

AVA-5500

AI-Enabled Video Analytics Platform

User's Manual



Manual Rev.: 1.1

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Part No: 50-1Z294-2010

Revision History

Revision	Release Date	Description of Change(s)
1.0	2019-09-09	Initial release
1.1	2020-03-31	SIM card slots moved to front panel; add optional 4x isolated DIO; add AVA-5520 content

Preface

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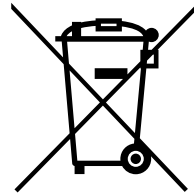
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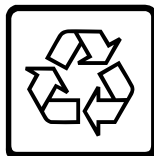
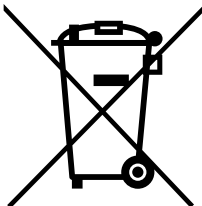
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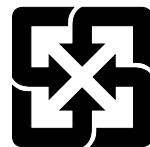
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Battery Labels



Li-ion



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Conventions

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



NOTE:

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



CAUTION:

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



WARNING:

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

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1 Introduction

1.1 Overview

The AVA-5500 Series is a high performance fanless AI-Enabled Video Analytics Platform equipped with the 6th/7th Gen Intel® Core™ i7 Processor and integrated NVIDIA Quadro GPGPU module. This EN50155 certified AIoT Platform is not only ruggedized for both wayside and onboard deployment with its wide range DC input and isolated I/O design, but also provides an ideal edge solution for real-time video/graphic analysis applications that are vital to today's increasingly complex railroad operations. The target applications include but are not limited to:

- ▶ Passenger Information Systems
- ▶ Railroad Intrusion Detection
- ▶ Train Station Surveillance
- ▶ Onboard Video Security
- ▶ Railroad Hazard Detection

The AVA-5510 version features an additional 2x USB 2.0 via M12 connectors and 2 additional 2.5" SATA 6.0 Gb/s drive bays.

1.2 Features

- ▶ 6th/7th Gen Intel® Core. i7 Processor
- ▶ Supports Type A and B MXM on PCI Express x16 for add-on GPU module
 - ▷ EGX-MXM-P1000: 512 CUDA cores, 1.8 TFLOPS peak, 4GB GDDR5 memory
 - ▷ EGX-MXM-P2000: 768 CUDA cores, 2.3 TFLOPS peak, 4GB GDDR5 memory
 - ▷ EGX-MXM-P3000: 1280 CUDA cores, 3.9 TFLOPS peak, 6GB GDDR5 memory
 - ▷ EGX-MXM-P5000: 2048 CUDA cores, 6.4 TFLOPS peak, 16GB GDDR5 memory (supported by AVA-5520 only)
- ▶ Rich I/O: 8x M12 GbE (4 support 7W PoE), 4x RS-422, 4x USB 3.0, 1x DVI-I, 4x DisplayPort with lockable connectors
 - ▷ AVA-5510: additional 2x USB 2.0 via M12 connectors
- ▶ Rich Storage Options: 1x M.2 SATA slot, 1x CFast socket
 - ▷ AVA-5500/5520: 2x 2.5" SATA 6.0 Gb/s drive bays
 - ▷ AVA-5510: 4x 2.5" SATA 6.0 Gb/s drive bays
- ▶ GNSS/3G/4G/WLAN support via 2x Mini PCIe slots and 2x externally accessible USIM slots
- ▶ MVB/CAN bus support by Mini PCIe add-on module
- ▶ Input Voltage:
 - ▷ AVA-5500/5510: Nominal Voltage: 24VDC, 36VDC, 72VDC and 110VDC (EN50155 compliant)
 - ▷ AVA-5520: 12VDC only

1.3 Package Contents

Please check that your package contains the items below. If you discover damaged or missing items, please contact your vendor.

- ▶ AVA-5500 Series AI-Enabled Video Analytics Platform
- ▶ Wall-mount bracket
- ▶ Screw pack for wall-mounting and SSD drives



WARNING:

DO NOT install or apply power to equipment that is damaged or if there is missing/incomplete equipment. Retain the shipping carton and packing materials for inspection. Please contact your ADLINK dealer/vendor immediately for assistance. Obtain authorization from your dealer before returning any product to ADLINK.

Optional Accessories

Starter Cable Kit for AVA-5500/5520 (P/N: 91-95247-000E)

- ▶ 1x S-coded M12 power supply cable
- ▶ 4x PoE X-coded M12 to RJ45 Ethernet cable
- ▶ 4x A-coded M12 to RJ-45 cable
- ▶ 1x Y cable for PS/2 KB/MS

Starter Cable Kit for AVA-5510 (P/N: 91-95247-100E)

- ▶ 1x S-coded M12 power supply cable
- ▶ 4x PoE X-coded M12 to RJ45 Ethernet cable
- ▶ 4x A-coded M12 to RJ-45 cable
- ▶ 1x Y cable for PS/2 KB/MS
- ▶ 2x A-coded M12 to USB 2.0 type A cable



WARNING:

The Starter Cable Kits are for evaluation purposes only, and not recommend for field use.

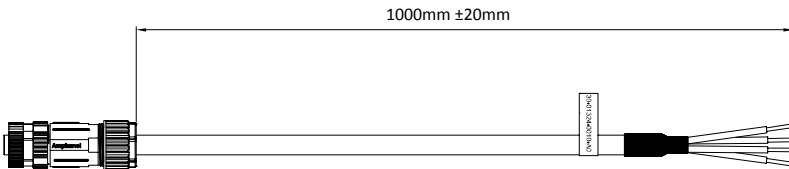
Mini PCIe Cellular Kit for Taiwan, China (P/N: 91-95247-400E)

- ▶ 1x Mini PCIe Cellular module (SIMCOM SIM7100C-PCIE, GSM/TD-SCDMA/CDMA/WCDMA/LTE/GNSS)
- ▶ 2x external antennas
- ▶ 2x internal RF cables

Mini PCIe Cellular Kit for Europe (P/N: 91-95247-500E)

- ▶ 1x Mini PCIe Cellular module (SIMCOM SIM7100C-PCIE, GSM/TD-SCDMA/CDMA/WCDMA/LTE/GNSS)
- ▶ 2x external antennas
- ▶ 2x internal RF cables

S-coded M12 Power Supply Cable (P/N: 30-01324-0010-A0)



Mini PCIe Cellular Module for Taiwan, China

(SIMCOM SIM7100C-PCIE, GSM/TD-SCDMA/CDMA/WCDMA/LTE/GNSS, P/N:29-D0023-F000)

Mini PCIe Cellular Module for Europe

(SIMCOM SIM7100C-PCIE, GSM/TD-SCDMA/CDMA/WCDMA/LTE/GNSS, P/N:29-D0012-F000)

2 System Description

2.1 AVA-5500/5510 Specifications

Model	AVA-5500	AVA-5510	AVA-5520
System Core			
Processor	Intel® Core™ i7-6820EQ, 2.8GHz Intel® Core™ i7-7820EQ, 3.0GHz		
Memory	DDR4 2133 8GB by SODIMM, up to 32GB		
Graphics Outputs			
DisplayPort	2x DisplayPort by integrated Intel graphics (DP1-DP2) 4x DisplayPort by MXM GPU module: NVIDIA Quadro P1000/P2000/P3000 (DP3-DP6; DP3 output is eDP only, no DP++ support)		Same as AVA-5500, additional support for NVIDIA Quadro P5000
DVI	1x DVI-I port		
External I/O Interfaces			
Ethernet	2x GbE via RJ-45 4x M12 X-code 1000BASE-T Ethernet ports supporting PoE Class 2 (7W) and 1.5kV isolation 4x M12 A-coded 1000BASE-T Ethernet ports, 1.5kV isolation		
Serial Port	4x COM (RS232/422/485), 2kVrms isolation		
CAN	2x DB-9 cutouts reserved for CAN bus outputs		
USB 2.0	N/A	2x USB 2.0 via M12 connectors	N/A
USB 3.0	4x USB 3.0 host port		
Audio	Mic-in / Line-out		
PS/2	Keyboard / Mouse		
Digital I/O (optional)	4x isolated DI and 4x isolated DO via two DB-9 connectors, supported by add-on module occupying one 2.5" drive space (pre-installed at factory) DI: 0-24V input voltage with 1500VDC isolation DO: 3.3V-35VDC output voltage, 250mA/ch sink current, 1500VDC isolation		

Table 2-1: AVA-5500/5510 Specifications

Model	AVA-5500	AVA-5510	AVA-5520
USIM	2x micro-SIM card slots (accessible on the front panel)		
Buttons	Power button, reset button		
Status LEDs	1x Diagnostic, 1x Storage, 1x WDT, 3x User Defined		
Camera Interfaces			
PoE	4x M12 Class 2 (7W)		
Internal I/O Interfaces			
Slots	1x M.2 2280 SATA 2x Full-size Mini PCIe slots		
USB	1x lockable USB 2.0 box header		
Security			
TPM	Intel® PTT (fTPM)		
Storage Support			
M.2	1x M.2 2280 SATA		
CFast	1x CFast socket (external)		
SATA	2x 2.5" SATA (external)	4x 2.5" SATA (external)	2x 2.5" SATA (external)
Power Requirements			
DC Input	1x 4-pin S-coded M12 connector		
	+24V/+36V/+72V/+110VDC nominal power input (16.8V to 137.5V, EN50155 compliant)		12V input (w/o wide voltage powerboard)
Grounding	Digital/chassis ground		
Mechanical			
Dimensions	360mm x 225.1mm x 88.8mm	360mm x 225.1mm x 105.4mm	360mm x 225.1mm x 88.8mm
IP Rating	IP4X		
Antennas	4 connection plug holes reserved		
Mounting	Wall mount		
Cooling	Fanless, passive convection		

Table 2-1: AVA-5500/5510 Specifications

Model	AVA-5500	AVA-5510	AVA-5520
CMOS Battery			
Model	BR-2032		
Protection	Reverse charge protection		
Firmware/Software Support			
SEMA	SEMA support with BMC		
WDT	Watch Dog Timer support		
Operating Systems			
Windows	Windows 7 Professional, Windows 8, Windows 10		
Linux	Ubuntu 16.04		
Environmental & Safety			
Operating Temperature	Convection cooled Class OT1: -25°C to 55°C with NVIDIA P3000 GPU module Class OT3: -25°C to 70°C with NVIDIA P1000/P2000 GPU module		0°C to 55°C with P3000/P5000 GPU module
Operating Humidity	EN 50125-1: compliant with EN 60068-2-30, Test Db, 2 cycles at 55 °C		
Storage Temperature	-40°C to 85°C		
Vibration	EN50155 standard, method EN61373:2010, Category 1 Class B		
Shock	EN50155 standard, method EN61373:2010, Category 1 Class B		
ESD	EN50153 EN50124-1		
EMC	EN50155:2017 standard EN50121-3-2:2015		
Safety	EN50153 EN50124-1		

Table 2-1: AVA-5500/5510 Specifications



NOTE:

The MXM module must be installed at the factory. Please contact your local ADLINK representative for more information.

When an MXM graphics module is installed, the default Primary Display BIOS setting (Auto) will send bootup display output to DP3-DP6 (MXM graphics). To send bootup display output to DP1-DP2 (integrated Intel graphics), go to BIOS setup and change *Advanced > Graphics Configuration > Primary Display* to *IGFX* (see 5.4.2 Graphics Configuration on p. 49).



NOTE:

M.2 and Mini PCIe modules may require an additional thermal solution when operated above 60 °C. Please contact your local ADLINK representative for more information.

2.2 DisplayPort Feature Support

GPU	DVI-I	DP++	eDP only
Intel	1920x1080 @ 60Hz	4096x2160 @ 60Hz (DP1, DP2)	—
P1000 P2000 P3000 P5000	—	3840x2160 @60Hz (DP4, DP5, DP6)	3840x2160 @60Hz (DP3)

Table 2-2: DisplayPort Feature Support

2.3 Block Diagram

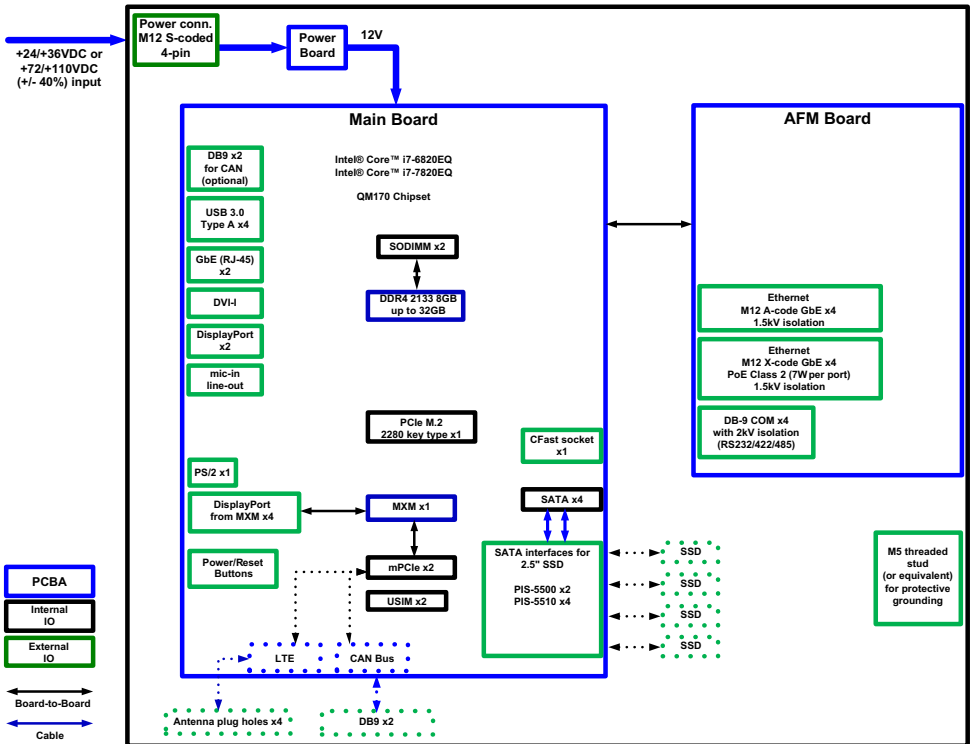


Figure 2-1: AVA-5500 Block Diagram

2.4 Mechanical Dimensions

AVA-5500/5520

(units: mm)

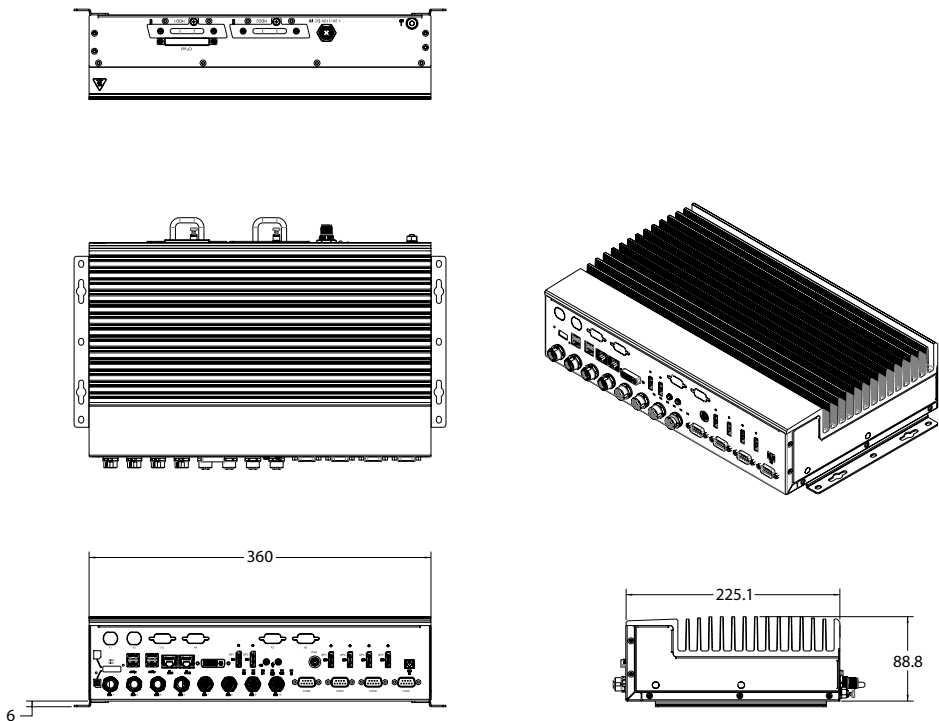


Figure 2-2: AVA-5500/5520 Dimensions

AVA-5510

(units: mm)

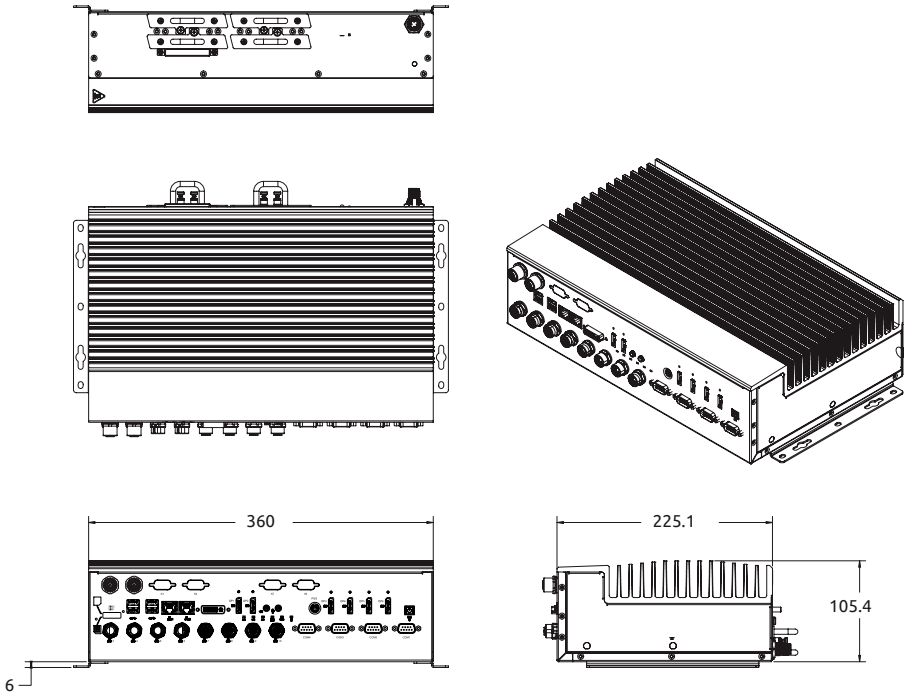


Figure 2-3: AVA-5510 Dimensions

2.5 Mechanical Layout

Front View

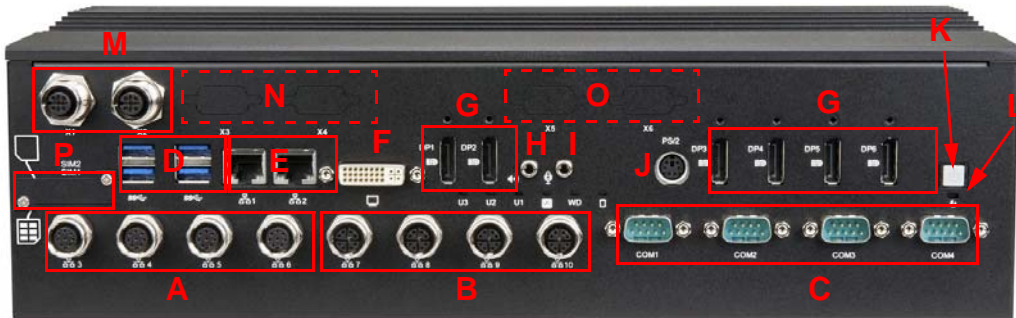


Figure 2-4: AVA-5500 Series Front Layout
(AVA-5510 shown)

A	M12 A-code GbE
B	M12 X-code GbE with PoE Class 2
C	RS232/422/485
D	USB 3.0
E	RJ-45 GbE
F	DVI-I
G	DisplayPort*
H	Mic-in
I	Line-out
J	PS/2
K	Power On/Off button
L	System Reset button
M	M12 USB 2.0 (AVA-5510 only)
N	Reserved for DIO
O	Reserved for CAN bus
P	USIM card slots



NOTE:

*DP3 output is eDP only, no DP++ support.

Rear View



Figure 2-5: AVA-5500/5200 Rear I/O Layout



Figure 2-6: AVA-5510 Rear I/O Layout

Q	2.5" SATA Drive Bays
R	CFast Slot
S	DC Input
T	Ground Stud

2.6 Power Specifications

2.6.1 Power Consumption

The following table presents the AVA-5500 Series power consumption data at room temperature under the following test conditions.

- ▶ Intel® Core™ i7-6820EQ
- ▶ Memory:
 - ▷ NVIDIA P1000 GPU: 8GB
 - ▷ NVIDIA P3000/P5000 GPU: 32GB
- ▶ Storage: M.2 SATA 64GB
- ▶ Hyper Threading Support enabled
- ▶ TurboBoost Support enabled
- ▶ EIST enabled
- ▶ cTDP Setting: Normal
- ▶ PoE full loading (4x 7W)
- ▶ BurnInTest Revision: 8.1.1025
- ▶ TAT Revision: 6.0.1011
- ▶ Windows 10 Enterprise 64-bit v1809

Input Voltage	Loading	Setup	Current	Power Consumption
24VDC	Stress: Windows typical mode, (Burnintest tool & GPU Heater)	GPU: P1000	5.99A	143.9W
		GPU: P3000	6.77A	162.6W
	Stress: Windows MAX mode, (Intel TAT & GPU Heater)	GPU: P1000	7.91A	190W
		GPU: P3000	7.97A	191.4W
	S3 mode	-	470mA	11.28W
	S4 mode	-	430mA	10.32W
S5 mode	-	450mA	10.8W	

Table 2-3: AVA-5500/5510 Power Consumption

Input Voltage	Loading	Setup	Current	Power Consumption
12VDC	Stress: Windows typical mode, (Burnintest tool & GPU Heater)	GPU: P5000	14.75A	177W
	Stress: Windows MAX mode, (Intel TAT & GPU Heater)		17.15A	205.8W
	S3 mode	-	450mA	5.4W
	S4 mode	-	400mA	4.8W
	S5 mode	-	380mA	4.56W

Table 2-4: AVA-5200 Power Consumption

2.6.2 System Power Features

Operating Voltage Range

The system is equipped with a wide DC input range from 16.8V to 137.5V.

- ▶ Input range: 16.8V to 137.5V (AVA-5520 supports 12V only)
- ▶ Max. input current:
 - ▷ 110V: 3A
 - ▷ 24V: 8.3A
 - ▷ 16.8V: 15A
 - ▷ 12V: 20A (AVA-5520 only)

Input Over-Voltage Protection

When the input voltage exceeds the 161V, the module will shut down, and try to restart every 9 seconds until the over current condition is corrected.

Input Over-Temperature Protection

Power will automatically shut down when the operating temperature of the power module sensor exceeds 125°C.

Under Voltage Lockout (UVLO)

The under voltage lockout feature will shut down the power if the input voltage is below 14V \pm 0.4V and automatically restart when the input voltage is above 16V \pm 0.4V.

2.7 Mini PCIe CAN Bus Module (optional)

An optional Mini PCIe Card CAN Bus Kit consisting of an Innodisk EMUC-B202 Mini PCIe CAN bus module and cable can be installed at the factory. The module features are:

- ▶ CAN 2.0B backward compatible with 2.0A
- ▶ Supports baud rates 100/125/250/500(default)/800/1000 kbps
- ▶ Supports CAN message acceptance filter
- ▶ Configuration retained after hardware reboot
- ▶ Up to 6000 CAN messages per second (receive data)
- ▶ Supports Listen-only mode
- ▶ Additional driver to support Linux SocketCAN
- ▶ Supports SAE J1939 high layer protocol (optional)
- ▶ Termination resistor enabled/disabled by jumper
- ▶ Complies with EN61000-4-5 2.5kV surge protection
- ▶ Complies with IEC 60950-1:2005 + A1: 2009 + A2:2013 2.5kV Hipot protection
- ▶ Complies with EN61000-4-2 (ESD); air: 15kV, contact: 8kV

AVA-5500 Mini PCIe Card CAN Bus Kit (P/N: 91-95247-300E)

- ▶ 1x Mini PCIe Innodisk EMUC-B202-W2 CAN bus module (P/N: 92-97138-0010)
- ▶ 1x CAN bus cable (P/N: 30-21558-0000-A0)



NOTE:

It is strongly recommended that the CAN bus module be installed at the factory. If you wish to use a different module or install it yourself, please contact your local ADLINK representative for more information.

3 Getting Started

Follow the instructions in this chapter to install USIM cards; Wi-Fi, cellular and M.2 SATA modules; mounting brackets; CFast card; 2.5" SATA drives; ground cable; and DC power supply.



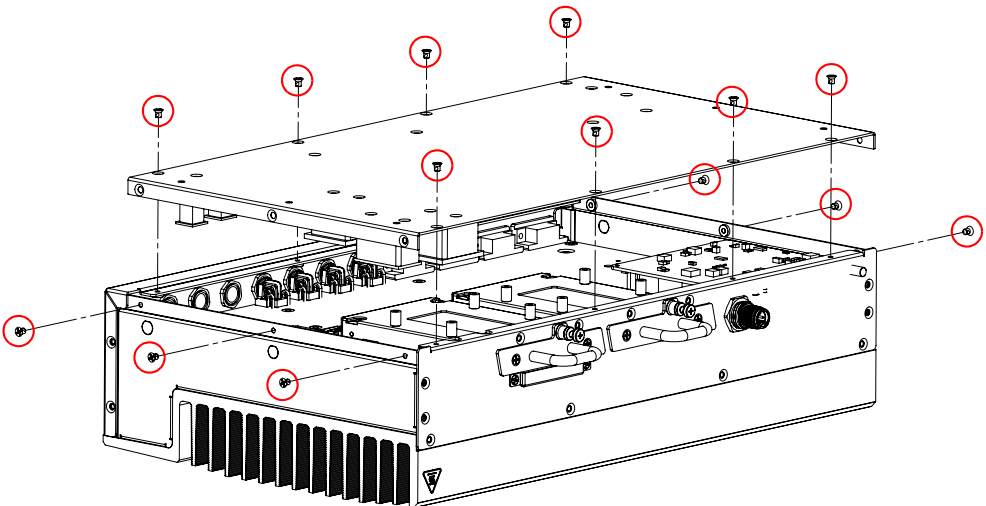
NOTE:

MXM and CAN bus modules must be installed at the factory. Please contact your local ADLINK representative for more information.

3.1 Removing the Bottom Cover

To install the optional modules, first remove the bottom cover as described below.

1. Place the box PC on a suitable surface with the bottom side facing up. Remove the 8 screws from the bottom side and 3 screws each from the left and right side as indicated below.

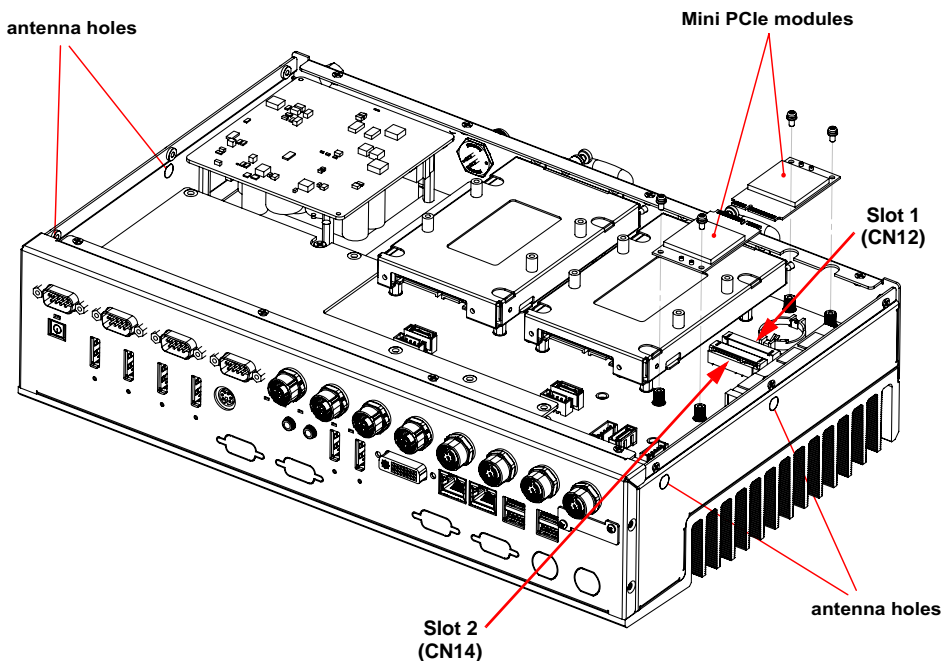


2. Lift the rear cover off of the box PC chassis.
3. To install the bottom cover, place it in its original location and replace the 8 screws removed above.

3.2 Installing Wi-Fi or Cellular Modules (optional)

Follow the instructions below to install a Mini PCIe Wi-Fi or cellular module.

1. Insert the Mini PCIe LTE or Wi-Fi module into one of the slots as shown and secure it using two M2.5 screws.



2. Connect the internal RF cables to the module and install the SMA connectors into the antenna openings indicated above.

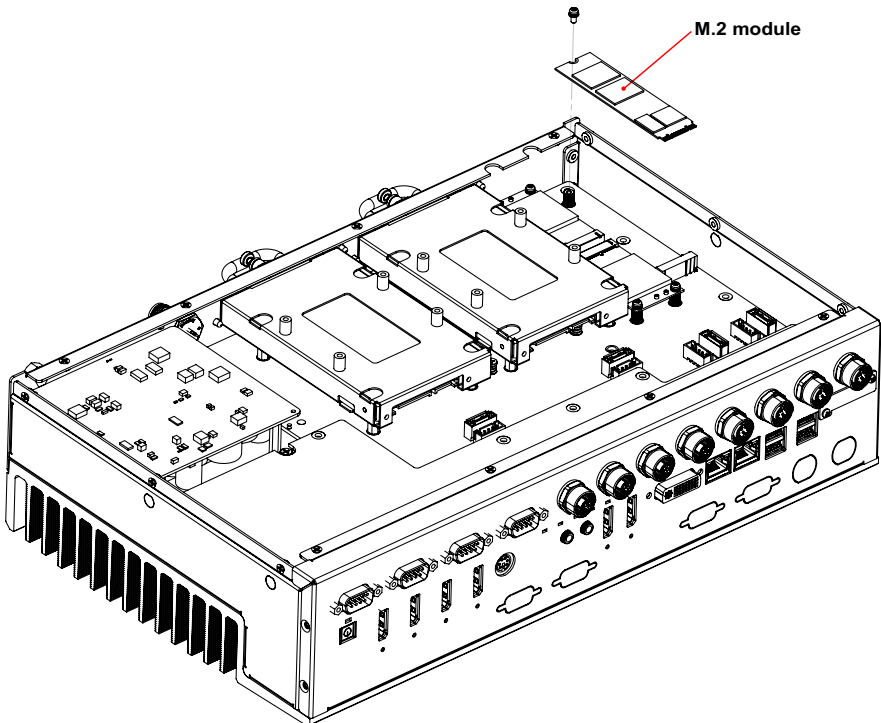


NOTE:

Mini PCIe modules may require an additional thermal solution when operated above 60 °C. Please contact your local ADLINK representative for more information.

3.3 Installing a M.2 2280 SATA Module (optional)

To install an M.2 2280 SATA module, insert the module into the slot and secure it with one M2.5 screw as shown.



NOTE:

M.2 modules may require an additional thermal solution when operated above 60 °C. Please contact your local ADLINK representative for more information.

3.4 Installing micro-USIM Cards (optional)

The micro-USIM card slots are located at the left of the front panel. Open the USIM card slot cover by removing the 2 screws indicated below. Insert the USIM cards into the slots using the orientations indicated on the front panel (SIM2 contacts facing down, SIM1 contacts facing up) with the beveled (cut) corner facing outwards. SIM1 corresponds to Mini PCIe slot 1 (CN12), and SIM2 corresponds to Mini PCIe slot 2 (CN14). See 3.2 Installing Wi-Fi or Cellular Modules (optional) on pg. 18 for Mini PCIe slot locations

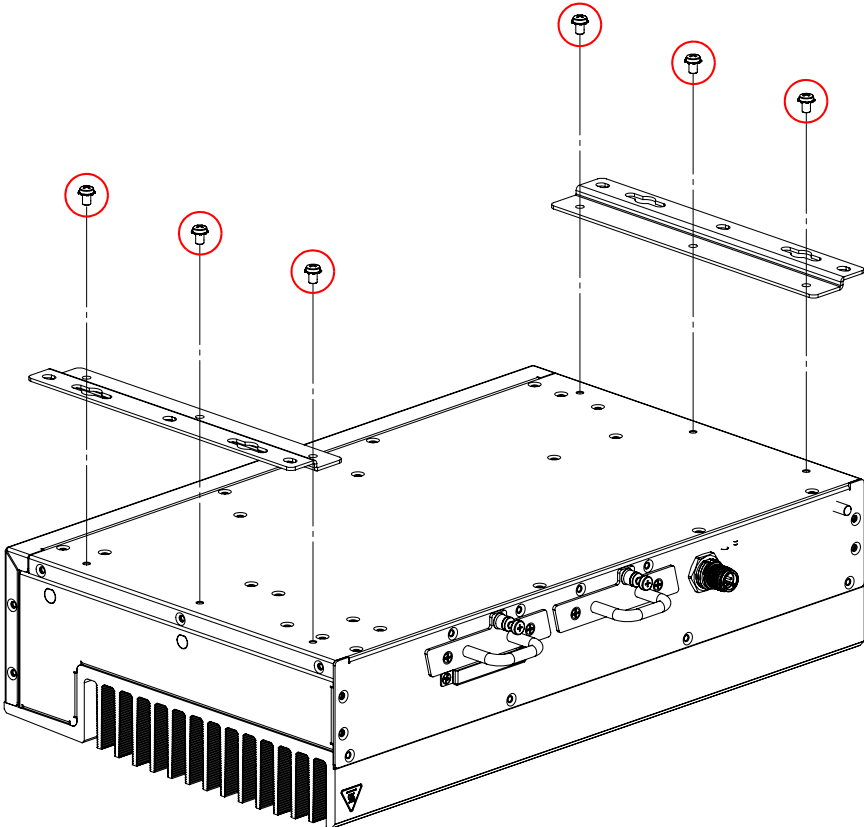


NOTE:

The SIM card must be inserted with beveled (cut) corner facing outwards. This is contrary to the standard method of inserting SIM cards.

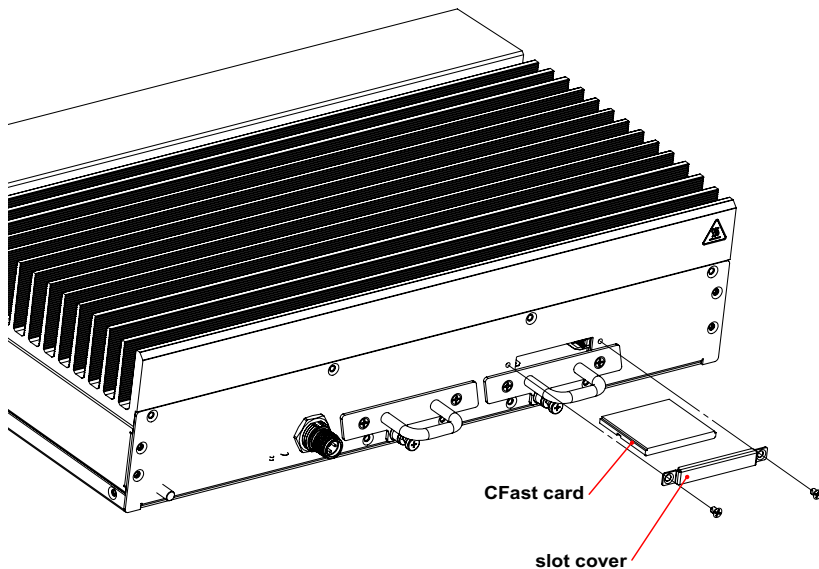
3.5 Mounting

The AVA-5500 can be wall or surface mounted using the wall mount brackets and screws provided. If wall mounting, make sure the wall can support the weight of the device. Secure the brackets to the chassis using the 6 screws provided as shown.



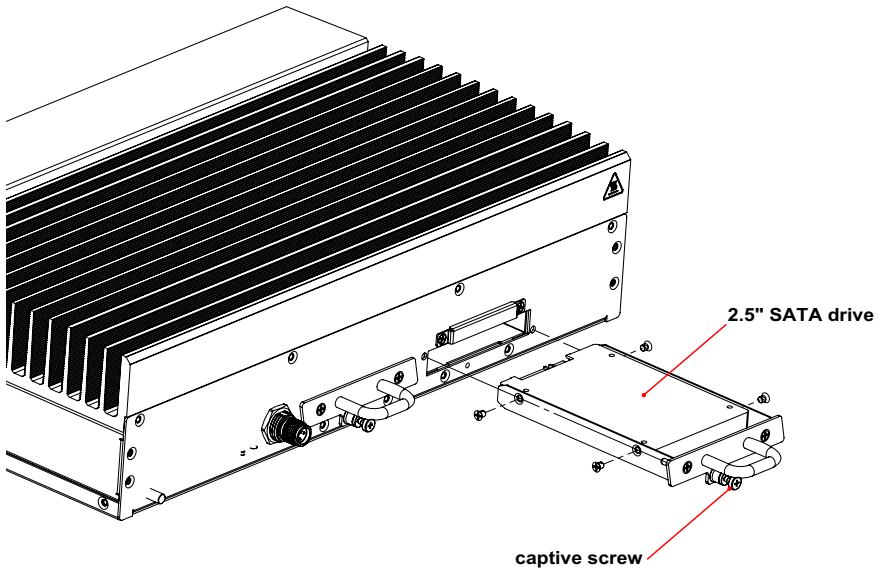
3.6 CFast Card Installation

To install or remove the CFast card, remove the screws securing the CFast slot cover and remove the cover. Insert the CFast card and secure the cover.



3.7 SATA Drive Installation

To install a 2.5" SATA drive, loosen the captive screw securing the drive bay cover and remove the drive bracket. Install the 2.5" SATA drive into the bracket and secure with four screws. Insert the drive bracket assembly into the drive bay and secure the cover with the captive screw.



3.8 Connections

Connecting a Ground Cable



Connect the ground cable before making any other connections. When disassembling the system, always detach the ground cable last.

- ▶ Use a ground cable with a cross section of at least 0.823mm^2 (18AWG) and an M5 size ring terminal.
- ▶ Slide the ring terminal onto the ground stud and secure it with the locking M5 nut.



ground stud

Connecting Peripherals

Connect all the peripheral devices needed for your system to function.

Connecting the Power Supply

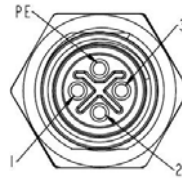


WARNING:

- ▷ Work on the computer system may only be carried out by personnel qualified for the specific task and who have the training and experience to identify risks and avoid potential hazards.
- ▷ Make sure that a ground cable has been connected to the system before connecting an external power supply and switching on the system.
- ▷ Make sure that the voltage supplied by the external power supply conforms with specifications of the system

Connect the power supply to the 4-pin M12 connector on the rear of the chassis (Pantron Z07M12S-4PMS-SF8B15). The device will power up when the power supply is turned on.

Pin #	Signal
1	Vin
2	GND
3	Vin
4(PE)	GND



3.9 Starting Up the System

Upon startup, the system will auto-detect storage devices and boot from the operating system, if found. To change the boot device order, press or <Esc> to enter BIOS setup menu and change the Boot Option settings. If no operating system is found, the system will enter the BIOS setup menu automatically.

The AVA-5500 is delivered without an operating system installed.



NOTE:

When an MXM graphics module is installed, the default Primary Display BIOS setting (Auto) will send bootup display output to DP3-DP6 (MXM graphics). To send bootup display output to DP1-DP2 (integrated Intel graphics), go to BIOS setup and change *Advanced > Graphics Configuration > Primary Display* to *IGFX* (see 5.4.2 Graphics Configuration on pg. 49).

4 Interfaces

4.1 Pin Definitions

Please refer to Figure 2-4 AVA-5500 Series Front Layout on page 12 for connector locations.

GbE M12 A-code Connectors

Pin #	Signal Name
1	MDO0P
2	MDO0N
3	MDO1P
4	MDO1N
5	MDO3P
6	MDO3N
7	MDO2N
8	MDO2P

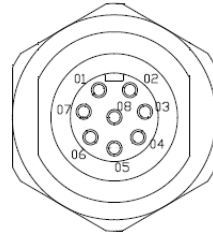


Table 4-1: GbE M12 A-code Pin Definition

GbE M12 X-code Connectors

Pin #	Signal Name
1	MDI_T_P0
2	MDI_T_N0
3	MDI_T_P1
4	MDI_T_N1
5	MDI_T_P3
6	MDI_T_N3
7	MDI_T_N2
8	MDI_T_P2

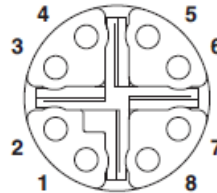


Table 4-2: GbE M12 X-code Pin Definition

USB 3.0 Connector

Pin #	Signal Name
1	+5V_USB3
2	USB2_P0_DN
3	USB2_P0_DP
4	GND
5	USB3_P0_RXN
6	USB3_P0_RXP
7	GND
8	USB3_P0_TXN
9	USB3_P0_TXP

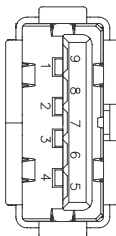
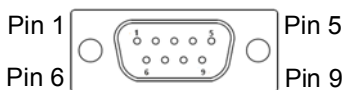


Table 4-3: USB 3.0 Pin Definition

COM DB9 Connectors



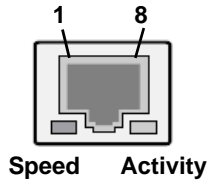
Pin #	RS-232	RS-422	RS-485
Pin1	DCD	TXD-	D-
Pin2	RXD	TXD+	D+
Pin3	TXD	RXD+	NA
Pin4	DTR	RXD-	NA
Pin5	GND	NA	NA
Pin6	DSR	NA	NA
Pin7	RTS	NA	NA
Pin8	CTS	NA	NA
Pin9	RI	NA	NA

Table 4-4: COM Port Pin Definition

RJ-45 GbE Connectors

Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	LAN_TX0+
2	TX-	LAN_TX0-
3	RX+	LAN_TX1+
4	—	LAN_TX2+
5	—	LAN_TX2-
6	RX-	LAN_TX1-
7	—	LAN_TX3+
8	—	LAN_TX3-

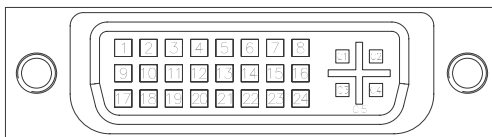
Table 4-5: RJ-45 GbE Pin Definitions



Status		Speed LED (Green/Amber)	Activity LED (Yellow)
Network link is not established or system powered off		OFF	OFF
10 Mbps	Link	OFF	ON
	Active		Blinking
100 Mbps	Link	Green	ON
	Active		Blinking
1000 Mbps	Link	Yellow	ON
	Active		Blinking

Table 4-6: LAN LED Status Definitions

DVI-I Connector



Pin #	Signal	Pin #	Signal
1	TMDS Data2-	16	Hot Plug Detect
2	TMDS Data2+	17	TMDS Data0-
3	GND	18	TMDSData0+
4	NC	19	GND
5	NC	20	NC
6	DDC Clock [SCL]	21	NC
7	DDC Data [SDA]	22	GND
8	Analog vertical sync	23	TMDS Clock +
9	TMDS Data1-	24	TMDS Clock -
10	TMDS Data1+	C1	Analog Red
11	GND	C2	Analog Green
12	NC	C3	Analog Blue
13	NC	C4	Analog Horizontal Sync
14	+5 V Power	C5	Analog GND Return
15	GND		

Table 4-7: DVI-I Connector Pin Definition

DisplayPort Connectors

Pin #	Signal	Pin #	Signal
1	CN_DP0_P	2	Ground
3	CN_DP0_N	4	CN_DP1_P
5	Ground	6	CN_DP1_N
7	CN_DP2_P	8	Ground
9	CN_DP2_N	10	CN_DP3_P
11	Ground	12	CN_DP3_N
13	CN_CAD-L	14	CN_CEC
15	CN_AUX_P	16	Ground
17	CN_AUX_N	18	DDP_HPD
19	Ground	20	P3V3

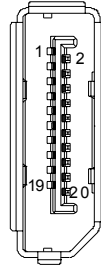


Table 4-8: DisplayPort Pin Definition

PS/2 Keyboard/Mouse Connector

Pin #	Signal	Function
1	KBDATA	Keyboard Data
2	MSDATA	Mouse Data
3	GND	Ground
4	+5V	Power
5	KBCLK	Keyboard Clock
6	MSCLK	Mouse Clock

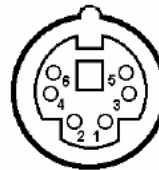


Table 4-9: PS/2 Keyboard/Mouse Pin Definition

DC power Input M12 Connector

Pin #	Signal
1	Vin
2	GND
3	Vin
4(PE)	GND

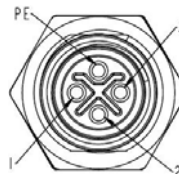


Table 4-10: DC Power Input Pin Definition

USB 2.0 M12 Connector (AVA-5510 only)

Pin #	Signal
1	Data -
2	+5V
3	NC
4	Data +
5	GND

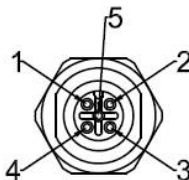
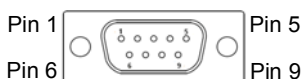


Table 4-11: USB 2.0 M12 Connector Pin Definition

CAN Bus DB9 Connectors (optional)

The location and pin definitions of Port 0 and Port 1 of the optional CAN Bus module are as shown below.



Pin #	Port 0	Port 1
1	NC	NC
2	Port 0 CAN L	Port 1 CAN L
3	GND	GND
4	NC	NC
5	NC	NC
6	NC	NC
7	Port 0 CAN H	Port 1 CAN H
8	NC	NC
9	NC	NC

Table 4-12: CAN Bus Male DB9 Connector Pin Definition

DIO DB9 Connectors (optional)

The location and pin definitions of the optional DIO connectors are as shown below.

Pin #	Port 0/1
1	DI0
2	DI1
3	-
4	DO0
5	DO1
6	DI_COM0/1
7	P_+VD0_EXT1
8	-
9	P-+3V3_Do_GND

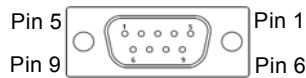


Table 4-13: DIO DB9 Connector Pin Definition

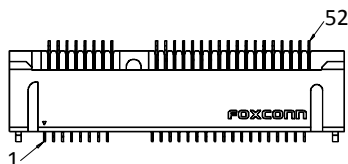
Optical Isolated Input Channel

Number of Channel	2 DI
Input Voltage	0–24V dc logic H: 3.3–24V logic L: 0–1.5V
Input Resistance	2.4kΩ @ 0.5W
Isolated Voltage	1500VDC

Optical Isolated Output Channel

Number of Channel	2 DO
Output Voltage	3.3VDC min, 35VDC maximum
Sink Current	250mA/Ch
Isolated Voltage	1500VDC
Onboard Isolated 3.3V Output Power	200mA

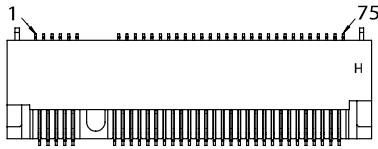
Mini PCIe Connector



Pin	Signal Name	Pin	Signal Name
1	PCIE_WAKE#	2	P_+3V3_MPCIE
3	N/C	4	GND
5	N/C	6	P_+1V5_S
7	MPCIE0_CLKREQ#	8	P_+3V3_UIM
9	GND	10	UIM_DATA
11	REFCLK_MPCIE_N	12	UIM_CLK
13	REFCLK_MPCIE_P	14	UIM_RST
15	GND	16	UIM_VPP
17	N/C	18	GND
19	N/C	20	N/C
21	GND	22	PLTRST_MINIPCI-E-L
23	MPCIE_RXN	24	P_+3V3_MPCIE
25	MPCIE_RXP	26	GND
27	GND	28	P_+1V5_S
29	GND	30	MPCIE_CLK
31	MPCIE_TXN	32	MPCIE_DAT
33	MPCIE_TXP	34	GND
35	GND	36	MPCIE_USB_N
37	GND	38	MPCIE_USB_P
39	P_+3V3_MPCIE	40	GND
41	P_+3V3_MPCIE	42	N/C
43	GND	44	N/C
45	N/C	46	N/C
47	N/C	48	P_+1V5_S
49	N/C	50	GND
51	N/C	52	P_+3V3_MPCIE

Table 4-14: Mini PCI Express Connector Pin Definition

M.2 Connector



Pin	Signal Name	Pin	Signal Name
1	N/C	2	P_+3V3_NGFF
3	GND	4	P_+3V3_NGFF
5	GND	6	N/C
7	N/C	8	N/C
9	N/C	10	N/C
11	GND		
KEY-B			
21	GND	20	N/C
23	N/C	22	N/C
25	N/C	24	N/C
27	GND	26	N/C
29	N/C	28	N/C
31	N/C	30	N/C
33	GND	32	N/C
35	N/C	34	N/C
37	N/C	36	N/C
39	GND	38	NGFF_DEVSLP
41	NGFF_SATA_RXP	40	N/C
43	NGFF_SATA_RXN	42	N/C
45	GND	44	N/C
47	NGFF_SATA_TXN	46	N/C
49	NGFF_SATA_TXP	48	N/C
51	GND	50	N/C
53	N/C	52	N/C
55	N/C	54	N/C
57	GND	56	N/C

Pin	Signal Name	Pin	Signal Name
59	N/C	58	N/C
61	N/C	60	N/C
63	N/C	62	N/C
65	N/C	64	N/C
67	N/C	66	N/C
69	N/C	68	NGFF_SUSCLK
71	GND	70	P_+3V3_NGFF
73	GND	72	P_+3V3_NGFF
75	GND	74	P_+3V3_NGFF

Table 4-15: M.2 Connector Pin Definition

4.2 Status LEDs



LED indicator	Color	Description
SATA Drive	Red	When blinking, indicates the SATA drive is active.
Watchdog (WD)	Amber	Indicates watchdog timer status. When watchdog timer starts, the LED flashes. When the timer is expired, the system will auto reboot.
Diagnostic	Green	If lit continuously, indicates no physical storage is connected. If blinking, indicates no memory is installed on either SO-DIMM socket.
U1	White	Programmable LED: user defined. Controlled by GPP_A21 on PCH.
U2	White	Programmable LED: user defined. Controlled by GPP_A22 on PCH.
U3	White	Programmable LED: user defined. Controlled by GPP_A23 on PCH.

Table 4-16: Status LED Definitions

4.3 Power Button

The power button is non-latched, with a blue LED indicator. System is turned on when the button is depressed, and the power LED lights. If the system hangs, depressing the button for 5 seconds to turn off the system completely.

System status	Power Button LED
Idle on OS	On
Suspend	Blinking (1Hz)
Hibernation	Blinking (1Hz)
Power Off	Off

4.4 Reset Button

The reset button is a non-latched. The system is restarted when the button is depressed. If the system hangs, press the button to restart the system.

5 BIOS Setup

5.1 Introduction

The following chapter describes basic navigation for the AMI EFI BIOS setup utility.

5.2 Entering BIOS Setup

To enter the setup screen, follow these steps:

1. Power on the motherboard
2. Press the < Delete > key on your keyboard when you see the following text prompt:
< Press DEL to run Setup >
3. After you press the < Delete > key, the main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as Chipset and Power menus.



NOTE:

In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

Setup Menu

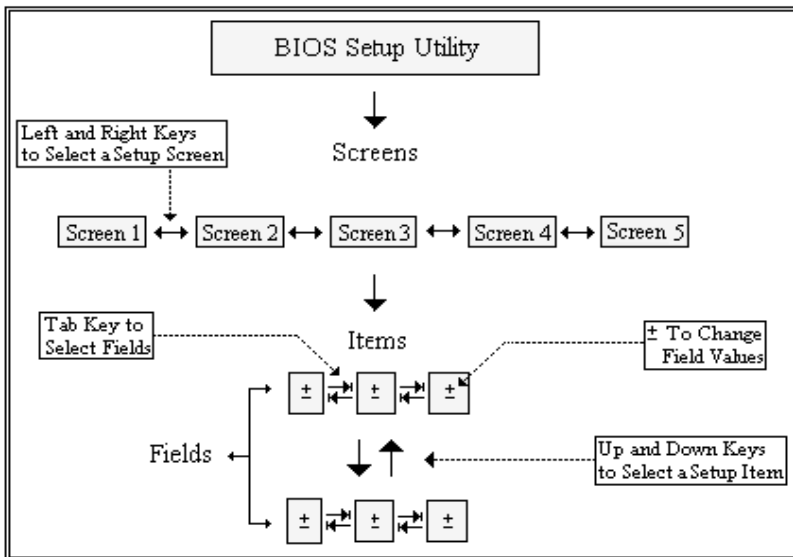
The main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed" options cannot be configured, "Blue" options can be.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.

Navigation

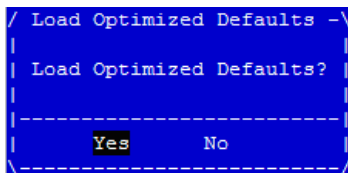
The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the BIOS setup utility hot keys can be used at any time during the setup navigation process.



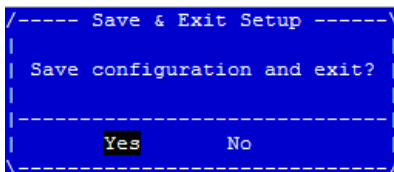
NOTE:

There is a hot key legend located in the right frame on most setup screens.

- F9** The < F9 > key on your keyboard is the optimized defaults key. To set the optimized defaults settings of the BIOS, press the < F9 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The optimized defaults settings allow the motherboard to boot up with the optimized defaults of options set. This can lessen the probability of conflicting settings.

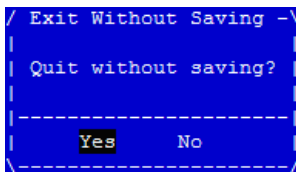


- F10** The < F10 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:



Press the < Enter > key to save the configuration and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

- ESC** The < Esc > key allows you to discard any changes you have made and exit the Setup. Press the < Esc > key to exit the setup without saving your changes. The following screen will appear:



Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

5.3 Main Setup

The Main Menu provides read-only information about system and also allows to set system's date and time.

5.3.1 BIOS Information

BIOS Item	Options	Description
BIOS Vendor	Info only American Megatrends	Display vendor name of system BIOS.
BIOS Version	Info only x.yy.zz	Display version of booting BIOS.
Build Date	Info only MM/DD/YYYY	Display the date that the BIOS was built.
MRC Version	Info only w.x.y.z	Display the revision of MRC code which is implemented in BIOS.
VBIOS Version	Info only x.y.zzzz	<i>VBIOS Version:</i> When video option ROM is set to "Legacy Only", this will display. <i>GOP Version:</i> When video option ROM is set to "UEFI Only", this will display.
ME FW Version	Info only ww.x.yy.zzzz	Display the version of Intel manageability firmware which is implemented in BIOS.
BIOS Boot Source	Info only Primary BIOS/ Backup BIOS	Display which BIOS flash boots the system. <i>Primary BIOS:</i> usually means that boots from SPI0 <i>Backup BIOS:</i> usually means that boots from SPI1

5.3.2 System Information

BIOS Item	Options	Description
Project Name	Info only AVA-5500	Display the project name.
CPU Board Version	Info only A1/A2/A3/...	Display the CPU board HW version.
CPU Brand String	Info only Intel(R) Core, ...	Display what CPU is booting the system.
CPU Frequency	Info only XXXX MHz	Display CPU frequency.
Total Memory	Info only XXXX MB (DDRx)	Display total memory size used on the motherboard and memory type.
Memory Frequency	Info only XXXX MHz	Display memory's frequency.
SOC SKU	Info only xx	Display what PCH SKU is designed on motherboard.

5.3.3 System Time/System Date

Use this option to change the system time and date. Highlight System Time or System Date using the < Arrow > keys. Enter new values using the keyboard. Press the < Tab > key or the < Arrow > keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

BIOS Item	Options	Description
System Date	MM/DD/YYYY	For configuring/showing system date. When setting the Date, use <Tab> key to switch between Date elements.
System Time	HH:MM:SS	For configuring/showing system time. When setting the Time, use <Tab> key to switch between Time elements.
Access Level	Info only Administrator/User	Display what access level is used to enter BIOS setup menu.



NOTE:

The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

5.3.4 Board Information

BIOS Item	Options	Description
Serial Number	Info only	Display board's serial number.
Manufacturing Date	Info only	Display manufacturing date.
Last Repair Date	Info only	Display Last Repair Date.
MAC ID	Info only	Display onboard Ethernet MAC ID.
Total Runtime	Info only	The returned value specifies the total time in minutes the system is running in S0 state.
Current Runtime	Info only	The returned value specifies the time in seconds the system is running in S0 state. This counter is cleared when the system is removed from the external power supply.
Power Cycle	Info only	The returned value specifies the number of times the external power supply has been shut down.
Boot Cycles	Info only	The boot cycle is increased after a HW or SW reset or after a successful power-up.
Boot Reason	Info only	The boot reason is the event which causes the reboot of the system.

5.4 Advanced Menu

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

BIOS Item	Options	Description
CPU Configuration	Submenu	For configuring CPU features/ functions.
Graphic Configuration	Submenu	For setting graphic controller parameters.
Power Management	Submenu	
System Management	Submenu	
Thermal Management	Submenu	
Watchdog Timer	Submenu	
CSM Configuration	Submenu	
Super IO Configuration	Submenu	
Serial Console Redirection	Submenu	
Miscellaneous	Submenu	
Network Stack Configuration	Submenu	
Trusted Configuration	Submenu	
Intel(R) Ethernet Connection (2) I219-LM-88:88:88:88:87:88	Submenu	

5.4.1 CPU Configuration

BIOS Item	Options	Description
Active Processor Cores	All 1 2 3	Number of cores to enable in each processor package
Hyper-Threading	Disable Enable	Enabled for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and Disabled for other OS (OS not optimized for Hyper-Threading Technology).
Turbo Mode	Disable Enable	Enable/Disable processor Turbo Mode
Config TDP Configurations	Submenu	Config TDP Configuration
Intel (VMX) Virtualization Technology	Disable Enable	When enabled, VMM can utilize the additional hardware capabilities provided by Vanderpool Technology
C-States	Disable Enable	Enables/disables C-States

Config TDP Configurations

BIOS Item	Options	Description
Configurable TDP Boot Mode	Nominal Down Deactivate	Configure TDP Mode as Nominal/Down/Deactivate. Deactivate option will set MSR to Nominal and MMIO to Zero.
Configurable TDP Lock	Disabled Enabled	Configurable TDP Mode Lock sets the Lock bits on TURBO_ACTIVATION_RATIO and CONFIG_TDP_CONTROL. Note: When CTDTP Lock is enabled Custom ConfigTDP Count will be forced to 1 and Custom ConfigTDP Boot Index will be forced to 0.
CTDP BIOS control	Disable Enabled	Enables CTDTP control via runtime ACPI BIOS methods.
ConfigTDP Levels	Info-only.	

BIOS Item	Options	Description
ConfigTDP Turbo	Info-only.	
Power Limit 1	Info-only.	
Power Limit 2	Info-only.	
Custom Settings Nominal Config TDP Nominal	Info-only.	
Power Limit 1	45000	Power Limit 1 in milliwatts. Overclocking SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power Limit and TDP Limit.
Power Limit 2	60000	Power Limit 2 in milliwatts. Overclocking SKU: Value must be between Max and Min Power Limits (specified by PACKAGE_POWER_SKU_MSR). Other SKUs: This value must be between Min Power Limit and TDP Limit.
Power Limit 1 Time Window	[0]	Platform Power Limit 1 Time Window value in seconds. The value may vary from 0 to 128. 0 = default values. Indicates the time window over which Platform TDP value should be maintained.
ConfigTDP Turbo Activation Ratio	0	Custom value for Turbo Activation Ratio

5.4.2 Graphics Configuration

BIOS Item	Options	Description
Primary Display	Auto IGFX PEG PCI SG	Select which of IGFX/PEG/PCI Graphics device should be Primary Display Or select SG for Switchable Gfx.
Internal Graphics	Auto Disable Enable	Keep IGFX enabled based on the setup options.

5.4.3 Power Management

BIOS Item	Options	Description
Enable ACPI Auto Configuration	Disabled Enabled	Enable/disable BIOS ACPI auto configuration function.
Enable Hibernation	Disabled Enabled	Enable/disable system ability to hibernate. This option may be not effective with some OSes.
ACPI Sleep State	S3 (Suspend to RAM) Suspend Disabled	Select ACPI sleep state the system will enter when the "suspend" button is pressed.
Lock Legacy Resources	Disabled Enabled	Enables or disables lock of legacy resource.
Power Consumption	Submenu	

Power Consumption

BIOS Item	Options	Description
Voltage	Read only	Display the sensed voltage based on hardware design.

5.4.4 System Management

BIOS Item	Options	Description
Version xxx	Info only	Show the BIOS design of system management.
SEMA Firmware	Read only	Show SEMA firmware version installed on system.
Build Date	Read only	Show when SEMA firmware was built.
SEMA Bootloader	Read only	Show SEMA bootloader's version.
Build Date	Read only	Show when SEMA bootloader was built.
SEMA Features	Submenu	
Flags	Submenu	

SEMA Features

BIOS Item	Options	Description
SEMA Supported Features	Info only	SEMA provides many features for selection. Following reported feature is to indicate that the feature is implemented on system.
Uptime & Power Cycles Counter	Info only	If this item is shown, it means SEMA supports "Uptime & Power Cycles counter".
System Reset Event	Info only	If this item is shown, it means SEMA supports "System Reset Event".
User-Flash size	Info only	It will show 512 bytes or 1024 bytes depends on the design.
Watchdog	Info only	If this item is shown, it means SEMA supports "Watchdog".
Temperatures	Info only	If this item is shown, it means SEMA supports "Temperature".
Voltage Monitor	Info only	If this item is shown, it means SEMA supports "Voltage Monitor".
Power-up Watchdog	Info only	If this item is shown, it means SEMA supports "Power-up Watchdog".
Power Monitor (current sense)	Info only	If this item is shown, it means SEMA supports "Power Monitor (current sense)".

BIOS Item	Options	Description
Boot Counter	Info only	If this item is shown, it means SEMA supports "Boot Counter".
TVIA BMC	Info only	If this item is shown, it means SEMA supports "TVIA BMC".

Flags

BIOS Item	Options	Description
BMC Flags	Read only	Show current BMC settings.
BMC Select	Read only	Display current boot BIOS ROM chip.
ATX/AT-Mode	Read only	Display current power mode setting, AT or ATX mode.
Exception Code	Read only	Display system exception reason.

5.4.5 Thermal Management

BIOS Item	Options	Description
CPU Temperature		
Current	Read only	Show current CPU temperature gotten from sensor.
Startup	Read only	Show the CPU temperature at system power up.
Min	Read only	Show the minimum CPU temperature after system boot.
Max	Read only	Show the maximum CPU temperature after system boot.
Board Temperature		
Current	Read only	Show current board temperature gotten from sensor.
Startup	Read only	Show the board temperature at system power up.
Min	Read only	Show the minimum board temperature after system boot.
Max	Read only	Show the maximum board temperature after system boot.
Passive Cooling Trip Point	Disabled Enabled	Temperature threshold of passive cooling trip point.

5.4.6 Watchdog Timer

BIOS Item	Options	Description
Power-Up Watchdog	Enabled Disabled	The Power-Up Watchdog resets the system after a certain amount of time after power-up. Pressing F12 key during startup will disable the power-up watchdog timer.

5.4.7 CSM Configuration

BIOS Item	Options	Description
CSM Support	Enabled Disable	This option controls if CSM will be launched.
CSM16 Module Version	Info only	
Boot Option filter	UEFI and Legacy Legacy only UEFI only	This option controls what devices system can to boot.
Option ROM execution	Info only	
Network	Do not launch Legacy UEFI	Controls the execution of UEFI and Legacy PXE OpROM.
Storage	Do not launch UEFI Legacy	Controls the execution of UEFI and Legacy Storage OpROM.
Video	Do not launch UEFI Legacy	Controls the execution of UEFI and Legacy Video OpROM.
Other PCI devices	Do not launch UEFI Legacy	For PCI devices other than Network, Mass storage or Video defines which OpROM to launch.

5.4.8 Super IO Configuration

BIOS Item	Options	Description
Serial Port 1 Configuration	Submenu	
Serial Port 2 Configuration	Submenu	
Serial Port 3 Configuration	Submenu	
Serial Port 4 Configuration	Submenu	

5.4.9 Serial Port x Configuration

BIOS Item	Options	Description
Serial Port	Disabled Enabled	Enable or disable serial port (COMx).
Device Setting	Info only	It will show current resource assignment of serial port (COMx).
Change Settings	Auto IO=3F8;IRQ=4; IO=3F8;IRQ=3,4,5,7,9,10,11,12 IO=2F8;IRQ=3,4,5,7,9,10,11,12 IO=3E8;IRQ=3,4,5,7,9,10,11,12 IO=2E8;IRQ=3,4,5,7,9,10,11,12	Select an optimal setting for Super IO device.
COMx Control	RS232 RS422 RS485	Select serial port mode

5.4.10 Serial Console Redirection

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

COMx Console Redirection Settings

BIOS Item	Options	Description
Terminal Type	VT100 VT100+ VT-UTF8 ANSI	Configure the type of console emulation. Emulation: ANSI: Extended ASCII char set. VT100: ASCII char set. VT100+: Extends VT100 to support color, function keys, etc. VT-UTF8: Uses UTF8 encoding to map Unicode chars onto 1 or more bytes.
Bits per second	9600 19200 38400 57600 115200	Selects serial port transmission speed. The speed must be matched on the other side. Long or noisy lines may require lower speed.
Data Bits	7 8	Configure the number of data bits in each transmitted or received serial character for both serial ports.

BIOS Item	Options	Description
Parity	None Even Odd	Configures if parity bit is generated (transmit data) or checked. 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	Configures the number of stop bits transmitted and received in each serial character for both serial ports. 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 Software	Configures flow control for console redirection. Hardware flow control uses RTC/CTS. Software flow control uses XON/XOFF.
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 or disables extended terminal resolution.
Putty KeyPad	VT100 LINUX XTERMR6 SCO ESCN VT400	Select Function Keys and Key Pad on Putty.

COMx Legacy Console Redirection Settings

BIOS Item	Options	Description
Redirection COM Port	COM1 COM2 COM3 COM4	Select a COM port to display redirection of Legacy OS and Legacy OPROM Messages
Redirection	80x24 80x25	Set console display resolution.
Redirection After POST	Always Enabled BootLoader	The setting specifies if BootLoader is selected, then legacy console redirection is disabled before booting to legacy OS.

5.4.11 Miscellaneous

BIOS Item	Options	Description
PEG Port Configuration	Submenu	PEG Port Options
SATA And RTS Configuration	Submenu	SATA Device Options Setting
State After G3	S0 State S5 State	Specify what state to go to when power is re-applied after a power failure (G3 state)

PEG Port Configuration

BIOS Item	Options	Description
Enable Root Port	Disable Enable Auto	Enable or Disable the root port
Max Link Speed	Auto Gen1 Gen2 Gen3	Configure PEG 0:1:0 Max Speed

SATA and RTS Configuration

BIOS Item	Options	Description
SATA Controller(s)	Enabled Disabled	Enable/Disable SATA Device.
SATA Mode Selection	AHCI Intel RST Premium	Determines how SATA controller(s) operate.
SATA Test Mode	Enabled Disabled	Test Mode Enable/Disable (Loop Back)
Aggressive LPM Support	Enabled Disabled	Enable PCH to aggressively enter link power state.
SATA Controller Speed	Default Gen1 Gen2 Gen3	Indicates the maximum speed the SATA controller can support.
Serial ATA Port 0	Info only	
Software Preserve	Info only	
Port X	Disabled Enabled	Enable/Disable SATA Port.
Hot Plug	Disabled Enabled	Designates this port as Hot Pluggable.
Configured as eSATA	Info only	
Spin up Device	Disabled Enabled	If enabled for any port, Staggered 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.

BIOS Item	Options	Description
SATA Device Type	Hard Disk Drive Solid State Drive	Identify the SATA port is connected to Solid State Drive or Hard Disk Drive.
Topology	Unknown ISATA Direct Connect Flex M2	Identify the SATA Topology if it is Default, ISATA, Flex, DirectConnect or M2.
SATA Port 0 DevSlp	Disabled Enabled	Enable/Disable SATA Port 0 DevSlp. Board rework for LP needed before enable.
DITO Configuration	Disable Enable	Enable/Disable DITO Configuration.
DITO Value	Info only	
DM Value	Info only	

5.4.12 Network Stack Configuration

BIOS Item	Options	Description
Network Stack	Disabled Enabled	To enable or disable network stack.
Ipv4 PXE Support	Disabled Enabled	To enable or disable Ipv4 PXE boot.
Ipv6 PXE Support	Disabled Enabled	To enable or disable Ipv6 PXE boot.
PXE boot wait time	Value Range	Set wait time to press ESC key to abort the PXE boot

5.4.13 Trusted Computing

BIOS Item	Options	Description
Security Device Support	Disabled Enabled	Enables/disables BIOS support for security device. When enabled, OS will not show the security device, and TCG EFI protocol and INT1A interface will not be available.

5.4.14 IntelEthernet Connection (2) I210-LM

BIOS Item	Options	Description
NIC Configuration	Submenu	For configuring link speed and wake function.
Blink LEDs	Value Range	Identifies the physical network port by blinking the associated LED.

NIC Configuration

BIOS Item	Options	Description
Link Speed	Auto Negotiated 10 Mbps Half 10 Mbps Full 100 Mbps Half 100 Mbps Full	For setting link speed of Ethernet.
Wake On LAN	Enabled Disabled	For enabling/disabling wake on LAN function.

5.5 Security Menu

This menu contains the settings for security in the system.

BIOS Item	Options	Description
Administrator Password	Enter to set password	Configure/Clear Administrator Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password.
User Password	Enter to set password	Configure/Clear User Password. When pressing enter, a menu will be popped up for creating new password. When password installed, press enter without inputting password, it will clear password.
Secure Boot menu	Submenu	

5.5.1 Secure Boot

BIOS Item	Options	Description
System Mode	Info only	
Secure Boot	Info only	
Secure Boot Control	Disabled Enabled	Secure Boot can be enabled if: 1. System running in User mode with enrolled Platform Key (PK) 2. CSM function is disabled.

5.6 Boot Menu

This menu contains the settings for bootable devices in the system.

BIOS Item	Options	Description
Setup Prompt Timeout	1	Number of seconds to wait for setup activation key. 65535 (0xFFFF) means indefinite waiting.
Bootup NumLock State	On Off	Select the keyboard NumLock state after system boot.
Quiet Boot	Disabled Enabled	Enabled: will show splash screen during POST. Disabled: will show boot message during POST.
Fast Boot	Disabled Enabled	Enable or disabled Fast boot feature. Most probes are skipped to reduce time cost during boot.
Boot Option #1~#8	Hard Disk CD/DVD USB Hard Disk USB CD/DVD USB Key USB Floppy USB Lan Network Disabled	Set system boot order.

5.7 Save & Exit Menu

BIOS Item	Options	Description
Save Changes and Exit	Enter	Save changed settings and exit BIOS setup utility.
Discard Changes and Exit	Enter	Skip changed setting and exit BIOS setup utility.
Save Changes and Reset	Enter	Save all changed settings and let system do reset to boot system.
Discard Changes and Reset	Enter	Discard all changed settings and let system do reset to boot system.
Save Changes	Enter	Save all changed settings.
Discard Changes	Enter	Discard changes done so far to any of the setup options.
Restore Default	Enter	Load the default made when BIOS was built.
Save as User Default	Enter	Save all changed done so far as User Defaults.
Restore User Default	Enter	Load the default that user save as user defaults.
Boot Override	Info only	

5.8 BIOS Beep Codes

Number of Beeps	Description
2 beeps	Boot up
5 beeps	Keyboard, Mouse, or Monitor not detected
1 long, 3 short beeps	Memory failure

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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 equipment before handling/operating the equipment.

- ▶ Read these safety instructions carefully.
- ▶ Keep this user's manual for future reference.
- ▶ Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- ▶ When installing/mounting or uninstalling/removing equipment:
 - ▷ Turn off power and unplug any power cords/cables.
- ▶ To avoid electrical shock and/or damage to equipment:
 - ▷ Keep equipment away from water or liquid sources;
 - ▷ Keep equipment away from high heat or high humidity;
 - ▷ Keep equipment properly ventilated (do not block or cover ventilation openings);
 - ▷ Make sure to use recommended voltage and power source settings;
 - ▷ Always install and operate equipment near an easily accessible electrical socket-outlet;
 - ▷ Secure the power cord (do not place any object on/over the power cord);
 - ▷ Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
 - ▷ If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

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



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

- ▶ Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.
- ▶ Equipment must be serviced by authorized technicians when:
 - ▷ The power cord or plug is damaged;
 - ▷ Liquid has penetrated the equipment;
 - ▷ It has been exposed to high humidity/moisture;
 - ▷ It is not functioning or does not function according to the user's manual;
 - ▷ It has been dropped and/or damaged; and/or,
 - ▷ It has an obvious sign of breakage.

Getting Service

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