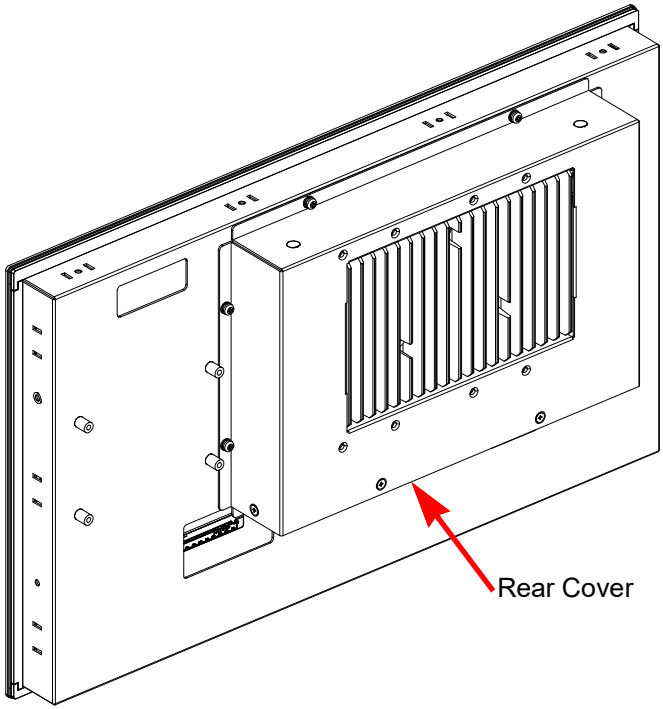
### 2.9.2 VESA Mounting

The PKX-SP2-KL Series can be VESA mounted with a rear cover and VESA bracket. (Optional items sold separately.)

NOTE:

All I/O ports **must** face down.

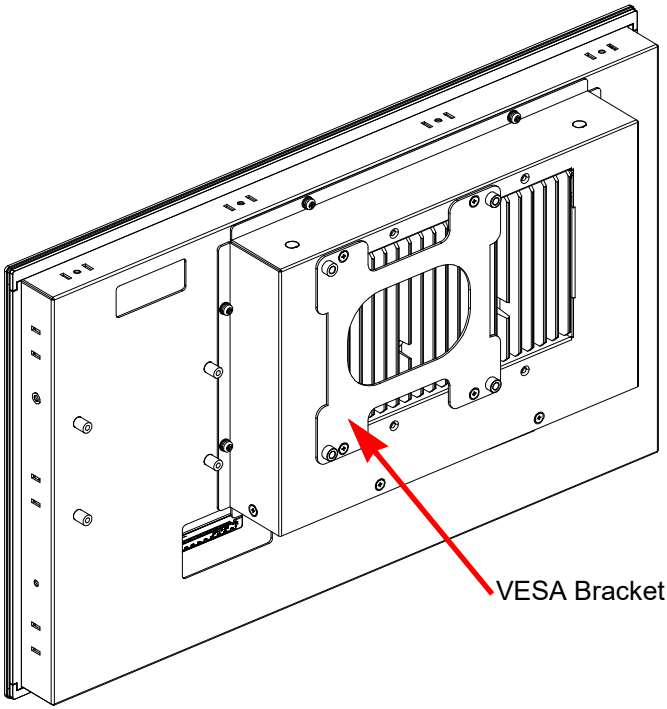
**Step 1**: Attach the rear cover to the panel PC with the screws supplied in the kit.





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**Step 2**: Attach the VESA bracket to the rear cover with 4x M3 screws.




NOTE:

Optional VESA bracket and M3 screws sold separately. Contact your ADLINK reseller for details.

NOTE:

Mounting bracket provides 100 mm x 100 mm VESA mounting and requires 4x M4 screws.



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# 3 System Layout

## 3.1 External I/O Connectors

The PKX-SP2-KL Series provides the following external I/O connectors.

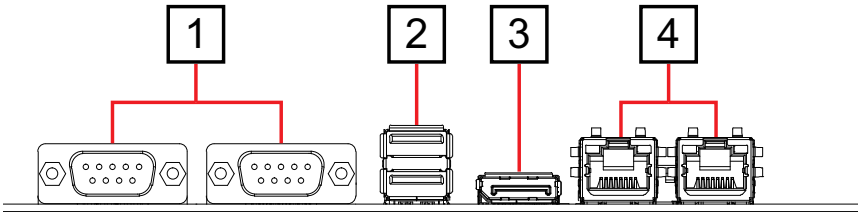



**Figure 3-1: PKX-SP2-KL Series External I/O**

| | |
|---|---|
| **1** | 2x DB-9P COM1 port supports RS-232/422/485 |
| **2** | 1x USB 3.2 Gen1 (5Gbps) Type-A<br>1x USB 2.0 Type-A |
| **3** | 1x DisplayPort |
| **4** | 2x RJ45 GbE LAN I225 type, up to 2.5GHz |

**Table 3-1: External I/O Legend**


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### 3.1.1 COM1 Port Connector

The COM1 port is a D-sub 9-pin connector supporting RS-232/422/485 modes by BIOS setting.

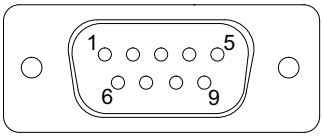



**Figure 3-2: COM1 Port Pin Definition**

| Pin | Signal | RS-232 | RS-422 | RS-485 |
|---|---|---|---|---|
| 1 | COM1_DCD-L_CN | DCD# | TXD422- | 485DATA- |
| 2 | COM1_RXD_CN | RXD | TXD422+ | 485DATA+ |
| 3 | COM1_TXD_CN | TXD | RXD422+ | N/S |
| 4 | COM1_DTR-L_CN | DTR# | RXD422- | N/S |
| 5 | GND | GND | N/S | N/S |
| 6 | COM1_DSR-L_CN | DSR# | N/S | N/S |
| 7 | COM1_RTS-L_CN | RTS# | N/S | N/S |
| 8 | COM1_CTS-L_CN | CTS# | N/S | N/S |
| 9 | COM1_RI-L_CN | RI# | N/S | N/S |

**Table 3-2: COM1 Port Pin Definition**


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### 3.1.2 COM2 Port Connector

The COM2 port is a D-sub 9-pin connector supporting RS-232/ 422/485 modes by BIOS setting.

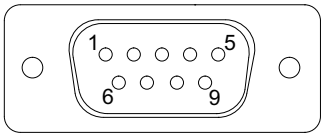



**Figure 3-3: COM2 Port Pin Definition**

| Pin | Signal | RS-232 | RS-422 | RS-485 |
|---|---|---|---|---|
| 1 | COM2_DCD-L_CN | DCD# | TXD422- | 485DATA- |
| 2 | COM2_RXD_CN | RXD | TXD422+ | 485DATA+ |
| 3 | COM2_TXD_CN | TXD | RXD422+ | N/S |
| 4 | COM2_DTR-L_CN | DTR# | RXD422- | N/S |
| 5 | GND | GND | N/S | N/S |
| 6 | COM2_DSR-L_CN | DSR# | N/S | N/S |
| 7 | COM2_RTS-L_CN | RTS# | N/S | N/S |
| 8 | COM2_CTS-L_CN | CTS# | N/S | N/S |
| 9 | COM2_RI-L_CN | RI# | N/S | N/S |

**Table 3-3: COM2 Port Pin Definition**


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### 3.1.3 USB 3.0 + USB 2.0 Combo Connector

USB 3.0 Gen1 (5 Gbps) Type-A + USB 2.0 Type-A connectors are provided compatible with SuperSpeed, Hi-Speed, Full-Speed, and Low-Speed USB devices suitable for USB peripherals.

- USB 3.1 connector up to 5Gbps with 1600 mA power and OCP protection
- USB 2.0 connector up to 480 Mbps with 1000 mA power and OCP protection.

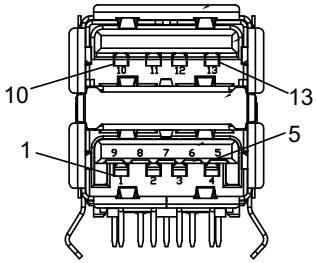



**Figure 3-4: USB 3.0 + USB 2.0 Connector Pin Definition**


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| Pin | Signal |
|---|---|
| 1 | P_+5V_USB3 |
| 2 | CN_U2_P1_N |
| 3 | CN_U2_P1_P |
| 4 | GND |
| 5 | CN_U3_RX1_N |
| 6 | CN_U3_RX1_P |
| 7 | GND |
| 8 | CN_U3_TX1_N |
| 9 | CN_U3_TX1_P |
| 10 | P_+5V_USB2 |
| 11 | CN_U2_P2_N |
| 12 | CN_U2_P2_P |
| 13 | GND |
| G1 | GND |
| G2 | GND |
| G3 | GND |
| G4 | GND |

**Table 3-4: USB 3.0 + USB 2.0 Connector Pin Definition**


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### 3.1.4 DisplayPort Connector

One DisplayPort connector, supporting the DP++ standard specification, can connect to VGA, DVI, HDMI, and DisplayPort with a DisplayPort to VGA adapter cable, DisplayPort to DVI adapter cable, or DisplayPort to HDMI adapter cable, or a DisplayPort cable, with DP1.4 support for resolutions up to 5120 x 3200 at 60Hz.

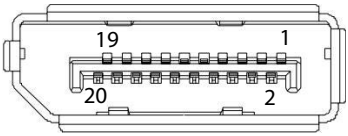



**Figure 3-5: DisplayPort Connector Pin Definition**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | CON_DDI1_TX0_P | 11 | GND |
| 2 | GND | 12 | CON_DDI1_TX3_N |
| 3 | CON_DDI1_TX0_N | 13 | CON_DDI1_DDC_AUX_SEL |
| 4 | CON_DDI1_TX1_P | 14 | CON_DDI1_CONFIG_2 |
| 5 | GND | 15 | CON_DDI1_I2CCLK_AUX_P |
| 6 | CON_DDI1_TX1_N | 16 | GND |
| 7 | CON_DDI1_TX2_P | 17 | CON_DDI1_I2CCLK_AUX_N |
| 8 | GND | 18 | CON_DDI1_HPD |
| 9 | CON_DDI1_TX2_N | 19 | GND |
| 10 | CON_DDI1_TX3_P | 20 | P_+3V3_DP1 |

**Table 3-5: DisplayPort Pin Definition**


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### 3.1.5 Gigabit Ethernet Port

Two 2.5 Gigabit Intel® Ethernet Controller i225 Series (V, IT or LM) RJ45 connectors support up to 2500/1000/100/10 Mbit/s connections.

- Other combinations supported on a by-project basis. Contact your ADLINK sales representative for more information.

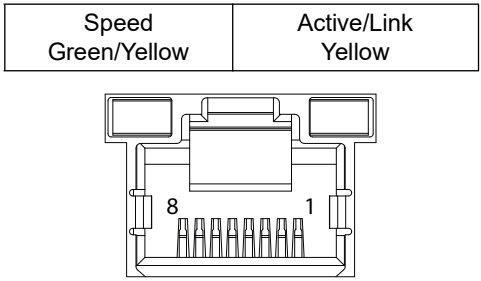



**Figure 3-6: Ethernet Port and LEDs**


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| Pin | Signal |
|---|---|
| R1 | L_GBE1_MDI0_P |
| R2 | L_GBE1_MDI0_N |
| R3 | L_GBE1_MDI1_P |
| R4 | L_GBE1_MDI1_N |
| R5 | Cap to GND |
| R6 | Cap to GND |
| R7 | L_GBE1_MDI2_P |
| R8 | L_GBE1_MDI2_N |
| R9 | L_GBE1_MDI3_P |
| R10 | L_GBE1_MDI3_N |
| L1 | L_GBE1_LED1_LINK/ACT-L |
| L2 | LINK_ACT_LED |
| L3 | L_GBE1_LINK100-L |
| L4 | L_GBE1_LINK1000-L |
| G1 | GND |
| G2 | GND |

**Table 3-6: Ethernet Port Pin Definition**

| LED | Color | Status | Description |
|---|---|---|---|
| Active/Link | Yellow | On | LAN is connected |
| | | Blinking | LAN is initializing |
| Speed | None | Off | 10/100 Mbps |
| | Green | On | 1000 Mbps |
| | Yellow | On | 2500 Mbps |

**Table 3-7: Active/Link and Speed LED Indicators**


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## 3.2 Internal I/O Connectors

WARNING:

Installation of add-on devices must be carried out by ADLINK service personnel only. Users must not disassemble the device themselves.

*L'installation de périphériques complémentaires doit être effectuée uniquement par le personnel de service ADLINK. Les utilisateurs ne doivent pas démonter l'appareil eux-mêmes.*

### 3.2.1 Mainboard Connector Locations

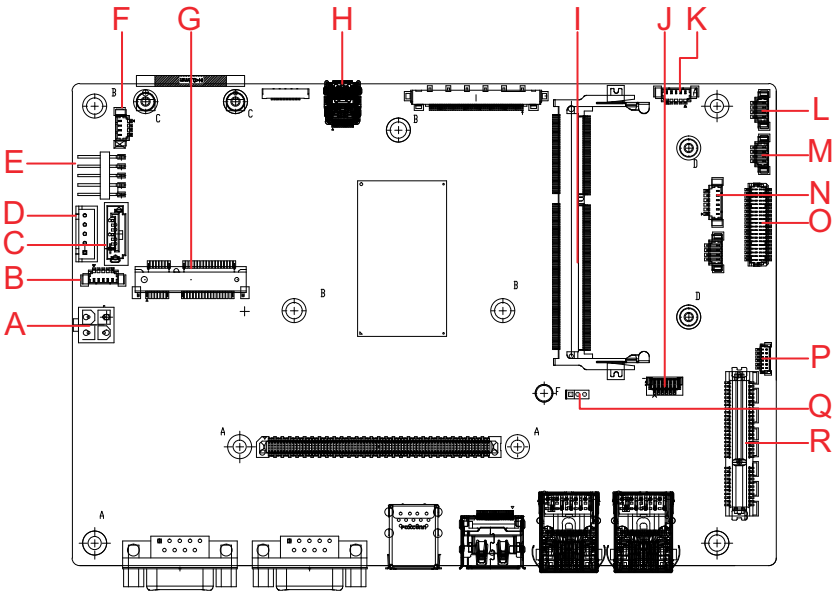



**Figure 3-7: Mainboard Connectors (top)**



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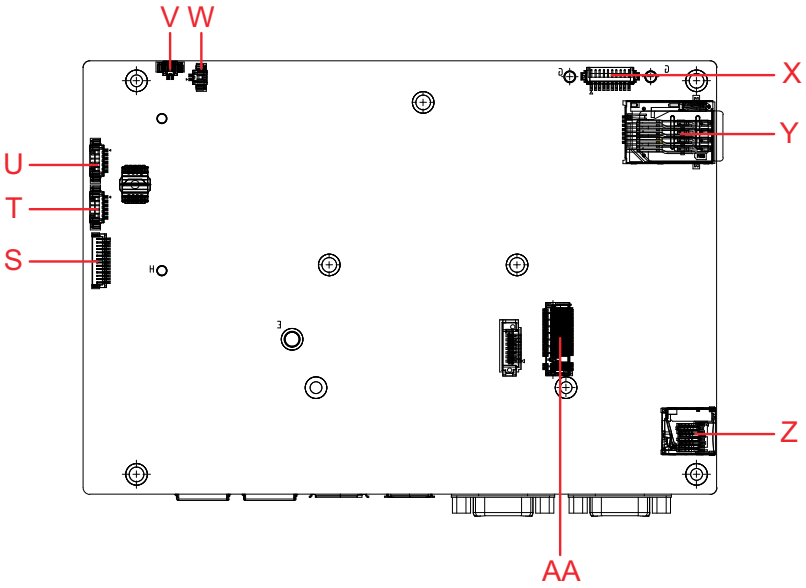



**Figure 3-8: Mainboard Connectors (bottom)**


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| | | | |
|---|---|---|---|
| **A** | DC power connector | **O** | Key connector (optional) |
| **B** | Backup battery connector | **P** | USB 2.0 |
| **C** | SATA data | **Q** | Clear CMOS jumper |
| **D** | SATA power | **R** | PCIe Gen3 x4 slot (optional) |
| **E** | Resistive touch | **S** | LED wafer |
| **F** | Capacitive touch | **T** | I2C connector 1 |
| **G** | Mini PCIe | **U** | I2C connector 2 |
| **H** | Mini DisplayPort | **V** | Buzzer |
| **I** | DDR3L SO-DIMM | **W** | RTC Battery wafer |
| **J** | USB 2.0 (camera) | **X** | GPIO wafer |
| **K** | Power/reset button | **Y** | SIM card slot |
| **L** | Mic-in/Line-out | **Z** | MicroSD card |
| **M** | Speaker | **AA** | M.2 2280 SATA SSD connector |
| **N** | Volume & Backlight Control Connector (optional) | | |

**Figure 3-9: Mainboard Connector Legend**



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### 3.2.2 DC Power Connector

The 4-pin power connector connects an AC/DC power supply adapter, DC to DC power module and battery, with AT and ATX power modes (AT mode start is controlled by BIOS).

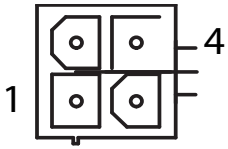



**Figure 3-10: Power Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | GND |
| 3 | PWR_CONN_IN |
| 4 | PWR_CONN_IN |

**Table 3-8: Power Connector Pin Definition**


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### 3.2.3 Backup Battery Power Connector

The SMBUS allows the external battery for data backup to be read. Backup time is around 10 minutes.

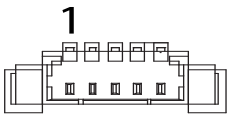



**Figure 3-11: Power Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | P_+3V3_BMC_A |
| 2 | GND |
| 3 | CHG_SMBCLK |
| 4 | CHG_SMBDAT |
| 5 | SMB_ALERT-L_R |
| 6 | GND |
| 7 | GND |

**Table 3-9: Power Connector Pin Definition**



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### 3.2.4 SATA Data & Power Connectors

The SATA data and power connectors are used to connect an internal 2.5” HDD.

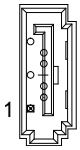



**Figure 3-12: SATA Data Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | SATA_TX1_P |
| 3 | SATA_TX1_N |
| 4 | GND |
| 5 | SATA_RX1_N |
| 6 | SATA_RX1_P |
| 7 | GND |

**Table 3-10: SATA Data Connector Pin Definition**

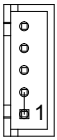



**Figure 3-13: SATA Power Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | NC |
| 2 | GND |
| 3 | P_+5V_S0 |
| 4 | GND |
| 5 | P_+3V3_S0 |

**Table 3-11: SATA Power Connector Pin Definition**


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### 3.2.5 Resistive Touch Connector

The USB 2.0 connector supports a a resistive digitizer.

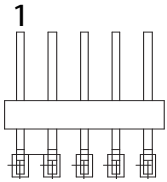



**Figure 3-14: Resistive Touch Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | X- |
| 2 | Y- |
| 3 | SENSE |
| 4 | X+ |
| 5 | Y+ |

**Table 3-12: Resistive Touch Connector Pin Definition**

### 3.2.6 Capacitive Touch Connector

The USB 2.0 connector supports a a resistive digitizer.

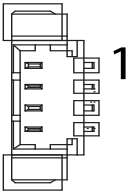



**Figure 3-15: Capacitive Touch Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | TSC_D+ |
| 3 | TSC_D- |
| 4 | P5V_U2_TOU |

**Table 3-13: Capacitive Touch Connector Pin Definition**



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### 3.2.7 Mini PCIe

The mini PCIe port supports standard PCIe signals such as PCIe gen3 and USB2.0..

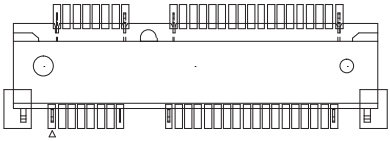


**Figure 3-16: Mini PCIe Pin Definition**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | PCIE_WAKE-L | 2 | P_+3V3_S0_mPCIe |
| 3 | TP point | 4 | GND |
| 5 | TP point | 6 | P_+1V5_S0_mPCIe |
| 7 | PCH_CLK_REQ3-L | 8 | SIM_VCC |
| 9 | GND | 10 | SIM_IO |
| 11 | MPCIE_CLK3_N | 12 | UIM2_CLK |
| 13 | MPCIE_CLK3_P | 14 | UIM2_RST |
| 15 | GND | 16 | UIM2_VPP |
| 17 | X | 18 | GND |
| 19 | X | 20 | TP point |
| 21 | GND | 22 | PLTRST-L_MINIPCIE |
| 23 | MPCIE_RX6_N | 24 | P_+3V3_S0_mPCIe |
| 25 | MPCIE_RX6_P | 26 | GND |
| 27 | GND | 28 | P_+1V5_S0_mPCIe |
| 29 | GND | 30 | PCH_SMB_CLK_MINI |
| 31 | MPCIE_TX6_N_C | 32 | PCH_SMB_DAT_MINI |

**Table 3-14: Mini PCIe Pin Definition**


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| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 33 | MPCIE_TX6_P_C | 34 | GND |
| 35 | GND | 36 | USB_MINIPCIE_N |
| 37 | GND | 38 | USB_MINIPCIE_P |
| 39 | P_+3V3_S0_mPCIe | 40 | GND |
| 41 | P_+3V3_S0_mPCIe | 42 | X |
| 43 | GND | 44 | TP point |
| 45 | X | 46 | X |
| 47 | X | 48 | P_+1V5_S0_mPCIe |
| 49 | X | 50 | GND |
| 51 | X | 52 | P_+3V3_S0_mPCIe |

**Table 3-14: Mini PCIe Pin Definition**



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### 3.2.8 Mini DisplayPort Connector

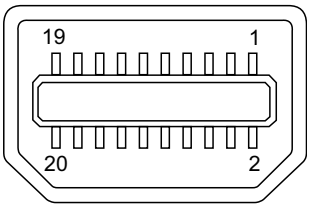



**Figure 3-17: Mini DisplayPort Pin Definition**

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | CON_TCP2_HPD |
| 3 | CON_TCP2_TX0_P |
| 4 | CON_TCP2_DDC_AUX_SEL |
| 5 | CON_TCP2_TX0_N |
| 6 | GND |
| 7 | GND |
| 8 | GND |
| 9 | CON_TCP2_TX1_P |
| 10 | CON_TCP2_TX3_P |
| 11 | CON_TCP2_TX1_N |
| 12 | CON_TCP2_TX3_N |
| 13 | GND |
| 14 | GND |
| 15 | CON_TCP2_TX2_P |
| 16 | CON_TCP2_I2CCLK_AUX_P |
| 17 | CON_TCP2_TX2_N |
| 18 | CON_TCP2_I2CCLK_AUX_N |
| 19 | GND |
| 20 | P_+3V3_DP2 |

**Table 3-15: Mini DisplayPort Pin Definition**


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### 3.2.9 USB 2.0 (Camera) Wafer

The USB 2.0 wafer facilitates connection of a camera to the device.

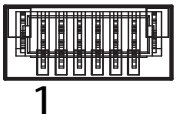



**Figure 3-18: USB 2.0 (Camera) Wafer Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | P5V_U2_WAFER |
| 2 | CN_U2_P10_N |
| 3 | CN_U2_P10_P |
| 4 | GND |
| 5 | NC |
| 6 | NC |

**Table 3-16: USB 2.0 (Camera) Wafer Connector Pin Definition**


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### 3.2.10 Power/Reset Button

Connects to power, reset button, and power LED via cable.

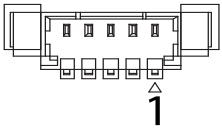



**Figure 3-19: Power/Reset Button Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | P_+3V3_BMC_A |
| 2 | PWRBTN-L_R |
| 3 | SYS_RESET-L_R |
| 4 | SIG_PWRLED-L |
| 5 | GND |

**Table 3-17: Power/Reset Button Connector Pin Definition**


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### 3.2.11 Mic In/Line Out

Supports Mic in/line out, connecting to speakers via cable.

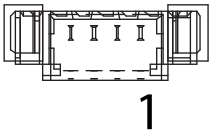



**Figure 3-20: Mic In/Line Out Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | EX_MIC_CN |
| 2 | HP_CN_L |
| 3 | HP_CN_R |
| 4 | AGND_AUDIO |

**Table 3-18: Mic In/Line Out Connector Pin Definition**

### 3.2.12 Speaker

Supports 2x 2 watt speakers.

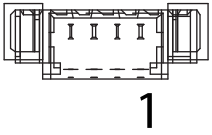



**Figure 3-21: Speaker Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | SPKR_L_P_CN |
| 2 | SPKR_L_N_CN |
| 3 | SPKR_R_P_CN |
| 4 | SPKR_R_N_CN |

**Table 3-19: Speaker Connector Pin Definition**



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### 3.2.13 Volume & Backlight Control Connector

Controls volume and adjusts display brightness.

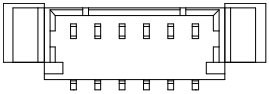



**Figure 3-22: Volume & Backlight Control Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | P_+3V3_S0 |
| 2 | EC_BTN_33 |
| 3 | EC_BTN_34 |
| 4 | EC_BTN_35 |
| 5 | EC_BTN_36 |
| 6 | GND |

**Table 3-20: Volume & Backlight Control Connector Pin Definition**


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### 3.2.14 Key Connector (Optional)

The key connector supports 32 physical keys and 5 control keys with the following default values:

- Directions: ↑, ↓, ←, →
- Numbers: 0 to 9
- Functions: Enter, ESC, TAB, Backspace, Delete, Clear, PageUp, PageDn
- Hot keys: F1 - F10

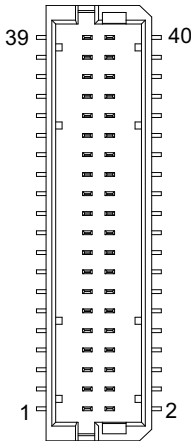



**Figure 3-23: Key Connector Pin Definition**



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| Pin | Signal | Function Value | Key Code | Pin | Signal | Function Value | Key Code |
|---|---|---|---|---|---|---|---|
| 1 | GND | N/A | N/A | 2 | P_+3V3_S0 | N/A | N/A |
| 3 | EC_BTN_17 | ^ | 48h | 4 | EC_BTN_1 | Tab | 0Fh |
| 5 | EC_BTN_18 | V | 50h | 6 | EC_BTN_2 | Backspace | 0Eh |
| 7 | EC_BTN_19 | > | 4Dh | 8 | EC_BTN_3 | Delete | 53h |
| 9 | EC_BTN_20 | < | 4Bh | 10 | EC_BTN_4 | Space | 39h |
| 11 | EC_BTN_21 | 0 | 0Bh | 12 | EC_BTN_5 | Page up | 49h |
| 13 | EC_BTN_22 | 1 | 02h | 14 | EC_BTN_6 | Page down | 51h |
| 15 | EC_BTN_23 | 2 | 03h | 16 | EC_BTN_7 | F1 | 3Bh |
| 17 | EC_BTN_24 | 3 | 04h | 18 | EC_BTN_8 | F2 | 3Ch |
| 19 | EC_BTN_25 | 4 | 5Ch | 20 | EC_BTN_9 | F3 | 3Dh |
| 21 | EC_BTN_26 | 5 | 06h | 22 | EC_BTN_10 | F4 | 3Eh |
| 23 | EC_BTN_27 | 6 | 07h | 24 | EC_BTN_11 | F5 | 3Fh |
| 25 | EC_BTN_28 | 7 | 08h | 26 | EC_BTN_12 | F6 | 40h |
| 27 | EC_BTN_29 | 8 | 09h | 28 | EC_BTN_13 | F7 | 41h |
| 29 | EC_BTN_30 | 9 | 0Ah | 30 | EC_BTN_14 | F8 | 42h |
| 31 | EC_BTN_31 | Enter | 1Ch | 32 | EC_BTN_15 | F9 | 43h |
| 33 | EC_BTN_32 | ESC | 01h | 34 | EC_BTN_16 | F10 | 44h |
| 35 | EC_BTN_37 | Power | N/A | 36 | N/C | | |
| 37 | N/C | | N/A | 38 | P_+3V3_A | N/A | N/A |
| 39 | N/C | | N/A | 40 | P_+3V3_A | N/A | N/A |
| G1 | GND | N/A | N/A | G2 | GND | N/A | N/A |

**Table 3-21: Key Connector Pin Definition**


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### 3.2.15 USB 2.0 Connector




**Figure 3-24: USB 2.0 Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | P5V_U2_CAM |
| 2 | CN_U2_P8_N |
| 3 | CN_U2_P8_P |
| 4 | GND |
| 5 | NC |
| 6 | NC |

**Table 3-22: USB 2.0 Connector Pin Definition**

### 3.2.16 Clear CMOS Jumper (JP6)

If the PKX-SP2-KL fails to boot, clearing the BIOS content stored in CMOS and restoring the default settings may be effective. To clear CMOS (JP6), short Pin 2 and Pin 3 and wait for 5 seconds. Then, remove the jumper cap and short Pin 1 and Pin 2.




**Figure 3-25: Clear CMOS Jumper (JP6) Pin Definition**

| Clear CMOS | |
|---|---|
| 2-3 | Clear CMOS |
| 1-2 | N/A (default) |

**Table 3-23: Clear CMOS Jumper (JP6)**



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### 3.2.17 PCIe x4 Gen3 Connectors (optional)

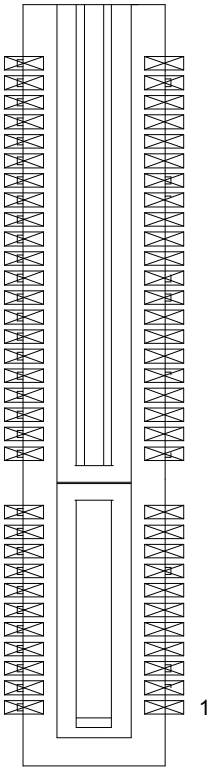



**Figure 3-26: PCIe x4 Gen3 Connector Pin Definition**

| Pin | Side B Connector | | Side A Connector | |
|---|---|---|---|---|
| | Name | Description | Name | Description |
| 1 | +12V | +12 volt power | PRSNT#1 | Hot plug presence detect |
| 2 | +12V | +12 volt power | +12V | +12 volt power |
| 3 | +12V | +12 volt power | +12V | +12 volt power |
| 4 | GND | Ground | GND | Ground |
| 5 | SMCLK | SMBus clock | JTAG2 | TCK |


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| Pin | Side B Connector | | Side A Connector | |
|---|---|---|---|---|
| | Name | Description | Name | Description |
| 6 | SMDAT | SMBus data | JTAG3 | TDI |
| 7 | GND | Ground | JTAG4 | TDO |
| 8 | +12V | +12V power | JTAG5 | TMS |
| 9 | JTAG1 | +TRST# | +3.3V | +3.3 volt power |
| 10 | 3.3Vaux | 3.3 volt power | +3.3V | +3.3 volt power |
| 11 | WAKE# | Link Reactivation | PERST# | Reset |
| **Mechanical Key** | | | | |
| 12 | RSVD | Reserved | GND | Ground |
| 13 | GND | Ground | REFCLK+ | Reference Clock |
| 14 | HSOp(0) | Transmitter Lane 0, | REFCLK- | Differential pair |
| 15 | HSOn(0) | Differential pair | GND | Ground |
| 16 | GND | Ground | HSIp(0) | Receiver Lane 0, |
| 17 | PRSNT#2 | Hotplug detect | HSIn(0) | Differential pair |
| 18 | GND | Ground | GND | Ground |
| 19 | HSOp(1) | Transmitter Lane 1, | RSVD | Reserved |
| 20 | HSOn(1) | Differential pair | GND | Ground |
| 21 | GND | Ground | HSIp(1) | Receiver Lane 1, |
| 22 | GND | Ground | HSIn(1) | Differential pair |
| 23 | HSOp(2) | Transmitter Lane 2, | GND | Ground |
| 24 | HSOn(2) | Differential pair | GND | Ground |
| 25 | GND | Ground | HSIp(2) | Receiver Lane 2, |
| 26 | GND | Ground | HSIn(2) | Differential pair |
| 27 | HSOp(3) | Transmitter Lane 3, | GND | Ground |
| 28 | HSOn(0) | Differential pair | GND | Ground |
| 29 | GND | Ground | HSIp(3) | Receiver Lane 3, |
| 30 | RSVD | Reserved | HSIn(3) | Differential pair |
| 31 | PRSNT#2 | Hot plug detect | GND | Ground |
| 32 | GND | Ground | RSVD | Reserved |

**Table 3-24: PCIe x4 Gen3 Connector Pin Definition**


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### 3.2.18 Speaker Connector

The speaker connector supports 2 2x 2W speakers via cable.

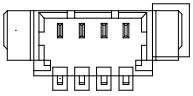



**Figure 3-27: Speaker Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | AMP_L+ |
| 2 | AMP_L- |
| 3 | AMP_R+ |
| 4 | AMP_R- |

**Table 3-25: Speaker Connector Pin Definition**

### 3.2.19 Fan Connectors

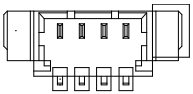



**Figure 3-28: Fan Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | FAN_PWR_IN (12V) |
| 3 | BMC_FAN0_IN |
| 4 | BMC_FAN0_OUT |

**Table 3-26: Fan Connector Pin Definition**


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### 3.2.20 COM2 Connector

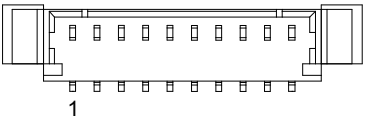



**Figure 3-29: COM2 Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | COM2_DCD-L_CN |
| 2 | COM2_RXD_CN |
| 3 | COM2_TXD_CN |
| 4 | COM2_DTR-L_CN |
| 5 | GND |
| 6 | COM2_DSR-L_CN |
| 7 | COM2_RTS-L_CN |
| 8 | COM2_CTS-L_CN |
| 9 | COM2_RI-L_CN |
| 10 | NC |

**Table 3-27: COM2 Connector Pin Definition**


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### 3.2.21 LED Connector

The LED connector supports up to 10 LEDs.

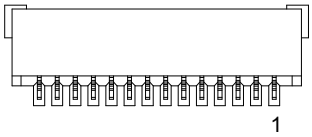



**Figure 3-30: LED Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | GND |
| 2 | CN_STDBY_PWR |
| 3 | CN_GP3_LED-L |
| 4 | CN_GP2_LED-L |
| 5 | CN_GP1_LED-L |
| 6 | P_+3V3_A |
| 7 | CN_COM2_SOUT_LED_L |
| 8 | CN_COM2_SIN_LED_L |
| 9 | CN_COM1_SOUT_LED_L |
| 10 | CN_COM1_SIN_LED_L |
| 11 | CN_SATA_LED-L_R |
| 12 | P_+3V3_S0 |
| 13 | CN_WDT_LED-L |
| 14 | P_+3V3_A |
| 15 | GND |
| 16 | GND |

**Table 3-28: LED Connector Pin Definition**


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### 3.2.22 I2C Connector 1 & 2

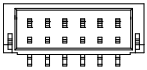



**Figure 3-31: I2C Connector 1 & 2 Pin Definition**

| Pin | Signal |
|---|---|
| 1 | P_+5V_I2C |
| 2 | P_+3V3_I2C |
| 3 | DIO_I2C4_SDA |
| 4 | DIO_I2C4_SCL |
| 5 | DIO_I2C1_INT |
| 6 | GND |

**Table 3-29: I2C Connector 1 & 2 Pin Definition**

### 3.2.23 Buzzer Connector

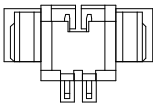



**Figure 3-32: Buzzer Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | P_+5V_S0 |
| 2 | N40235133 |

**Table 3-30: Buzzer Connector Pin Definition**



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### 3.2.24 RTC Battery Wafer

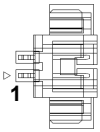



**Figure 3-33: RTC Battery Wafer Pin Definition**

| Pin | Signal |
|---|---|
| 1 | P_+VCC_RTC_CN_A |
| 2 | GND |

**Table 3-31: RTC Battery Wafer Pin Definition**


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### 3.2.25 GPIO Connector

PKX-SP2-KL provides 4 channels of non-isolation digital input and 4 channels of non-isolation digital output circuits.

**4-channel Digital Input**

- VIH: 2.9 to 3.3V
- VIL: 0 to 0.15V

**4-channel Digital Output**

- Output type: open drain N-channel
- MOSFET driver with internal pull-high of 200Ω resistance
- Source/Sink current for all channels: 22mA
- VOH: 2.21 to 3.3V
- VOL: 0 to 0.55V

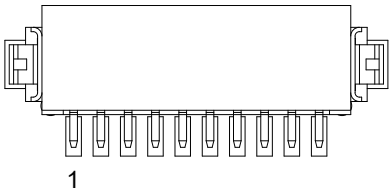



**Figure 3-34: GPIO Connector Pin Definition**

| Pin | Signal Name |
|---|---|
| 1 | P_+3V3_S0 |
| 2 | WFR_GPIO_1_R |
| 3 | WFR_GPIO_2_R |
| 4 | WFR_GPIO_3_R |
| 5 | WFR_GPIO_4_R |
| 6 | WFR_GPIO_5_R |
| 7 | WFR_GPIO_6_R |
| 8 | WFR_GPIO_7_R |
| 9 | WFR_GPIO_8_R |
| 10 | GND |

**Table 3-32: GPIO Connector Pin Definition**


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| Pin | Signal | PCH GPIO | Default Value | Input/Output Voltage Range |
|---|---|---|---|---|
| 1 | P_+3V3_S0 | | | |
| 2 | GPIO_1 | GPP_B3 | Output High | VIH: 2.9V<br>VIL: 0.15V<br>VOH: 2.211V<br>VOL: 0.55V |
| 3 | GPIO_2 | GPP_B4 | Output Low | VIH: 2.9V<br>VIL: 0.15V<br>VOH: 2.211V<br>VOL: 0.55V |
| 4 | GPIO_3 | GPP_E3 | Output High | VIH: 2.9V<br>VIL: 0.15V<br>VOH: 2.211V<br>VOL: 0.55V |
| 5 | GPIO_4 | GPP_E7 | Output Low | VIH: 2.9V<br>VIL: 0.15V<br>VOH: 2.211V<br>VOL: 0.55V |
| 6 | GPIO_5 | GPP_A14 | Output High | VIH: 2.9V<br>VIL: 0.15V<br>VOH: 2.211V<br>VOL: 0.55V |
| 7 | GPIO_6 | GPP_A15 | Output Low | VIH: 2.9V<br>VIL: 0.15V<br>VOH: 2.211V<br>VOL: 0.55V |
| 8 | GPIO_7 | GPP_A21 | Output High | VIH: 2.9V<br>VIL: 0.15V<br>VOH: 2.211V<br>VOL: 0.55V |
| 9 | GPIO_8 | GPP_A22 | Output Low | VIH: 2.9V<br>VIL: 0.15V<br>VOH: 2.211V<br>VOL: 0.55V |
| 10 | GND | | | |

**Table 3-33: GPIO Connector Pin Voltage**


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### 3.2.26 Backup Battery Connector (Optional)

An optional backup battery connector is available. Contact ADLINK to for more information.

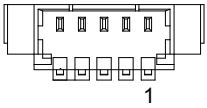



**Figure 3-35: Backup Battery Connector Pin Definition**

| Pin | Signal |
|---|---|
| 1 | CHG_PWR |
| 2 | GND |
| 3 | CHG_SMBCLK |
| 4 | CHG_SMBDAT |
| 5 | SMB_ALERT-L_R |

**Table 3-34: Backup Battery Connector Pin Definition**


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### 3.2.27 SIM Card Connector

The Nano SIM connector provides 4G/5G communication functionality.

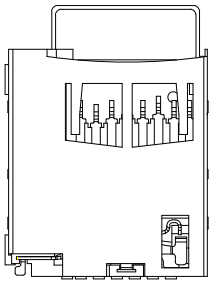


**Figure 3-36: SIM Connector Pin Definition**

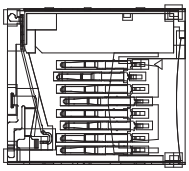
| Pin | Signal |
|---|---|
| C1 | P_+3V3_UIM_M2 |
| C2 | M2_UIM_RST |
| C3 | M2_UIM_CLK_R |
| CD | M2_UIM1_CD |
| C5 | GND |
| C6 | M2_UIM_VPP |
| C7 | M2_UIM_DATA |
| G1 | GND |
| G2 | GND |
| G3 | GND |
| G4 | GND |

**Table 3-35: SIM Connector Pin Definition**


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### 3.2.28 MicroSD Card Slot

The MicroSD card slot can be used for expanded storage.



| Pin | Signal |
|---|---|
| 1 | SOC_SDCARD_D2 |
| 2 | SOC_SDCARD_D3 |
| 3 | SOC_SDCARD_CMD |
| 4 | P_+3V3_SDCARD |
| 5 | SOC_SDCARD_CLK |
| 6 | GND |
| 7 | SOC_SDCARD_D0 |
| 8 | SOC_SDCARD_D1 |
| 9 | GND |
| 10 | GND |
| 11 | SOC_SDCARD_CD-L |
| 12 | GND |

**Table 3-36: MicroSD Card Slot Pin Definition**



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### 3.2.29 M.2 2280 SATA SSD Connector

The M.2 B+M key supports a SATA SSD.

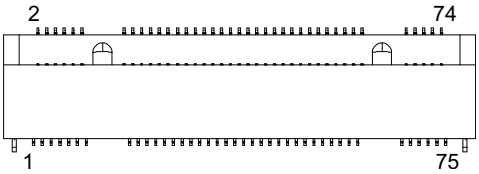



**Figure 3-37: M.2 2280 Connector Pin Definition**

| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 1 | NC | 2 | P_+3V3_S0 |
| 3 | GND | 4 | P_+3V3_S0 |
| 5 | NC | 6 | NC |
| 7 | NC | 8 | NC |
| 9 | GND | 10 | NC |
| 11 | NC | 12 | P_+3V3_S0 |
| 13 | NC | 14 | P_+3V3_S0 |
| 15 | GND | 16 | P_+3V3_S0 |
| 17 | NC | 18 | P_+3V3_S0 |
| 19 | NC | 20 | NC |
| 21 | NC | 22 | NC |
| 23 | NC | 24 | NC |
| 25 | NC | 26 | NC |
| 27 | GND | 28 | NC |
| 29 | NC | 30 | NC |
| 31 | NC | 32 | NC |
| 33 | GND | 34 | NC |
| 35 | NC | 36 | NC |
| 37 | NC | 38 | TP85 |
| 39 | GND | 40 | NC |
| 41 | SATA_RX0_P | 42 | NC |
| 43 | SATA_RX0_N | 44 | NC |
| 45 | GND | 46 | NC |


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| Pin | Signal | Pin | Signal |
|---|---|---|---|
| 47 | SATA_TX0_N | 48 | NC |
| 49 | SATA_TX0_P | 50 | NC |
| 51 | GND | 52 | NC |
| 53 | NC | 54 | NC |
| 55 | NC | 56 | NC |
| 57 | GND | 58 | NC |
| 67 | NC | 68 | NC |
| 69 | NC | 70 | P_+3V3_S0 |
| 71 | GND | 72 | P_+3V3_S0 |
| 73 | GND | 74 | P_+3V3_S0 |
| 75 | NC | - | - |
| G1 | GND | G2 | GND |
| N1 | NC | N2 | NC |

**Table 3-37: M.2 2280 Connector Pin Definition**


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# 4 BIOS Setup (PKX-SP2-KL)

The Basic Input/Output System (BIOS) is a program that provides a basic level of communication between the processor and peripherals. In addition, the BIOS also contains codes for various advanced features applied to the PKX-SP2-KL. The BIOS setup program includes menus for configuring settings and enabling features of the PKX-SP2-KL. Most users do not need to use the BIOS setup program, as the PKX-SP2-KL ships with default settings that work well for most configurations.


NOTE:

BIOS options used in this manual are for reference only, and are subject to change. Users can download the latest BIOS version from the ADLINK website.


WARNING:

Changing BIOS settings may lead to unexpected system behavior and the possible inability to boot.

## 4.1 BIOS Setup Menu

The BIOS Setup Utility is invoked by pressing <ESC> or <DEL> when the system boots. A system reboot is required when changes are made in the BIOS Setup Utility.

The BIOS Setup Utility includes the following hotkeys.

- <F1>: General help
- <F8>: Load previous BIOS values
- <F9>: Load BIOS default values
- <F10>: Save & Exit the Setup Utility



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## Menu Selection Bar

The Menu Selection Bar is located at the top of the screen. It displays the top level menus available to the user.

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

## Menu Conventions

The appearance of the setup menus and items listed in this chapter are based on a VT100 terminal connection via serial console with the following menu conventions.

- Using color

  The default BIOS setup fields are black. The BIOS setup fields currently not used are grey. The display strings are black.

- Using brackets

  Editable menu options are marketed with square brackets, '[' and ']'.


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## 4.2 Menu Structure

This section presents the six primary menus of the BIOS Setup Utility. Use the following tables as a quick reference for the contents of the BIOS Setup Utility. The remainder of this chapter describe the sub-menus and options for each menu item. The default settings are presented in bold, and the function of each setting is described in the right hand column of the table.

| Main | Advanced |
|---|---|
| - BIOS Information<br>- System Information<br>- Board Information | - CPU Configuration ►<br>- Graphics Configuration ►<br>- Power Management ►<br>- System Management ►<br>- Thermal Management ►<br>- Watchdog Timer ►<br>- CSM Configuration ►<br>- Super IO Configuration ►<br>- Serial Console Redirection ►<br>- Network Stack Configuration ►<br>- Trusted Computing ►<br>- USB Configuration ► |

| Chipset | Security |
|---|---|
| - System Agent (SA) Configuration ►<br>- PCH-IO Configuration ► | - Secure Boot menu |



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| Boot | Save & Exit |
|---|---|
| - Boot Configuration ▶<br>- UEFI Hard Disk Drive BBS Priorities ▶<br>- UEFI NVME Drive BBS Priorities ▶<br>- UEFI CDROM/DVD Drive BBS Priorities ▶<br>- UEFI SD Drive BBS Priorities ▶<br>- UEFI USB Hard Disk Drive BBS Priorities ▶<br>- UEFI USB CDROM/DVD Drive BBS Priorities ▶<br>- UEFI USB Key Drive BBS Priorities ▶<br>- UEFI USB Floppy Drive BBS Priorities ▶<br>- UEFI USB Lan Drive BBS Priorities ▶<br>- UEFI NETWORK Drive BBS Priorities ▶ | - Save Changes and Exit<br>- Discard Changes and Exit<br>- Save Changes and Reset<br>- Discard Changes and Reset<br>- Save Options<br>- Save Changes<br>- Discard Changes<br>- Restore Defaults<br>- Save as User Defaults<br>- Restore User Defaults<br>- Boot Override<br>- Launch EFI Shell from filesystem device |


NOTE:

- ▶ indicates a submenu
- Gray text indicates info only
- **Bold text** indicates a default setting


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## 4.3 Main Menu

This menu provides read-only information about your system and also allows you to set the System Date and Time. Refer to the tables below for details of the sub-menus and settings.

### 4.3.1 Main > BIOS Information

| Feature | Options | Description |
|---|---|---|
| BIOS Vendor | Info only | BIOS Vendor |
| BIOS Version | Info only | BIOS Version. |
| Build Date | Info only | BIOS build date |
| MRC Version | Info only | MRC Version |
| GOP Version | Info only | GOP Version |
| ME FW Version | Info only | ME FW Version |
| BIOS Boot Source | Info only | BIOS Boot Source |

### 4.3.2 Main > System Information

| Feature | Options | Description |
|---|---|---|
| Project Name | Info only | Project Name |
| CPU Board Version | Info only | CPU Board Version |
| CPU Brand String | Info only | CPU Brand String |
| CPU Frequency | Info only | CPU Frequency |
| Total Memory | Info only | Total Memory |
| Memory Frequency | Info only | Memory Frequency |
| PCH SKU | Info only | Consumer SKU |
| FM Board | Info only | FM Board |


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### 4.3.3 Main > Board Information

| Feature | Options | Description |
|---|---|---|
| Board Information | Info only | Board Information |
| Serial Number | Info only | Serial Number |
| Manufacturing Date | Info only | Manufacturing Date |
| Last Repair Date | Info only | Last Repair Date |
| Runtime Statistics | Info only | Runtime Statistics |
| Total Runtime | Info only | Total Runtime |
| Current Runtime | Info only | Current Runtime |
| Power Cycles | Info only | Power Cycles |
| Boot Cycles | Info only | Boot Cycles |
| Boot Reason | Info only | Boot Reason |


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## 4.4 Advanced Menu

This menu contains the settings for most of the user interfaces in the system.

### 4.4.1 Advanced > CPU Configuration

| Feature | Options | Description |
|---|---|---|
| CPU Signature | Info only | Displays the CPU Signature |
| Microcode Patch | Info only | Displays the Microcode Patch |
| Max CPU Speed | Info only | Displays the CPU Speed |
| Min CPU Speed | Info only | Displays the Min CPU Speed |
| Processor Cores | Info only | Displays the number of Processor Cores |
| Intel HT Technology | Info only | Displays Intel HT Technology status |
| Intel VT-x Technology | Info only | Displays Intel VT-x Technology status |
| L1 Data Cache | Info only | Displays the Processor L1 Data Cache size. |
| L1 Instruction Cache | Info only | Displays the Processor L1 Instruction Cache size. |
| L2 Cache | Info only | Displays the Processor L2 Cache size. |
| L3 Cache | Info only | Displays the Processor L3 Cache size. |
| L4 Cache | Info only | Displays the Processor L4 eDRAM size. |
| VMX | Info only | VMX Supported or Not |
| SMX/TXT | Info only | SMX/TXT Supported or Not |
| Intel(R) SpeedStep(tm) | Disabled, **Enabled** | Allows more than two frequency ranges to be supported. |


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| Feature | Options | Description |
|---|---|---|
| Turbo Mode | Disabled, **Enabled** | Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled, unless max turbo ratio is bigger than 16 - SKL A0 W/A |
| C states | **Enabled**, Disabled | Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized. |
| Enhanced C-states | Disabled, **Enabled** | Enable/Disable C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State. |
| C-State Auto Demotion | Disabled<br>C1<br>C3<br>**C1 and C3** | Configure C-State Auto Demotion |
| C-State Un-demotion | Disabled<br>C1<br>C3<br>**C1 and C3** | Configure C-State Un-demotion |
| Package C-State Demotion | Disabled<br>Enabled<br>**Auto** | Enable or Disable Package C-State Demotion. Auto: Enabled for Skylake; Disabled for Kabylake |
| Package C-State Un-demotion | Disabled<br>Enabled<br>**Auto** | Enable or Disable Package C-State UnDemotion. Auto: Enabled for Skylake; Disabled for Kabylake |
| DTS SMM | Disabled<br>**Enabled**<br>Critical Temp Reporting (Out Of spec) | Disabled: ACPI thermal management uses EC reported temperature values. |


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### 4.4.2 Advanced > Graphics Configuration

| Feature | Options | Description |
|---|---|---|
| LVDS | Info Only | |
| eDP/LVDS | Disabled<br>**Enabled** | Enable/Disable eDP/ LVDS |
| Data format and Color Depth | **Auto**<br>VESA 24 bpp<br>JEIDA 24 bpp<br>JEIDA/vesa 18 bpp | Data format and Color Depth select |
| LVDS Output Mode | **Auto**<br>Dual LVDS bus<br>Single LVDS bus | Single/Dual mode select |
| DE Polarity | Active High<br>Active Low | DE Polarity select |
| Vsync Polarity | **Active High**<br>Active Low | Vsync Polarity select |
| Hsync Polarity | **Active High**<br>Active Low | Hsync Polarity select |
| Spreading depth | No Spreading<br>0.5%<br>1.0%<br>1.5%<br>2.0%<br>**2.5%** | Clock frequency center spreading depth. |
| FM Board DDI port | No Device<br>DisplayPort<br>HDMI<br>**DisplayPort with HDMI/ DVI Compatible** | DDI port 1 function choose to DisplayPort or HDMI |


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| Feature | Options | Description |
|---|---|---|
| LFP Panel Type | Auto<br>640x480<br>800x600<br>1024x768<br>1280x1024<br>1400x1050 LVDS1<br>1400x1050 LVDS2<br>1600x1200<br>1366x768<br>1680x1050<br>1920x1200<br>1440x900<br>1600x900<br>**1280x800**<br>1920x1080<br>2048x1536 | Select LFP panel used by Internal Graphics Device by selecting the appropriate setup item. |

### 4.4.3 Advanced > Power Management

| Feature | Options | Description |
|---|---|---|
| Enable ACPI Auto Configuration | **Disabled**<br>Enabled | Enables/Disables BIOS ACPI Auto Configuration. |
| Enable Hibernation | Disabled<br>**Enabled** | Enables/Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems. |
| ACPI Sleep State | Suspend Disabled<br>**S3 (Suspend to RAM)** | Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed. |
| PCIE Wake | Disabled<br>**Enabled** | Enables/Disables PCIe wake function |
| RI Wake | Disabled<br>**Enabled** | |


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| Feature | Options | Description |
|---|---|---|
| RTC Wake system from S5 | **Disabled**<br>Fixed Time<br>Dynamic Time | Enable or disable System wake on alarm event.<br>FixedTime: system will wake on the hr::min::sec specified.<br>Select DynamicTime: system will wake on the current time + Increase minute(s) |
| Wake up hour | **0x00** | Wake up hour in hex.<br>Range: 0x00-0x17 in increments of 0x01 (0-23 hrs, 1 hr increments) |
| Wake up minute | **0x00** | Wake up hour in hex.<br>Range: 0x00-0x3B in increments of 0x01 (0-59 mins, 1 min increments) |
| Wake up second | **0x00** | Wake up second in hex.<br>Range: 0x00-0x3B in increments of 0x01 (0-59 sec, 1 sec increments) |
| Wake up minute increase | **0x01** | Wake up minute increase in hex for Dynamic RTC Wake.<br>Range: 0x00-0x05 in increments of 0x01 (0-5 min, 1 min increments) |
| Emulation AT/ATX | Emulation AT<br>**ATX** | Select Emulation AT or ATX function. If this option is set to [Emulation AT], BIOS will report no suspend functions to ACPI OS. On Windows XP, the OS will show a shutdown message during system shutdown. |
| Power Consumption > | Sub-menu | |


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### 4.4.4 Advanced > Power Management > Power Consumption

| Feature | Options | Description |
|---|---|---|
| Power Consumption | Info only | |
| Current Input Current | Info only | Current Input Current |
| Current Input Power | Info only | Current Input Power |
| CPU-Vcore | Info only | CPU-Vcore |
| VGFX | Info only | VGFX |
| VCCIO | Info only | VCCIO |
| VCCSTG | Info only | VCCSTG |
| VCCSA | Info only | VCCSA |
| 1V8_A | Info only | 1V8_A |
| 1V0_A | Info only | 1V0_A |
| VDDQ | Info only | VDDQ |
| VIN | Info only | VIN |
| V12 | Info only | V12 |
| V5SBY | Info only | V5SBY |
| V5S | Info only | V5S |
| P_+3V3_A | Info only | P_+3V3_A |
| P_+3V3_S | Info only | P_+3V3_S |
| VRTC | Info only | VRTC |
| AIN15 | Info only | AIN15 |

### 4.4.5 Advanced > System Management

| Feature | Options | Description |
|---|---|---|
| EC Version | Info only | Version of EC Firmware |
| SEMA Firmware | Info only | Version of SEMA Firmware |
| Build Date | Info only | Build Date of SEMA Firmware |
| SEMA Bootloader | Info only | Version of SEMA Bootloader |
| Build Date | Info only | Build Date of SEMA Bootloader |


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### 4.4.6 Advanced > System Management > SEMA Features

| Feature | Options | Description |
|---|---|---|
| SEMA Features | Info only | |
| SEMA Supported Features | Info only | SEMA Supported Features |
| • Uptime & Power Cycles Counter | Info only | • Uptime & Power Cycles Counter |
| • System Restart Event | Info only | • System Restart Event |
| • 512 Bytes User-Flash | Info only | • 512 Bytes User-Flash |
| • 1024 Bytes User-Flash | Info only | • 1024 Bytes User-Flash |
| • Watchdog | Info only | • Watchdog |
| • Temperatures | Info only | • Temperatures |
| • Voltage Monitor | Info only | • Voltage Monitor |
| • Power-Up Watchdog | Info only | • Power-Up Watchdog |
| • Power Monitor (current sense) | Info only | • Power Monitor (current sense) |
| • Boot Counter | Info only | • Boot Counter |
| • I2C bus 2 | Info only | • I2C bus 2 |
| • System Fan 1 | Info only | • System Fan 1 |
| • ACPI Thermal Trigger | Info only | • ACPI Thermal Trigger |
| • DTS register available | Info only | • DTS register available |
| • TIVA BMC | Info only | • TIVA BMC |
| • SEMA Error Log | Info only | • SEMA Error Log |


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### 4.4.7 Advanced > System Management > Flags

| Feature | Options | Description |
|---|---|---|
| BMC Flags | Info only | BMC Flags |
| BIOS Select | Info only | BIOS Select |
| ATX/AT-Mode | Info only | ATX/AT-Mode |
| Exception Code | Info only | Exception Code |

### 4.4.8 Advanced > System Management > SEMA > Temperature

| Feature | Options | Description |
|---|---|---|
| CPU Temperature ► | Sub-Menu | |
| Current | Info only | Current CPU temperature |
| Startup | Info only | Startup CPU temperature |
| Min | Info only | Min. CPU temperature |
| Max | Info only | Max. CPU temperature |
| Board Temperatures ► | Sub-Menu | |
| Current | Info only | Current Board temperature |
| Startup | Info only | Startup Board temperature |
| Min | Info only | Min. Board temperature |
| Max | Info only | Max. Board temperature |
| Board2 Temperatures ► | Sub-Menu | |
| Current | Info only | Current Board temperature |
| Startup | Info only | Startup Board temperature |
| Min | Info only | Min. Board temperature |
| Max | Info only | Max. Board temperature |
| CPU Fan Speed | Info only | CPU Fan Speed |
| Smart Fan ► | Sub-Menu | |
| Critical Trip Point | **Disabled**<br>60 C<br>70 C<br>80 C | This value is the temperature threshold of the Critical Trip Point. |


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| Feature | Options | Description |
|---|---|---|
| Passive Cooling Trip Point | **Disabled**<br>60 C<br>70 C<br>80 C | This value is the temperature threshold of the Passive Cooling Trip Point. |


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### 4.4.9 Advanced > Watchdog Timer

| Feature | Options | Description |
|---|---|---|
| Power-Up Watchdog | **Disabled**<br>Enabled | Enbles/Disables the Watchdog Timer |
| Timeout | **0xFFFF** | Time Power Up Watchdog should wait until it resets the system in hex. Range 0x018-0xFFFF (18-65535 minutes, 1 min increments) |
| ATTENTION: Pressing F12 during start up disables the Power Up Watchdog. | | |

### 4.4.10 Advanced > CSM Configuration

| Feature | Options | Description |
|---|---|---|
| CSM Support | Disabled<br>**Enabled** | Enable/Disable CSM Support. |
| CSM16 Module Version | Info only | |
| GateA20 Active | **Upon Request**<br>Always | Upon Request: GA20 can be disabled using BIOS services.<br>ALWAYS: do not allow disabling GA20; this option is useful when any RT code is executed above 1MB. |
| Boot option filter | **UEFI and Legacy**<br>Legacy only<br>UEFI only | This option controls Legacy/UEFI ROMs priority |
| Option ROM execution | Info only | |
| Network | Do not launch<br>**UEFI**<br>Legacy | Controls the execution of UEFI and Legacy PXE OpROM |


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| Feature | Options | Description |
|---|---|---|
| Storage | Do not launch<br>**UEFI**<br>Legacy | Controls the execution of UEFI and Legacy Storage OpROM |
| Video | Do not launch<br>**UEFI**<br>Legacy | Controls the execution of UEFI and Legacy Video OpROM |
| Other PCI devices | Do not launch<br>UEFI<br>**Legacy** | Determines OpROM execution policy for devices other than Network, Storage, or Video |

### 4.4.11 Advanced > Super IO Configuration

| Feature | Options | Description |
|---|---|---|
| Super IO Chip | Info only | |
| ► Serial Port 1 Configuration | Sub-Menu | |
| ► Serial Port 2 Configuration | Sub-Menu | |
| ► Serial Port 3 Configuration | Sub-Menu | |
| ► Serial Port 4 Configuration | Sub-Menu | |


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### 4.4.12 Advanced > Super IO Configuration > Serial Port 1 Configuration

| Feature | Options | Description |
|---|---|---|
| Serial Port | Disabled<br>**Enabled** | Enables/Disables the serial port (COM) |
| Device Settings | IO=3F8h; IRQ=4 | |
| Change Settings | **Auto**<br>IO=3F8h; IRQ=4<br>IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12<br>IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12<br>IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12 | Selects optimal settings for Super IO Device |
| COM1 Control | **RS232**<br>RS422<br>RS485 | Sets COM1 mode as RS-232, RS-422 or RS-485 |

### 4.4.13 Advanced > Super IO Configuration > Serial Port 2 Configuration

| Feature | Options | Description |
|---|---|---|
| Serial Port | Disabled<br>**Enabled** | Enables/Disables the serial port (COM) |
| Device Settings | IO=2F8h; IRQ=3 | |
| Change Settings | **Auto**<br>IO=2F8h; IRQ=3;<br>IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12<br>IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12<br>IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12<br>IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12 | Selects optimal settings for Super IO Device |


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| Feature | Options | Description |
|---|---|---|
| COM2 Control | **RS232**<br>RS422<br>RS485 | Sets COM2 mode as RS-232, RS-422 or RS-485 |

### 4.4.14 Advanced > Super IO Configuration > Serial Port 3 Configuration

| Feature | Options | Description |
|---|---|---|
| Serial Port | **Disabled**<br>Enabled | Enables/Disables the serial port (COM) |
| Device Settings | Reset Required | |
| Change Settings | Auto<br>IO=3E8h; IRQ=7;<br>IO=3F8h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=2F8h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=3E8h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=2E8h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=220h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=228h;<br>IRQ=3,4,5,6,7,9,**10**,11,12 | Selects optimal settings for Super IO Device |

### 4.4.15 Advanced > Super IO Configuration > Serial Port 4 Configuration

| Feature | Options | Description |
|---|---|---|
| Serial Port | **Disabled**<br>Enabled | Enables/Disables the serial port (COM) |
| Device Settings | Reset Required | |


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| Feature | Options | Description |
|---|---|---|
| Change Settings | Auto<br>IO=3E8h; IRQ=7;<br>IO=3F8h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=2F8h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=3E8h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=2E8h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=220h;<br>IRQ=3,4,5,6,7,9,**10**,11,12<br>IO=228h;<br>IRQ=3,4,5,6,7,9,**10**,11,12 | Selects optimal settings for Super IO Device |


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### 4.4.16 Advanced > Serial Console Redirection

| Feature | Options | Description |
|---|---|---|
| COM0 | | |
| Console Redirection | **Disabled**<br>Enabled | Enables/Disables console redirection on COM0 port. |
| Console Redirection Settings ► | Sub-Menu | |
| COM1 | | |
| Console Redirection | **Disabled**<br>Enabled | Enables/Disables console redirection on COM1 port. |
| Console Redirection Settings ► | Sub-Menu | |
| Legacy Console Redirection | | |
| Legacy Console Redirection settings ► | Sub-Menu | |

### 4.4.17 Advanced > Console Redirection > COM 0 > Console Redirection Settings

| Feature | Options | Description |
|---|---|---|
| Terminal Type | VT100<br>VT100Plus<br>VT-UTF8<br>**ANSI** | Emulation:<br>ANSI: Extended ASCII character set.<br>VT100: ASCII character set.<br>VT100Plus: Extends VT100 to support color, function keys, etc.<br>VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes. |
| Bits per second | 9600<br>19200<br>38400<br>57600<br>**115200** | Selects serial port transmission speed. The speed must be matched on both connected systems. Long or noisy lines may require lower speeds. |
| Data Bits | 7<br>**8** | Data Bits. |


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| Feature | Options | Description |
|---|---|---|
| Parity | **None**<br>Even<br>Odd<br>Mark<br>Space | A parity bit can be sent with the data bits to detect some transmission errors.<br>Even: parity bit is 0 if the num of 1's in the data bits is even.<br>Odd: parity bit is 0 if num of 1's in the data bits is odd<br>Mark: Parity bit is always 1.<br>Space: Parity bit is always 0.<br>Mark and Space Parity do not allow for error detection. They can be used as an additional data bit. |
| Stop Bits | **1**<br>2 | Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. |
| Flow Control | **None**<br>Hardware RTS/CTS | Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop |
| VT-UTF8 Combo Key Support | Disabled<br>**Enabled** | Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals |
| Recorder Mode | **Disabled**<br>Enabled | With this mode enabled only text will be sent. This is to capture terminal data. |
| Resolution 100x31 | **Disabled**<br>Enabled | Enables/Disables extended terminal resolution |
| Putty KeyPad | **VT100**<br>LINUX<br>XTERMR6<br>SCO<br>ESCN<br>VT400 | Select FunctionKey and KeyPad on Putty. |


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### 4.4.18 Advanced > Console Redirection > COM 1 > Console Redirection Settings

| Feature | Options | Description |
|---|---|---|
| Terminal Type | VT100<br>VT100Plus<br>VT-UTF8<br>**ANSI** | Emulation:<br>ANSI: Extended ASCII character set.<br>VT100: ASCII character set.<br>VT100Plus: Extends VT100 to support color, function keys, etc.<br>VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes. |
| Bits per second | 9600<br>19200<br>38400<br>57600<br>**115200** | Selects serial port transmission speed. The speed must be matched on both connected systems. Long or noisy lines may require lower speeds. |
| Data Bits | 7<br>**8** | Data Bits. |
| Parity | **None**<br>Even<br>Odd<br>Mark<br>Space | A parity bit can be sent with the data bits to detect some transmission errors.<br>Even: parity bit is 0 if the num of 1's in the data bits is even.<br>Odd: Parity bit is 0 if num of 1's in the data bits is odd<br>Mark: parity bit is always 1.<br>Space: Parity bit is always 0.<br>Mark and Space Parity do not allow for error detection. They can be used as an additional data bit. |
| Stop Bits | **1**<br>2 | Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit. |
| Flow Control | **None**<br>Hardware<br>RTS/CTS | Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop |


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| Feature | Options | Description |
|---|---|---|
| VT-UTF8 Combo Key Support | Disabled<br>**Enabled** | Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals |
| Recorder Mode | **Disabled**<br>Enabled | With this mode enabled only text will be sent. This is to capture terminal data. |
| Resolution 100x31 | **Disabled**<br>Enabled | Enables/Disables extended terminal resolution |
| Putty KeyPad | **VT100**<br>LINUX<br>XTERMR6<br>SCO<br>ESCN<br>VT400 | Select FunctionKey and KeyPad on Putty. |

### 4.4.19 Advanced > Console Redirection > Legacy Console Redirection Settings

| Feature | Options | Description |
|---|---|---|
| Legacy Console Redirection Settings | | |
| Redirection COM Port | **COM0**<br>COM1<br>COM2<br>COM3 (Disabled) | Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages |
| Resolution | **80x24**<br>80x25 | On Legacy OS, the Number of Rows and Columns supported redirection |
| Redirect After POST | **Always Enable**<br>BootLoader | When Bootloader is selected, then Legacy Console Redirection is disabled before booting to legacy OS. When Always Enable is selected, then Legacy Console Redirection is enabled for legacy OS. Default setting for this option is set to Always Enable. |


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### 4.4.20 Advanced > Miscellaneous > Network Stack Configuration

| Feature | Options | Description |
|---|---|---|
| Network Stack | **Disabled**<br>Enabled | Enables/Disables UEFI Network Stack |
| IPv4 PXE Support | **Disabled**<br>Enabled | Enables/Disables IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available. |
| IPv6 PXE Support | **Disabled**<br>Enabled | Enables/Disables IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available. |
| PXE boot wait time | **0x00** | Time in seconds to wait to press ESC key to abort PXE boot. Use +/- or numeric keys to set. Range: 0x00-0x05 in increments of 0x01 (0-5 sec, 1 sec increments) |

### 4.4.21 Advanced > Trusted Computing > TPM 1.2 Configuration

| Feature | Options | Description |
|---|---|---|
| Configuration | Info only | |
| Security Device Support | Disable<br>**Enable** | Enables or Disables BIOS support for security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |
| TPM State | Disabled<br>**Enabled** | Enable/Disable Security Device. NOTE: Your Computer will reboot during restart in order to change State of the Device. |
| Pending operation | **None**<br>TPM Clear | Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device. |
| Security Device Support* | Disable<br>**Enable** | Enables or Disables BIOS support for security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |


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| Feature | Options | Description |
|---|---|---|
| TCM State | Disabled<br>**Enabled** | Enable/Disable Security Device. NOTE: Your Computer will reboot during restart in order to change State of the Device. |
| Pending operation* | **None**<br>TPM Clear | Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device. |
| Device Select | TPM 1.2<br>TPM 2.0<br>**Auto** | TPM 1.2 restricts support to TPM 1.2 devices, TPM 2.0 restricts support to TPM 2.0 devices, Auto supports both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated |
| Current Status Information | | |
| TPM Enabled Status: | N/A, reset required | |
| TPM Active Status: | N/A, reset required | |
| TPM Owner Status: | N/A, reset required | |
| TCM Enabled Status: | N/A, reset required | |
| TCM Active Status: | N/A, reset required | |
| TCM Owner Status: | N/A, reset required | |

### 4.4.22 Advanced > TPM 2.0 Configuration

| Feature | Options | Description |
|---|---|---|
| Security Device Support* | Disable<br>**Enable** | Enables or Disables BIOS support for security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available. |
| Active PCR banks | N/A, reset required | |
| Available PCR banks | N/A, reset required | |
| SHA-1 PCR Bank | **Disabled**<br>Enabled | Enable or Disable SHA-1 PCR Bank |
| SHA256 PCR Bank | Disabled<br>**Enabled** | Enable or Disable SHA256 PCR Bank |
| SHA384 PCR Bank | **Disabled**<br>Enabled | Enable or Disable SHA384 PCR Bank |


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| Feature | Options | Description |
|---|---|---|
| SHA512 PCR Bank | **Disabled**<br>Enabled | Enable or Disable SHA512 PCR Bank |
| SM3_256 PCR Bank | **Disabled**<br>Enabled | Enable or Disable SM3_256 PCR Bank |
| Pending operation | **None**<br>TPM Clear | Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device. |
| Platform Hierarchy | Disabled<br>**Enabled** | Enable or Disable Platform Hierarchy |
| Storage Hierarchy | Disabled<br>**Enabled** | Enable or Disable Storage Hierarchy |
| Endorsement Hierarchy | Disabled<br>**Enabled** | Enable or Disable Endorsement Hierarchy |
| TPM 2.0 UEFI Spec Version | TCG_1_2<br>**TCG_2** | Select the TCG2 Spec Version Support, |
| Physical Presence Spec Version | 1.2<br>**1.3** | Select to Tell OS to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3. |
| TPM 2.0 InterfaceType | **CRB**<br>TIS | Select the Communication Interface to TPM 20 Device. |
| Device Select* | TPM 1.2<br>TPM 2.0<br>**Auto** | TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated |

### 4.4.23 Advanced > USB Configuration

| Feature | Options | Description |
|---|---|---|
| XHCI Hand-off | **Enabled**<br>Disabled | This is a workaround for OSs without XHCI hand-off support. The XHCI ownership change should be claimed by the XHCI driver. |
| USB Mass Storage Driver Support | Disabled<br>**Enabled** | Enables/Disables USB Mass Storage Driver Support. |
| USB hardware delays and time-outs: | | |


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| Feature | Options | Description |
|---|---|---|
| USB transfer time-out | 1 sec<br>5 sec<br>10 sec<br>**20 sec** | The time-out value for Control, Bulk, and Interrupt transfers. |
| Device reset time-out | 10 sec<br>**20 sec**<br>30 sec<br>40 sec | USB mass storage device Start Unit command time-out. |
| Device power-up delay | **Auto**<br>Manual | Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses the default value: 100 ms for a Root port, for a Hub port the delay is taken from the Hub descriptor. |
| Device power-up delay in seconds | **0x05** | Delay in hex. Range: 0x01-0x28, (1-40 seconds, 1 second increments) |


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## 4.5 Chipset

This menu contains chipset configuration information.

### 4.5.1 Chipset > System Agent (SA) Configuration

| Feature | Options | Description |
|---|---|---|
| System Agent (SA) Configuration | | |
| VT-d | Supported | |
| Memory Configuration ► | Sub-menu | |
| Graphics Configuration ► | Sub-menu | |
| VT-d* | Disabled<br>**Enabled** | VT-d capability |
| Above 4GB MMIO BIOS assignment | Enabled<br>**Disabled** | Enable/Disable above 4GB MemoryMappedIO BIOS assignment |

### 4.5.2 Chipset > System Agent (SA) Configuration > Memory Configuration

| Feature | Options | Description |
|---|---|---|
| Memory Configuration | Info only | Memory Configuration |
| Memory RC Version | Info only | Memory RC Version |
| Memory Frequency | Info only | Memory Frequency |
| Memory Timings (tCL-tRCD-tRP-tRAS) | Info only | Memory Timings (tCL-tRCD-tRP-tRAS) |
| Controller 0 Channel 0 Slot 0 | Info only | Controller 0 Channel 0 Slot 0 |
| Size | Info only | Size |
| Number of Ranks | Info only | Number of Ranks |
| Manufacturer | Info only | Manufacturer |


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| Feature | Options | Description |
|---|---|---|
| Maximum Memory Frequency | **Auto**<br>1067<br>1200<br>1333<br>1400<br>1600<br>1800<br>1867<br>2000<br>2133<br>2200<br>2400<br>2600<br>2667<br>2800<br>2933<br>3000<br>3100<br>3200<br>3467<br>3733<br>4000<br>4133 | Maximum Memory Frequency Selections in Mhz. |
| Max TOLUD | **Dynamic**<br>1 GB<br>1.25 GB<br>1.5 GB<br>1.75 GB<br>2 GB<br>2.25 GB<br>2.5 GB<br>2.75 GB<br>3 GB<br>3.25 GB<br>3.5 GB | Maximum Value of TOLUD. Dynamic assignment would adjust TOLUD automatically based on largest MMIO length of installed graphic controller |


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### 4.5.3 Chipset > System Agent (SA) Configuration > Graphics Configuration

| Feature | Options | Description |
|---|---|---|
| Graphics Configuration | Info only | Graphics Configuration |
| Skip Scaning of External Gfx Card | **Disabled**<br>Enabled | If Enabled, system will not scan for External Gfx Card on PEG and PCH PCIE Ports |
| Primary Display | **Auto**<br>IGFX<br>PEG<br>PCI<br>SG | Select which IGFX/PEG/PCI graphics device should be primary display. Select SG for switchable graphics. |
| Select PCIE Card | **Auto**<br>Elk Creek 4<br>PEG Eval | Select the card used on the platform |
| Internal Graphics | **Auto**<br>Disabled<br>Enabled | Keep IGFX enabled based on the setup options. |
| GTT Size | 2MB<br>4MB<br>**8MB** | Select the GTT Size |
| Aperture Size | 128MB<br>**256MB**<br>512MB<br>1024MB<br>2048MB | Select the Aperture Size |



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| Feature | Options | Description |
|---|---|---|
| DVMT Pre-Allocated | 0M<br>32M<br>64M<br>4M<br>8M<br>12M<br>16M<br>20M<br>24M<br>28M<br>**32M**/F7<br>36M<br>40M<br>44M<br>48M<br>52M<br>56M<br>60M | Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device. |
| DVMT Total Gfx Mem | **256M**<br>128M<br>MAX | Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device. |
| Gfx Low Power Mode | **Enabled**<br>Disabled | This option is applicable for SFF only. |

### 4.5.4 Chipset > PCH-IO Configuration

| Feature | Options | Description |
|---|---|---|
| PCH-IO Configuration | Info Only | PCH-IO Configuration |
| PCI Express Configuration ► | Sub Menu | PCI Express Configuration |
| SATA And RST Configuration ► | Sub Menu | SATA And RST Configuration |
| USB Configuration ► | Sub Menu | USB Configuration |
| Miscellaneous Configuration ► | Sub Menu | Miscellaneous Configuration |
| HD Audio Configuration ► | Sub Menu | HD Audio Configuration |
| SeriaIIo Configuration ► | Sub Menu | Serial IO Configuration |


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| Feature | Options | Description |
|---|---|---|
| SCS Configuration ► | Sub Menu | SCS Configuration |

### 4.5.5 Chipset > PCH-IO Configuration > PCI Express Configuration

| Feature | Options | Description |
|---|---|---|
| PCI Express Configuration | Info Only | |
| PCI Express Clock Gating | | PCI Express Clock Gating Enable/ Disable for each root port. |
| Legacy IO Low Latency | | Set to enable low latency of legacy IO. Some systems require lower IO latency, often at the expense of power. |
| DMI Link ASPM Control | | The control of Active State Power Management of the DMI Link. |
| Port8xh DFecode | | PCI Express Port8xh Decode Enable/Disable. |
| Port8xh Decode Port | | Peer Memory Write Enable/ Disable. |
| Peer Memory Write Enable | | Peer Memory Write Enable/ Disable. |
| Compliance Test Mode | | Enable when using Compliance Load Board. |
| PCI Express Root Port 1 ► | Sub Menu | |
| PCI Express Root Port 6 ► | Sub Menu | |
| PCI Express Root Port 9 ► | Sub Menu | |
| PCI Express Root Port 10 ► | Sub Menu | |
| PCI Express Root Port 11 ► | Sub Menu | |
| PCI Express Root Port 12 ► | Sub Menu | |


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### 4.5.6 Chipset > PCH-IO Configuration > SATA and RST Configuration

| Feature | Options | Description |
|---|---|---|
| SATA And RST Configuration | Info Only | |
| SATA Controller(s) | **Enabled**<br>Disabled | Enable/Disable SATA Device. |
| SATA Mode Selection | **AHCI**<br>Intel RST Premium With Intel Optane System Acceleration | Determines how SATA controller(s) operate. |
| SATA Test Mode | Enabled<br>**Disabled** | Toggle SATA loopback for testing |
| SATA Controller Speed | **Default**<br>Gen1<br>Gen2<br>Gen3 | Indicates the maximum speed the SATA controller can support. |
| Serial ATA Port 0 | Empty | |
| Software Preserve | Unknown | |
| Port 0 | Disabled<br>**Enabled** | Enable or Disable SATA Port |
| Hot Plug | **Disabled**<br>Enabled | Designates this port as Hot Pluggable. |
| Configured as eSATA | Hot Plug supported | |
| Spin Up Device | **Disabled**<br>Enabled | If enabled for any of ports, staggered spin up will be performed and only the drives which have this option enabled will spin up at boot. Disabled: all drives spin up at boot |
| SATA Device Type | **Hard Disk Drive**<br>Solid State Drive | Identify the SATA port is connected to Solid State Drive or Hard Disk Drive |
| SATA Port 0 DevSlp | **Disabled**<br>Enabled | Toggle SATA Port 0 DevSlp. Not available on all variants. |


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| Feature | Options | Description |
|---|---|---|
| DITO Configuration | **Disabled**<br>Enabled | Toggle DITO configuration |
| DITO Value | **0x0271** | DITO value in hex. Range: 0x0000-0x03FF in increments of 1. |
| DM Value | **0x0F** | DM value in hex. Range: 0x0F-0x00 in increments of 1. |
| Serial ATA Port 1 | Empty | |
| Software Preserve | Unknown | |
| Port 1 | Disabled<br>**Enabled** | Enable or Disable SATA Port |
| Hot Plug | **Disabled**<br>Enabled | Designates this port as Hot Pluggable. |
| Configured as eSATA | Hot Plug supported | |
| Spin Up Device | **Disabled**<br>Enabled | If enabled for any of ports, staggered spin up will be performed and only the drives which have this option enabled will spin up at boot. Disabled: all drives spin up at boot |
| SATA Device Type | **Hard Disk Drive**<br>Solid State Drive | Identify the SATA port is connected to Solid State Drive or Hard Disk Drive |
| SATA Port 1 DevSlp | **Disabled**<br>Enabled | Toggle SATA Port 1 DevSlp. Not available on all variants. |
| DITO Configuration | **Disabled**<br>Enabled | Toggle DITO configuration |
| DITO Value | **0x0271** | DITO value in hex. Range: 0x0000-0x03FF in increments of 1. |
| DM Value | **0x0F** | DM value in hex. Range: 0x0F-0x00 in increments of 1. |


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### 4.5.7 Chipset > PCH-IO Configuration > USB Configuration

| Feature | Options | Description |
|---|---|---|
| XHCI Disable Compliance Mode | **FALSE**<br>TRUE | Options to disable Compliance Mode. Set TRUE to disable Compliance Mode. |
| xDCI Support | **Disabled**<br>Enabled | Enable/Disable xDCI (USB OTG Device). |
| USB Port Disable Override | **Disabled**<br>Select Per-Pin | Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller. |
| USB SS Physical Connector #0 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB SS Physical Connector #1 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB SS Physical Connector #2 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB SS Physical Connector #3 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |


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| Feature | Options | Description |
|---|---|---|
| USB SS Physical Connector #4 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB SS Physical Connector #5 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB SS Physical Connector #6 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB SS Physical Connector #7 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB SS Physical Connector #8 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB SS Physical Connector #9 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |


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| Feature | Options | Description |
|---|---|---|
| USB HS Physical Connector #0 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB HS Physical Connector #1 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB HS Physical Connector #2 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB HS Physical Connector #3 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB HS Physical Connector #4 | Disabled<br>**Enabled** | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB HS Physical Connector #5 | **Enabled**<br>Disabled | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |


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| Feature | Options | Description |
|---|---|---|
| USB HS Physical Connector #6 | **Enabled**<br>Disabled | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB HS Physical Connector #7 | **Enabled**<br>Disabled | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |
| USB HS Physical Connector #8 | **Enabled**<br>Disabled | Enable/Disable the specified USB Physical Connector (physical port). Once disabled, USB devices plugged into the connector will not be detected by BIOS or OS. |

### 4.5.8 Chipset > PCH-IO Configuration > Miscellaneous Configuration

| Feature | Options | Description |
|---|---|---|
| Miscellaneous Configuration | Info Only | |
| RTC Lock | **Disabled**<br>Enabled | Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM |
| BIOS Lock | **Disabled**<br>Enabled | Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash. |
| CLKRUN# logic | **Disabled**<br>Enabled | Enable the CLKRUN# logic to stop PCI clocks for power saving. |
| Serial IRQ Mode | Quiet<br>**Continuous** | Configure Serial IRQ Mode. |


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| Feature | Options | Description |
|---|---|---|
| State After G3 | **S0 State**<br>S5 State | Specify what state to go to when power is re-applied after a power failure (G3 state). |

### 4.5.9 Chipset > PCH-IO Configuration > HD Audio Configuration

| Feature | Options | Description |
|---|---|---|
| HD Audio Subsystem Configuration Settings | Info Only | |
| HD Audio | Disabled<br>Enabled<br>**Auto** | Control Detection of the HD-Audio device. |
| Audio Output Selection | Speaker-out<br>**Line out** | Audio Output Selection |

### 4.5.10 Chipset > PCH-IO Configuration > SerialIO Configuration

| Feature | Options | Description |
|---|---|---|
| Seriallo Configuration | Info Only | |
| I2C0 Controller* | Disabled<br>**Enabled** | Enables/Disables Seriallo Controller |
| I2C1 Controller* | Disabled<br>**Enabled** | Enables/Disables Seriallo Controller |
| I2C2 Controller | Disabled<br>**Enabled** | Enables/Disables Seriallo Controller |
| I2C3 Controller | Disabled<br>**Enabled** | Enables/Disables Seriallo Controller |
| SPI0 Controller | **Disabled**<br>Enabled | Enables/Disables Seriallo Controller |
| > Serial IO I2C0 Settings | | |
| > Serial IO I2C1 Settings | | |
| > Serial IO I2C2 Settings | | |
| > Serial IO I2C3 Settings | | |


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## 4.6 Security

| Feature | Options | Description |
|---|---|---|
| Minimum length | 3 | Password length for both user and administrator passwords. |
| Maximum length | 20 | |


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## 4.7 Boot

### 4.7.1 Boot > Boot Configuration

| Feature | Options | Description |
|---|---|---|
| Setup Prompt Timeout | **0x0001** | Number of seconds to wait for setup activation key in hex. Range: 0x0001-0xFFFF (0 to 65535 seconds, 1 second increments). 0xFFFF (65535 seconds) means indefinite waiting. |
| Bootup NumLock State | On<br>**Off** | Selects the keyboard NumLock state. |
| Quiet Boot | Disabled<br>**Enabled** | Enables/Disables Quiet Boot option. |
| Fast Boot | **Disabled**<br>Enabled | Enables/Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options. |


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| Feature | Options | | Description |
|---|---|---|---|
| Boot Option #1 | Hard Disk<br>NVME<br>CD/DVD<br>SD<br>USB Hard Disk<br>USB CD/DVD<br>USB Key<br>USB Floppy<br>USB Lan<br>Network<br>Disabled | **Hard Disk** | Sets the system boot order |
| Boot Option #2 | | **CD/DVD** | |
| Boot Option #3 | | **USB Hard Disk:UEFI: Sandisk** | |
| Boot Option #4 | | **Partition 1** | |
| Boot Option #5 | | **USB CD/DVD** | |
| Boot Option #6 | | **USB Key** | |
| Boot Option #7 | | **USB Floppy** | |
| Boot Option #8 | | **USB Lan** | |


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| Feature | Options | Description |
|---|---|---|
| UEFI Hard Disk Drive BBS Priorities ▶ | Sub-Menu | |
| UEFI CDROM/DVD Drive BBS Priorities ▶ | Sub-Menu | |
| UEFI USB Hard Disk Drive BBS Priorities ▶ | Sub-Menu | |
| UEFI USB CDROM/ DVD Drive BBS Priorities ▶ | Sub-Menu | |
| UEFI USB Key Drive BBS Priorities ▶ | Sub-Menu | |
| UEFI USB Floppy Drive BBS Priorities ▶ | Sub-Menu | |
| UEFI USB Lan Drive BBS Priorities ▶ | Sub-Menu | |
| UEFI NETWORK Drive BBS Priorities ▶ | Sub-Menu | |
| Hard Disk Drive BBS Priorities ▶ | Sub-Menu | |
| CDROM/DVD Drive BBS Priorities ▶ | Sub-Menu | |
| USB Hard Disk Drive BBS Priorities ▶ | Sub-Menu | |
| USB Floppy Drive BBS Priorities ▶ | Sub-Menu | |
| USB Lan Drive BBS Priorities ▶ | Sub-Menu | |
| NETWORK Drive BBS Priorities ▶ | Sub-Menu | |


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## 4.8 Save & Exit

| Feature | Options | Description |
|---|---|---|
| Save Changes and Exit | Yes<br>No | Exits system setup after saving the changes. |
| Discard Changes and Exit | Yes<br>No | Exits system setup without saving any changes. |
| Save Changes and Reset | Yes<br>No | Resets the system after saving the changes. |
| Discard Changes and Reset | Yes<br>No | Resets system setup without saving any changes. |
| Save Options | Info only | |
| Save Changes | Yes<br>No | Saves changes done so far to any of the setup options. |
| Discard Changes | Yes<br>No | Discards changes done so far to any of the setup options. |
| Restore Defaults | Yes<br>No | Restores/Loads default values for all the setup options. |
| Save as User Defaults | Yes<br>No | Saves the changes done so far as User Defaults. |
| Restore User Defaults | Yes<br>No | Restores the User Defaults to all the setup options. |
| Boot Override | Info only | |
| Launch EFI Shell from filesystem device | Launch EFI Shell from available filesystems. | |


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# 5 Driver & Application Installation

After installing the operating system, all related drivers must be installed for the system to function properly. This section describes the drivers needed for Windows operating systems and the procedures to install them. For other operating system support, contact ADLINK for further information.

Visit the ADLINK web site to download drivers:

https://www.adlinktech.com/Products/Panel_PCs_Monitors/Panel_PCs_Monitors/PKX-SP2-KL_Series

## 5.1 Driver Installation Order

Install drivers in the following order.

1. Fully install Microsoft Windows before installing any drivers. Most standard I/O device drivers have been included in Microsoft Windows. For Windows 10 IoT Enterprise users, Administrator privilege is required to install the drivers.

2. Install the chipset driver.
See “Chipset Driver Installation” on page 114.

3. Install the graphics driver.
See “Graphics Driver Installation” on page 115.

4. Install the Ethernet driver.
See “Ethernet Driver Installation” on page 116.

5. Install the Management Engine driver
See “Management Engine Driver Installation” on page 116.

6. Install the Serial I/O driver.
See “Serial I/O Driver Installation” on page 117.

7. DI/O Driver Installation
See “DI/O Driver Installation” on page 117.


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## 5.2 Chipset Driver Installation

The chipset driver directs the operating system to configure the Intel® chipset components in order to ensure that the following features function properly:

- SATA Storage Support
- USB Support
- Identification of Intel® Chipset Components in the Device Manager

Windows 10 IoT Enterprise must be fully installed and running on the system before installing this software.

To install the chipset driver for the PKX-SP2-KL:

1. Close any running applications.
2. From ADLINK's website, download Windows 10 IoT Enterprise drivers for the PKX-SP2-KL.
3. Execute Setup.exe and follow the on-screen instructions to complete the installation.
4. After the installation is complete, reboot the system.


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## 5.3 Graphics Driver Installation

The PKX-SP2-KL is equipped with the Intel® Graphics Media Accelerator Driver package, which supports Windows 10 IoT Enterprise.

To install the graphics driver:

1. Close any running applications.
2. From ADLINK's website, download Windows 10 IoT Enterprise drivers for the PKX-SP2-KL.
3. Execute Setup.exe and follow the on-screen instructions to complete the installation.
4. After the installation is complete, reboot the system.


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## 5.4 Ethernet Driver Installation

To install the driver for the Intel I225 Gigabit Ethernet controller:

1. Close any running applications.
2. From ADLINK's website, download Windows 10 IoT Enterprise drivers for the PKX-SP2-KL.
3. Execute Setup.exe and follow the on-screen instructions to complete the installation.
4. After the installation is complete, reboot the system.

## 5.5 Management Engine Driver Installation

To install the driver for the ME controller:

1. Close any running applications.
2. From ADLINK's website, download Windows 10 IoT Enterprise drivers for the PKX-SP2-KL.
3. Execute Setup.exe and follow the on-screen instructions to complete the installation.
4. After the installation is complete, reboot the system.


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## 5.6 Serial I/O Driver Installation

To install the driver for the serial I/O controller:

1. Close any running applications.
2. From ADLINK's website, download Windows 10 IoT Enterprise drivers for the PKX-SP2-KL.
3. Execute Setup.exe and follow the on-screen instructions to complete the installation.
4. After the installation is complete, reboot the system.

## 5.7 DI/O Driver Installation

Download DI/O drivers from the ADLINK website at:

https://www.adlinktech.com/Products/Panel_PCs_Monitors/Panel_PCs_Monitors/PKX-SP2-KL_Series



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# Important Safety Instructions

For user safety, please read and follow all instructions, Warnings, Cautions, and Notes marked in this manual and on the associated device before handling/operating the device, to avoid injury or damage.

- Read these safety instructions carefully.
- Keep the User's Manual for future reference.
- Read the Specifications section of this manual for detailed information on the recommended operating environment.
- It is recommended that the device be installed in Information Technology Rooms that are in accordance with Article 645 of the National Electrical Code and NFPA 75.
- When installing/mounting or uninstalling/removing device is required:
  - Turn off power and unplug any power cords/cables.
  - Reinstall all chassis covers before restoring power.
- To avoid electrical shock and/or damage to device:
  - Keep device away from water or liquid sources.
  - Keep device away from high heat or humidity.
  - Keep device properly ventilated (do not block or cover ventilation openings).
  - Always use recommended voltage and power source settings.
  - Always install and operate device near an easily accessible electrical outlet.
  - Secure the power cord (do not place any object on/over the power cord).
  - Only install/attach and operate device on stable surfaces and/or recommended mountings.
  - The device is powered by an adapter or DC source. Ensure that the adapter or DC source is properly grounded.
- If the device will not be used for long periods of time, turn off and unplug from its power source.
- Never attempt to repair the device, which should only be serviced by qualified technical personnel using suitable tools.

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- A Lithium-type battery may be provided for uninterrupted backup or emergency power.




Risk of explosion if battery is replaced with one of an incorrect type; please dispose of used batteries appropriately.

- The device must be serviced by authorized technicians when:
  - The power cord or plug is damaged
  - Liquid has entered the device interior
  - The device has been exposed to high humidity and/or moisture
  - The device is not functioning or does not function according to the User's Manual
  - The device has been dropped and/or damaged and/or shows obvious signs of breakage
- Disconnect the power supply cord before loosening the thumbscrews and always fasten the thumbscrews with a screwdriver before starting the system up.
- It is recommended that the device be installed only in a server room or computer room where access is:
  - Restricted to qualified service personnel or users familiar with restrictions applied to the location, reasons therefor, and any precautions required
  - Only afforded by the use of a tool or lock and key, or other means of security, and controlled by the authority responsible for the location.

| | |
|---|---|
|  | **BURN HAZARD**<br>Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching. |

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# *Consignes de Sécurité Importante*

*Pour la sécurité de l'utilisateur, veuillez lire et suivre toutes les instructions, avertissements, mises en garde et notes marqués dans ce manuel et sur l'appareil associé avant de manipuler/d'utiliser l'appareil, afin d'éviter toute blessure ou tout dommage.*

- *Lisez attentivement ces consignes de sécurité*
- *Conservez le manuel de l'utilisateur pour pouvoir le consulter ultérieurement*
- *Lisez la section Spécifications de ce manuel pour des informations détaillées sur l'environnement d'exploitation recommandé*
- *Il est recommandé d'installer l'appareil dans Information Salles technologiques conformes à l'article 645 du Code national de l'électricité et NFPA 75.*
- *Lorsque l'installation/le montage ou la désinstallation/le retrait du périphérique est requis:*
  - *Mettez l'appareil hors tension et débranchez tous les cordons/câbles d'alimentation*
  - *Réinstallez tous les couvercles de châssis avant de rétablir l'alimentation*
- *Pour éviter les chocs électriques et/ou d'endommager l'appareil:*
  - *Tenez l'appareil à l'écart de toute source d'eau ou de liquide.*
  - *Tenez l'appareil à l'écart d'une forte chaleur ou d'une humidité élevée.*
  - *Maintenez l'appareil correctement ventilé (n'obstruer ou ne couvrez pas les ouvertures de ventilation).*
  - *Utilisez toujours les réglages de tension et de source d'alimentation recommandés.*
  - *Installez et utilisez toujours l'appareil près d'une prise de courant facilement accessible.*
  - *Fixez le cordon d'alimentation (ne placez aucun objet sur le cordon d'alimentation).*

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- *Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou sur les fixations recommandées.*
- *L'ordinateur Smart Touch est alimenté par un adaptateur ou une source CC. Veuillez vous assurer que l'adaptateur ou la source CC doit conserver la connexion à la terre s'il est doté d'une protection.*

- *Si l'appareil ne doit pas être utilisé pendant de longues périodes, éteignez-le et débranchez-le de sa source d'alimentation*
- *N'essayez jamais de réparer l'appareil, qui ne doit être réparé que par un personnel technique qualifié à l'aide d'outils appropriés*
- *Une batterie de type Lithium peut être fournie pour une alimentation de secours ininterrompue ou d'urgence.*

---




*ATTENTION: Risque d'explosion si la pile est remplacée par une autre de type incorrect. Veuillez jeter les piles usagées de façon appropriée.*

---

- *L'appareil doit être entretenu par des techniciens agrees lorsque:*
  - *Le cordon d'alimentation ou la prise est endommagé(e)*
  - *Un liquide a pénétré à l'intérieur de l'appareil.*
  - *L'appareil a été exposé à une forte humidité et/ou de la buée.*
  - *L'appareil ne fonctionne pas ou ne fonctionne pas selon le manuel de l'utilisateur.*
  - *L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de dommage.*
- *Débranchez le cordon d'alimentation avant de desserrer les vis à oreilles et serrez toujours les vis à oreilles avec un tournevis avant de mettre le système en marche.*

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- *Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique où l'accès est:*
  - *Réservé au personnel de service qualifié ou aux utilisateurs familiarisés avec les restrictions appliquées à l'emplacement, aux raisons de ces restrictions et toutes les précautions requises*
  - *Uniquement autorisé par l'utilisation d'un outil, d'une serrure et d'une clé, ou d'un autre moyen de sécurité, et contrôlé par l'autorité responsable de l'emplacement.*

| | |
|---|---|
|  | ***RISQUE DE BRÛLURES***<br><br>***Partie chaude!*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures. Pour éviter tout danger, laissez la surface refroidir avant de la toucher.* |

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# EMC Compliance

## CE Warning

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

## FCC Warning

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

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# Getting Service

**Ask an Expert:** http://askanexpert.adlinktech.com

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Fax: +886-3-328-5706
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Please visit the Contact page at www.adlinktech.com for information on how to contact the ADLINK regional office nearest you.

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