
ELIT-1650 Series

**Robust Embedded System with
Intel® Core™ i7-2610UE / Celeron® 827E
Processor**

User's Manual

Version 1.0

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Declaration of Conformity

CE

The CE symbol on your product 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 A

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 A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the

equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

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.

About This User's Manual

This User's Manual is intended for experienced users and integrators with hardware knowledge of personal computers. If you are not sure about any description in this User's Manual, please consult your vendor before further handling.

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.

Lithium Battery Replacement

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:
<ftp://ftp.arbor.com.tw/pub/manual>

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

<http://www.arbor.com.tw>

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

General Information

1.1. Introduction

ELIT-1650 is a digital signage player meant for service industry to deliver information to customers timely, efficiently and cost-effectively. Optionally loaded with Intel® Core™ i7-2610UE or Celeron® 827E, the digital signage player is enhanced by Intel® HD Graphics 3000 to bring high-end graphics performance.

ELIT-1650 is ideal for the PIS (Passenger Information System) for the mass transportation services such as train stations and airports. It also brings the brain for the kiosks in hotels and movie theatres. It is capable of the rich multi-media contents needed for the advertisement screens in the leisure places such as shopping malls and complexes. The computer is all about hospitality enhancement and customers touting for your business.

1.2. Product Highlights

- All-In-One Platform

The CPU, DRAM and even software are integrated to provide a plug-and-play machine.

- Compact-sized

The brain of ELIT-1650 is either EmETXe-i65M2-827E or EmETXe-i67M2-2610UE with carrier board PBC-9004. The boards are based on non-standard form factor to make the computer compact enough and consume only a little space.

- Fanless Design

By using a low power processor, the system does not have to rely on fans, which are unreliable and often cause dust to circulate inside the equipment.

- Modular CPU Board

The modularized CPU board facilitates the possible maintenance or upgrades to system. Systems based on a modular CPU board can be easily modified to fit many different applications on customers' requests.

- Powerful Networking

The ELIT-1650 provides multiple COM ports, two Ethernet ports and six USB ports for data communication.

- Numerous Display/Video Output

Integrated with an Intel® HD Graphics core, ELIT-1650 improves graphics and 3D rendering performance and supports the display/video output including DVI-I and HDMI.

- Advanced Storage

ELIT-1650 comes with an eSATA port for fast data transfer speeds for external storage device and a CFast-card slot for better, faster and cost-effective expansibility for more applications.

- Trustworthy

The onboard Watchdog Timer can invoke an NMI or system reset when your application misbehaves within the system.

1.3. Ordering Information

ELIT-1650-2610UE	Barebone system w/ Intel® Core™ i7-2610UE w/o storage and memory
ELIT-1650-827E	Barebone system w/ Intel® Celeron® 827E w/o storage and memory
ELIT-1650-2610UE-16S2G	Intel® Core™ i7-2610UE Box System with 16GB SSD and 2GB DDR3 1333MHz SDRAM
ELIT-1650-827E-16S2G	Intel® Celeron® 827E Box System with 16GB SSD and 2GB DDR3 1333MHz SDRAM

1.4. Packing List

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:



1 x ELIT-1650 Embedded System



1 x Driver CD
1 x User's Manual

1.5. Optional Accessory



PAC-B065W-1
65W AC/DC adapter kit

1.6. Optional Configuration (Configure to Order Service)

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.



SSD-25016
2.5" 16GB SATAII SSD

SSD-25032
2.5" 32GB SATAII SSD



MM-3I-2G
DDR3-1333 2GB SDRAM

MM-3I-4G
DDR3-1333 4GB SDRAM



WIFI-IN1300
Intel® Centrino® Advanced-N 6205 WiFi module
w/ 20cm internal wiring



ANT-D11
1 x WiFi Dual-band 2.4G/5G antenna

1.7. CD Drivers Paths

Windows XP

Driver	Path
Chipset	\CHIPSET\INTEL\XP_32_64_WIN7_32_64_SERIES
VGA	\GRAPHICS\INTEL\XP_32
LAN	\ETHERNET\XP_32
Audio	\AUDIO\REALTEK\XP_32_64
ME	\ME
.NET Framework	\NET FRAMEWORK

Windows 7 32-bit

Driver	Path
Chipset	\CHIPSET\INTEL\XP_32_64_WIN7_32_64_SERIES
VGA	\GRAPHICS\INTEL\WIN7_32
LAN	\ETHERNET\WIN7_32
Audio	\AUDIO\REALTEK\WIN7_32_64
ME	\ME

Windows 7 64-bit

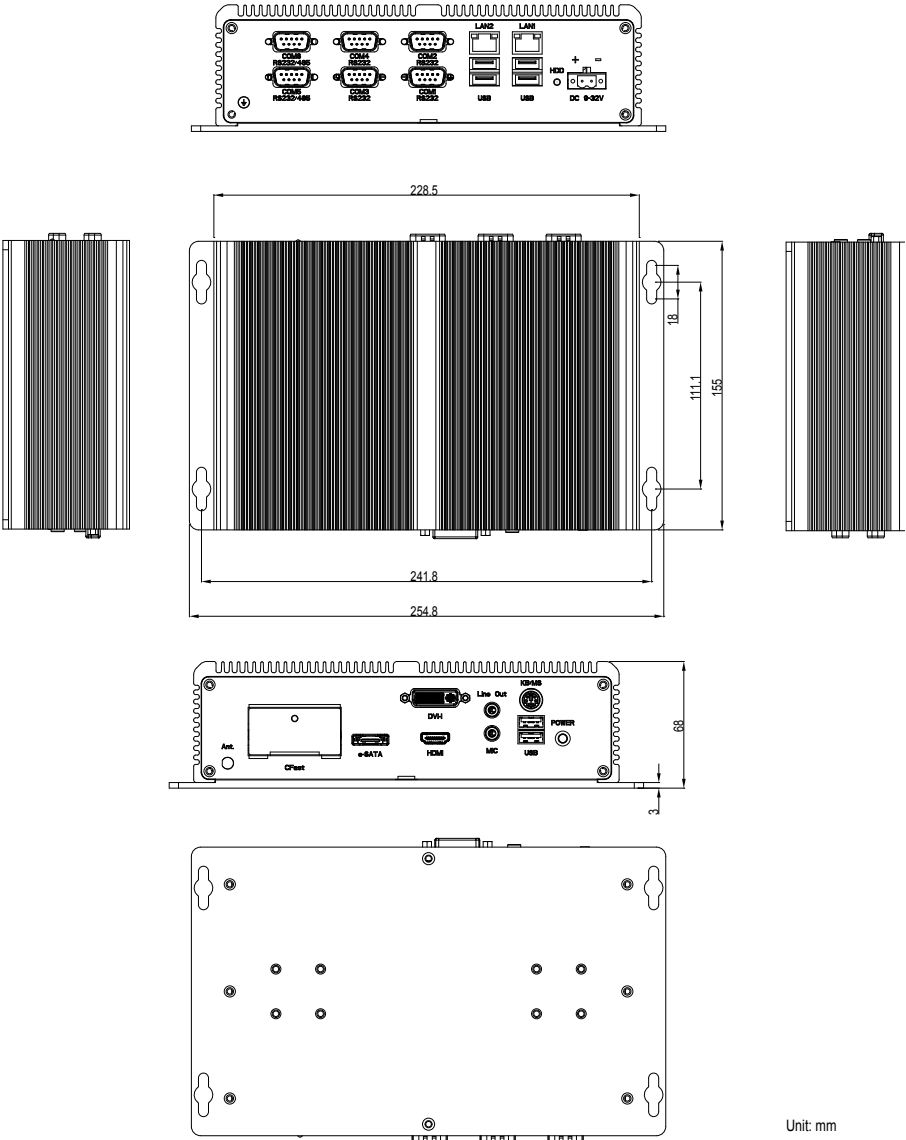
Driver	Path
Chipset	\CHIPSET\INTEL\XP_32_64_WIN7_32_64_SERIES
VGA	\GRAPHICS\INTEL\WIN7_64
LAN	\ETHERNET\WIN7_64
Audio	\AUDIO\REALTEK\WIN7_32_64
ME	\ME

1.8. Specifications

System Kernel	
Processor	Soldered onboard Intel® Core™ i7-2610UE 1.5GHz or Celeron™ 827E 1.4GHz Processor
BIOS	AMI Flash BIOS
Chipset	<ul style="list-style-type: none"> Intel® PCH QM67 for EmETXe-i67M2-2610UE Intel® PCH HM65 for EmETXe-i65M2-827E
Graphics	Integrated Intel® HD Graphics 3000
Memory	2 x 204-pin SO-DIMM sockets, supporting DDR3 1066/1333 MHz up to 8GB SDRAM
Serial ATA	1 x Serial ATA port with 600MB/s HDD transfer rate
Ethernet Controller	<ul style="list-style-type: none"> 1 x Intel® 82579LM Gigabit Ethernet controller w/ iAMT 7.0 1 x Intel® 82583V Gigabit Ethernet controller
Watchdog Timer	1 ~ 255 levels reset
I/O Ports	
Serial Port	<ul style="list-style-type: none"> 4 x COM ports RS-232 2 x COM ports RS-232/485
Expansion Bus	1 x Mini-card slot for optional WiFi module
USB Port	6 x USB 2.0 ports
LAN	2 x RJ-45 ports for Gigabit Ethernet
Video Port	<ul style="list-style-type: none"> 1 x DVI-I receptacle for Digital Video output 1 x HDMI female connector for Digital Video output
Audio	Mic-in, Line-out
External SATA	1 x eSATA port
Storage	
Type	<ul style="list-style-type: none"> 1 x 2.5" drive bay for HDD/SSD 1 x outside accessible CFast socket
Qualification	
FCC	Class A certified
CE	Certified
Environmental	
Operating Temp.	-20 ~ 60°C (-4 ~ 140°F), ambience w/ air flow
Storage Temp.	-40 ~ 85°C (-40 ~ 185°F)
Relative Humidity	5 ~ 95% @ 40°C (non-condensing)

Vibration	1 Grms/5~500Hz/random operation, CFast, 1G/SDD
Shock	Operating 40G (11ms), Non-operating 80G with SSD Operating 20G (11ms), Non-operating 60G with HDD
Mechanical	
Construction	Aluminum alloy
Mounting	DIN-rail mount & wall mount
Weight	2.87 kg (6.32 lb) (Bare-bone)
Dimensions (W x D x H)	228.5 x 155 x 65 mm (8.99" x 6.10" x 2.55")
Power Requirement	
Power Input	DC 9-32V input
Power Consumption	Max. 38W

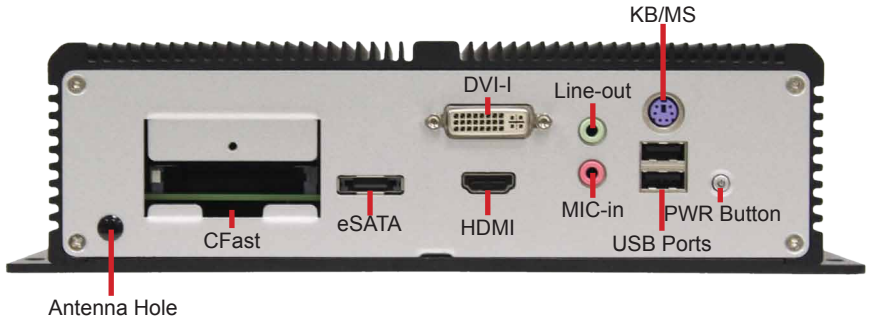
1.9. Dimensions



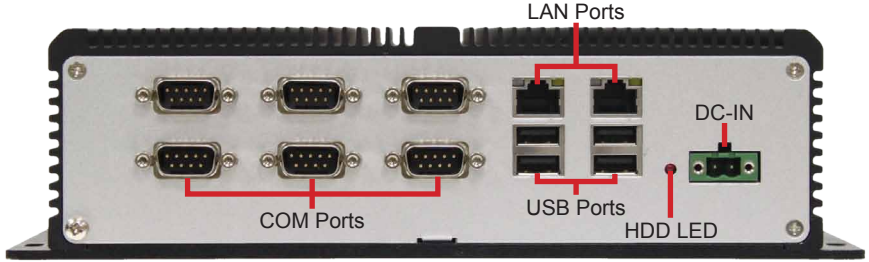
1.10. External Controls and Connectors

Take a look around the computer and find the external controls and connectors.

Front View



Rear View



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Chapter 2

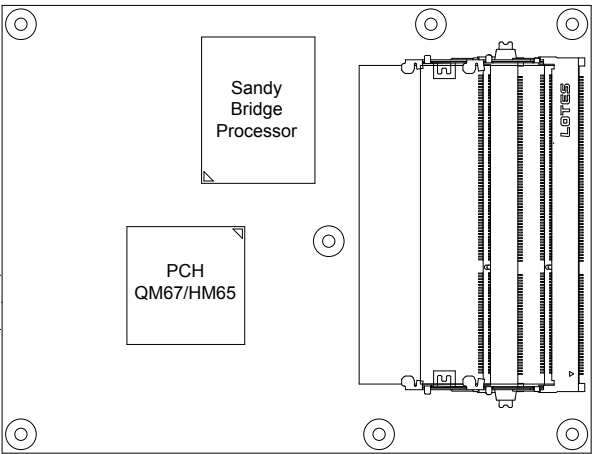
Engine of the Computer

2.1. Board Layout

The CPU board of either EmETXe-i67M2 or EmETXe-i65M2 and the carrier board PBC-9004 together form the engine of the ELIT-1650.

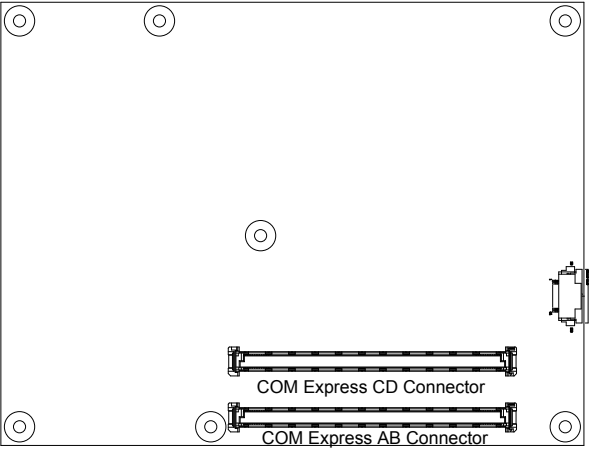
2.1.1. CPU Board

Top View



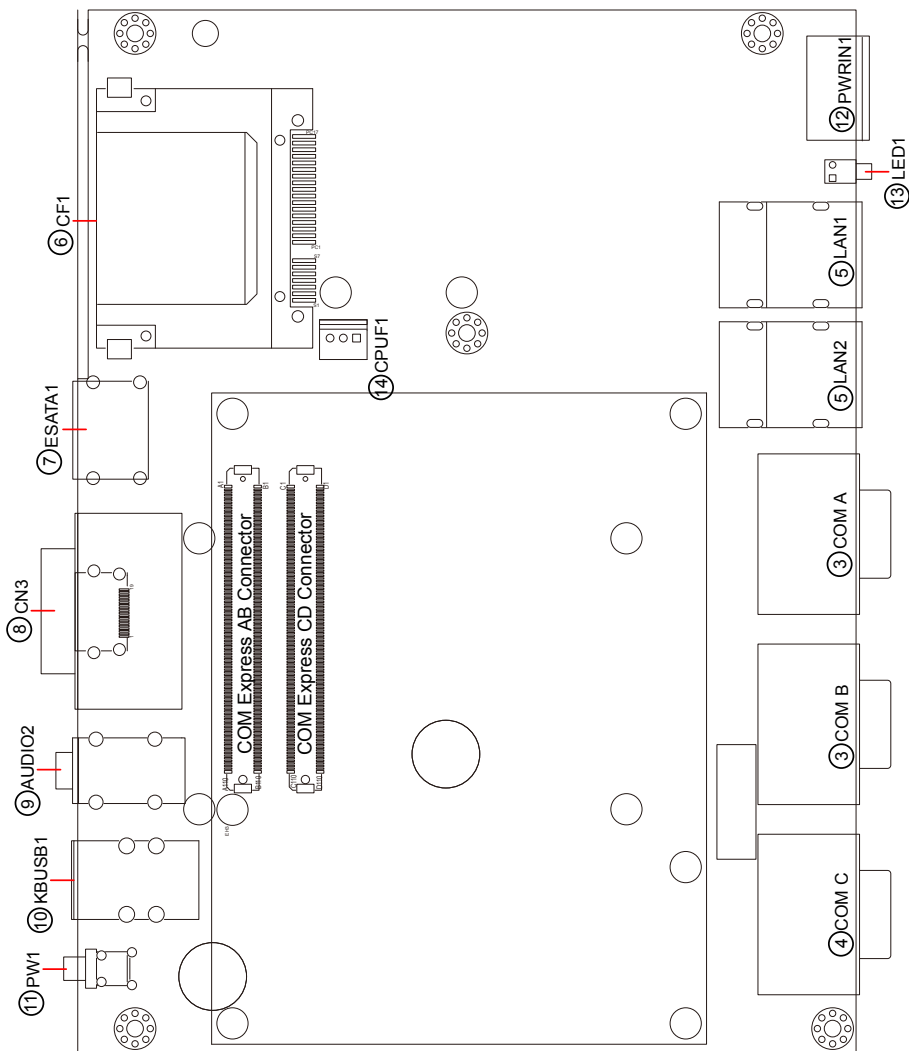
Bottom View

COM Express® AB Connector
COM Express® CD Connector

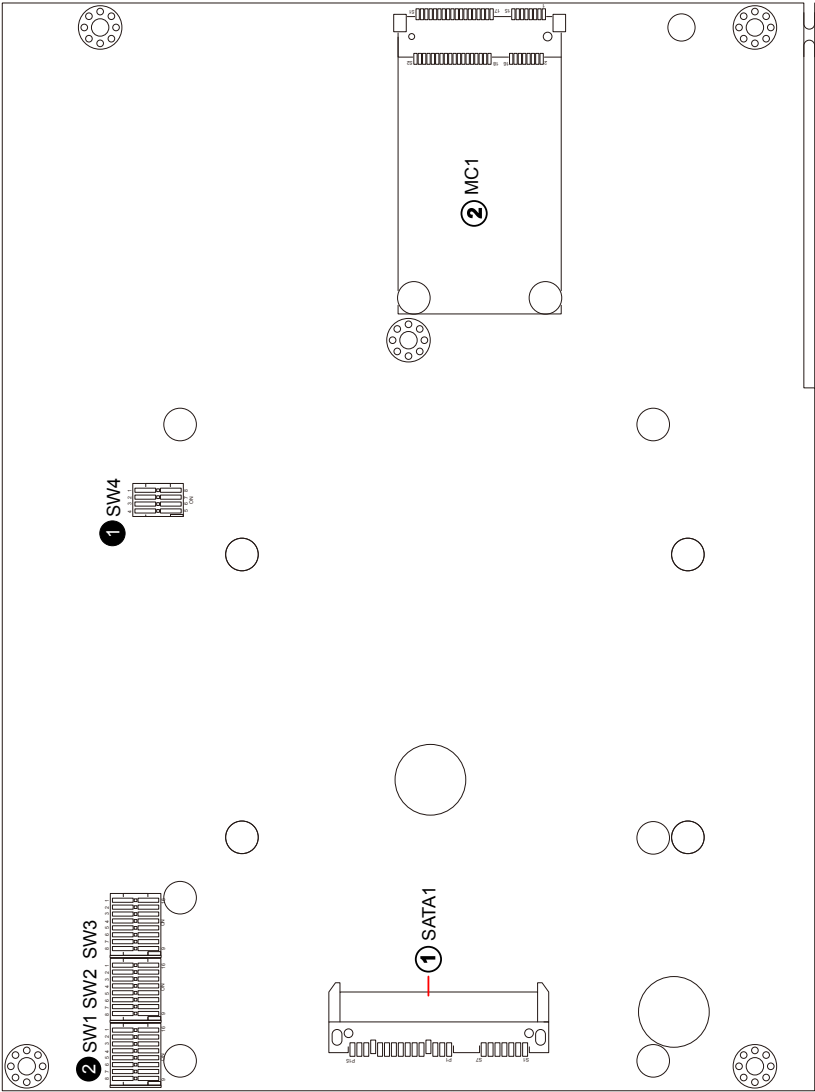


2.1.2. Carrier Board

PBC-9004: Board Top



PBC-9004: Board Bottom



2.2. DIP Switches and Connectors

2.2.1. List of DIP Switches and Connectors

DIP Switches

Board Side	No.	Label	Function
Bottom	❶	SW4	Clears/keeps CMOS setting
			Selects the BIOS from the CPU board or carrier board.
			Switches power supply between AT and ATX modes.
Bottom	❷	SW1~3	Sets COM5~6 to RS-232 or RS-485.

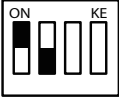
Connectors

Board Side	No.	Label	Description
Bottom	❶	SATA1	Serial ATA connectors
Bottom	❷	MC1	Mini-card interface connector
Top	❸	COM A/B	COM1~4 RS-232 serial ports
Top	❹	COM C	COM5~6 RS-232/485 serial ports
Top	❺	LAN1~2	Ethernet connectors (including USB connectors)
Top	❻	CF1	CFast slot
Top	❼	ESATA1	External serial ATA connector
Top	❽	CN3	HDMI and DVI-I connectors
Top	❾	AUDIO2	Audio jack connector (line-out/mic-in)
Top	❿	KBUSB1	PS/2 keyboard and mouse (including USB connectors)
Top	⓫	PW1	Power button
Top	⓬	PWRIN1	DC power input
Top	⓭	LED1	HDD status LED
Top	⓮	CPUF1	CPU fan connector

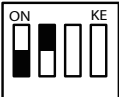
2.2.2. DIP Switch Setting

2.2.2.1. SW4 ❶: Clears/Keeps CMOS Setting

The SW4 is a 8-pin and 4-toggle switch. It relies on its toggles 1 and 2 to clear/keep the CMOS setting of the computer.

	Toggle	Position	Function	Setting
SW4	1	On	Keeps CMOS setting (default)	
	2	Off		

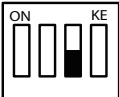
Toggle 1 2 3 4

	Toggle	Position	Function	Setting
SW4	1	Off	Clears CMOS setting	
	2	On		

Toggle 1 2 3 4

2.2.2.2. SW4 ❷: Sets Power Supply Mode

It relies on SW4's toggles 3 to switch the power supply mode between AT and ATX modes.

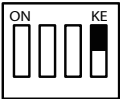
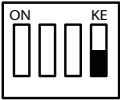
	Toggle	Position	Function	Setting
SW4	3	Off	Sets the power supply to ATX mode (default)	
	3	On	Sets the power supply to AT mode	

Toggle 1 2 3 4

Toggle 1 2 3 4

2.2.2.3. SW4 ①: Selects BIOS from CPU Board / Carrier Board

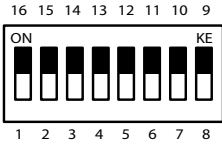
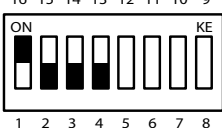
It relies on SW4's toggle 4 to select the BIOS from either the CPU board or the carrier board.

	Toggle	Position	Function	Setting
SW4	4	On	Selects the BIOS from the CPU board	
	4	Off	Selects the BIOS from te carrier boards (default)	


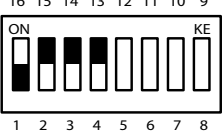
2.2.2.4. SW1, SW3 ②: COM5 Data Transmission Interface Setting

It relies on SW1 and SW3 to set the data transmission interface for COM5. To set COM5 to RS-232 or RS-485, apply the following setting:

► RS-232 (Default)

	Toggle	Pins	Position	Setting
SW1	1	1 & 16	On	
	2	2 & 15	On	
	3	3 & 14	On	
	4	4 & 13	On	
	5	5 & 12	On	
	6	6 & 11	On	
	7	7 & 10	On	
	8	8 & 9	On	
SW3	1	1 & 16	On	
	2	2 & 15	Off	
	3	3 & 14	Off	
	4	4 & 13	Off	

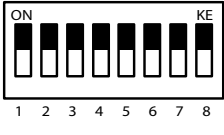
► RS-485

SW1	Toggle	Pins	Position	<div>Setting</div> 	
	1	1 & 16	Off		
	2	2 & 15	Off		
	3	3 & 14	Off		
	4	4 & 13	Off		
	5	5 & 12	Off		
	6	6 & 11	Off		
	7	7 & 10	Off		
	8	8 & 9	Off		
SW3	Toggle	Pins	Position	<div>Setting</div> 	
	1	1 & 16	Off		
	2	2 & 15	On		
	3	3 & 14	On		
	4	4 & 13	On		

2.2.2.5. SW2, SW3 ②: COM6 Data Transmission Interface Setting

It relies on SW2 and SW3 to set the data transmission interface for COM6. To set COM6 to RS-232 or RS-485, apply the following setting:

► RS-232 (Default)

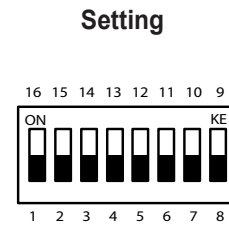
SW2	Toggle	Pins	Position	<div>Setting</div> 	
	1	1 & 16	On		
	2	2 & 15	On		
	3	3 & 14	On		
	4	4 & 13	On		
	5	5 & 12	On		
	6	6 & 11	On		
	7	7 & 10	On		
	8	8 & 9	On		

	Toggle	Pins	Position
SW3	5	5 & 12	On
	6	6 & 11	Off
	7	7 & 10	Off
	8	8 & 9	Off

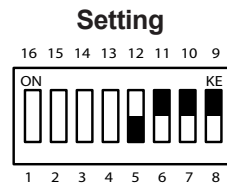


► RS-485

	Toggle	Pins	Position
SW2	1	1 & 16	Off
	2	2 & 15	Off
	3	3 & 14	Off
	4	4 & 13	Off
	5	5 & 12	Off
	6	6 & 11	Off
	7	7 & 10	Off
	8	8 & 9	Off



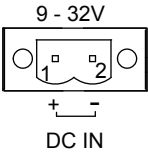
	Toggle	Pins	Position
SW3	5	5 & 12	Off
	6	6 & 11	On
	7	7 & 10	On
	8	8 & 9	On



2.2.3. Pin Assignment for Connectors

PWRIN1 ⑫: DC Power Input

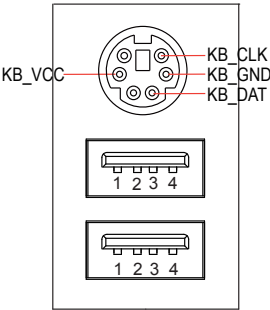
Pin	Description
1	PWRIN1_VCC
2	C-GND



KBUSB1 ⑩: PS/2 Keyboard and USB Stacked Connectors

Connector type: 6-pin Mini-DIN/Stacked USB type A connector

USB Pin	Description
1	+5V
2	USB-
3	USB+
4	GND

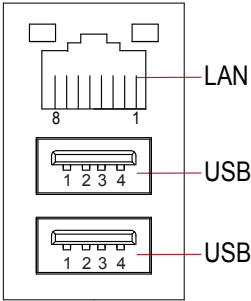


LAN1~2 ⑤: LAN + USB Stacked Connectors

This connector supports USB 2.0 x 2 (USB0, 1) & 10/100Mbps or Gigabit RJ-45 Ethernet connection.

LAN (RJ-45)

Pin	Description
1	MDI0+
2	MDI0-
3	MDI1+
4	MDI1-
5	MDI2+
6	MDI2-
7	MDI3+
8	MDI3-



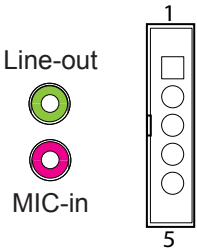
USB (Type A Connector)

Pin	Description
1	+5V
2	USB-
3	USB+
4	GND

AUDIO2 ⑨: Audio Jacks

The jacks support HD '97 audio. The green jack is line-out jack while the pink one is the mic-in.

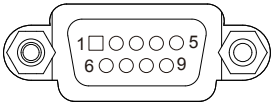
Pin	Description
1	GND
2	R
3	HP-IN
4	GND
5	L



COM A/B/C ③④: Stacked Male Type DSUB9 Connectors

Serial ports 1 ~ 6

RS232 (COM 1~6)	Pin	Description	Pin	Description
	1	DCD1	2	RXD1
	3	TXD1	4	DTR1
	5	GND	6	DSR1
	7	RTS1	8	CTS1
	9	RI1	10	NC

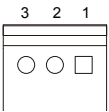


RS485 (COM 5~6 only)	Pin	Description	Pin	Description
	1	485-	2	485+
	3	NC	4	NC
	5	GND	6	NC
	7	NC	8	NC
	9	NC	10	NC

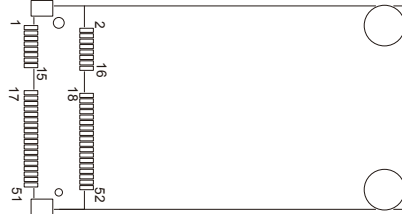
CPUF1 ⑭: Reserved Fan Connector

Connector Type: Onboard 3-pin wafer connector for the system fan. The fan must be a +12V fan.

Pin	Description
1	GND
2	+12V
3	Fan_Detect



MC1 ②: Mini-card Slot

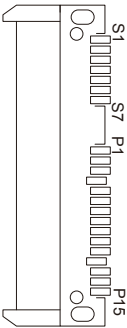


Pin	Description	Pin	Description
1	Wake	2	+3.3V
3	COEX1	4	GND
5	COEX2	6	+1.5V
7	CLKREQ#	8	UIM_PWR
9	GND	10	UIM_DATA
11	REFCLK-	12	UIM_CLK
13	REFCLK+	14	UIM_RESET
15	GND	16	UIM_VPP
17	UIM_C8/Reserved	18	GND
19	UIM_C4/Reserved	20	W_Disable#
21	GND	22	PERST#
23	PERn0	24	+3.3V
25	PERp0	26	GND
27	GND	28	+1.5V
29	GND	30	SMB_CLK
31	PETn0	32	SMB_DATA
33	PETp0	34	GND
35	GND	36	USB_D-
37	GND	38	USB_D+
39	+3.3V	40	GND
41	+3.3V	42	LED_WWAN#
43	GND	44	LED_WLAN#
45	Reserved	46	LED_WPAN#
47	Reserved	48	+1.5V
49	Reserved	50	GND
51	Reserved	52	+3.3V

SATA1 ①: Serial ATA Connector

Connector Type: Standard 15-pin Serial ATA Connector that supports two SATA ports at 6 Gb/s (SATA1,2)

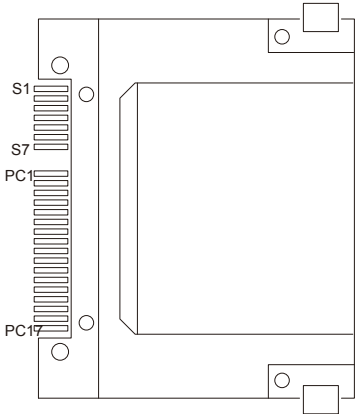
Pin	Description	Pin	Description
S1	GND	P1	+V3.3S
S2	TX+	P2	+V3.3S
S3	TX-	P3	+V3.3S
S4	GND	P4	GND
S5	RX+	P5	GND
S6	RX-	P6	GND
S7	GND	P7	+V5S
		P8	+V5S
		P9	+V5S
		P10	GND
		P11	NC
		P12	GND
		P13	NC
		P14	NC
		P15	NC



CF1 ⑥: CFast Card Connector

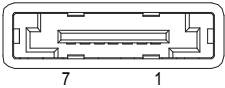
This connector supports two SATA ports at 6 Gb/s (SATA1, 2)

Pin	Description	Pin	Description
S1	GND	PC1	CDI
S2	TX+	PC2	GND
S3	TX-	PC3	NC
S4	GND	PC4	NC
S5	RX+	PC5	NC
S6	RX-	PC6	NC
S7	GND	PC7	GND
		PC8	NC
		PC9	NC
		PC10	NC
		PC11	NC
		PC12	NC
		PC13	CFast VCC
		PC14	CFast VCC
		PC15	GND
		PC16	GND
		PC17	CDO



ESATA1 ⑦: External SATA Connector

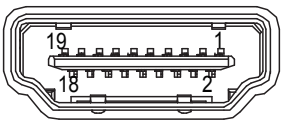
Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX+
6	RX-
7	GND



CN3 ⑧: HDMI and DVI-I Connectors

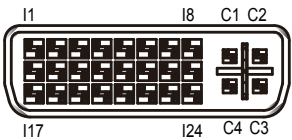
HDMI Connector

Pin	Description	Pin	Description
1	DATA2	2	GND
3	DATA2#	4	DATA1
5	GND	6	DATA1#
7	DATA0	8	GND
9	DATA0#	10	CLK
11	GND	12	CLK#
13	NC	14	NC
15	SPC	16	SPD
17	GND	18	+5V
19	HPD	20	GND
21	GND	22	GND
23	GND		



DVI-I Connector

Pin	Description	Pin	Description
I1	TX2-	I2	TX2+
I3	GND	I4	NC
I5	NC	I6	DVI DDC CLK
I7	DVI DDC DATA	I8	CRT VSYNC
I9	TX1-	I10	TX1+
I11	GND	I12	NC
I13	NC	I14	+5V
I15	CRT HPD	I16	HTPLG
I17	TX0-	I18	TX0+
I19	GND	I20	CRT DDC CLK
I21	CRT DDC DATA	I22	GND
I23	TXC+	I24	TXC-
C1	CRT RED	C2	CRT RED
C3	CRT BLUE	C4	CRT HSYNC
C5	GND	C6	GND



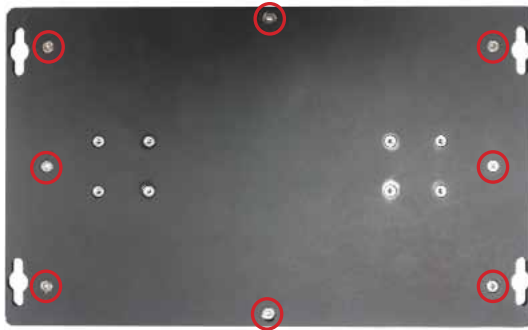
Chapter 3

Installation & Maintenance

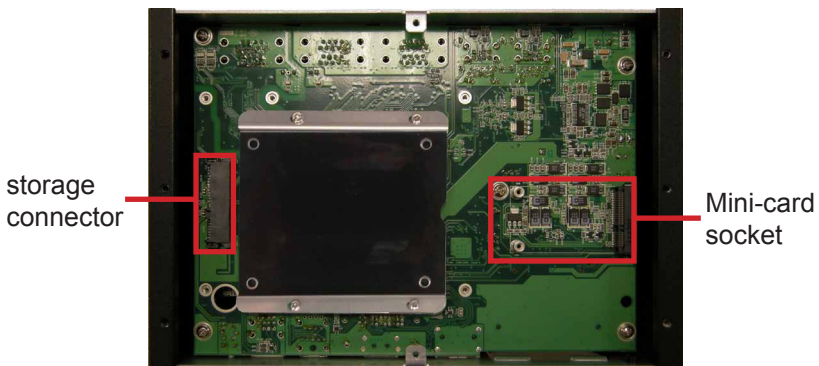
ELIT-1650 is based on modular design for easy setup and maintenance. The following sections will guide you to the simple hardware installations.

3.1. Remove Bottom Cover

1. Place the Box PC upside down on a flat surface.
2. See the picture below. Loosen and remove the eight screws that fixes the bottom cover.



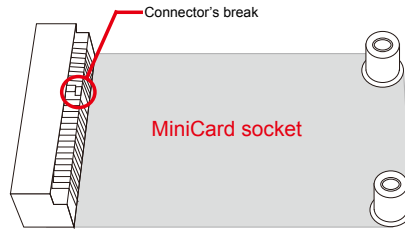
3. Dismount the bottom cover from the computer.



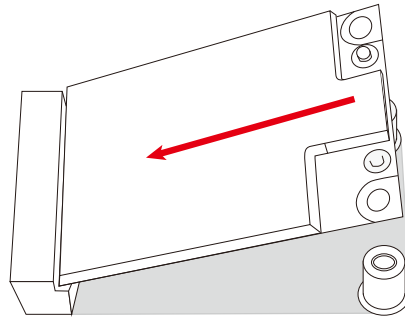
Then the storage bracket and mini-card socket come into view.

3.2. Install Wi-Fi Module (Optional)

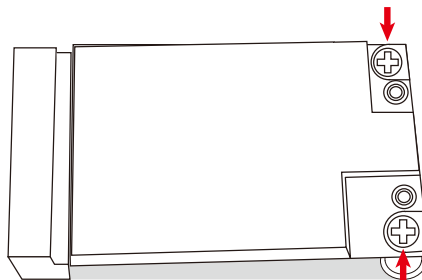
1. Remove the bottom cover as described in [3.1. Remove Bottom Cover](#) on page [28](#).
2. Find the mini-card socket. There is a break on the socket's connector.



3. Plug a Wi-Fi module to the socket's connector by a slanted angle. Note the notch on the Wi-Fi module should meet the break on the connector.



4. Press down the module and fix it in place using two screws.



3.3. Install/Uninstall CFast Card

Note: Be sure to power off the computer before installing or removing the CFast card if the OS is installed on it.

1. Find the door to CFast card socket on the front panel of the computer. Loosen and remove the screw that fixes the door.



2. Once the door is removed, the socket shows.



3. Install a CFast card to the socket.



4. Restore the card door.

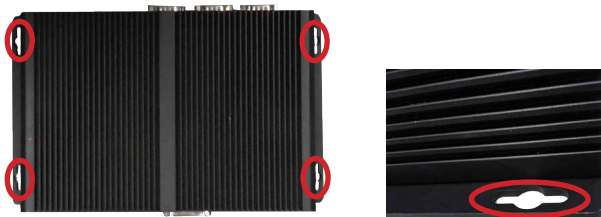
If later it is necessary to uninstall the CFast card, remove the card as described in step 1 and push-eject the card.



Push-eject the card to remove it.

3.4. Wall Mount

The computer comes with 4 cutouts at the four corners on the bottom plate. Use these cutouts to mount the computer to a wall where the computer works.



3.5. DIN-Rail Mount

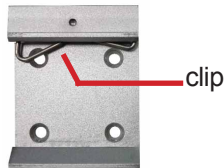
The computer supports only landscape orientation on the DIN-Rail.



Landscape orientation

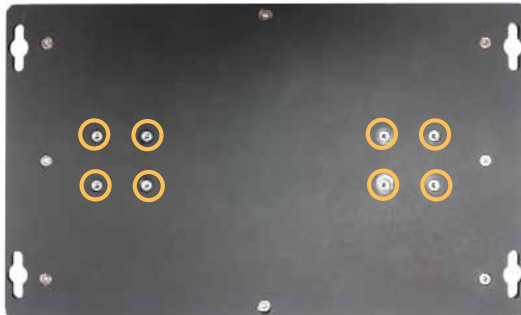
Prepare the DIN-rail adapters, screws and a screwdriver. Each DIN-rail adapter is equipped with a clip to integrate with the DIN-rail.

DIN-rail adapter

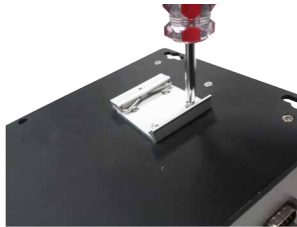


Follow through the steps below to use DIN-rail on the computer:

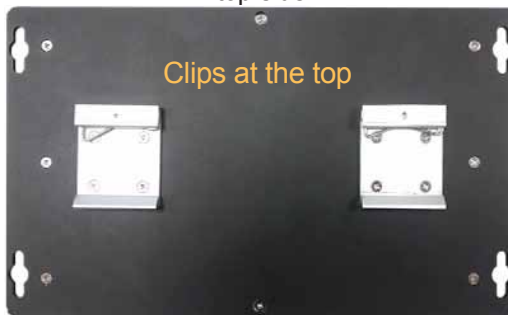
1. Place the computer upside down on a flat surface.
2. Find the 8 screw holes for mounting the DIN rail adapters.



3. Mount the adapters to the computer. Fix them place with 8 screws.

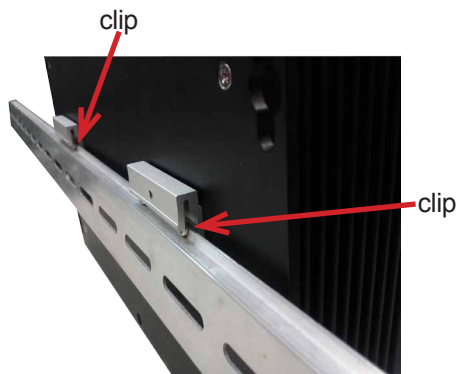


top side



down side

4. Confront the adapter-side with the DIN-rail. Hang the computer onto the DIN-rail by the adapters' clips.



5. Push the down side of the computer to snap the computer completely onto the DIN-rail.



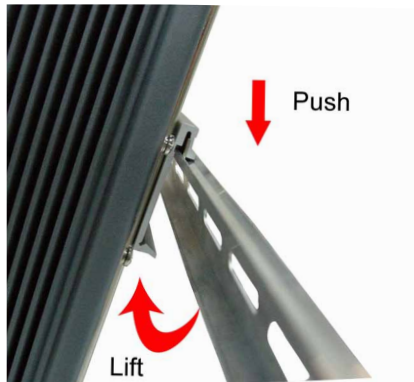
6. If the computer cannot be fixed on the DIN-rail, try again the other side around.

3.5.1. Dismount from DIN-rail

Power off the computer and disconnect all cables from it before dismounting the computer off the DIN-rail.

1. Push down the computer by the top side with both hands.

Then the DIN-rail can be parted from the computer.



2. Completely dismount the computer off the DIN-rail by lifting the computer's bottom side.

3.6. Ground the Computer

Follow the instructions below to ground the computer onto land. Be sure to follow every grounding requirement in your place.



Warning Whenever installing the unit, the ground connection must always be made first of all and disconnected lastly.

1. See the illustration below. Remove the ground screw from the bottom-left of the rear panel.
2. Attach a ground wire to the rear panel with the screw.



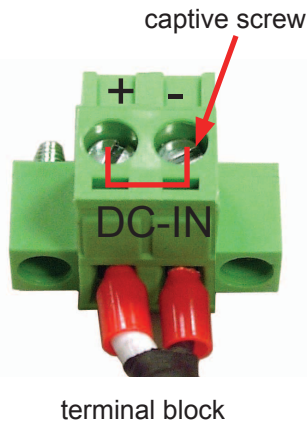
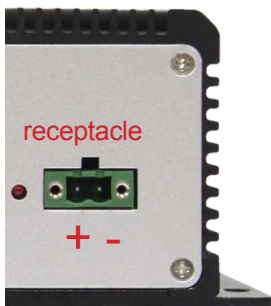
3.7. Wire the DC-Input Power Source



Warning Only trained and qualified personnel are allowed to install or replace this equipment.

Follow the instructions below for connecting the computer to a DC-input power source.

1. Before wiring, make sure the power source is disconnected.
2. Locate the terminal block that shipped in the accessory box with your computer.
3. Using the wire-stripping tool, strip a short piece of insulation from the output wires of the DC power source. The wire gauge must be in the range between 14-22 AWG.
4. Identify the positive and negative feed positions for the terminal block connection. See the symbols printed on the rear panel indicating the polarities and DC-input power range in voltages.
5. Insert the exposed wires into the terminal block plugs. Only wires with insulation should extend from the terminal block plugs. Note that the polarities between the wires and the terminal block plugs must be positive to positive and negative to negative.
6. Use a slotted screwdriver to tighten the captive screws. Plug the terminal block firmly, which wired, into the receptacle on the rear panel.



terminal block

Chapter 4

Driver & AP

4.1. Before Installation

After everything aforementioned is done, proceed to install the necessary drivers and the application so the computer can function for you. The following instructions take Windows XP as the exemplary OS. Different OS may vary slightly regarding driver/AP installation, but generally they are similar. Note to install the drivers as the sequence below:

Chipset→.NET Framework→VGA→Audio→LAN→ME

Follow This Procedure to install all necessary pieces of software in most cases to prevent errors.

Find the drivers & AP for Windows XP and Windows 7 on the CD that goes with your purchase. The paths to find them on CD are tabulated as below.

Windows XP

Driver	Path
Chipset	\\CHIPSET\\INTEL\\XP_32_64_WIN7_32_64_SERIES
VGA	\\GRAPHICS\\INTEL\\XP_32
LAN	\\ETHERNET\\XP_32
Audio	\\AUDIO\\REALTEK\\XP_32_64
ME	\\ME
.NET Framework	\\NET FRAMEWORK

Windows 7 32-bit

Driver	Path
Chipset	\\CHIPSET\\INTEL\\XP_32_64_WIN7_32_64_SERIES
VGA	\\GRAPHICS\\INTEL\\WIN7_32
LAN	\\ETHERNET\\WIN7_32
Audio	\\AUDIO\\REALTEK\\WIN7_32_64
ME	\\ME

Windows 7 64-bit

Driver	Path
Chipset	\\CHIPSET\\INTEL\\XP_32_64_WIN7_32_64_SERIES
VGA	\\GRAPHICS\\INTEL\\WIN7_64
LAN	\\ETHERNET\\WIN7_64
Audio	\\AUDIO\\REALTEK\\WIN7_32_64
ME	\\ME

4.2. Install Drivers

4.2.1. Chipset

1. Run the executable file “setup.exe” at the folder \CHIPSET\INTEL\XP_32_64_WIN7_32_64_SERIES as described in [4.1. Before Installation](#) on page [38](#).

The installation wizard then opens. Click **Next** to proceed.



2. Read the license agreement and click **Yes** to proceed.



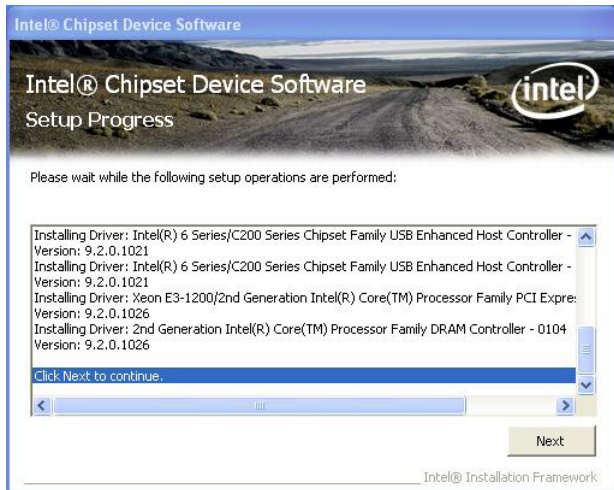
3. Read the readme file and click **Next** to proceed.



The installation wizard then starts with some setup operations.



4. Once the setup operations are through, click **Next** to proceed.



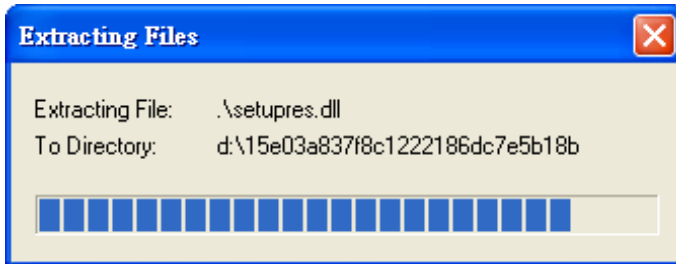
5. Click **Finish** to finish and quit the driver installation.



4.2.2. .Net Framework

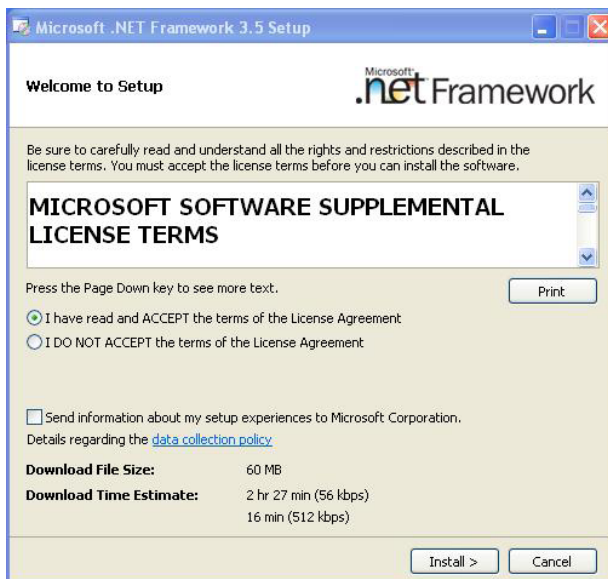
1. Run the executable file “dotnetfx35.exe” at the folder \NET Framework 3.5 as described in [4.1. Before Installation](#) on page [38](#).

Files extraction is then triggered for the driver installation.

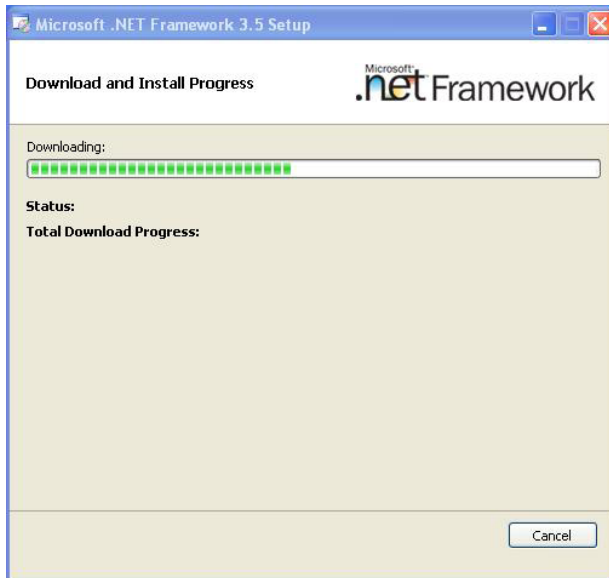


Once the files extraction is through, the installation wizard opens.

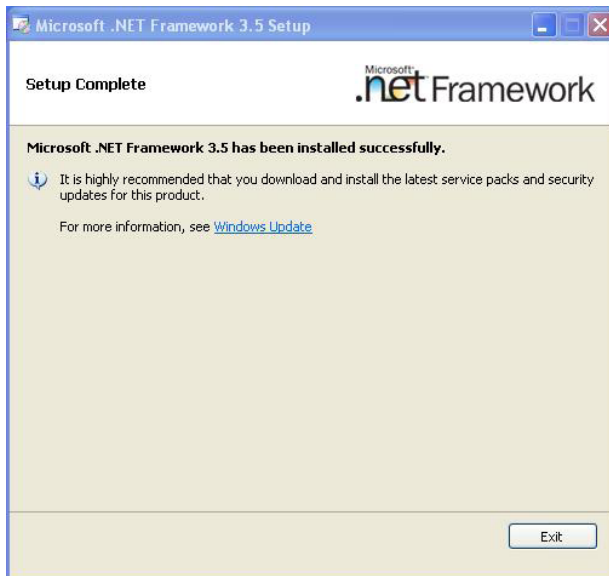
2. Select **I have read and ACCEPT the terms of the License Agreement** and click **Install** to proceed.



3. The driver installation then starts and progresses.



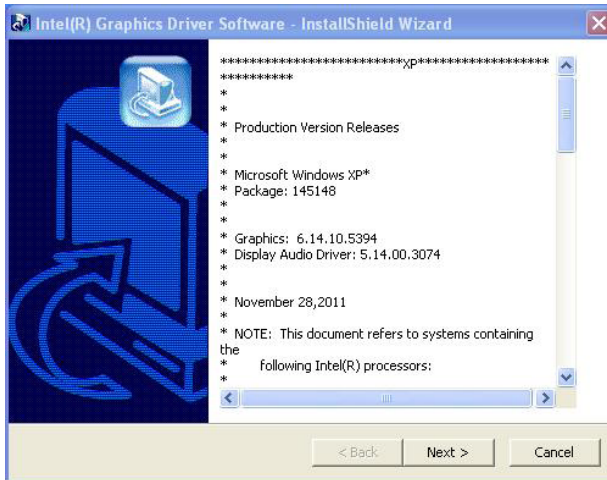
4. Once the installation is through, click **Exit** to finish and quit the installation.



4.2.3. VGA

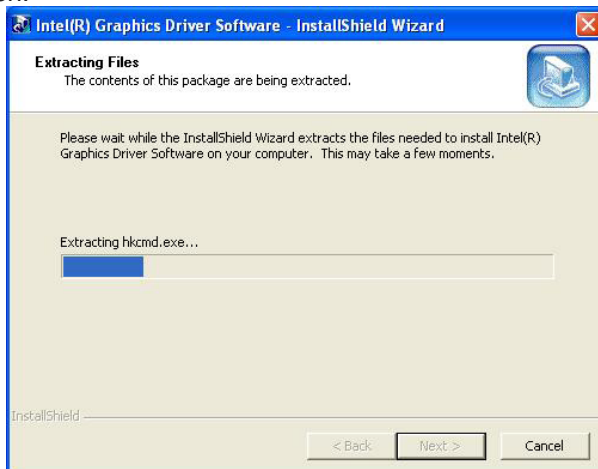
1. Run the executable file “setup.exe” at the folder \GRAPHICS\INTEL\XP_32 as described in [4.1. Before Installation](#) on page [38](#).

The installation wizard then opens.



2. Click **Next** to proceed.

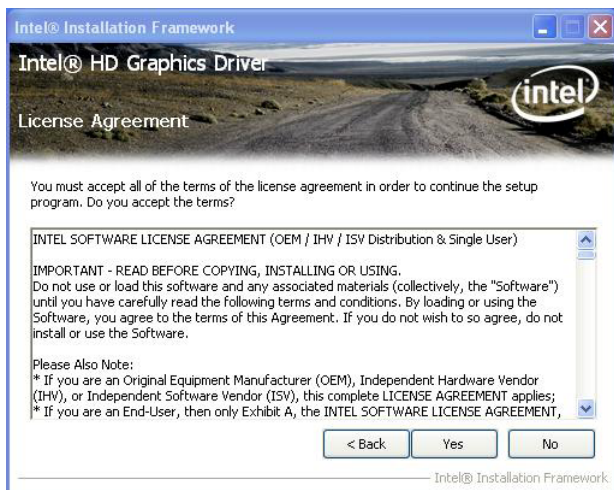
The installation wizard then starts to extract the files required for the installation.



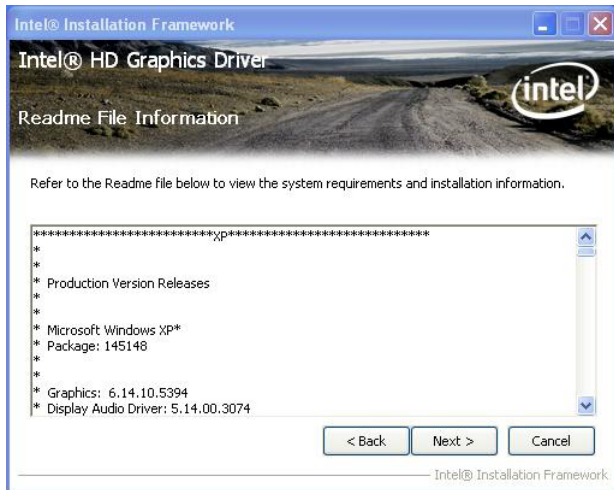
- Once the files extraction is through, click **Next** to proceed.



- Read the license agreement and click **Yes** to proceed.



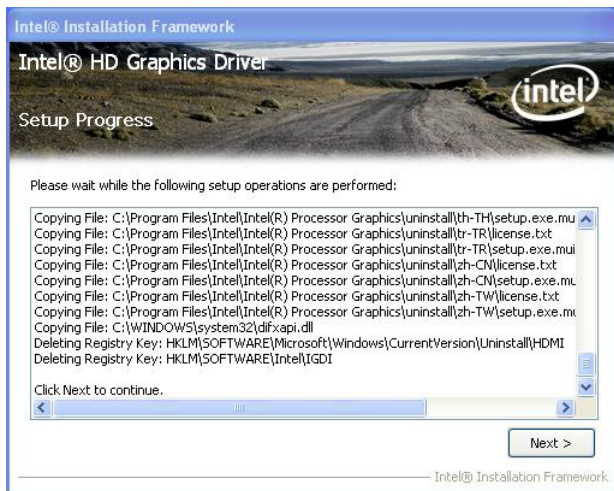
5. Read the readme file and click **Next** to proceed.



Setup then starts and progresses.



6. Once the setup is through, click **Next** to proceed.



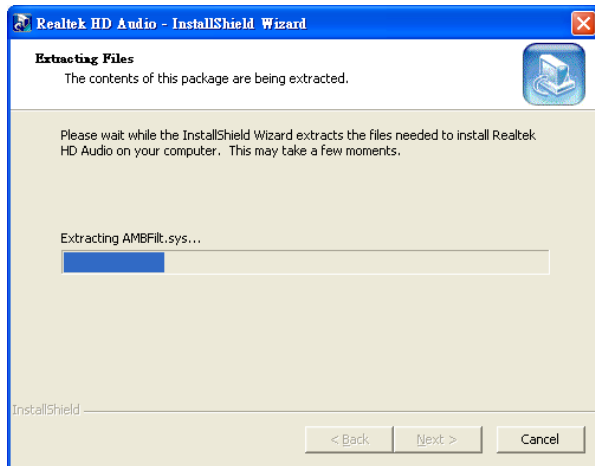
7. Select **Yes, I want to restart this computer now** and click **Finish**.



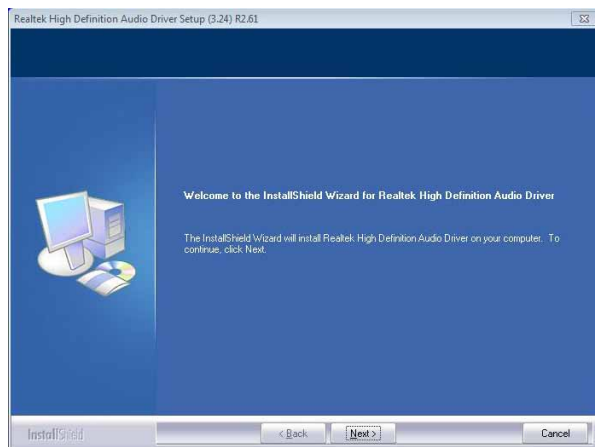
4.2.4. Audio

1. Run the executable file “XP_2000 WDM_R261 32_64 bit.exe” at the folder **\\AUDIO\\REALTEK\\XP_32_64** as described in [4.1. Before Installation](#) on page [38](#).

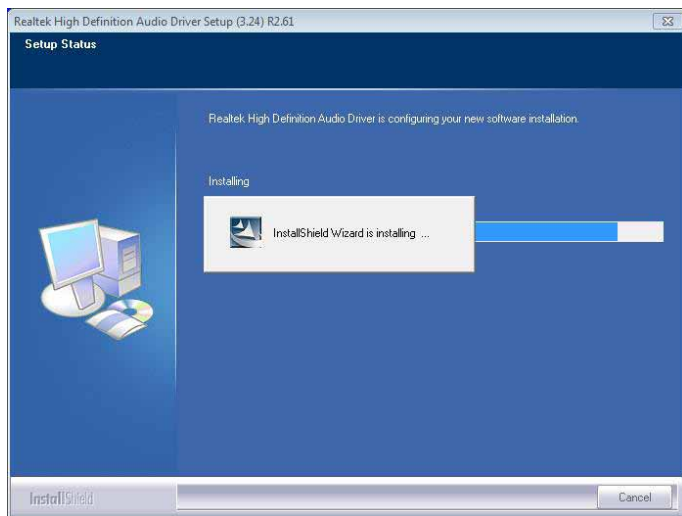
The install wizard then opens and starts to extract the files needed for driver installation.



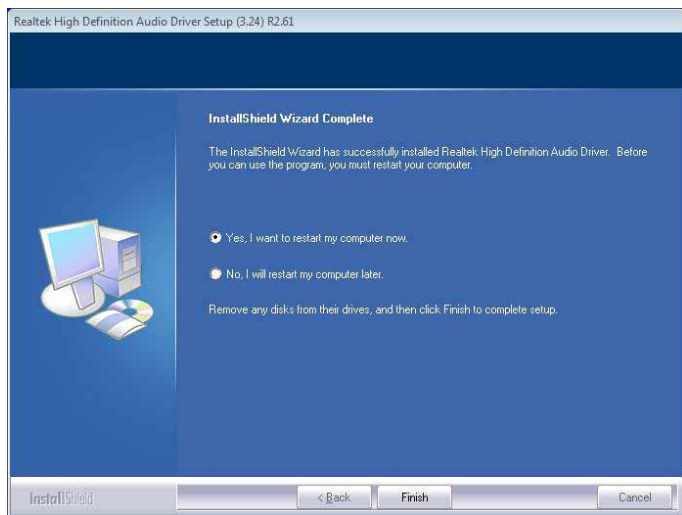
2. Once the file extraction is through, the install wizard prompts to install the audio driver. Click **Next** to proceed.



The installation then starts, progresses and finishes.



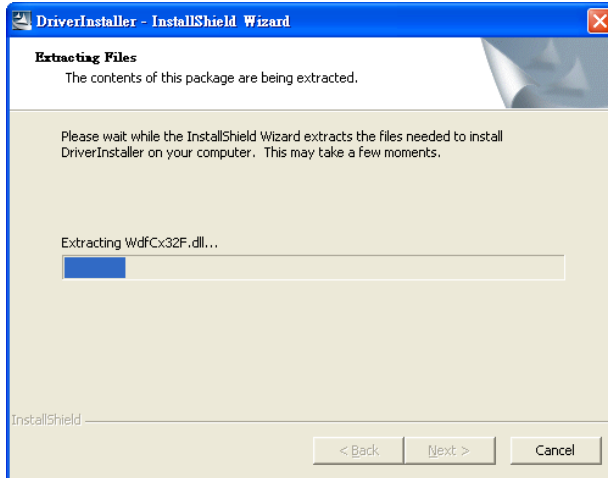
3. Select **Yes, I want to restart my computer now.** and click **Finish** button to restart the system to immediately apply the change, or select **No, I will restart my computer later.**



4.2.5. LAN

1. Run the executable file “PROWin32.exe” at the folder \ETHERNETXP_32 as described in [4.1. Before Installation](#) on page [38](#).

Files extraction then starts and progresses.



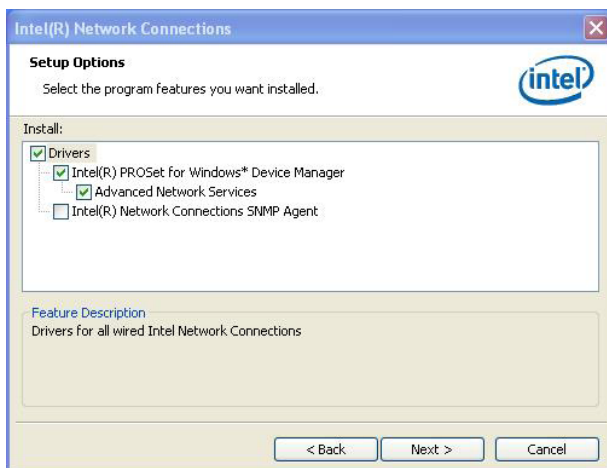
2. Once the files extraction is through, click **Next** to proceed.



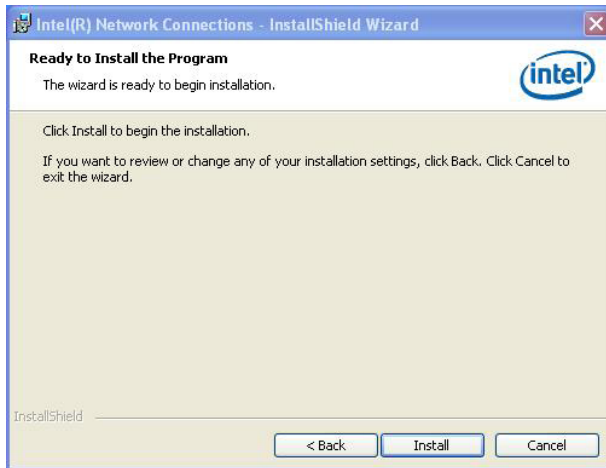
3. Read the agreement. Select **I accept the terms in the License agreement** and click **Next** to proceed.



4. Select the program features to install and click **Next** to proceed.



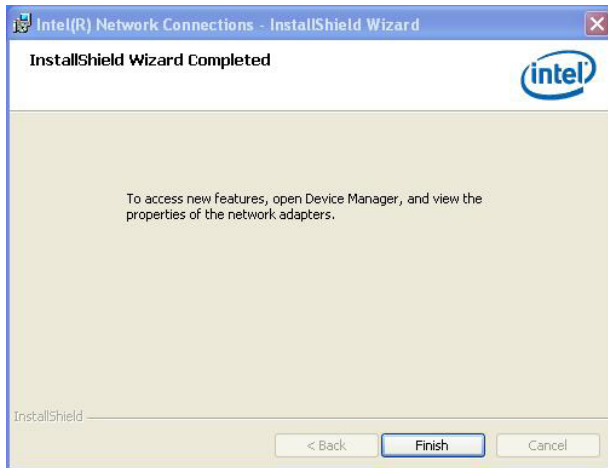
5. Click **Install** to proceed.



The driver installation then starts and progresses.



6. Once the driver installation is through, click **Finish** to finish and quit the installation.



4.2.6. Intel® Management Engine

Intel® Management Engine (Intel® ME) is a microcontroller embedded in the PCH chipset. It uses host-invisible resources to run the management firmware to deliver capable management. The firmware is digitally signed and authenticated by Intel® ME before it is executed so the connection to an authentic device can be sure when a remote management console connects to a client via the network.

Intel® ME-capable chipsets and associated firmware formed the architecture of Intel® AMT. When a remote management console connects to a client through the network, the Intel® ME firmware interacts with the host OS drivers through virtualized PCI devices to deliver the functionality even in the absence of the OS (the “out-of-band” capability). This capability to function even in low host power states (S3, S4 and S5) requires Intel® ME to be able to manage all the resources it needs independent of the host, which is supported by the integrated hardware and software solutions that the PCH chipset brings.

The PCH chipset has a management engine to enable the platform manageability and the key components for the manageability including the interface to LAN and SPI flash components through its integrated Gigabit Ethernet controller (GbE) and SPI flash controller. Intel® Management Engine includes the following manageability functions:

- **IDE-R** - for remote boot and software installation
- **SOL** - redirecting keyboard and text-based display over network connection
- **KVM** - redirecting keyboard, video and mouse over network connection, supersedes SOL when support.
- **ASF** - Alert Specification Format, the PC industry specification.

See also [5.2.5. AMT Configuration](#) on page [68](#).

4.2.6.1. Driver Installation

To make Intel® ME features work correctly on the computer, install the driver by following the steps below.

1. Run the executable file “Setup.exe” at the folder \ME as described in [4.1. Before Installation](#) on page [38](#).
2. Follow the onscreen instructions to go through the installation.

Chapter 5

BIOS

The BIOS Setup utility for ELIT-1650 is featured by American Megatrends Inc 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, press-and-hold the “Delete” key upon powering on the computer.

Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.		
Main Advanced Chipset Boot Security Save & Exit		
BIOS Information BIOS Vendor American Megatrends Core Version 4.6.4.0 Compliency UEFI 2.1 BIOS Version ELit-1650 1.00 Build Date and Time 08/03/2012 17:35:42 System Date [Thu 10/18/2012] System Time [17:14:06] Access Level Administrator		Set the Date. Use Tab to switch between Data elements. →←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit
Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.		

The featured settings are:

Menu	Description
Main	See 5.1. Main on page 58 .
Advanced	See 5.2. Advanced on page 60 .
Chipset	See 5.3. Chipset on page 78 .
Boot	See 5.4. Boot on page 93 .
Security	See 5.5. Security on page 93 .
Save & Exit	See 5.6. Save & Exit on page 95 .

Key Commands

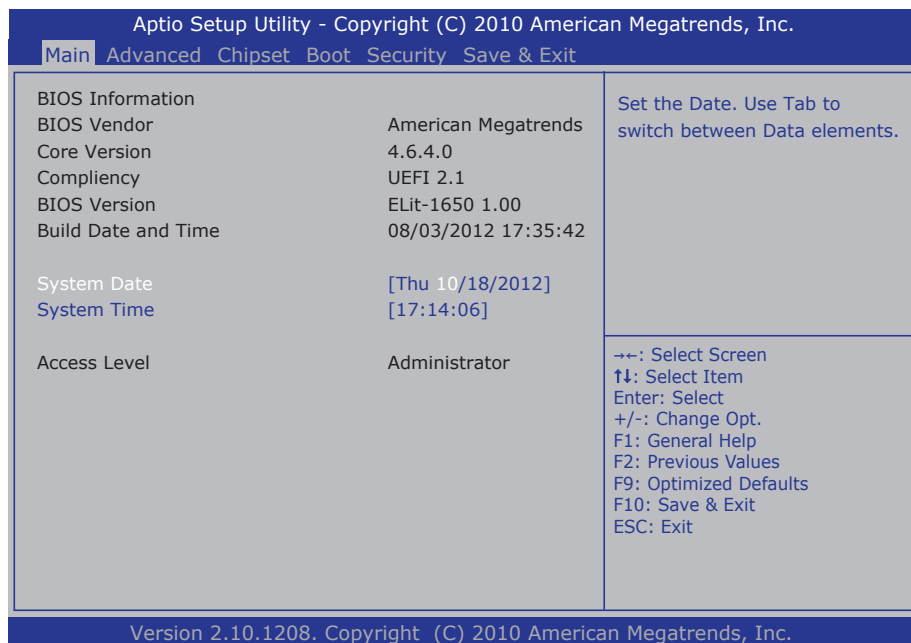
The BIOS Setup utility relies on a keyboard to receive user's instructions. Hit the following keys to navigate within the utility and use the utility.

Keystroke	Function
← →	Moves left/right between the top menus.
↓ ↑	Moves up/down between highlight items.
Enter	Selects an highlighted item/field.
Esc	<ul style="list-style-type: none">▶ 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.

5.1. Main

The **Main** menu features the settings of **System Date** and **System Time** and also displays some BIOS info.



The BIOS info displayed are:

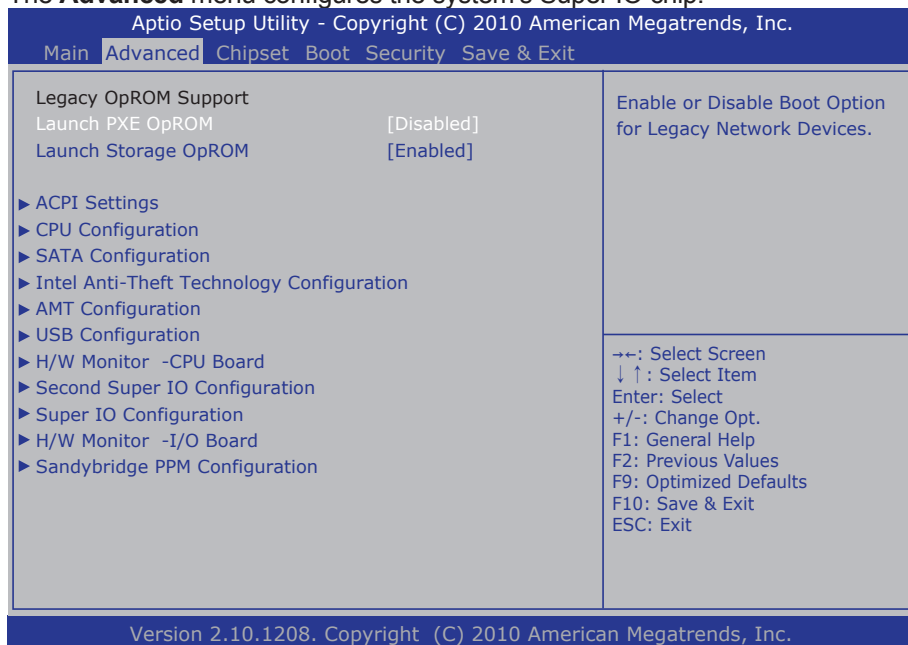
Info Item	Description
BIOS Vendor	Delivers the provider of the BIOS Setup utility.
Core Version	Delivers the version info of the core.
Compliency	Delivers the UEFI support.
Project Version	Delivers the computer's BIOS version info.
Build Date and Time	Delivers the date and time the BIOS Setup utility was made/updated.
Access Level	Delivers the level that the BIOS is being accessed at the moment.

The featured settings are:

Setting	Description
System Time	Sets system time.
System Date	Sets system date.

5.2. Advanced

The **Advanced** menu configures the system's Super IO chip.



The featured settings and submenus are:

Setting	Description
Launch PXE OpROM	Enables/disables the boot option for legacy network devices. ► Disabled is the default.
Launch Storage OpROM	Enables/disables the boot option for the legacy mass storage devices with Option ROM. ► Enabled is the default.
ACPI Settings	See 5.2.1. ACPI Settings on page 61 .
CPU Configuration	See 5.2.2. CPU Configuration on page 62 .
SATA Configuration	See 5.2.3. SATA Configuration on page 63 .
Intel Anti-Theft Technology Configuration	See 5.2.4. Intel® Anti-Theft Technology Configuration on page 67 .
AMT Configuration	See 5.2.5. AMT Configuration on page 68 .
USB Configuration	See 5.2.6. USB Configuration on page 71 .

H/W Monitor -CPU Board	See 5.2.7. H/W Monitor -CPU Board on page 72 .
Second Super IO Configuration	See 5.2.8. Second Super IO Configuration on page 72 .
Super IO Configuration	See 5.2.9. Super IO Configuration on page 75 .
H/W Monitor -I/O Board	See 5.2.10. H/W Monitor -I/O Board on page 76 .
Sandybridge PPM Configuration	See 5.2.11. Sandybridge PPM Configuration on page 76 .

5.2.1. ACPI Settings

ACPI Settings enable users to change the system's ACPI (Advanced Configuration and Power Interface). The featured settings are:

Setting	Description
Enable ACPI Auto Configuration	Enables/disables BIOS' auto configuration of ACPI. ▶ Disabled is the default.
Enable Hibernation	Enables/disables the system to/from hibernation (OS/ S4 Sleep State). ▶ This setting is only available when Enable ACPI Auto Configuration is disabled. ▶ This option may not be effective with some OS. ▶ This setting is enabled by default.
ACPI Sleep State	Sets the highest ACPI sleep state that system enters when the suspend button is hit. ▶ This setting is only available when Enable ACPI Auto Configuration is disabled. ▶ Options available are Suspend Disabled , S1 (CPU Stop Clock) and S3 (Suspend to RAM) . ▶ S1 (CPU Stop Clock) is the default.
Lock Legacy Resources	Enables/disables locking legacy resources. ▶ Disabled is the default.
Power-Supply Type	Sets the power-supply type. ▶ Options available are AT (default) and ATX .

5.2.2. CPU Configuration

Select **CPU Configuration** to identify the CPU and its capabilities by running a report listing the CPU's model name, processor stepping, processor speed, microcode revision, max. processor speed, min. processor speed, processor cores, Intel® Hyper-Threading Technology support, EMT64 support and so on.


And **CPU Configuration** features two settings as below:

Setting	Description
Limit CPUID Maximum	<p>Sets whether the processor should limit the maximum CPUID input value to 03h when the operating system queries it upon startup.</p> <ul style="list-style-type: none">▶ Select Enabled to allow a processor with Intel® Hyper-Threading technology to work with an operating system that doesn't support it.▶ Disabled is the default.
Intel Virtualization Technology	<p>Enables/disables Intel® Virtualization Technology (IVT) extensions that allow multiple operating systems to simultaneously run on the same computer by creating virtual machine, each running its own x86 operating system.</p> <ul style="list-style-type: none">▶ Disabled is the default.

5.2.3. SATA Configuration

SATA Configuration delivers SATA device(s) information and features the settings to control SATA device(s). Featured settings are:

Setting	Description	
SATA Controller(s)	Enables/disables SATA device(s). ▶ Enabled is the default.	
SATA Mode Selection	Configures how SATA controller(s) operate. ▶ Options available are IDE (default) and AHCI .	
Aggressive LPM Support	Enables/disables PCH to aggressively enter LPM (link power management), a power-saving state that helps the disk save power by setting a SATA link to the disk to low-power state when the disk idles (, which means there is no input/output). ▶ Enabled is the default. ▶ This setting is available only when SATA Mode Selection is set to AHCI .	
Software Feature Mask Configuration	This is a submenu to feature the settings regarding RAID (Redundant Array of Inexpensive Disks), OROM (Option ROM) and RST (Rapid Storage Technology). ▶ This submenu is available only when SATA Mode Selection is set to AHCI . The featured settings are:	
	Setting	Description
	RAID0	See 5.2.3.1. RAID0 on page 64.
	RAID1	See 5.2.3.2. RAID1 on page 64.
	RAID10	See 5.2.3.3. RAID10 on page 64.
	RAID5	See 5.2.3.4. RAID5 on page 64.
	Intel Rapid Recovery Technology	See 5.2.3.5. Intel Rapid Recovery Technology on page 65.
	OROM UI and Banner	See 5.2.3.6. OROM UI and Banner on page 65.
	HDD Unlock	See 5.2.3.7. HDD Unlock on page 65.
	LED Locate	See 5.2.3.8. LED Locate on page 65.
	IRRT Only on eSATA	See 5.2.3.9. IRRT Only on eSATA on page 65.

Serial ATA Port 1	Controls Serial ATA features. Each Serial ATA port features the following setting:	
Serial ATA Port 2	Setting	Description
	Port #	See 5.2.3.10. Port # on page 65 .
	Hot Plug	See 5.2.3.11. Hot Plug on page 66 .
Serial ATA Port 3	External SATA	See 5.2.3.12. External SATA on page 66 .
	SATA Device Type	See 5.2.3.13. SATA Device Type on page 66 .
Serial ATA Port 4	Spin Up Device	See 5.2.3.14. Spin Up Device on page 66 .
	 These settings are available only when SATA Mode Selection is set to AHCI .	

5.2.3.1. RAID0

Enables/disables RAID 0 scheme, which features blocks striped, no mirror and no parity.

- **Enabled** is the default.

5.2.3.2. RAID1

Enables/disables RAID 1 scheme, which features blocks mirrored, no stripe and no parity.

- **Enabled** is the default.

5.2.3.3. RAID10

Enables/disables RAID 10 scheme, which features blocks mirrored and striped.

- **Enabled** is the default.

5.2.3.4. RAID5

Enables/disables RAID 5, which features block striped and distributed parity.

- **Enabled** is the default.

5.2.3.5. Intel Rapid Recovery Technology

Enables/disables Intel® Rapid Recovery Technology, which auto-switches the storage to the mirrored disk in case the primary disk fails. IRRT also duplicates all data on the mirrored disk back to the newly installed primary disk.

- ▶ **Enabled** is the default.

5.2.3.6. OROM UI and Banner

Controls the behavior of Intel® RST OROM UI and the banner splash screen that displays during POST at system boot-up.

- ▶ Select **Enabled** to show the OROM UI of SATA devices.
- ▶ Select **Disabled** to show neither OROM banner nor information if all disks and RAID volumes are normal.

5.2.3.7. HDD Unlock

If the HDD password unlock is enabled in the OS, select **Enabled** (, which is also the default).

5.2.3.8. LED Locate

If the LED/SGPIO hardware is attached and the ping to locate the feature is enabled in the OS, select **Enabled** (, which is also the default).

5.2.3.9. IRRT Only on eSATA

Select **Enabled** to have only the IRRT volume span the internal and eSATA drives.

Select **Disabled** to have any RAID volume span the internal and eSATA drives.

- ▶ **Enabled** is the default.

5.2.3.10. Port

Enables/disables the SATA port.

- ▶ **Enabled** is the default.

5.2.3.11. Hot Plug

Sets whether to make the SATA port an hot pluggable one.

- ▶ **Disabled** is the default.

5.2.3.12. External SATA

Enables/disables external SATA support.

- ▶ **Disabled** is the default.

5.2.3.13. SATA Device Type

Defines whether the SATA port is connected to a **Solid State Drive** or **Hard Disk Drive**.

- ▶ **Hard Disk Drive** is the default.

5.2.3.14. Spin Up Device

For the platforms with numerous Serial ATA hard disk drives, the power issue regarding the electrical current load during system power-up is often critical. This setting enables/disables “Staggered Spin Up”, which provides a simple mechanism for SATA HBAs (host bus adapters) to sequence disk drive initialization and spin-up.

- ▶ **Disabled** is the default.

5.2.4. Intel® Anti-Theft Technology Configuration

The computer is Intel® Anti-Theft Technology-enabled. When working with an Intel® AT-enabled service, the technology can keep the data stored in the computer safe and secure when the computer is lost or stolen.

See <http://www.intel.com/content/www/us/en/architecture-and-technology/anti-theft/anti-theft-service-providers.html> to know the Intel® AT service providers.

The submenu features the following settings regarding Intel® AT:

Setting	Description
Intel Anti-Theft Technology	Enables/disables Intel® AT in BIOS for testing only. ▶ Disabled is the default.
Intel Anti-Theft Technology Recovery	Sets how many times is recovery attempted. ▶ 3 is the default.
Enter Intel AT Suspend Mode	Sets whether the platform can enter Intel® AT suspend mode. ▶ Disabled is the default.

5.2.5. AMT Configuration

Intel® Active Management Technology (Intel® AMT) is a hardware-based solution that uses out-of-band communication for basic management of client systems, which allows a system administrator to monitor and manage the computers and other network equipment by remote control even if the hard drive is crashed, the system is turned off or the operation system is locked.

This submenu features the necessary BIOS extension settings as listed below to make use of Intel® AMT.

Setting	Description
Intel AMT	<p>Enables/disables Intel® Active Management Technology BIOS extensions.</p> <ul style="list-style-type: none"> ▶ iAMT hardware is always enabled. ▶ This setting only controls BIOS extension execution. ▶ Enabled is the default. ▶ When enabled, additional firmware is required in the SPI device.
Intel AMT Setup Prompt	<p>Sets whether to show the prompt to enter Intel® AMT setup during POST.</p> <ul style="list-style-type: none"> ▶ Enabled is the default. ▶ Select Disabled to disable accessing Intel® AMT setup.
BIOS Hotkey Pressed	<p>Enables/disables the hotkey for AMT BIOS setting, which is normally Ctrl + P.</p> <ul style="list-style-type: none"> ▶ When enabled, AMT setup is presented each time the system boots up. ▶ Disabled is the default.
MEBx Selection Screen	<p>Enables/disables MEBx (Intel® Management Engine BIOS extension) selection screen.</p> <ul style="list-style-type: none"> ▶ Disabled is the default.
Verbose MEBx Output	<p>Enables/disables verbose MEBx output.</p> <ul style="list-style-type: none"> ▶ Enabled is the default.
Hide Un-Configure ME Confirmation	<p>Enables/disables the password confirmation when undoing ME configuration.</p> <ul style="list-style-type: none"> ▶ Disabled is the default.

MEBx Debug Message Output	Enables/disables MEBx debug message output. ▶ Disabled is the default.
Un-configure ME	Enables/disables undoing ME configuration. ▶ Disabled is the default.
Intel AMT Password Write Enabled	Sets whether to make Intel® AMT password writable. ▶ Select Enabled to make the password writable, which is the default.
AMT Wait Timer	Sets the time to wait before sending ASF_GET_BOOT_OPTIONS. ▶ Enabled is the default.
ASF	Enables/disables Alert Specification Format, a DMTF (Distributed Management Task Force) standard for remote monitoring, management and control of computer system in both OS-present and OS-absent environments. ▶ Enabled is the default.
Activate Remote Assistance Process	Enables/disables CIRA (Client-Initiated Remote Access) boot. ▶ Disabled is the default.
USB Configure	Enables/disables USB configure function. ▶ Enabled is the default.
PET Progress	Sets whether to receive PET (Platform Event Traps) or not. ▶ PET is an event arising directly from platform firmware (BIOS) or platform hardware (ASIC, chipset or microcontroller) independently of the state of the operating system or system management hardware. ▶ Enabled is the default.
Intel AMT SPI Protected	Enables/disables the write protect of Intel® AMT SPI (Serial Peripheral Interface). ▶ Disabled is the default.

AMT CIRA Timeout	<p>Customizes the timeout for the establishment of MPS connection.</p> <ul style="list-style-type: none">▶ This setting is only available when Activate Remote Assistance Process is enabled.▶ Set it to 0 to use the default timeout value of 60 seconds.▶ Set it to 255 to have MEBx wait until the connection succeeds.▶ CIRA means “Client Initiated Remote Access”.
WatchDog	<p>Enables/disables watchdog timer.</p> <ul style="list-style-type: none">▶ Disabled is the default.
OS Timer	<p>Defines OS watchdog timer.</p> <ul style="list-style-type: none">▶ This setting is only available when WatchDog is enabled.
BIOS Timer	<p>Defines BIOS watchdog timer.</p> <ul style="list-style-type: none">▶ This setting is only available when WatchDog is enabled.

5.2.6. USB Configuration

USB Configuration displays the info of the connected USB devices and sets USB parameters. The featured settings are:

Setting	Description
Legacy USB Support	<p>Enables/disables legacy USB support.</p> <ul style="list-style-type: none"> ▶ Options available are Enabled (default), Disabled and Auto. ▶ Select Auto to disable legacy support if no USB device are connected. ▶ Select Disabled to keep USB devices available only for EFI applications.
EHCI Hand-off	<p>Enables/disables a workaround for the operating systems that have no EHCI hand-off support.</p> <ul style="list-style-type: none"> ▶ Disabled is the default.
USB Beep Switch	<p>Enables/disables USB beep sound.</p> <ul style="list-style-type: none"> ▶ Enabled is the default.
USB transfer time-out	<p>Sets the timeout for Control/Bulk/Interrupt transfers.</p> <ul style="list-style-type: none"> ▶ Options available are 1 sec, 5 sec, 10 sec and 20 sec (default).
Device reset time-out	<p>Sets the time for POST to wait for a USB device to start.</p> <ul style="list-style-type: none"> ▶ Options available are 10 sec, 20 sec (default), 30 sec and 40 sec.
Device power-up delay	<p>Sets the maximum time elapses before a USB device reports itself to the controller.</p> <ul style="list-style-type: none"> ▶ Select Auto (default) to apply a 100 ms delay to the root port and make the hub port use the delay from Hub descriptor. ▶ Select Manual to customize a delay from 1 to 40 seconds.

5.2.7. H/W Monitor -CPU Board

H/W Monitor -CPU Board monitors the CPU board's hardware status. Select it to run a report of the info including CPU temperature, system temperature, VCC, VCORE and so on.

5.2.8. Second Super IO Configuration

Second Super IO Configuration is a submenu to configure the Super IO chip Fintek F81216. It configures the serial port 3, 4, 5 and 6 on the system. The featured settings are:

Setting	Description	
Serial Port 3 Configuration	The featured settings are:	
	Setting	Description
	Serial Port	Enables/disables the serial port. ▶ Enabled is the default.
	Change Settings	Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ▶ Options available are: Auto IO=3E8h; IRQ=10; (default) IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;

Serial Port 4 Configuration	The featured settings are:	
	Setting	Description
	Serial Port	Enables/disables the serial port. ▶ Enabled is the default.
Serial Port 5 Configuration	Change Settings	Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ▶ Options available are: Auto IO=2E8h; IRQ=10; (default) IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
	Serial Port	Enables/disables the serial port. ▶ Enabled is the default.
	Change Settings	Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ▶ Options available are: Auto IO=2E0h; IRQ=10; (default) IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;
	COM5 RS485 AutoFlow	Enables/disables RS485 autoflow control for COM5. ▶ Disabled is the default.

Serial Port 6 Configuration	The featured settings are:	
	Setting	Description
	Serial Port	Enables/disables the serial port. ▶ Enabled is the default.
	Change Settings	Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ▶ Options available are: Auto IO=2F0h; IRQ=10; (default) IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F0h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E0h; IRQ=3,4,5,6,7,9,10,11,12;
	COM6 RS485 AutoFlow	Enables/disables RS485 autoflow control for COM6. ▶ Disabled is the default.

5.2.9. Super IO Configuration

Super IO Configuration is a submenu to control the system's Super IO chip Fintek F71869E. It configures the serial port 1 and 2 on the system. The featured settings are:

Setting	Description						
Serial Port 1 Configuration	The featured settings are:						
	<table><tr><th>Setting</th><th>Description</th></tr><tr><td>Serial Port</td><td>Enables/disables the serial port. ► Enabled is the default.</td></tr><tr><td>Change Settings</td><td>Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ► Options available are: Auto (default) IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;</td></tr></table>	Setting	Description	Serial Port	Enables/disables the serial port. ► Enabled is the default.	Change Settings	Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ► Options available are: Auto (default) IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
	Setting	Description					
	Serial Port	Enables/disables the serial port. ► Enabled is the default.					
Change Settings	Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ► Options available are: Auto (default) IO=3F8h; IRQ=4; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;						
Serial Port 2 Configuration	The featured settings are:						
	<table><tr><th>Setting</th><th>Description</th></tr><tr><td>Serial Port</td><td>Enables/disables the serial port. ► Enabled is the default.</td></tr><tr><td>Change Settings</td><td>Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ► Options available are: Auto (default) IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;</td></tr></table>	Setting	Description	Serial Port	Enables/disables the serial port. ► Enabled is the default.	Change Settings	Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ► Options available are: Auto (default) IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;
	Setting	Description					
	Serial Port	Enables/disables the serial port. ► Enabled is the default.					
Change Settings	Sets the optimal IO address and IRQ info for the serial port, or leaves it on BIOS auto-detection. ► Options available are: Auto (default) IO=2F8h; IRQ=3; IO=3F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2F8h; IRQ=3,4,5,6,7,9,10,11,12; IO=3E8h; IRQ=3,4,5,6,7,9,10,11,12; IO=2E8h; IRQ=3,4,5,6,7,9,10,11,12;						
Power On After Power Fail	Defines the state for the computer to go to when power is resumed after a power failure. ► Options available are Power Off (default) and Power On .						

5.2.10. H/W Monitor -I/O Board

H/W Monitor -I/O Board monitors the carrier board's hardware status. Select it to run a report of various voltage info.

5.2.11. Sandybridge PPM Configuration

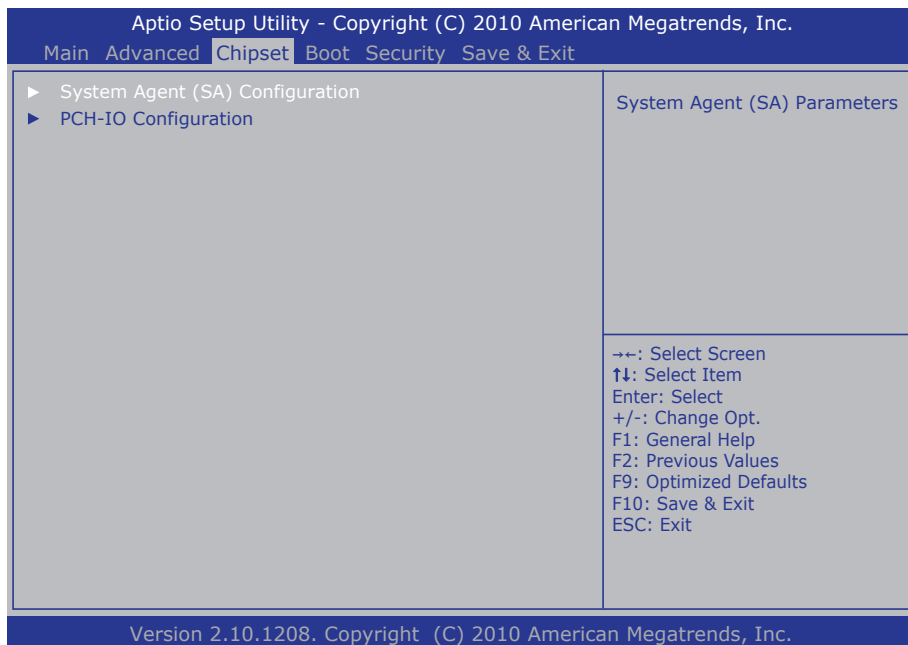
This submenu controls processor power management by the following settings:

Submenu	Description
EIST	Enables/disables EIST (Enhanced Intel SpeedStep® Technology), which enables the system to dynamically adjust processor voltage and core frequency to reduce power consumption and heat production. ▶ Enabled is the default.
CPU C3 Report	Enables/disables CPU C3 (ACPI C2) report to the OS. ▶ Enabled is the default.
CPU C6 Report	Enables/disables CPU C6 (ACPI C3) report to the OS. ▶ Enabled is the default.
CPU C7 Report	Enables/disables CPU C7 (ACPI C3) report to the OS. ▶ Enabled is the default.
Long duration power limit	Sets the power limit when Intel® Turbo Boost Technology is applied during a long duration of time. ▶ Intel® Turbo Boost Technology allows the processor to operate at a power level higher than its rated upper power limit (TDP) for short durations. ▶ The default setting is 0, which means the factory default.
Long duration maintained	Sets the time to maintain long duration power. ▶ The default setting is 28 milliseconds.

Short duration power limit	<p>Sets the power limit when Intel® Turbo Boost Technology is applied during a short duration of time. After that, the Long Duration Power Limit will be honored.</p> <ul style="list-style-type: none">▶ The default setting is 0, which means the factory default.
TCC active offset	<p>Sets the offset (in degrees Celsius) that activates the TCC (Thermal Control Circuit), a thermal protection mechanism for Intel® Turbo Boost Technology operation since ACPI passive throttling states will pull the processor out of turbo operation when triggered.</p> <ul style="list-style-type: none">▶ The default setting is 0, which means the factory default.

5.3. Chipset

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



The featured submenu are **System Agent (SA) Configuration** and **PCH-IO Configuration**, which are covered in the following sections.

Submenu overview:

Submenu	Description
System Agent (SA) Configuration	See 5.3.1. System Agent (SA) Configuration on page 79 .
PCH-IO Configuration	See 5.3.2. PCH-IO Configuration on page 87 .

5.3.1. System Agent (SA) Configuration

This submenu configures **System Agent (SA)** parameters. The featured settings are:

Setting / Submenu	Description
CHAP Device (B0:D7:F0)	Enables/disables SA CHAP device. ▶ Disabled is the default.
Thermal Device (B0:D4:F0)	Enables/disables SA thermal device. ▶ Disabled is the default.
Enable NB CRID	Enables/disables NB (northbridge) CRID (Compatible Revision ID) workaround. ▶ CRID makes it flexible for the BIOS to load OS drivers optimized for a previous revision of the silicon instead of the current revision of the silicon in order to reduce drivers updates and minimize change to the OS image for the minor optimizations for the silicon such as yield improvement or the feature enhancement reasons that do not negatively impact the OS driver functionality. ▶ Disabled is the default.
Graphics Configuration	See 5.3.1.1. Graphics Configuration on page 80 .
DMI Configuration	See 5.3.1.2. DMI Configuration on page 82 .
NB PCIe Configuration	See 5.3.1.3. NB PCIe Configuration on page 82 .
Memory Configuration	See 5.3.1.4. Memory Configuration on page 83 .
Memory Thermal Configuration	See 5.3.1.5. Memory Thermal Configuration on page 86 .
GT - Power Management Control	See 5.3.1.6. GT - Power Management Control on page 86 .

5.3.1.1. Graphics Configuration

Select **Graphics Configuration** to view graphics info and accesses graphics settings. The featured settings are:

Setting	Description
Graphics Turbo IMON Current	<p>Sets the graphics turbo IMON current values.</p> <ul style="list-style-type: none"> Options available are 14 to 31. 31 is the default.
Primary IGFX Boot Display	<p>Sets the graphics device to activate during POST.</p> <ul style="list-style-type: none"> This setting has no effect if an external graphics is present. The setting for the secondary boot display will become available depending on your selection. VGA modes are only supported on the primary display. Options available are CRT, DVI (default) and HDMI.
GTT Size	<p>Sets the size of the GTT, which means “graphics translation table”, an I/O memory management unit (IOMMU) used by AGP and PCI Express graphics cards.</p> <ul style="list-style-type: none"> Options available are 1MB and 2MB (default).
Aperture Size	<p>Sets the aperture size, the maximum amount of system memory available to the graphics port.</p> <ul style="list-style-type: none"> Options available are 128MB, 256MB (default) and 512MB.
DVMT Pre-Allocated	<p>Sets the DVMT 5.0 fixed (pre-allocated) memory size for the internal graphics device.</p> <ul style="list-style-type: none"> Options available are: 0M 32M 64M (default) 96M 128M 160M 192M 224M 256M 288M 320M 352M 384M 416M 448M 480M 512M

DVMT Total Gfx Memory	<p>Sets the DVMT 5.0 total memory size for the internal graphics device.</p> <ul style="list-style-type: none"> Options available are: 128M 256M (default) MAX
Gfx Low Power Mode	<p>Enables/disables graphics low power mode.</p> <ul style="list-style-type: none"> This setting is applicable to SFF (small form factor) only. Enabled is the default.

5.3.1.2. DMI Configuration

Use this submenu to control various DMI (Direct Media Interface) features such as the following:

Setting	Description
DMI VC1 Control	Enables/disables DMI vc1. ▶ “vc” means “virtual channel”. ▶ Enabled is the default.
DMI VCp Control	Enables/disables DMI vcp. ▶ “vc” means “virtual channel”. ▶ Enabled is the default.
DMI VCm Control	Enables/disables DMI vcm. ▶ “vc” means “virtual channel”. ▶ Enabled is the default.
DMI Link ASPM Control	Enables/disables the Active State Power Management on the southbridge side of the DMI link. ▶ Options available are: Disabled , L0s , L1 and L0sL1 (default).
DMI Extended Synch Control	Enables/disables DMI extended synchronization. ▶ Disabled is the default.
DMI Gen 2	Enables/disables DMI Gen2. ▶ Enabled is the default.

5.3.1.3. NB PCIe Configuration

Configures northbridge PCI Express Graphics (PEG). Featured settings are:

Setting	Description
PEG0 - Gen X	Configures PEG0 B0:D1:F0 Gen1-Gen2, or leaves it on BIOS auto-detection. ▶ Options available are Auto , Gen1 (default) and Gen2 .
PEG1 - Gen X	Configures PEG1 B0:D1:F1 Gen1-Gen2, or leaves it on BIOS auto-detection. ▶ Options available are Auto (default), Gen1 and Gen2 .
PEG2 - Gen X	Configures PEG2 B0:D1:F2 Gen1-Gen2. ▶ Options available are Auto (default), Gen1 and Gen2 .

PEG3 - Gen X	Configures PEG3 B0:D6:F0 Gen1-Gen2. ► Options available are Auto (default), Gen1 and Gen2 .
Always Enable PEG	Enables/disables the PEG slot. ► Enabled is the default.
PEG ASPM	Sets ASPM (Active State Power Management) support for the PEG device, or leaves it on BIOS auto-detection. ► This setting has no effect if the PEG device isn't active at the moment. ► Options available are: Disabled , Auto (default), ASPM L0s , ASPM L1 and ASPM L0sL1 .
De-emphasis Control	Configures the de-emphasis control on PEG. ► Options available are: -6 dB and -3.5 dB (default).

5.3.1.4. Memory Configuration

Select **Memory Configuration** to view the system's memory information that includes memory RC version, memory frequency, total memory, DIMM presence, CAS latency and minimum delay time.

Memory Configuration is also a submenu to configure the memory with the following settings:

Setting	Description
DIMM profile	Sets the DIMM timing profile to use. ► Options available are: Default DIMM profile (default), XMP profile 1 and XMP profile 2 .
Memory Frequency	Sets the maximum memory frequency (in MHz), or leaves it on BIOS auto-detection. ► Options available are: Auto (default) 1067 1333 1600 1867 2133
ECC Support	Enables/disables ECC (Error Checking & Correcting) support for the DDR memory. ► Disabled is the default.

Max TOLUD	<p>Sets the maximum value of TOLUD (Top of Low Usable DRAM), the lowest address above both the graphics stolen memory and TSEG (Top of Memory Segment).</p> <ul style="list-style-type: none"> ▶ Select Dynamic to auto-adjust TOLUD based on the largest MMIO (memory mapped input/output) length of the installed graphics controller. ▶ Options available are: Dynamic (default) 1 GB 1.25 GB 1.75 GB 2 GB 2.25 GB 2.5 GB 2.75 GB 3 GB 3.25 GB
NMode Support	<p>Sets memory timing parameters, or leaves it on BIOS auto-detection.</p> <ul style="list-style-type: none"> ▶ Options available are: Auto (default) 1N Mode 2N Mode ▶ Both 1N Mode and 2N Mode are command rates. Each is the time it takes for a signal to be issued from the memory to a RAM module.
Memory Scrambler	<p>Enables/disables the support of memory scrambler, which randomizes the content of the memory to complicate data retrieval from the memory.</p> <ul style="list-style-type: none"> ▶ Options available are: Enabled (default) Disabled
RMT Crosser Support	<p>Enables/disables RmtCrosserEnable support.</p> <ul style="list-style-type: none"> ▶ Disabled is the default.

MRC Fast Boot	<p>Enables/disables MRC (Memory Reference Code) fast boot, which restores memory data from the valid NVRAM without hardware training to speed up booting.</p> <ul style="list-style-type: none"> Options available are: Enabled (default) Disabled
Force Cold Reset	<p>Force cold reset or choose MRC cold reset mode, when cold boot is required during MRC execution. Note: If ME 5.0MB-sized firmware is present, force cold reset is required.</p> <ul style="list-style-type: none"> Options available are: Enabled (default) Disabled
Scrambler Seed Generation Off	<p>Controls memory scrambler seed generation.</p> <ul style="list-style-type: none"> Select Enabled to turn off scrambler seed generation. Select Disabled to always generate scrambler seed. (Default)
Memory Remap	<p>Enables/disables remapping the memory above 4G.</p> <ul style="list-style-type: none"> Enabled is the default.
Channel A DIMM Control	<p>Sets how to enable the DIMMs on channel A.</p> <ul style="list-style-type: none"> Options available are: Enable Both DIMMs (default) Disable DIMM0 Disable DIMM1 Disable Both DIMMs
Channel B DIMM Control	<p>Sets how to enable the DIMMs on channel B.</p> <ul style="list-style-type: none"> Options available are: Enable Both DIMMs (default) Disable DIMM0 Disable DIMM1 Disable Both DIMMs

5.3.1.5. Memory Thermal Configuration

This submenu configures the memory thermal parameters by the following settings:

Setting	Description
Memory Thermal Management	Enables/disables memory thermal management. ▶ Enabled is the default.
PECI Injected Temperature	Enables/disables memory temperatures to be injected to the processor via Peci (Platform Environment Controller Interface). ▶ Disabled is the default.
EXTTS# via TS-on-Board	Enables/disables routing TS-on-Board ALERT# (signal) and THERM# to EXTTS# pin on the PCH. ▶ "TS" means thermal sensor. ▶ Disabled is the default.
EXTTS# via TS-on-DIMM	Enables/disables routing TS-on-DIMM ALERT# (signal) to EXTTS# pin on the PCH. ▶ "TS" means thermal sensor. ▶ Disabled is the default.
Virtual Temperature Sensor (VTS)	Enables/disables Virtual Temperature Sensor (VTS). ▶ Disabled is the default.

5.3.1.6. GT - Power Management Control

Select this submenu to manage the memory power for GT (integrated graphics engine).

Setting	Description
RC6 (Render Standby)	Enables/disables render standby support, a technique that optimizes the average power to the graphics render engine during the engine's idleness. ▶ Enabled is the default.
GT OverClocking Support	Enables/disables GT overclocking support. ▶ Disabled is the default.

5.3.2. PCH-IO Configuration

PCH-IO Configuration sets PCH parameters. The featured settings are:

Setting / Submenu	Description						
PCH LAN Controller	Enables/disables the onboard NIC (network interface controller). ▶ Enabled is the default.						
Wake on LAN	Enables/disables the integrated LAN to wake the system. ▶ Disabled is the default.						
PCIE Wake Up	Enables/disables PCIE Wake# (signal) to wake the system. ▶ Disabled is the default.						
Wake on Ring	Enables/disables the RI# (signal) to wake the system. ▶ Disabled is the default.						
Azalia	Enables/disables Intel High Definition Audio. ▶ “Azalia” is the codename for Intel’s High Definition Audio during development stage. ▶ Select Disabled to unconditionally disable Azalia. ▶ Select Auto to enable Azalia if it is present and to disable it if otherwise. ▶ Select Enabled to unconditionally enable Azalia. When enabled, the following settings are available:						
	<table><tr><th>Setting</th><th>Description</th></tr><tr><td>Azalia Docking Support</td><td>See 5.3.2.1. Azalia Docking Support on page 90.</td></tr><tr><td>Azalia Internal HDMI Codec</td><td>See 5.3.2.2. Azalia Internal HDMI Codec on page 90.</td></tr></table>	Setting	Description	Azalia Docking Support	See 5.3.2.1. Azalia Docking Support on page 90 .	Azalia Internal HDMI Codec	See 5.3.2.2. Azalia Internal HDMI Codec on page 90 .
	Setting	Description					
	Azalia Docking Support	See 5.3.2.1. Azalia Docking Support on page 90 .					
Azalia Internal HDMI Codec	See 5.3.2.2. Azalia Internal HDMI Codec on page 90 .						
SLP_S4 Assertion Width	Sets the minimum assertion width of the SLP_S4# signal. ▶ Options available are: 1-2 Seconds 2-3 Seconds 3-4 Seconds 4-5 Seconds (default)						

USB Configuration	Controls USB devices. Featured settings are:	
	Setting	Description
	EHCI1	Enables/disables the USB EHCI (USB2.0) functions. ▶ Enabled is the default. ▶ One EHCI controller must always be enabled.
	EHCI2	Enables/disables the USB EHCI (USB2.0) functions. ▶ Enabled is the default. ▶ One EHCI controller must always be enabled.
	USB Ports Per-Port Disable Control	Enables/disables disabling each of the USB ports (0~9) . ▶ Disabled is the default.

PCI Express Configuration	Setting	Description	
	PCI Express Clock Gating	Enables/disables the PCI Express root port ► Enabled is the default.	
	DMI Link ASPM Control	Controls the Active State Power Management on both northbridge side and southbridge side of the DMI (Direct Media Interface) link. ► Options available are: Disabled , L0s and L0sL1 (default).	
	DMI Link Extended Synch Control	Enables/disables the extended synch on the southbridge side of the DMI link. ► Disabled is the default.	
	PCI Express Root Port 1	Each PCI Express root port features the following settings:	
	PCI Express Root Port 2	Setting	Description
		PCI Express Root Port #	See 5.3.2.3. PCI Express Root Port # on page 90.
	PCI Express Root Port 3	PEG - Gen X	See 5.3.2.4. PEG - Gen X on page 90.
		ASPM Support	See 5.3.2.5. ASPM Support on page 91.
	PCI Express Root Port 5	Extra Bus Reserved	See 5.3.2.6. Extra Bus Reserved on page 91.
		Reserved Memory	See 5.3.2.7. Reserved Memory on page 92.
		Reserved I/O	See 5.3.2.8. Reserved I/O on page 92.

5.3.2.1. Azalia Docking Support

Enables/disables Azalia docking support of audio controller.

- ▶ Disabled is the default.

5.3.2.2. Azalia Internal HDMI Codec

Enables/disables internal HDMI codec for Azalia.

- ▶ **Enabled** is the default.
- ▶ When enabled, the following settings are available:

Setting	Description
Azalia HDMI codec Port B	Enables/disables the internal HDMI codec port for Azalia. ▶ Disabled is the default.
Azalia HDMI codec Port C	Enables/disables the internal HDMI codec port for Azalia. ▶ Enabled is the default.
Azalia HDMI codec Port D	Enables/disables the internal HDMI codec port for Azalia. ▶ Disabled is the default.

5.3.2.3. PCI Express Root Port

Enables/disables the port.

- ▶ **Enabled** is the default.

5.3.2.4. PEG - Gen X

Controls PEG1 B0:D28:F0 Gen1-Gen2, or leaves it on BIOS auto-detection.

- ▶ Options are **Auto**, **Gen1** (default) and **Gen2**.

5.3.2.5. ASPM Support

Sets ASPM level.

- ▶ Options are **Disabled**, **L0s**, **L1**, **L0sL1** and **Auto** (default).
- ▶ When enabled, the following settings become available:

Setting	Description
URR	Enables/disables PCI Express unsupported request reporting. ▶ Disabled is the default.
FER	Enables/disables PCI Express fatal error reporting. ▶ Disabled is the default.
NFER	Enables/disables PCI Express non-fatal error reporting. ▶ Disabled is the default.
CER	Enables/disables PCI Express correctable error reporting. ▶ Disabled is the default.
CTO	Enables/disables PCI Express completion timeout. ▶ Disabled is the default.
SEFE	Enables/disables Root PCI Express system error on fatal error. ▶ Disabled is the default.
SENFE	Enables/disables Root PCI Express system error on non-fatal error. ▶ Disabled is the default.
SECE	Enables/disables Root PCI Express system error on correctable error. ▶ Disabled is the default.
PME SCI	Enables/disables PCI Express PME (power management event) SCI (system control interrupt). ▶ Enabled is the default.
Hot Plug	Enables/disables PCI Express hot plug. ▶ Disabled is the default.

5.3.2.6. Extra Bus Reserved

Sets the extra bus reserved for the bridge behind this root bridge.

- ▶ 0 is the default.
- ▶ 0-7 customizable.

5.3.2.7. Reserved Memory

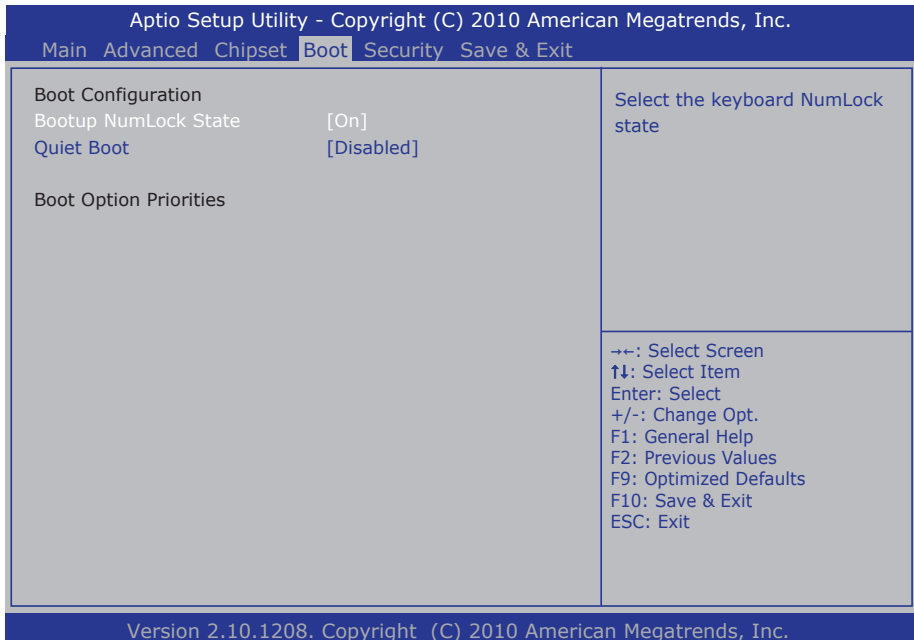
Sets the reserved memory and prefetchable memory range (1~20MB) for this root bridge.

5.3.2.8. Reserved I/O

Sets the reserved I/O range (4K/8K/12K/16K/20K) for this root bridge.

5.4. Boot

The **Boot** menu configures how to boot up the system such as boot device priority.



The featured settings are:

Setting	Description
Bootup NumLock State	Sets keyboard's NumLock state when the system boots up. ► Options available are On (default) and Off .
Quiet Boot	Sets whether to display the POST (power on self tests) messages or the system manufacturer's full screen logo during booting. ► Select Disabled to display the normal POST messages, which is the default setting.
Boot Option Priority	Sets boot device priority. ► This item opens in context with the storage installed in the systems.

5.5. Security

The **Security** menu sets up the administrator password. Once an 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.

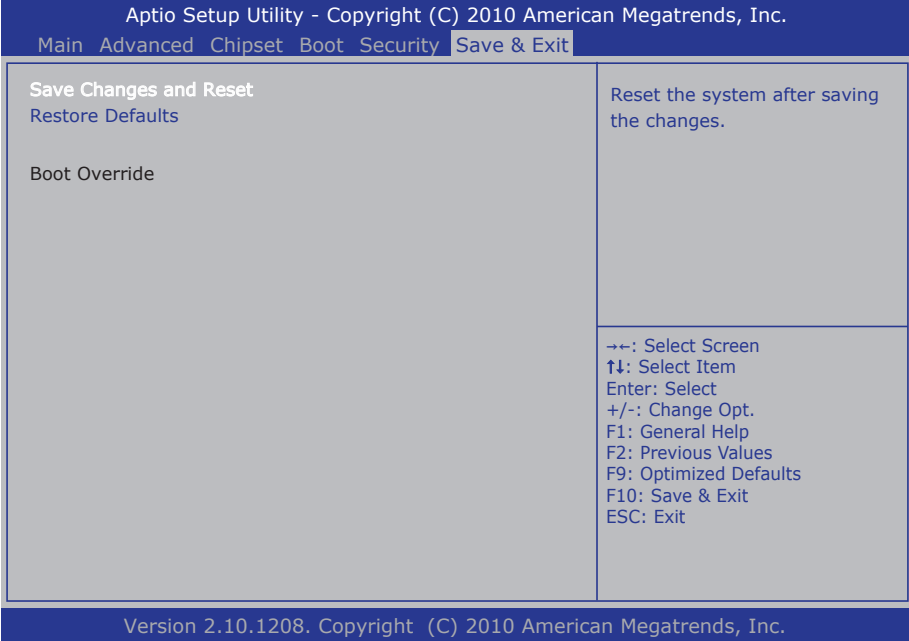
Aptio Setup Utility - Copyright (C) 2010 American Megatrends, Inc.	
Main Advanced Chipset Boot Security Save & Exit	
<p>Password Description</p> <p>If ONLY the Administrator's password is set, then this only limits access to Setup and is only asked for when entering Setup.</p> <p>If ONLY the User's password is set, then this is a power on password and must be entered to boot or enter Setup. In Setup the User will have Administrator rights.</p> <p>The password must be 3 to 20 characters long.</p> <p>Administrator Password</p>	<p>Set Setup Administrator Password</p> <p>→←: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F9: Optimized Defaults F10: Save & Exit ESC: Exit</p>
Version 2.10.1208. Copyright (C) 2010 American Megatrends, Inc.	

The featured setting is:

Setting	Description
Administrator Password	<p>To set up an administrator password:</p> <ol style="list-style-type: none"> 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.

5.6. Save & Exit

The **Save & Exit** menu features a handful of commands to launch actions from the BIOS Setup utility regarding saving changes, quitting the utility and recovering defaults.



Features settings are:

Setting	Description
Save Changes and Reset	Saves the changes and resets the system. ► This is a command to launch action from the BIOS Setup utility.
Restore Defaults	Restores the factory defaults. ► This is a command to launch action from the BIOS Setup utility.
Boot Override	Boot Override presents a list in context with the boot devices installed in the system. Select the device to boot up the system regardless of the currently configured boot priority. ► This is a command to launch action from the BIOS Setup utility.

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Appendix

A: Watchdog Timer (WDT) Setting

WDT is widely applied to industry computers to monitor CPU activities. The programmed application triggers WDT by adequate timer setting depending on its requirement. Before WDT counts down to zero, the functional system will reset the counter. In case the WDT counter is not reset by an abnormal system, it will count down to zero and then reset the system automatically.

This computer supports the watchdog timer up to 255 levels for users for software programming. Hereunder is the source code written in C for a WDT application example.

Sample code:

```

outportb(0x2e, 0x87);    /* initial IO port */
outportb(0x2e, 0x87);    /* twice, */

outportb(0x2e, 0x07);    /* point to logical device */
outportb(0x2e+1, 0x07);  /* select logical device 7 */
outportb(0x2e, 0xf5);    /* select offset f5h */
outportb(0x2e+1, 0x40);  /* set bit5 = 1 to clear bit5 */
outportb(0x2e, 0xf0);    /* select offset f0h */
outportb(0x2e+1, 0x81);  /* set bit7 =1 to enable WDTRST# */
outportb(0x2e, 0xf6);    /* select offset f6h */
outportb(0x2e+1, 0x05);  /* update offset f6h to 0ah :10sec */
outportb(0x2e, 0xF5);    /* select offset f5h */
outportb(0x2e+1, 0x20);  /* set bit5 = 1 enable watch dog time */

outportb(0x2e, 0xAA);    /* stop program F71869E, Exit */

```

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