SP2-EHL Series

User's Manual

Open-Frame Panel PC



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Leading EDGE COMPUTING

Revision History

Revision	Description	Date
1.0	Initial release	2023-10-16
1.1	System layout updated	2025-03-05

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Preface

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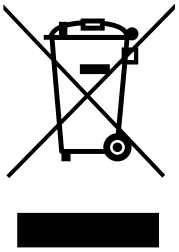
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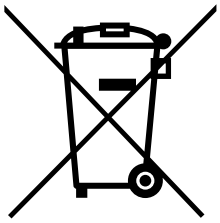
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Conventions

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



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



CAUTION: Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.



WARNING: Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

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Table of Contents

Preface iii

List of Figures vii

List of Tables vii

1 Introduction 9

1.1 Overview 9

1.2 Features 9

1.3 Package Contents 9

1.4 Optional Accessories 9

2 Specifications 11

2.1 Product Specifications 11

2.2 Functional Block Diagram 13

3 Mechanical Layout 15

3.1 SP2-7WP Dimensions 15

3.2 Thermal Options 18

4 Getting Started 21

4.1 Adding or Changing Memory 21

4.2 Installing a Wi-Fi-Module 22

4.3 Mounting 23

5 System Layout 29

5.1 External I/O Connectors 29

5.2 Internal I/O Connectors 29

6 Connector Pinouts and Jumper Settings 33

6.1 Power Connector 33

6.2 SATA Power Connector 33

6.3 SATA Data Connector 33

6.4 Resistive Touch Connector 33

6.5 Capacitative Touch Connector 34

6.6 Mini PCIe Connector 34

6.7 M.2 2230, E Key for Wi-Fi/Bluetooth Modules 35

6.8 Function Module Board Connector 36

6.9 LVDS/eDP Connector 37

6.10 Power/Reset/LED Button 38

6.11 Buzzer Connector 38

6.12 Mic In/Line Out Connector 38

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

6.13 Speaker Connector 39
6.14 Camera Connector 39
6.15 USB 2.0 Connector 39
6.16 Volume & Backlight Control Connector 39
6.17 Key Connector 40
6.18 Fan Connector 40
6.19 Clear CMOS Jumper 40
6.20 LAN2 Connector 41
6.21 COM2 Connector 41
6.22 COM1 Connector 41
6.23 LED Connector 42
6.24 I²C Connector-1 42
6.25 I²C Connector-2 42
6.26 RTC Battery Connector 42
6.27 DB40 Connector 43
6.28 GPIO Connector 43
6.29 UPS Connector 45
6.30 M.2 M Key Connector 45

7 BIOS Settings 47

7.1 BIOS Setup Menu 47
7.2 ADLINK Unique Settings 48

8 Driver Installation 49

8.1 Driver Installation Steps 49

Safety Instructions 51

Getting Services 53

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List of Figures

Figure 1: Functional block diagram....13
Figure 2: SP2-7WP dimensions....15
Figure 3: SP2-10WP dimensions....16
Figure 4: SP2-15WP dimensions....17
Figure 5: SP2-21WP dimensions....17
Figure 6: Active Cooling Heatsink....18
Figure 7: Heatsink dimensions....19
Figure 8: Cable routing considerations for heatsinks....20
Figure 9: SP2-7WP cutout dimensions....24
Figure 10: SP2-10WP cutout dimensions....24
Figure 11: Mounting clip dimensions....26
Figure 12: External I/O connectors....29
Figure 13: Mainboard connectors (Top)....30
Figure 14: Mainboard connectors (Bottom)....30
Figure 15: Digital input circuit....44
Figure 16: Digital output circuit....45

List of Tables

Table 1: Heatsink components....18
Table 2: External I/O legend....29
Table 3: Mainboard connector legend....31
Table 4: GPIO connector pin voltage....44

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1 Introduction

1.1 Overview

The SP2-EHL Series open-frame panel PC is based on the ultra- low-power Intel Atom® x6000E series processors (formerly Elkhart Lake) featuring flexible IO options. The SP2-EHL Series features efficient capabilities and compact size that are easy to integrate with kiosk and panel PC applications.

1.2 Features

- High power efficiency with Intel Atom® x6000E series processors (formerly Elkhart Lake)
- Extensive I/O and function expansion through wire-to-board connectors and custom function modules
- Comprehensive expansion and customization options for fast and easy integration with all form factors, kiosks, and all-in-one panel PC applications
- Enhanced protection in case of sudden power outage with support for back-up battery (Optional)
- Pre-compliance EMC testing and high ESD tolerance
- High reliability in case of power fluctuation with an optional 9-36V DC voltage range
- Simple cabling with optional 60W Power Over Ethernet module
- Supports up to 3 displays, including integrated panel, DisplayPort, and USB Type-C (Optional)

1.3 Package Contents

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 SP2-EHL Series Smart Panel

1.4 Optional Accessories

- Panel-mount clip kit
- VESA kit
- Rear cover
- Active sink
- Wi-Fi module
- 60W (12V/5A) or 84W (12V/7A) power supply
- Power cable (SP2-EHL to power supply)
- Cables for internal IO expansion
- Function Modules
- SP FM
- Titan FM
- USB FM



The contents of non-standard cPCI-3630 configurations may vary depending on the customer's requirements.

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2 Specifications

2.1 Product Specifications

Model	SP2-07WP-EHL	SP2-10WP-EHL	SP2-15WP-EHL	SP2-21WP-EHL
Processor	Intel Atom® x6425E, 2.0(3.0) GHz, 12W, 4C/32EU Intel Atom® x6413E, 1.5(3.0) GHz, 9W, 4C/16EU Intel Atom® x6211E, 1.2(3.0) GHz, 6W, 2C/16EU Intel Atom® J6412, 2.0(2.6) GHz, 10W, 4C/16EU			
Memory	1x SODIMM socket, DDR4 3200MHz (Up to 32GB)			
Storage	1x M.2 SATA M key 2280, support SATA SSD and NVME (PCIe x2) 1x 2.5” SSD/HDD SATA 6 Gbps port			
Display and Touch				
Size	7”	10.1"	15.6”	21.5”
Resolution	1024 x 600	1280 x 800	1920 x 1080	1920 x 1080
Contrast Ratio	600:1	800:1	1000:1	1000:1
Brightness (Nits)	600 cd/m^2 (typ.)	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)	85/85/85/85	89/89/89/89		
Touch Points	5 points	10 points		
Touch Structure	Glass/Glass			
Surface Hardness	7H			
Surface Treatment	Clear	Anti-Fingerprint coating		
External I/O				
Ethernet	2x GbE (Intel® I226), RJ-45, WOL (Default 1Gbps, optional: 2.5Gbps)			
USB Ports	2x USB 3.2, Gen 1 (5 Gbps), OCP, Type A 2x USB 2.0, OCP, Type A 1x USB 3.1 Gen 1, Type C (optional)			
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			
Internal I/O with Wire to Board Connectors				
USB Port	2x USB 2.0 client, wafer			
COM port	2x RS-232/422/485 programmable, auto flow (wire to connectors) Default: COM 1, COM 2: BOM optional			
I^{2}C	2x for I^{2}C client			
Audio (Optional)	1x for 2x stereo speaker (2 watts) 1x Mic-in and Line-out 1x buzzer			
Keys	1x for 32 GPIO or physical keys (Optional), 1x LCD backlight up/down and volume up/down (BOM optional)			
GPIO	1x 8-pin GPIO			
mPCIe	1x full size mPCIe slot			
M.2 2230 slot	1x M.2 2230 E key for wireless (Wi-Fi/Bluetooth)			

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Model	SP2-07WP-EHL	SP2-10WP-EHL	SP2-15WP-EHL	SP2-21WP-EHL
Power				
Power Input	AT/ATX (default: AT mode) 12V ±5%, (optional: 9-36VDC), both with OVP/UVP protection			
Power Connector	1x 6-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				
Temperature SP2-EHL-J6412	Operating: 0°C to 60°C Storage: -20°C to 70°C			
Temperature SP2-EHL-x6211E SP2-EHL-x6213E SP2-EHL-x6425E	Operating: -20°C to 60°C Storage: -20°C to 70°C			Operating: 0°C to 60°C Storage: -20°C to 60°C
Humidity	Up 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 Certifications	CE/FCC class B EN 55032:2015 + A11:2020; EN 55035:2017 + A11:2020; BS EN 55032:2015 + A11:2020; BS EN 55035:2017 + A11:2020; AS/NZS CISPR 32:2015 + A1:2020 EN 60601-1-2:2015 + A1:2021; IEC 60601-1-2:2014 + A1:2020 BS EN 60601-1-2:2015 + A1:2021 IEC/EN 61000-3-2, IEC/EN 61000-3-3			
EMC/Safety Compliance	EN 61000-6-4, EN 61000-6-2, EN 50121-3-2 IEC/EN 60601-1 IEC/EN 62368-1 2nd FCC Part 15 Subpart B ICES-003, Issue 7, October 15, 2020			
Software				
Supported	Supported			
Windows ® 10 IoT Enterprise x64 bit Ubuntu Linux 22.04 LTS	Windows ® 10 IoT Enterprise x64 bit Ubuntu Linux 22.04 LTS			
Mechanical				
Size	7”	10.1”	15.6”	21.5”
Construction	SGCC			
Dimensions (HxWxD)	216 x 160 x 54.54 ± 2	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	1.09 ±0.2kg	1.5 ±0.2kg	2.63 ±0.2kg	4.86 ±0.2kg
Mounting (Optional)	Panel Mounting VESA mounting (requires optional rear cover)			
Power				
Power Supply Options	60W (12V/5A) 84W (12V/7A) DC Input Options: 12V DC (default) or 9-36V DC (optional) input are supported.			

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2.2 Functional Block Diagram

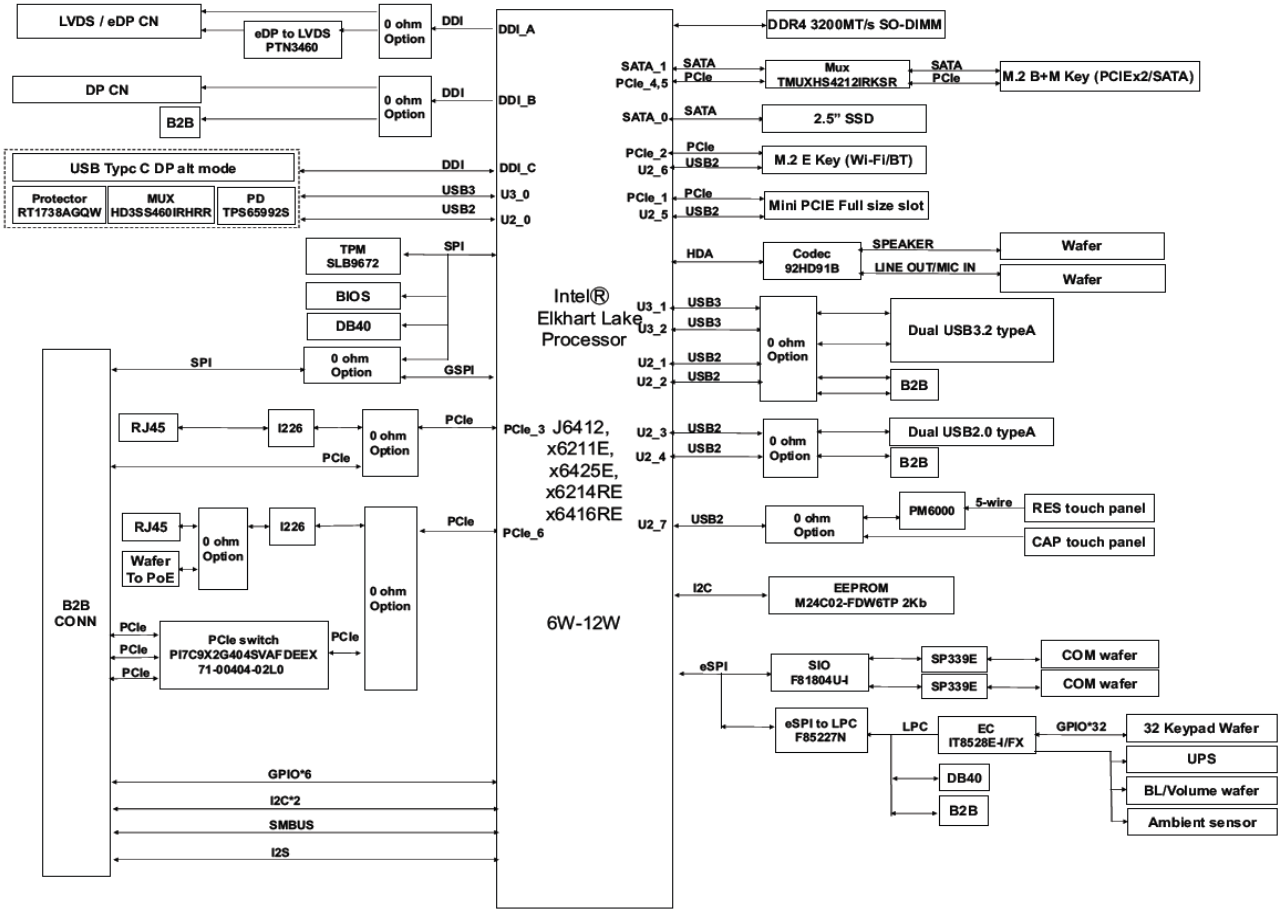


Figure 1: Functional block diagram

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3 Mechanical Layout

3.1 SP2-7WP Dimensions

NOTE:

All dimensions are in millimeters, unless noted.

3.1.1 SP2-7WP Dimensions

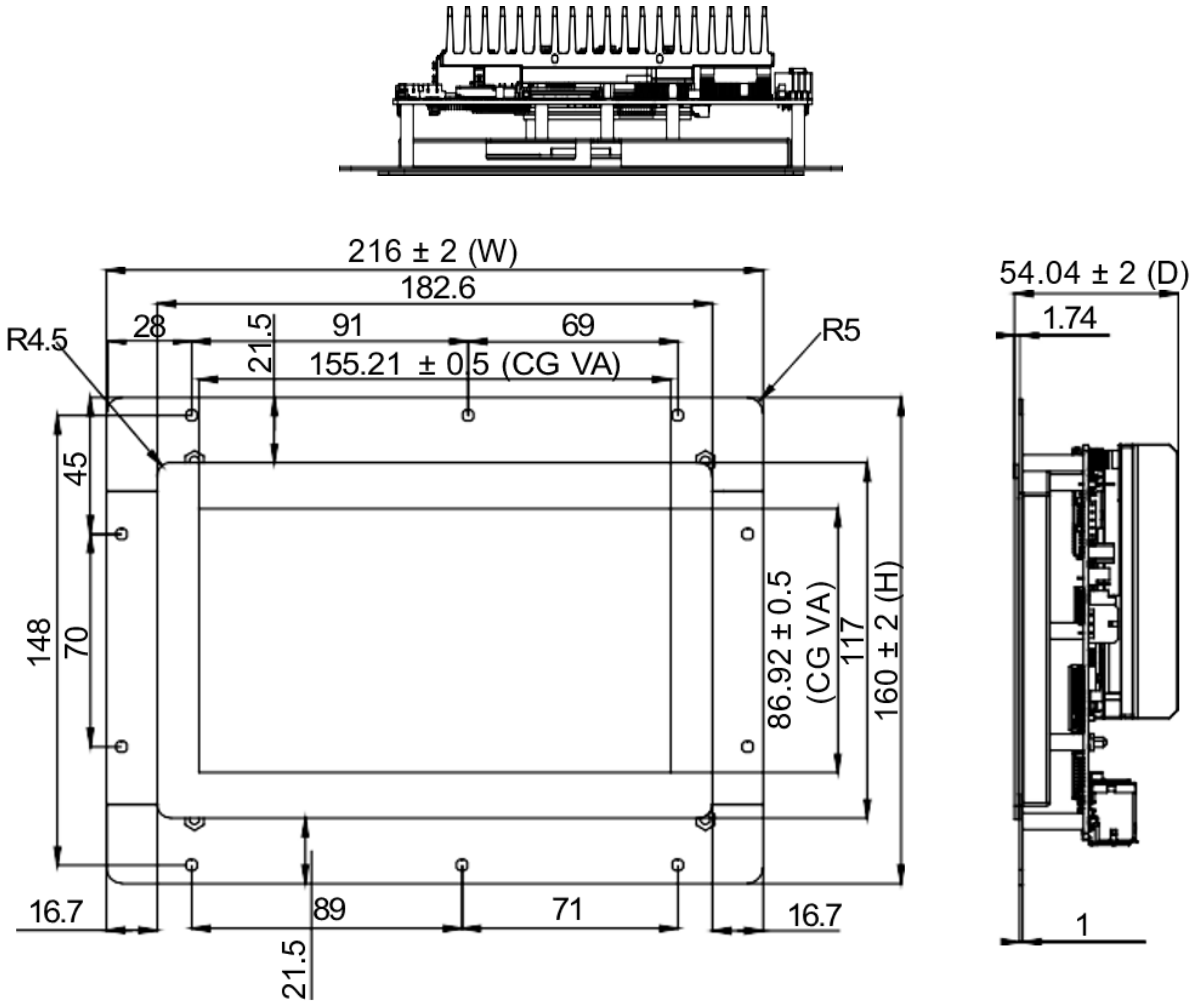


Figure 2: SP2-7WP dimensions

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3.1.2 SP2-10WP Dimensions

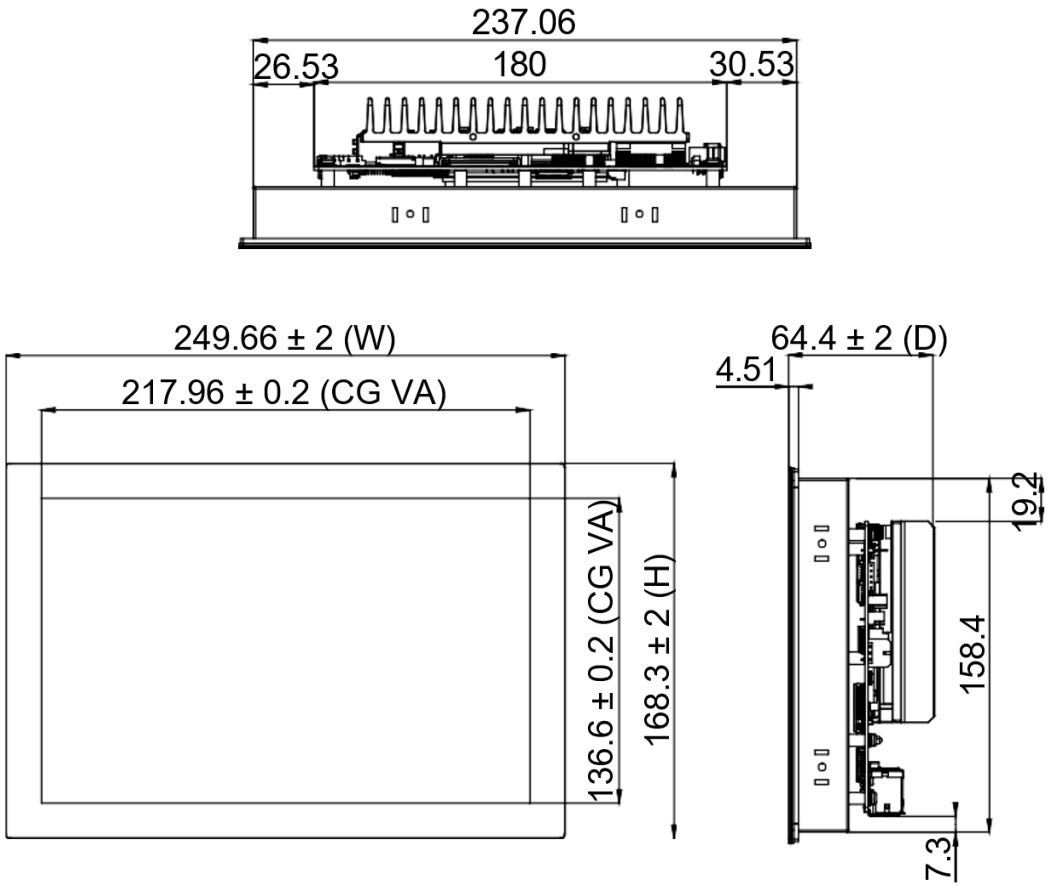
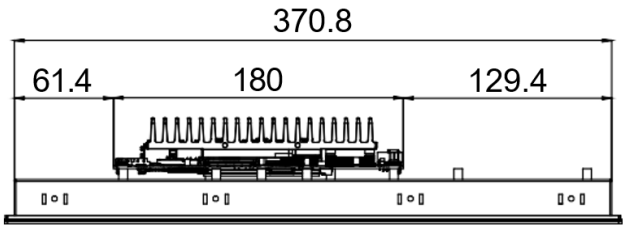


Figure 3: SP2-10WP dimensions

3.1.3 SP2-15WP Dimensions



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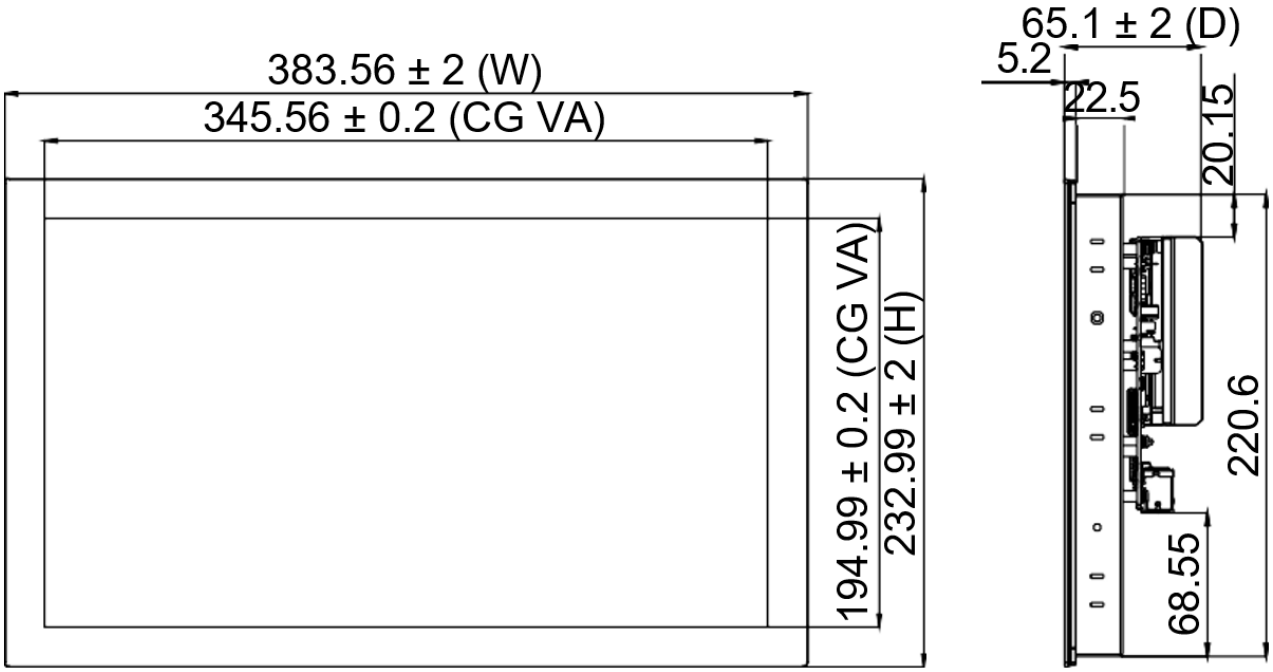


Figure 4: SP2-15WP dimensions

3.1.4 SP2-21WP Dimensions

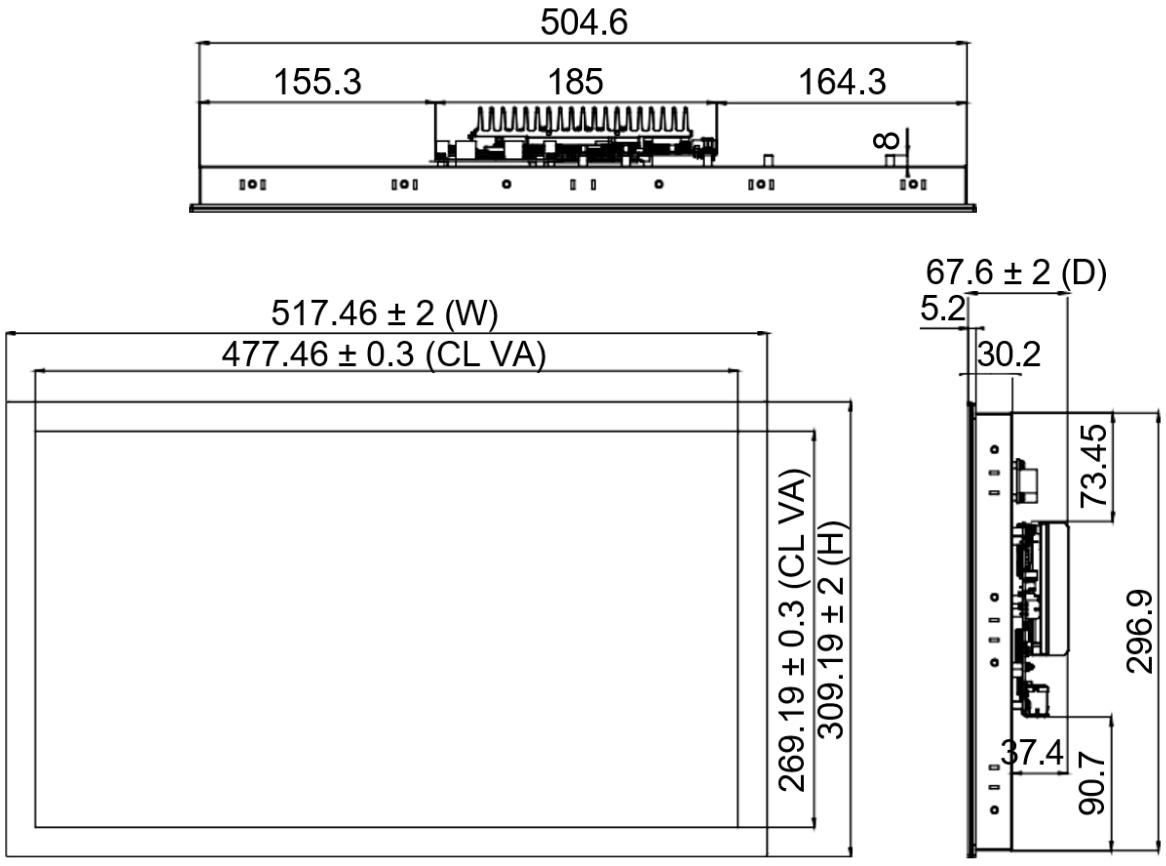


Figure 5: SP2-21WP dimensions

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3.2 Thermal Options

3.2.1 Active Cooling Heatsink

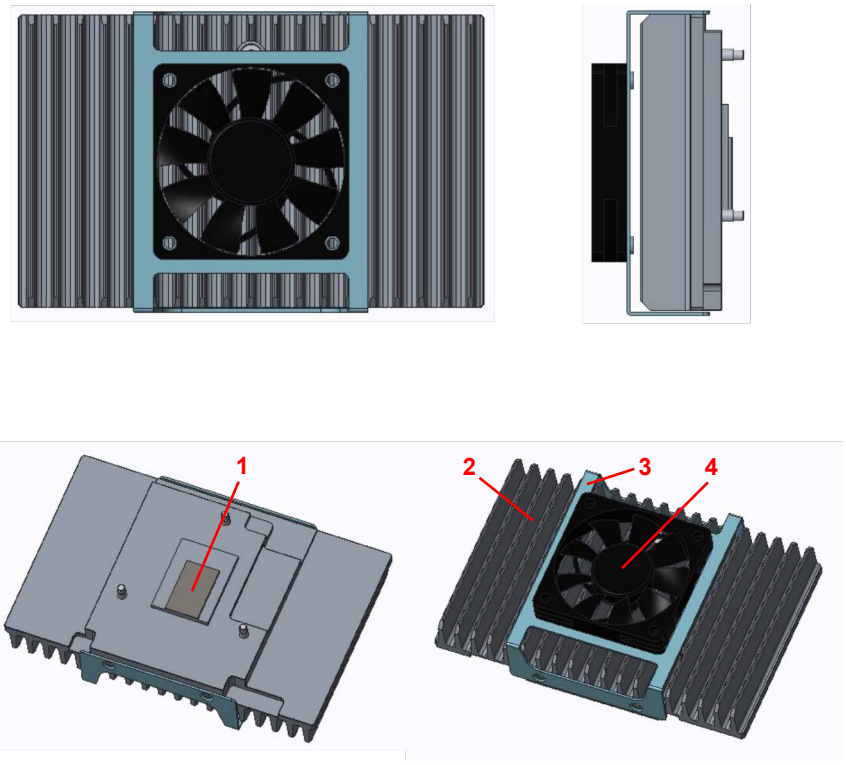


Figure 6: Active Cooling Heatsink

Table 1: Heatsink components

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

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3.2.2 Heatsink Dimensions

NOTE:

All dimensions are in millimeters, unless noted.

CAUTION:

Due to radiant heat from the passive heatsink, make sure the heatsink is positioned at least 10cm from the nearest wall.

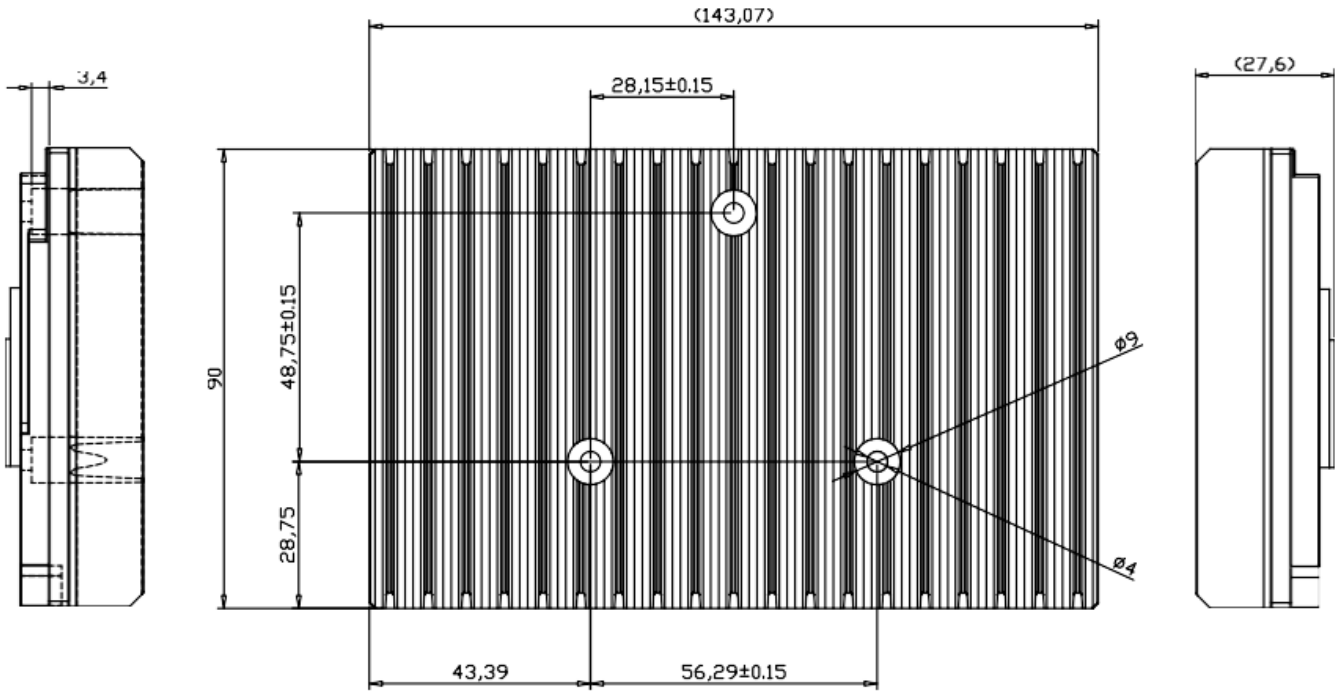


Figure 7: Heatsink dimensions

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3.2.3 Cable Routing Considerations for Heatsinks

Cable routing should avoid high temperature areas as shown below.

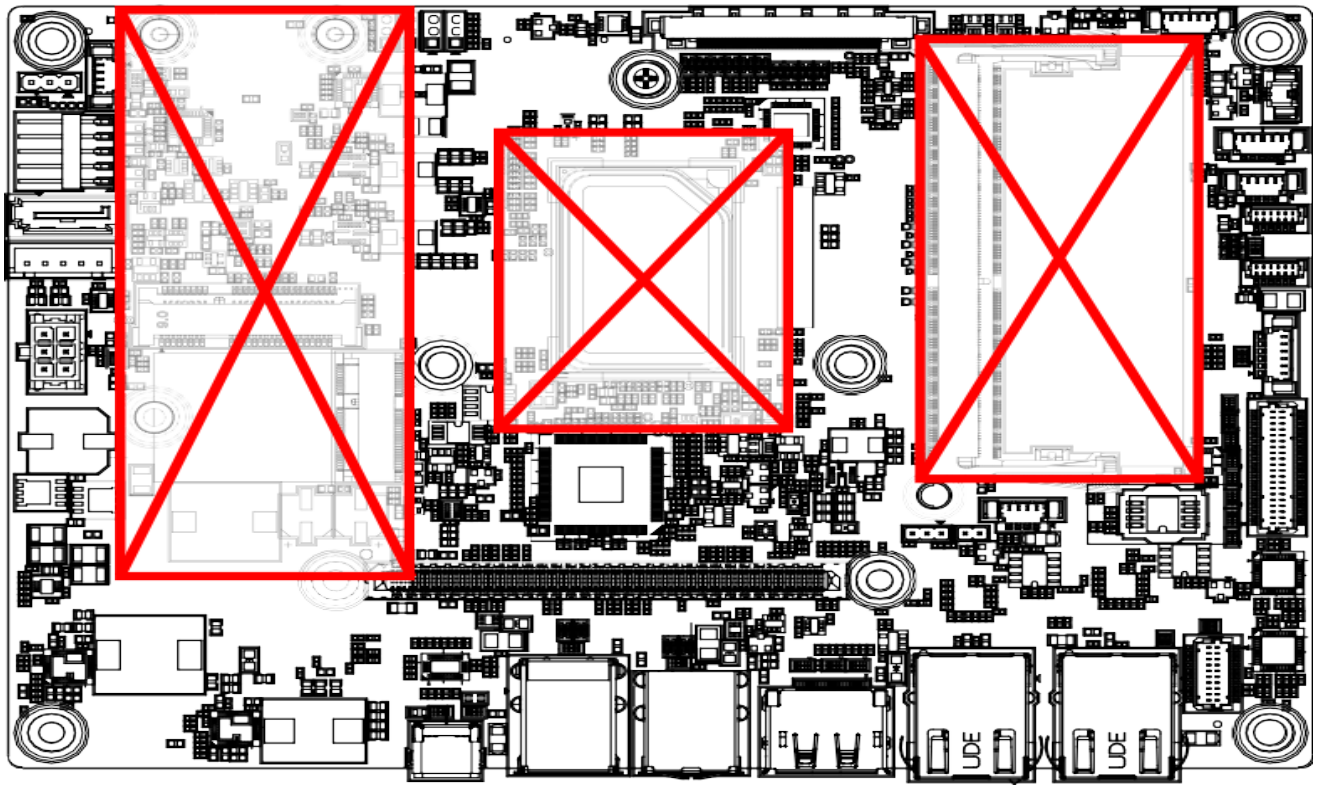


Figure 8: Cable routing considerations for heatsinks

NOTE:

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

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

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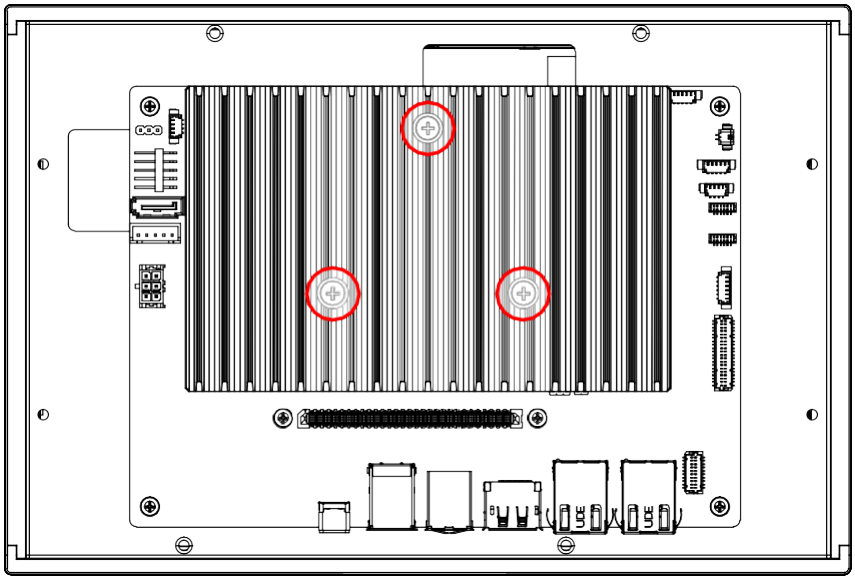
4 Getting Started

Follow the instructions in this chapter to add or change memory; Wi-Fi modules, mounting brackets, and mounting clips.

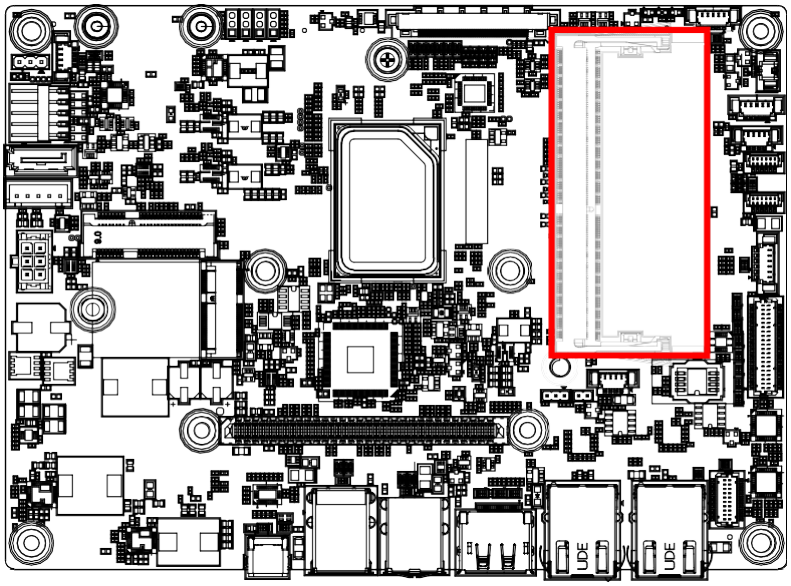
4.1 Adding or Changing Memory

Follow these steps to add or change memory modules.

1. Remove the 3 screws that attach the heatsink to the mainboard, and then remove the heatsink.



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



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

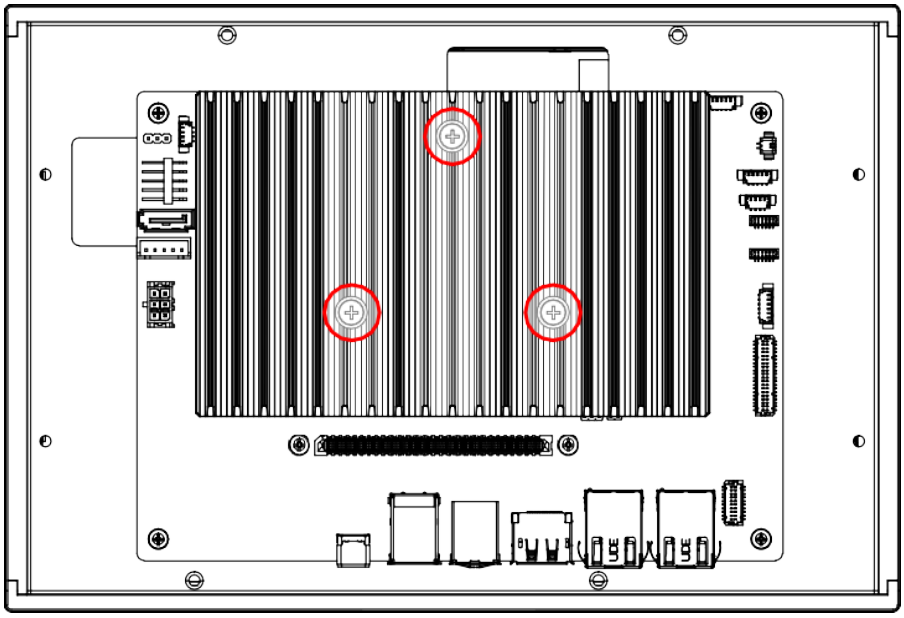
4.2 Installing a Wi-Fi-Module

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

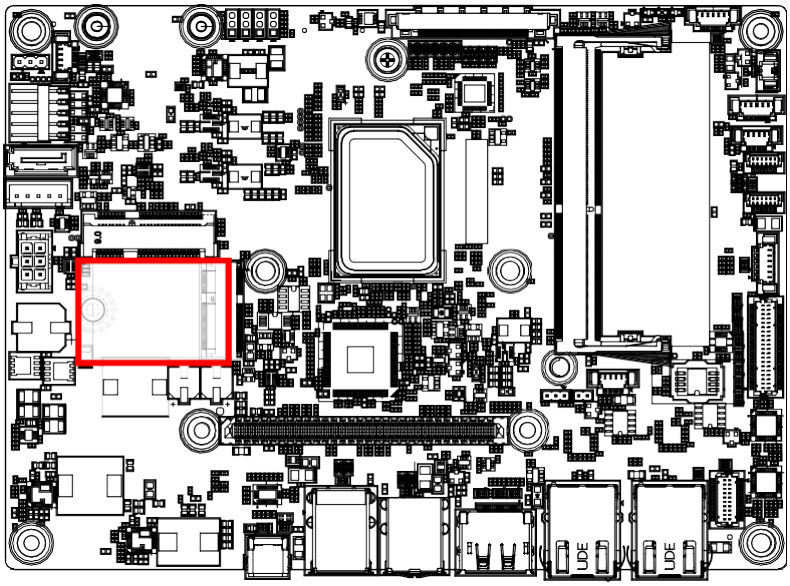
NOTE:

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 heatsink to the mainboard, and then remove the heatsink.



2. Install the Wi-Fi module.



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


NOTE:

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

4.3 Mounting

This section includes details for panel and VESA mounting options.


WARNING:

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.


CAUTION:

Risk of burns to the user caused by hot surfaces:

Turn off power and allow the device to cool down prior to per- forming 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.


NOTE:

All dimensions are in millimeters, unless noted.

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4.3.1 Panel Mounting

The SP2-EHL 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.

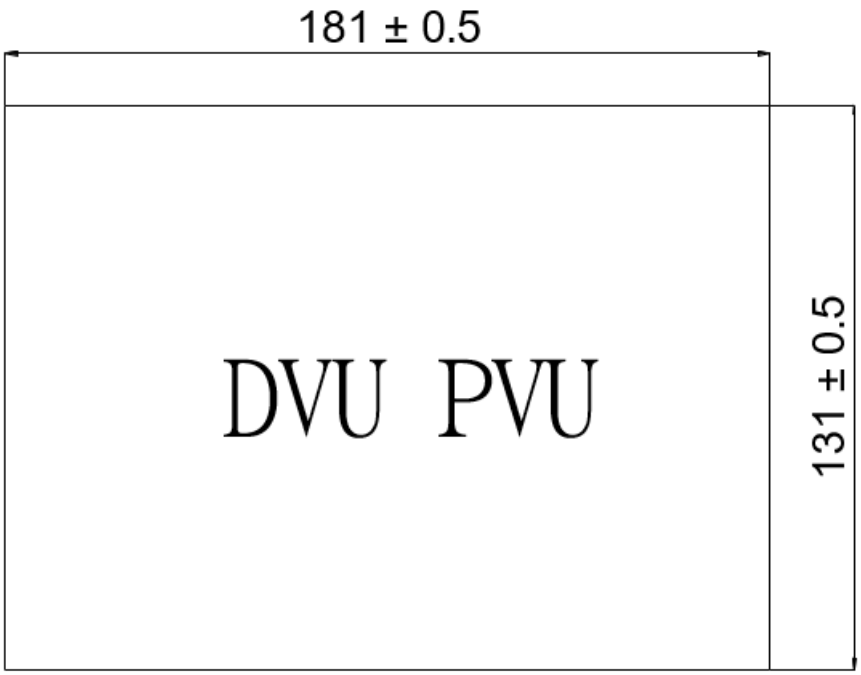


Figure 9: SP2-7WP cutout dimensions

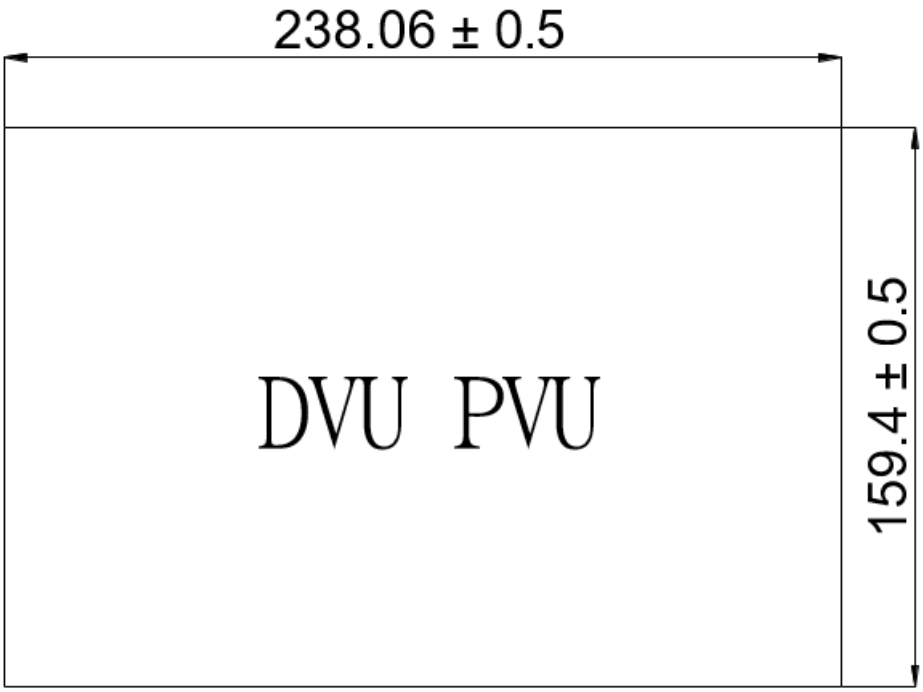
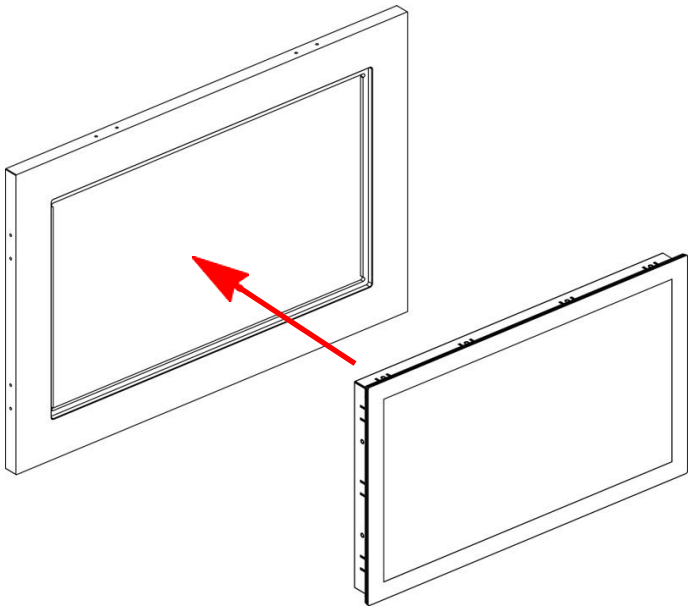


Figure 10: SP2-10WP cutout dimensions

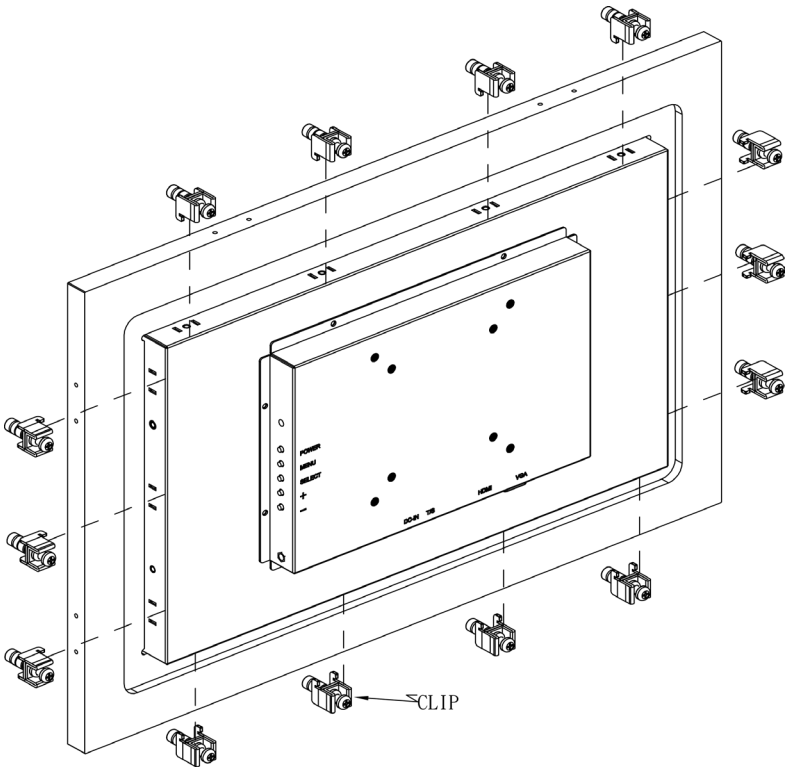
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Step 2: Attach I/O cables to the device before installing into the panel if rear access will be limited after installation.

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.



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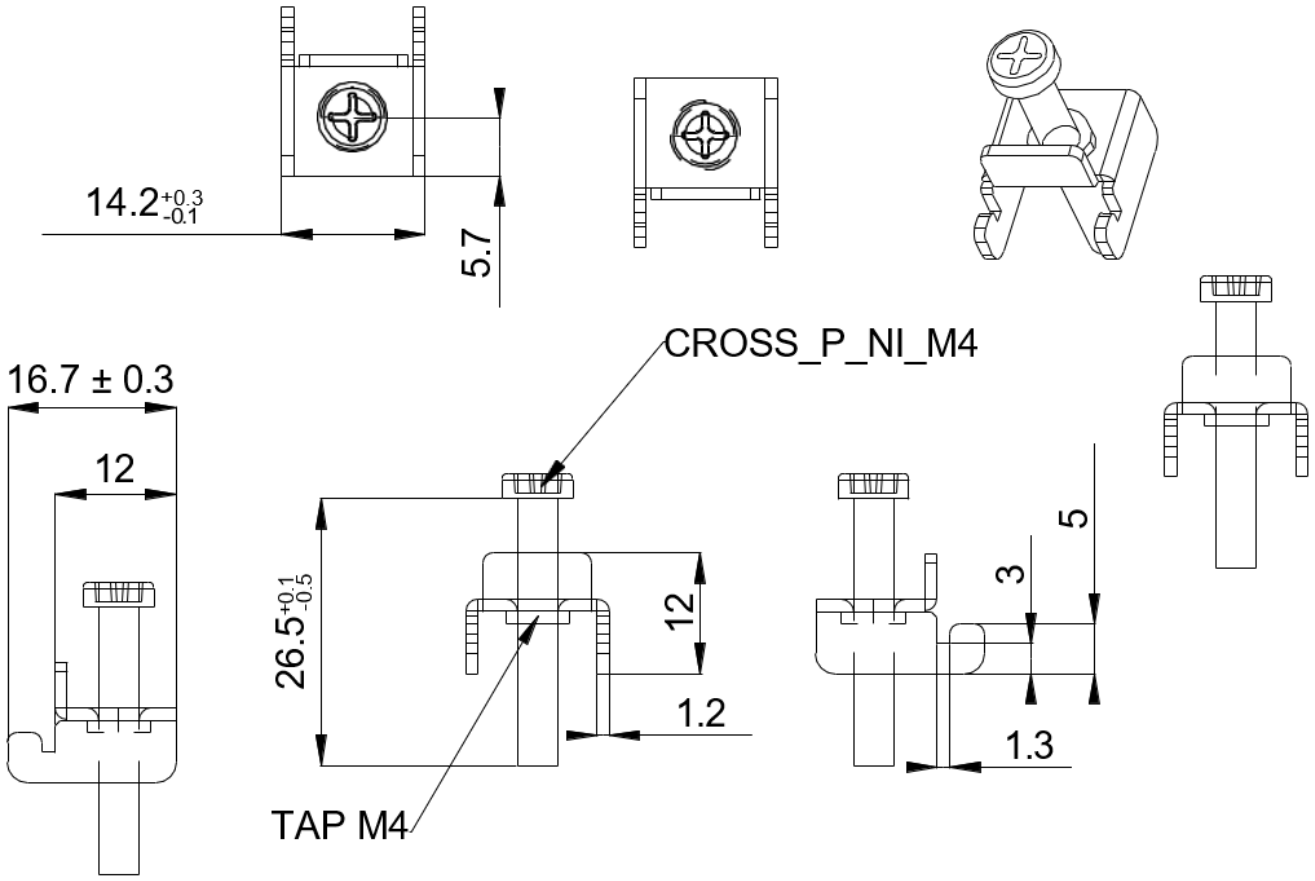


Figure 11: Mounting clip dimensions

NOTE:

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

4.3.2 VESA Mounting

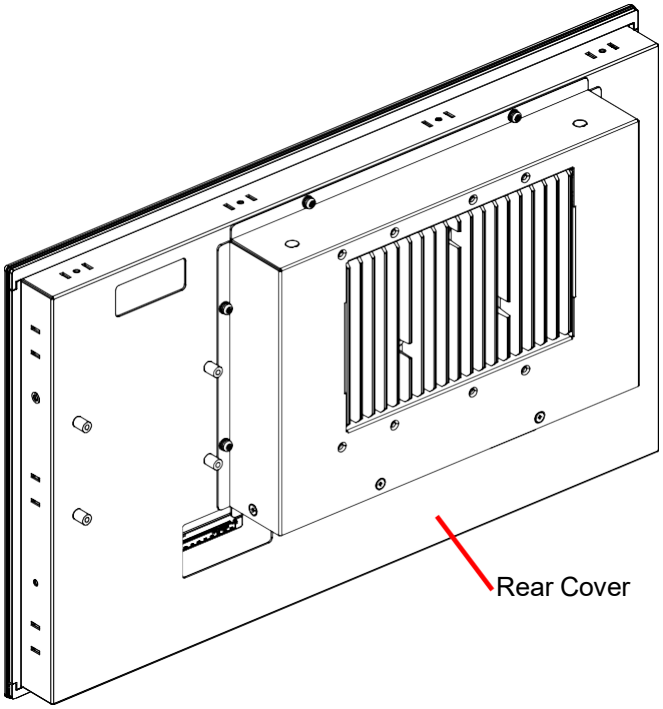
The SP2-EHL Series can be VESA mounted with a rear cover and VESA bracket. (Optional items sold separately.)

NOTE:

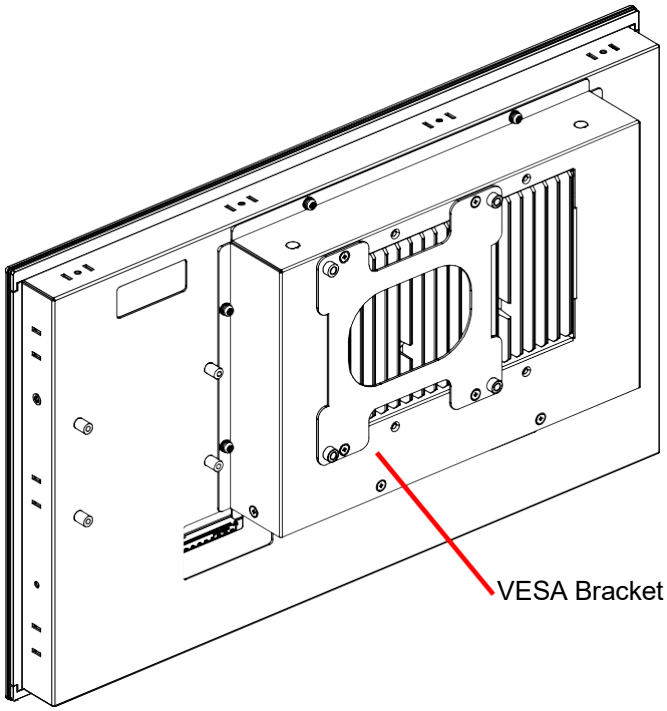
1. All I/O ports **must** face down.
2. Optional VESA bracket and M3 screws sold separately. Contact your ADLINK reseller for details.
3. Mounting bracket provides 100 mm x 100 mm VESA mounting and requires 4x M4 screws.

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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.



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5 System Layout

5.1 External I/O Connectors

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

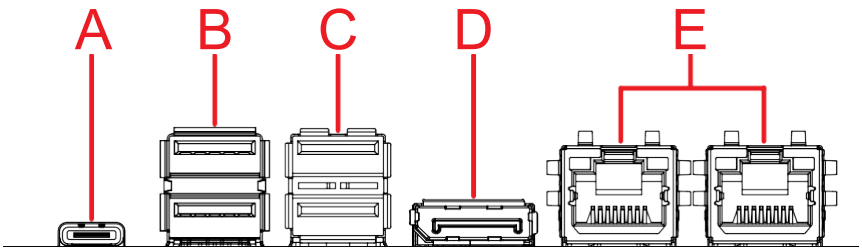


Figure 12: External I/O connectors

Table 2: External I/O legend

A	1x USB 3.1 Gen 1, Type-C
B	2x USB 3.2 Gen1 (5Gbps) Type-A
C	2x USB 2.0 Type-A
D	1x DisplayPort
E	2x RJ45 GbE LAN

5.2 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 effec- tuée uniquement par le personnel de service ADLINK. Les util- isateurs ne doivent pas démonter l'appareil eux-mêmes.

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5.2.1 Mainboard Connector Locations

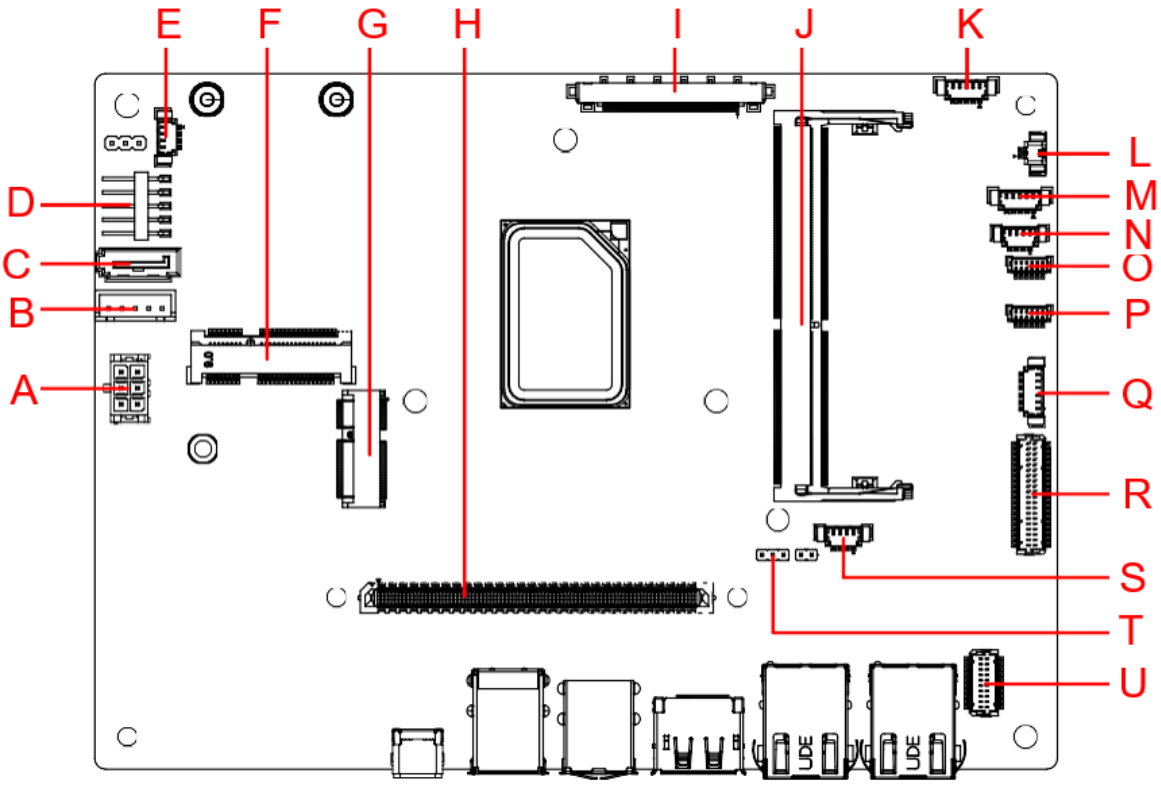


Figure 13: Mainboard connectors (Top)

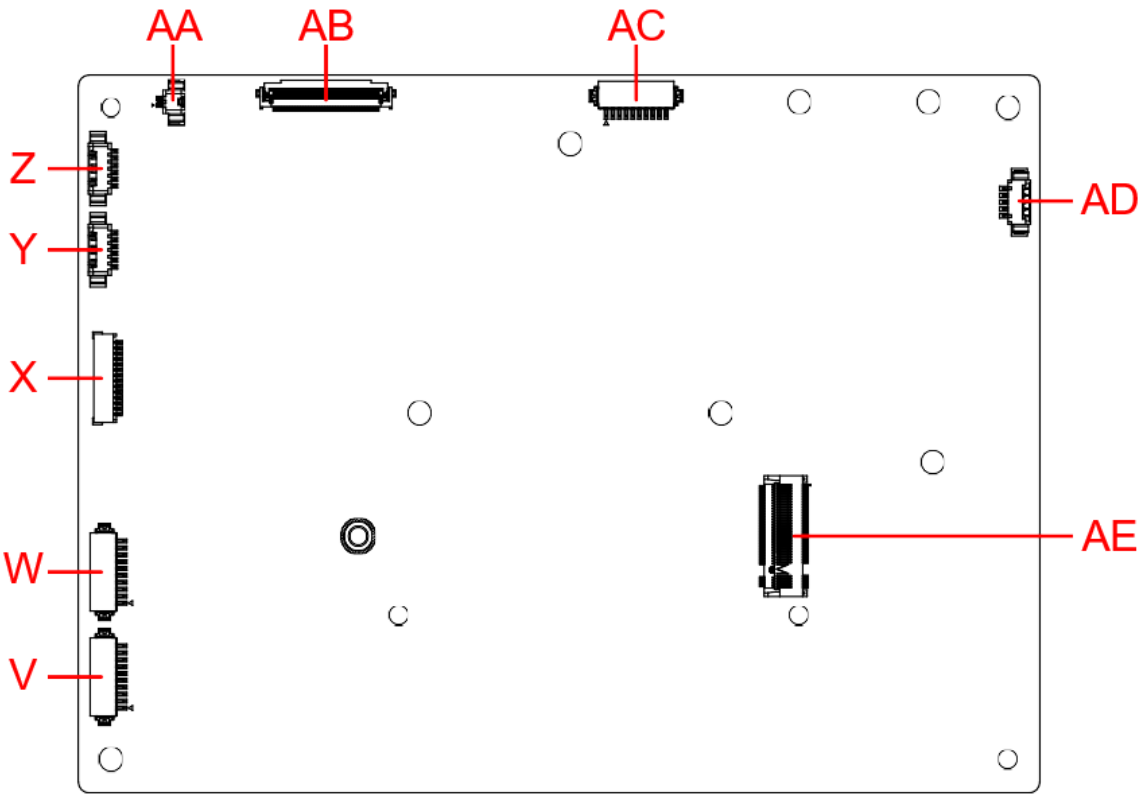


Figure 14: Mainboard connectors (Bottom)

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Table 3: Mainboard connector legend

A	Power connector	**Q**	Volume & Backlight Control Connector
B	SATA Power Connector	**R**	Key Connector
C	SATA Data Connector	**S**	Fan Connector
D	Resistive Touch Connector	**T**	Clear CMOS Jumper
E	Capacitive Touch Connector	**U**	PoE Module (Optional)
F	Mini PCIe connector	**V**	COM2 Connector
G	M.2 2230, E Key for Wi-Fi/Bluetooth Modules	**W**	COM1 Connector
H	Function Module	**X**	LED Connector
I	LVDS/eDP Connector	**Y**	I²C Connector-1
J	SO-DIMM Slot	**Z**	I²C Connector-2
K	Power/Reset/LED Button	**AA**	RTC Battery Connector
L	Buzzer Connector	**AB**	DB40 Connector
M	Mic-in/Line-out	**AC**	GPIO Connector
N	Speaker	**AD**	UPS Connector
O	USB 2.0 Connector	**AE**	M.2 M Key Connector
P	USB 2.0 Connector		

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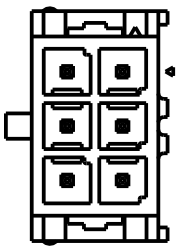
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6 Connector Pinouts and Jumper Settings

6.1 Power Connector

The 6-pin power connector connects an AC/DC power supply adapter, DC-to-DC power, module and battery. Supports AT and ATX power modes, with AT mode controlled by the BIOS.

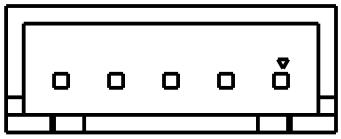
Pin	Signal
1	GND
2	GND
3	GND
4	PWR_CONN_IN
5	PWR_CONN_IN
	PWR_CONN_IN



6.2 SATA Power Connector

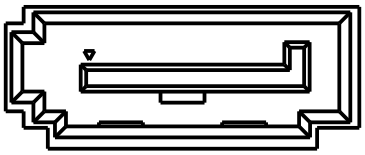
The SATA power connector provides a power connection for an internal 2.5” HDD.

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



6.3 SATA Data Connector

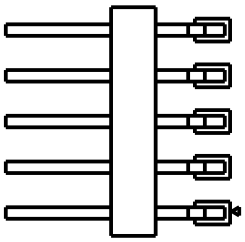
Pin	Signal
1	GND
2	SATA_TX1_P
3	SATA_TX1_N
4	GND
5	SATA_RX1_N
6	SATA_RX1_P
7	GND



6.4 Resistive Touch Connector

The internal USB 2.0 connector supports a resistive digitizer.

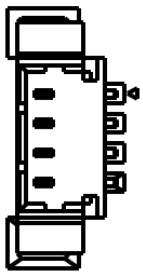
Pin	Signal
1	X-
2	Y-
3	SENSE
4	X+
5	Y+



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6.5 Capacitative Touch Connector

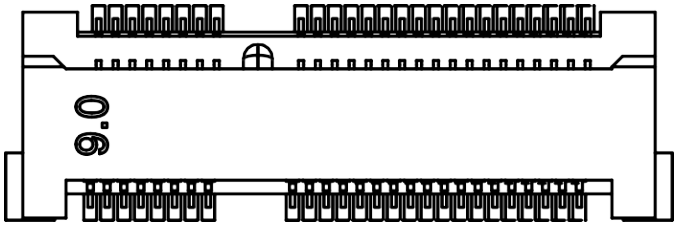
Pin	Signal
1	GND
2	TSC_D+
3	TSC_D-
4	P5V_U2TOU



6.6 Mini PCIe Connector

The mini PCIe connector supports standard PCIe signals such as PCIe Gen4 and USB2.0.

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	X
9	GND	10	X
11	MPCIE_CLK3_N	12	X
13	MPCIE_CLK3_P	14	X
15	GND	16	X
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
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

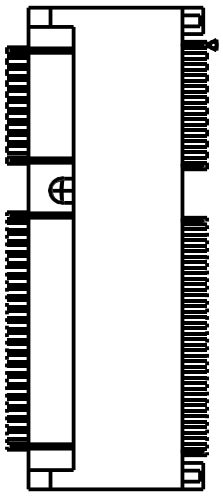


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6.7 M.2 2230, E Key for Wi-Fi/Bluetooth Modules

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

Pin	Signal	Pin	Signal
1	GND	2	P_+3V3_NGFF_E
3	M2E_USB_P	4	P_+3V3_NGFF_E
5	M2E_USB_N	6	NC
7	GND	8	NC
9	NC	10	NC
11	NC	12	NC
13	NC	14	NC
15	NC	16	NC
17	NC	18	GND
19	NC	20	NC
21	NC	22	NC
23	NC	32	NC
33	GND	34	NC
35	PCIE2_M2E_TX_P	36	NC
37	PCIE2_M2E_TX_N	38	NC
39	GND	40	NC
41	PCIE2_RX_P	42	NC
43	PCIE2_RX_N	44	NC
45	GND	46	NC
47	PCIECLK1_100M_P	48	NC
49	PCIECLK1_100M_N	50	NC
51	GND	52	M2E_PLTRST_BUF-L
53	PCH_CLK_REQ1-L	54	NC
55	M2_E_PEWAKE_N	56	W_DISABLE1
57	GND	58	PCH_SMB_DAT_A
59	NC	60	PCH_SMB_CLK_A
61	NC	62	GP_C02_SMB_ALERT-
63	GND	64	NC
65	NC	66	NC
67	NC	68	NC
69	GND	70	NC
71	NC	72	P_+3V3_NGFF_E
73	NC	74	P_+3V3_NGFF_E
75	GND		



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6.8 Function Module Board Connector

The function module allows customized expandability of the device. Contact your ADLINK representative for details.

Pin	Signal	Pin	Signal
1	P_+12V_A	2	P_+12V_A
3	P_+12V_A	4	P_+12V_A
5	GND	6	GND
7	GND	8	GND
9	P_+5V_A	10	P_+5V_A
11	P_+5V_A	12	P_+5V_A
13	GND	14	GND
15	GND	16	GND
17	P_+3V3_A	18	P_+3V3_A
19	P_+3V3_A	20	P_+3V3_A
21	GND	22	GND
23	GND	24	GND
25	PCH_SLP_S3-L	26	FM_I2C6_SDA_A
27	PCH_PCIE_FM_WAKE-L	28	FM_I2C6_SCL_A
29	GND	30	FM_PRESET-L
31	SOC_FM_PCIECLK2_P	32	PLTRST-L_FM
33	SOC_FM_PCIECLK2_N	34	GND
35	GND	36	GP_C02_SMB_ALERT-
37	SOC_FM_PCIE_RX3_P	38	PCH_SMB_DAT_A
39	SOC_FM_PCIE_RX3_N	40	PCH_SMB_CLK_A
41	GND	42	GND
43	SOC_FM_PCIE_TX3_P	44	FM_U3_TX1_P
45	SOC_FM_PCIE_TX3_N	46	FM_U3_TX1_N
47	GND	48	GND
49	SW_PCIE_CLK1_P	50	FM_U3_RX1_P
51	SW_PCIE_CLK1_N	52	FM_U3_RX1_N
53	GND	54	GND
55	FM_PCIE_RX1_P	56	FM_U2_P1_P
57	FM_PCIE_RX1_N	58	FM_U2_P1_N
59	GND	60	GND
61	FM_PCIE_TX1_P	62	FM_U3_TX2_P
63	FM_PCIE_TX1_N	64	FM_U3_TX2_N
65	GND	66	GND
67	SW_PCIE_CLK2_P	68	FM_U3_RX2_P
69	SW_PCIE_CLK2_N	70	FM_U3_RX2_N
71	GND	72	GND
73	FM_PCIE_RX2_P	74	FM_U2_P2_P
75	FM_PCIE_RX2_N	76	FM_U2_P2_N
77	GND	78	GND
79	FM_PCIE_TX2_P	80	FM_U2_P3_P
81	FM_PCIE_TX2_N	82	FM_U2_P3_N
83	GND	84	GND
85	SW_PCIE_CLK3_P	86	FM_U2_P4_P
87	SW_PCIE_CLK3_N	88	FM_U2_P4_N
89	GND	90	GND



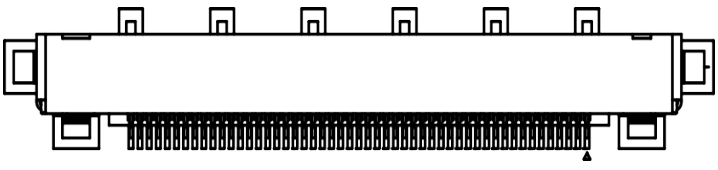
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91	FM_PCIE_RX3_P	92	LPC_AD0_R
93	FM_PCIE_RX3_N	94	LPC_AD1_R
95	GND	96	LPC_AD2_R
97	FM_PCIE_TX3_P	98	LPC_AD3_R
99	FM_PCIE_TX3_N	100	LPC_FRAME-L_R
101	GND	102	LPC_CLK0
103	PCH_CLK_REQ2-L	104	LPC_SERIRQ_R
105	FM_CLK_REQ123-L	106	LPC_DRQn_FM
107	GND	108	GND
109	FM_DDI1_TX0_P	110	I2S1_TXD
111	FM_DDI1_TX0_N	112	I2S1_RXD
113	GND	114	I2S1_SFRM
115	FM_DDI1_TX1_P	116	I2S1_SCLK
117	FM_DDI1_TX1_N	118	I2S_MCLK1
119	GND	120	GND
121	FM_DDI1_TX2_P	122	USB_OC2-L_R
123	FM_DDI1_TX2_N	124	USB_OC3-L_R
125	GND	126	GND
127	FM_DDI1_TX3_P	128	FM_GPIO0
129	FM_DDI1_TX3_N	130	FM_GPIO1
131	GND	132	FM_GPIO2
133	FM_DDI1_I2CCLK_AUX_P_CN	134	FM_GPIO3
135	FM_DDI1_I2CDAT_AUX_N_CN	136	FM_GPIO4
137	GND	138	FM_GPIO5
139	FM_DDI1_DDC_AUX_SEL_CN	140	FM_SPI_MISO
141	FM_DDI1_HPD	142	FM_SPI_MOSI
143	GND	144	FM_SPI_CS#
145	FM_I2C7_SDA_A	146	FM_SPI_CLK
147	FM_I2C7_SCL_A	148	GND
149	FM_I2C7_INT	150	UART_SOC_RI_N

6.9 LVDS/eDP Connector

The LVDS/eDP allows internal connection to a display. LVDS/eDP settings are controlled by BOM option.

Pin	Signal	Pin	Signal
1	BLPWR_12V_5V_CN	27	GND
2	BLPWR_12V_5V_CN	28	LVDS_A2P_1
3	BLPWR_12V_5V_CN	29	LVDS_A2N_1
4	BLPWR_12V_5V_CN	30	GND
5	CN_LVDS_BKLT_PWM	31	LVDS_A1P_1
6	CN2_LVDS_BKLT_EN	32	LVDS_A1N_1
7	GND	33	GND
8	GND	34	LVDS_A0P_1
9	GND	35	LVDS_A0N_1
10	GND	36	GND
11	Testpoint	37	LVDS_B3P_1
12	EDP_HPD	38	LVDS_B3N_1

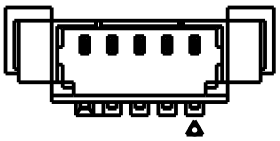


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13	LCD_SEL68_CN	39	GND
14	G_LVDS_I2C_CLK_CN	40	LVDS_BCKP_1
15	G_LVDS_I2C_DAT_CN	41	LVDS_BCKN_1
16	LCD_LVDS_5V	42	GND
17	LCD_LVDS_5V	43	LVDS_B2P_1
18	GND	44	LVDS_B2N_1
19	LCD_LVDS_3V3	45	GND
20	LCD_LVDS_3V3	46	LVDS_B1P_1
21	GND	47	LVDS_B1N_1
22	LVDS_A3P_1	48	GND
23	LVDS_A3N_1	49	LVDS_B0P_1
24	GND	50	LVDS_B0N_1
25	LVDS_ACKP_1	51	GND
26	LVDS_ACKN_1		

6.10 Power/Reset/LED Button

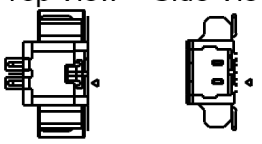
Pin	Signal
1	P_+3V3_A
2	PWRBTN-L_R
3	SYS_RESET-L_R
4	SIG_PWRLED-L
5	GND



6.11 Buzzer Connector

Pin	Signal
1	P_+5V_S0
2	N40235133

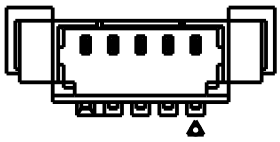
Top View Side View



6.12 Mic In/Line Out Connector

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

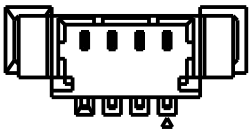
Pin	Signal
1	CON_MIC1_IN
2	CON_LINE1_OUT_L
3	CON_LINE1_OUT_R-
4	LINE1_OUT_JD
5	AGND_AUDIO



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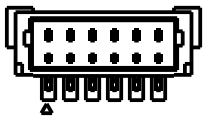
6.13 Speaker Connector

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



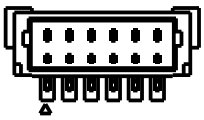
6.14 Camera Connector

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



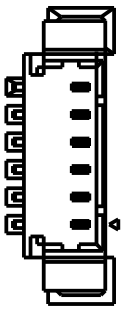
6.15 USB 2.0 Connector

Pin	Signal
1	P5V_U2_INTUSB
2	CN_U2_P9_N
3	CN_U2_P9_P
4	GND
5	NC
6	NC



6.16 Volume & Backlight Control Connector

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



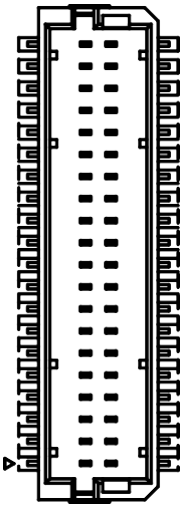
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6.17 Key Connector

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

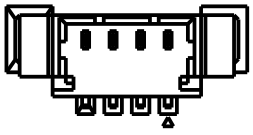
- Directions: ↑, ↓, ←, →
- Numbers: 0 to 9
- Functions: Enter, ESC, TAB, Backspace, Delete, Clear, PageUp, PageDn
- Hot keys: F1 - F10

Pin	Signal	Function Value	Pin	Signal	Function Value
1	GND		2	P_+3V3_S0	
3	EC_BTN_17	Tab	4	EC_BTN_1	↑
5	EC_BTN_18	Backspace	6	EC_BTN_2	↓
7	EC_BTN_19	Delete	8	EC_BTN_3	→
9	EC_BTN_20	Space	10	EC_BTN_4	←
11	EC_BTN_21	Page Up	12	EC_BTN_5	0
13	EC_BTN_22	Page down	14	EC_BTN_6	1
15	EC_BTN_23	F1	16	EC_BTN_7	2
17	EC_BTN_24	F2	18	EC_BTN_8	3
19	EC_BTN_25	F3	20	EC_BTN_9	4
21	EC_BTN_26	F4	22	EC_BTN_10	5
23	EC_BTN_27	F5	24	EC_BTN_11	6
25	EC_BTN_28	F6	26	EC_BTN_12	7
27	EC_BTN_29	F7	28	EC_BTN_13	8
29	EC_BTN_30	F8	30	EC_BTN_14	9
31	EC_BTN_31	F9	32	EC_BTN_15	Enter
33	EC_BTN_32	F10	34	EC_BTN_16	Esc
35	EC_BTN_37		36	NC	
37	NC		38	P_+3V3_A	
39	NC		40	P_+3V3_A	



6.18 Fan Connector

Pin	Signal
1	GND
2	FAN_PWR_IN (12V)
3	SIO_FANIN1_CN
4	SIO_PWM_DAC1_CN



6.19 Clear CMOS Jumper

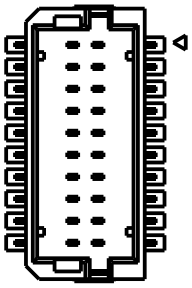
	Clear CMOS
1-2	Clear CMOS
2-3	N/A (default)



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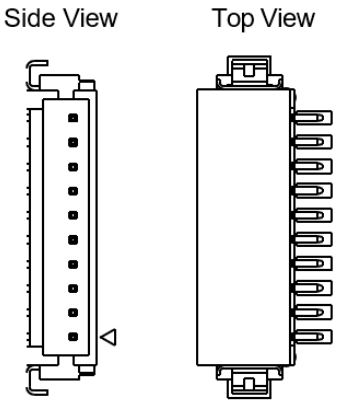
6.20 LAN2 Connector

Pin	Signal	Pin	Signal
1	L_GBE2_MDI2_P_PD	2	L_GBE2_MDI0_P_PD
3	L_GBE2_MDI2_N_PD	4	L_GBE2_MDI0_N_PD
5	GND	6	GND
7	L_GBE2_MDI3_P_PD	8	L_GBE2_MDI1_P_PD
9	L_GBE2_MDI3_N_PD	10	L_GBE2_MDI1_N_PD
11	GND	12	GND
13	P_+3V3_I226_B	14	P_+3V3_I226_B
15	L_GBE2_LED0_1000-L	16	L_GBE2_LED1_LINK/ACT-L
17	NC	18	NC
19	GND	20	GND



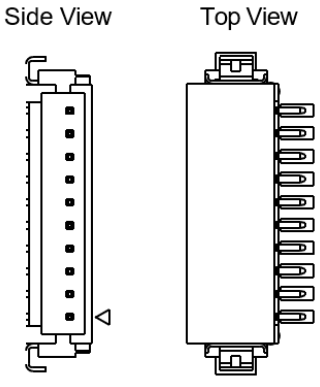
6.21 COM2 Connector

Pin	Signal	RS232	RS422	RS485
1	COM2_DCD-L_CN	DCD#	TXD422-	485DATA-
2	COM2_RXD_CN	RXD	TXD422+	485DATA+
3	COM2_TXD_CN	TXD	RXD422+	NC
4	COM2_DTR-L_CN	DTR#	RXD422-	NC
5	GND	GND	NC	NC
6	COM2_DSR-L_CN	DSR#	NC	NC
7	COM2_RTS-L_CN	RTS#	NC	NC
8	COM2_CTS-L_CN	CTS#	NC	NC
9	COM2_RI-L_CN	RI#	NC	NC
10	NC	NC	NC	NC



6.22 COM1 Connector

Pin	Signal	RS232	RS422	RS485
1	COM1_DCD-L_CN	DCD#	TXD422-	485DATA-
2	COM1_RXD_CN	RXD	TXD422+	485DATA+
3	COM1_TXD_CN	TXD	RXD422+	NC
4	COM1_DTR-L_CN	DTR#	RXD422-	NC
5	GND	GND	NC	NC
6	COM1_DSR-L_CN	DSR#	NC	NC
7	COM1_RTS-L_CN	RTS#	NC	NC
8	COM1_CTS-L_CN	CTS#	NC	NC
9	COM1_RI-L_CN	RI#	NC	NC
10	NC	NC	NC	NC

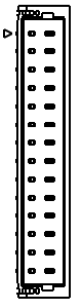


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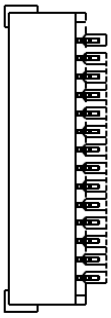
6.23 LED Connector

Pin	Signal	Pin	Signal
1	GND	8	COM2_SIN_LED_L
2	STDBY_PWR	9	COM1_SOUT_LED_L
3	GP3_LED-L	10	COM1_SIN_LED_L
4	GP2_LED-L	11	CN_SATA_LED-L_R
5	GP1_LED-L	12	P_+3V3_S0
6	P_+3V3_A	13	CN_WDT_LED-L
7	COM2_SOUT_LED_L	14	P_+3V3_A

Side View



Top View

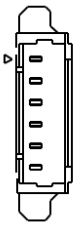


6.24 I²C Connector-1

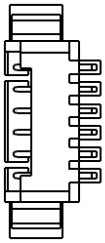
The I²C (Inter-Integrated Circuit) connector is a robust interface that facilitates low-speed, serial communication between various devices within a compact electronic system, enhancing connectivity and data transmission efficiency.

Pin	Signal
1	P_+5V_I2C
2	P_+3V3_I2C
3	PCH_I2C2_SDA_A
4	PCH_I2C2_SCL_A
5	DIO_I2C1_INT
6	GND

Side View



Top View



6.25 I²C Connector-2

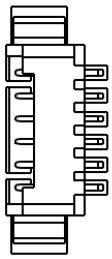
The I²C (Inter-Integrated Circuit) connector is a robust interface that facilitates low-speed, serial communication between various devices within a compact electronic system, enhancing connectivity and data transmission efficiency.

Pin	Signal
1	P_+5V_I2C2
2	P_+3V3_I2C2
3	2ND_SDA
4	2ND_SCL
5	2ND_INT
6	GND

Side View



Top View

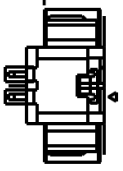


6.26 RTC Battery Connector

The Real Time Clock battery connector allows connection of a backup battery to sustain the system clock in the event of a power outage.

Pin	Signal
1	P_+VCC_RTC_CN_A
2	GND

Top View



Side View



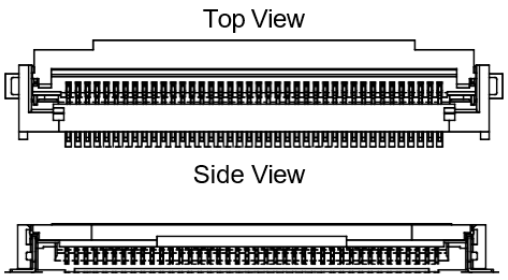
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6.27 DB40 Connector

This connector is useful during the design and development phase. It offers access to the following critical parts of the module:

- Test points for measurement of internal power rails
- I2C bus for BIOS POST code readout
- SPI BIOS programming interface
- Embedded controller programming interface

Pin	Signal	Pin	Signal
1	RESVD	21	GND
2	SMC_STATUS	22	3.3V_A
3	BIOS_MODE	23	3.3V_SMC
4	SEL_BIOS	24	LPC_AD0
5	POSTWDT_DIS#	25	LPC_AD1
6	SUS_S5#	26	LPC_AD2
7	SUS_S4#	27	LPC_AD3
8	SUS_S3#	28	LPC_FRAME#
9	CB_PWROK	29	CLK33_LPC
10	CB_RESET#	30	RST#
11	SYS_RESET#	31	BIOS_DIS0
12	PWRBTN#	32	GND
13	OCD0B	33	3V3_LPC
14	OCD0A	34	SPI_BIOS_CLK
15	CLK	35	SPI_BIOS_MOSI
16	DATA	36	SPI_BIOS_MISO
17	RESET_IN#	37	SPI_BIOS_CS1#
18	FUMD0	38	SPI_BIOS_CS0#
19	RXD6	39	GND
20	TXD6	40	VCC_SPI_IN



6.28 GPIO Connector

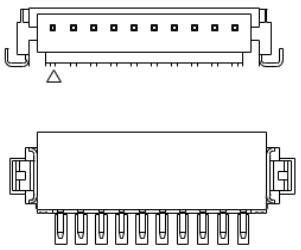
This device provides 4 channels of non-isolation digital input and 4 channels of non-isolation digital output circuits.

4-Channel Digital Input

- VIH: 2 to 5.25V
- VIL: 0 to 0.8V

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: 2.4 to 5V
- VOL: 0 to 0.55V



Pin	Signal Name
1	P_+3V3_S0
2	CN_DI0
3	CN_DI1

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4	CN_DI2
5	CN_DI3
6	CN_DO0
7	CN_DO1
8	CN_DO2
9	CN_DO3
10	GND

Table 4: GPIO connector pin voltage

Pin	Signal	PCH GPIO	Default Value	Input/Output Voltage Range
1	P_+3V3_S0			
2	CN_DI0	GP_F05	Input	VIH: 2V VIL: 0.8V
3	CN_DI1	GP_F11	Input	VIH: 2V VIL: 0.8V
4	CN_DI2	GP_F12	Input	VIH: 2V VIL: 0.8V
5	CN_DI3	GP_F13	Input	VOH: 2V VOL: 0.8V
6	CN_DO0	GP_F14	Output	VOH: 2.4V VOL: 0.55V
7	CN_DO1	GP_F15	Output	VOH: 2.4V VOL: 0.55V
8	CN_DO2	GP_F16	Output	VOH: 2.4V VOL: 0.55V
9	CN_DO3	GP_F17	Output	VOH: 2.4V VOL: 0.55V
10	GND			

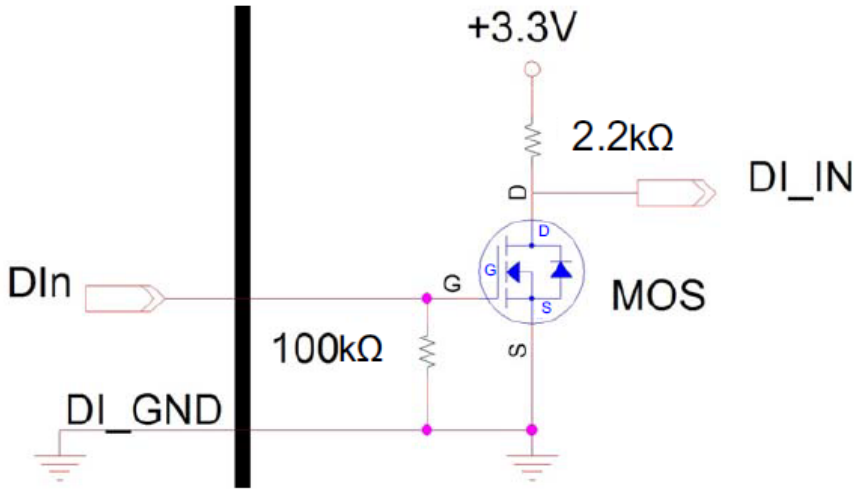


Figure 15: Digital input circuit

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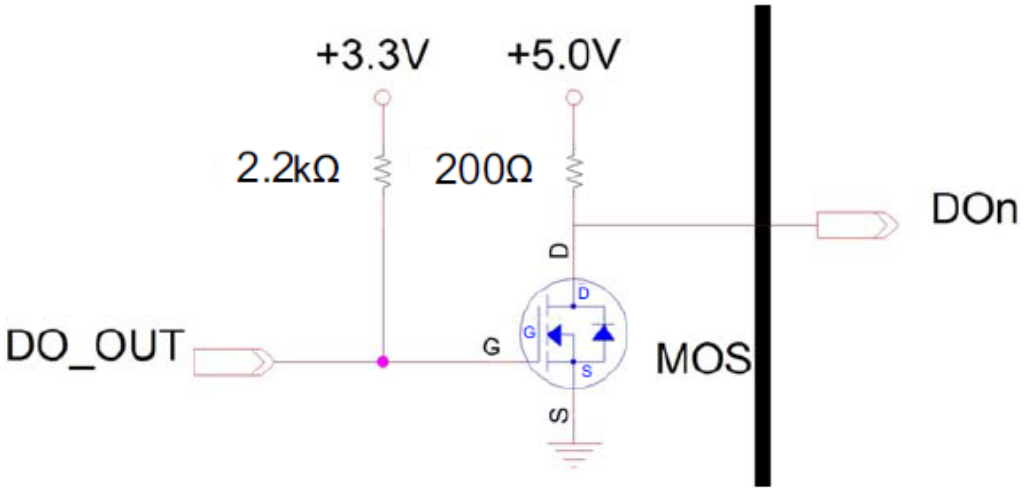


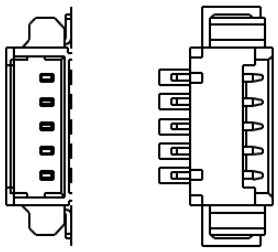
Figure 16: Digital output circuit

6.29 UPS Connector

The Uninterruptible Power Supply connector allows the device to interface with a UPS device for backup power in the event of power failure.

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

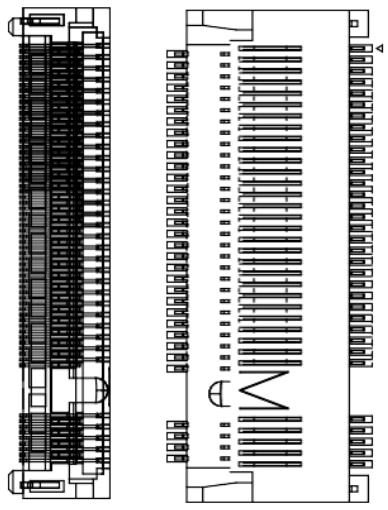
Top View Side View



6.30 M.2 M Key Connector

Pin	Signal	Pin	Signal
1	NGFF_CONFIG3	2	P_+3V3_NGFF_M
3	GND	4	P_+3V3_NGFF_M
5	NC	6	NC
7	NC	8	NC
9	GND	10	NC
11	NC	12	P_+3V3_NGFF_M
13	NC	14	P_+3V3_NGFF_M
15	GND	16	P_+3V3_NGFF_M
17	NC	18	P_+3V3_NGFF_M
19	NC	20	NC
21	NGFF_CONFIG0	22	NC
23	NC	24	NC
25	NC	26	NC
27	GND	28	NC
29	PCIE5_RX_N	30	NC
31	PCIE5_RX_P	32	NC
33	GND	34	NC

Side View Top View



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35	M2_PCIE5_TX_N	36	NC
37	M2_PCIE5_TX_P	38	PCH_DEVSLP0
39	GND	40	NC
41	M2_PCIE_SATA_RX_P_R	42	NC
43	M2_PCIE_SATA_RX_N_R	44	NC
45	GND	46	NC
47	M2_PCIE_SATA_TX_N_R	48	NC
49	M2_PCIE_SATA_TX_P_R	50	M2M_PLTRST_BUF-L
51	GND	52	PCH_CLK_REQ3-L
53	C_PCIECLK3_100M_N	54	PCH_PCIE_M2M_WAKE-
55	C_PCIECLK3_100M_P	56	NC
57	GND	58	NC
67	NC	68	NC
69	NGFF_CONFIG1	70	P_+3V3_NGFF_M
71	GND	72	P_+3V3_NGFF_M
73	GND	74	P_+3V3_NGFF_M
75	NGFF_CONFIG2		

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7 BIOS Settings

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 SP2-EHL Series. The BIOS setup program includes menus for configuring settings and enabling features of the SP2-EHL Series. Most users do not need to use the BIOS setup program, as the SP2-EHL Series ships with default settings that work well for most configurations.



WARNING:

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



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.

7.1 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

7.1.1 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 brackets

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

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7.2 ADLINK Unique Settings

The SP2-EHL Series follows industry-standard conventions. This section highlights the unique features of the ADLINK BIOS implementation that are unique to ADLINK devices.

7.2.1 Advanced > Panel Configuration

Feature	Options	Description
eDP/LVDS	Disabled, **Enabled**	Toggle the Embedded DisplayPort (eDP) or Low-Voltage Differential Signaling (LVDS) display panel interface.
FM Board DDI port	No Device, Display Port, HDMI, **DisplayPort with HDMI/DVI Compatible**	Choose a device driver interface (DDI) for the function module (FM) board.
Data Format and Color Depth	**Auto**, VESA 24-bit, JEIDA 24-bit, JEIDA/ VESA 18-bit	Choose a display mode and color depth. Auto loads the value from the VBIOS. Auto loads the value from the VBIOS.
LVDS Output Mode	**Auto**, Dual LVDS bus, Single LVDS bus	Low-Voltage Differential Signaling (LVDS) bus mode. Auto defaults to hardware jumper setting.
DE Polarity	**Active High**, Active Low	Specify the data enable (DE) signal polarity for LCD signaling.
Vertical-Sync Polarity	**Active High**, Active Low	Sync Polarization defines the idle and active states of the sync signal. This setting should be set according to your display requirements.
Horizontal-Sync Polarity	**Active High**, Active Low	Sync Polarization defines the idle and active states of the sync signal. This setting should be set according to your display requirements.
Spreading Depth	No Spreading, 0.5%, 1.0%, 1.5%, 2.0%, **2.5%**	Clock spreading can slightly adjust the exact timing of a clock cycle to reduce electromagnetic interference. Specify depth of the spread.

7.2.2 Advanced > Watchdog Timer

Feature	Options	Description
BIOS Post Watchdog	**Disabled** Enabled	The watchdog resets the system after a specified amount of time has passed.
Minutes	**1** [1-255]	The number of minutes the watchdog should wait until it resets the system in minutes. Range 1-255 minutes.
Seconds	**16** [15-255]	The number of seconds the watchdog should wait until it resets the system in minutes. Range: 15 to 255 seconds.

7.2.3 Advanced > Miscellaneous

Feature	Options	Description
BIOS Lock	Enabled **Disabled**	Toggle the PCH BIOS Lock feature. Enabling this feature is required for System Management Mode (SMM) protection of flash.

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8 Driver 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/Pan- el_PCs_Monitors/SP2-EHL_Series

8.1 Driver Installation Steps

Follow the driver installation steps below:

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.
3. Install the graphics driver.
4. Install the Ethernet driver.
5. Install the Management Engine driver.
6. Install the Serial I/O driver.
7. Install the DI/O Driver.

8.1.1 VGA Noise Issues with Older Versions of Ubuntu OS.

The VGA port may exhibit noise when the system is running an older version of the Ubuntu OS. This is due to a graphics driver compatibility issue with the new Intel Atom® CPU (which is reproducible on the Intel Customer Reference Board). ADLINK recommends installing the latest version of Ubuntu (e.g., 14.04 LTS).

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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.

S'il vous plaît prêter attention stricte à tous les avertissements et mises en garde figurant sur l'appareil , pour éviter des blessures ou des dommages.

- 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.
- When installing/mounting or uninstalling/removing device; or when removal of a chassis cover is required for user servicing (See "Getting Started"):
  [> 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) and connect it to a socket-outlet with earthing connection.
  [> Only install/attach and operate device on stable surfaces and/or recommended mountings.
- 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.

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

- 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.
  [> The equipment is not intended to be installed or used in a home, school, or public area accessible to the general population.
  [> The knurled thumb screws with slotted heads for each Node module should be tightened with a tool after both initial installation and subsequent use.
- 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 therefore, 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.
- Please use an approved power source certified by IEC or UL. If you need an adapter, optional accessories, or further assistance, please contact ADLINK for more information.

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

RISQUE DE BRÛLURES
Ne touchez pas cette surface, cela pourrait entraîner des blessures. Pour éviter tout danger, laissez la surface refroidir avant de la toucher.

- 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*
- Lors de l'installation/montage ou de la désinstallation/retrait de l'appareil ; ou lorsque le retrait d'un boîtier est nécessaire pour l'entretien par l'utilisateur (voir Mise en route) :
  - Éteignez l'alimentation et débranchez tous les cordons/câbles d'alimentation.
  - Réinstallez tous les panneaux du boîtier avant de remettre l'alimentation sous tension.
- *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/au-dessus du cordon d'alimentation) et connectez-le à une prise de courant avec mise à la terre
- N'essayez jamais de réparer l'appareil, qui doit être réparé uniquement par du personnel technique qualifié *et utilisant des outils appropriés.*
  - *Lors de l'installation/montage ou de la désinstallation/retrait d'un périphérique, ou lorsque le retrait d'un couvercle de châssis est requis pour l'entretien par l'utilisateur :*
  - *Coupez l'alimentation et débranchez tous les cordons/câbles d'alimentation.*
- *Réinstallez tous les capots du châssis avant de rétablir l'alimentation. Installez/fixez et utilisez l'appareil uniquement sur des surfaces stables et/ou des supports recommandés.*
- *Si l'appareil n'est pas utilisé pendant une longue période, éteignez-le et débranchez-le de sa source d'alimentation.*
- *Une batterie de type lithium peut être fournie pour une alimentation de secours ou de secours ininterrompue.*

  - *L'appareil doit être réparé par des techniciens agréés lorsque :*
  - *Le cordon d'alimentation ou la fiche est endommagé.*
  - *Du liquide est entré dans l'appareil. € L'appareil a été exposé à une humidité élevée et/ou à l'humidité.*
  - *L'appareil ne fonctionne pas ou ne fonctionne pas conformément au manuel de l'utilisateur.*

- *L'appareil est tombé et/ou a été endommagé et/ou présente des signes évidents de casse.*
- *Débranchez le cordon d'alimentation avant de desserrer les vis moletées et fixez toujours les vis moletées avec un tournevis avant de démarrer le système.*
  - *L'équipement n'est pas destiné à être installé ou utilisé dans une maison, une école ou une zone publique accessible au grand public.*
  - *Les vis à molette avec têtes fendue pour chaque module Node doivent être serrées avec un outil après l'installation initiale et lors de l'utilisation suivante.*
- *Il est recommandé d'installer l'appareil uniquement dans une salle de serveurs ou une salle informatique dont l'accès est :*

  - *Réservé au personnel de service qualifié ou aux utilisateurs familiers avec les restrictions appliquées à l'emplacement, les raisons de celles-ci et les précautions requises.*
  - *Autorisé uniquement par l'utilisation d'un outil ou d'une serrure et d'une clé, ou d'autres moyens de sécurité, et contrôlé par l'autorité responsable du lieu.*

Veuillez utiliser une source d'alimentation approuvée et certifiée par la norme IEC ou UL. Si vous avez besoin d'un adaptateur, d'accessoires en option ou d'une assistance supplémentaire, veuillez contacter ADLINK pour plus d'informations.

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