SP2-IMX8 Series

Open-Frame Panel PC

User's Manual



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Part No:	50M-P1500-1010

LEADING EDGE COMPUTING

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Revision History

Revision	Release Date	Description of Change(s)
1.0	2024-04-19	Initial release.
1.1	2025-10-03	Boot mode switch definition updated.

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Preface

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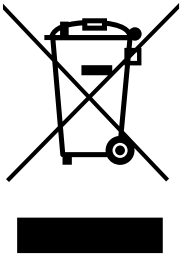
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Conventions

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

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

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

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

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1 Introduction

1.1 Overview

The SP2-IMX8 Series open-frame panel PC is based on the ultra-low-power ARM A53 series processors featuring flexible IO options. The SP2-IMX8 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 ARM A53
- Extensive I/O and function expansion through wire-to-board connectors
- 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)

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1.3 Packing List

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

- 1x SP2-IMX8 Series Smart Panel

1.4 Optional Accessories

- Wi-Fi module
- 60W (12V/5A) power supply
- Cables for internal IO expansion

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2 Specifications

2.1 SP2-IMX8 Series Specifications

Model	SP2-07WP-IMX8	SP2-10WP-IMX8
Processor	NXP i.MX 8M Plus, ARM A53, 64-Bit, 1.8GHz, 4 Core	NXP i.MX 8M Plus, ARM A53, 64-Bit, 1.6GHz, 4 Core
Memory	2 GB (Default) / 4 GB & 8 GB (Optional)	
Storage	32GB eMMC 5.1	
Display and Touch		
Size	7”	10.1"
Resolution	1024 x 600	1280 x 800
Contrast Ratio	800:1	800:1
Brightness (Nits)	425 cd/m^2 (typ.)	300 cd/m^2 (typ.)
Backlight Life (hrs)	70,000	50,000
Viewing Angle (U/D/R/L)	85/85/85/85	
Touch Points	5 points	
Touch Structure	Glass/Glass	
Surface Hardness	7H	
Surface Treatment	Anti-Glare coating	
External I/O		
Ethernet	1x GbE port, RJ45 connector, 1G TSN, wake on LAN support, (default) 1x GbE port, RJ45 connector, support wake on LAN, (optional)	
USB Ports	1x USB 3.0, Type A (default) or 1x USB 3.0 + 2.0, Type A (Optional) 1x USB 2.0 Micro B OTG (default)	
DisplayPort	1x HDMI 2.0a, up to 3840x2160p30 for display, 1920x1080p60 for Video	
Buttons	1x Reset button 1x Function button 1x Wafer to support power button	

Table 2-1: SP2-IMX8 Series Specifications

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Model	SP2-07WP-IMX8	SP2-10WP-IMX8
Internal I/O with Wire to Board Connectors		
Serial Port	1x RS485, with auto flow control (default) 1x RS-232/422/485 programmable, auto flow (optional)	
USB Port	1x USB 2.0 client, wafer	
COM port	1x RS485, with auto flow control (default) 1x RS-232/422/485 programmable, auto flow (optional)	
I^2C	2x for I^2C client, wafer	
Audio (optional)	1x for 2x stereo speaker (2 watts) 1x Mic-in (mono) and Line-out (stereo) 1x buzzer	
CAN	1x CAN Bus, wafer	
M.2 2230 slot	1x M.2 2230 E key for wireless (Wi-Fi/Bluetooth)	
Expansion IO (optional)	1x USB 3.2 Gen1 (5Gbps), 1x I2C, 1x SPI, 4GPI&4GPO	
Power		
Power Input	12V (default) or 12-24V (optional)	
Power Connector	1x 2.5 Φ DC Jack (default) or 4-pin power connector (optional)	
Backup Battery	1x RTC battery	
Environmental		
Operating Temperature	0°C to 60°C (SP2-07WP-IMX8/SP2-10WP-IMX8) -40°C to 80°C (SP2-IMX8-SBC)	
Storage Temperature	-20°C to 70°C (SP2-07WP-IMX8/SP2-07WP-IMX8) -40°C to 85°C (SP2-IMX8-SBC)	
Humidity	Up to 95% @ 40°C	
Vibration	OP 1 Grms, 5-500Hz, (Refer to IEC60068-2-64) X, Y, Z axes, 60 min/axis (SP2-07WP-IMX8/SP2-10WP-IMX8) OP 1.87 Grms, 5-500Hz, (Refer to IEC60068-2-64) X, Y, Z axes, 60 min/axis (SP2-IMX8-SBC)	
Shock	OP 20G peak acceleration (Half-Sine), Pulse Duration: 11ms (Refer to IEC60068-2-27), ±X, ±Y, ±Z, 3 shocks/ axes (SP2-07WP-IMX8/SP2-10WP-IMX8) OP 30G peak acceleration (Half-Sine), Pulse Duration: 11ms (Refer to IEC60068-2-27), ±X, ±Y, ±Z, 3 shocks/ axes (SP2-IMX8-SBC)	
ESD	Air: ±15kV, Contact: ±8kV	

Table 2-1: SP2-IMX8 Series Specifications

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Model	SP2-07WP-IMX8	SP2-10WP-IMX8
EMC/Safety Compliance	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; EN IEC 61000-3-2:2019+A1:2021; BS EN IEC 61000-3-2:2019+A1:2021; EN 61000-3-3:2013+A1:2019+A2:2021; BS EN 61000-3-3:2013+A1:2019+A2:2021; EN IEC 61000-6-4:2019; EN IEC 61000-6-2:2019; BS EN IEC 61000-6-4:2019; BS EN IEC 61000-6-2:2019; EN 50121-3-2:2016+A1:2019; BS EN 50121-3-2:2016+A1:2019; EN 55011:2016+A11:2020 (Group1, class B); BS EN 55011:2016+A11:2020; IEC/EN 60601-1; IEC/EN 62368-1 2nd	
Software		
Operating Systems	Yocto Kirkstone LTS (5.15), by default Android 13, optional Windows 10, by demand	
Mechanical		
Construction	SGCC	
Dimensions (HxWxD)	184 x 154 mm	257.6 x 202.2 mm
Weight	860g ± 25g	950g ± 28g
Mounting (Optional)	1) Panel Mounting 2) Rear cover 3) VESA bracket	

Table 2-1: SP2-IMX8 Series Specifications

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2.2 SP2-IMX8 Series Block Diagram

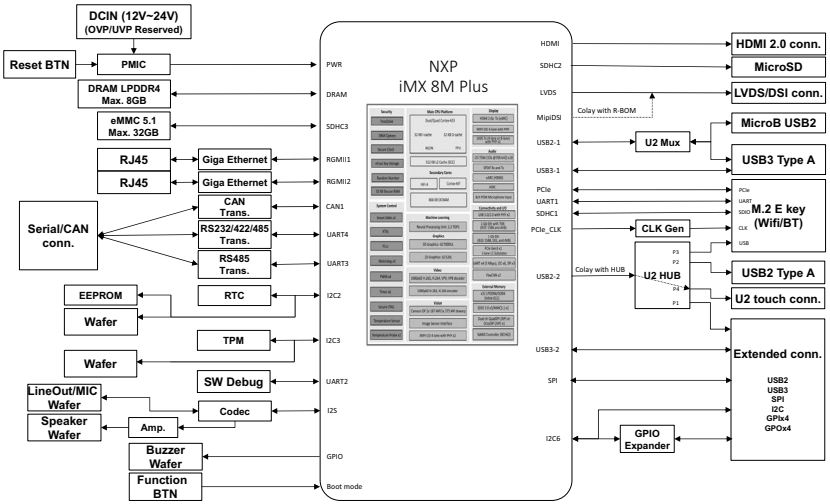


Figure 2-1: SP2-IMX8 Series Block Diagram

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2.3 Power



Please use an approved power source as certified by IEC or UL.
If you need adaptor, optional accessories or further assistance, please contact with ADLINK for further information.
Tma of this device is 60?
The altitude during operation is up to 5000 m whose output meets LPS and SELV (ES1) circuits.
The output rating of DC power source as following

- *Voltage: 12 VDC or 24 VDC*
- *Current: 2.5A minimum / 1.25A minimum*

The output rating of adapter as following

- *Voltage: 12 VDC or 24 VDC*
- *Current: 2.5A minimum / 1.25A minimum*

Before providing DC power to the SP2-IMX8, ensure the voltage and polarity provided are compatible with the DC input. Improper input voltage and/or polarity can be responsible for system damage.

Veuillez utiliser une source d'alimentation approuvée et certifiée par IEC ou UL.
Si vous avez besoin d'un adaptateur d'appareil, d'accessoires en option ou d'une assistance supplémentaire, veuillez contacter ADLINK pour plus d'informations.
Tma de cet appareil est de 60?
L'altitude pendant le fonctionnement est jusqu'à 5000 m dont la sortie répond aux circuits LPS et SELV (ES1).
La puissance nominale de sortie de la source d'alimentation CC comme suit
Tension : 12 VDC or 24 VDC
Courant : 2.5A minimum / 1.25A minimum
La note de sortie de l'adaptateur comme suit
Tension : 12 VDC or 24 VDC
Courant : 2.5A minimum / 1.25A minimum
Avant de connecter le PC Lenovo SP2-IMX8 à une source de courant continu, veuillez vous assurer de la polarité de la tension conformément à l'entrée CC du PC. Une tension et/ou une polarité incorrectes peuvent causer des dommages irréversibles sur le système.

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2.4 Mechanical Dimensions

NOTE:

All dimensions are in millimeters, unless noted.

2.4.1 SP2-7WP Dimensions

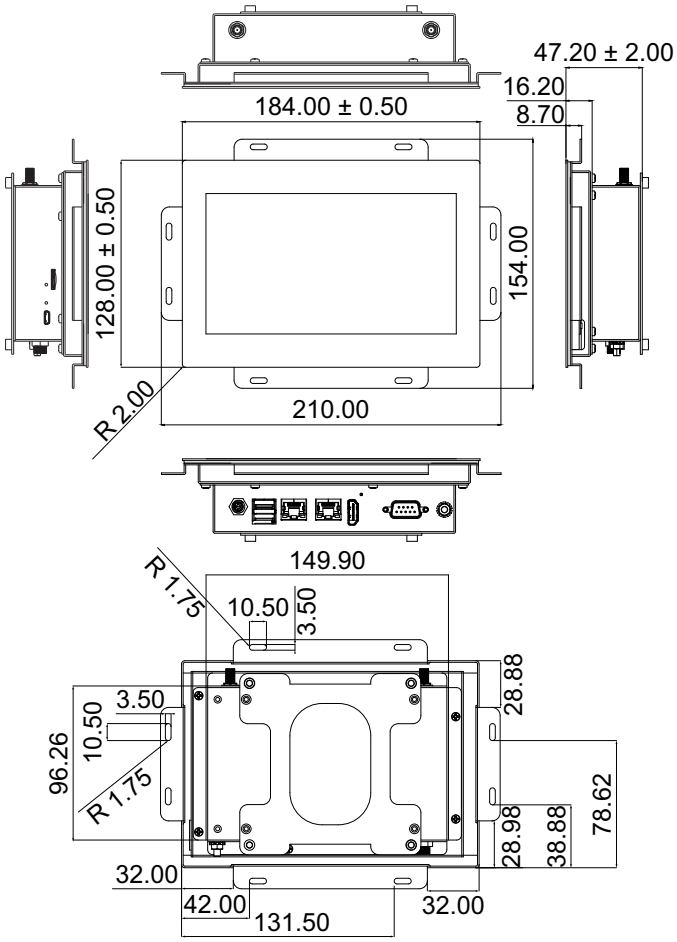


Figure 2-2: SP2-7WP Dimensions

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2.4.2 SP2-10WP Dimensions

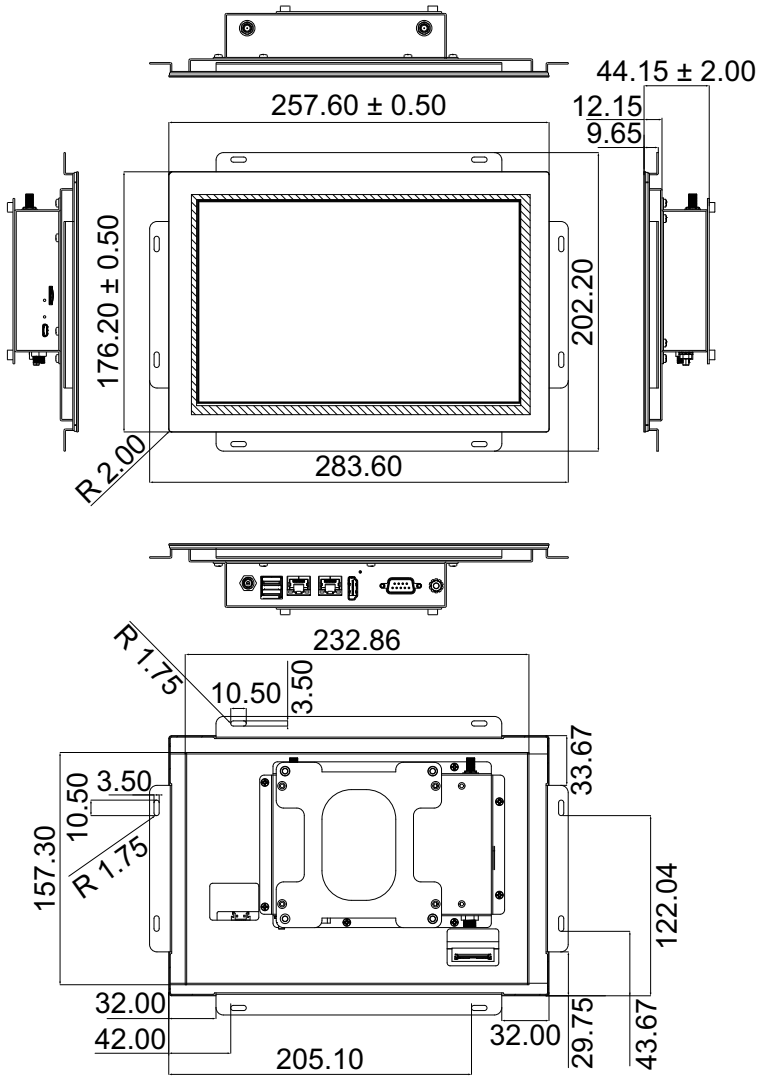


Figure 2-3: SP2-10WP Dimensions

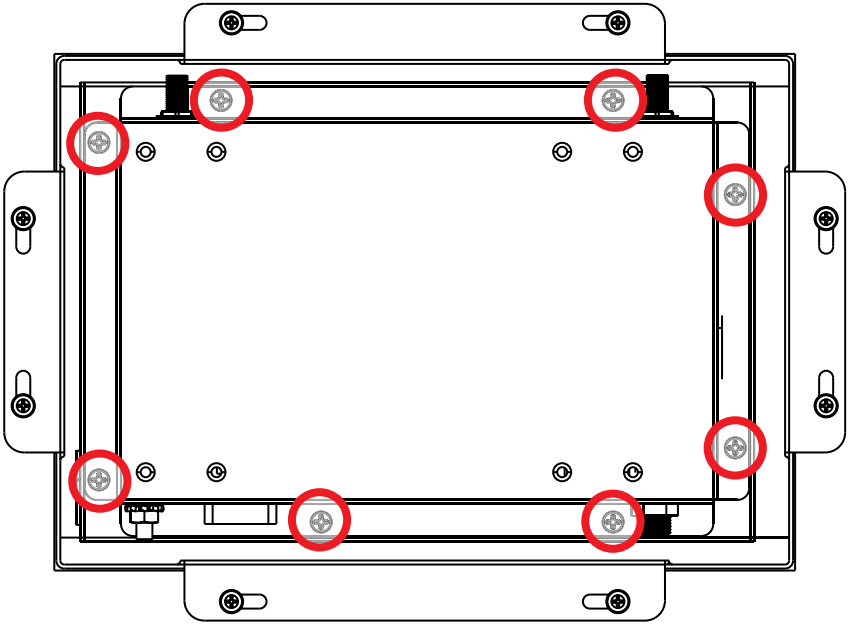
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2.5 Installing a Wi-Fi Module

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

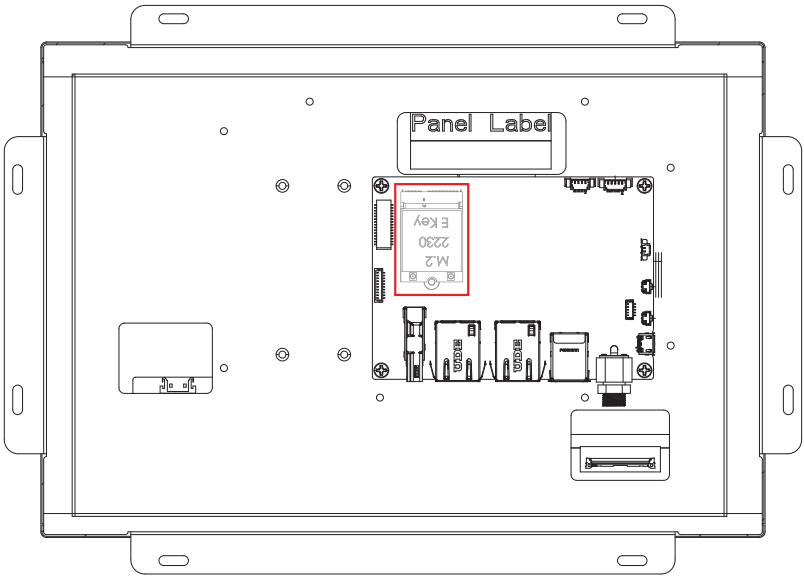
NOTE: In the default configuration, only one PCI slot is available.

1. Remove the 6 screws that attach the rear cover to the chasis and remove the cover.



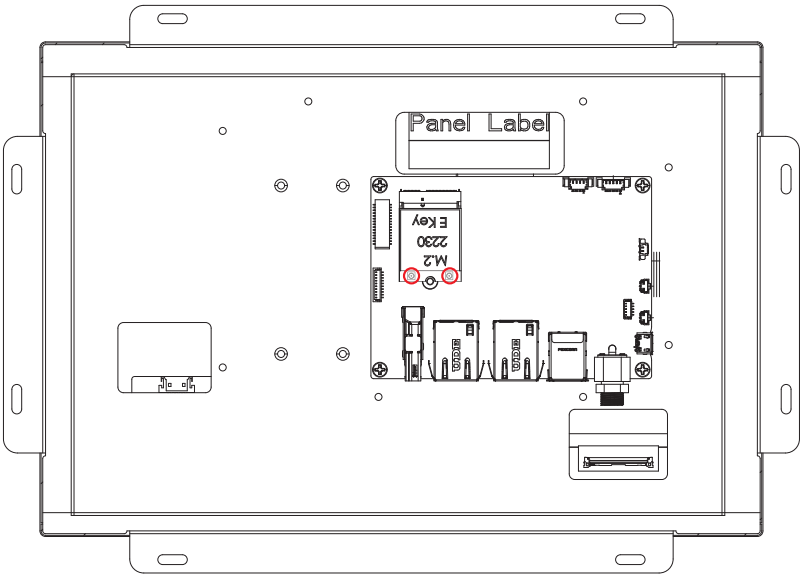
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2. Install the Wi-Fi module.



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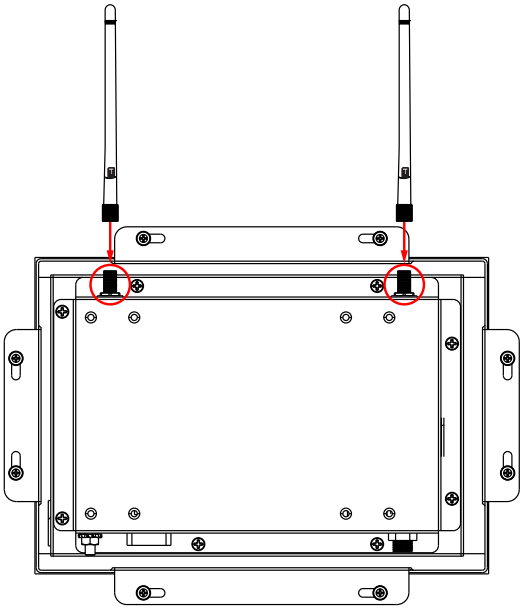
3. Connect Wi-Fi antenna wires from the chassis to the Wi-Fi Module.



4. Reattach the rear cover to the chasis with the previously removed screws.

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5. Attach the Wi-Fi antennas to the outside of the chassis.



NOTE:

Wi-Fi antennas must be installed on the SP2-IMX8 Series housing in order for Wi-Fi to function properly.

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2.6 Mounting

This section includes details for panel and VESA mounting options.



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



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



All dimensions are in millimeters, unless noted.

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2.6.1 Panel Mounting

The SP2-IMX8 Series can be panel mounted with 14 mounting clips (optional items sold separately). Make sure there is adequate space behind the panel for ventilation, and that the panel material and thickness can support the weight of the device.

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

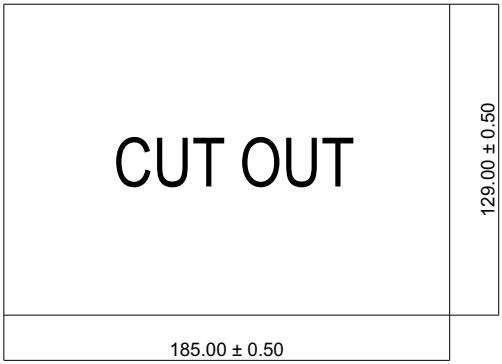


Figure 2-4: SP2-7WP Cutout Dimensions

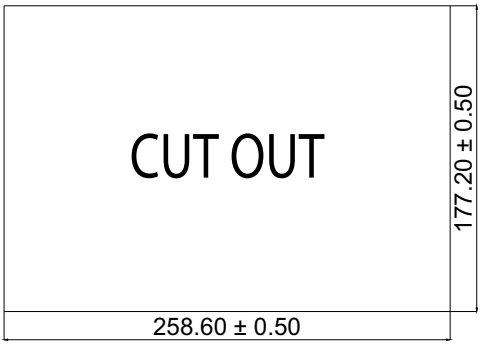
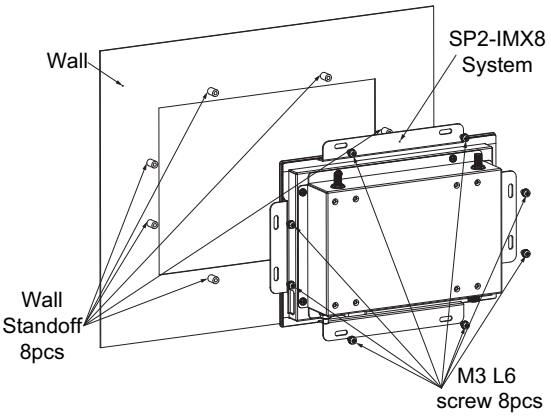


Figure 2-5: SP2-10WP Cutout Dimensions

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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.

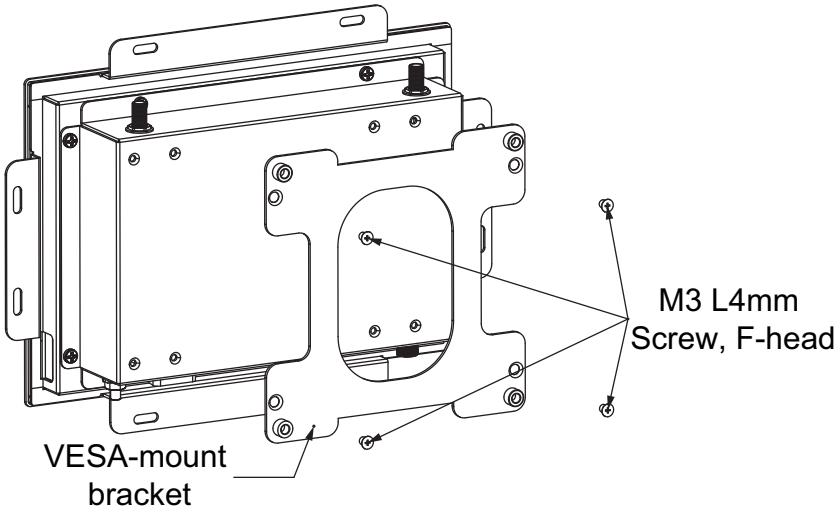


Step 4: Secure the device using the 8 screw holes in the frame.

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2.6.2 VESA Mounting

The SP2-IMX8 Series can be VESA mounted with a rear cover and VESA bracket. (Optional items sold separately.)



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

NOTE: Mounting bracket provides 100 mm x 100 mm VESA mounting and requires 4x M3 screws.

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3 System Layout

3.1 External I/O Connectors

The SP2-IMX8 Series provides the following external I/O connectors.

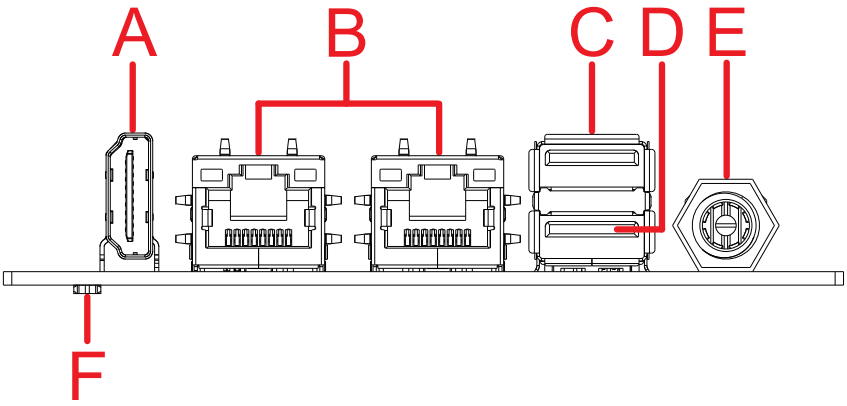


Figure 3-1: SP2-IMX8 Series External I/O (Back)

A	1x HDMI
B	2x RJ45 GbE LAN
C	1x USB 2.0, Type A
D	1x USB 3.2 Gen1 (5Gbps) Type-A
E	1x DC input
F	1x LED

Table 3-1: External I/O Legend (Back)

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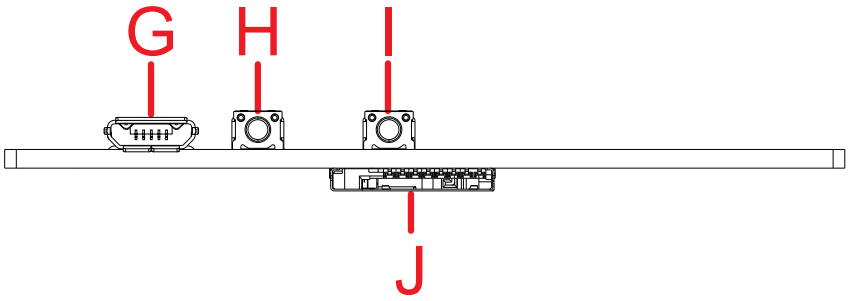


Figure 3-2: SP2-IMX8 Series External I/O (Side)

G	1x Micro USB-B
H	1x Function Button
I	1x Reset Button
J	1x MicroSD Card Slot

Table 3-2: External I/O Legend (Side)

3.1.1 RJ45 GbE LAN

2 LEDs indicate LAN status.

Color	Indicator	Description
Yellow	On	Ethernet connected with no activity.
	Off	Ethernet disconnected.
	Flashing	Ethernet connected and active.
Green	Off	10 Mbps
	On	100/1000 Mbps

Table 3-3: LAN LED Indicator Definition

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3.1.2 LED

2 LEDs indicate system status.

Color	Indicator	Description
Green	Standby	Indicates standby power ready.
Orange	Status	Indicates System OS is Ready to use.

Table 3-4: LED Indicator Definition

3.1.3 Micro USB-B Port (OTG)

This Micro USB-B Port facilitates connection of external or OTG devices.

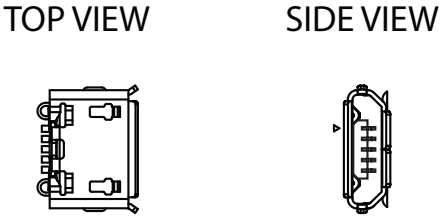


Figure 3-3: Micro USB-B Port (OTG) Definition

Pin	Signal
1	VBUS
2	DN
3	DP
4	ID (GND, depending on Device Mode)
5	GND

Table 3-5: Micro USB-B Port (OTG) Definition

3.1.4 Function Button

The function button overrides the eMMC boot behavior option. Since eMMC is the default first boot device, this means the func-

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tion button effectively changes the preferred boot device. The first boot device can be changed using the Boot Mode switches in the next section, and may significantly alter the functionality of this button. See “Boot Mode Switch” on page 31.

By default, holding the function button and then attaching the AC power connector will cause the system to boot from the microSD card. If there is no boot code or boot device in the microSD card slot, the system will boot in to serial download mode.

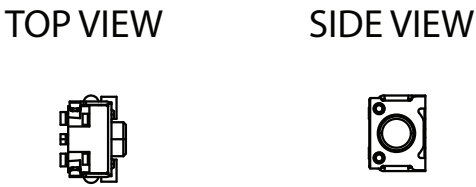


Figure 3-4: Function Button

Function	Trigger
Override eMMC boot mode to boot from microSD card	Press and hold before powering on, release as soon as green LED illuminates.
Enter USB Mass Storage Mode	Press and hold before powering on, continue holding after green LED illuminates until on-screen instructions appear.
Wake up from suspend.	Press once while in suspend mode (initiated from OS).

Table 3-6: Function Button Triggers

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3.1.5 Reset Button

Pressing the reset button will restart the system immediately.

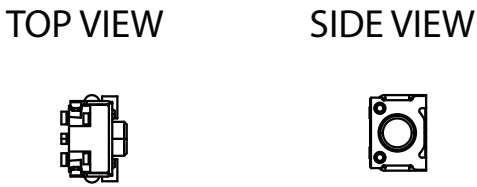


Figure 3-5: Reset Button

3.1.6 MicroSD Card

The MicroSD card slot can be used for expanded storage. The slot supports SDR12, SDR25, SDR50, SDR104, and DDR50 speed grades.

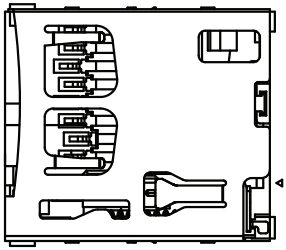


Figure 3-6: MicroSD Card Connector Pin Definition

Pin	Signal
1	DATA2
2	DATA3
3	CMD
4	VDD(3V3)
5	CLK
6	GND
7	DATA0
8	DATA1

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Table 3-7: MicroSD Card Connector Pin Definition

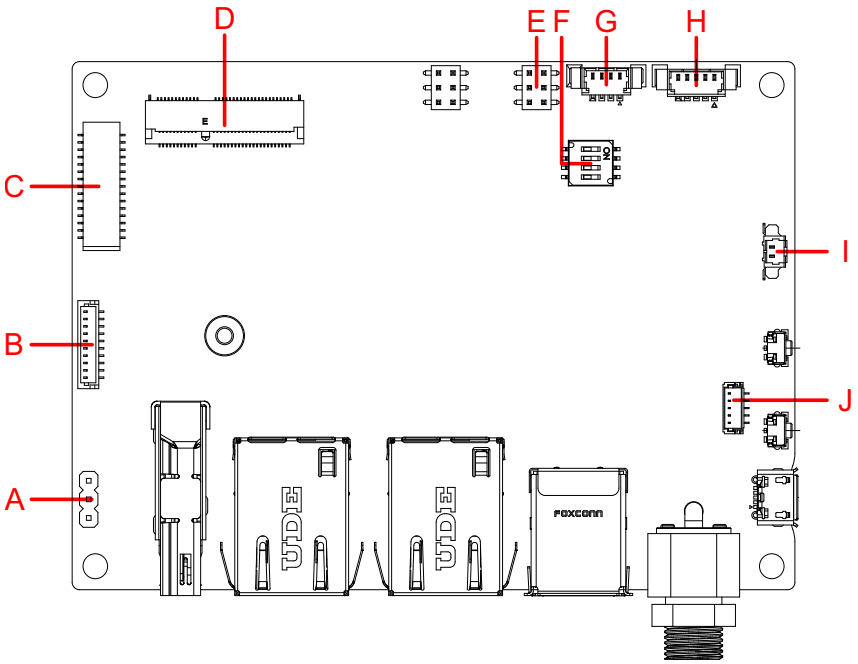
3.2 Internal I/O Connectors

WARNING:

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

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

3.2.1 Mainboard Connector Locations



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Figure 3-7: Mainboard Connectors (top)

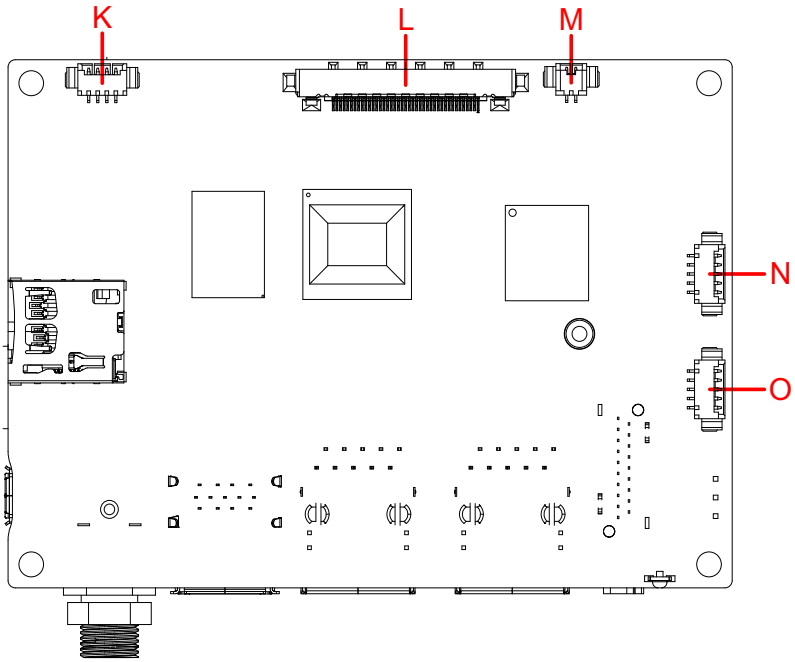


Figure 3-8: Mainboard Connectors (bottom)

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A	UART debugging connector	**I**	Buzzer
B	RS232/RS422/RS485 & RS485/CAN wafer	**J**	Internal Reset and Function Button Wafer
C	I/O Expander Connector	**K**	USB Touch
D	2230, E Key for Wi-Fi/Bluetooth Modules	**L**	LVDS Connector
E	LVDS Power Selection Jumper	**M**	RTC Battery wafer
F	Boot Mode Switch	**N**	I2C 3 Wafer
G	Speaker	**O**	I2C 2 Wafer
H	Line Out/Mic In		

Figure 3-9: Mainboard Connector Legend

3.2.2 UART Debugging Connector

There is one port is used for debugging purposes. 3-pin header with 2.54mm pitch. 1.8V UART interface direct to/from SOC.



Figure 3-10: UART Debugging Connector Pin Definition

Pin	Signal
1	UART2_TXT
2	UART2_RXT
3	GND

Table 3-8: UART Debugging Connector Pin Definition

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3.2.3 RS232/RS422/RS485 & RS485/CAN Wafer

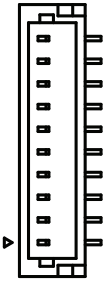


Figure 3-11: RS232/RS422/RS485 & RS485/CAN Wafer Pin Definition

Pin	Signal	RS232	RS422	RS485	CAN
1	CN_COM1_CTS#	CTS#	TXD422-	485DATA1-	NC
2	CN_COM1_RXD	RXD	TXD422+	485DATA1+	NC
3	CN_COM1_TXD	TXD	RXD422+	NC	NC
4	CN_COM1_RTS#	RTS#	RXD422-	NC	NC
5	GND	GND	NC	GND	NC
6	CN_RS485_DN	NC	NC	485DATA2-	NC
7	CN_RS485_DP	NC	NC	485DATA2+	NC
8	CON_CAN1_H	NC	NC	NC	CAN_H
9	CON_CAN1_L	NC	NC	NC	CAN_L
10	GND	NC	NC	GND	GND

Table 3-9: RS232/RS422/RS485 & RS485/CAN Pin Definition

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3.2.4 I/O Expander Connector

The 30-pin I/O expander connector includes expansion options for USB 3, I^2C, SPI, GPI, and GPO.

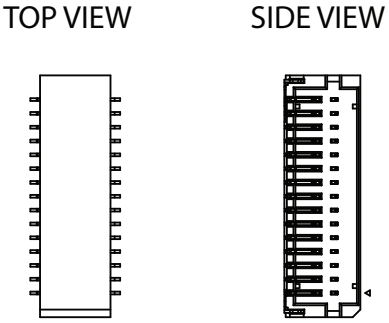


Figure 3-12: I/O Expander Connector Pin Definition

Pin	Signal	Pin	Signal
1	P_5V_VUSB_INT(PWR	2	GND
3	P_5V_VUSB_INT(PWR	4	GND
5	USB3_TX_N_INT_CN	6	P_3V3_A_EIO(PWR)
7	USB3_TX_P_INT_CN	8	SPI2_MOSI_3V3_CN
9	GND	10	SPI2_MISO_3V3_CN
11	USB3_RX_N_INT_CN	12	SPI2_CS0#_3V3_CN
13	USB3_RX_P_INT_CN	14	SPI2_CLK_3V3_CN
15	GND	16	CN_DI0
17	USB2_N_INT_CN	18	CN_DI1
19	USB2_P_INT_CN	20	CN_DI2
21	I2C6_SCL_3V3	22	CN_DI3
23	I2C6_SDA_3V3	24	CN_DO0
25	I2C6_INT#_3V3	26	CN_DO1
27	GND	28	CN_DO2
29	DCIN_IN_EIO(PWR)	30	CN_DO3

Table 3-10: I/O Expander Connector Pin Definition

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

Provides expansion for a Wi-Fi/Bluetooth module.

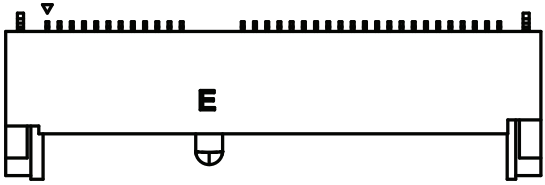


Figure 3-13: E Key Connector Pin Definition

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	M2_SD_CLK	10	NC
11	M2_SD_CMD	12	NC
13	M2_SD_DATA0	14	NC
15	M2_SD_DATA1	16	NC
17	M2_SD_DATA2	18	GND
19	M2_SD_DATA3	20	M2_UART_WAKE
21	M2_SD_WAKE	22	UART1_RXD
23	M2_SD_nRST	32	UART1_TXD
33	GND	34	UART1_CTC
35	PCIE2_M2E_TX_P	36	UART1_RTS
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

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Pin	Signal	Pin	Signal
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		

Table 3-11: Key Connector Connector Pin Definition

3.2.6 LVDS Power Selection Jumper

This 6-pin jumper configures the panel backlight and voltage through the LVDS connection.

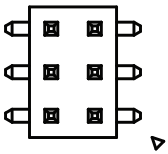


Figure 3-14: LVDS Power Selection Jumper Pin Definition

Pins	Signal
2-4	+12V(Default)
4-6	+5V
Pins	**Signal**
1-3	+3V3(Default)
3-5	+5V

Table 3-12: LVDS Power Selection Jumper Pin Definition

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3.2.7 Boot Mode Switch

NOTE:

Avoid adjusting the boot mode switch configuration on production devices without testing. Changing the boot mode switch configuration will significantly alter the behavior of the function button and device boot order. If the function button behaves unexpectedly after changing boot mode switch configuration, consider powering off your device and returning the switches to their default settings.

The 4-switch block controls boot mode.

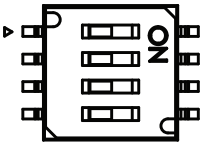


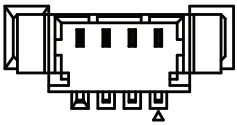
Figure 3-15: Boot Mode Switch Definition

Boot Mode	SW1	SW2	SW3	SW4
Boot From Internal Fuses	OFF	OFF	OFF	OFF
USB Serial Download	ON	OFF	OFF	OFF
USDHC3 (eMMC boot only, SD3 8-bit) (Default)	OFF	ON	OFF	OFF
USDHC2 (SD boot only, SD2)	ON	ON	OFF	OFF

Table 3-13: Boot Mode Switch Definition

3.2.8 Speaker Connector

Supports 2x 2-watt speakers..



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Figure 3-16: Speaker Connector Pin Definition

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

Table 3-14: Speaker Connector Pin Definition

3.2.9 Mic In/Line Out Connector

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

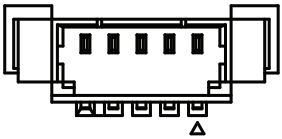


Figure 3-17: Mic In/Line Out Connector Pin Definition

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

Table 3-15: Mic In/Line Out Connector Pin Definition

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3.2.10 Buzzer Connector

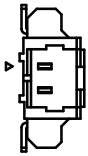


Figure 3-18: Buzzer Connector Pin Definition

Pin	Signal
1	BUZZER-
2	BUZZER+

Table 3-16: Buzzer Connector Pin Definition

3.2.11 Internal Reset and Function Button Wafer

Connects to reset and function buttons via cable.



Figure 3-19: Internal Reset and Function Buttons Pin Definition

Pin	Signal
1	Function_BTN
2	GND
3	GND
4	RST_BTN
5	PWRBTN

Table 3-17: Reset and Function Buttons Pin Definition

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3.2.12 USB Touch Connector

The USB 2.0 connector supports a touch-sensitive digitizer

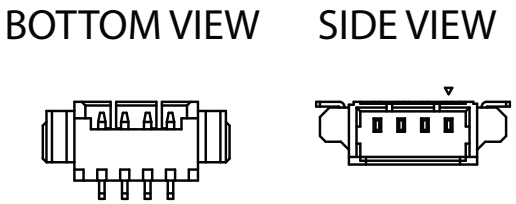


Figure 3-20: USB Touch Connector Pin Definition

Pin	Signal
1	GND
2	USB2_DP_TOUCH_CN
3	USB2_DN_TOUCH_CN
4	P5V_U2_TOU(PWR)

Table 3-18: USB Touch Connector Pin Definition

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3.2.13 LVDS Connector

The LVDS/eDP allows internal connection to a display.

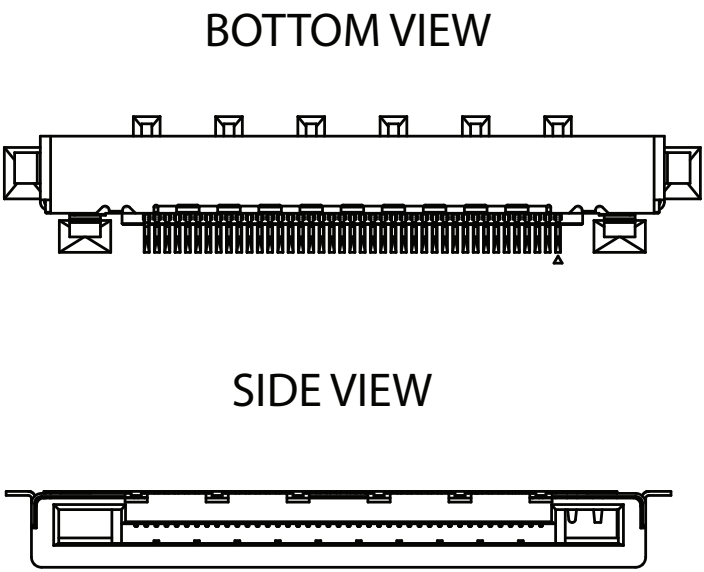


Figure 3-21: LVDS Connector Pin Definition

Pin	Signal	Pin	Signal
1	LVDS_A3N_1	2	LVDS_A3P_1
3	GND	4	LVDS_A2N_1
5	LVDS_A2P_1	6	GND
7	LVDS_ACKN_1	8	LVDS_ACKP_1
9	GND	10	LVDS_A1N_1
11	LVDS_A1P_1	12	GND
13	LVDS_A0N_1	14	LVDS_A0P_1
15	GND	16	LVDS_B3N_1
17	LVDS_B3P_1	18	GND
19	LVDS_B2N_1	20	LVDS_B2P_1
21	GND	22	LVDS_BCKN_1
23	LVDS_BCKP_1	24	GND

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Pin	Signal	Pin	Signal
25	LVDS_B1N_1	26	LVDS_B1P_1
27	GND	28	LVDS_B0N_1
29	LVDS_B0P_1	30	GND
31	+VDD_PANEL_CN(PWR)	32	+VDD_PANEL_CN(PWR)
33	GND	34	BLPWR_12V_5V_CN(PWR)
35	BLPWR_12V_5V_CN(PWR)	36	G_LVDS_I2C_DAT_CN
37	G_LVDS_I2C_CLK_CN	38	LCD_SEL68_CN
39	CN2_LVDS_BKLT_EN	40	CN_LVDS_BKLT_PWM
41	GND		

Table 3-19: LVDS Connector Pin Definition

3.2.14 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.

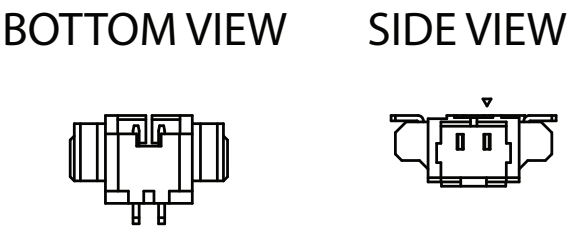


Figure 3-22: RTC Battery Wafer Pin Definition

Pin	Signal
1	VRTC_IN
2	GND

Table 3-20: RTC Battery Wafer Pin Definition

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3.2.15 I²C Connector 3

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.

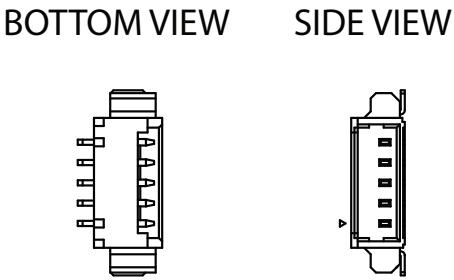


Figure 3-23: I2C Connector 3 Pin Definition

Pin	Signal
1	NC
2	P_3V3_A_I2C(PWR)
3	I2C_SDA_3V3
4	I2C_SCL_3V3
5	I2C_INT#_3V3
6	GND

Table 3-21: I2C Connector 3 Pin Definition

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3.2.16 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.

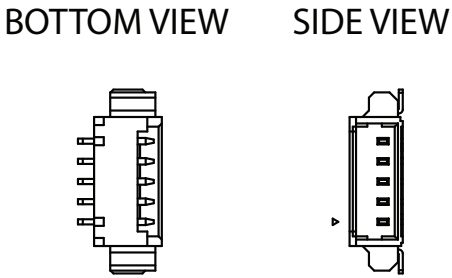


Figure 3-24: I2C Connector 2 Pin Definition

Pin	Signal
1	NC
2	P_3V3_A_I2C(PWR)
3	I2C_SDA_3V3
4	I2C_SCL_3V3
5	I2C_INT#_3V3
6	GND

Table 3-22: I2C Connector 2 Pin Definition

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4 Getting Started with SP2-IMX8 Kit

This section provides helpful tips for booting up the SP2-IMX8 LPDDR4 development kit.


NOTE:

This chapter assumes default Boot Mode Switch configuration and function button behavior. If you experience unexpected behavior with the function button, verify that the device has not been opened after delivery or, if it has been opened, that the Boot Switch configuration has not been changed. See "Function Button" on on page 21 and "Boot Mode Switch" on on page 31 for details.

4.1 Connecting Optional External Displays

SP2-IMX8 supports external HDMI displays in addition to the integrated LVDS touch panel. For SP2-IMX8 development kit options with no LVDS touch panel, the external HDMI display can act as a primary display instead.

4.2 Connecting Power

Connect a regulated 12v DC power supply to the DC power port on SP2-IMX8 to power the device on. To power off the device, remove the power supply.

4.3 Creating and Booting from a Micro-SD Card

The SP2-IMX8 Development Kit ships with empty eMMC storage and does not include a pre-built Linux binary demo image.

A pre-built Yocto based binary demo image with graphical desktop (NXP desktop) can be downloaded and flashed to a MicroSD card.

Once the binary demo image is downloaded and flashed, the card can be used to boot into a working GUI desktop environment.

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4.3.1 Creating a Bootable MicroSD Card

You can boot into a Linux environment in preparation for flashing to the on-board eMMC. ADLINK provides a demo image built specifically for the SP2-IMX8 board configuration.

1. On an existing PC, download the image from the ADLINK website at the following URL:

   https://www.adlinktech.com/Products/Panel_PCs_-Monitors/Panel_PCs_Monitors/SP2-IMX-8_Series?Lang=en

2. Using an image flashing tool, flash the bootable WIC image on to the microSD card. You can use a GUI tool such as BalenaEtcher, or a command-line tool, such as bmaptool from the bmap-tools package.


NOTE:

You can also use the image flashing tool to flash the on-board eMMC directly using the USB Mass Storage Mode.

4.3.2 Booting from a MicroSD Card

To boot from a flashed microSD card:

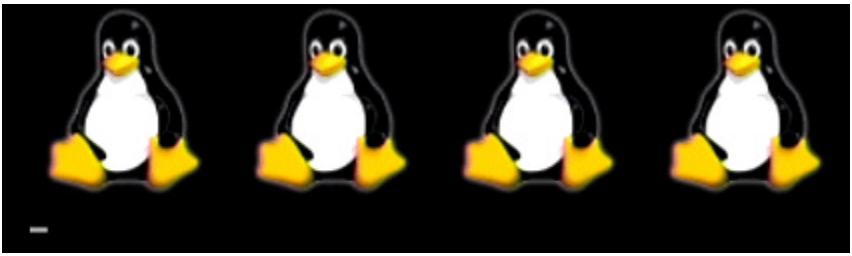
1. With the device powered off, insert the microSD card into the slot.

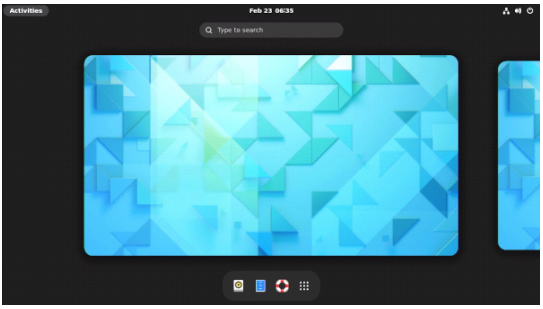
2. Press and hold the function button, and then connect the power. When the green LED illuminates, release the function button.

3. After the ADLINK logo, the device proceeds to the U-Boot process. If uninterrupted, it will continue to boot the kernel.

As Linux boots up, you will see a number of Linux Penguins in the upper left corner of the screen, followed by a GNOME-like GUI desktop environment on the LVDS touch panel.

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Congratulations, you can now move on to Flashing Linux to the eMMC from the microSD card.

NOTE: If no valid boot image is available on the microSD card, or no card is inserted, the device will fall back to Serial Download Mode.

4.3.3 Flashing Linux to the eMMC from the microSD card

The easiest way to install Linux onto the on-board eMMC is to use the installer script from the desktop.

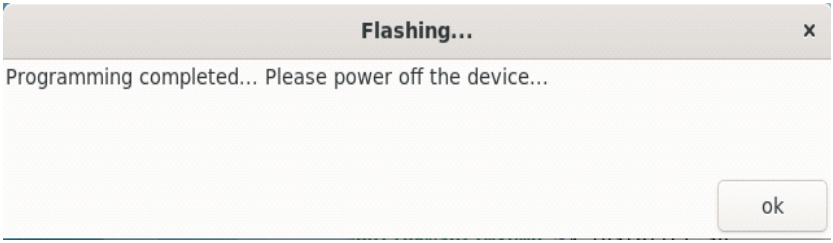
1. Once the desktop is booted, open a terminal window.

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2. Type 'installer.sh' and press **Enter** to run the installer script.

3. Follow the onscreen instructions to complete the installation process.

4. Once the installation process is completed, eject the microSD card and cycle the power or reset the device.



When the device is powered back on, it will now boot from the on-board eMMC.

4.4 Advanced Features

4.4.1 Accessing On-Board eMMC from Another Device

The bootloader for SP2-IMX8, U-Boot, supports using emulated eMMC as USB Mass Storage, allowing you to use the on-board eMMC storage on another computer as though it was a USB drive.

Before you begin: Make sure you have flash a microSD card with the prebuilt image.

1. Connect the SP2-IMX8 to your computer using a micro USB cable.

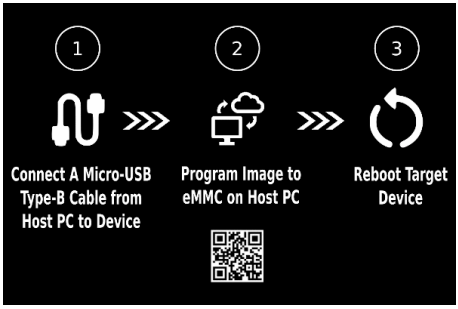
2. Insert your microSD card into the slot on SP2-IMX8.

3. Press and hold the function button while resetting/powering on the SP2-IMX8.

4. Continue to hold the function button until the instructions for USB Mass Storage mode appear. The device storage

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should now be visible on the host computer.



5. Use a flashing tool to flash the image onto the emulated mass storage device (on-board eMMC storage).

6. Once the flashing process completes, disconnect the cable and restart the device. You will now be able to boot from the newly flashed eMMC storage.

4.4.2 Flashing an Image Using the Universal Update Utility in Serial Download Mode

The Universal Update Utility (UUU) runs on a Windows or Linux OS host and is used to download images to eMMC storage devices on an i.MX board.

Before you begin: Make sure you have installed UUU on your computer and downloaded the necessary bootloader and eMMC image before proceeding.

1. To boot into serial download mode, connect the device to your computer with a microUSB cable, and then turn the device on while holding the function button. Make sure no microSD card is inserted.

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2. On your computer, open a shell.

3. Use lsusb to verify that the SP2-IMX8 is in serial download mode.

4. Run **`uuu -b emmc_all <path to bootloader> <path to eMMC image>`** to flash the image.

5. Disconnect the cable and reboot the device.

4.4.3 Using a Serial Console Cable

You can connect a serial console cable by connecting a USB to UART adapter cable to the debug port on the development board. This feature is provided for developers needing to access the system directly.


NOTE:

The debug port operates at TTL voltage levels, with the TX pin connecting to RX on the UART cable, and RX pin to TX on UART cable. The USB end connects to a computer.


NOTE:

Connecting the serial console cable requires opening the chassis of the device to access the debug port.

4.4.4 Changing Default Boot Behavior with Boot Switch Setup (Optional)

You can change the default boot behavior by reconfiguring the switches on the board. See “Boot Mode Switch” on page 31.

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5 Software Support

Visit the ADLINK github page at:

https://github.com/adlink/meta-adlink-nxp

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Important Safety Instructions

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

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

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

CAUTION:

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

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



BURN HAZARD

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

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Consignes de Sécurité Importante

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

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

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

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



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

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

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

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

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EMC Compliance

CE Warning

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

FCC Warning

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

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

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Getting Service

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

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