EMP-520 Series

User's Manual

Industrial Box PC



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Part Number: 50M-00097-1000

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Leading EDGE COMPUTING

Revision History

Revision	Description	Date
0.1	Preliminary release	2025-04-22
0.2	Introduction, block diagram, getting started, and connector pinouts and jumper settings updated	2025-04-29
0.3	Getting started and connector pinouts and jumper settings updated	2025-04-29

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Preface

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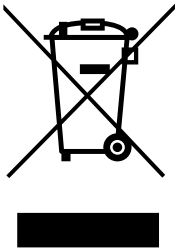
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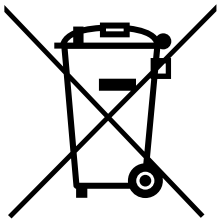
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Conventions

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.

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'exécu- tion 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 bles- sures 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 EMP-520 Series multi-screen media players/embedded computers feature a powerful and energy-efficient Intel® Core™ Ultra processor (formerly “Meteor Lake-U/H”), support for either Microsoft® Windows® or Linux® Ubuntu operating system, and 4 video-out connectors in a compact, durable and fanless package, ideal for high-quality and optimal display experiences in advertising, digital menu boards, and digital billboard applications.

1.2 Features

- Intel® Core™ Ultra 5/Ultra 7 BGA SoC processors
- 2x DDR5 SODIMM up to 96GB
- FHD/4K up to 4x independent displays (supports quad display, 4x HDMI)
- 2x 2.5GbE, 1x COM, 2x USB3.2 Gen1 and 4x USB2.0 ports
- M.2 2280 SSD
- Wi-Fi/LTE compatibility
- OS support
    - Windows 11 IoT Enterprise/LTSC 64-bit
    - Ubuntu Linux

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. Keep 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.

- EMP-520
- Wall-mount brackets (screws included)
- 120W adapter or 84W adapter

1.4 Optional Accessories

- M.2 PCIe/SATA SSD
    - up to 1TB
- Wireless Module
    - Wi-Fi kit (w/ antenna)
    - LTE kit (w/ antenna)
- AC/DC Adapter
    - 120W for EMP-520
- VESA bracket (screws included)

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2 Specifications

2.1 Product Specifications

Model	EMP-520
System Core	
Processor	Intel® Core™ Ultra 5
TDP	28W
# of Cores	14
Base Frequency	1.2 GHz
Max. Turbo Frequency	4.5 GHz
Memory	2x DDR5 SODIMM, supports 5600MHz SDRAM up to 96GB
Storage	1x M-key 2280 (PCIex4 gen4+SATA) for SSD, up to 1TB
I/O Interface	
Display output	4x HDMI, max. resolution up to 3840x2160
Ethernet	2x 2.5GbE RJ45
Serial Ports	1x DB9 COM (RS-232)
USB Ports	2x USB 3.2 Gen1 + 4x USB 2.0 ports
TBT port	1x TBT4 port (Optional)
Audio	Headphone + Mic in (Headset)
Security	fTPM
DC input	12V DC
Antennas	2x Antenna holes for SMA-type antennas (Wi-Fi/BT/LTE)
Expansion	• 1x M.2 B-key 3042 (USB3.0+USB2.0) for optional LTE module with 1x external SIM • 1x M.2 E-key 2230 (PCIe+USB2.0) for optional Wi-Fi/BT module
Mechanical	
Dimensions	211 (W) x 115 (D) x 35 (H) mm
Weight	2.5 kg
Mounting	Wall mount (default) / VESA mount (optional)
Environmental	
Operating Temperature	Standard: 0°C to 50°C (with 0.6 m/s air flow) ETT: -20°C to +50°C
Storage Temperature	-40°C to 85°C (-40°F to 185°F) (excluding storage)
Humidity	95% @ 40°C (104°F) (non-condensing)
Vibration	Operating: 3 Grms, 5-500 Hz, 3 axes (w/ SSD)
Shock	Operating: 50 Grms, half sine 11ms duration (w/ SSD)
ESD	Contact ±4KV, Air ±8KV
EMC	EN55032/ 55035, CE, FCC Class B
Safety	UL/cUL, CB

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2.2 Power Consumption

Power consumption is based on lab data in which 12V DC is applied and current is measured by the DC power supply. The power consumption (W) is calculated as the product of applied voltage (V) and the current (A). Platforms tested for this data have available external I/O interfaces and are attached to supported devices such as keyboard/mouse, USB dummy load, COM loopback, LAN port, and with an internal SSD driver installed. Information is presented for reference only. Actual power consumption will vary with different attached devices and operating systems.

Table 1: Power consumption

	EMP-520
Power Off (S5) (ErP)	0.5W
Power Off (S5) (Non ErP)	2.1W
System Idle (S0)	14.4W
System Full Load	71.3W
Recommended Power Supply	120W

2.3 Functional Block Diagram

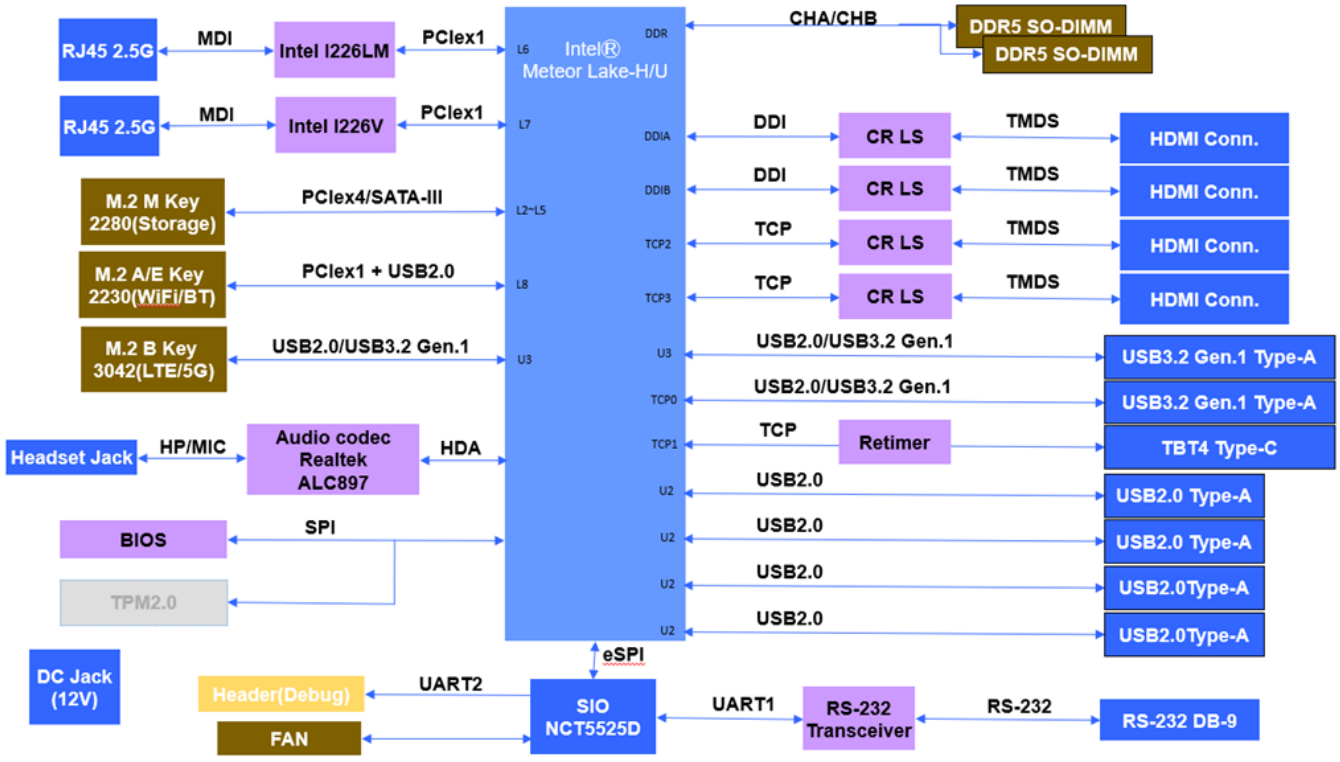


Figure 1: Functional block diagram

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3 Mechanical Layout

3.1 Mechanical Dimensions

NOTE:

All dimensions are in millimeters, unless noted.

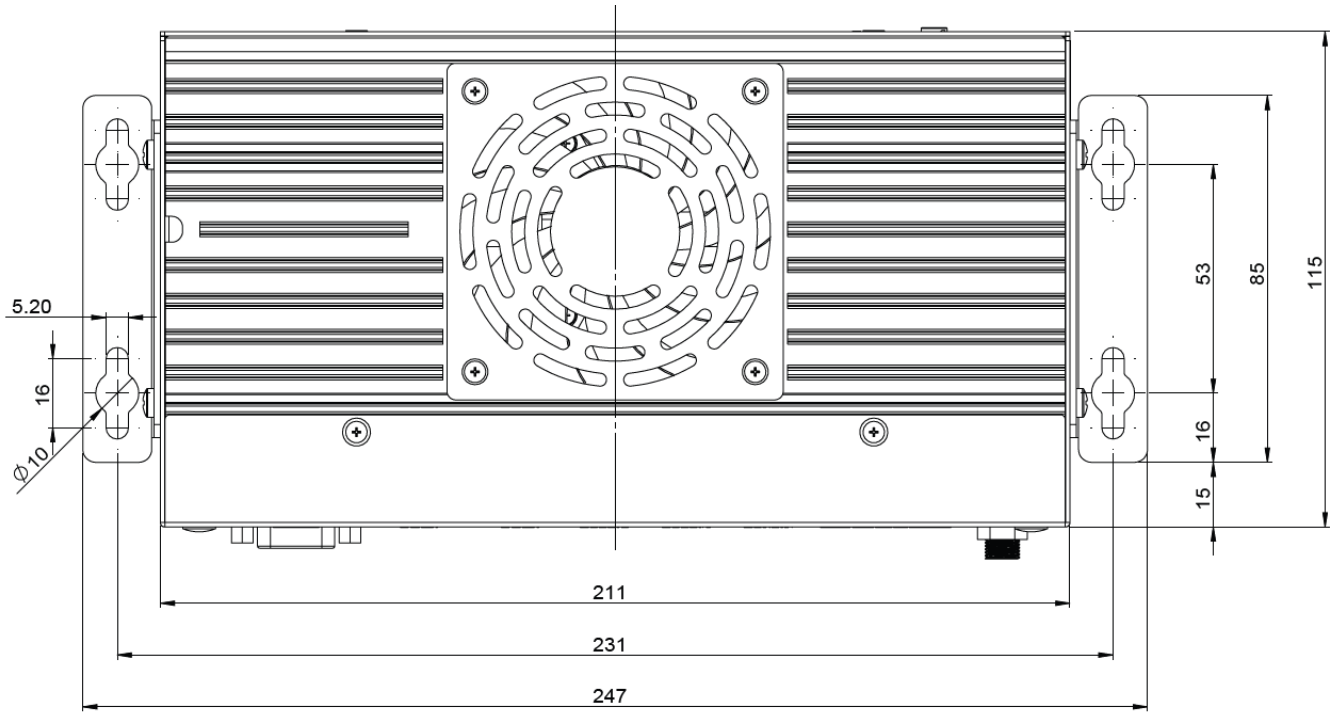


Figure 2: Top view

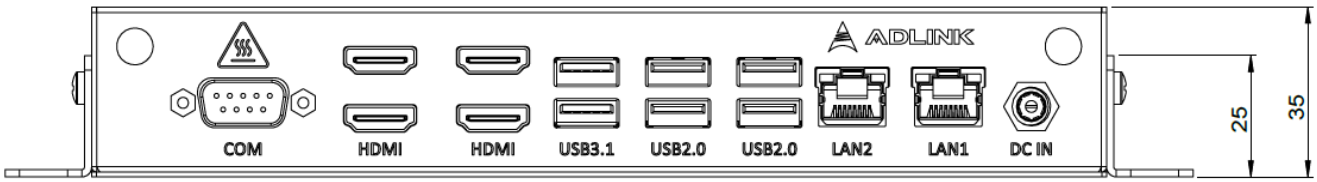


Figure 3: Front view

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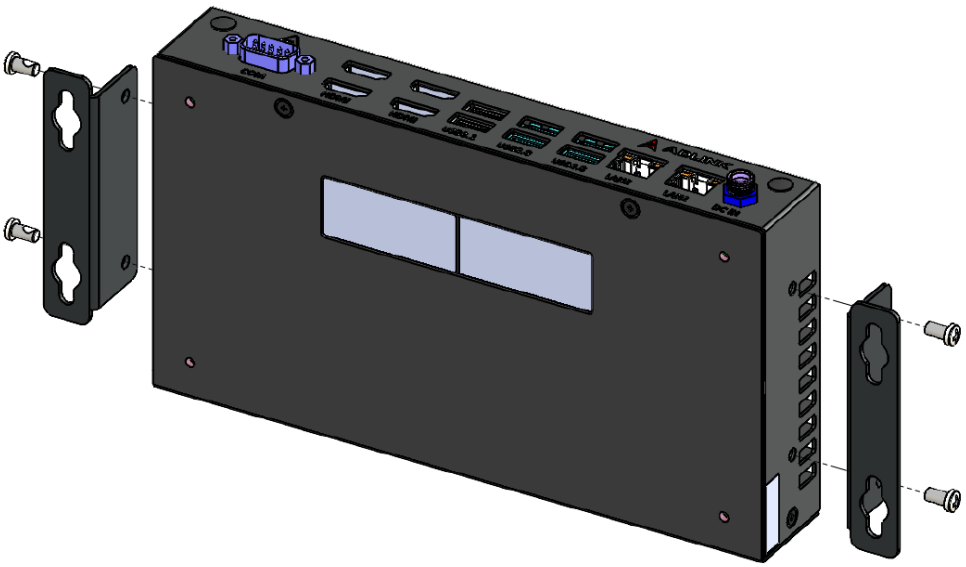
4 Getting Started

Follow the instructions in this chapter to install wall-mount brackets and mount the device.

4.1 Installing the Wall-Mount Brackets

Use the 4x M4x8mm screws included in the package contents to attach the 2 wall-mount brackets to the chassis with 6kgf/cm of torque.

Utilisez les 4 vis M4x8mm incluses dans le contenu de l’emballage pour fixer les 2 supports muraux au châssis avec un couple de 6 kgf/cm.





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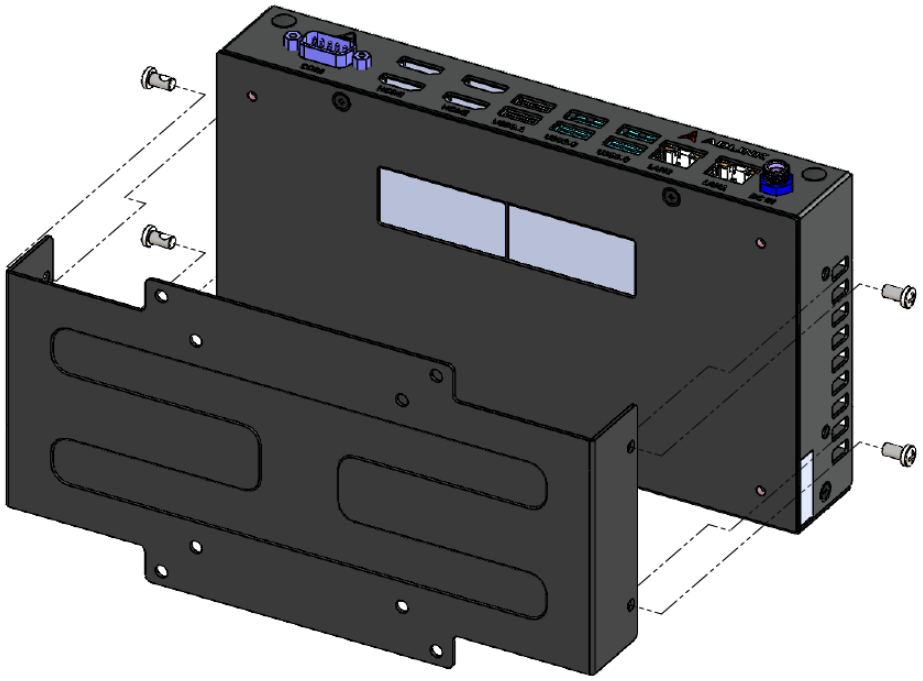


Figure 4: Installing the wall-mount brackets

4.2 Installing the VESA Brackets

Use the 4x M4x8mm screws included in the package to attach the VESA brackets to the chassis, applying 6 kgf/cm of torque.

Utilisez les 4 vis M4x8mm incluses dans l'emballage pour fixer les supports VESA au châssis, en appliquant un couple de 6 kgf/cm.



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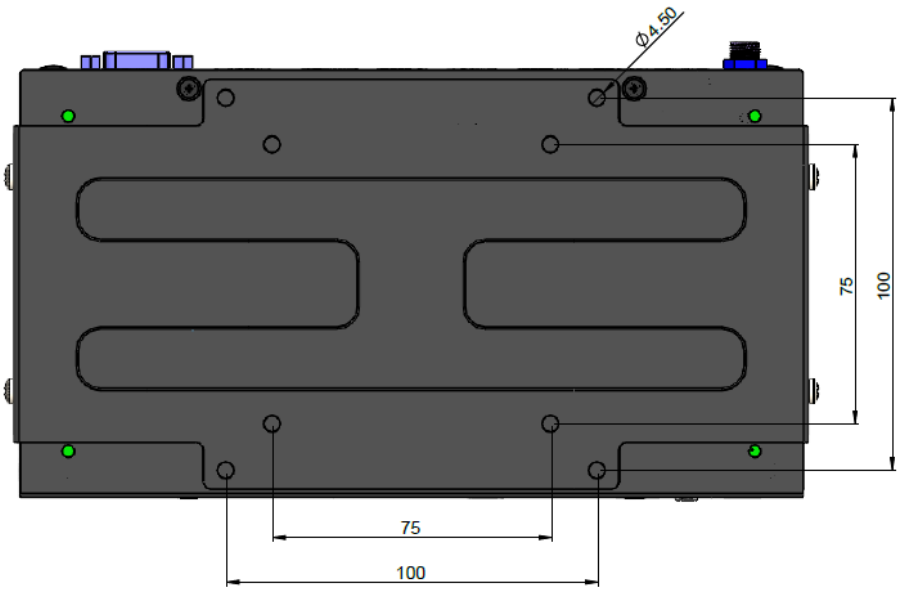


Figure 5: Installing the VESA brackets

4.3 Mounting the Device

Mount the device to a wall using the 4 keyhole openings indicated with M4 8mm screws torqued to 6kgf/cm according to the spacing dimensions of the holes in the bracket as shown in 3.1 Mechanical Dimensions (Figures 1 and 2).

Montez l'appareil au mur en utilisant les 4 ouvertures en trou de serrure indiquées, avec des vis M4 de 8 mm serrées à un couple de 6 kgf/cm, conformément aux dimensions d'espacement des trous du support indiquées dans la section 3.1 Dimensions mécaniques (Figures 1 et 2).

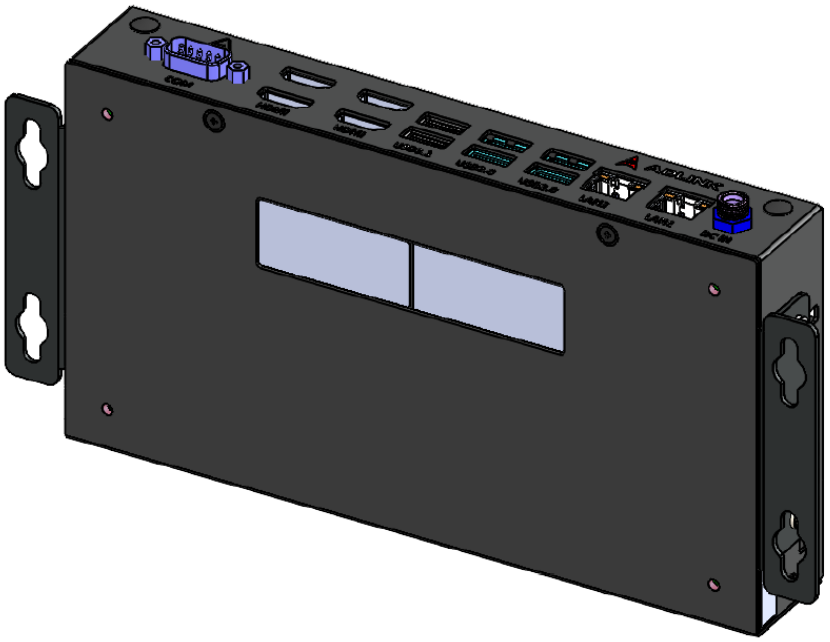


Figure 6: Mounting the device

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4.4 Thermal Considerations

The recommended system space is 500x456x120mm^3, with an airflow speed of 0.6m/s for better thermal dissipation performance. Refer to the figures below for the recommended minimum system clearances.

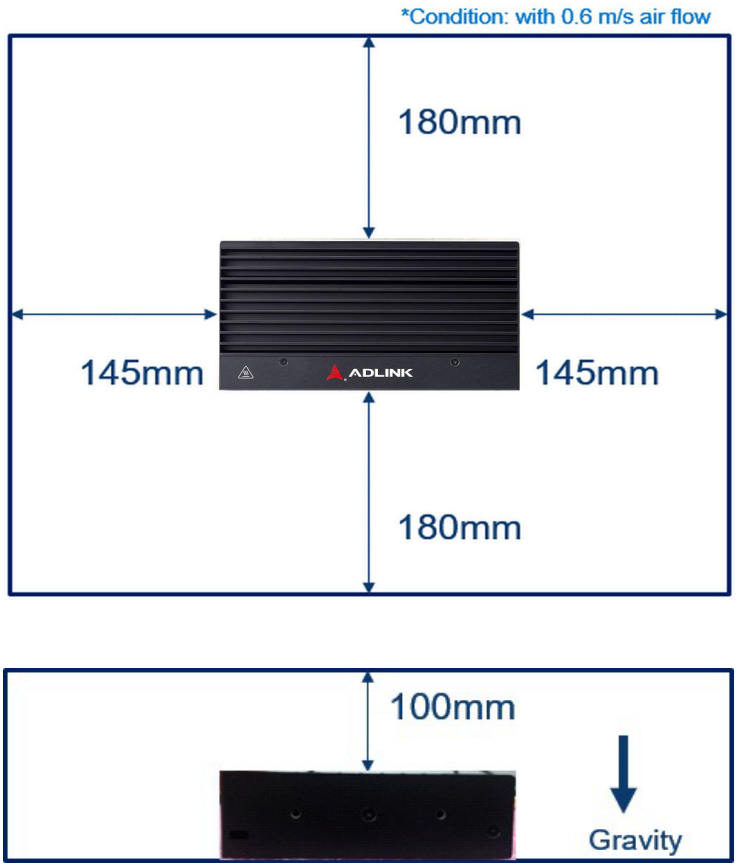


Figure 7: Thermal considerations

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5 System Layout

5.1 Front Panel I/O Connectors

The EMP-520 Series provides the following external I/O connectors.

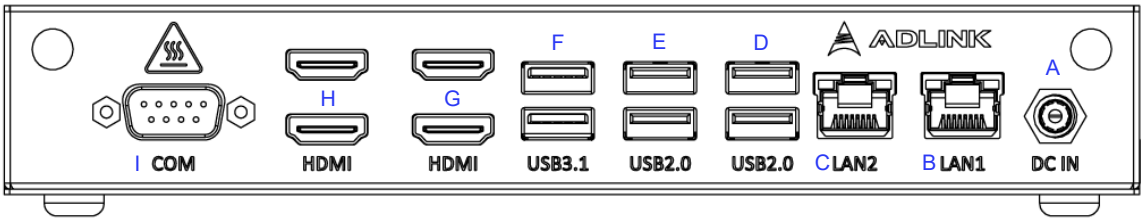


Figure 8: Front Panel I/O connectors

Table 2: External I/O legend

A	12V DC input jack
B	2.5Gbe LAN
C	2.5Gbe LAN
D	2x USB2.0
E	2x USB2.0
F	2x USB3.2 Gen1
G	2x HDMI
H	2x HDMI
I	COM RS-232

5.2 Rear Panel

The EMP-520 Series provides the following buttons and LED on the rear panel.

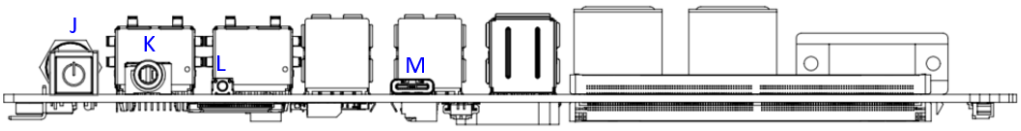


Figure 9: Rear panel

Table 3: Rear panel legend

Item	Function	Description
J	Power Button with LED	Press to turn system on/off. LED→ Power off: off /Power on: on
K	Headset	Audio Headphone and Mic-in
L	EDID Button	Be sure to press the EDID Button to acquire or change the EDID data when the connected display/monitor cannot be recognized, or the displayed image does not fit the screen.
M	Type C port	TBT4 function

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6 Connector Pinouts and Jumper Settings

6.1 Wireless Antenna Holes

SMA-type antenna holes are reserved for use with a wireless, Wi-Fi, or LTE module. Wireless antennas should be attached to the holes when a wireless, Wi-Fi, or LTE module has been installed in the EMP-520 Series.

6.2 Headset Audio Connectors

The EMP-520 Series implements Intel® High-Definition Audio (HDA) with a Realtek ALC897 Series Audio CODEC, with support up to 24-bit, 192 KHz sample rate high quality headphone output and microphone input.

6.3 Display Connections

The EMP-520 Series supports 4 independent display output ports under Windows 11 and Ubuntu Linux, and 2 independent display output ports in the UEFI shell, as shown in the following table.

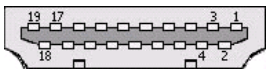
Table 4: Maximum number of independent displays

System	Maximum Number of Independent Displays	Notes
Windows	4	
Ubuntu Linux	4	
UEFI Shell	2	Priority 1: HDMI 1 Priority 2: HDMI 2 Priority 3: HDMI 3 Priority 4: HDMI 4

6.4 HDMI Connector

The HDMI connector supports HDMI.

Pin #	Signal	Pin #	Signal
1	TMDS Data2+	2	TMDS Data2 Shield
3	TMDS Data2–	4	TMDS Data1+
5	TMDS Data1 Shield	6	TMDS Data1–
7	TMDS Data0+	8	TMDS Data0 Shield
9	TMDS Data0–	10	TMDS Clock+
11	TMDS Clock Shield	12	TMDS Clock–
13	CEC	14	Reserved
15	SCL	16	SDA
17	DDC/CEC Ground	18	+5 V Power
19	Hot Plug Detect		

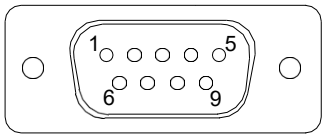


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6.5 COM Port Connector

The COM port is a D-sub 9-pin connector supporting RS-232 mode.

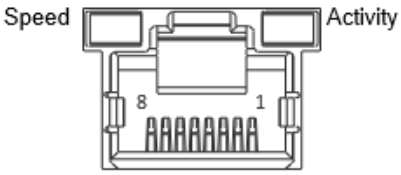
Pin	Signal	RS-232
1	COM1_DCD-L_CN	DCD#
2	COM1_RXD_CN	RXD
3	COM1_TXD_CN	TXD
4	COM1_DTR-L_CN	DTR#
5	GND	GND
6	COM1_DSR-L_CN	DSR#
7	COM1_RTS-L_CN	RTS#
8	COM1_CTS-L_CN	CTS#
9	COM1_RI-L_CN	RI#



6.6 Gigabit Ethernet Port

Two Gigabit Intel® Ethernet Controller I226 Series RJ45 connectors support up to 2500/1000/100/10 Mbit/s connections.

Pin	10BASE-T/100BASE-TX	1000/2500BASE-T
1	TX+	TX0+
2	TX-	TX0-
3	RX+	TX1+
4	-	TX1-
5	-	TX2+
6	RX-	TX2-
7	-	TX3+
8	-	TX3-



6.6.1 Active/Link and Speed LED Indicators

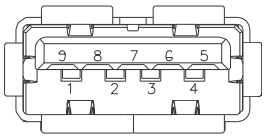
LED	LED Color	Status	Description
Active/Link (right)	Yellow	OFF	Ethernet port is disconnected
		ON	Ethernet port is connected with no activity
		Flashing	Ethernet port is connected and active
Speed (left)	Green/ Yellow	OFF	10/100Mbps
		Green	1000 Mbps
		Yellow	2500 Mbps

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6.7 USB 2.0 and USB3.2 Connector

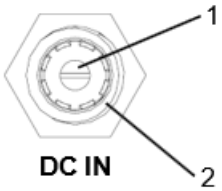
Two USB 3.2 Gen1 (5 Gbps with 1600 mA power and OCP protection) and Four USB 2.0 (480Mbps with 500 mA power and OCP protection) Type-A connectors are provided. They are compatible with Super Speed, Hi-Speed, Full-speed, and Low-speed USB devices, making them suitable for USB peripherals.

Pin No.	Signal
1	VBUS
2	D-
3	D+
4	GND
5	StdA_SSRX−
6	StdA_SSRX+
7	GND_DRAIN
8	StdA_SSTX−
9	StdA_SSTX+



6.8 DC-in Power Connector

Pin	Function	Description
1	Power	Power input
2	Ground	Reference ground



6.9 Headset 3.5mm Audio Jack Connector

ø3.5mm stereo audio jacks provide Headphone and Mic-in audio connections.



6.10 Power Adapter

This product is intended to be powered by a UL-listed (certified) power supply with an output rated at 12 VDC, minimum 7 A, a minimum Tma of 50°C, and suitable for operation at altitudes up to 5000 m. For further assistance, please contact the manufacturer, UL file owner, or brand owner for more information.

Ce produit est conçu pour être alimenté par une source d'alimentation certifiée UL (inscrite), avec une sortie nominale de 12 VDC, un courant minimum de 7 A, une température ambiante maximale (Tma) minimale de 50 °C, et adaptée à un fonctionnement jusqu'à 5000 m d'altitude. Pour toute assistance supplémentaire, veuillez contacter le fabricant, le détenteur du fichier UL ou le propriétaire de la marque pour plus d'informations.

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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 EMP-520 Series. The BIOS setup program includes menus for configuring settings and enabling features of the EMP-520 Series. Most users do not need to use the BIOS setup program, as the EMP-520 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

7.2 Menu Structure

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

7.2.1.1 Main 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

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Main	Advanced	Chipset	Security	Boot	Save & Exit
BIOS Information System Information System Date System Time	CPU Configuration ► Power Management ► Super IO Configuration ► BIOS Watchdog Timer ► Serial Port Console Redirection ► Hardware Monitor ► NVME Configuration ► Trusted Computing ► Miscellaneous ► Network Stack Configuration ►	System Agent (SA) Configuration► PCH-IO Configuration►	Password Description Secure Boot Menu ►	Boot Configuration	Save Options Default Options Boot Override

Notes:

► indicates a submenu
Gray text indicates info only

7.3 Main

The Main Menu provides read-only information about your system and also allows you to set the System Date and Time. Refer to the tables below the screen shot of this menu for details of the submenus and settings.

7.3.1 Main > BIOS Information

Feature	Options	Description
BIOS Vender	Info only	American Megatrends
BIOS Version	Info only	Display Core version
Build Date	Info only	Display compliancy information
MRC Version	Info only	Display compliancy information
GOP Driver Version	Info only	Display Intel Graphic Version
ME FW Version	Info only	Display Intel CSME Version

7.3.2 Main > System Information

Board Information	Info only	Description
Project Name	Info only	Display Project Name.
CPU Board Version	Info only	Display CPU Signature.
CPU Brand String	Info only	Display CPU Brand Name.
Total Memory	Info only	Display Installed Memory Size.
Memory Frequency	Info only	Display Memory Frequency.
PCH SKU	Info only	Display PCH Information.
FM Board	Info only	

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7.3.3 Main > Board Information

Board Information	Info only	Description
Serial Number	Read only	Display SMC serial number
Manufacturing Date	Read only	Display SMC manufacturing date.
Last Repair Date	Read only	Display SMC last repair date.

7.3.4 Main > System Date and Time

Feature	Options	Description
System Date	Weekday, MM/DD/YYYY	Requires the alpha-numeric entry of the day of the week, day of the month, calendar month, and all 4 digits of the year, indicating the century and year (Fri XX/XX/20XX)
System Time	HH/MM/SS	Presented as a 24-hour clock setting in hours, minutes, and seconds
Access Level	Info only	

7.4 Advanced

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

7.4.1 Advanced > CPU Configuration

Feature	Options	Description
Turbo Mode	Disabled, **Enabled**	Enable/Disable processor Turbo Mode (requires EMTTM enabled too). AUTO means enabled.
C States	Disabled, **Enabled**	Enable/Disable CPU Power Management. Allows CPU to go to C states when it's not 100% utilized.
Intel Trusted Execution Technology	**Disabled**, Enabled	Enables utilization of additional hardware capabilities provided by Intel (R) Trusted Execution Technology. Changes require a full power cycle to take effect.
X2APIC Enable	Disabled, **Enabled**	Enable/Disable X2APIC Operating Mode. When this option is configured as ‘Enable’, ‘VT-d’ option must be ‘Enabled’ and ‘X2APIC Opt Out’ option must be ‘Disabled’ as well. This option will be grayed out when ‘VT-d’ option is configured as ‘Disabled’

7.4.2 Advanced > Power Management

Feature	Options	Description
Enable ACPI Auto Configuration	**Disabled**, Enabled	Enables or Disables BIOS ACPI Auto Configuration.

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Feature	Options	Description
Enable Hibernation	Disabled, **Enabled**	Enables or 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.
ERP	**Disabled**, Enabled	Energy-Related Products
State After G3	**S0 State**, S5 State	Specify what state to go to when power is re-applied after a power failure (G3 state).

7.4.3 Advanced > Super I/O Configuration

Feature	Options	Description
Serial Port 1 Configuration	submenu	

7.4.3.1 Advanced > Super I/O Configuration > Serial Port 1 Configuration

Feature	Options	Description
Serial Port 1 Configuration	Info only	
Serial Port	Disabled **Enabled**	Enable or Disable Serial Port (COM).
Device Settings	Info only	
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;	Select an optimal setting for Super IO Device

7.4.4 Advanced > BIOS Watchdog Timer

Feature	Options	Description
BIOS Watchdog Timer	**Info only**	
BIOS POST watchdog	**Disabled,** Second Mode, Minute Mode	1. Disable: Disable WatchDog Timer; 2. Second Mode: Enable Watchdog Timer in second mode; 3. Minute Mode: Enable Watchdog Timer in minute mode.

7.4.5 Advanced > Serial Console Redirection

Feature	Options	Description
Console Redirection	**Disabled,** Enabled	To enable or disable console redirection of COMx.
Console Redirection Settings	Submenu	The settings specify how the host computer and the remote computer (which the user is using) will exchange data. Both computers should have the same or compatible settings.

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7.4.5.1 Advanced > Serial Port Console > Console Redirection Settings

Feature	Options	Description
COM0	Info only	
Console Redirection Settings	Info only	
Terminal Type	VT100 VT100+ VT-UTF8 **ANSI**	Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: 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 the other side. 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.
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.

7.4.6 Advanced > Hardware Monitor

Feature	Options	Description
System temperature	Info Only	
CPU temperature	Info Only	
FAN Speed	Info Only	
P_+5V_S0	Info Only	
P_+12V_S0	Info Only	
VCC3V	Info Only	
VSB3V	Info Only	
VBAT	Info Only	
AVSB	Info Only	
Smart Fan Function	Submenu	Smart Fan function setting

7.4.6.1 Advanced > Hardware Monitor > Smart Fan Function

Feature	Options	Description
Fan Setting	Submenu	

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7.4.6.2 Hardware Monitor > Smart Fan Function > Fan setting

Feature	Options	Description
Fan Mode	Manual mode, SMART FAN IV	Fan control mode select

7.4.6.2.1 Hardware Monitor > Smart Fan Function > Fan setting > Manual mode

Feature	Options	Description
Step up time	10	The amount of time Fan takes to increase its value by one step. (Units are intervals of 0.1 second)
Step up time	10	The amount of time Fan takes to decrease its value by one step. (Units are intervals of 0.1 second)
Manual PWM	128	Fan will work with this Manual PWM Value(0 to 255 for 0% to 100%)

7.4.6.2.2 Hardware Monitor > Smart Fan Function > Fan setting > SMART FAN IV

Feature	Options	Description
Step up time	10	The amount of time Fan takes to increase its value by one step. (Units are intervals of 0.1 second)
Step up time	10	The amount of time Fan takes to decrease its value by one step. (Units are intervals of 0.1 second)
Temperature 1	38	The value of temperature1.
Temperature 2	48	The value of temperature2.
Temperature 3	58	The value of temperature3.
Temperature 4	68	The value of temperature4.
FD/RPM 1	77	The value of Fan Duty/RPM when temperature is T1.
FD/RPM 2	128	The value of Fan Duty/RPM when temperature is T2.
FD/RPM 3	204	The value of Fan Duty/RPM when temperature is T3.
FD/RPM 4	255	The value of Fan Duty/RPM when temperature is T4.
Critical temperature	70	Fan temperature critical value.
Critical tolerance	0	Critical Temperature Tolerance.

7.4.7 Advanced > NVMe Configuration

Feature	Options	Description
Seg:Bus:Dev:Func	Info only	
Model Number	Info only	
Total Size	Info only	
Vendor ID	Info only	
Device ID	Info only	
Namespace	Info only	

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Feature	Options	Description
Self Test Option	**Short** Extended	Select either Short or Extended Self Test. Short option will take couple of minutes and extended option will take several minutes to complete.
Self Test Action	**Controller Only Test** Controller and NameSpace Test	Select either to test Controller alone or Controller and NameSpace. Selecting Controller and Namespace option will take lot longer to complete the test.
Run Device Self Test		Perform device self test for the corresponding Option and Action selected by user. Pressing the 'Esc' key will abort the test. The result shown below it is the recent result logged in the device.

7.4.8 Advanced > Trusted Computing

Feature	Options	Description
Security Device Support	Disable, **Enable**	Enables or Disables BIOS support for security device. O.S. will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

7.4.9 Advanced > Miscellaneous

Feature	Options	Description
Miscellaneous	Info only	
BIOS Lock	**Disabled** Enabled	Enable/Disable the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

7.4.10 Advanced > Network Stack Configuration

Feature	Options	Description
Network Stack	**Disabled** Enabled	Enable/Disable UEFI network stack.
Ipv4 PXE Support	**Disabled** Enabled	Enable/Disable IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
Ipv6 PXE Support	**Disabled** Enabled	Enable/Disable IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
PXE boot wait time	**0**	Wait time in seconds to press ESC key to abort the PXE boot. Use either +/- or numeric keys to set the value.

7.5 Chipset

Feature	Options	Description
System Agent (SA) Configuration	submenu	
PCH-IO Configuration	submenu	

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7.5.1 Chipset > System Agent (SA) Configuration

Feature	Options	Description
Graphics Configuration	submenu	Graphics Configuration
VT-d setup menu	submenu	VT-d Configuration settings
Above 4GB MMIO BIOS assignment	**Enabled,** Disabled	Enable/Disable above 4GB MemoryMapped IO BIOS assignment\n\n This is enabled automatically when Aperture Size is set to 2048MB.

7.5.2 Chipset > PCH-IO Configuration

Feature	Options	Description
PCI Express Configuration	Submenu	
SATA Configuration	Submenu	
USB Configuration	Submenu	
HD Audio Configuration	Submenu	

7.5.2.1 Chipset > PCH-IO Configuration > PCI Express Configuration

Feature	Options	Description
PCI Express Root Port PXPA1	Info only	
PCI Express Root Port PXPA2	Info only	
PCI Express Root Port PXPA3	Info only	
PCI Express Root Port PXPA4	Info only	
PCI Express Root Port PXPB1	Submenu	Control the PCI Express Root Port.
PCI Express Root Port PXPB2	Submenu	Control the PCI Express Root Port.
PCI Express Root Port PXPB3	Submenu	Control the PCI Express Root Port.
PCI Express Root Port PXPB4	Submenu	Control the PCI Express Root Port.

7.5.2.1.1 Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express Root Port PXPB1

Feature	Options	Description
PCI Express Root Port PXPB1	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in, **Slot**	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1, L0sL1, Auto	Set the ASPM Level: Force L0s - Force all links to L0s StateAUTO - BIOS auto configure DISABLE - Disables ASPM
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.
PCIe Speed	**Auto**, Gen1, Gen2, Gen3, Gen4	Configure PCIe Speed

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7.5.2.1.2 Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express Root Port PXB2

Feature	Options	Description
PCI Express Root Port PXB2	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in, **Slot**	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1, L0sL1, Auto	Set the ASPM Level: Force L0s - Force all links to L0s StateAUTO - BIOS auto configure DISABLE - Disables ASPM
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.
PCIe Speed	**Auto**, Gen1, Gen2, Gen3, Gen4	Configure PCIe Speed

7.5.2.1.3 Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express Root Port PXB3

Feature	Options	Description
PCI Express Root Port PXB3	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in, **Slot**	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1, L0sL1, Auto	Set the ASPM Level:Force L0s - Force all links to L0s StateAUTO - BIOS auto configure DISABLE - Disables ASPM
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.
PCIe Speed	**Auto**, Gen1, Gen2, Gen3, Gen4	Configure PCIe Speed

7.5.2.1.4 Chipset > PCH-IO Configuration > PCI Express Configuration > PCI Express Root Port PXB4

Feature	Options	Description
PCI Express Root Port PXPB4	Disabled, **Enabled**	Control the PCI Express Root Port.
Connection Type	Built-in, **Slot**	Built-In: a built-in device is connected to this rootport. SlotImplemented bit will be clear. Slot: this rootport connects to user-accessible slot. SlotImplemented bit will be set.
ASPM	**Disabled**, L0s, L1,	Set the ASPM Level:Force L0s - Force all links to L0s StateAUTO - BIOS auto configure DISABLE - Disables ASPM

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	L0sL1, Auto	
L1 Substates	Disabled, L1.1, **L1.1 & L1.2**	PCI Express L1 Substates settings.
Hot Plug	**Disabled**, Enabled	PCI Express Hot Plug Enable/Disable.
PCIe Speed	**Auto**, Gen1, Gen2, Gen3, Gen4	Configure PCIe Speed

7.5.2.2 Chipset > PCH-IO Configuration > SATA Configuration

Feature	Options	Description
Port 0	Disabled, **Enabled**	Enable or Disable SATA Port
Hot Plug	**Disabled**, Enabled	Designates this port as Hot Pluggable.

7.5.2.3 Chipset > PCH-IO Configuration > USB Configuration

Feature	Options	Description
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 Device Mode Port #0	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB SS Device Mode Port #1	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB HS Device Mode Port #0	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB HS Device Mode Port #1	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB HS Device Mode Port #2	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB HS Device Mode Port #3	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB HS Device Mode Port #4	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB HS Device Mode Port #5	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB HS Device Mode Port #6	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB HS Device Mode Port #7	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.
USB HS Device Mode Port #8	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.

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USB HS Device Mode Port #9	Disabled, **Enabled**	Enable/Disable this USB Physical Connector (physical port). Once disabled, any USB devices plug into the connector will not be detected by BIOS or OS.

7.5.2.4 Chipset > PCH-IO Configuration > HD Audio Configuration

Feature	Options	Description
HD Audio	Disabled, **Enabled**	Control Detection of the HD-Audio device. Disabled = HDA will be unconditionally disabled Enabled = HDA will be unconditionally enabled.

7.6 Security

Feature	Options	Description
Administrator Password	Enter password	Set Administrator Password
User Password	Enter password	Set User Password
HDD Security Configuration	Info only	
Secure Boot	submenu	

7.6.1 Secure Boot Menu

Feature	Options	Description
Secure Mode	Info only	
Secure Boot	**Disabled** Enabled	Secure Boot feature is Active if Secure Boot is Enabled, platform Key (PK) is enrolled and the System is in User mode, The mode change requires platform reset
Secure Boot Mode	**Standard** Custom	Secure Boot mode options: Standard or Custom. In Custom mode, Secure Boot Policy variables can be configured by a physically present user without full
Restore Factory Keys	Info only	Force System to User Mode. Install factory default Secure Boot key databases
Reset To Setup Mode	Info only	
Expert Key Management		Enables expert users to modify Secure Boot Policy variables without full authentication

7.7 Boot

7.7.1 Boot Configuration

Feature	Options	Description
Boot Configuration	Info only	
Setup Prompt Timeout	**1**	Number of seconds to wait for setup activation key. 65535(0xFFFF) means indefinite waiting.
Bootup NumLock State	**On** Off	Select the keyboard NumLock state
Quiet Boot	Disabled	Enables or disables Quiet Boot option

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Feature	Options	Description
	Enabled	
Fast Boot	Disabled **Enabled**	Enables or disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.
SATA Support	**Last Boot SATA Devices Only** All Sata Devices	If Last Boot SATA Devices Only, only the last boot SATA device will be available in Post. If All SATA Devices, all SATA devices will be available in OS and Post.
NVME Support	Disabled **Enabled**	If Disabled, NVMe device will be skipped.
VGA Support	Auto **EFI Driver**	If Auto, only install Legacy OpRom with Legacy OS and logo would NOT be shown during post. Efi driver will still be installed with EFI OS.
USB Support	Disabled **Full Initial** Partial Initial	If Disabled, all USB devices will NOT be available until after OS boot. If Partial Initial, USB Mass Storage and specific USB port/device will NOT be available before OS boot. If Enabled, all USB devices will be available in OS and Post.
PS2 Devices Support	Disabled **Enabled**	If Disabled, PS2 devices will be skipped.
Network Stack Driver Support	**Disabled** Enabled	If Disabled, Network Stack Driver will be skipped.
Redirection Support	Disabled **Enabled**	If disable, Redirection function will be disabled.

7.8 Save & Exit

7.8.1 Save Options

Feature	Options	Description
Save Changes and Exit		Exit system setup after saving the changes.
Discard Changes and Exit		Exit system setup without saving any changes.
Save Changes and Reset		Reset the system after saving the changes.
Discard Changes and Reset		Reset system setup without saving any changes.
Save Option	Info only	
Save Changes		Save changes done so far to any of the setup options.
Discard Changes		Discard Changes done so far to any of the setup options.
Restore Defaults		Restore/Load Default values for all the setup options.
Save as User Defaults		Save the changes done so far as User Defaults.
Boot Override	Info only	

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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/industrial-display-panel-pcs/industrial-box-pcs-and-digital-signage-players/EMP-520_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 USB 3.0 driver
6. Install the I/O driver.

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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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