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

Revision History

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

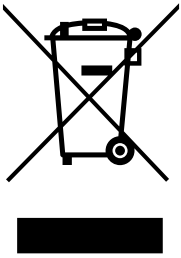
Preface

Disclaimer

The information in this document is subject to change without prior notice in order to improve reliability, design, and function and does not represent a commitment on the part of the manufacturer.

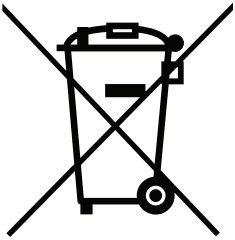
In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Environmental Responsibility



ADLINK is committed to fulfill its social responsibility to global environmental preservation through compliance with the European Union's Restriction of Hazardous Substances (RoHS) directive and Waste Electrical and Electronic Equipment (WEEE) directive. Environmental protection is a top priority for ADLINK. We have enforced measures to ensure that our products, manufacturing processes, components, and raw materials have as little impact on the environment as possible. When products are at their end of life, our customers are encouraged to dispose of them in accordance with the product disposal and/or recovery programs prescribed by their nation or company.

Battery Labels (for products with battery)



California Proposition 65 Warning

WARNING: This product can expose you to chemicals including acrylamide, arsenic, benzene, cadmium, Tris(1,3-dichloro-2-propyl) phosphate (TDCPP), 1,4-Dioxane, formaldehyde, lead, DEHP, styrene, DINP, BBP, PVC, and vinyl materials, which are known to the State of California to cause cancer, and acrylamide, benzene, cadmium, lead, mercury, phthalates, toluene, DEHP, DIDP, DnHP, DBP, BBP, PVC, and vinyl materials, which are known to the State of California to cause birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov.

Trademarks

Product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

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

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

2 Specifications

2.1 PKX-SP2-KL Series Specifications

Model	PKX-SP2-KL-10	PKX-SP2-KL-15	PKX-SP2-KL-21
Processor	Standard: Intel® Core™ i3-7100U Processor, 2.4GHz, 3MB,15W (2C) Intel® Core™ i5-7300U Processor, 2.6 (3.5)GHz, 3MB,15W(25W MAX) (2C) 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 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 1x USB 3.2, 5 Gbps, Type-A, OCP, 1600mA		
DisplayPort	1x DisplayPort, DP++, supports DP 1.2, resolutions up to 5120x3200@60Hz 24bpp 1x MiniDisplayPort, DP++, supports DP 1.2, resolutions up to 5120x3200@60Hz 24bpp		

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

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) 1x Mic-in and Line-out 1x buzzer		
Keys	1x for 32 physical keys (BOM optional), 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) 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) X, Y, Z axes, 60 min/axis		
Shock	OP 20G peak acceleration, 11 ms (IEC60068-2-64) ±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 EMS*: EN 55035, EN 61000-6-2, EMC*: CE, FCC Class B, IEC 60601-1-2:2014/EN60601-1-2:2015, UNECE R10, EN 50121-3-2 Safety*: Compliant with 60601-1/61010-1/62368-1 *PKX-SP2-KL has passed pre-compliance testing of EMI, EMS, EMC, and Safety.		

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

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 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 VESA mounting (requires optional rear cover)		

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

2.2 PKX-SP2-KL Series Block Diagram

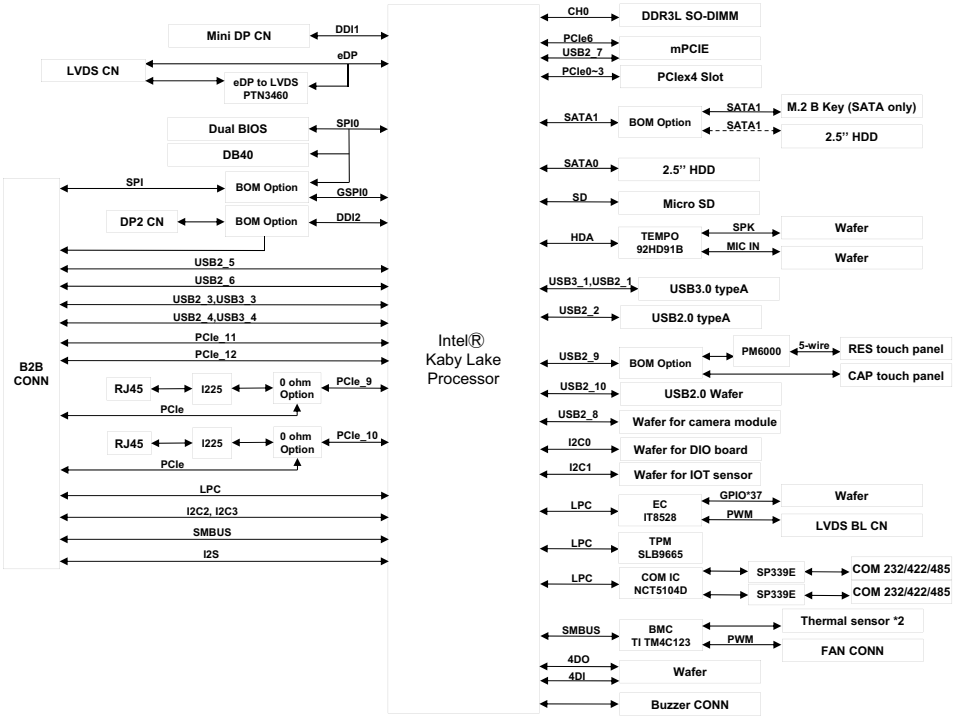


Figure 2-1: PKX-SP2-KL Series Block Diagram

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.

2.4 Mechanical Dimensions

NOTE:

All dimensions are in millimeters, unless noted.

2.4.1 PKX-SP2-KL-10 Dimensions

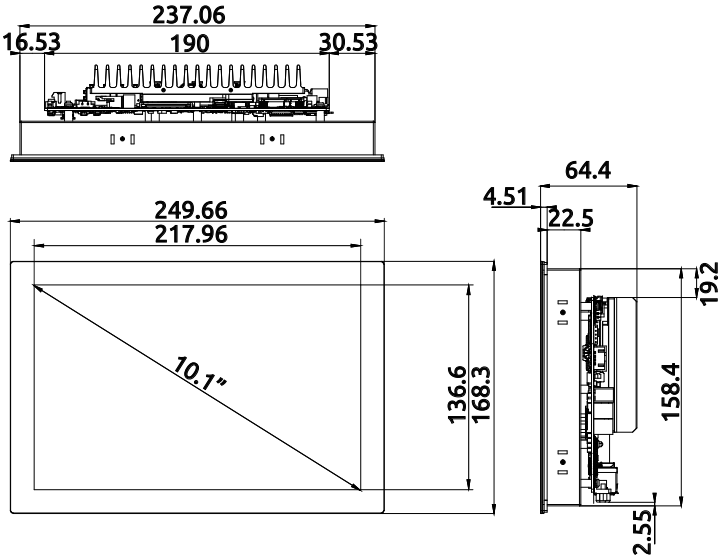


Figure 2-2: PKX-SP2-KL-10 Dimensions

2.4.2 PKX-SP2-KL-15 Dimensions

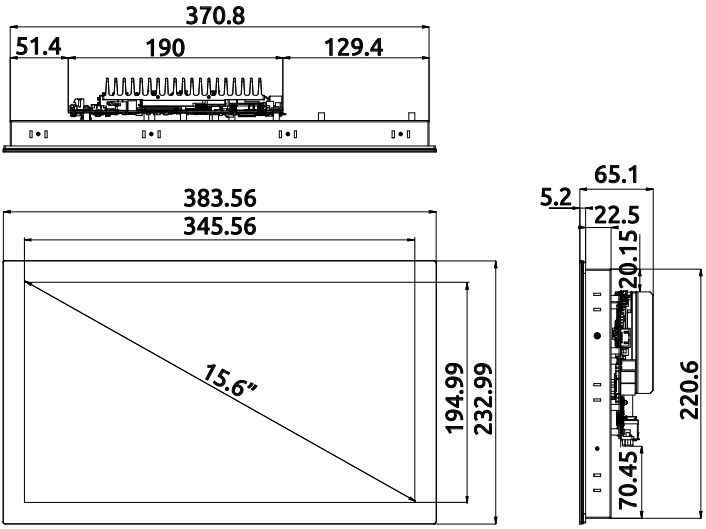


Figure 2-3: PKX-SP2-KL-15 Dimensions

2.4.3 PKX-SP2-KL-21 Dimensions

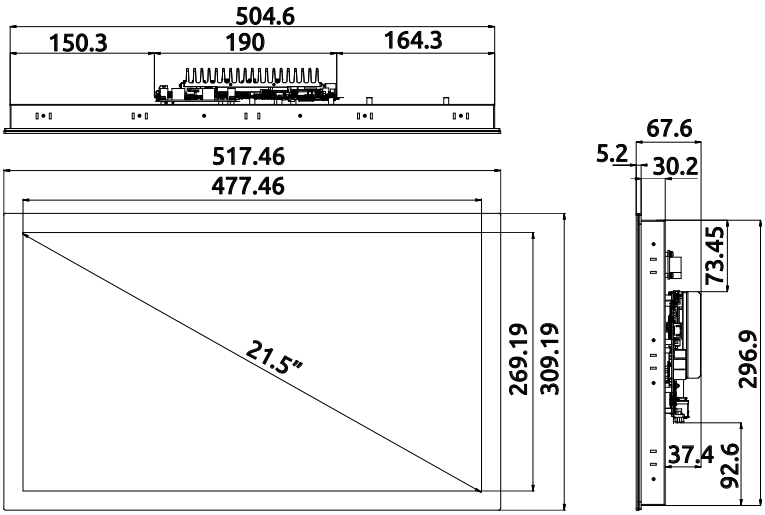


Figure 2-4: PKX-SP2-KL-21 Dimensions

2.5 Thermal Options

2.5.1 Active Cooling Heat Sink

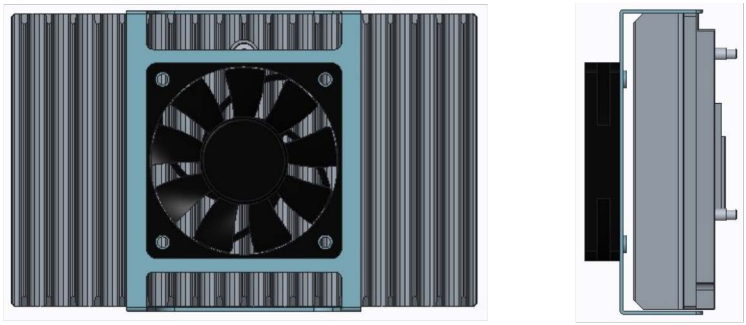


Figure 2-5: Active Cooling Heat Sink

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.

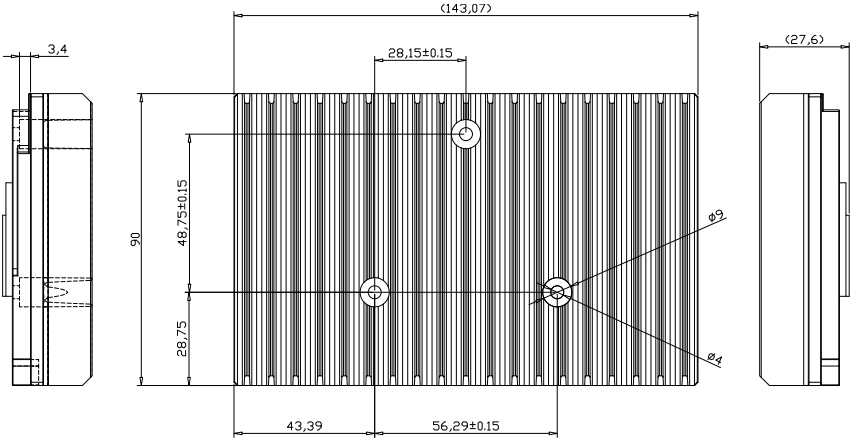


Figure 2-6: Heat Sink Dimensions

2.5.3 Cable Routing Considerations for Heat Sinks

Cable routing should avoid high temperature areas as shown.

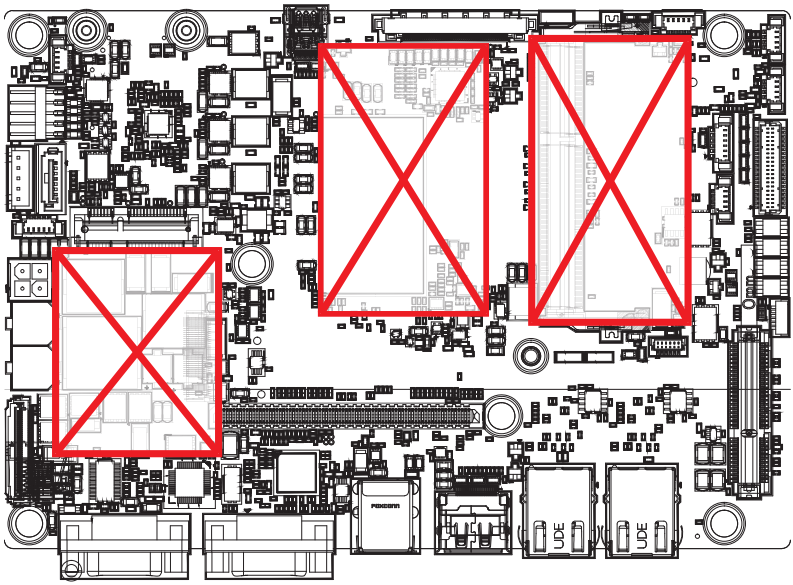


Figure 2-7: Cable Routing Considerations for Heat Sinks

NOTE:

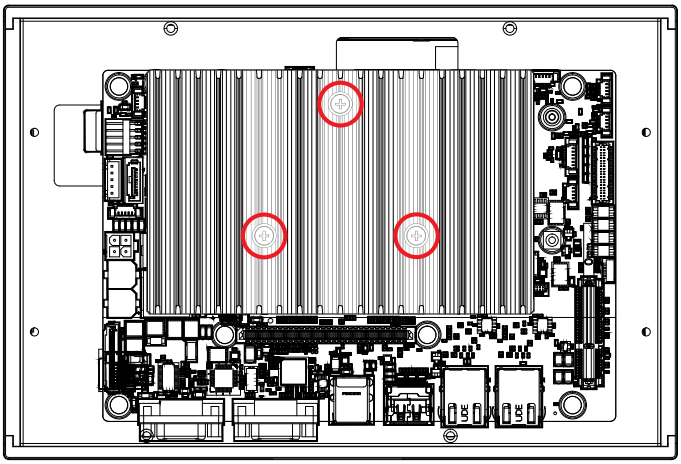
Heat sink design optimized for open-frame installations, such as a kiosk.

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

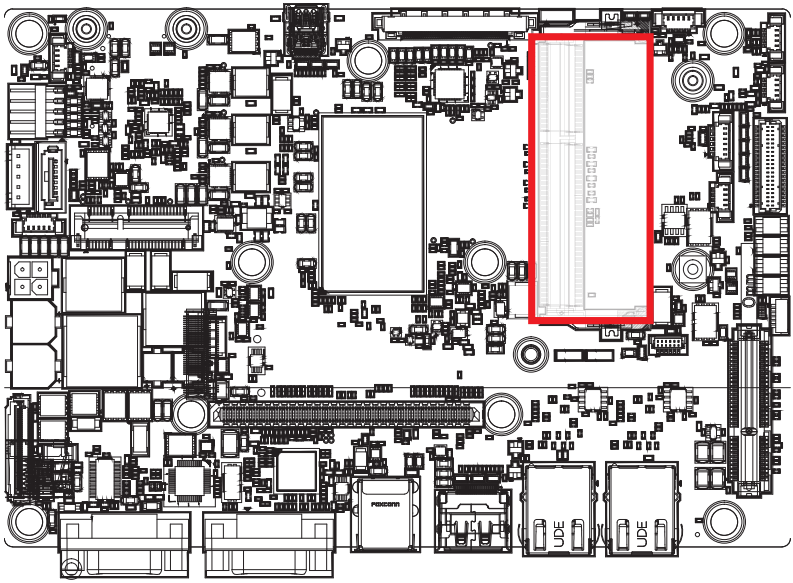
2.6 Adding or Changing Memory

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.



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.

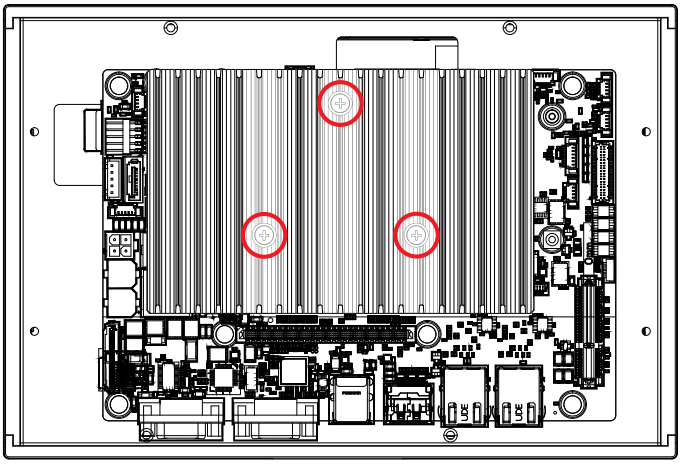
2.7 Installing a Wi-Fi Module

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

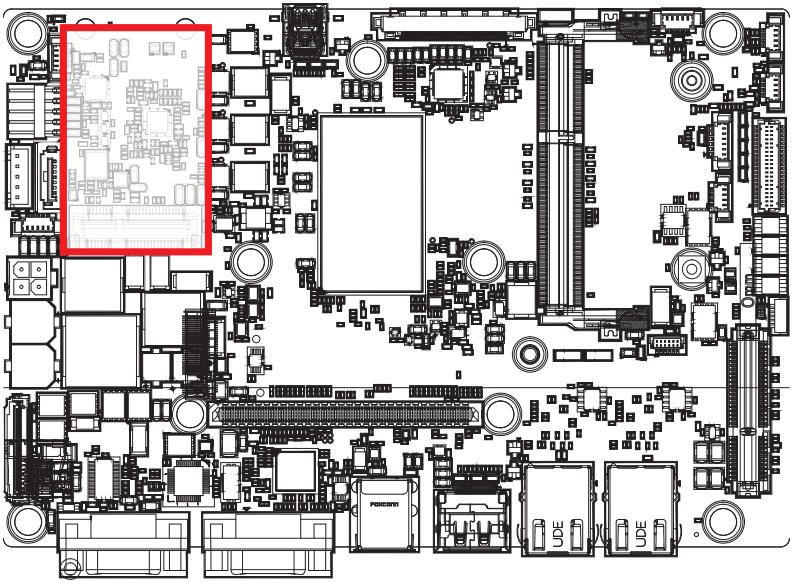
NOTE:

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.



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.

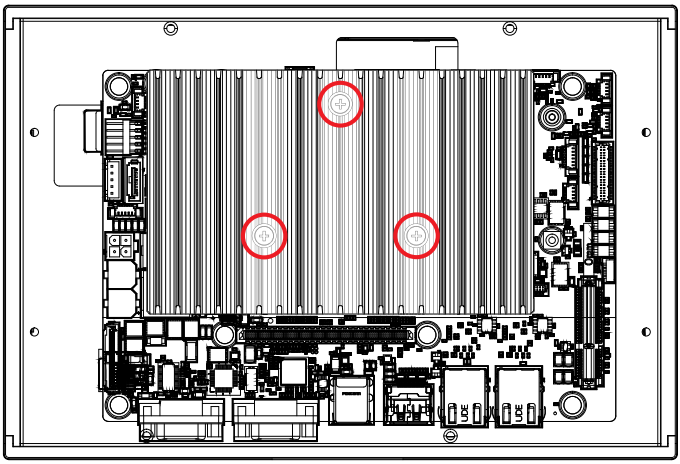
2.8 Installing a 4G/5G Module

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

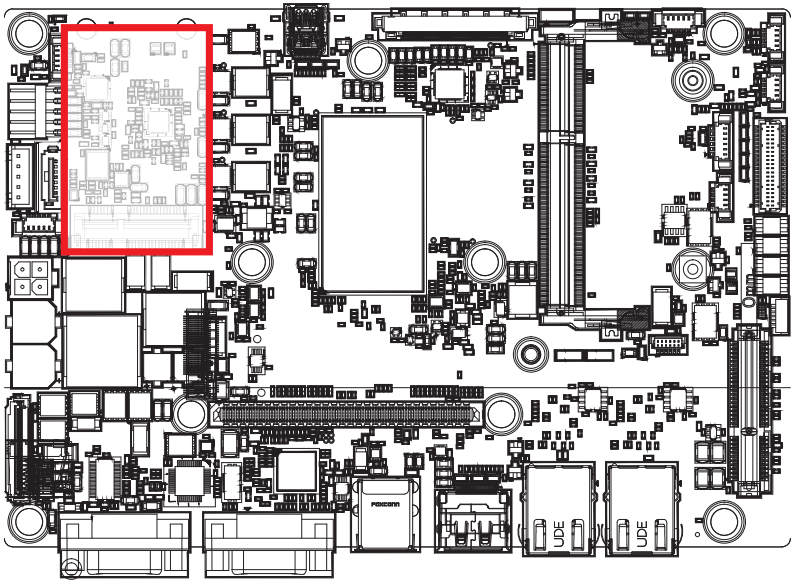
NOTE:

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.



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.

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.

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.

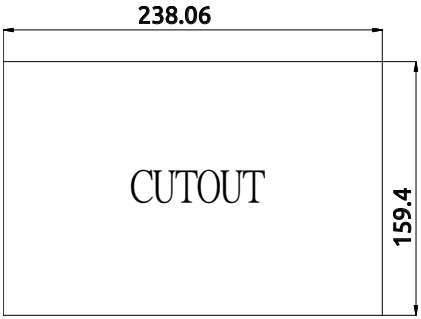


Figure 2-8: PKX-SP2-KL-10 Cutout Dimensions

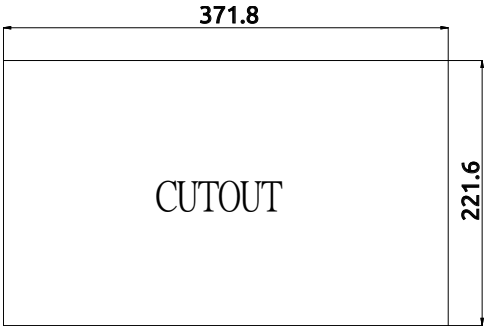


Figure 2-9: PKX-SP2-KL-15 Cutout Dimensions

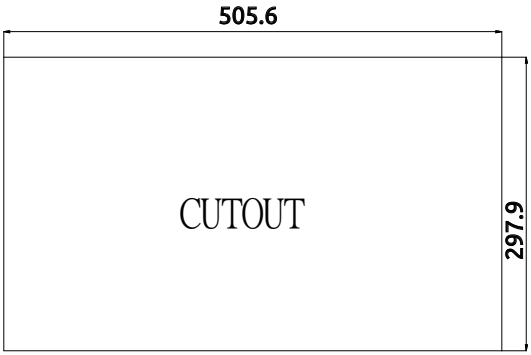
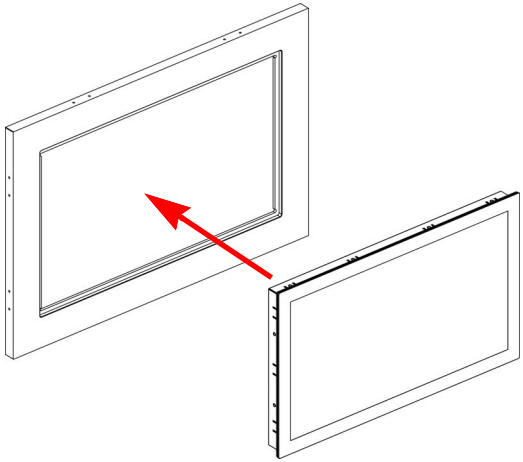


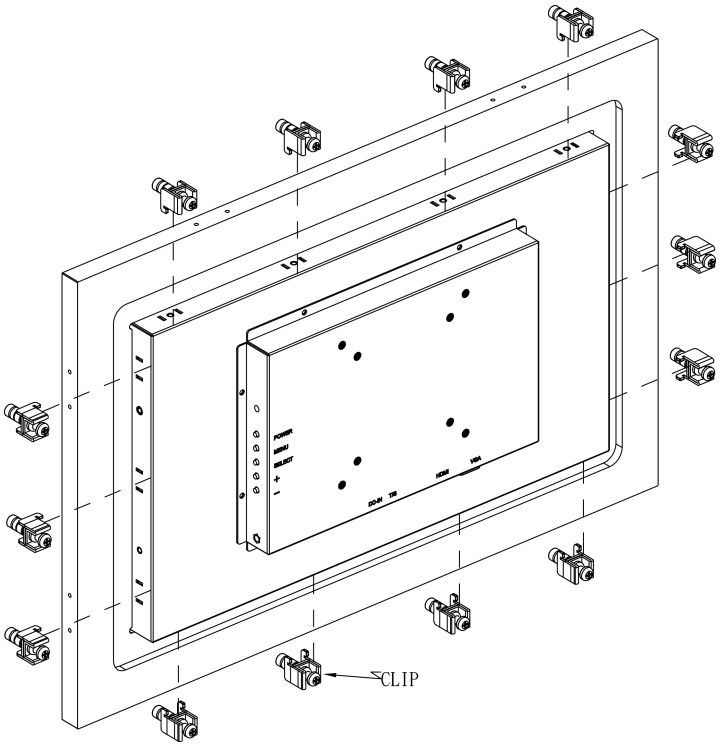
Figure 2-10: PKX-SP2-KL-21 Cutout Dimensions

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.



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.

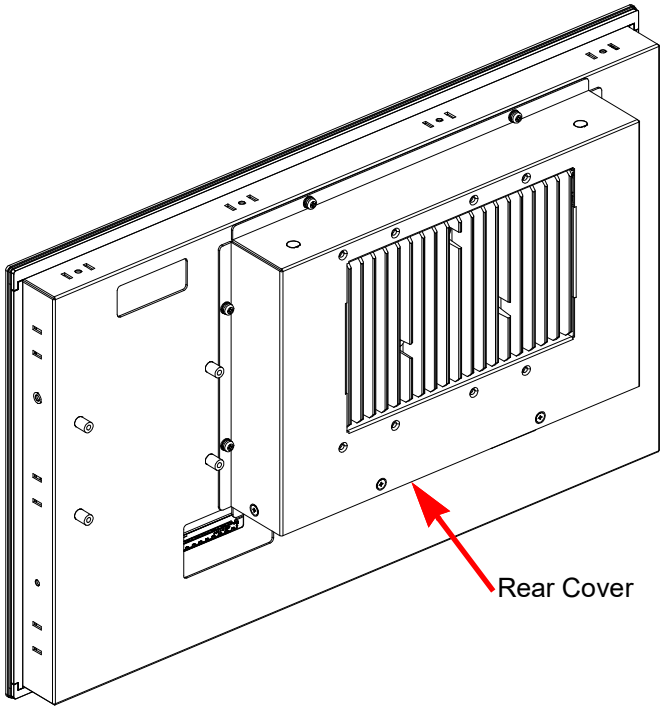
2.9.2 VESA Mounting

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

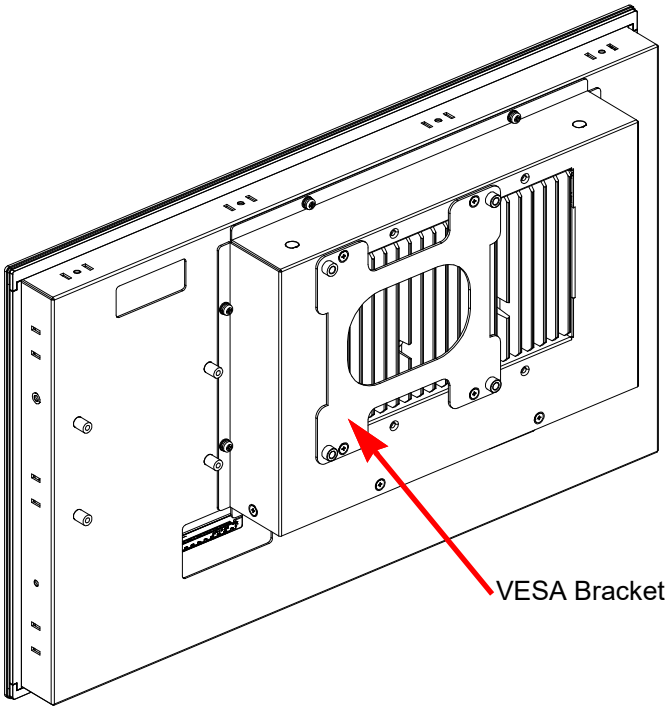
NOTE:

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

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



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.

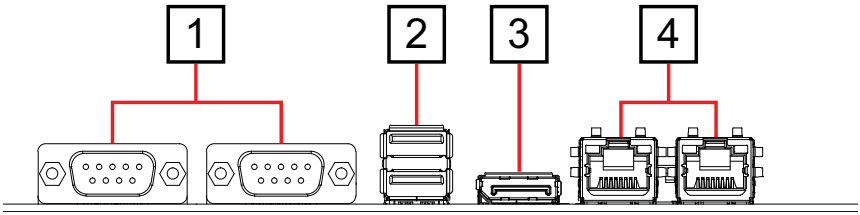


Figure 3-1: PKX-SP2-KL Series External I/O

1	2x DB-9P COM1 port supports RS-232/422/485
2	1x USB 3.2 Gen1 (5Gbps) Type-A 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

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.

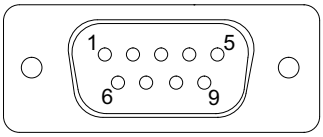


Figure 3-2: COM1 Port Pin Definition

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

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.

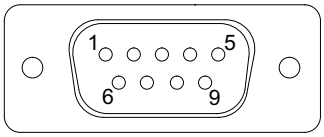


Figure 3-3: COM2 Port Pin Definition

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

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.

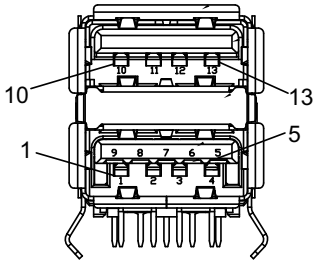


Figure 3-4: USB 3.0 + USB 2.0 Connector Pin Definition

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

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.

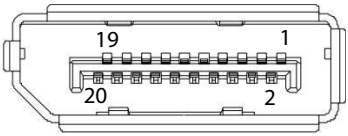


Figure 3-5: DisplayPort Connector Pin Definition

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

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.

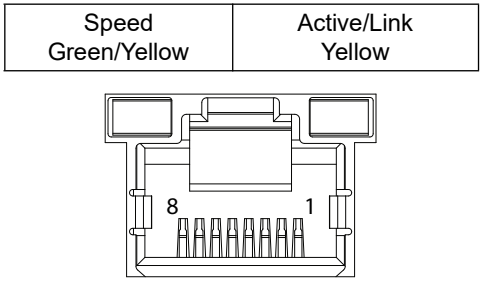


Figure 3-6: Ethernet Port and LEDs

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

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

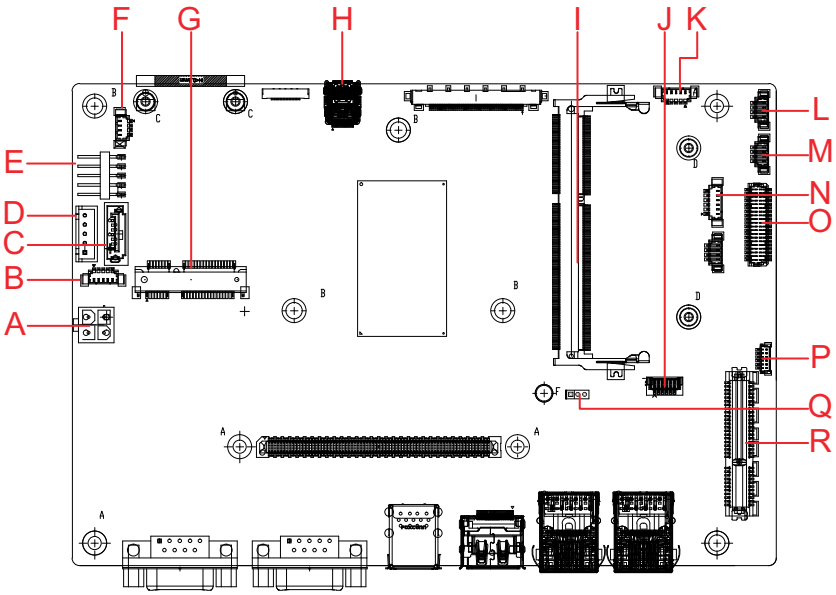


Figure 3-7: Mainboard Connectors (top)

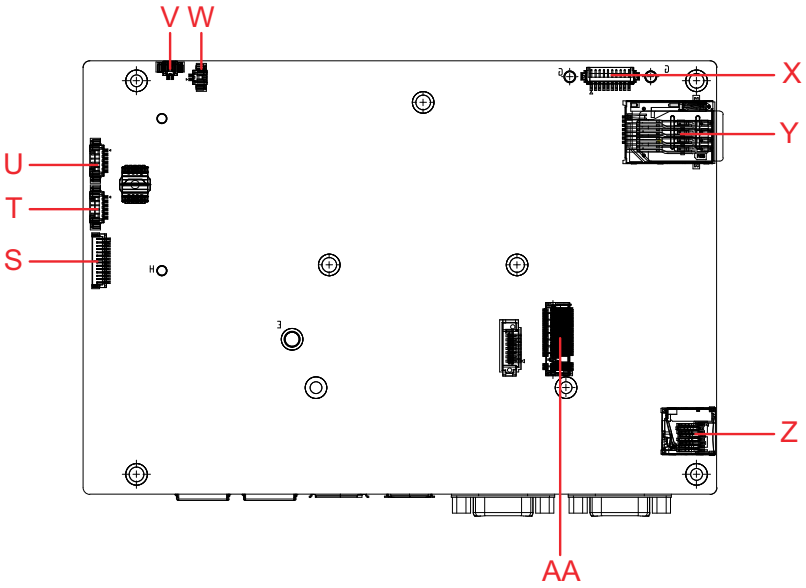


Figure 3-8: Mainboard Connectors (bottom)

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

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).

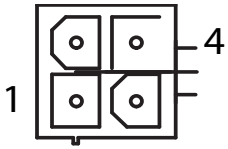


Figure 3-10: Power Connector Pin Definition

Pin	Signal
1	GND
2	GND
3	PWR_CONN_IN
4	PWR_CONN_IN

Table 3-8: Power Connector Pin Definition

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.

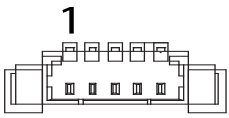


Figure 3-11: Power Connector Pin Definition

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

3.2.4 SATA Data & Power Connectors

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

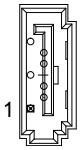


Figure 3-12: SATA Data Connector Pin Definition

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

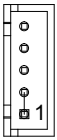


Figure 3-13: SATA Power Connector Pin Definition

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

Table 3-11: SATA Power Connector Pin Definition

3.2.5 Resistive Touch Connector

The USB 2.0 connector supports a a resistive digitizer.

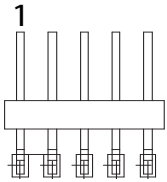


Figure 3-14: Resistive Touch Connector Pin Definition

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.

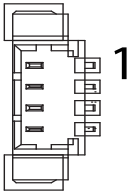


Figure 3-15: Capacitive Touch Connector Pin Definition

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

Table 3-13: Capacitive Touch Connector Pin Definition

3.2.7 Mini PCIe

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

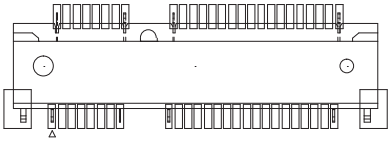


Figure 3-16: Mini PCIe Pin Definition

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

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

3.2.8 Mini DisplayPort Connector

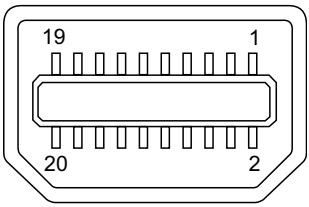


Figure 3-17: Mini DisplayPort Pin Definition

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

3.2.9 USB 2.0 (Camera) Wafer

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

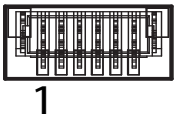


Figure 3-18: USB 2.0 (Camera) Wafer Connector Pin Definition

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

3.2.10 Power/Reset Button

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

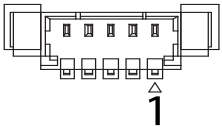


Figure 3-19: Power/Reset Button Connector Pin Definition

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

3.2.11 Mic In/Line Out

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

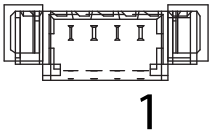


Figure 3-20: Mic In/Line Out Connector Pin Definition

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.

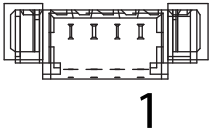


Figure 3-21: Speaker Connector Pin Definition

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

3.2.13 Volume & Backlight Control Connector

Controls volume and adjusts display brightness.

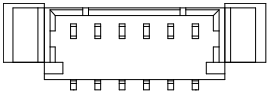


Figure 3-22: Volume & Backlight Control Connector Pin Definition

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

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

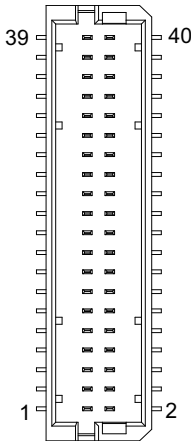


Figure 3-23: Key Connector Pin Definition

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

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)

3.2.17 PCIe x4 Gen3 Connectors (optional)

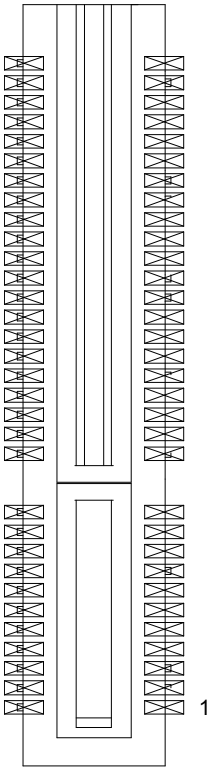


Figure 3-26: PCIe x4 Gen3 Connector Pin Definition

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

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

3.2.18 Speaker Connector

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

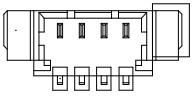


Figure 3-27: Speaker Connector Pin Definition

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

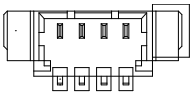


Figure 3-28: Fan Connector Pin Definition

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

Table 3-26: Fan Connector Pin Definition

3.2.20 COM2 Connector

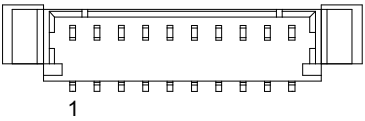


Figure 3-29: COM2 Connector Pin Definition

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

3.2.21 LED Connector

The LED connector supports up to 10 LEDs.

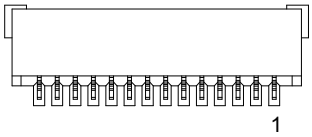


Figure 3-30: LED Connector Pin Definition

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

3.2.22 I2C Connector 1 & 2

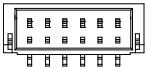


Figure 3-31: I2C Connector 1 & 2 Pin Definition

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

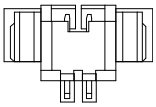


Figure 3-32: Buzzer Connector Pin Definition

Pin	Signal
1	P_+5V_S0
2	N40235133

Table 3-30: Buzzer Connector Pin Definition

3.2.24 RTC Battery Wafer

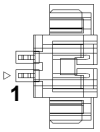


Figure 3-33: RTC Battery Wafer Pin Definition

Pin	Signal
1	P_+VCC_RTC_CN_A
2	GND

Table 3-31: RTC Battery Wafer Pin Definition

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

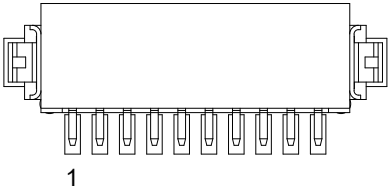


Figure 3-34: GPIO Connector Pin Definition

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

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

Table 3-33: GPIO Connector Pin Voltage

3.2.26 Backup Battery Connector (Optional)

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

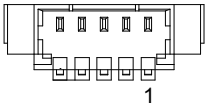


Figure 3-35: Backup Battery Connector Pin Definition

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

3.2.27 SIM Card Connector

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

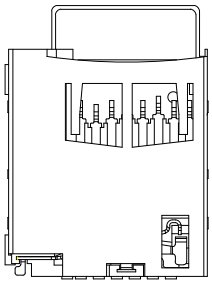


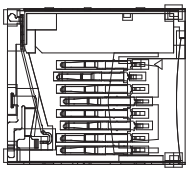
Figure 3-36: SIM Connector Pin Definition

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

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

3.2.29 M.2 2280 SATA SSD Connector

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

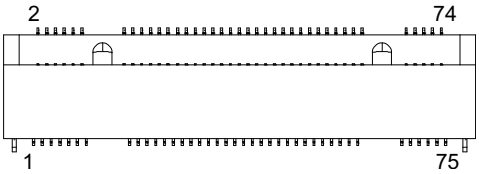


Figure 3-37: M.2 2280 Connector Pin Definition

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

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

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 ']'.

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 - System Information - Board Information	- CPU Configuration ► - Graphics Configuration ► - Power Management ► - System Management ► - Thermal Management ► - Watchdog Timer ► - CSM Configuration ► - Super IO Configuration ► - Serial Console Redirection ► - Network Stack Configuration ► - Trusted Computing ► - USB Configuration ►

Chipset	Security
- System Agent (SA) Configuration ► - PCH-IO Configuration ►	- Secure Boot menu

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


NOTE:

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

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

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

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.

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 C1 C3 **C1 and C3**	Configure C-State Auto Demotion
C-State Un-demotion	Disabled C1 C3 **C1 and C3**	Configure C-State Un-demotion
Package C-State Demotion	Disabled Enabled **Auto**	Enable or Disable Package C-State Demotion. Auto: Enabled for Skylake; Disabled for Kabylake
Package C-State Un-demotion	Disabled Enabled **Auto**	Enable or Disable Package C-State UnDemotion. Auto: Enabled for Skylake; Disabled for Kabylake
DTS SMM	Disabled **Enabled** Critical Temp Reporting (Out Of spec)	Disabled: ACPI thermal management uses EC reported temperature values.

4.4.2 Advanced > Graphics Configuration

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

Feature	Options	Description
LFP Panel Type	Auto 640x480 800x600 1024x768 1280x1024 1400x1050 LVDS1 1400x1050 LVDS2 1600x1200 1366x768 1680x1050 1920x1200 1440x900 1600x900 **1280x800** 1920x1080 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** Enabled	Enables/Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled **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 **S3 (Suspend to RAM)**	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
PCIE Wake	Disabled **Enabled**	Enables/Disables PCIe wake function
RI Wake	Disabled **Enabled**	

Feature	Options	Description
RTC Wake system from S5	**Disabled** Fixed Time Dynamic Time	Enable or disable System wake on alarm event. FixedTime: system will wake on the hr::min::sec specified. Select DynamicTime: system will wake on the current time + Increase minute(s)
Wake up hour	**0x00**	Wake up hour in hex. Range: 0x00-0x17 in increments of 0x01 (0-23 hrs, 1 hr increments)
Wake up minute	**0x00**	Wake up hour in hex. Range: 0x00-0x3B in increments of 0x01 (0-59 mins, 1 min increments)
Wake up second	**0x00**	Wake up second in hex. 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. Range: 0x00-0x05 in increments of 0x01 (0-5 min, 1 min increments)
Emulation AT/ATX	Emulation AT **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	

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

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

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** 60 C 70 C 80 C	This value is the temperature threshold of the Critical Trip Point.

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

4.4.9 Advanced > Watchdog Timer

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

Feature	Options	Description
Storage	Do not launch **UEFI** Legacy	Controls the execution of UEFI and Legacy Storage OpROM
Video	Do not launch **UEFI** Legacy	Controls the execution of UEFI and Legacy Video OpROM
Other PCI devices	Do not launch UEFI **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	

4.4.12 Advanced > Super IO Configuration > Serial Port 1 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enables/Disables the serial port (COM)
Device Settings	IO=3F8h; IRQ=4	
Change Settings	**Auto** IO=3F8h; IRQ=4 IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12	Selects optimal settings for Super IO Device
COM1 Control	**RS232** RS422 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 **Enabled**	Enables/Disables the serial port (COM)
Device Settings	IO=2F8h; IRQ=3	
Change Settings	**Auto** IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12	Selects optimal settings for Super IO Device

Feature	Options	Description
COM2 Control	**RS232** RS422 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** Enabled	Enables/Disables the serial port (COM)
Device Settings	Reset Required	
Change Settings	Auto IO=3E8h; IRQ=7; IO=3F8h; IRQ=3,4,5,6,7,9,**10**,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,**10**,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,**10**,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,**10**,11,12 IO=220h; IRQ=3,4,5,6,7,9,**10**,11,12 IO=228h; 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** Enabled	Enables/Disables the serial port (COM)
Device Settings	Reset Required	

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

4.4.16 Advanced > Serial Console Redirection

Feature	Options	Description
COM0		
Console Redirection	**Disabled** Enabled	Enables/Disables console redirection on COM0 port.
Console Redirection Settings ►	Sub-Menu	
COM1		
Console Redirection	**Disabled** 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 VT100Plus VT-UTF8 **ANSI**	Emulation: ANSI: Extended ASCII character set. VT100: ASCII character set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 **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 **8**	Data Bits.

Feature	Options	Description
Parity	**None** Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd Mark: Parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	**1** 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** 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 **Enabled**	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	**Disabled** Enabled	With this mode enabled only text will be sent. This is to capture terminal data.
Resolution 100x31	**Disabled** Enabled	Enables/Disables extended terminal resolution
Putty KeyPad	**VT100** LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

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

Feature	Options	Description
Terminal Type	VT100 VT100Plus VT-UTF8 **ANSI**	Emulation: ANSI: Extended ASCII character set. VT100: ASCII character set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 **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 **8**	Data Bits.
Parity	**None** Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: Parity bit is 0 if num of 1's in the data bits is odd Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	**1** 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** 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

Feature	Options	Description
VT-UTF8 Combo Key Support	Disabled **Enabled**	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	**Disabled** Enabled	With this mode enabled only text will be sent. This is to capture terminal data.
Resolution 100x31	**Disabled** Enabled	Enables/Disables extended terminal resolution
Putty KeyPad	**VT100** LINUX XTERMR6 SCO ESCN 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** COM1 COM2 COM3 (Disabled)	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages
Resolution	**80x24** 80x25	On Legacy OS, the Number of Rows and Columns supported redirection
Redirect After POST	**Always Enable** 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.

4.4.20 Advanced > Miscellaneous > Network Stack Configuration

Feature	Options	Description
Network Stack	**Disabled** Enabled	Enables/Disables UEFI Network Stack
IPv4 PXE Support	**Disabled** Enabled	Enables/Disables IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
IPv6 PXE Support	**Disabled** 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 **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 **Enabled**	Enable/Disable Security Device. NOTE: Your Computer will reboot during restart in order to change State of the Device.
Pending operation	**None** 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 **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.

Feature	Options	Description
TCM State	Disabled **Enabled**	Enable/Disable Security Device. NOTE: Your Computer will reboot during restart in order to change State of the Device.
Pending operation*	**None** 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 TPM 2.0 **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 **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** Enabled	Enable or Disable SHA-1 PCR Bank
SHA256 PCR Bank	Disabled **Enabled**	Enable or Disable SHA256 PCR Bank
SHA384 PCR Bank	**Disabled** Enabled	Enable or Disable SHA384 PCR Bank

Feature	Options	Description
SHA512 PCR Bank	**Disabled** Enabled	Enable or Disable SHA512 PCR Bank
SM3_256 PCR Bank	**Disabled** Enabled	Enable or Disable SM3_256 PCR Bank
Pending operation	**None** 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 **Enabled**	Enable or Disable Platform Hierarchy
Storage Hierarchy	Disabled **Enabled**	Enable or Disable Storage Hierarchy
Endorsement Hierarchy	Disabled **Enabled**	Enable or Disable Endorsement Hierarchy
TPM 2.0 UEFI Spec Version	TCG_1_2 **TCG_2**	Select the TCG2 Spec Version Support,
Physical Presence Spec Version	1.2 **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** TIS	Select the Communication Interface to TPM 20 Device.
Device Select*	TPM 1.2 TPM 2.0 **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** 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 **Enabled**	Enables/Disables USB Mass Storage Driver Support.
USB hardware delays and time-outs:		

Feature	Options	Description
USB transfer time-out	1 sec 5 sec 10 sec **20 sec**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec **20 sec** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	**Auto** 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)

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 **Enabled**	VT-d capability
Above 4GB MMIO BIOS assignment	Enabled **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

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

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

Feature	Options	Description
DVMT Pre-Allocated	0M 32M 64M 4M 8M 12M 16M 20M 24M 28M **32M**/F7 36M 40M 44M 48M 52M 56M 60M	Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	**256M** 128M MAX	Select DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
Gfx Low Power Mode	**Enabled** 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
SerialIo Configuration ►	Sub Menu	Serial IO Configuration

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	

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

Feature	Options	Description
SATA And RST Configuration	Info Only	
SATA Controller(s)	**Enabled** Disabled	Enable/Disable SATA Device.
SATA Mode Selection	**AHCI** Intel RST Premium With Intel Optane System Acceleration	Determines how SATA controller(s) operate.
SATA Test Mode	Enabled **Disabled**	Toggle SATA loopback for testing
SATA Controller Speed	**Default** Gen1 Gen2 Gen3	Indicates the maximum speed the SATA controller can support.
Serial ATA Port 0	Empty	
Software Preserve	Unknown	
Port 0	Disabled **Enabled**	Enable or Disable SATA Port
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Configured as eSATA	Hot Plug supported	
Spin Up Device	**Disabled** 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** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
SATA Port 0 DevSlp	**Disabled** Enabled	Toggle SATA Port 0 DevSlp. Not available on all variants.

Feature	Options	Description
DITO Configuration	**Disabled** 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 **Enabled**	Enable or Disable SATA Port
Hot Plug	**Disabled** Enabled	Designates this port as Hot Pluggable.
Configured as eSATA	Hot Plug supported	
Spin Up Device	**Disabled** 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** Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive
SATA Port 1 DevSlp	**Disabled** Enabled	Toggle SATA Port 1 DevSlp. Not available on all variants.
DITO Configuration	**Disabled** 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.

4.5.7 Chipset > PCH-IO Configuration > USB Configuration

Feature	Options	Description
XHCI Disable Compliance Mode	**FALSE** TRUE	Options to disable Compliance Mode. Set TRUE to disable Compliance Mode.
xDCI Support	**Disabled** Enabled	Enable/Disable xDCI (USB OTG Device).
USB Port Disable Override	**Disabled** Select Per-Pin	Selectively Enable/Disable the corresponding USB port from reporting a Device Connection to the controller.
USB SS Physical Connector #0	Disabled **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 **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 **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 **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.

Feature	Options	Description
USB SS Physical Connector #4	Disabled **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 **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 **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 **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 **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 **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.

Feature	Options	Description
USB HS Physical Connector #0	Disabled **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 **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 **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 **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 **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** 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.

Feature	Options	Description
USB HS Physical Connector #6	**Enabled** 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** 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** 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** Enabled	Enable will lock bytes 38h-3Fh in the lower/upper 128-byte bank of RTC RAM
BIOS Lock	**Disabled** Enabled	Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.
CLKRUN# logic	**Disabled** Enabled	Enable the CLKRUN# logic to stop PCI clocks for power saving.
Serial IRQ Mode	Quiet **Continuous**	Configure Serial IRQ Mode.

Feature	Options	Description
State After G3	**S0 State** 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 Enabled **Auto**	Control Detection of the HD-Audio device.
Audio Output Selection	Speaker-out **Line out**	Audio Output Selection

4.5.10 Chipset > PCH-IO Configuration > SerialIO Configuration

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

4.6 Security

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

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 **Off**	Selects the keyboard NumLock state.
Quiet Boot	Disabled **Enabled**	Enables/Disables Quiet Boot option.
Fast Boot	**Disabled** 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.

Feature	Options		Description
Boot Option #1	Hard Disk NVME CD/DVD SD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network 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**	

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	

4.8 Save & Exit

Feature	Options	Description
Save Changes and Exit	Yes No	Exits system setup after saving the changes.
Discard Changes and Exit	Yes No	Exits system setup without saving any changes.
Save Changes and Reset	Yes No	Resets the system after saving the changes.
Discard Changes and Reset	Yes No	Resets system setup without saving any changes.
Save Options	Info only	
Save Changes	Yes No	Saves changes done so far to any of the setup options.
Discard Changes	Yes No	Discards changes done so far to any of the setup options.
Restore Defaults	Yes No	Restores/Loads default values for all the setup options.
Save as User Defaults	Yes No	Saves the changes done so far as User Defaults.
Restore User Defaults	Yes 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.

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.

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.

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.

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.

- 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** Touching this surface could result in bodily injury. To reduce risk, allow the surface to cool before touching.

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).*

- *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.*

- *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*** ***Partie chaude!*** *Ne touchez pas cette surface, cela pourrait entraîner des blessures. Pour éviter tout danger, laissez la surface refroidir avant de la toucher.*

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.

Getting Service

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

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