ELIT-1850

Digital Signage Player
w/ Intel® Core™ i7-5650U/i3-5010U CPU

User's Manual

Version 1.0

P/N: 4016185000100P 2016.04

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Revision History

Version	Date	Description
1.0	April. 2016	Initial release

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Copyright Notice

The information in this document is subject to change without prior notice in order to improve the reliability, design and function. It does not represent a commitment on the part of the manufacturer.

Under no circumstances will the manufacturer be liable for any direct, indirect, special, incidental, or consequential damages arising from the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Declaration of Conformity

CE

The CE symbol on the computer indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from ARBOR. Please contact your local supplier for ordering information.

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

FCC Class B

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1) This device may not cause harmful interference, and
(2) This device must accept any interference received, including interference that may cause undesired operation.

NOTE:
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.

RoHS

ARBOR Technology Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.

The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.

ARBOR Technology Corp. hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, Arbor hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH --Registration, Evaluation, Authorization, and Restriction of Chemicals) regulated by the European Union.

All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Important Safety Instructions

Read these safety instructions carefully

1. Read all cautions and warnings on the equipment.
2. Place this equipment on a reliable surface when installing. Dropping it or letting it fall may cause damage
3. Make sure the correct voltage is connected to the equipment.
4. For pluggable equipment, the socket outlet should be near the equipment and should be easily accessible.
5. Keep this equipment away from humidity.
6. The openings on the enclosure are for air convection and protect the equipment from overheating. DO NOT COVER THE OPENINGS.
7. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
8. Never pour any liquid into opening. This may cause fire or electrical shock.
9. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
10. If one of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped or damaged.
    f. The equipment has obvious signs of breakage.
11. Keep this User's Manual for later reference.

Warning

The Box PC and its components contain very delicately Integrated Circuits (IC). To protect the Box PC and its components against damage caused by static electricity, you should always follow the precautions below when handling it:

1. Disconnect your Box PC from the power source when you want to work on the inside.
2. Use a grounded wrist strap when handling computer components.
3. Place components on a grounded antistatic pad or on the bag that came with the Box PC, whenever components are separated from the system.

Replacing Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.

The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.

Do not throw lithium batteries into the trash can. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please consult the user's manual first at: http://arbor-technology.com

Please do not hesitate to call or e-mail our customer service when you still cannot find out the answer.

http://arbor-technology.com

E-mail:info@arbor.com.tw

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.

Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.

Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.

Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

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Chapter 1

Introduction

1.1. The Computer

The ELIT-1850 is the digital signage player designed to answer the market needs for powerful video performance. The computer comes loaded with Intel® Core™ i7-5650U/i3-5010U to support three displays and satisfy most demanding digital signage applications.

Product Highlights

- Intel® Core™ i7-5650U/i3-5010U Processor
- Support Triple-display for 1 x DVI-D, 1 x DisplayPort, 1 x HDMI
- Support one channel 4K (UHD) Display
- Support 2 x COM, 4 x USB3.0, 2 x USB2.0
- Support DirectX 11.1
- Support iAMT Function
- One NGFF connector for Wireless
- RTC Wakeup supported
- Operating Temperature: -20 ~ 60°C

1.2. About this Manual

This manual is meant for the experienced users and integrators with hardware knowledge of personal computers. If you are not sure about the description herein, consult your vendor before further handling.

We recommend that you keep one copy of this manual for the quick reference for any necessary maintenance in the future. Thank you for choosing ARBOR products.

1.3. Specifications

System	
CPU	Soldered onboard Intel® Core™ i7-5650U, 2.2GHz 4M L2 Cache, up to 3.1GHz, 15W TDP
	Soldered onboard Intel® Core™ i3-5010U, 2.1GHz 3M L2 Cache, 15W TDP
BIOS	AMI BIOS
Chipset	5th Generation Intel® Core™ ULT SoC
Graphics	Integrated Intel® HD Graphics 6000(i7)/5500(i3)
Memory	1 x 204-pin DDR3L SO-DIMM socket, supporting 1066/1333MHz SDRAM up to 8GB
Serial ATA	1 x Serial ATA port with 600MB/s HDD transfer rate
LAN Chipset	1 x Intel® i218LM GbE PHY (w/ iAMT10.0 supported)
	1 x Intel® i210AT GbE controller
Watchdog Timer	1 ~ 255 levels reset
I/O Ports	
Serial Port	2 x RS-232/485 ports
USB Port	4 x USB 3.0 ports
	2 x USB 2.0 ports
LAN Port	2 x RJ-45 ports for GbE
Video Port	1 x DVI-D
	1 x DisplayPort, up to 4K (UHD)
	1 x HDMI, up to 4K (UHD)
Audio	Realtek ALC662 HDA codec, Mic-in/Line-out
Expansion Bus	1 x M.2 (NGFF) E Key 22 x 30 mm (2230)
Storage	
Type	1 x 2.5” drive bay for SSD
Qualification	
Certification	CE, FCC Class A

Environment	
Operating Temp.	-20 ~ 60°C (-4 ~ 140°F), ambient w/ air flow
Storage Temp.	-30 ~ 70°C (-22 ~ 158°F)
Operating Humidity	10 ~ 95% @ 60°C (non-condensing)
Vibration	3 Grms/5 ~ 500Hz/random operation
Shock	Operating 40G (11ms); Non-operating 80G with SSD
Mechanical	
Construction	Aluminum alloy
Mounting	VESA-mount / wall-mount
Weight	1.6 kg (3.52 lb)
Dimensions (W x D x H)	193 x 170 x 50 mm (7.60" x 6.69" x 1.96")
Power Requirement	
Power Input	DC 12~24V input
Power Consumption	Max. 30W (w/o I/O card)

1.4. Inside the Package

Upon opening the package, carefully inspect the contents. If any of the items is missing or appears damaged, contact your local dealer or distributor. The package should contain the following items:

One ELIT-1850 Digital Signage Player

One Driver DVD
One User's Manual

1.5. Ordering Information

ELIT-1850-5650U	Digital Signage Player with Intel® Core™ i7-5650U, w/o memory and storage
ELIT-1850-5350U(BTO)	Digital Signage Player with Intel® Core™ i5-5350U, w/o memory and storage
ELIT-1850-5010U	Digital Signage Player with Intel® Core™ i3-5010U, w/o memory and storage

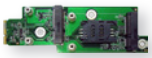
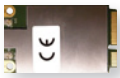
1.5.1. Optional Accessories

The following items are normally optional, but some vendors may include them as a standard package, or some vendors may not carry all the items.

PAC-B065W-1	19V/3.4A 65W AC/DC adapter kit

1.5.2. Configure-to-Order Service

Make the computer more tailored to your needs by selecting one or more components from the list below to be fabricated to the computer.

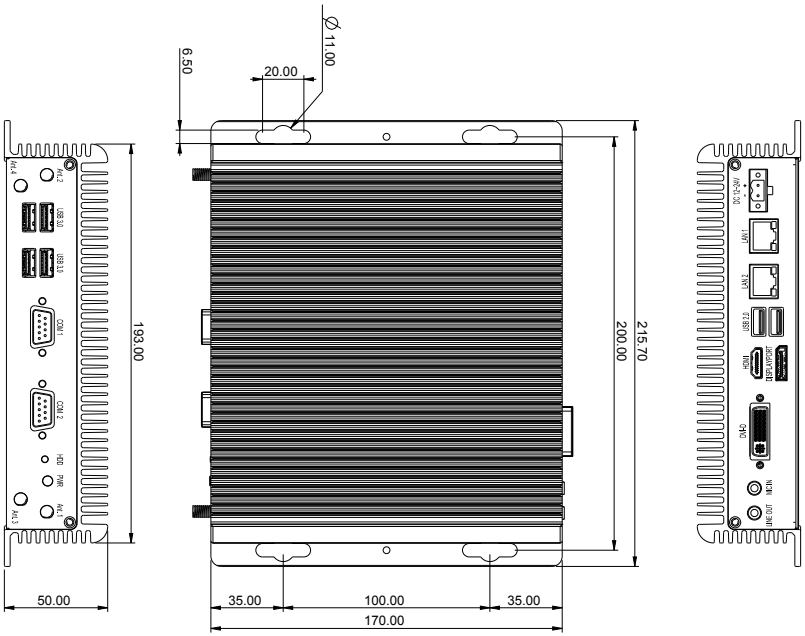
80GB SSD	Intel 2.5” 80GB SATAIII SSD kit	
MM-3IL-8G	Industrial DDR3L-1600 8GB SDRAM	
ANT-D11	1 x Wi-Fi dual-band 2.4G/5G antenna	
SCDB-1289E	M.2 to 2 x Mini PCIe daughter board	
HSUPA-1450	HSUPA 3.75G module kit w/ 25cm internal wiring	
ANT-H11	1 x 2dBi HSUPA Antenna Kit	

Chapter 2

Getting Started

2.1. Dimensions

The following illustration shows the dimensions of the computer, with the measurements in width, depth, and height called out.

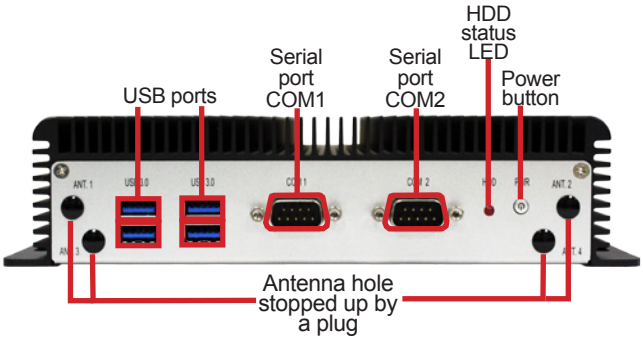


Unit: mm

2.2. Take A Tour

The computer has some I/O ports, status LED light and controls on the front and rear panels. The following illustrations show all the components called out .

Front View



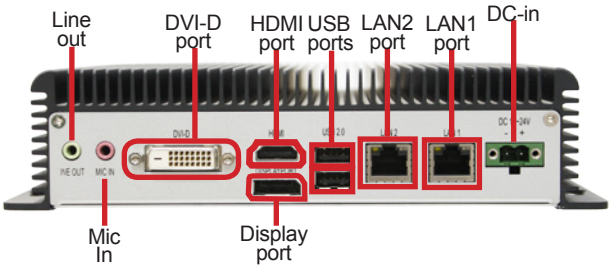
- **Power button**

  Press and hold the power button to power on the computer.

  The power button features a dual-color LED to signify the following condition:

LED Color	Description
Green	The computer is powered on.
Red	Standby/Sleep/Power off

Rear View



Side View

2.3. Driver Installation Notes

The computer supports the operating systems of Windows 7 and Windows 8. For these operating systems, find the necessary device drivers on the CD that comes with your purchase. For different operating systems, the installation of drivers/utilities may vary slightly, but generally they are similar.
Paths to find various drivers on the CD:

Windows 7

Device		Driver Path
Chipset		\Chipset\SetupChipset.exe
Ethernet	**32bit**	\Ethernet\PROWin32.exe
	64bit	\Ethernet\PROWin64.exe
Graphic	**32bit**	\Graphic\win32_153628.4332.exe
	64bit	\Graphic\win64_153628.4332.exe
Audio	**32bit**	\Audio\32bit_Win7_Win8_Win81_R275.exe
	64bit	\Audio\64bit_Win7_Win8_Win81_R275.exe
USB 3.0		\USB 3.0 Driver_3.0.5.69\Setup.exe
ME-1	**32bit**	\Intel(R)_ME10.0_5M_10.0.38.1036\kmdf-1.11-Win-6.1-x86.msu
	64bit	\Intel(R)_ME10.0_5M_10.0.38.1036\kmdf-1.11-Win-6.1-x64.msu
ME-2		\Intel(R)_ME10.0_5M_10.0.38.1036\SetupME.exe

Windows 8.1

Chipset		\Chipset\SetupChipset.exe
Ethernet	**32bit**	\Ethernet\PROWin32.exe
	64bit	\Ethernet\PROWin64.exe
Graphic	**32bit**	\Graphic\win32_153628.4332.exe
	64bit	\Graphic\win64_153628.4332.exe
Audio	**32bit**	\Audio\32bit_Win7_Win8_Win81_R275.exe
	64bit	\Audio\64bit_Win7_Win8_Win81_R275.exe
ME		\Intel(R)_ME10.0_5M_10.0.38.1036\SetupME.exe

Optional

WiFi	\M.2 Wifi (optional)\AZ_RTL8723BE_8821AE_Win7_Win8.1_Win10\ RTL8723BE_8821AE_Win7_Win8.1_Win10\Setup.exe
BT	\M.2 Wifi (optional)\AZ_RTL8723BE_8821AE_Win7_Win8.1_Win10\ RTBlueR_Windows\Setup.exe

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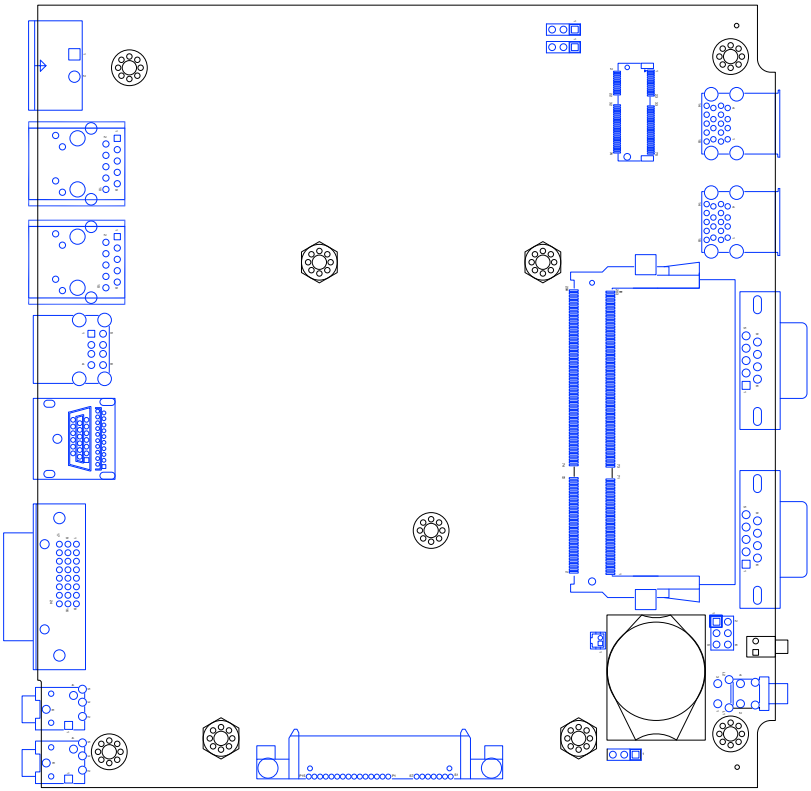
Chapter 3

System Configuration

3.1. Board Layout

The main board FMB-i88U1 forms the engine of the computer. This section will provide an thorough view of this board.

FMB-i88U1: Board Top



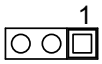
3.2. Jumpers and Connectors

The main board FMB-i88U1 comes with some connectors to join some devices and also some jumpers to alter hardware configuration. The following in this chapter will explicate each of these components.

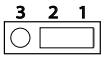
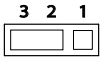
3.2.1. Jumpers

JRTC1

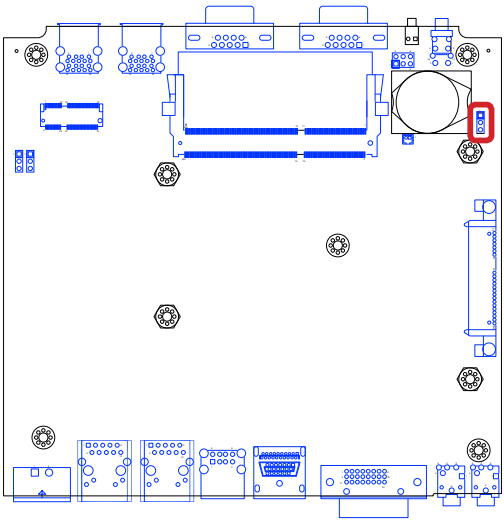
Function: CMOS Setting
Jumper Type: Onboard 2.54mm-pitch 1x3-pin header



Setting:

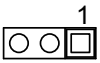
Pin	Function	Setting
1-2	Keeps CMOS (Default)	
2-3	Clears CMOS	

Board Top

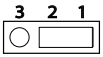
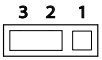


JME1

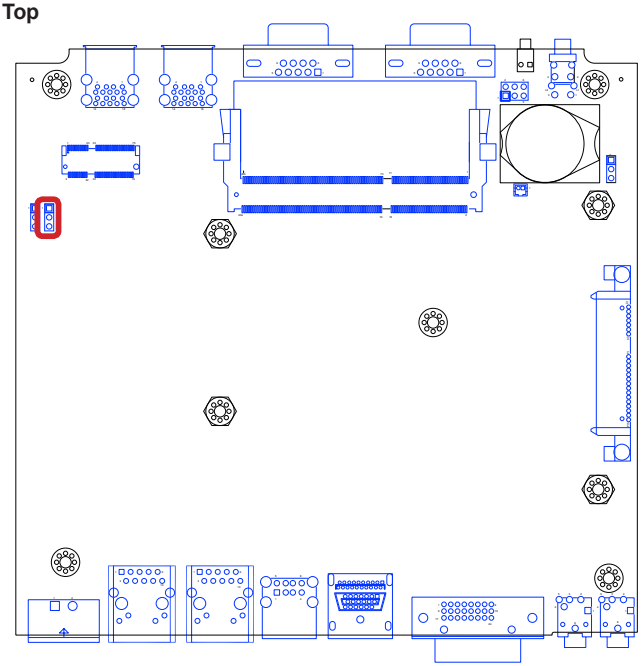
Function: ME Flash function
Jumper Type: Onboard 2.54mm-pitch 1x3-pin header



Setting:

Pin	Function	Setting
1-2	ME Flash Disable (Default)	
2-3	ME Flash Enable	

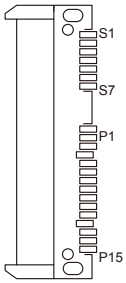
Board Top



3.2.2. Connectors

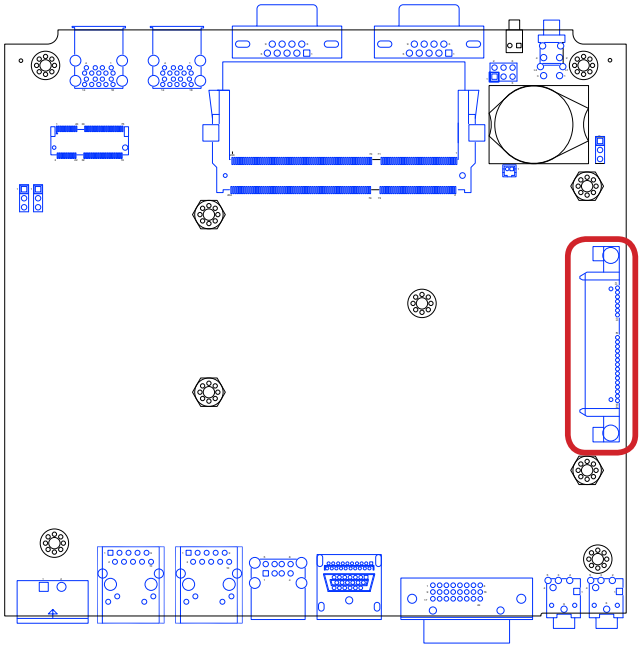
SATA1

Description: Serial ATA Connector
Connector Type: SATA port with data & power vertical connector (7+15pin)



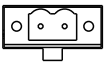
Pin	Desc.	Pin	Desc.	Pin	Desc.
S1	GND	P1	3.3V	P9	5V
S2	TX+	P2	3.3V	P10	GND
S3	TX-	P3	3.3V	P11	NC
S4	GND	P4	GND	P12	GND
S5	RX-	P5	GND	P13	NC
S6	RX+	P6	GND	P14	NC
S7	GND	P7	5V	P15	NC
		P8	5V		

Board Top



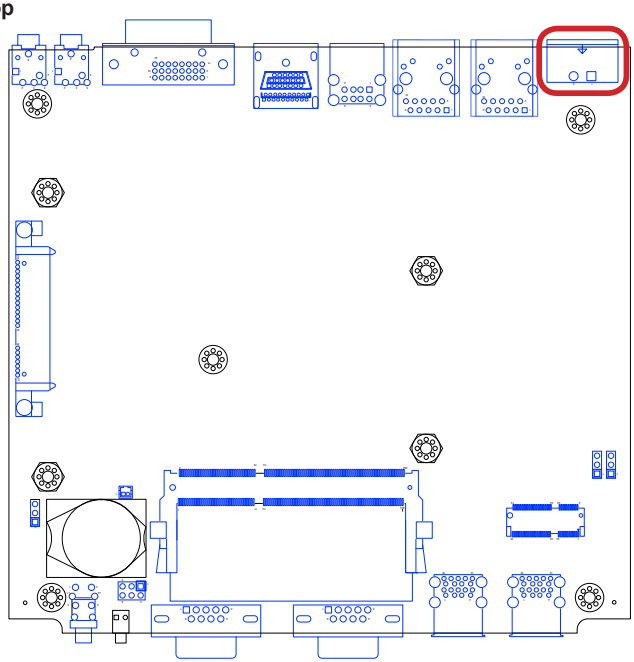
JPWR1

Description: Power Connector
Connector Type: 2-pole Power Terminal Block

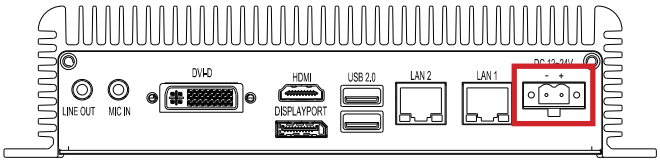


Pin	Description
1	ADAPTER IN +
2	ADP_GND

Board Top

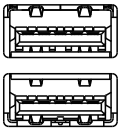


Rear Panel



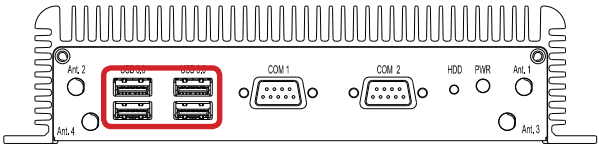
CN1~2

Description: USB ports
Connector Type: Double-stacked type-A USB 3.0 ports

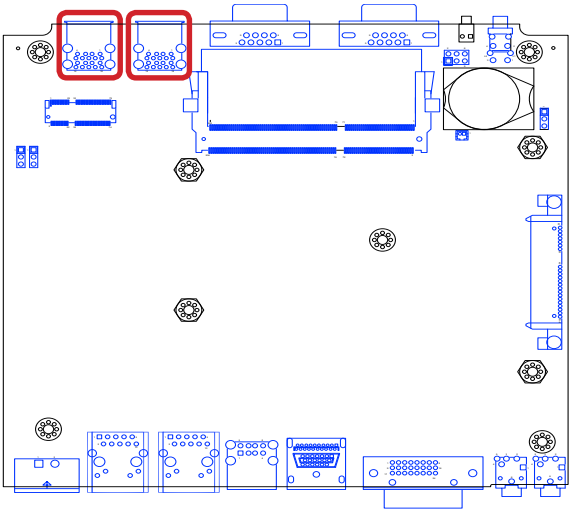


Pin		Desc.	Pin		Desc.
10	1	5V	14	5	USB SSRX-
11	2	USB D-	15	6	USB SSRX+
12	3	USB D+	16	7	GND
13	4	GND	17	8	USB SSTX-
18	9	USB SSTX+			

Front Panel

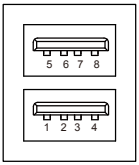


Board Top



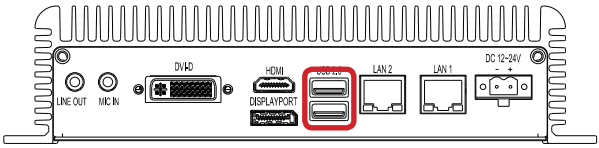
CN3

Description: USB ports
Connector Type: Double-stacked type-A USB 2.0 ports

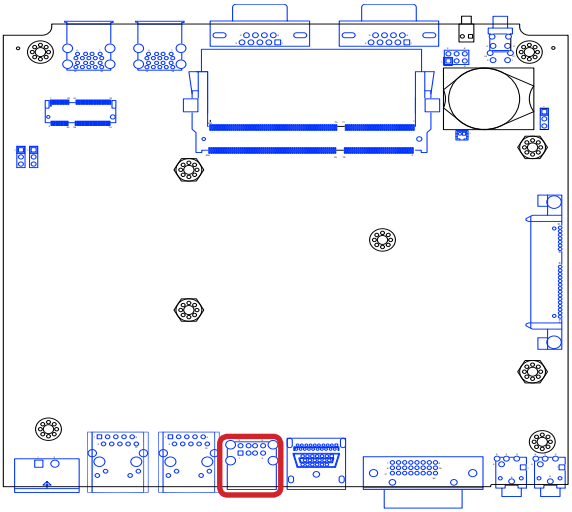


Lower		Upper	
Pin	**Desc.**	**Pin**	**Desc.**
1	5V	5	5V
2	USB D-	6	USB D-
3	USB D+	7	USB D+
4	GND	8	GND

Front Panel

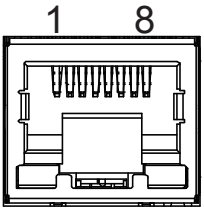


Board Top



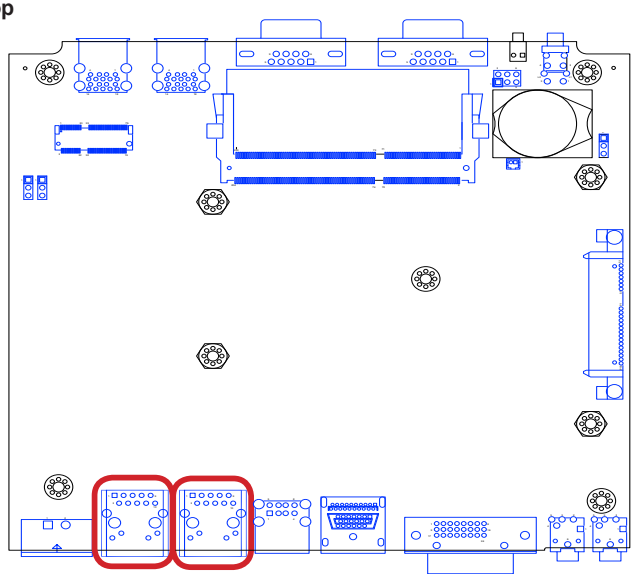
LAN1&LAN2

Description: Ethernet connector
Connector Type: RJ-45 connector that supports 10/100/1000Mbps fast Ethernet

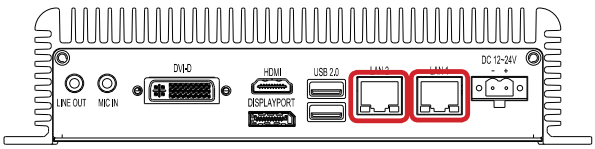


Pin	Description	Pin	Description
1	MDI0	9	MDI3
2	MDI0#	10	MDI3#
3	MDI1	11	LED2 G-O+
4	MDI1#	12	LED2 G+O-
5	MDI2	13	LED1 Y-
6	MDI2#	14	LED1 Y+
7	MDI3	X1	CGND
8	MDI3#	X2	CGND

Board Top

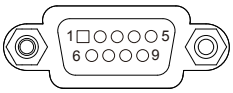


Rear Panel



COM1 & COM2

Description: Serial ports.
Connector Type: External 9-pin D-sub male connector



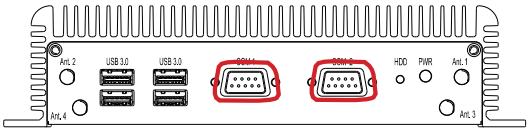
RS-232

Pin	Description	Pin	Description	Pin	Description
1	DCD	2	RXD	3	TXD
4	DTR	5	GND	6	DSR
7	RTS	8	CTS	9	RI
10	LPC_AD1				

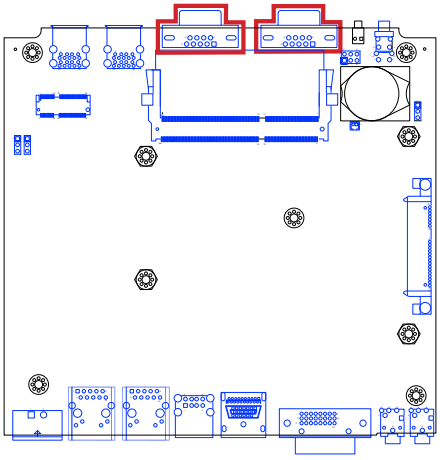
RS485 Mode

Pin	Description	Pin	Description
1	RS485_TX-	2	RS485_TX+

Front Panel

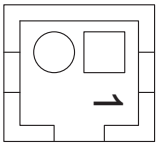


Board Top



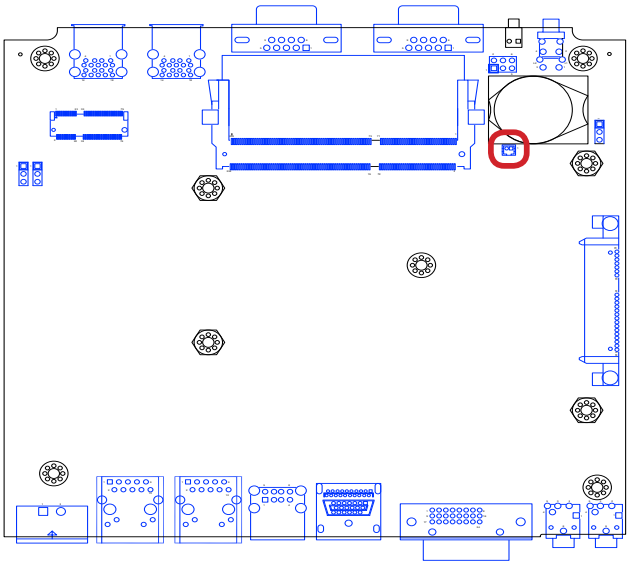
JBAT1

Description: Battery connector
Connector Type: 1.25mm-pitch 1x2-pin wafer connector



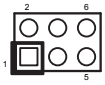
Pin	Description
1	GND
2	battery power

Board Top



JPH1

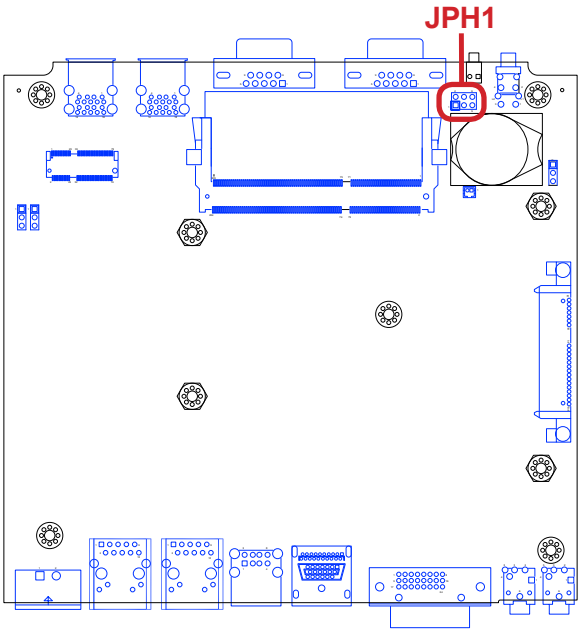
Function: RESET/POWER Button (For Remote)
Connector Type: Onboard 2.54mm-pitch 2x3-pin header



Setting:

Pin	Description
1-2	Reset
3-4	Power ON/OFF
5-6	Power LED 5- 6+

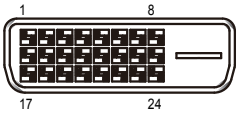
Board Top



DVI1

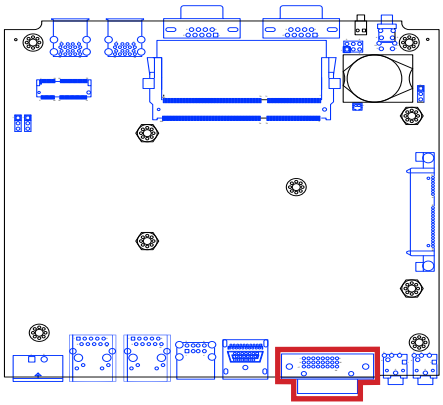
The computer features a DVI (digital visual interface) port, supporting DVI-D (analog only) video output.

Description: DVI-D port (digital)
Connector Type: 24-pin DIP-type female DVI connector w/o screw

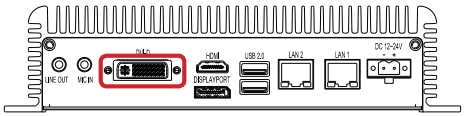


Pin	Desc.	Pin	Desc.	Pin	Desc.
1	T.M.D.S DATA 2-	9	T.M.D.S DATA 1-	17	T.M.D.S DATA 0-
2	T.M.D.S DATA 2+	10	T.M.D.S DATA 1+	18	T.M.D.S DATA 0+
3	T.M.D.S DATA 2/4 SHIELD	11	T.M.D.S DATA 1/3 SHIELD	19	T.M.D.S DATA 0/5 SHIELD
4	(NC) T.M.D.S DATA 4-	12	(NC) T.M.D.S DATA 3-	20	(NC) T.M.D.S DATA 5-
5	(NC) T.M.D.S DATA 4+	13	(NC) T.M.D.S DATA 3+	21	(NC) T.M.D.S DATA 5+
6	DDC CLOCK	14	+5V	22	T.M.D.S CLOCK SHIELD
7	DDC DATA	15	GND	23	T.M.D.S CLOCK-
8	(NC) CRT VSYNC	16	HOT PLUG DETECTED	24	T.M.D.S CLOCK+

Board Top



Rear Panel



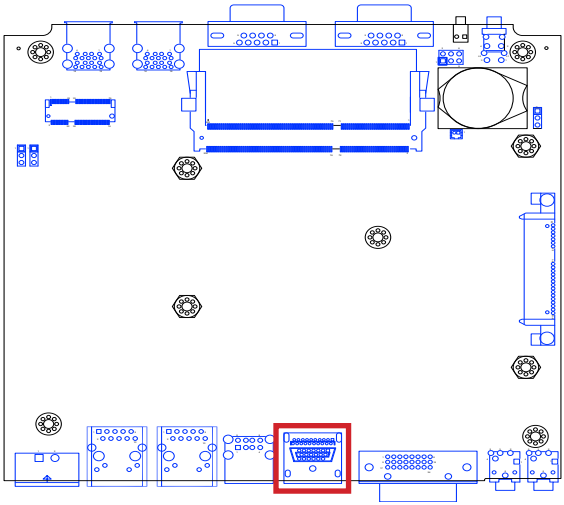
CN4

Description: DP (TOP)+ HDMI (bottom) Connector
Connector Type: ,DISPLAYPORT+HDMI connector

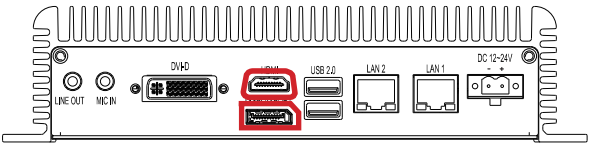
DP:
The pin assignments conform to the industry standard.

HDMI:
The pin assignments conform to the industry standard.

Board Top



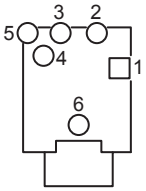
Rear Panel



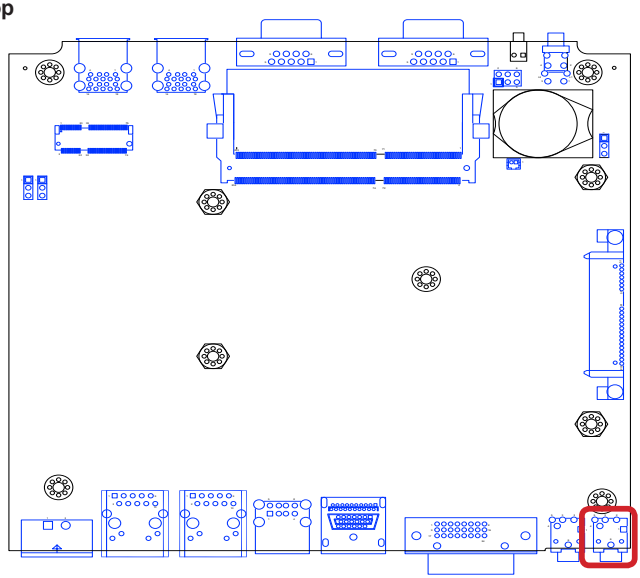
JLOUT1

Description: Audio output
Connector Type: Lime green 3.5mm audio jack with shield

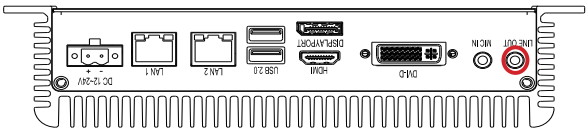
Pin	Description
1	Audio Left
2	NC
3	Audio Right
4	Audio Jack Detect
5	Audio GND
6	Audio GND



Board Top



Rear Panel

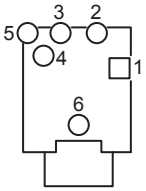


JMIC1

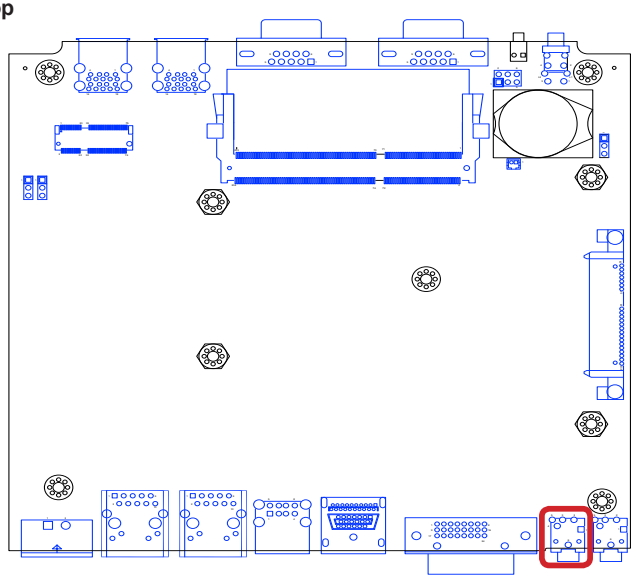
Description: Microphone
Connector Type: Pink 3.5mm audio jack with shield

MIC IN

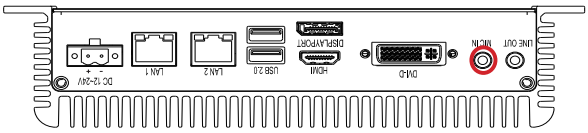
Pin	Description
1	MICL
2	N/A
3	MIC_R
4	MIC1_JD
5	AU_GND
6	AU_GND



Board Top

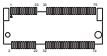


Rear Panel



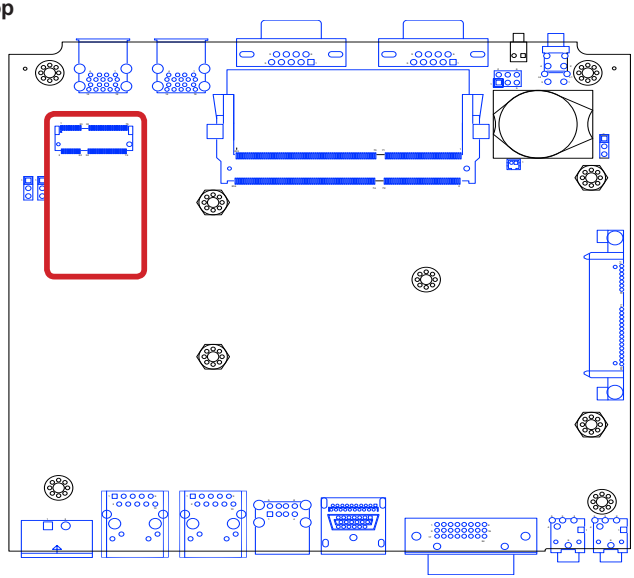
NGFF1

Description: NGFF Card Slot
Connector Type: NGFF, 75P, KEY E, APCI0154-P002A



The pin assignments conform to the industry standard.

Board Top



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Chapter 4

Installation and Maintenance

4.1. Install Hardware

The computer is constructed based on modular design to make it easy for users to add hardware or to maintain the computer. The following sections will guide you to the simple hardware installations for the computer.

4.1.1. Open the Computer

For the computer, removing the bottom cover is essential to open the computer and access the inside. Follow through the steps below to remove the bottom cover from the computer.

4.1.1.1. Remove Bottom Cover

All jumpers, connectors, PCI Express Mini-card sockets and SDRAM SO-DIMM slot are built on the main board. To access these components, the computer's bottom cover has to go. Follow through the steps below to remove the bottom cover.

1. Place the computer on a flat surface, with the bottom facing up. Loosen and remove the 3 screws from the bottom cover as marked in the illustration below.

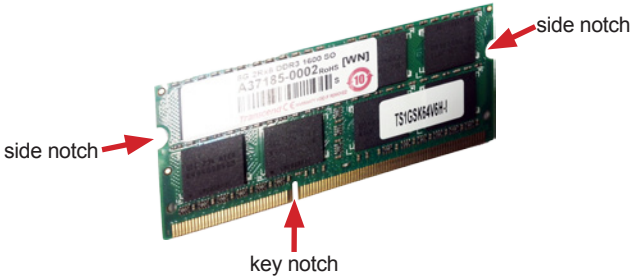
2. Slide out the bottom cover and remove the bottom cover from the computer.

The inside of the computer comes to view.

- To adjust jumpers or connect/disconnect devices to/from the main board, see 3.2.1. Jumpers on page 15 and 3.2.2. Connectors on page 17.
- To install a memory module to the computer, see 4.1.2. Install Memory Module on page 34.

4.1.2. Install Memory Module

The main board has one dual inline memory module (DIMM) sockets. Load the computer with a memory module of higher capacity to make programs run faster. The memory module for the computer's SO-DIMM socket should be a 204-pin memory with a "key notch" off the centre among the pins, which enables the memory module for particular applications. There are another two notches at each left and right side of the memory module to help fix the module in the socket.



To install a memory module:

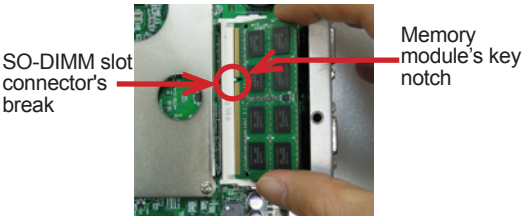
1. Remove the bottom cover from the computer as described in 4.1.1.1. Remove Bottom Cover on page 32.

   The inside of the computer comes to view.

2. Find the SO-DIMM socket on the board as marked in the illustration below.

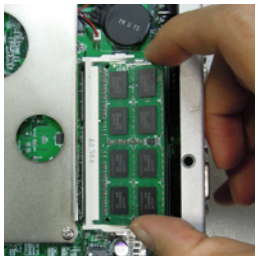
   The SO-DIMM socket is horizontal type, and it has two spring-loaded locks to fix the memory module.

3. Confront the memory module's edge connector with the SO-DIMM slot connector. Align the memory module's key notch at the break on the SO-DIMM slot connector.

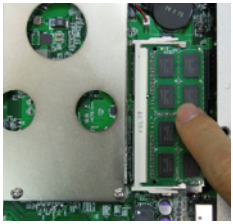


Aligh the memory module's key notch at the SO-DIMM slot connector's break.

4. Fully plug the memory module until it cannot be plugged any more.



5. Press down the memory module until it gets auto-locked in place.



6. Restore the bottom cover to the computer.

To uninstall the memory module:

1. Pull back both locks from the memory module.

   The memory module will be auto-released from the socket.

2. Remove the memory module.

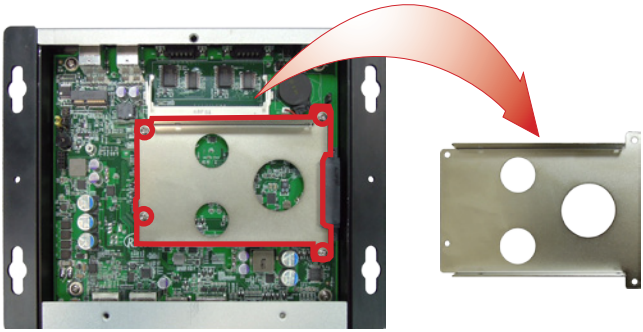
3. Restore the bottom cover to the computer.

4.1.3. Install 2.5" SSD Storage Device

1. Remove the bottom cover from the computer as described in 4.1.1. Open the Computer on page 32.

   The inside of the computer comes to view.

2. See the illustration below and find the bracket for an SSD. Loosen and remove the four screws. Dismount the SSD bracket from the computer.



3. Slide a 2.5-inch SSD into the bracket.

Slide a 2.5-inch SSD into the bracket.

4. Fix the assemblage with four screws - two screws on each side of the bracket.

5. Plug the SSD (with the bracket) to the onboard SATA connector.

Plug the SSD to the onboard SATA connector.

6. Restore the four screw that fix the bracket.

Restore the four screws that fix the bracket.

7. Restore the bottom cover to the computer.

4.2. Mount the Computer

Integrate the computer to where it works by mounting it to a wall in the surroundings or to the rear of a display monitor.

4.2.1. Wall-Mount

Follow through the guide below to mount the computer to a wall.

1. Find the four cutouts as marked in the illustration below:

2. Mount the computer to a wall by the said cutouts.

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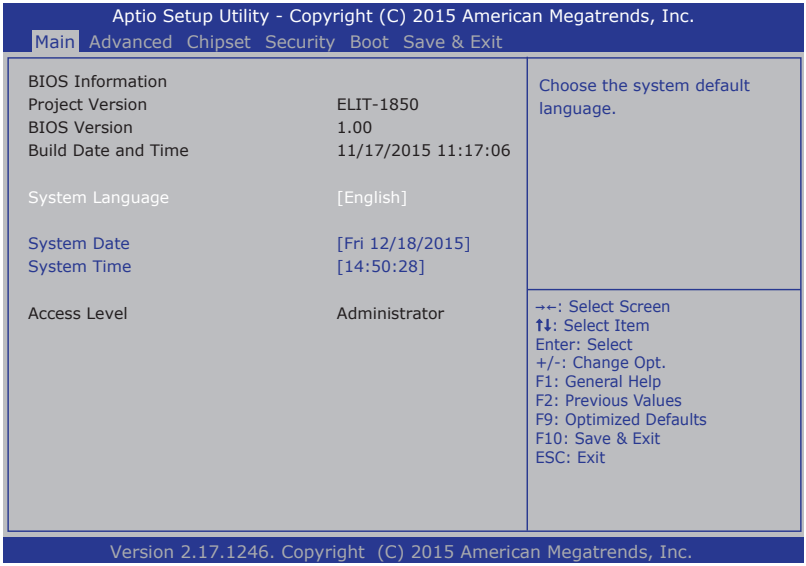
Chapter 5

BIOS

The BIOS Setup utility for the computer is to configure the system settings stored in the system's BIOS ROM. The BIOS is activated once the computer powers on. When the computer is off, the battery on the main board supplies power to BIOS RAM.

To enter the BIOS Setup utility, keep hitting the "Delete" key upon powering on the computer.



The BIOS' featured menus are:

Menu	Description
Main	See 5.1. Main on page 44
Advanced	See 5.2. Advanced on page 46
Chipset	See 5.3. Chipset on page 59
Security	See 5.4. Security on page 64
Boot	See 5.5. Boot on page 65
Save & Exit	See 5.6. Save & Exit on page 66

Key Commands

The BIOS Setup utility relies on a keyboard to receive user's instructions. Hit the following keys to navigate within the utility and configure the utility.

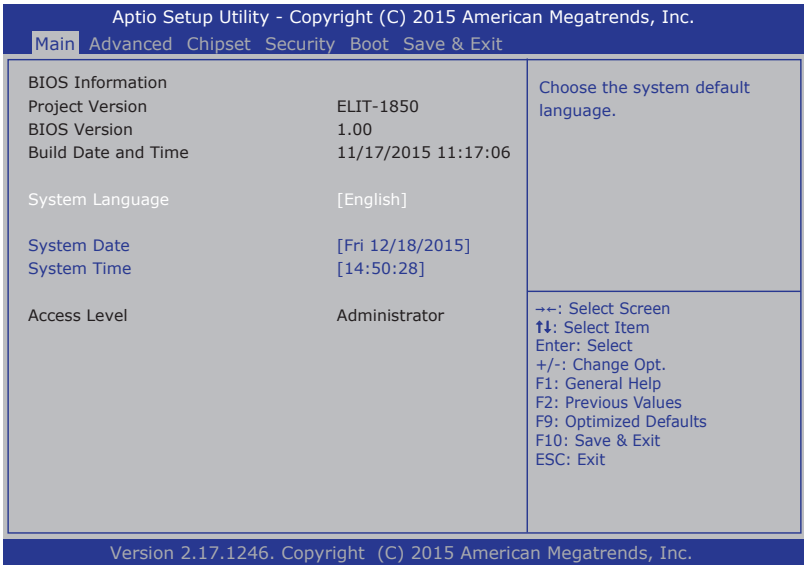
Keystroke	Function
← →	Moves left/right between the top menus.
↓ ↑	Moves up/down between highlight items.
Enter	Selects an highlighted item/field.
Esc	▸ On the top menus: Use **Esc** to quit the utility without saving changes to CMOS. (The screen will prompt a message asking you to select **OK** or **Cancel** to exit discarding changes. ▸ On the submenus: Use **Esc** to quit current screen and return to the top menu.
Page Up / +	Increases current value to the next higher value or switches between available options.
Page Down / -	Decreases current value to the next lower value or switches between available options.
F1	Opens the **Help** of the BIOS Setup utility.
F10	Exits the utility saving the changes that have been made. (The screen then prompts a message asking you to select **OK** or **Cancel** to exit saving changes.)

Note: Pay attention to the "WARNING" that shows at the left pane onscreen when making any change to the BIOS settings.

This BIOS Setup utility is updated from time to time to improve system performance and hence the screenshots hereinafter may not fully comply with what you actually have onscreen.

5.1. Main

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS RAM of the system stores the Setup utility and configurations. When you turn on the computer, the BIOS is immediately activated. To enter the BIOS SETUP UTILITY, press “Delete” once the power is turned on. The Main Setup screen lists the following information:



Setting	Description
System Language	Choose the system default language.
System Date	Set the system date. Use Tab to switch between Data elements. Note that the ‘Day’ automatically changes when you set the date. ► The date format is: **Day:** Sun to Sat **Month:** 1 to 12 **Date:** 1 to 31 **Year:** 1998 to 2099
System Time	Set the system time. Use Tab to switch between Time elements. ► The time format is: **Hour:** 00 to 23 **Minute:** 00 to 59 **Second:** 00 to 59

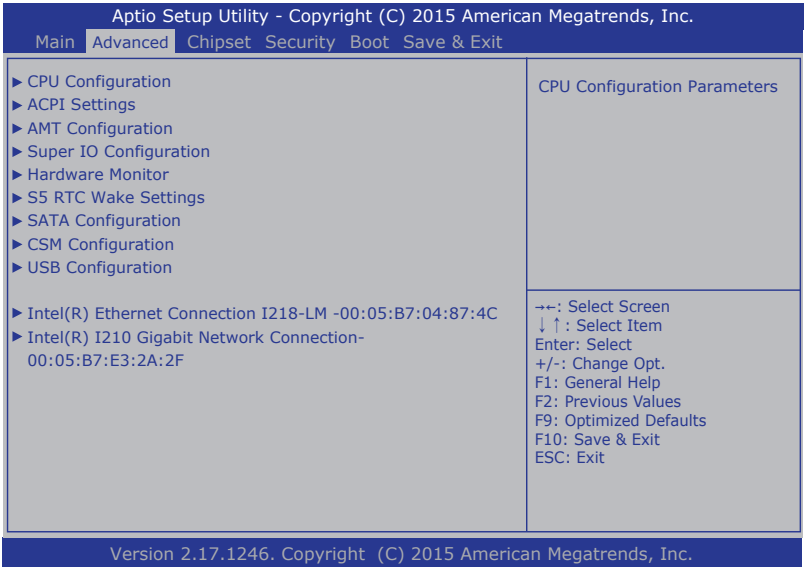
Key Commands

BIOS Setup Utility is mainly a key-based navigation interface. Please refer to the following key command instructions for navigation process.

Keystroke	Function
◄ ►	Move to highlight a particular configuration screen from the top menu bar / Move to highlight items on the screen
▼ ▲	Move to highlight previous/next item
Enter	Select and access a setup item/field
Esc	On the Main Menu – Quit the setup and not save changes into CMOS (a message screen will display and ask you to select “OK” or “Cancel” for exiting and discarding changes. Use “←” and “→” to select and press “Enter” to confirm) On the Sub Menu – Exit current page and return to main menu
Page Up / +	Increase the numeric value on a selected setup item / make change
Page Down -	Decrease the numeric value on a selected setup item / make change
F1	Activate “General Help” screen
F10	Save the changes that have been made in the setup and exit. (a message screen will display and ask you to select “OK” or “Cancel” for exiting and saving changes. Use “←” and “→” to select and press “Enter” to confirm)

5.2. Advanced

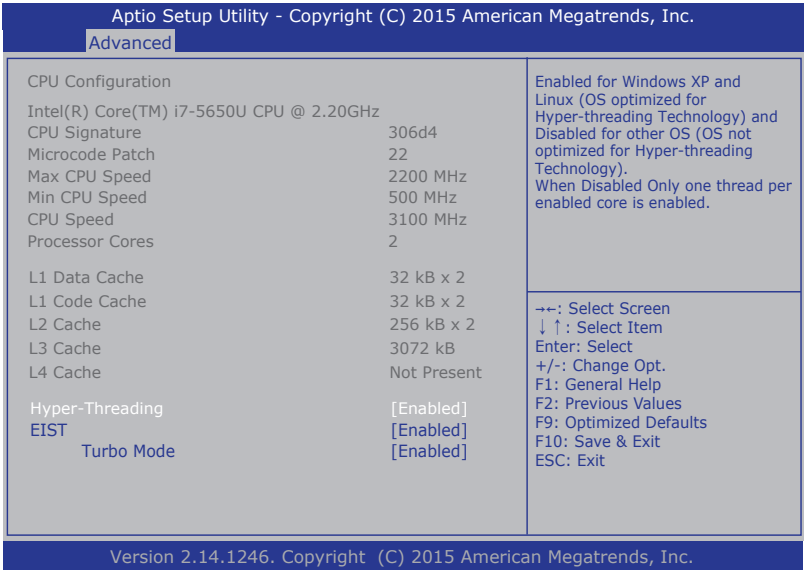
The “Advanced” setting page provides you the options to configure the details of your hardware, such as ACPI, CPU, SATA, AMT, USB and Super IO.



Setting	Description
CPU Configuration	See Section 5.2.1. CPU Configuration on page 47
ACPI Settings	See Section 5.2.2. ACPI Settings on page 48
AMT Configuration	See Section 5.2.3. AMT Configuration on page 49
Super IO Configuration	See Section 5.2.4. Super IO Configuration on page 50
Hardware Monitor	See Section 5.2.5. Hardware Monitor on page 51
S5 RTC Wake Settings	See Section 5.2.6. S5 RTC Wake Settings on page 52
SATA Configuration	See Section 5.2.7. SATA Configuration on page 53
CSM Configuration	See Section 5.2.8. CSM Configuration on page 54

USB Configuration	See Section 5.2.9 USB Configuration on page 55
Intel(R) Ethernet Connection I218-LM	See Section 5.2.10 Intel(R) Ethernet Connection I218-LM on page 57
Intel(R) I210 Giigabit Network Connection	See Section 5.2.11 Intel(R) Ethernet Connection I210 on page 58

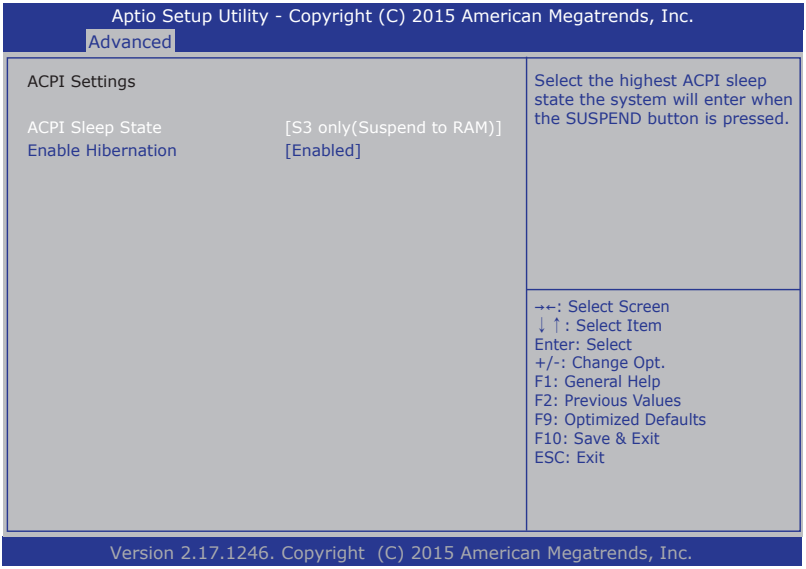
5.2.1. CPU Configuration



Setting	Description
Hyper-threading	**Enabled** (default) for Windows XP and Linux (OS optimized for Hyper-Threading Technology) and **Disabled** for other OS (OS not optimized or Hyper-Threading Technology). When Disabled only one thread per enabled core is enabled.
EIST	**Enable** (default)/**Disable** Intel SpeedStep
Turbo Mode	**Enable** (default)/**Disable** the Turbo Mode

5.2.2. ACPI Settings

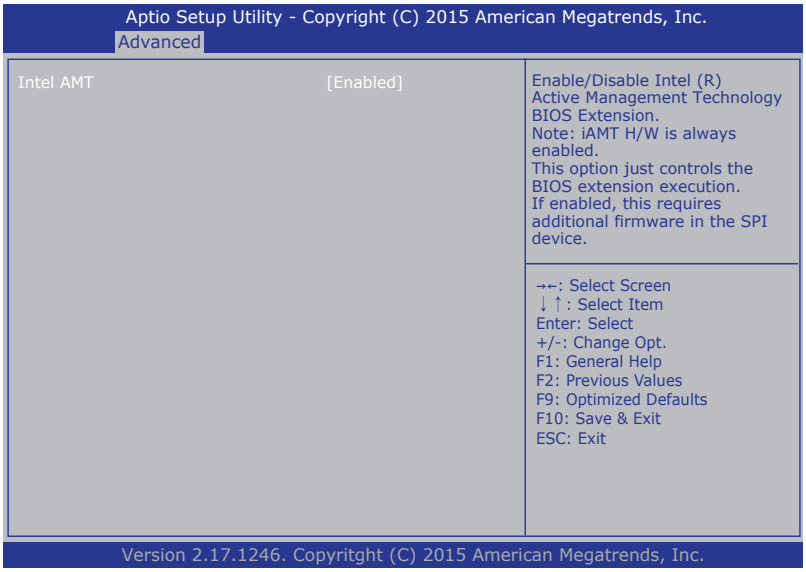
Access this submenu to configure system ACPI parameters.



The featured setting is:

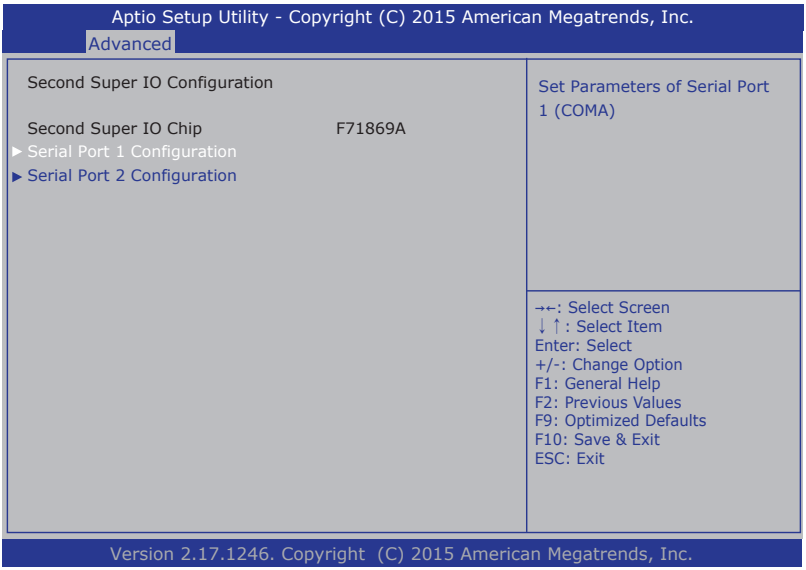
Setting	Description
ACPI Sleep State	Select ACPI sleep state the system will enter when the SUSPEND button is pressed. ► Options: **Suspend Disabled**, **S1 only(CPU Stop Clock)**, **S3 only(Suspend to RAM)**(default), **Both S1 and S3 available for OS to choose from**
Enable Hibernation	**Enable** (default)/**Disable** System ability to Hibernate (OS/S4 Sleep State). This option may be not effective with some OS.

5.2.3. AMT Configuration



Setting	Description
Intel AMT	**Enable** (default)/**Disable** Intel(R) Active Management Technology BIOS Extension. Note : iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device.

5.2.4. Super IO Configuration

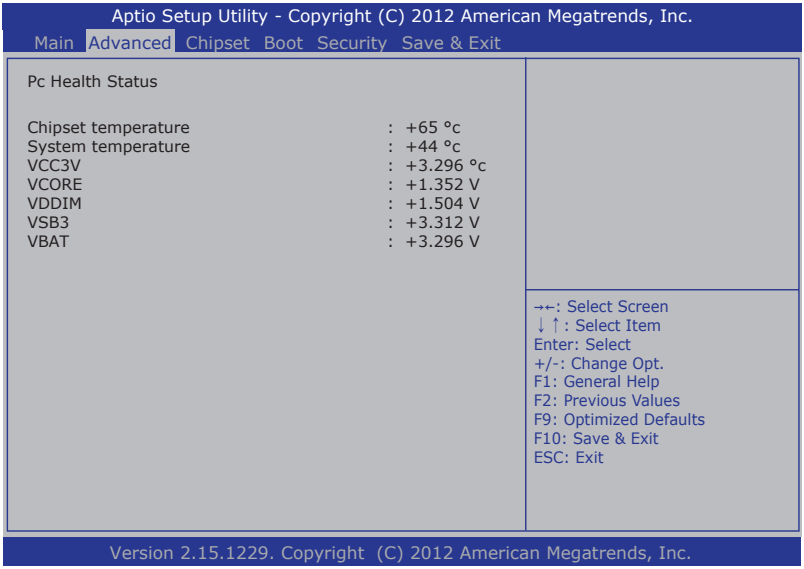


Setting	Description
Serial Port 1 Configuration	See below
Serial Port 2 Configuration	

Setting	Description
Serial Port	**Enable** (default)/**Disable** Serial Port (COM).
UART Type	Select an UART type for Serial Port ► Options: **RS232** (default) ; **RS485**; **RS485 With Terminator**

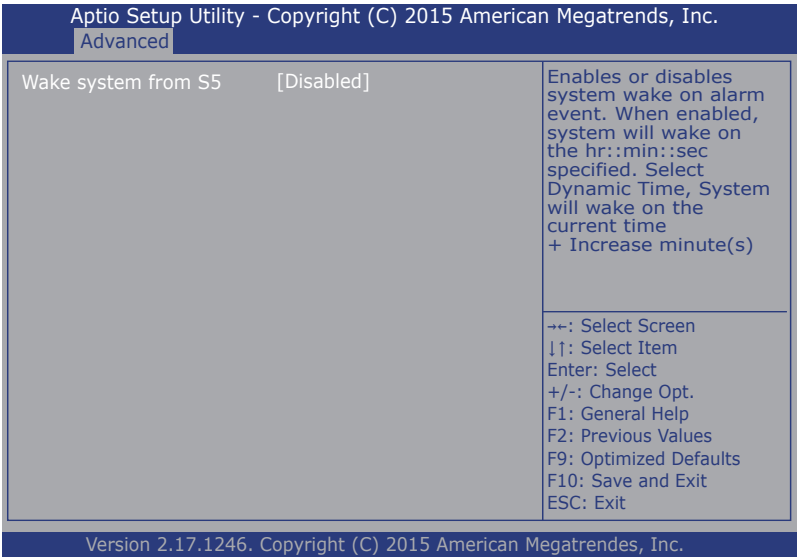
5.2.5. Hardware Monitor

Select this submenu to view the main board's hardware status. Select it to run a report of various info as depicted below:



5.2.6. S5 RTC Wake Settings

Access this submenu to control whether the system can wake from S5 using the RTC alarm.

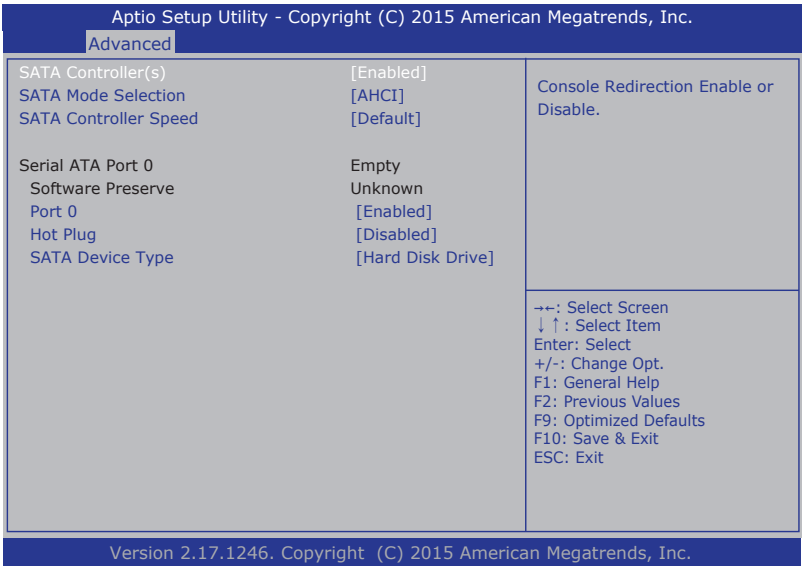


The featured setting is:

Setting	Description
Wake system with Fixed Time	Enables/disables the system to wake up on a specified time. ▸ **Disabled** is the default. ▸ When enabled, the following settings become available:

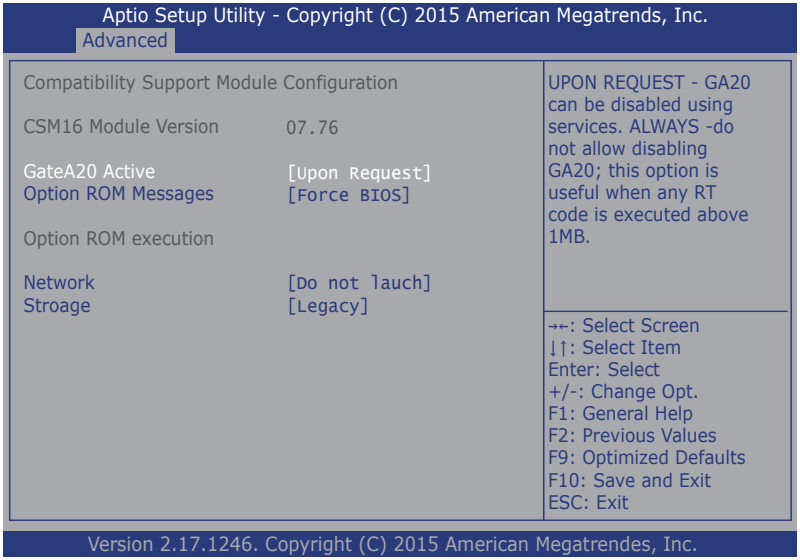
Setting	Description
Wake up hour	Defines the (hour) time to wake up the system. ▸ 0 to 23 configurable.
Wake up minute	Defines the (minute) time to wake up the system. ▸ 0 to 59 configurable.
Wake up second	Defines the (second) time to wake up the system. ▸ 0 to 59 configurable.

5.2.7. SATA Configuration



Setting	Description
SATA Controller(s)	**Enable** (default)/**disable** SATA Device.
SATA Mode Selection	Determines how SATA controller(s) operate. ► Options: **AHCI** (default)
SATA Controller Speed	Indicates the maximum speed the SATA controller can support. ► Options: **Default** (default), **Gen1**, **Gen2**, **Gen3**
Port 0	**Enable** (default)/**disable** SATA Port.
Hot plug	**Enable** /**disable** (default) the SATA port Hot plug.
SATA Device Type	Identify the SATA port is connected to **Solid State Drive** or **Hard Disk Drive** (default).

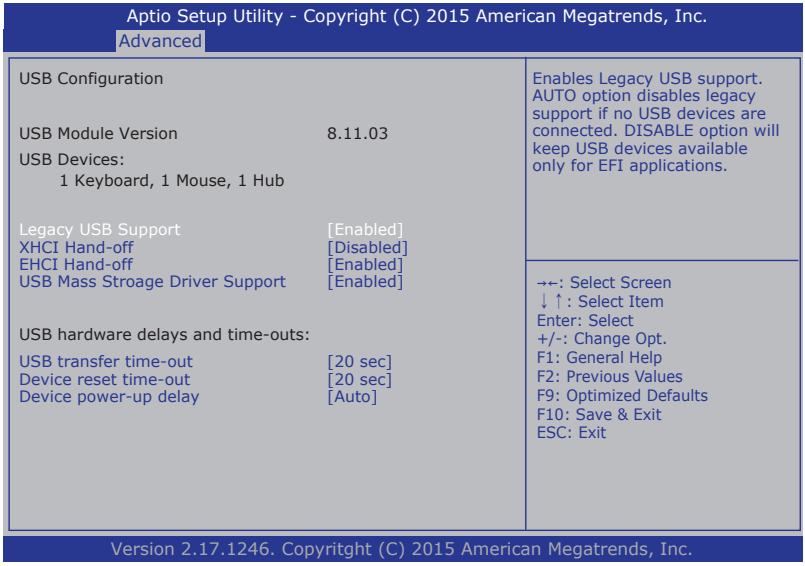
5.2.8. CSM Configuration



Setting	Description
GateA20 Active	Select setting for GateA20. ► Options: **UPON REQUEST** - GA20 can be disabled using services or **ALWAYS** -do not allow disabling GA20
Option ROM Messages	Set display mode for Option ROM. ► Options: **Force BIOS** (default) and **Keep Current**
Network	Control the execution of UEFI and Legacy PXE OpROM ► Options: **Do not lauch (default)** and **Legacy**
Storage	Control the execution of UEFI and Legacy Storage OpROM ► Options: **Do not launch** (default) and **Legacy**

5.2.9 USB Configuration

Select this submenu to view the status of the USB ports and configure USB features.

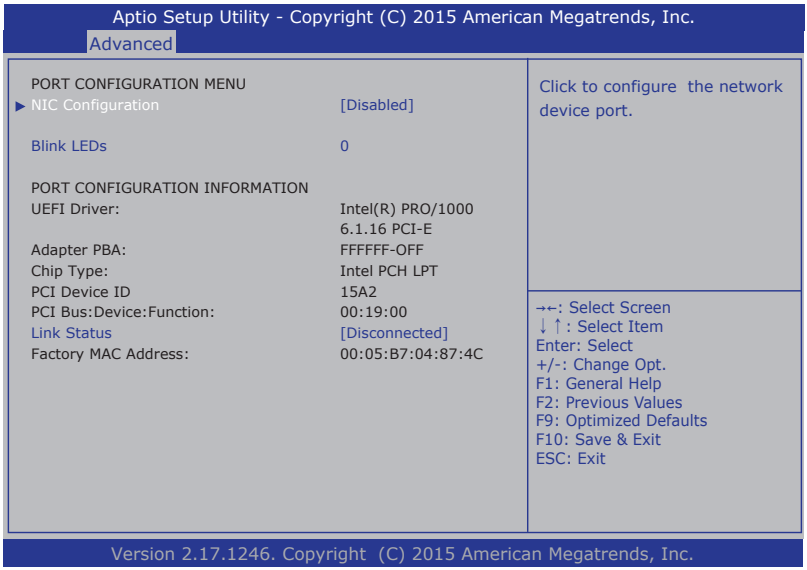


Setting	Description
Legacy USB Support	**Enables** (default) Legacy USB support. **AUTO** option disables legacy support if no USB devices are connected. **DISABLE** option will keep USB devices available only for EFI applications.
XHCI Hand-off	This is a workaround for OSes without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver. The optional settings are: **Enabled / Disabled.**
EHCI Hand-off	This is a workaround for OSes without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver. The optional settings are: **Disabled / Enabled.**
USB Mass Storage Driver Support	**Enable** (default)/**disable** USB Mass Storage Driver Support.

<table>
<tr>
<td>USB hardware delay and time-out</td>
<td>This is a submenu to configure the features of USB hardware delay and time-out. The featured settings are:
<table>
<tr><th>Setting</th><th>Description</th></tr>
<tr><td>USB transfer time-out</td><td>Use this item to set the time-out value for control, bulk, and interrupt transfers.
‣ Options available are: 1 sec, 5 sec, 10 sec, 20 sec</td></tr>
<tr><td>Device reset time-out</td><td>Use this item to set USB mass storage device start unit command time-out.
‣ Options available are: 10 sec, 20 sec, 30 sec, 40 sec</td></tr>
<tr><td>Device power-up delay</td><td>Use this item to set maximum time the device will take before it properly reports itself to the host controller. ‘Auto’ uses default value: for a root port it is 100 ms, for a hub port the delay is taken from hub descriptor.

‣ Options available are:
Auto: Default
Manual: Select Manual you can set value for the following sub-item: ‘Device Power-up delay in seconds’, the delay range in from 1 to 40 seconds, in one second increments.</td></tr>
</table>
</td>
</tr>
</table>

5.2.10 Intel(R) Ethernet Connection I218-LM

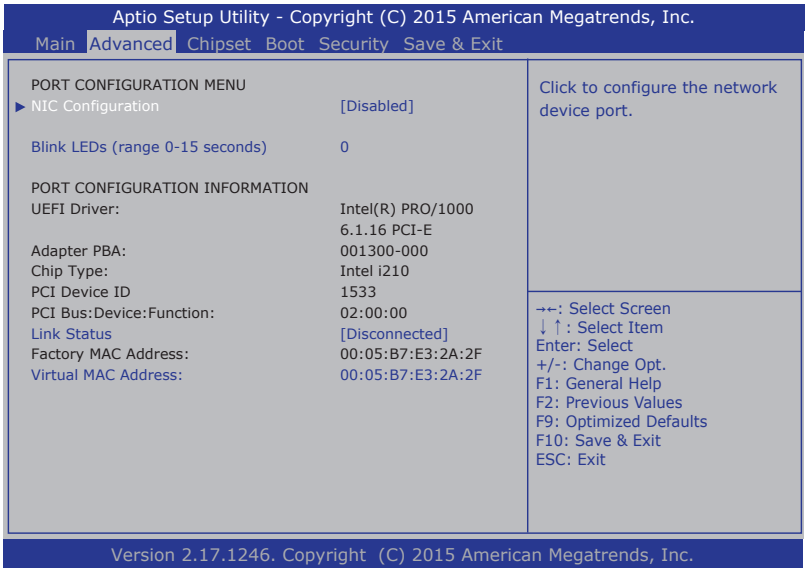


Setting	Description
NIC Configuration	See next page.
Blink LEDs (range 0-15 seconds)	Blink LEDs for the specified duration (up to 15 seconds).
Link Status	Link Status

NIC Configuration

Setting	Description
Link Speed	Change link speed and duplex for current port. ► Options: **AutoNeg** (default), **10 Mbps Half**, **10 Mbps Full**, **100 Mbps Half**, **100 Mbps Full**
Wake on LAN	Enable this option to wake the system with a magic packet. ► Options: **Enabled** (default) or **Disabled**

5.2.11 Intel(R) Ethernet Connection I210



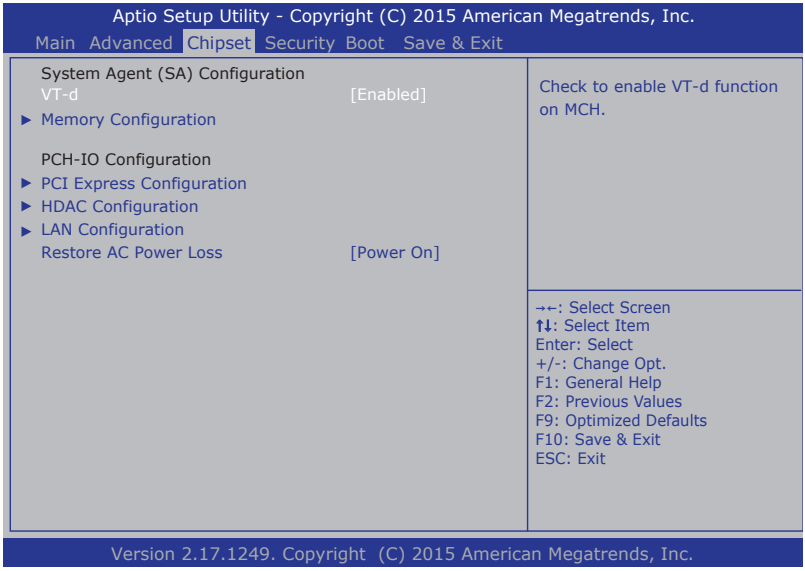
Setting	Description
NIC Configuration	See next page.
Blink LEDs (range 0-15 seconds)	Blink LEDs for the specified duration (up to 15 seconds).
Link Status	Link Status

NIC Configuration

Setting	Description
Link Speed	Change link speed and duplex for current port. ► Options: **AutoNeg** (default), **10 Mbps Half**, **10 Mbps Full**, **100 Mbps Half**, **100 Mbps Full**
Wake on LAN	Enable this option to wake the system with a magic packet. ► Options: **Enabled** (default) or **Disabled**

5.3. Chipset

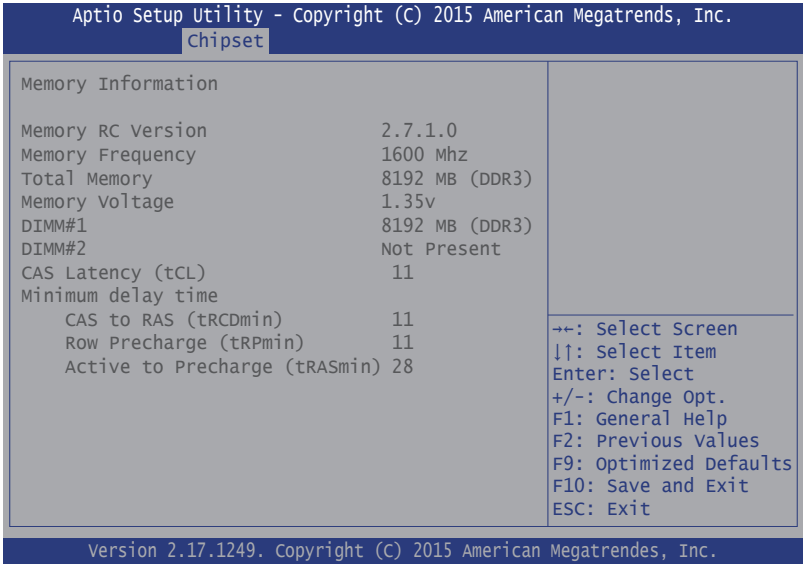
The **Chipset** menu controls the system's chipset.



Setting	Description
VT-d	Enables/disables Intel virtualization technology for directed I/O on the MCH (memory controller hub).
Memory Configuration	See Section 5.3.1. Memory Configuration on page 60
PCI Express Configuration	See Section 5.3.2. PCI Express Configuration on page 61
HDAC Configuration	See Section 5.3.3. HDAC Configuration on page 62
LAN Configuration	See Section 5.3.4. LAN Configuration on page 63
Restore AC Power loss	Sets whether the system should power on or power off when the power resumes after accidental power loss. ► Options: Power On (default), and Power Off.

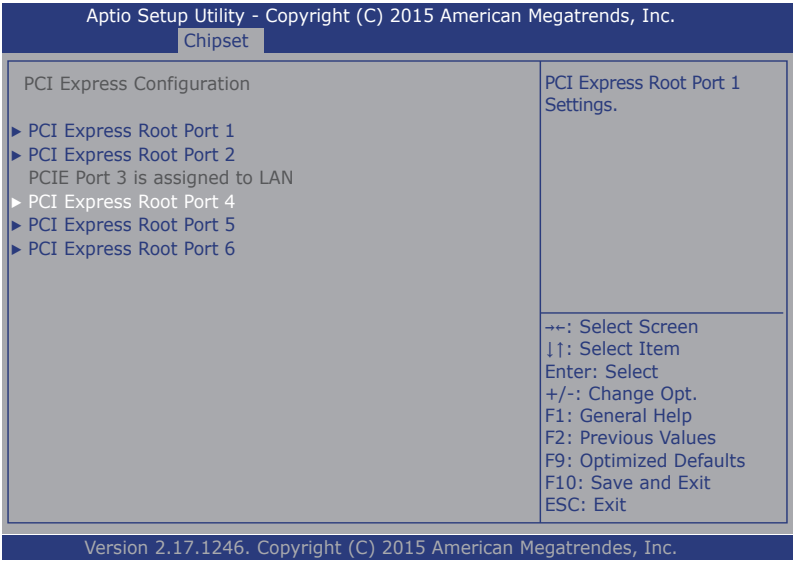
5.3.1. Memory Configuration

Select this submenu to view the system memory info



5.3.2. PCI Express Configuration

Select this submenu to configure the PCI Express Ports:

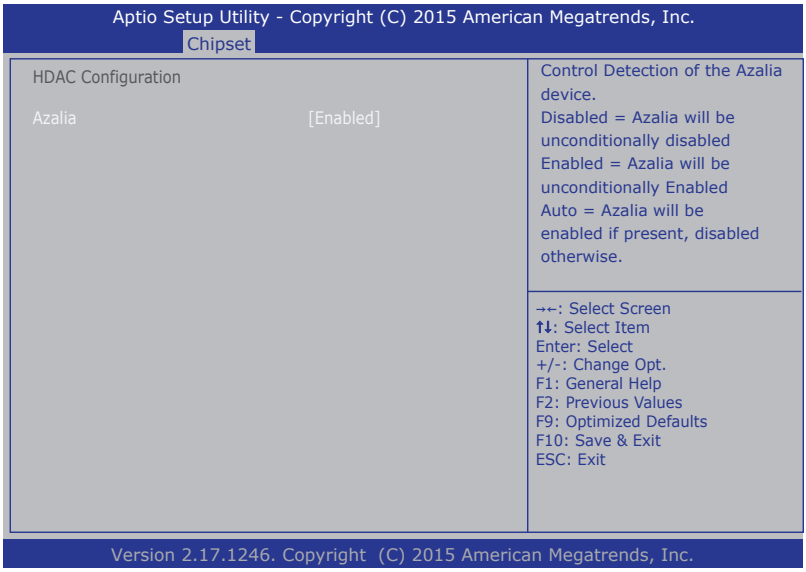


Configures PCI Express by the following settings:

Setting	Description
PCI Express Port 4/5/6	▸ PCI Express Root Port 4/5/6 Enables/Disables the port ▸ ASPM Support Options are: **Disable** : disables ASPM **L0s** : force all links to L0s state **L1** : force all links to L1 state **L0sL1** : force all links to L0s+L1 state **Auto** : BIOS auto configure ▸ PCIe Speed Options are: **Auto**, **Gen 1**, **Gen 2** **Auto** is the default.

5.3.3. HDAC Configuration

Select this submenu to configure the PCI Express Ports:

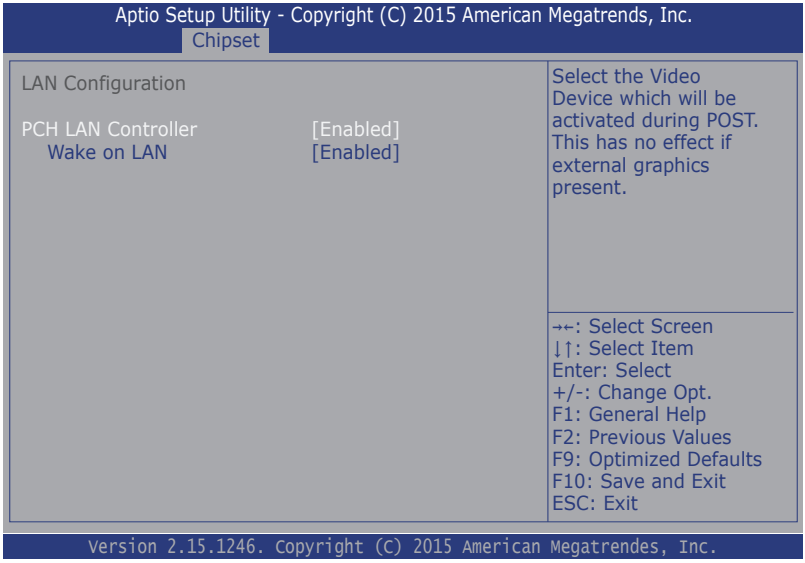


Configures HDAC by the following settings:

Setting	Description
Azalia	Control Detection of the Azalia device. **Disabled** = Azalia will be unconditionally disabled **Enabled** (default) = Azalia will be unconditiona lly Enabled **Auto** = Azalia will be enabled if present, disabled otherwise.

5.3.4. LAN Configuration

Select this submenu to configure the LAN Configuration

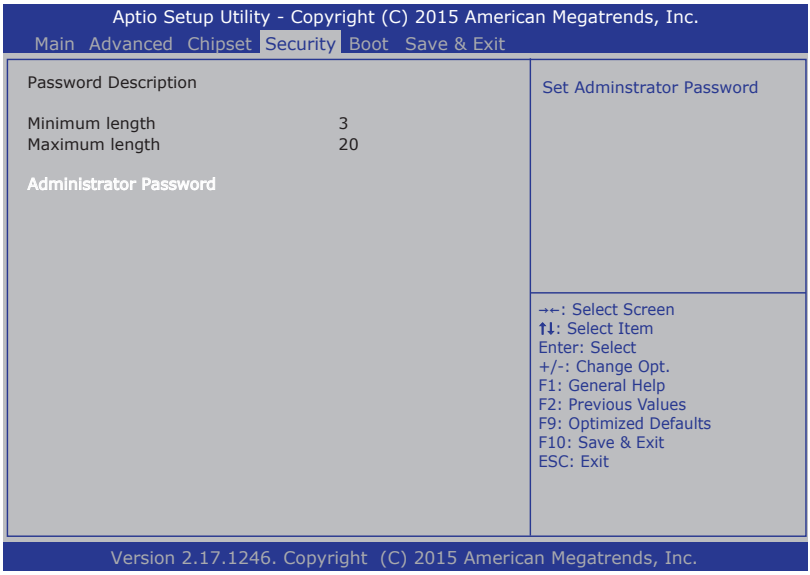


Configures LAN configuration by the following settings:

Setting	Description
PCH LAN Controller	Enables/Disables the onboard NIC ▸ **Enabled** is the default.
Wake on LAN	Enables/Disables the Wake on LAN ▸ **Enabled** is the default.

5.4. Security

The **Security** menu sets up the password for the system's administrator account. Once the administrator password is set up, this BIOS Setup utility is limited to access and will ask for the password each time any access is attempted.

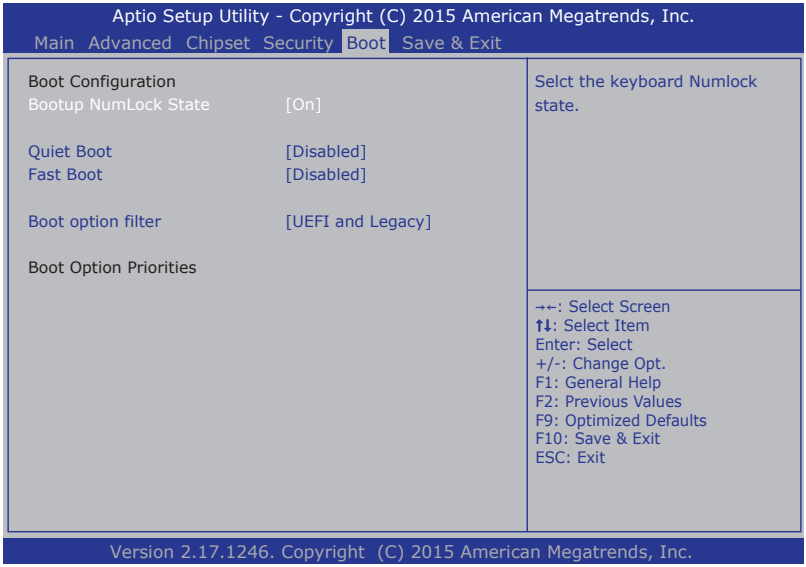


The featured setting is:

Setting	Description
Administrator Password	To set up an administrator password: 1. Select **Administrator Password**. An **Create New Password** dialog then pops up onscreen. 2. Enter your desired password that is no less than 3 characters and no more than 20 characters. 3. Hit [Enter] key to submit.

5.5. Boot

Access this **Boot** menu to configure how to boot up the system such as the configuration of boot device priority.

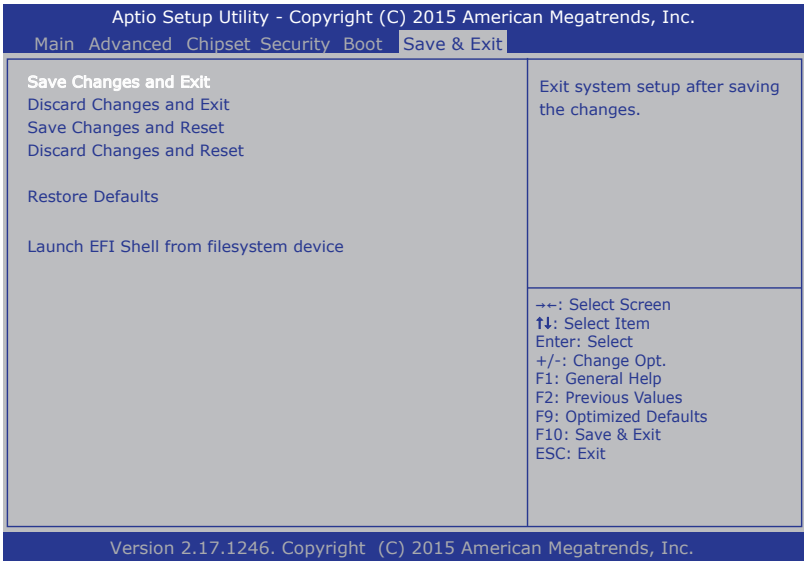


The featured settings are:

Setting	Description
Boot NumLock State	Select the keyboard NumLock state. ► Options: **On** (default) and **Off**.
Quiet Boot	**Enable/Disable** (default) Quiet Boot option.
Fast Boot	**Enable/Disable** (default) Fast Boot option.
Boot option Filter	Select the option of Legacy/UEFI ROMs priority ► Options: **UEFI and Legacy** (default), **Legacy Only** and **UEFI Only**.
Boot option Priorities	This option controls device boot priorities.

5.6. Save & Exit

The Save & Exit menu features a handful of commands to launch actions from the BIOS.



Setting	Description
Save Changes and Exit	Exit system setup after saving the changes. ► Enter the item and then a dialog box pops up: **Save configuration and exit? (Yes/ No)**
Discard Changes and Exit	Exit system setup without saving the changes. ► Enter the item and then a dialog box pops up: **Quit without saving? (Yes/ No)**
Save Changes and Reset	Reset the system after saving the changes.
Discard Changes and Reset	Reset the system after saving the changes.
Restore Defaults	Restore/Load Default values for all the setup options. ► Enter the item and then a dialog box pops up: **Load Optimized Defaults? (Yes/ No)**
Launch EFI Shell from filesystem device	Attempt to launch EFI Shell application (Shellx64.efi) from one of the available filesystem devices. Press “Enter” to proceed.

Appendices

Appendix A: Install M.2 Wireless Card

1. Remove the bottom cover from the computer as described in 4.1.1. Open the Computer on page 32.

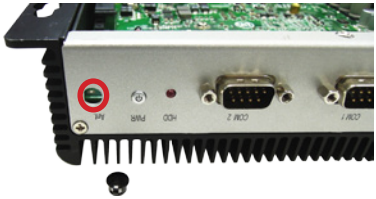
   The inside of the computer comes to view.

2. See the illustration below and find the slot for an M.2 device.

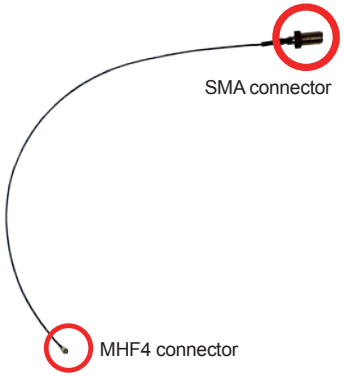
3. Prepare the Wi-Fi module kit. The module is a M.2 wireless module, with two M.FL connectors, one is “1“, and the other is “0“.
4. Plug the Wi-Fi module to the socket’s connector by a slanted angle. Fully plug the module and note the notch on the wireless module should meet the break of the connector.

5. Press the module down and fix the module in place using one screw.

6. Remove a plastic plug from the computer's panel to make an antenna hole. Keep the plastic plug for any possible restoration in the future.

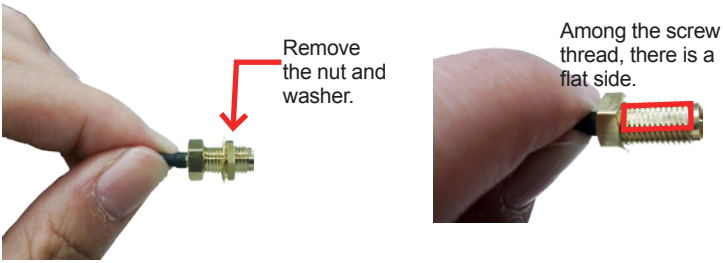


7. Have the RF antenna. The antenna has an SMA connector on one end and an MHF4 connector on the other.



8. Connect the RF antenna's MHF4 connector to the Wi-Fi module's "1" connector.

9. From the other end of the RF antenna, which is an SMA connector, remove the washer and the nut. Save the washer and nut for later use. Note the SMA connector has the form of a threaded bolt, with one flat side.



10. Pull the SMA connector through the above mentioned antenna hole. Note to meet the aforesaid flattened side with the antenna hole's flat side.

11. Mount the washer first and then the nut to the SMA connector. Make sure the nut is tightened.

12. Restore the computer's bottom cover

13. Have an external antenna. Screw and tightly fasten the antenna to the SMA connector.

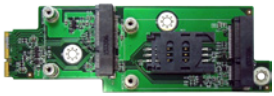
Appendix B: Install M.2 to 2x Mini PCIe daughter board

1. Remove the bottom cover from the computer as described in 4.1.1. Open the Computer on page 32.

   The inside of the computer comes to view.

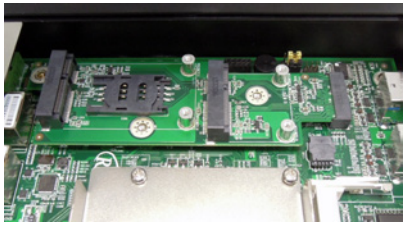
2. See the illustration below and find the slot for an M.2 device.

3. Prepare the daughter board SCDB-1289E.



4. Insert the daughter board into the M.2 slot

5. Insert the daughter board completely and place it on correct potion.



6. Fix the daughter board with screws. One of the screws is different from others, please choose the correct screw.