SP2-AL Series

Open-Frame Panel PC

User's Manual



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LEADING EDGE COMPUTING

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Revision History

Revision	Release Date	Description of Change(s)
1.0	2023-04-01	Initial Release

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Preface

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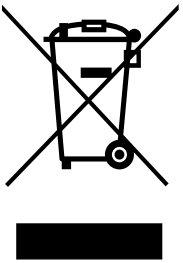
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Conventions

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

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

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

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

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1 Introduction

1.1 Overview

ADLINK's SP2-AL smart panel, based on the Intel Atom® TM E3900 series (System-on-Chip) 64-bit, multi-core processor built on 14nm technology, to be paired with the Apollo Lake Platform, is an embedded open-frame panel computer meeting diverse form factors for vertical usage. The SP2-AL provides a wide range of display, touch, and I/O options to bring products to market quickly.

1.2 Features

- High power efficiency with Intel Atom® processor E3900 series
- Extensive I/O and function expansion through wire-to-board connectors and custom function module
- Extensive expansion and customization options for fast and easy integration with all form factors, kiosks and all-in-one panel PC applications
- Enhanced data integrity and protection in case of sudden power outage with support for back-up battery (optional)
- Low-risk cost-effective choice with pre-compliance EMC testing and high ESD tolerance
- High applicability and reliability in case of power fluctuation with a 9-36VDC voltage range

1.3 Packing List

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

- 1x SP2-AL Smart Panel

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1.4 Optional Accessories

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

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2 Specifications

2.1 SP2-AL Series Specifications

Model	SP2-07WP-AL	SP2-10WP-AL	SP2-15WP-AL	SP2-21WP-AL
Processor	Intel Atom® x7-E3950 1.6/2.0GHz (Turbo), 12W (4C/1866) Intel Atom® x5-E3930 1.3/1.8GHz (Turbo), 6W (2C/1866)			
Memory	1x SODIMM socket, DDR3L 1600MHz (Up to 8GB)			
Storage	1x M.2 SATA 6 Gbps port, M key 2280 1x 2.5” SSD/HDD SATA 6 Gbps port (optional)			
Display and Touch				
Size	7”	10.1"	15.6”	21.5”
Resolution	1024 x 600	1280 x 800	1920 x 1080	1920 x 1080
Contrast Ratio	600:1	800:1	1000:1	1000:1
Brightness (Nits)	600 cd/m^2 (typ)	400 cd/m^2 (typ)	420 cd/m^2 (typ)	400 cd/m^2 (typ)
Backlight Life (Hrs)	50,000			
Viewing Angle (U/D/R/L)	85/85/85/85	89/89/89/89		
Touch Points	5 points	10 points		
Touch Structure	Glass/Glass			
Surface Hardness	7H			
Surface Treatment	Clear	AS coating		
External I/O				
Ethernet	2x GbE (Intel® I225), RJ45, WOL, 1 Gb/s			
Serial Port	2x RS-232/422/485 programmable, auto-flow			
USB Ports	1x USB 2.0, Type-A, OCP, 1000mA 1x USB 3.0, Type-A, OCP, 1600mA			
DisplayPort	1x DP, DP++, supports resolutions up to 4096x2160@60Hz			
Internal I/O with Wire to Board Connectors				
USB Port	1x USB 2.0 client			
I2C	2x for I2C client			
Audio	1x for 2x stereo speaker (2 watts) 1x Mic-in and Line-out			
Keys	1x for 32 physical keys (BOM optional), 1x LCD backlight up/down and volume up/down (BOM optional)			
GPIO	1x 8-pin GPIO			
mPCIe slot	1x mPCIe slot (Wi-Fi/BT/4G)			
SIM	1x SIM slot for 4G/5G communication			

Table 2-1: SP2-AL Series Specifications

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Model	SP2-07WP-AL	SP2-10WP-AL	SP2-15WP-AL	SP2-21WP-AL
Power with Wire to Board Connectors				
Power Input	AT/ATX (default: AT mode) 12V ±5% / 9-36VDC, both with OVP/UVP protection			
Power Connector	1x 4-pin power connector			
Power/Fail Reset	1x wafer supports system reset, power button and power LED			
Backup Battery	1x wafer for UPS kit to back up data when AC shuts down (optional)			
Environmental				
Operating Temperature	-20°C to 60°C			0°C to 60°C
Storage Temperature	-20°C to 70°C			-20°C to 60°C
Humidity	Up to 95%			
Vibration	OP 1 Grms, 5-500Hz w/ SSD, (IEC60068-2-64) X, Y, Z axes, 60 min/axis			
Shock	OP 20G peak acceleration, 11 ms (IEC60068-2-64) ±X, ±Y, ±Z, 3 shocks/asix			
IP Rating	IP65 front panel			
ESD	Air: ±15kV, Contact: ±8kV			
EMC/Safety Compliance	EMI: IEC/EN 61000-3-2, IEC/EN 61000-3-3, EN 61000-6-4, EN 55032 EMS: EN 55035, EN 61000-6-2, EMC: CE, FCC Class B, IEC 60601-1-2:2014/EN60601-1-2:2015, UNECE R10, EN 50121-3-2 Safety: Compliant with 60601-1/61010-1/62368-1 **Note**: SP2-AL has passed pre-compliance testing of EMI, EMS, EMC and Safety.			
Software				
SEMA	SEMA 4.0			
WDT	Watchdog Timer supported			
Operating Systems	Windows® 10 IoT Enterprise 64-bit Linux Ubuntu 22.04 LTS			
Mechanical				
Construction	SGCC			
Dimensions (HxWxD)	216 x 160 x 54.54 mm ±2mm	249.66 x 168.3 x 64.4 ±2mm	383.56 x 232.99 x 65.1 ±2mm	517.46 x 309.19 x 67.6 ±2mm
Weight	2.06 ±0.2kg		3.02 ±0.2kg	4.85 ±0.2kg
Mounting (Optional)	1. Panel Mounting 2. VESA mounting (requires optional rear cover)			

Table 2-1: SP2-AL Series Specifications

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2.2 SP2-AL Series Block Diagram

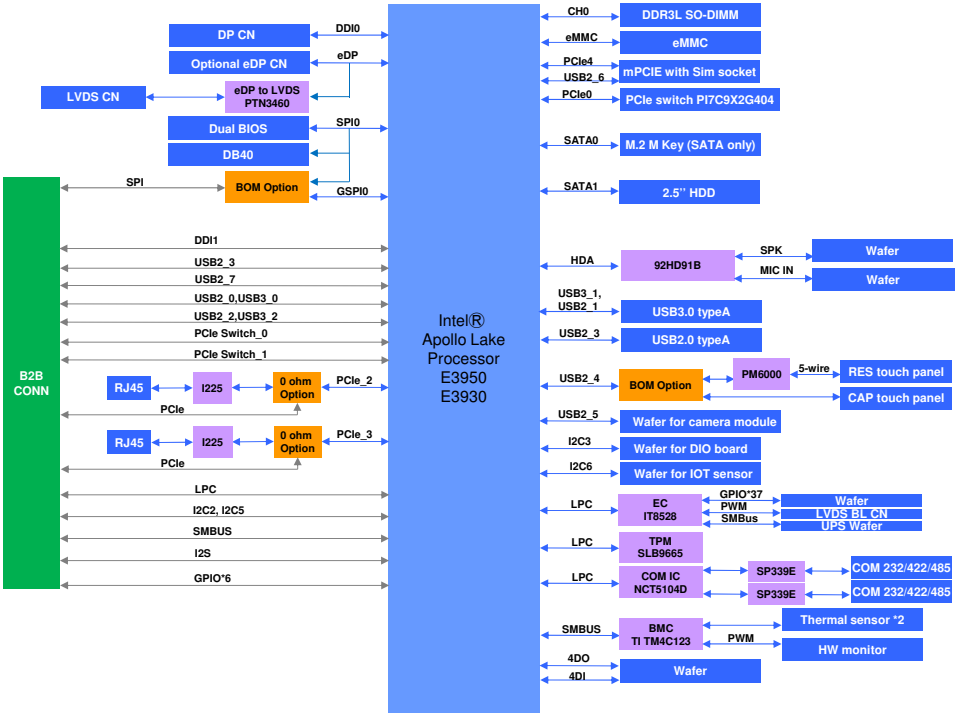


Figure 2-1: SP2-AL Series Block Diagram

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2.3 Power

Power supply options:

- 60W (12V/5A)
- 84W (12V/7A)

2.3.1 DC Input Options

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

2.3.2 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 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 loop-back, LAN port, and with an internal SSD drive installed. Information is presented for reference only. Actual power consumption will vary with different attached devices and operating systems.

Configuration	Idle	Full Load	Power Off
SP2-10WP-AL950 with USB-FM with 12V adapter	14.5 W	27.6 W	5.1 W
SP2-15WP-AL950 with USB-FM with 12V adapter	25.7 W	33 W	4.6 W
SP2-21WP-AL950 with USB-FM with 12V adapter	38.9 W	44.2 W	4.6 W

Table 2-2: Power Consumption

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2.4 Mechanical Dimensions

NOTE:

All dimensions are in millimeters, unless noted.

2.4.1 SP2-07WP-AL Dimensions

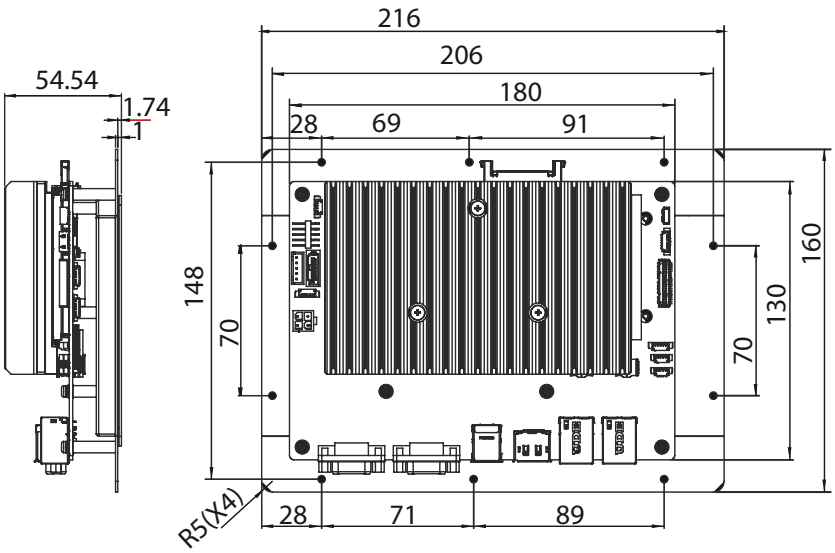


Figure 2-2: SP2-07WP-AL Dimensions

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2.4.2 SP2-10WP-AL Dimensions

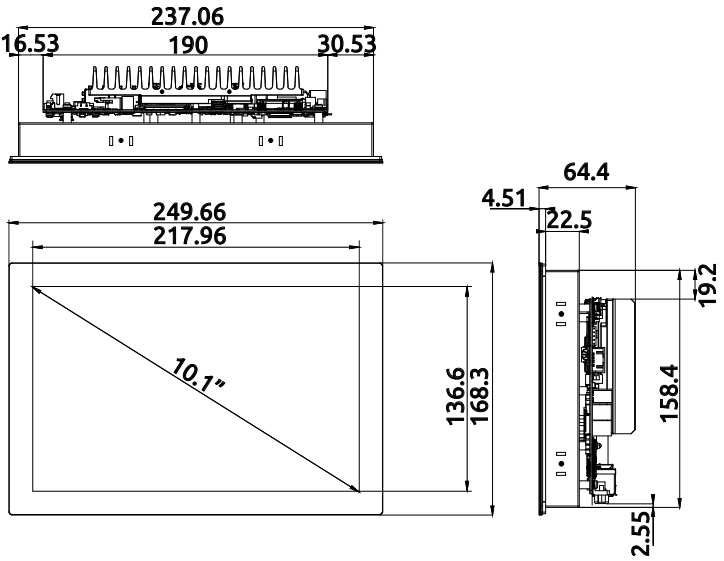


Figure 2-3: SP2-10WP-AL Dimensions

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2.4.3 SP2-15WP-AL Dimensions

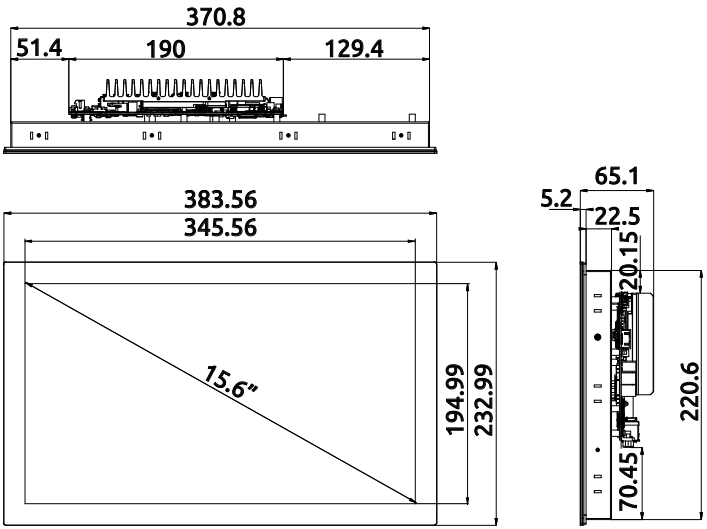


Figure 2-4: SP2-15WP-AL Dimensions

2.4.4 SP2-21WP-AL Dimensions

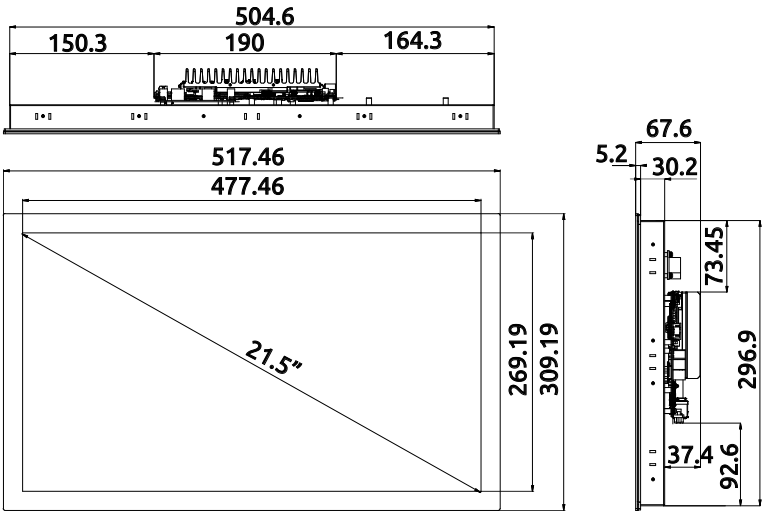


Figure 2-5: SP2-21WP-AL Dimensions

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2.5 Thermal Specification

2.5.1 Heat Sink Specifications

Heat sink designation is based on open-frame locations such as kiosk installation. For Panel PC, design concept will differ.

CPU	CPU TDP	Part	Material	Dimensions (mm)	Remarks
E3930	6W	CPU heat sink	AL6063	72x67x6.01	Optional
E3950	12W			79x102x48.2	Optional

2.5.2 Heat Sink Dimensions



All dimensions are in millimeters, unless noted.

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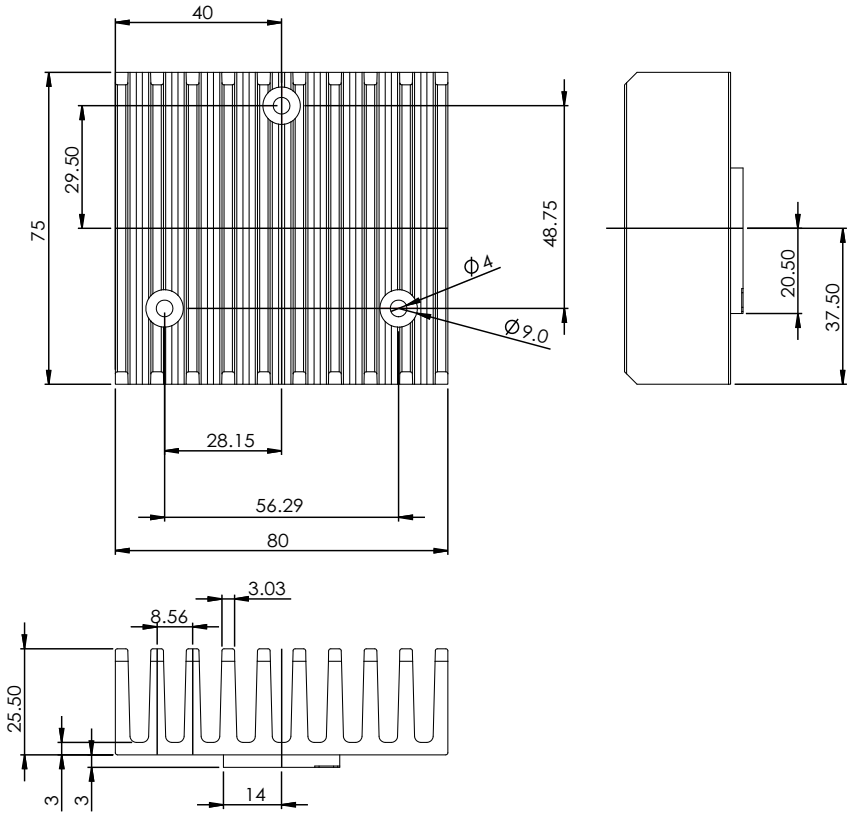


Figure 2-6: E3930 Heat Sink Dimensions

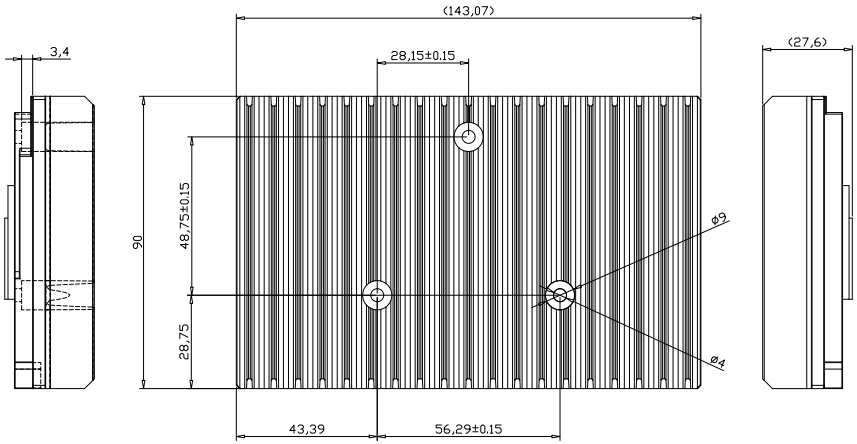
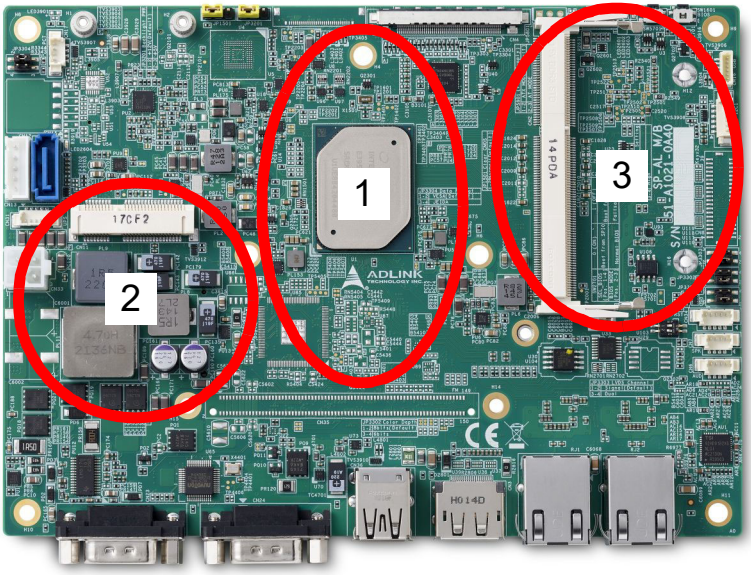


Figure 2-7: E3950 Heat Sink Dimensions

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2.5.3 Routing Considerations

Cable routing should avoid high temperature areas as follows.



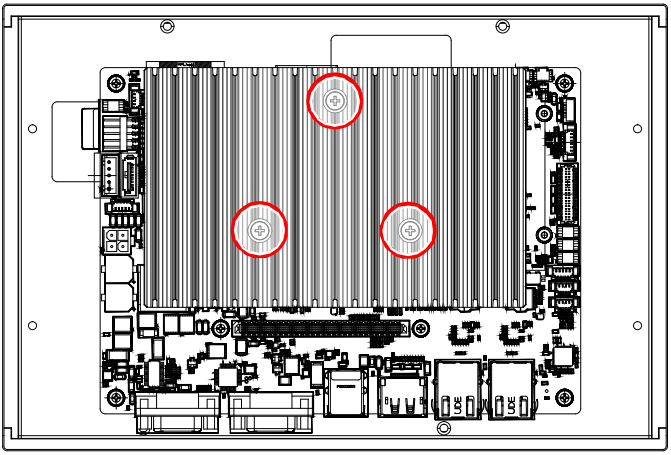
1	CPU
2	Power
3	Memory

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2.6 Adding or Changing Memory

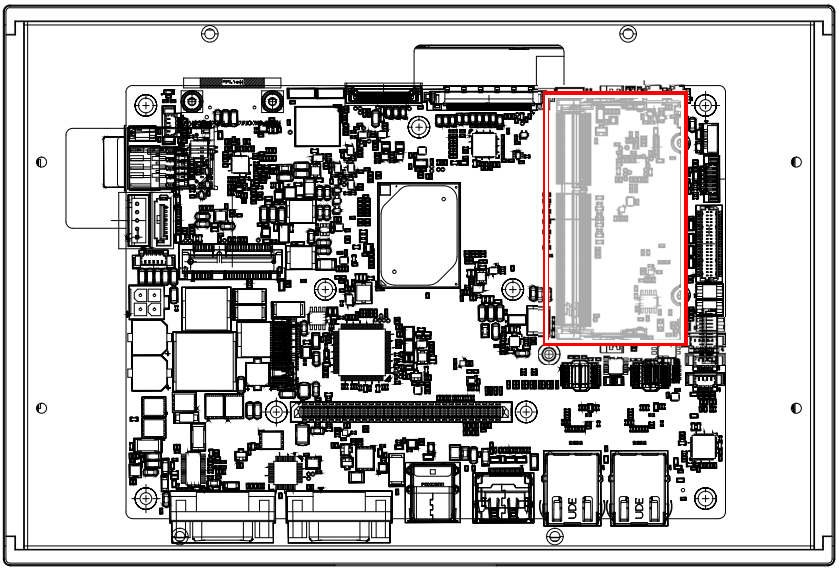
Follow these steps to add or change memory modules.

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



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2. Add or change memory modules to the SODIMM connectors as necessary.



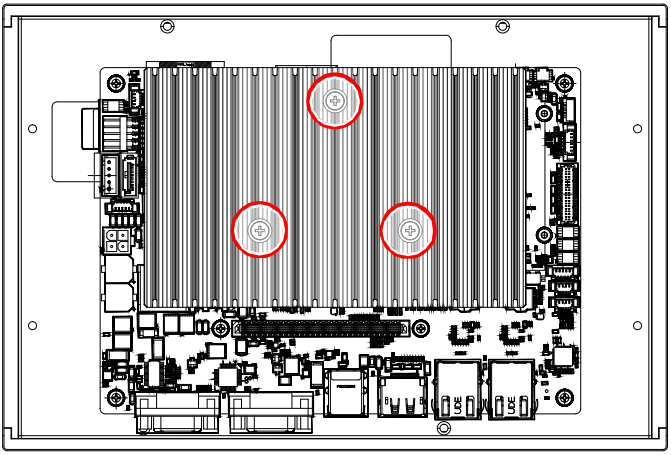
3. Reattach the heat sink to the mainboard with the previously removed screws.

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2.7 Installing a WiFi/4G/5G Module

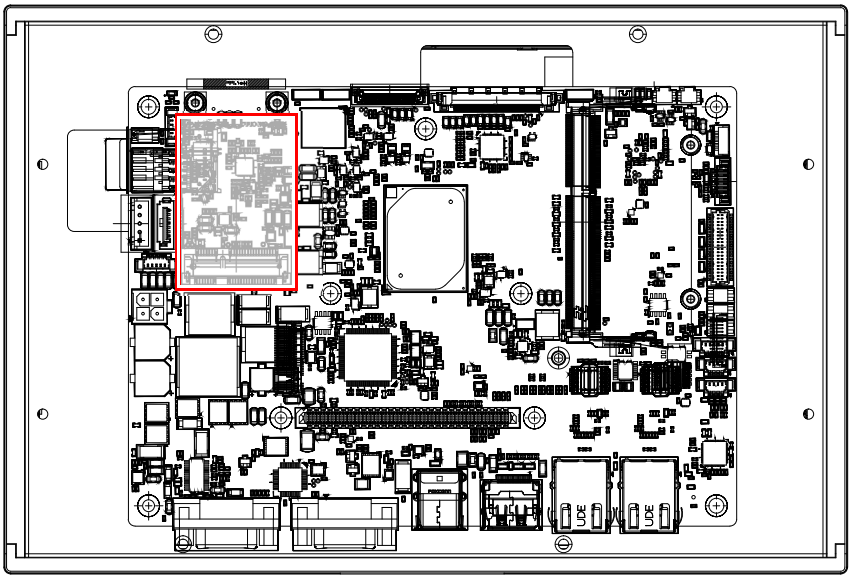
Follow these steps to add or change memory modules.

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



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2. Install the WiFi/4G/5G module.



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

NOTE:

WiFi antennas must be installed on the SP2-AL Series housing in order for WiFi/4G/5G to function properly.

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2.8 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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2.8.1 Panel Mounting

The SP2-AL Series can be panel mounted with 10 (SP2-7WP-AL) or 14 mounting clips (optional items sold separately). Make sure there is adequate space behind the panel for ventilation, and that the panel material and thickness can support the weight of the device.

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

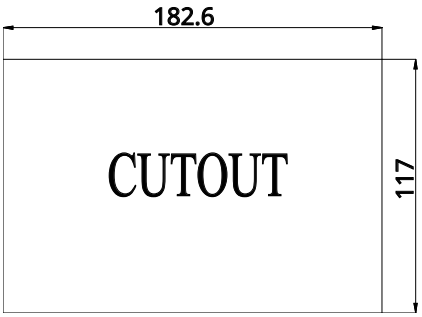


Figure 2-8: SP2-7WP-AL Cutout Dimensions

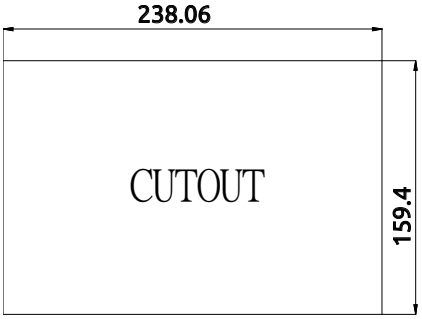


Figure 2-9: SP2-10WP-AL Cutout Dimensions

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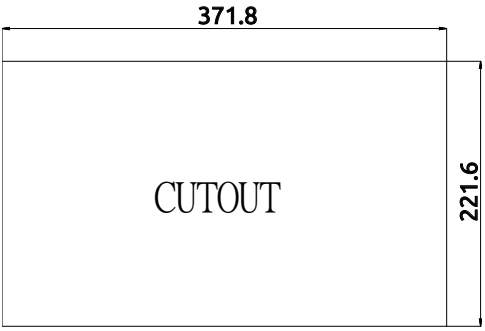


Figure 2-10: SP2-15WP-AL Cutout Dimensions

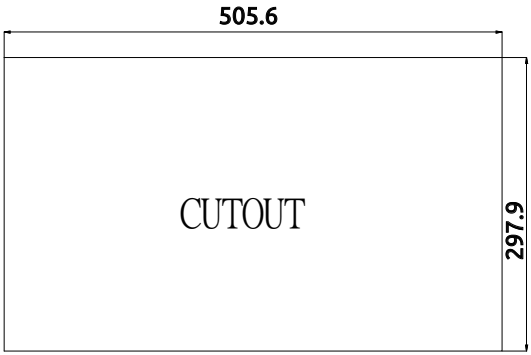
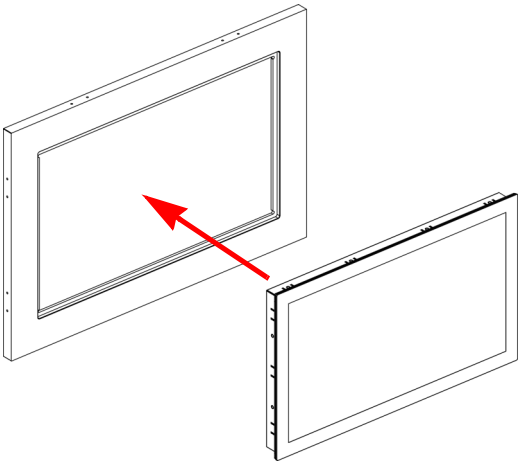


Figure 2-11: SP2-21WP-AL Cutout Dimensions

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

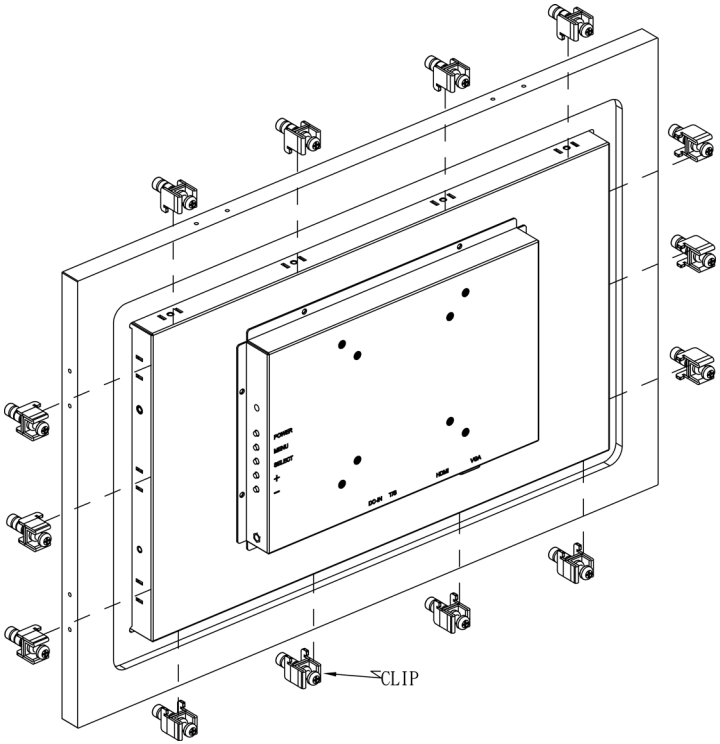
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Step 3: Place the device into the panel cutout.



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

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CLIP

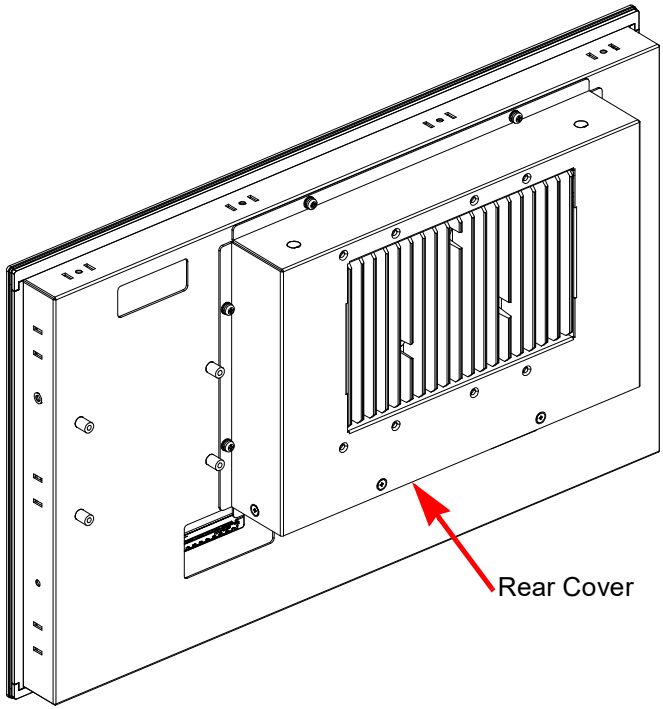
2.8.2 VESA Mounting

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

NOTE:

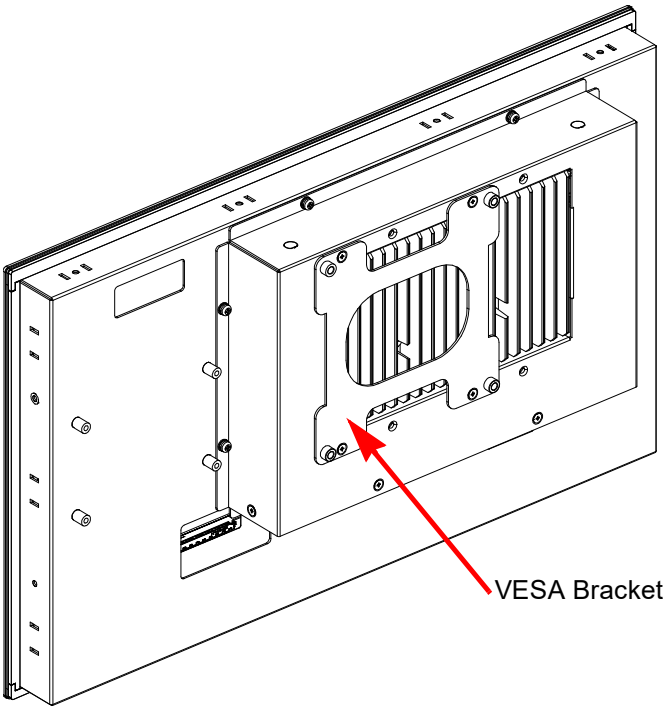
All I/O ports **must** face down.

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



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Step 2: Attach the VESA bracket to the rear cover with the screws supplied in the kit.



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3 System Layout

3.1 External I/O Connectors

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

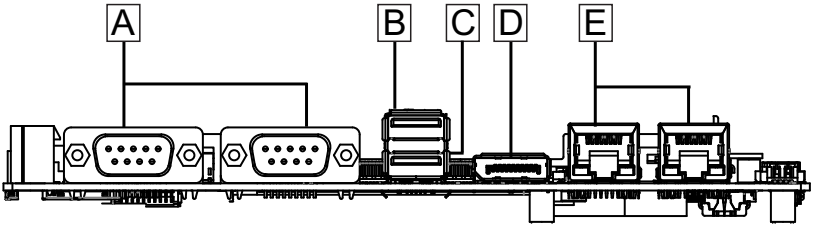


Figure 3-1: External I/O

A	2x DB-9P COM port supports RS-232/422/485
B	1x USB 2.0 Type-A
C	1x USB 3.0 Type-A
D	1X DisplayPort
E	2x RJ45 GbE LAN I225/I226

Table 3-1: External I/O Legend

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3.1.1 DB-9P COM Port Connectors

Through two D-sub 9-pin connectors, COM1 or COM2 support RS-232 (default) and RS-422/RS-485 modes, by BIOS setting.

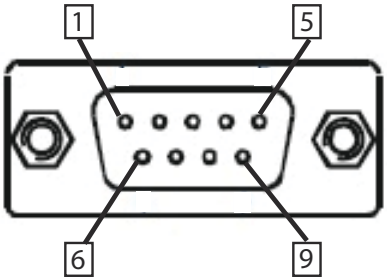


Figure 3-2: DB-9P COM Port

Pin	Signal		
	RS-232	**RS-422**	**RS-485**
1	DCD#	TXD422-	485-
2	RXD	TXD422+	485+
3	TXD	RXD422+	N/C
4	DTR#	RXD422-	N/C
5	GND	N/C	N/C
6	DSR#	N/C	N/C
7	RTS#	N/C	N/C
8	CTS#	N/C	N/C
9	RI#	N/C	N/C

Table 3-2: DB-9P COM Port Pin Assignment

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3.1.2 USB 3.0 + USB 2.0 Combo Connector

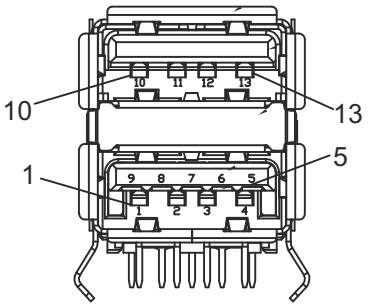


Figure 3-3: USB Ports

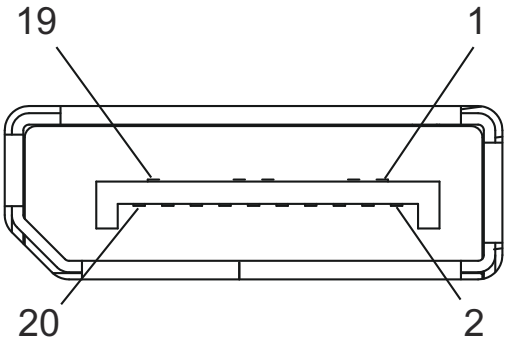
Pin	Connector	Signal
1	USB 3.0	USB3.0_VBUS
2		D-
3		D+
4		GND
5		SSRX-
6		SSRX+
7		GND
8		SSTX-
9		SSTX+
10	USB 2.0	USB2.0_VBUS
11		D-
12		D+
13		GND

Table 3-3: USB Ports Pin Assignment

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3.1.3 DisplayPort Connector

One DisplayPort connector supports the DP++ standard specification, and can connect to VGA, DVI, HDMI, and DisplayPort monitors via DisplayPort to VGA adapter cable, DisplayPort to DVI adapter cable, or DisplayPort to HDMI adapter cable and DisplayPort cable, with DP1.2 support for resolutions up to 4096 x 2160 at 60Hz.



Pin	Signal	Pin	Signal
1	ML_Lane0_P	11	GND
2	GND	12	ML_Lane3_N
3	ML_Lane0_N	13	Config1
4	ML_Lane1_P	14	Config2
5	GND	15	Aux_P
6	ML_Lane1_N	16	GND
7	ML_Lane2_P	17	Aux_N
8	GND	18	Hot Plug
9	ML_Lane2_N	19	Return
10	ML_Lane3_P	20	DP_PWR_+3.3V

Table 3-4: DisplayPort Pin Assignment

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3.1.4 Gigabit Ethernet Port

Two Gigabit Intel® Ethernet Controller I225 Series (V, IT or LM) RJ45 connectors support up to 1000/100/10 Mbit/s connections.

- The V version supports up to 1 GbE (without TSN, selected for a Standard Operating Temperature SKU)
- Other combinations supported on a by-project basis. Contact your ADLINK sales representative for more information.

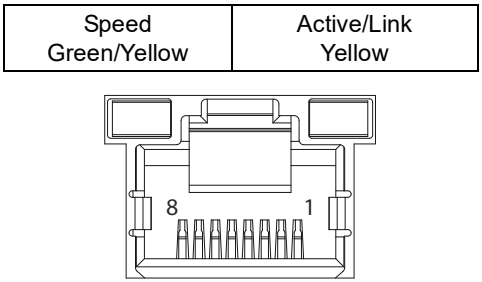


Figure 3-4: Ethernet Port and LEDs

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

Table 3-5: Active/Link and Speed LED Indicators

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

Table 3-6: Ethernet Port Pin Definition

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3.2 Internal I/O Connectors

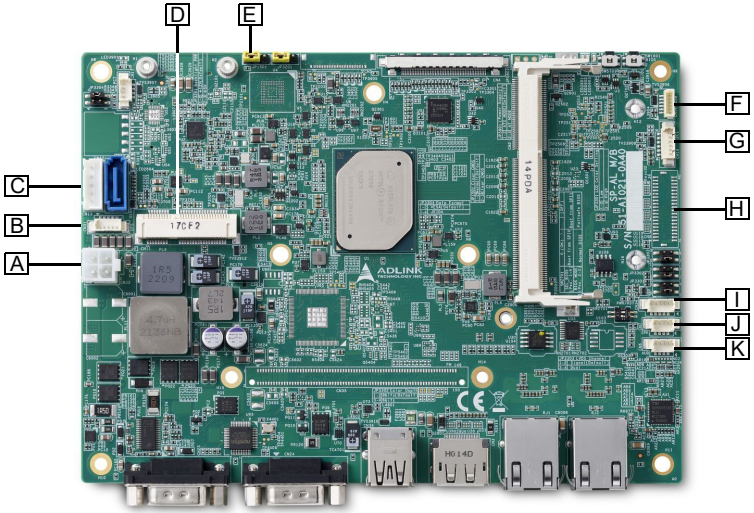


Figure 3-5: Internal I/O (Main Board Top Side)

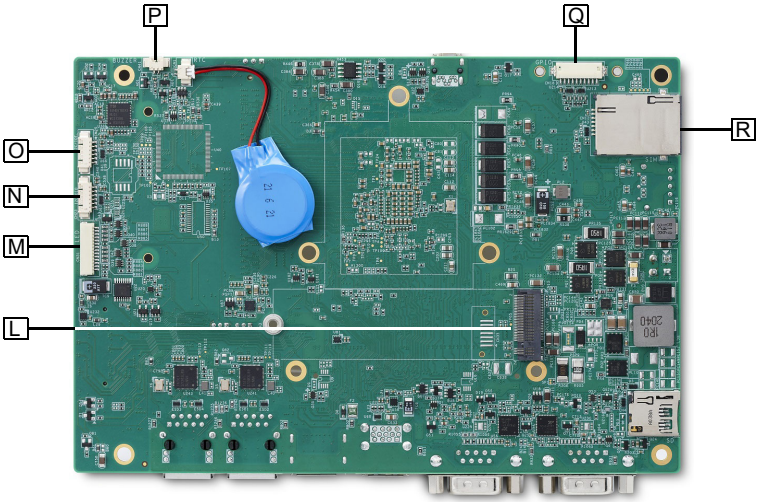


Figure 3-6: Internal I/O (Main Board Underside)

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A	Power connector
B	SMBUS connector
C	2.5" SATA data & power connectors
D	Mini PCIe port
E	CMOS jumper (JP1501)
F	USB 2.0
G	I^2C connector
H	Data input keys
I	Power & reset
J	2x 2W speaker (CN7)
K	Mic in/Line out
L	M.2 SSD
M	LED connector
N	I2C connector
O	Control keys connector
P	Debug connector
Q	GPI/O connector
R	SIM card slot

Table 3-7: Internal I/O Legend

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3.2.1 Power Connector

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

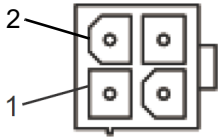


Figure 3-7: Power Connector

Pin	Signal
1	V-
2	V-
3	V+
4	V+

Table 3-8: Power Connector Pin Assignments

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3.2.2 SMBUS Connector

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

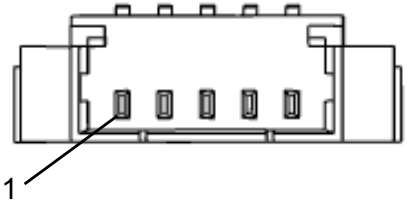


Figure 3-8: SMBUS Connector

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

Table 3-9: SMBUS Connector Pin Assignments

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3.2.3 SATA Data & Power Connectors

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

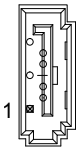


Figure 3-9: SATA Data Connector Pin Definition

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

Table 3-10: SATA Data Connector Pin Definition

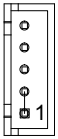


Figure 3-10: SATA Power Connector Pin Definition

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

Table 3-11: SATA Power Connector Pin Definition

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3.2.4 Mini PCIe Port

The mini PCIe port supports standard mini PCIe signals such as PCIe gen2 and USB2.0.

3.2.5 CMOS Jumper (JP1501)

Under conditions in which the SP2-AL fails to boot, clearing the BIOS content stored in CMOS and restoring the default settings may be effective. To clear CMOS (located at JP1501), short Pin 2 and Pin 3 and wait for 5 seconds. Remove the jumper and re-short 1 and 2. CMOS is restored to factory default settings.

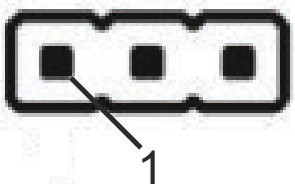


Figure 3-11: CMOS Jumper

Pin	Signal
1	P_+VCC_RTC_CN_A
2	SOC_RTC_RST-L
3	GND

Table 3-12: CMOS Jumper Pin Assignments

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3.2.6 USB 2.0 Port

Supports connection to USB devices by cable.

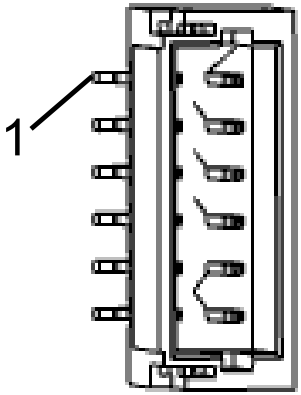


Figure 3-12: USB 2.0 Port

Pin	Signal
1	P5V_U2_USB_3
2	CN_USB2_P3N
3	CN_USB2_P3P
4	GND

Table 3-13: USB 2.0 Port Pin Assignments

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3.2.7 I2C Connector

The top-mounted I2C connector supports I2C clients such as IOT sensors, connected by cable.

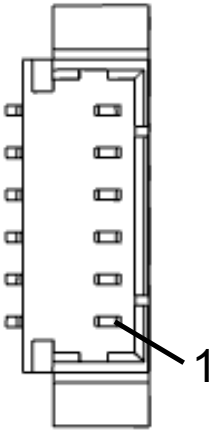


Figure 3-13: I²C Connector

Pin	Signal
1	P_+5V_A
2	P_+3V3_A
3	I2C_DAT_IOT
4	I2C_CLK_IOT
5	I2C_INT_IOT
6	GND

Table 3-14: I²C Connector Pin Assignments

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3.2.8 Data Input Keys

One connector supports 32 physical keys and 5 control keys, with default values of:

Direction: ↑, ↓, ←, →

Number: 0 to 9

Function: Enter, ESC, TAB, Backspace, Delete, Clear, PagUp, PagDn

Hot keys: F1 - F10

Control: Shutdown touch screen and power off display

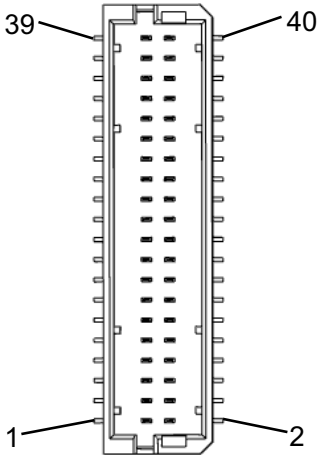


Figure 3-14: Data Input Connector

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Pin	Signal	Function Value	Key Code	Pin	Signal	Function Value	Key Code
1	GND	N/A	N/A	2	P_+3V3_S0	N/A	N/A
3	EC_BTN_17	^	48h	4	EC_BTN_1	Tab	0Fh
5	EC_BTN_18	v	50h	6	EC_BTN_2	Backspace	0Eh
7	EC_BTN_19	>	4Dh	8	EC_BTN_3	Delete	53h
9	EC_BTN_20	<	4Bh	10	EC_BTN_4	Space	0x39
11	EC_BTN_21	0	0Bh	12	EC_BTN_5	Page up	49h
13	EC_BTN_22	1	02h	14	EC_BTN_6	Page down	51h
15	EC_BTN_23	2	03h	16	EC_BTN_7	F1	3Bh
17	EC_BTN_24	3	04h	18	EC_BTN_8	F2	3Ch
19	EC_BTN_25	4	05h	20	EC_BTN_9	F3	3Dh
21	EC_BTN_26	5	06h	22	EC_BTN_10	F4	3Eh
23	EC_BTN_27	6	07h	24	EC_BTN_11	F5	3Fh
25	EC_BTN_28	7	08h	26	EC_BTN_12	F6	40h
27	EC_BTN_29	8	09h	28	EC_BTN_13	F7	41h
29	EC_BTN_30	9	0Ah	30	EC_BTN_14	F8	42h
31	EC_BTN_31	Enter	1Ch	32	EC_BTN_15	F9	43h
33	EC_BTN_32	ESC	01h	34	EC_BTN_16	F10	44h
35	EC_BTN_37	Power	N/A	36	N/C		
37	N/C			38	P_+3V3_A	N/A	N/A
39	N/C			40	P_+3V3_A	N/A	N/A
G1	GND	N/A	N/A	G2	GND	N/A	N/A

Table 3-15: Data Input Connector Pin Assignments

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3.2.9 Power & Reset Connector

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

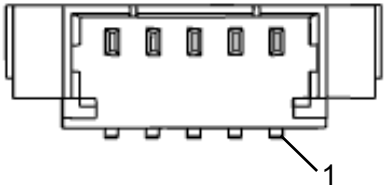


Figure 3-15: Power & Reset Connector

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

Table 3-16: Power & Reset Connector Pin Assignments

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3.2.10 2W Speaker Connectors (CN7)

Supports two 2W speakers, at CN7, connecting via cable.

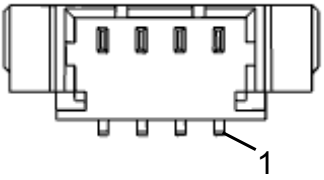


Figure 3-16: 2W Speaker Connector

Pin	Signal
1	SPK_LEFT_P
2	SPK_LEFT_N
3	SPK_RIGHT_P
4	SPK_RIGHT_N
5	GND
6	GND

Table 3-17: 2W Speaker Connector Pin Assignments

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3.2.11 MIC-in & Line-out Connectors

Supports MIC-in and Line-out, connecting to speakers via cable.

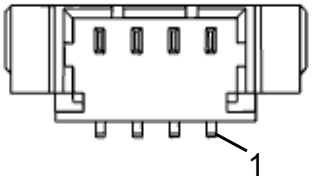


Figure 3-17: MIC-in & Line-out Connector

Pin	Signal
1	EX_MIC_CN
2	HP_CN_L
3	HP_CN_R
4	GND
5	GND
6	GND

Table 3-18: MIC-in & Line-out Pin Assignments

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3.2.12 M.2 SSD Slot

M.2 type is 2280 M key.

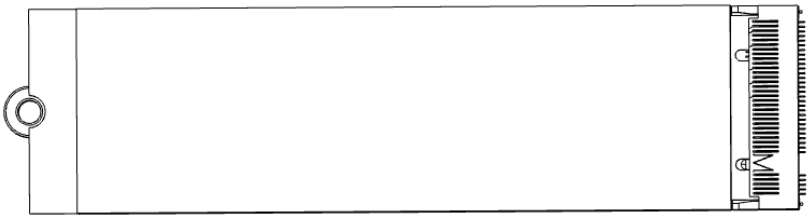


Figure 3-18: M.2 SSD Slot

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3.2.13 LED Connector

Supports 10 LEDs.

Indicator	Color	Description
Watchdog (WDT)	Yellow	Indicates watchdog timer status. Flashes when watchdog timer starts, and when timer is expired, system will auto-reboot.
HDD	Red	When blinking, indicates the SATA hard driver is active
Standby	Blue	Indicates the system is in power standby mode

Table 3-19: LED Indicators

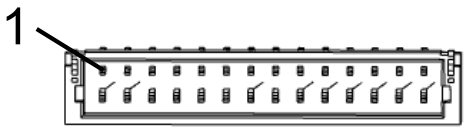


Figure 3-19: LED Connector

Pin	Function
1	GND
2	STDBY_PWR
3	GP3_LED-L
4	GP2_LED-L
5	GP1_LED-L
6	P_+3V3_A
7	COM2_SOUT_LED_L
8	COM2_SIN_LED_L
9	COM1_SOUT_LED_L
10	COM1_SIN_LED_L
11	CN_SATALED-L
12	P_+3V3_S0
13	WDT_LED
14	P_+3V3_BMC_A

Table 3-20: LED Connector Pin Assignments

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3.2.14 I2C Connector

The underside-mounted I2C connector, controlled by EC, connects to I2C clients or sensors via cable.

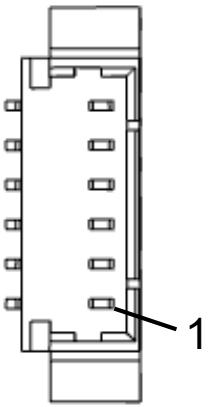


Figure 3-20: I2C Connector

Pin	Signal
1	P_+5V_S0
2	P_+3V3_S0
3	I2C_DAT_DIO
4	I2C_CLK_DIO
5	I2C_INT_DIO
6	GND

Table 3-21: I2C Connector Pin Assignments

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3.2.15 Control Keys Connector

A wafer expandable to a physical key controls LCD backlight and volume, connecting to the physical key via cable.

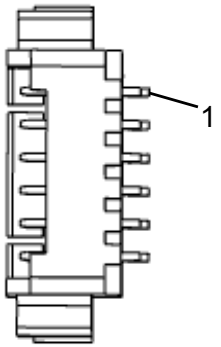


Figure 3-21: Control Keys Connector

Pin	Signal	Function
1	P_+3V3_S0	Power
2	EC_BTN_33	Vol_Up
3	EC_BTN_34	Vol_Down
4	EC_BTN_35	Bri_up
5	EC_BTN_36	Bri_Down
6	GND	N/A
7	GND	N/A
8	GND	N/A

Table 3-22: Control Keys Connector Pin Assignments

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3.2.16 Debug Connector

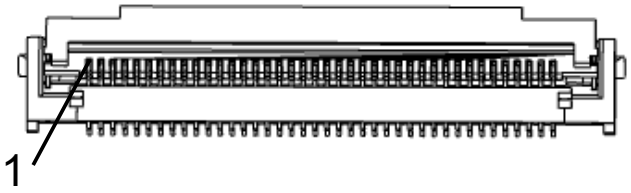


Figure 3-22: Debug Connector

Pin	Signal		
1	Reserved		
2	BMC debug signals	BMC_STATUS	
3		BIOS_MODE	
4		SYS_BIOS#	Connect to jumper for debugging
5		POSTWDT_DIS#	Connect to jumper for debugging
6	Test point	SUS_S5#	
7		SUS_S4#	
8		SUS_S3#	
9		CB_PWROK	
10		CB RESET #	
11		SY_RESET#	
12		PWRBTN#	Ω

Table 3-23: Debug Connector Pin Assignments

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Pin	Signal		
13	BMC Program interface	OCD0B	Includes a jumper to connect OCD0A via 1kΩ pull-up to 3.3V_BMC
14		OCD0A	Includes a jumper to connect OCD0A via 1kΩ pull-up to 3.3V_BMC
15		CLK	
16		DATA	
17		RESET_IN#	
18		FUMD0	
19		RXD6	
20		TXD6	
21		GND	
22		P_+3V3_A	3.3V power continuously provided via COM module
23		3.3V_BMC	3.3V power continuously provided via COM module
24	LPC Bus	LPC_AD0	
25		LPC_AD1	3.3V power continuously provided via COM module
26		LPC_AD2	
27		LPC_AD3	
28		LPC_FRAME#	
29		CLK33_LPC	
30		RST#	Platform reset
31		BIOS_DIS0	
32		GND	
33		3V3_LPC	System power 3.3V provided via COM module

Table 3-23: Debug Connector Pin Assignments

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Pin	Signal		
34	SPI program interface	SPI_BIOS_CLK	
35		SPI_BIOS_MOSI	
36		SPI_BIOS_MISO	
37		SPI_BIOS_CS1#	
38		SPI_BIOS_CS0#	
39		GND	
40		VCC_SPI_IN	SPI Power Input from flash tool to module. HW must add MOS FET to switch SPI power for SPI ROM

Table 3-23: Debug Connector Pin Assignments

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3.2.17 GPI/O Connector

DC power of the GPI/O connector is 3.3V.

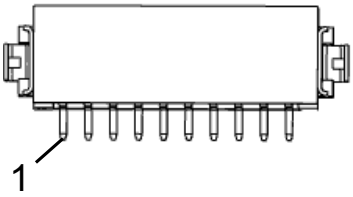


Figure 3-23: GPI/O Connector

Pin	Signal	PCH GPI/O	Default value	Input/output voltage range spec
1	P_+3V3_S0	N/A	N/A	N/A
2	GPIO_9	GPIO_9	Output High	VIH: 2.9V VIL: 0.15V VOH: 2.211V VOL: 0.55V
3	GPIO_21	GPIO_21	Output Low	VIH : 2.9V VIL : 0.15V VOH : 2.211V VOL : 0.55V
4	GPIO_23	GPIO_23	Output High	VIH : 2.9V VIL : 0.15V VOH : 2.211V VOL : 0.55V
5	GPIO_24	GPIO_24	Output Low	VIH : 2.9V VIL : 0.15V VOH : 2.211V VOL : 0.55V
6	GPIO_25	GPIO_25	Output High	VIH : 2.9V VIL : 0.15V VOH : 2.211V VOL : 0.55V

Table 3-24: GPI/O Connector Pin Assignments

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Pin	Signal	PCH GPI/O	Default value	Input/output voltage range spec
7	GPIO_27	GPIO_27	Output Low	VIH : 2.9V VIL : 0.15V VOH : 2.211V VOL : 0.55V
8	GPIO_29	GPIO_29	Output High	VIH : 2.9V VIL : 0.15V VOH : 2.211V VOL : 0.55V
9	GPIO_30	GPIO_30	Output Low	VIH : 2.9V VIL : 0.15V VOH : 2.211V VOL : 0.55V
10	GND	N/A		
11	GND	N/A		
12	GND	N/A		
N1	N/C			
N2	N/C			

Table 3-24: GPI/O Connector Pin Assignments

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3.2.18 SIM Card Slot

Supports 3G/4G LTE communication.

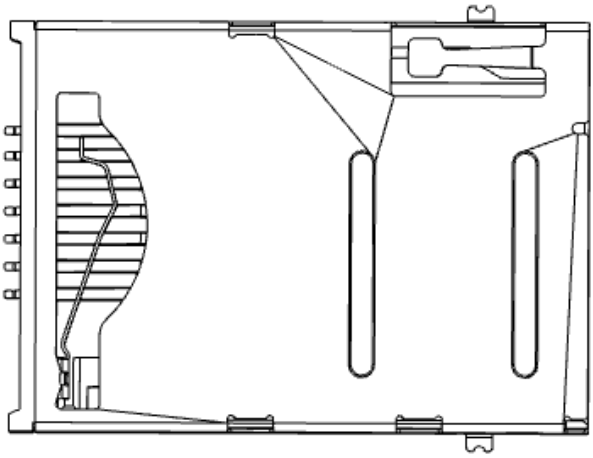


Figure 3-24: SIM Slot

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3.3 SEMA

The SEMA (Smart Embedded Management Agent) utility provides system control and failure protection, by counting, monitoring, and measuring hardware and software events.

For more information and operating instructions, please visit https://www.adlinktech.com/Products/Industrial_IoT_and_Cloud_solutions/SEMA_Smart_Embedded_Management_Agent/SEMA?lang=en

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4 Driver & Application Installation

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

Install drivers as follows.

1. Fully install Microsoft Windows OS before installing any drivers. Most standard I/O device drivers have been included in Microsoft Windows OS. For Windows 10 IoT Enterprise users, please note that you need Administrator privilege to install the drivers properly.
2. Install the chipset driver.
3. Install the graphics driver.
4. Install the Ethernet driver.
5. Install the PXE driver
6. Install the Serial I/O driver.
7. Install the SEMA utility, WDT and DI/O drivers.

4.1 Installing the Chipset Driver

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

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

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

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To install the chipset driver for the SP2-AL

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

4.2 Installing the Graphics Driver

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

To install the graphics driver:

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

4.3 Installing the Ethernet Driver

To install the driver for the Intel I210 Gigabit Ethernet controller:

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

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4.4 Installing the PXE Driver

To install the driver for the USB 3.0 controller:

1. Close any running applications.
2. From ADLINK's website, download Windows 10 IoT Enterprise drivers for the SP2-AL.
3. Launch setup.exe and follow onscreen instructions to complete the setup.
4. After installation is complete, reboot the system.

4.5 Installing the Serial I/O Driver

To install the driver for the I/O controller:

1. Close any running applications.
2. From ADLINK's website, download Windows 10 IoT Enterprise drivers for the SP2-AL.
3. Execute setup.msi and follow onscreen instructions to complete the setup.
4. After installation is complete, reboot the system.

4.6 Installing the SEMA Utility, WDT and DI/O Drivers

The SP2-AL supports ADLINK Smart Embedded Management Utility with features as follows.

- System Health for real time CPU, system temperature, total/ current uptime
- User-defined 1KB Flash
- Watchdog Timer
- Hardware Monitoring for input voltage levels and current power consumption

A WDT (watchdog timer) is a hardware mechanism resetting the system when the operating system or application is halted. A typical usage of WDT is to start the timers and periodically reset the timer, and when timer is expired, the system resets. SEMA utility installation is required to access the WDT function.

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To install the SEMA utility, WDT and DI/O drivers:

1. Close any running applications.

   From ADLINK's website, download Windows 10 IoT Enterprise drivers for the SP2-AL.

2. Execute Setup.exe and follow onscreen instructions to complete the setup.

After installation is complete, reboot the system.



Administrator privilege is required to use the API in Windows 10 IoT Enterprise.

Complete document support for SEMA utility can be found at:

`http://www.adlinktech.com/PD/web/PD_Manual.php?PDNo=1274&Kind=M&mktg_source=`

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A BIOS Setup

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



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

A.1 BIOS Setup Menu

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

The BIOS Setup Utility includes the following hotkeys.

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

Menu Selection Bar

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

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

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Menu Conventions

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

- Using color

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

- Using brackets

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

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A.2 Menu Structure

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

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

Chipset	Security
- North Bridge - South Bridge - Uncore Configuration - South Cluster Configuration	- Secure Boot menu

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



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

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A.3 Main Menu

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

A.3.1 Main

Feature	Options	Description
BIOS Information		
BIOS Vendor	American Megatrends	BIOS Vendor
BIOS Version	Info only	BIOS Version.
Build Date	Info only	BIOS build date
MRC Version	Info only	MRC Version
GOP Version	Info only	GOP Version
TXE FW Version	Info only	TXE FW Version
BIOS Boot Source	Primary BIOS	BIOS Boot Source
System Information		
Project Name	SP-AL	Project Name
CPU Board Version	Info only	CPU Board Version
CPU Brand String	Info only	CPU Brand String
CPU Frequency	Info only	CPU Frequency
Total Memory	Info only	Total Memory
Memory Frequency	Info only	Memory Frequency
PCH SKU	Info only	PCH SKU
FM Board	Info only	FM Board
Board Information		
Access Level	Info only	User Access Level
Access Level	Info only	AdministratorAccess Level

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A.3.2 Main > Board Information

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

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A.4 Advanced Menu

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

A.4.1 Advanced > CPU Configuration

Feature	Options	Description
Intel(R) Atom(TM) Processor (Info only)		
CPU Signature	Info only	Displays the CPU Signature
Microcode Patch	Info only	Displays the Microcode Patch version
Max CPU Speed	Info only	Displays the Max CPU Speed
Min CPU Speed	Info only	Displays the Min CPU Speed
Processor Cores	Info only	Displays the number of Processor cores
Intel HT Technology	Info only	Intel HT Technology
Intel VT-x Technology	Info only	Intel VT-x Technology
L1 Data Cache	Info only	Displays the Processor L1 Data Cache size.
L1 Code Cache	Info only	Displays the Processor L1 Code Cache size.
L2 Cache	Info only	Displays the Processor L2 Cache size.
L3 Cache	Info only	Displays the Processor L3 Cache size.
L4 Cache	Info only	Displays the Processor L4 eDRAM size.
EIST	Disabled **Enabled**	Enhanced Intel® Speedstep technology allows the processor to dynamically adjust frequency and voltage based on power versus performance needs.
Turbo Mode	Disabled **Enabled**	Enables/Disables processor Turbo Mode.
Intel Virtualization Technology	Disabled **Enabled**	When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.
VT-d	**Disabled** Enabled	Enables/Disables CPU VT-d
C states	Disabled **Enabled**	Enables/Disables CPU Power Management. Allows CPU to go to C states when not 100% utilized.

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Feature	Options	Description
Enhanced C-states	Disabled **Enabled**	Enables/Disables C1E. When enabled, CPU will switch to minimum speed when all cores enter C-State.
Max Package C State	**PC2** PC1 C0	Controls the Max Package C State that the processor will support.
Max Core C State	**Core C6** Core C1 Unlimited	This option controls the Max Core C State that cores will support.
C-State Auto Demotion	Disabled **C1**	Configure C-State Auto Demotion
C-State Un-demotion	Disabled **C1**	Configure C-State Un-demotion
DTS	Disabled **Enabled**	Enables/Disables Digital Thermal Sensor.

A.4.2 Advanced > Graphics Configuration

Feature	Options	Description
Graphics Configuration		
FM Display Type	No Device Display Port HDMI **DisplayPort with HDMI/DVI Compatible**	FM display type switch
For LVDS Only		
Data format and Color Depth	**Auto** VESA 24 bpp JEIDA 24 bpp JEIDA/vesa 18 bpp	Data format and Color Depth select
LVDS Output Mode	**Auto** Dual LVDS bus Single LVDS bus	Single/Dual mode select
DE Polarity	**Active High** Active Low	DE Polarity select
Vsync Polarity	**Active High** Active Low	Vsync Polarity select

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Feature	Options	Description
Hsync Polarity	**Active High** Active Low	Hsync Polarity select
Spreading depth	No Spreading 0.5% 1.0% 1.5% 2.0% **2.5%**	Clock frequency center spreading depth.
For eDP/LVDS		
LFP Panel Type	Auto 640x480 800x600 1024x768 1280x1024 1400x1050 1024x600 1600x1200 1366x768 1680x1050 1920x1200 1440x900 1600x900 **1280x800** 1920x1080 2048x1536	Select LFP panel used by Internal Graphics Device by selecting the appropriate setup item.

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A.4.3 Advanced > Power Management

Feature	Options	Description
Enable ACPI Auto Configuration	**Disabled** Enabled	Enables/Disables BIOS ACPI Auto Configuration.
Enable Hibernation	Disabled **Enabled**	Enables/Disables System ability to Hibernate (OS/S4 Sleep State). This option may not be effective with some operating systems.
ACPI Sleep State	Suspend Disabled **S3 (Suspend to RAM)**	Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
Lock Legacy Resources	**Disabled** Enabled	Enables/Disables Lock of Legacy Resources
mPCIe Slot Wake	Disabled **Enabled**	Enables/Disables PCI Express Slot wake capability
RTC Wake system from S5	**Disabled** Fixed Time Dynamic Time	Enables/Disables System wake on alarm event. Select FixedTime, system will wake on the hr::min::sec specified. Select DynamicTime, System will wake on the current time + Increase minute(s)
Wake up hour	[Max-Value, Min-Value, Step-Value] = [0x17, **0x00**, 0x01]	Range: 0-23 hr
Wake up minute	[Max-Value, Min-Value, Step-Value] = [0x3B, **0x00**, 0x01]	Range: 0-59 min
Wake up second	[Max-Value, Min-Value, Step-Value] = [0x3B, **0x00**, 0x01]	Range: 0-59 sec
Wake up minute increase	[Max-Value, Min-Value, Step-Value] = [0x05, 0x01, **0x01**]	Range: 1-5 min

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Feature	Options	Description
Backup Battery Function	**Disabled** Enabled	Enables/Disables backup battery function.
Emulation AT/ATX	Emulation AT **ATX**	Select Emulation AT or ATX function. If this option is set to [Emulation AT], BIOS will report no suspend functions to ACPI OS. On Windows XP, the OS will show a shutdown message during system shutdown.

A.4.4 Advanced > Power Management > Power Consumption

Feature	Options	Description
Power Consumption	Info only	
Current Input Current	Info only	
Current Input Power	Info only	
CPU-Vcore	Info only	
VGFX	Info only	
V1P05S	Info only	
VMEM	Info only	
VIN(12V)	Info only	
V5SBY	Info only	
V5S	Info only	
P_+3V3_A	Info only	
P_+3V3_S	Info only	
VRTC	Info only	
P_+1V24_S	Info only	
P_+1V8_S	Info only	

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A.4.5 Advanced > System Management

Feature	Options	Description
SEMA Firmware	Info only	
Build Date	Info only	
SEMA Bootloader	Info only	
Build Date	Info only	

A.4.6 Advanced > System Management > SEMA Features

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

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A.4.7 Advanced > System Management > Flags

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

A.4.8 Advanced > System Management > SEMA > Temperature

Feature	Options	Description
CPU Temperature		
Current	Info only	
Startup	Info only	
Min	Info only	
Max	Info only	
Board Temperatures		
Current	Info only	
Startup	Info only	
Min	Info only	
Max	Info only	
Board Temperatures		
Current	Info only	
Startup	Info only	
Min	Info only	
Max	Info only	
CPU Fan Speed	Info only	
Smart Fan		
Critical Trip Point	**Disabled** 70 C 80 C 90 C	This value is the temperature threshold of the Critical Trip Point.
Passive Cooling Trip Point	**Disabled** 60 C 70 C 80 C	This value is the temperature threshold of the Passive Cooling Trip Point.

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A.4.9 Advanced > Watchdog Timer

Feature	Options	Description
Power-Up Watchdog	**Disabled** Enabled	Enbles/Disables the Watchdog Timer
Timeout	[Max-Value, Min-Value, Step-Value] = [**0xFFFF**, 0x0018, 0x0001]	The time the Power Up Watchdog should wait until it resets the system.
ATTENTION: Pressing F12 during start up disables the Power Up Watchdog.		
RunTime Watchdog	**Disabled** Enabled	The RunTime Watchdog resets the system after a certain amount of time after power up.
Timeout	[Max-Value, Min-Value, Step-Value] = [0xFFFF, **0x0018**, 0x0001]	The time the Power Up Watchdog should wait until it resets the system.

A.4.10 Advanced > Super IO Configuration

Feature	Options	Description
Super IO Chip	Info only	

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A.4.11 Advanced > Super IO Configuration > Serial Port 1 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enables/Disables the serial port (COM)
Device Settings	IO=3F8; IRQ=4	
Change Settings	**Auto** IO=3F8h; IRQ=4 IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12	Selects optimal settings for Super IO Device
COM1 Control	**RS232** RS422 RS485	Sets COM1 mode as RS-232, RS-422 or RS-485

A.4.12 Advanced > Super IO Configuration > Serial Port 2 Configuration

Feature	Options	Description
Serial Port	Disabled **Enabled**	Enables/Disables the serial port (COM)
Device Settings	IO=2F8; IRQ=3	
Change Settings	**Auto** IO=2F8h; IRQ=3 IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12 IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12 IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12	Selects optimal settings for Super IO Device
COM2 Control	**RS232** RS422 RS485	Sets COM2 mode as RS-232, RS-422 or RS-485

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A.4.13 Advanced > Super IO Configuration > Serial Port 3 Configuration

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

A.4.14 Advanced > Super IO Configuration > Serial Port 4 Configuration

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

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A.4.15 Advanced > Serial Console Redirection

Feature	Options	Description
COM0		
Console Redirection	**Disabled** Enabled	Enables/Disables console redirection on COM0 port.
COM1		
Console Redirection	**Disabled** Enabled	Enables/Disables console redirection on COM1 port.

A.4.16 Advanced > Console Redirection > COM 0 > Console Redirection Settings

Feature	Options	Description
Terminal Type	VT100 VT100Plus VT-UTF8 **ANSI**	Emulation: ANSI: Extended ASCII character set. VT100: ASCII character set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 **115200**	Selects serial port transmission speed. The speed must be matched on both connected systems. Long or noisy lines may require lower speeds.
Data Bits	7 **8**	Data Bits.
Parity	**None** Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.

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Feature	Options	Description
Stop Bits	**1** 2	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	**None** Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop
VT-UTF8 Combo Key Support	Disabled **Enabled**	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	**Disabled** Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	**Disabled** Enabled	Enables/Disables extended terminal resolution
Putty KeyPad	**VT100** LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

A.4.17 Advanced > Console Redirection > COM 1 > Console Redirection Settings

Feature	Options	Description
Terminal Type	VT100 VT100Plus VT-UTF8 **ANSI**	Emulation: ANSI: Extended ASCII character set. VT100: ASCII character set. VT100Plus: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.

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Feature	Options	Description
Bits per second	9600 19200 38400 57600 **115200**	Selects serial port transmission speed. The speed must be matched on both connected systems. Long or noisy lines may require lower speeds.
Data Bits	7 **8**	Data Bits.
Parity	**None** Even Odd Mark Space	A parity bit can be sent with the data bits to detect some transmission errors. Even: parity bit is 0 if the num of 1's in the data bits is even. Odd: parity bit is 0 if num of 1's in the data bits is odd. Mark: parity bit is always 1. Space: Parity bit is always 0. Mark and Space Parity do not allow for error detection. They can be used as an additional data bit.
Stop Bits	**1** 2	Stop bits indicate the end of a serial data packet. (A start bit indicates the beginning). The standard setting is 1 stop bit. Communication with slow devices may require more than 1 stop bit.
Flow Control	**None** Hardware RTS/CTS	Flow control can prevent data loss from buffer overflow. When sending data, if the receiving buffers are full, a 'stop' signal can be sent to stop the data flow. Once the buffers are empty, a 'start' signal can be sent to re-start the flow. Hardware flow control uses two wires to send start/stop
VT-UTF8 Combo Key Support	Disabled **Enabled**	Enable VT-UTF8 Combination Key Support for ANSI/VT100 terminals
Recorder Mode	**Disabled** Enabled	With this mode enabled only text will be sent. This is to capture Terminal data.
Resolution 100x31	**Disabled** Enabled	Enables/Disables extended terminal resolution

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Feature	Options	Description
Putty KeyPad	**VT100** LINUX XTERMR6 SCO ESCN VT400	Select FunctionKey and KeyPad on Putty.

A.4.18 Advanced > Miscellaneous > Network Stack Configuration

Feature	Options	Description
Network Stack	**Disabled** Enabled	Enables/Disables UEFI Network Stack
Ipv4 PXE Support	**Disabled** Enabled	Enables/Disables IPv4 PXE boot support. If disabled, IPv4 PXE boot support will not be available.
Ipv6 PXE Support	**Disabled** Enabled	Enables/Disables IPv6 PXE boot support. If disabled, IPv6 PXE boot support will not be available.
PXE boot wait time	[Max-Value, Min-Value, Step-Value] = [0x05, **0x00**, 0x01]	Wait time in seconds to press ESC key to abort PXE boot. Use either +/- or numeric keys to set the value.

A.4.19 Advanced > Trusted Computing > TPM 1.2 Configuration

Feature	Options	Description
Configuration	Info only	
Security Device Support	Disabled **Enabled**	Enables/Disables BIOS support for security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.

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Feature	Options	Description
TPM State	Disabled **Enabled**	Enables/Disables Security Device. The computer will reboot in order to change State of the Device.
Pending Operation	**None** TPM Clear	Schedule an Operation for the Security Device. The computer will reboot in order to change State of the Device.
Security Device Support	Disabled **Enabled**	Enables/Disables BIOS support for security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
TCM State	Disabled **Enabled**	Enables/Disables Security Device. The computer will reboot in order to change State of the Device.
Pending Operation	**None** TPM Clear	Schedule an Operation for the Security Device. The computer will reboot in order to change State of the Device.
Device Select	TPM 1.2 TPM 2.0 **Auto**	TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated
Current Information	Info only	
TPM Enabled Status	N/A, reset required	
TPM Active Status	N/A, reset required	
TPM Owner Status	N/A, reset required	
TPM Enabled Status	N/A, reset required	
TPM Active Status	N/A, reset required	
TPM Owner Status	N/A, reset required	

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A.4.20 Advanced > TPM 2.0 Configuration

Feature	Options	Description
TPM 2.0 Device Found		
Security Device Support	Disabled **Enabled**	Enables/Disables BIOS support for security device. OS will not show Security Device. TCG EFI protocol and INT1A interface will not be available.
Active PCR banks	N/A, reset required	
Available PCR banks	N/A, reset required	
SHA-1 PCR Bank	**Disabled** Enabled	Enables/Disables SHA-1 PCR Bank
SHA256 PCR Bank	Disabled **Enabled**	Enables/Disables SHA256 PCR Bank
SHA384 PCR Bank	**Disabled** Enabled	Enables/Disables SHA384 PCR Bank
SHA512 PCR Bank	**Disabled** Enabled	Enables/Disables SHA512 PCR Bank
SM3_256 PCR Bank	**Disabled** Enabled	Enables/Disables SM3_256 PCR Bank
Pending operation	**None** TPM Clear	Schedule an Operation for the Security Device. NOTE: Your Computer will reboot during restart in order to change State of Security Device.
Platform Hierarchy	Disabled **Enabled**	Enables/Disables Platform Hierarchy
Storage Hierarchy	Disabled **Enabled**	Enables/Disables Storage Hierarchy
Endorsement Hierarchy	Disabled **Enabled**	Enables/Disables Endorsement Hierarchy
TPM2.0 UEFI Spec Version	TCG_1_2 **TCG_2**	Select the TCG2 Spec Version Support
Physical Presence Spec Version	1.2 **1.3**	Select to Tell OS to support PPI Spec Version 1.2 or 1.3. Note some HCK tests might not support 1.3.

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Feature	Options	Description
TPM 2.0 InterfaceType	**CRB** TIS	Select the Communication Interface for the TPM 2.0 Device.
Device Select	TPM 1.2 TPM 2.0 **Auto**	TPM 1.2 will restrict support to TPM 1.2 devices, TPM 2.0 will restrict support to TPM 2.0 devices, Auto will support both with the default set to TPM 2.0 devices if not found, TPM 1.2 devices will be enumerated.

A.4.21 Advanced > USB Configuration

Feature	Options	Description
USB Configuration		
XHCI Hand-off	Disabled **Enabled**	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by the XHCI driver.
USB Mass Storage Driver Support	Disabled **Enabled**	Enables/Disables USB Mass Storage Driver Support.
USB hardware delays and time-outs:		
USB transfer time-out	1 sec 5 sec 10 sec **20 sec**	The time-out value for Control, Bulk, and Interrupt transfers.
Device reset time-out	10 sec **20 sec** 30 sec 40 sec	USB mass storage device Start Unit command time-out.
Device power-up delay	**Auto** Manual	Maximum time the device will take before it properly reports itself to the Host Controller. 'Auto' uses the default value: 100 ms for a Root port, for a Hub port the delay is taken from the Hub descriptor.

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Feature	Options	Description
Device power-up delay in seconds	[Max-Value, Min-Value, Step-Value] = [0x28, 0x01, 0x01]	Delay range is 1 to 40 seconds, in one second increments.

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A.5 Chipset

A.5.1 Chipset > North Bridge

Feature	Options	Description
Memory Information		
Total Memory	Info only	
Memory Voltage	Info only	
Memory Slot0	Info only	
Max TOLUD	2 GB, 2.25 GB, 2.5 GB, 2.75 GB, 3 GB	Maximum Value of TOLUD.
Above 4GB MMIO BIOS assignment	**Disabled** Enabled	Enables/Disables above 4GB MemoryMappedIO BIOS assignment
PCIE VGA Workaround	**Disabled** Enabled	Enable it if your PCIe card cannot boot to DOS. This is for testing only.

A.5.2 Chipset > South Bridge

Feature	Options	Description
Serial IRQ Mode	Quiet **Continuous**	Configure Serial IRQ Mode.
SMBus Support	Disabled **Enabled**	Enables/Disables SMBus Support
PCI CLOCK RUN	Disabled **Enabled**	Enables/Disables CLKRUN# logic to stop PCI clocks.

A.5.3 Chipset > Uncore Configuration

Feature	Options	Description
Integrated Graphics Device	Disabled **Enabled**	Enabled: Enable Integrated Graphics Device (IGD) when selected as the Primary Video Adaptor. Disabled: Always disable IGD

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Feature	Options	Description
Primary Display	**IGD** PCIe HG	Select which IGD/PCI Graphics device should be the Primary Display.
RC6 (Render Standby)	**Disabled** Enabled	Check to enable render standby support. RC6 should be enabled if S0ix is enabled.
GTT Size	2MB 4MB **8MB**	Select the GTT Size.
Aperture Size	128MB **256MB** 512MB	Select the Aperture Size.
DVMT Pre-Allocated	**64M**, 96M, 128M, 160M, 192M, 224M, 256M, 288M, 320M, 352M, 384M, 416M, 448M, 480M, 512M	Select the DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.
DVMT Total Gfx Mem	128M, **256M**, MAX	Select the DVMT5.0 Total Graphic Memory size used by the Internal Graphics Device.
Cd Clock Frequency	144 MHz, 288 MHz, 384 MHz, 576 MHz, **624 MHz**	Select the highest Cd Clock frequency supported by the platform.

A.5.4 Chipset > South Cluster Configuration > HD-Audio Configuration

Feature	Options	Description
HD-Audio Configuration		
HD-Audio Support	Disabled **Enabled**	Enables/Disables HD-Audio Support

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A.5.5 Chipset > South Cluster Configuration > LPSS Configuration

Feature	Options	Description
Low Power Sub System		
LPSS I2C #1 Support (D22:F0)	Disable **PCI Mode** ACPI Mode	Enables/Disables LPSS I2C #1 Support
Set LPSS I2C #1 Speed	Standard Mode **Fast Mode** Fast Plus Mode High Speed Mode	Select LPSS I2C #1 Speed
LPSS I2C #3 Support (D22:F2)	Disable **PCI Mode** ACPI Mode	Enables/Disables LPSS I2C #3 Support
Set LPSS I2C #3 Speed	Standard Mode **Fast Mode** Fast Plus Mode High Speed Mode	Select LPSS I2C #3 Speed
LPSS I2C #4 Support (D22:F3)	Disable **PCI Mode** ACPI Mode	Enables/Disables LPSS I2C #4 Support
Set LPSS I2C #4 Speed	Standard Mode **Fast Mode** Fast Plus Mode High Speed Mode	Select LPSS I2C #4 Speed
LPSS I2C #5 Support (D23:F0)	Disable **PCI Mode** ACPI Mode	Enables/Disables LPSS I2C #5 Support
Set LPSS I2C #5 Speed	Standard Mode **Fast Mode** Fast Plus Mode High Speed Mode	Select LPSS I2C #5 Speed
LPSS I2C #6 Support (D23:F1)	Disable **PCI Mode** ACPI Mode	Enables/Disables LPSS I2C #6 Support
Set LPSS I2C #6 Speed	Standard Mode **Fast Mode** Fast Plus Mode High Speed Mode	Select LPSS I2C #6 Speed

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A.5.6 Chipset > South Cluster Configuration > PCI Express Configuration

Feature	Options	Description
PCI Express Clock Gating	**Disabled** Enabled	Enables/Disables PCI Express Clock Gating for each root port.
PCIE Port assigned to LAN		
Port8xh Decode Port#	[Max-Value, Min-Value, Step-Value] = [0x14, **0x00**, 0x01]	Selects PCI Express Port8xh Decode Root Port. User to ensure port availability.
Peer Memory Write Enable	**Disabled** Enabled	Enables/Disables Peer Memory Write
Compliance Test Mode	**Disabled** Enabled	Enable when using Compliance Load Board
> PCI Express Root Port 1		
> PCI Express Root Port 5		
> PCI Express Root Port 6		

A.5.7 Chipset > South Cluster Configuration > SATA Drives

Feature	Options	Description
Chipset SATA	Disabled **Enabled**	Enables/Disables the Chipset SATA Controller. The Chipset SATA controller supports the 2 black internal SATA ports (up to 3Gb/s supported per port).
SATA Interface Speed	**Auto** Gen1 Gen2 Gen3	Select SATA Interface Speed. CHV A1 always with Gen1 Speed.
SATA Test Mode	**Disabled** Enabled	Enables/Disables Test Mode (Loop Back).
Aggressive LPM Support	**Disabled** Enabled	Enables/Disables PCH to aggressively enter link power state.

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Feature	Options	Description
SATA Port 0 (M.2)		
Software Preserve		
Port 0	Disabled **Enabled**	Enables/Disables SATA Port
SATA Port 0 Hot Plug Capability	**Disabled** Enabled	Designates this port as Hot Pluggable
Configured as eSATA		
Mechanical Presence Switch	Disabled **Enabled**	Controls reporting if this port has a Mechanical Presence Switch.
Spin Up Device	**Disabled** Enabled	If enabled for any ports, Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	**Hard Disk Drive** Solid State Drive	Identifies if the SATA port is connected to a Solid State Drive or Hard Disk Drive.
SATA Port 0 DevSlp	**Disabled** Enabled	Enables/Disables SATA Port 0 DevSlp. Board rework for LP needed before enabling.
DITO Configuration	**Disabled** Enabled	Enables/Disables DITO Configuration
DITO Value	[Max-Value, Min-Value, Step-Value] = [0x03FF, 0x0000, 0x0000]	DITO Value
DM Value	[Max-Value, Min-Value, Step-Value] = [**0x0F**, 0x00, 0x00]	DM Value
SATA Port 1 (2.5” SSD)		
Software Preserve		
Port 1	Disabled **Enabled**	Enables/Disables SATA Port

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Feature	Options	Description
SATA Port 1 Hot Plug Capability	**Disabled** Enabled	Designates this port as Hot Pluggable
Configured as eSATA		
Mechanical Presence Switch	Disabled **Enabled**	Controls reporting if this port has a Mechanical Presence Switch.
Spin Up Device	**Disabled** Enabled	If enabled for any ports, Staggerred Spin Up will be performed and only the drives which have this option enabled will spin up at boot. Otherwise all drives spin up at boot.
SATA Device Type	**Hard Disk Drive** Solid State Drive	Identifies if the SATA port is connected to a Solid State Drive or Hard Disk Drive.
SATA Port 1 DevSlp	**Disabled** Enabled	Enables/Disables SATA Port 1 DevSlp. Board rework for LP needed before enabling.
DITO Configuration	**Disabled** Enabled	Enables/Disables DITO Configuration
DITO Value	[Max-Value, Min-Value, Step-Value] = [0x03FF, 0x0000, 0x0000]	DITO Value
DM Value	[Max-Value, Min-Value, Step-Value] = [**0x0F**, 0x00, 0x00]	DM Value

A.5.8 Chipset > South Cluster Configuration > SCC Configuration

Feature	Options	Description
SCC eMMC Support (D28:F0)	Disabled **Enabled**	Enables/Disables SCC eMMC Support
eMMC Max Speed	**HS400** HS200 DDR50	Select the eMMC maximum speed allowed.

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A.5.9 Chipset > PCH-IO Configuration > USB Configuration

Feature	Options	Description
XHCI Pre-Boot Driver	Enabled **Disabled**	Enables/Disables XHCI Pre-Boot Driver support.
xHCI Mode	Disabled **Enabled**	Once disabled, the XHCI controller is disabled and none of the USB devices are detectable or usable during boot time, or by the OS. Do not disable it unless using it for debug purposes.
USB VBUS	OFF **ON**	VBUS should be ON in HOST mode. It should be OFF in OTG device mode.
USB HSIC1 Support	**Disabled** Enabled	Enables/Disables USB HSIC1
USB SSIC1 Support	**Disabled** Enabled	Enables/Disables USB SSIC1
USB Port Disable Override	**Disabled** Enabled	Selectively Enables/Disables the corresponding USB port from reporting a Device Connection to the controller.
USB Port #0	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB Port #1	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB Port #2	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB Port #3	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.

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Feature	Options	Description
USB Port #4	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB Port #5	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB Port #6	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB Port #7	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB 3 Port #0	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB 3 Port #1	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB 3 Port #2	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB 3 Port #3	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
USB 3 Port #4	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.

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Feature	Options	Description
USB 3 Port #5	Disabled **Enabled**	Enables/Disables USB port. Once disabled, any USB devices plugged into the connector will not be detected by the BIOS or OS.
XDCI Support	**Disabled** PCI Mode	Enables/Disables XDCI
XHCI Disable Compliance Mode	**FALSE** TRUE	Options to disable XHCI Link Compliance Mode. Default is FALSE to not disable Compliance Mode. Set TRUE to disable Compliance Mode.
USB HW MODE AFE Comparators	**Disabled** Enabled	Enables/Disables USB HW MODE AFE Comparators

A.5.10 Chipset > PCH-IO Configuration > Miscellaneous Configuration

Feature	Options	Description
State After G3	**S0 State** S5 State	Specifies what state to go to when power is re-applied after a power failure (G3 state).
BIOS Lock	**Disabled** Enabled	Enables/Disables the PCH BIOS Lock Enable feature. Required to be enabled to ensure SMM protection of flash.

A.6 Security

Feature	Options	Description
If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup. If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights. The password length must be in the following range:		
Minimum length	20	
Maximum length	20	

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A.7 Boot

A.7.1 Boot > Boot Configuration

Feature	Options	Description	
Setup Prompt Timeout	[Max-Value, Min-Value, Step-Value] = [0xFFFF, **0x0001**, 0x0001]	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.	
Bootup NumLock State	On **Off**	Selects the keyboard NumLock state.	
Quiet Boot	Disabled **Enabled**	Enables/Disables Quiet Boot option.	
Fast Boot	**Disabled** Enabled	Enables/Disables boot with initialization of a minimal set of devices required to launch active boot option. Has no effect for BBS boot options.	
Boot Option #1	Hard Disk CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disabled	**Hard Disk**	Sets the system boot order
Boot Option #2		**CD/DVD**	
Boot Option #3		**USB Hard Disk**	
Boot Option #4		**USB CD/DVD**	
Boot Option #5		**USB Key**	
Boot Option #6		**USB Floppy**	
Boot Option #7		**USB Lan**	
Boot Option #8		**Network**	

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A.8 Save & Exit

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

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Important Safety Instructions

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

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

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



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

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

	**BURN HAZARD** 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

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