FPC-7510 Series

- FPC-7510, 7511, 7512, 7513 -

Robust Box PC with Intel® Socket G Core™ i5 / i7 Platform

User's Manual
Version 1.3

C E

RoHS
VERIFIED

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Revision History

Version	Time	Description
1.0	2012 July	The initial release for FPC-7510 & FPC-7512.
1.1	2012 October	The following sections are updated: • 1.3. Ordering Information • 1.5. Specifications • 3.1.2. Installing CPU • 3.1.5. Installing Mini-card (optional) • 3.3.2. Installing 1st Hard Disk Drive
1.2	2012 December	The following sections are updated: • 1.3. Ordering Information • 1.5. Specifications
1.3	2013 May	FPC-7511 & PFC 7513 are inducted to the series. The involved changes are: • 1.1. Introduction • 1.2. Packing List • 1.3. Ordering Information • 1.5. Specifications • 1.6. Dimensions • 1.7. Locating Controls and Connectors

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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.

Replacing the 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: 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

The computer is targeted at many different application fields. By adopting it, you can pinpoint specific markets, such as Thin Client, KIOSK, information booth, GSM Server, environment-critical and space-critical applications.

- **All-In-One Platform**
  The CPU, DRAM and even software are integrated to provide a plug-and-play machine.

- **Compact-sized**
  The kernel of the computer is FMB-i57M2, which is a non-standard form factor embedded board. The whole system consumes only a few space.

- **Fanless and Modular CPU Board**
  By using a low power processor, the system does not have to rely on fans, which are often unreliable and cause dust to circulate inside the equipment. The modular design facilitates maintenance or possible upgrades on the CPU board. Modular Box PC can be easily modified to fit many different applications according to customers' requests.

- **Powerful Communication Capability**
  The computer provides COM, LPT, Ethernet, USB, Mini Card slot, DVI and Digital I/O expansion slot.

- **Numerous Display/Video Output**
  Integrated with Intel® HD Graphics core, the computer improves graphics and 3D rendering performance and supports numerous display/video output options including DVI-I and DVI-D.

- **Advanced Storage Solution**
  The computer comes with Compact Flash slot, which offers a better, faster and more cost-effective expansibilities for various applications.

- **Trustworthy**
  The onboard Watchdog Timer can invoke an NMI or system RESET when your application loses control over the system.

1.2. Packing List

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

1 x FPC-751x Box PC
(FPC-7510, 7511, 7512 or 7513)

1 x Accessory Box
(Driver CD/User's Manual/Screws/
Cable/Terminal Block)

1.3. Ordering Information

FPC-7510	Barebone system w/ 1 x PCIe x16 expansion
FPC-7511	Barebone system w/ 1 x PCI expansion
FPC-7512	Barebone system w/ 2 x PCIe x8 expansion
FPC-7513	Barebone system w/ 2 x PCI expansion

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.

Optional Accessories

PAC-B120W-FSP (6960301200040P)
120W AC/DC adapter kit

WMK-7000 (6940070000000P)
Wall-mount kit for FPC-7XXX Series

CBL-7100-COM (3432022000050P)
COM Converter Cable (1 x 44-pin male to 4 x DB9 male
+ 1 x DB9 female) L=200mm

Optional Configuration (CTOS* Kit)

	SSD-25040 Intel® 2.5" 40GB SATAII SSD kit
	MK-3C-2G-1 DDR3-1333 2GB SDRAM DIMM1 kit
	MK-3C-2G-2 DDR3-1333 2GB SDRAM DIMM2 kit
	MK-3C-4G-1 DDR3-1333 4GB SDRAM DIMM1 kit
	MK-3C-4G-2 DDR3-1333 4GB SDRAM DIMM2 kit
	MK-3C-8G-1 DDR3-1600 8GB SDRAM DIMM1 kit
	MK-3C-8G-2 DDR3-1600 8GB SDRAM DIMM2 kit
	HSPA-SI1400 HSUPA 3.75G module kit & 30cm internal wiring
	WIFI-IN1500 Intel® Centrino® Advanced-N 6205 WiFi module w/ 30cm internal wiring
	ANT-H11 1 x 2dBi HSUPA antenna
	ANT-D11 1 x WiFi Dual-band 2.4G/5G antenna
	5001642691480P Core™ i7-620M 2.66GHz w/ 4M cache
	5001642491490P Core™ i5-520M 2.4GHz w/ 3M cache
	5001351891470P Celeron® Dual Core P4500 1.86GHz w/ 2M cache

1.4. The Installation Paths of CD Driver

Windows XP

Driver	Path
CHIPSET	\CHIPSET\INTEL\XP_32_64_WIN7_32_64_SERIES
VGA	\GRAPHICS\INTEL\XP_32
LAN	\ETHERNET\INTEL\XP_32
AUDIO	\AUDIO\REALTEK\XP_32_64
ME	\ME\MEI_AMT_ALLOS_6.1.0.1042_PV
Net Framework	\Net Framework

Windows 7 32-bit

Driver	Path
CHIPSET	\CHIPSET\INTEL\XP_32_64_WIN7_32_64_SERIES
VGA	\GRAPHICS\INTEL\WIN7_VISTA_32
LAN	\ETHERNET\INTEL\WIN7_32
AUDIO	\AUDIO\REALTEK\WIN7_32_64
ME	\ME\MEI_AMT_ALLOS_6.1.0.1042_PV

Windows 7 64-bit

Driver	Path
CHIPSET	\CHIPSET\INTEL\XP_32_64_WIN7_32_64_SERIES
VGA	\GRAPHICS\INTEL\WIN7_VISTA_64
LAN	\ETHERNET\INTEL\WIN7_64
AUDIO	\AUDIO\REALTEK\WIN7_32_64
ME	\ME\MEI_AMT_ALLOS_6.1.0.1042_PV

1.5. Specifications

System Kernel	
Processor	Intel® Socket G Core™ i5/i7 series processors
BIOS	AMI Flash BIOS
Chipset	Intel® QM57
Graphics	Intel® HD Graphics
System Memory	2 x 204-pin Dual-channels DDR3 SO-DIMM Sockets up to 8GB at 800/1066MHz
Serial ATA	2 x SATA 300MB/s
Ethernet Controller	1 x Intel® WG82583V Gigabit Ethernet controller
	1 x Intel® WG82578DM Gigabit Ethernet PHY w/ iAMT
Watchdog Timer	1 ~ 255 levels reset
I/O Ports	
Serial Port	4 x serial ports via one DB-44 female connector • COM1~COM3: RS-232 • COM4: isolated RS-232/422/485 selectable
*Selectable Port	• SPP/EPP/ECP mode selectable for LPT • 1 x 16-bit Digital I/O (8-in/8-out)
USB Port	8 x USB 2.0 ports
LAN Port	2 x RJ-45
Video Port	• 1 x DVI-I female connector for Digital Video output • 1 x DVI-D female connector for Digital Video output
KB/MS	1 x 6-pin Mini-DIN for keyboard & mouse
Audio	Mic-in/Line-out (6W pre-amplified)
Expansion Bus	• 1 x PCIe x16 slot (FPC-7510 only) • 1 X PCI slot (FPC-7511 only) • 2 x PCIe x8 slots (FPC-7512 only) • 2 X PCI slots(FPC-7513 only) • 1 x Mini-card slot interconnected with SIM card socket for optional WiFi or HSUPA module • 1 x SIM socket (outside accessible)

Storage	
HDD/SSD	1 or 2 x 2.5" drive bay for HDD or SSD w/ 9.5mm height limit
CF	1 x CFast socket (outside accessible)
Safety	
FCC	Class A certified
CE	Certified
Environment	
Operating Temp.	-20 ~ 55°C (-4 ~ 131°F), ambience w/ air flow
Storage Temp.	-40 ~ 85°C (-40 ~ 185°F)
Operating Humidity	10 ~ 95% @ 55°C (non-condensing)
Vibration	3 Grms/5 ~ 500Hz/random operation
Shock	• Operating 20G, 11ms; Non-operating 40G with HDD • Operating 40G, 11ms; Non-operating 60G with CFast/SSD
Mechanical	
Construction	Aluminum alloy
Mounting	Wall mounting
Weight	FPC-7510 & 7511: 4.2 kg (9.24 lb); FPC-7512 & 7513: 4.5 kg (9.9 lb)
Dimensions (W x D x H)	FPC-7510 & 7511: 195 x 268 x 90 mm (7.68" x 10.55" x 3.54") FPC-7512 & 7513: 195 x 268 x 110 mm (7.68" x 10.55" x 4.33")
Power Requirement	
Power Input	DC 10~28V input (w/ 4-pin DC input terminal block combine remote power on/off switch)
Power Consumption	Max. 50W (w/o I/O card)

*Note: For the **Selectable Port** , it is either LPT or Digital I/O to be opted for.

1.6. Dimensions

FPC-7510 & 7511

Unit: mm

FPC-7512 & 7513

Unit: mm
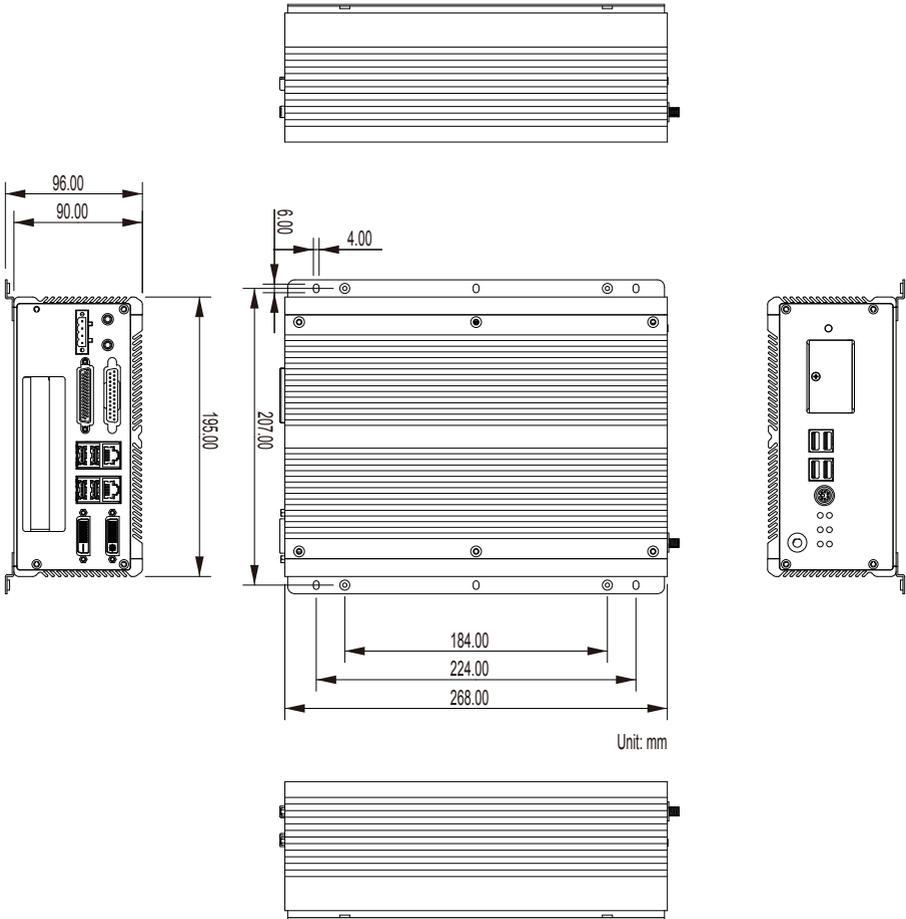
1.7. Locating Controls and Connectors

This series features the computers with the same I/O ports and connectors at the front panel, but their heights differ. Please take a moment to identify those controls and connectors shown in the following figures.

FPC-7510 & 7511
Front Panel
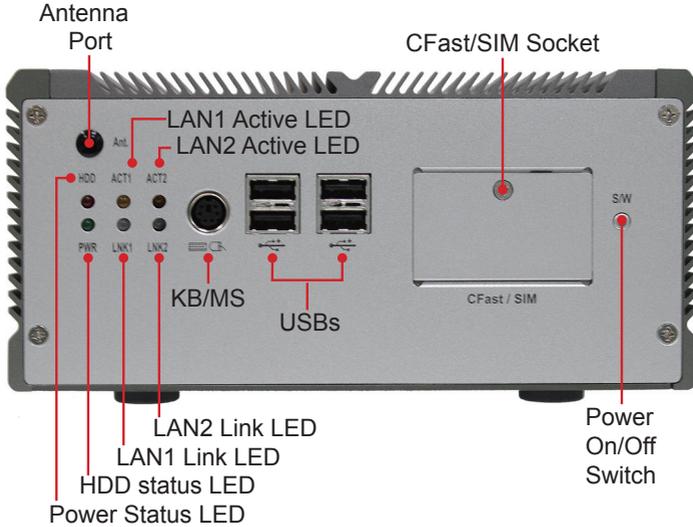
Rear Panel
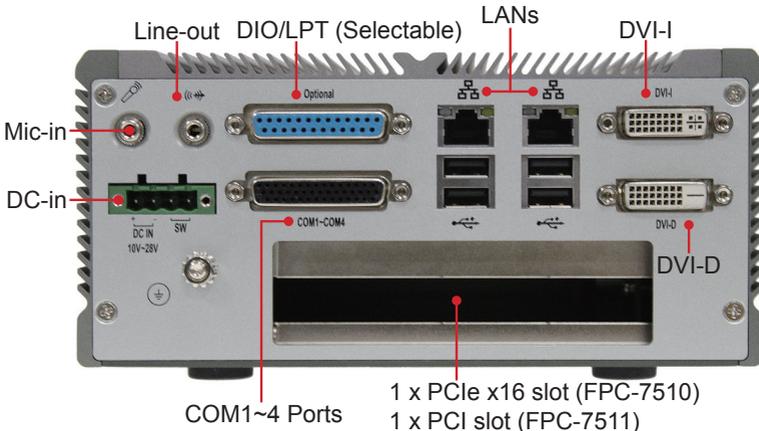
FPC-7512 & 7513

Front Panel

Antenna Port

LAN1 Active LED
LAN2 Active LED

CFast/SIM Socket

Ant.

HDD   ACT1   ACT2

PWR   LNK1   LNK2

KB/MS

USBs

CFast / SIM

S/W

LAN2 Link LED

LAN1 Link LED

HDD status LED

Power Status LED

Power On/Off Switch

Rear Panel

Line-out   DIO/LPT (Selectable)

LANs

DVI-I

Mic-in

Optional

DVI-I

DC-in

DC IN
10V~28V   SW

COM1~COM4

USB

USB

DVI-D

DVI-D

COM1~4 Ports

2 x PCIe x8 slots(FPC-7512)
2 x PCI slots(FPC-7513)
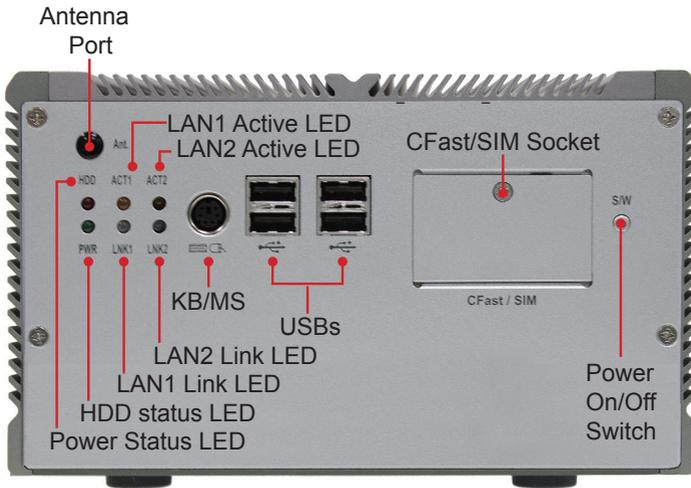
Side View

FPC-7510 & 7511

FPC-7512 & 7513

Chapter 2

Engine of
the Computer

2.1. Board Layout

The engine of the computer is FMB-i57M2.

Top View
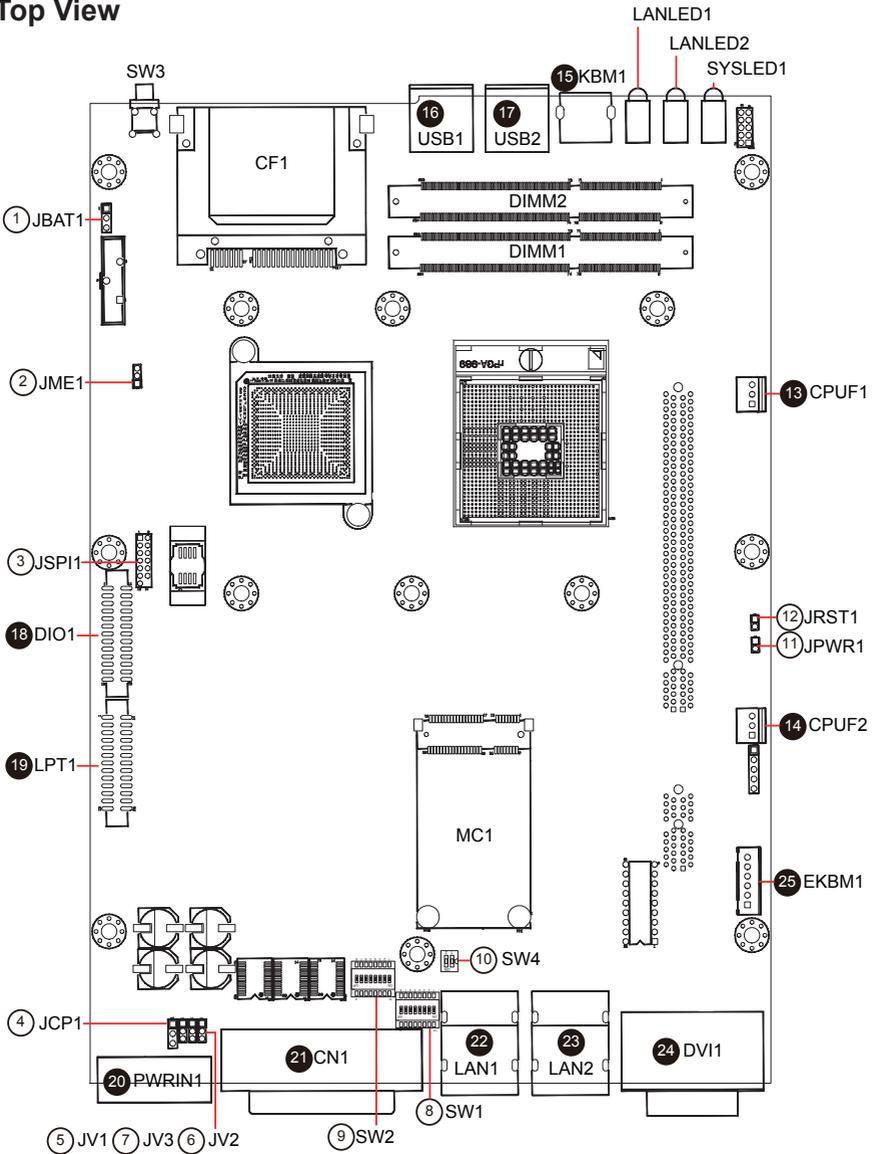
Bottom View
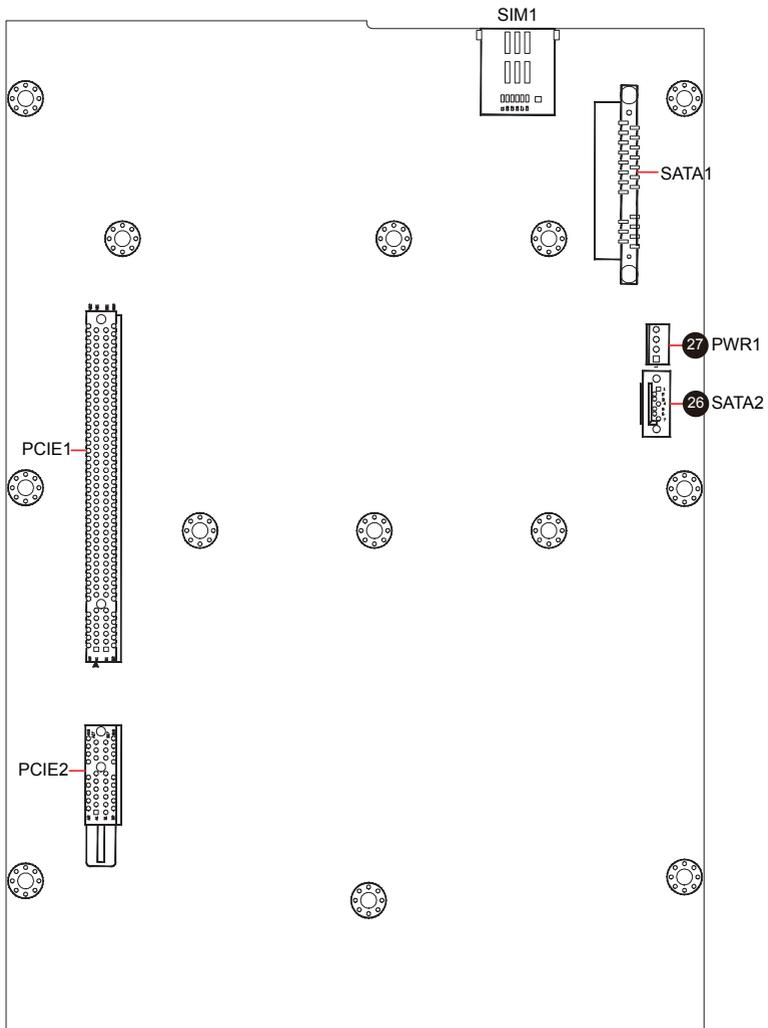
2.2. Jumpers and Connectors

2.2.1. Jumpers & Connectors List

Jumpers

Label	Function
JBAT1	Clear CMOS Setup
JME1	ME Enable
JSPI1	System BIOS Enable/Disable Pin Head
JCP1	COM Port Power Selection
JV1	RI/5V/12V (Pin 9) Selection for COM1
JV2	RI/5V/12V (Pin 9) Selection for COM2
JV3	RI/5V/12V (Pin 9) Selection for COM3
SW1~2	RS-232/RS-422/RS-485 Selection (for COM4)
SW4	Termination Setting (for COM4)
JPWR1	AT/ATX Power Selection
JRST1	Reset Pin Head

Connectors

Label	Function
CPUF1	CPU Fan Connector
CPUF2	System Fan Connector
SYSLED1	Power Status & HDD Status LED
LANLED1	LAN1 Link & Active LED
LANLED2	LAN2 Link & Active LED
KBM1	PS/2 Keyboard & Mouse
USB1~2	Double Stacked USB type A Connectors
DIMM1~2	DDR3 SO DIMM Sockets
CF1	CFAST Socket
SW3	Power On/Off Switch
DIO1	Digital I/O Box Head
LPT1	Parallel Port Box Head
PWRIN1	DC Adapter Power Input
CN1	COM1~4 (COM1~3 are RS-232; COM4 is RS-232/422/485)
LAN1~2	Ethernet Connectors (Include USB Port Connectors)
DVI1	DVI-I & DVI-D
EKBM1	External microphone & speaker
MC1	Mini Card Slot
PCIE1	PCIE-X16 Interface Slot
PCIE2	PCIE-X1 Interface Slot
SATA1	Serial ATA & Power Connector
SATA2	Serial ATA Connector
PWR1	HDD/SSD Power Connector
SIM1	SIM Card Socket

2.2.2. Jumper Setting

Label & Function	Jumper Settings	
JBAT1: Clear CMOS Setup (1)	1-2: Keep CMOS (default)	**3 2 1**
	2-3: Clear CMOS	**3 2 1**
JME1: ME Enable (2)	1-2: Enable ME (default)	**3 2 1**
	2-3: Disable ME	**3 2 1**
JCP1: COM Port Power Selection (4)	1-2: +5V (default)	**3 2 1**
	2-3: +12V	**3 2 1**
JV1~3: RI/5V/12V (Pin 9) Selection for COM1~3 (5~7)	1-2: RI (default)	**3 2 1**
	2-3: 5V or 12V (depends on JCP1)	**3 2 1**
JPWR1: AT/ATX Power Selection (11)	ATX Mode (default)	**1** ☐○ **2**
	AT Mode	**1** ☐ **2**
JRST1: Reset Pin Head (12)	Keep (default)	**1** ☐○ **2**
	Reset	**1** ☐ **2**

JSPI1: System BIOS Enable/ Disable Pin Header (3)

Pin	Enable BIOS	Disable BIOS
1-2	ON	OFF
3-4	ON	OFF
5-6	ON	OFF
7-8	ON	OFF
9-10	ON	OFF
11-12	N/C	SPI_CS1
13-14	GND	N/C (Key)
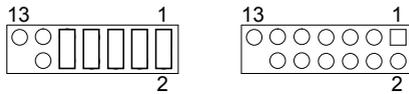
SW1~2: RS-232/RS-422/RS-485 Selection (for COM4) (8~9)

SW1	RS-232 (default)	RS-422	RS-485
1-16	ON	OFF	OFF
2-15	OFF	ON	OFF
3-14	OFF	OFF	ON
4-13	N/C	N/C	N/C
5-12	OFF	ON	ON
6-11	OFF	ON	ON
7-10	OFF	ON	OFF
8-9	OFF	ON	OFF
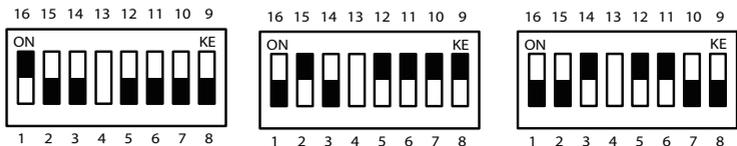
SW2	RS-232 (default)	RS-422	RS-485
1-16	ON	OFF	OFF
2-15	ON	OFF	OFF
3-14	ON	OFF	OFF
4-13	ON	OFF	OFF
5-12	ON	OFF	OFF
6-11	ON	OFF	OFF
7-10	ON	OFF	OFF
8-9	ON	OFF	OFF
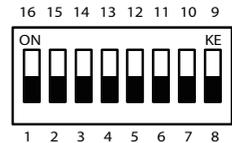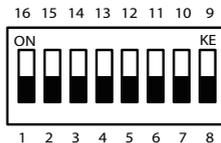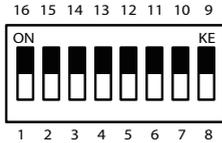
SW4: Termination Setting (for COM4) (10)

SW4	RS-422		RS-485	
1-4	Termination ON	Termination OFF	Not Used	Not Used
2-3	Termination ON	Termination OFF	Termination ON	Termination OFF

2.2.3. Pin Assignments for Connectors

CPUF1/2: CPU/System Fan Connector (13/14)

Pin	Description
1	GND
2	+12V
3	FAN_CTL

KBM1: PS/2 Keyboard & Mouse (15)

Pin	Description
1	KB_DAT
2	MS_DAT
3	GND
4	VCC5
5	KBCLK
6	MSCLK
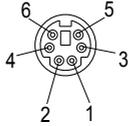
USB1~2: Double Stacked USB type A Connectors (16~17)
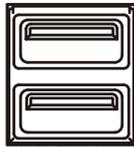
PWRIN1: DC Adapter Power Input (20)

Pin	Description
1	VCC
2	GND
3	GND-
4	PWR_BTN-
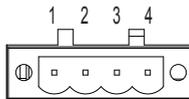
DVI1: DVI-I & DVI-D (24)
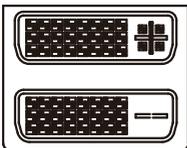
DVI-I

DVI-D

DIO1: Digital I/O Box Head (18)

Pin	Description	Pin	Description
1	DIO0	14	DIO1
2	DIO2	15	DIO3
3	DIO4	16	DIO5
4	DIO6	17	DIO7
5	DIO8	18	DIO9
6	DIO10	19	DIO11
7	DIO12	20	DIO13
8	DIO14	21	DIO15
9	VCC5	22	GND
10	VCC5	23	GND
11	N/C	24	N/C
12	N/C	25	N/C
13	N/C	26	N/C

LPT1: Parallel Port Box Head (19)

Pin	Description	Pin	Description
1	XP_STB#	14	P_AFD#
2	XP_D0	15	P_ERR#
3	XP_D1	16	P_INIT#
4	XP_D2	17	P_SLIN#
5	XP_D3	18	GND
6	XP_D4	19	GND
7	XP_D5	20	GND
8	XP_D6	21	GND
9	XP_D7	22	GND
10	P_ACK#	23	GND
11	P_BUSY	24	GND
12	P_PE	25	GND
13	P_SLCT	26	N/C

EKBM1: External microphone & speaker (25)

Pin	Description
1	MICL
2	MICR
3	MIC GND
4	Speaker(Lout)-L
5	Speaker(Lout)-R
6	Speaker GND
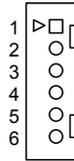
CN1: COM1~4 (COM1~3 are RS-232; COM4 is RS-232/422/485) (21)
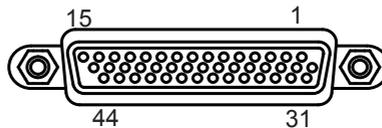
	Pin	Desc.	Pin	Desc.		Pin	Desc.	Pin	Desc.
COM1 (RS-232)	1	DCD	2	RXD	COM2 (RS-232)	11	DCD	12	RXD
	3	TXD	4	DTR		13	TXD	14	DTR
	5	GND	6	DSR		15	GND	16	DSR
	7	RTS	8	CST		17	RTS	18	CST
	9	RI	10	GND		19	RI	20	GND
COM3 (RS-232)	21	DCD	22	RXD	COM4 (RS-232)	31	DCD	32	RXD
	23	TXD	24	DTR		33	TXD	34	DTR
	25	GND	26	DSR		35	GND	36	DSR
	27	RTS	28	CST		37	RTS	38	CST
	29	RI	30	GND		39	RI	40	GND
N/C	41	N/C	42	N/C					
	43	N/C	44	N/C					

CBL-7100-COM (COM Converter Cable) (optional)
1 to 5 COM converter cable: 4 x DB9 male and 1 x DB9 female connectors
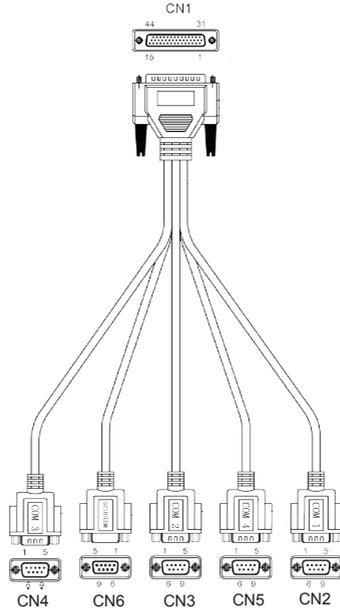
Note: CN6 on DB9 Cable Controller is unused.

COM1 (RS-232) labelled CN2 on DB9 Cable Controller

DB44 Pin	DB9 Pin	Desc.	DB44 Pin	DB9 Pin	Desc.
1	1	DCD	2	2	RXD
3	3	TXD	4	4	DTR
5	5	GND	6	6	DSR
7	7	RTS	8	8	CTS
9	9	RI	10		GND

COM2 (RS-232) labelled CN3 on DB9 Cable Controller

DB44 Pin	DB9 Pin	Desc.	DB44 Pin	DB9 Pin	Desc.
11	1	DCD	12	2	RXD
13	3	TXD	14	4	DTR
15	5	GND	16	6	DSR
17	7	RTS	18	8	CTS
19	9	RI	20		GND

COM3 (RS-232) labelled CN4 on DB9 Cable Controller

DB44 Pin	DB9 Pin	Desc.	DB44 Pin	DB9 Pin	Desc.
21	1	DCD	22	2	RXD
23	3	TXD	24	4	DTR
25	5	GND	26	6	DSR
27	7	RTS	28	8	CTS
29	9	RI	30		GND

COM4 (RS-232) labelled CN5 on DB9 Cable Controller

DB44 Pin	DB9 Pin	Desc.	DB44 Pin	DB9 Pin	Desc.
31	1	DCD	32	2	RXD
33	3	TXD	34	4	DTR
35	5	GND	36	6	DSR
37	7	RTS	38	8	CTS
39	9	RI	40		GND

COM4 (RS-422) labelled CN5 on DB9 Cable Controller

DB9 Pin	Signal	Desc.	DB9 Pin	Signal	Desc.
1	Tx-		2	Tx+	
3	Rx+		4	Rx-	
5	GND	Ground	6	N/C	
7	N/C		8	N/C	
9	N/C				

COM4 (RS-485) labelled CN5 on DB9 Cable Controller

DB9 Pin	Signal	Desc.	DB9 Pin	Signal	Desc.
1	DATA-	TX/RXDATA-	2	DATA+	TX/RXDATA+
3	N/C		4	N/C	
5	GND	Ground	6	N/C	
7	N/C		8	N/C	
9	N/C				

LAN1~2: Ethernet Connectors (Include USB Port Connectors) (22~23)

Pin	Description	Pin	Description
1	MDI0+	5	MDI2+
2	MDI0-	6	MDI2-
3	MDI1+	7	MDI3+
4	MDI10-	8	MDI3-

LAN

USB

USB
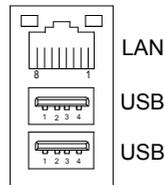
SATA2: Serial ATA Connector (26)

Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND
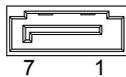
PWR1: HDD/SSD Power Connector (27)

Pin	Description
1	VCC5
2	GND
3	GND
4	+12V
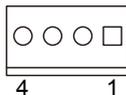
Chapter 3

Installation and Maintenance

3.1. CPU, Memory and Mini-card Installation

The computer is designed to be modular, slim and lightweight for easier maintenance. The following sections describe simple hardware installations.

3.1.1. Removing Top Cover

1. Locate the six screws which secure the top cover.

2. Use a screwdriver to remove top cover screws. First unscrew the four screws in each corner, and then two screws in the middle of two sides. Keep these screws safely for later use. (Remember to first secure two screws in the middle and then four corners when you are to install the top cover.)
3. Slightly pull the top cover upward.

- 28 -
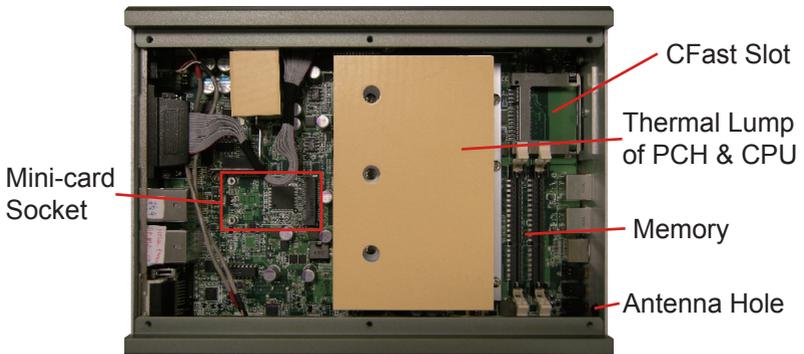
3.1.2. Installing CPU

1. Locate the six screws which secure the thermal lump.
2. Use a screwdriver to remove the six screws and thermal lump. Keep them safely for later use. Always keep this tip in mind, remove the outer screws before inner screws when taking off a module and secure inner screws before outer screws when installing a module.
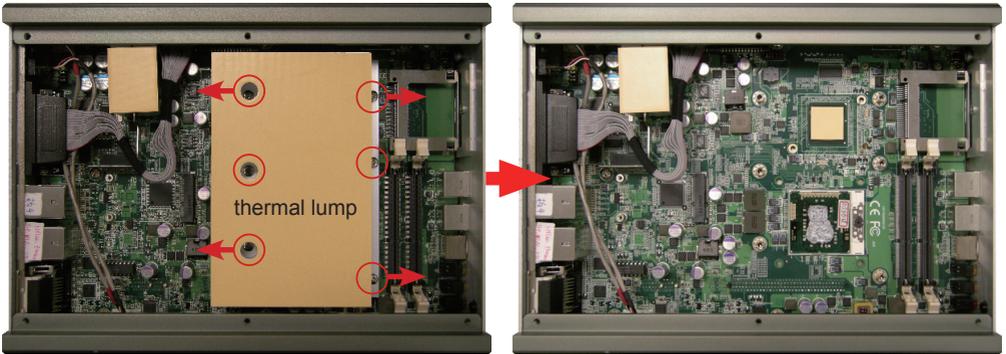
3. The processor socket comes with a screw to secure the CPU. As shown in below picture, loose the screw first before inserting the CPU.
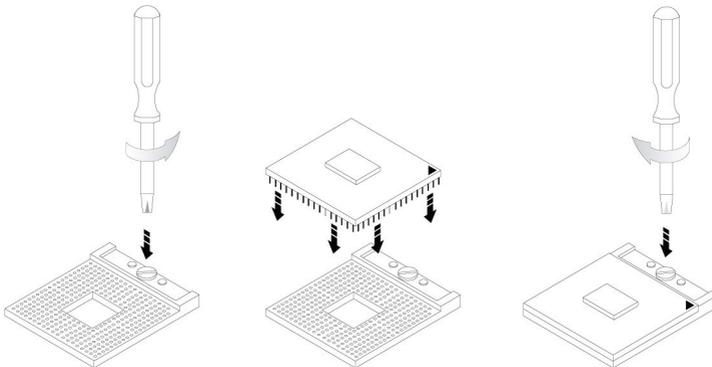
4. Place the CPU into the socket by making sure the notch on the corner of the CPU corresponds with the notch on the inside of the socket. Once the CPU has slid into the socket, lock the screw
5. There should be a thermal pad or paste in the gap between the processor and thermal lump. Make sure the thermal lump and CPU top is in complete contact to avoid CPU overheating problem. If not, it would cause your system or CPU to be hanged, unstable or damaged. At the end, lock thermal lump as point 1 guides.

3.1.3. Installing Memory Module

1. Locate the DDR3 SO-DIMM slots and press down the clips.
2. Align the SO-DIMM on the slot and let the notch on the SO-DIMM meet the break on the slot.
3. Hold the SO-DIMM with both hands, and gently insert the SO-DIMM into the slot until the clips of the SO-DIMM slot close to lock the memory module in place.
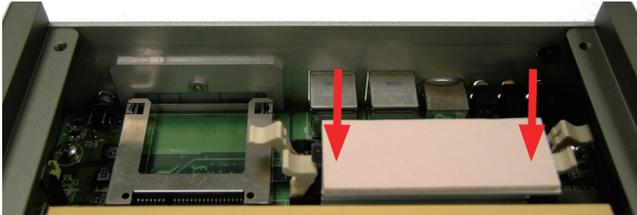
4. To remove the memory module, just press down the clips of the SO-DIMM slot with your hands. And then the memory module will be lifted up for removing.
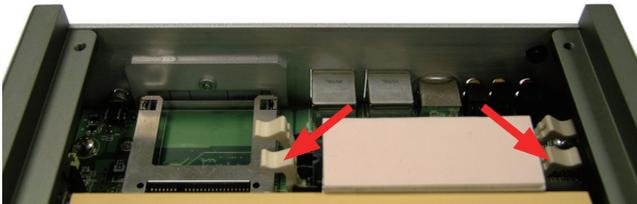
3.1.4. Installing Memory Module with Heatsink & Thermal Pad (optional)

1. Prepare the optional metal heatsink.

2. Attach the SO-DIMM to it as below.
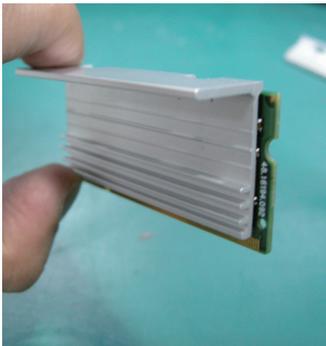
3. Attach another piece of heatsink to the SO-DIMM and hold them tight. Make sure the two pieces are aligned properly so that their notches can meet.
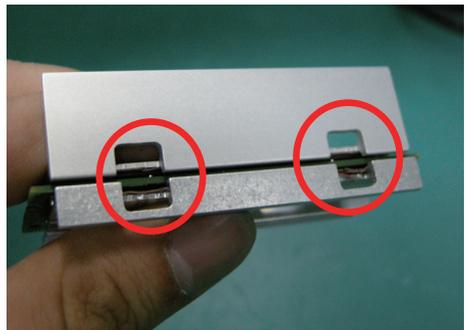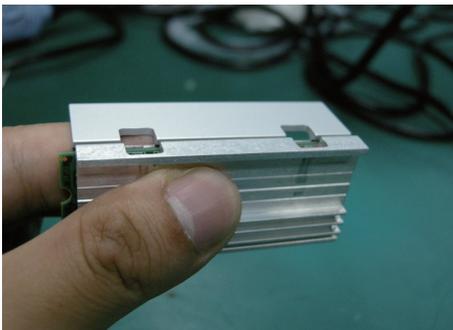
4. Use clips to clamp heatsink together.
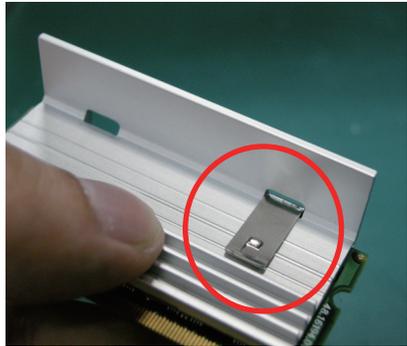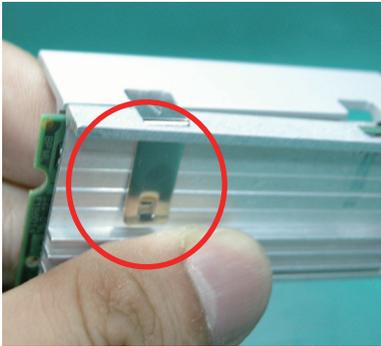
5. Stick the thermal pad on the top of heatsink.
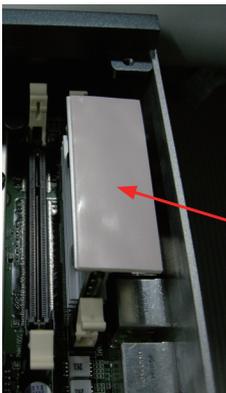
Thermal pad

3.1.5. Installing Mini-card (optional)

1. Before all, do the 1st step for WiFi module and only WiFi module. Due to the WiFi module's length limitation, you have to extend its length using mini half bracket, or it would be too short to install on socket on main borad. Combine WiFi module and mini half bracket in light of screw hole position, turn to the back and secure them.

WiFi Module

Mini Half Bracket
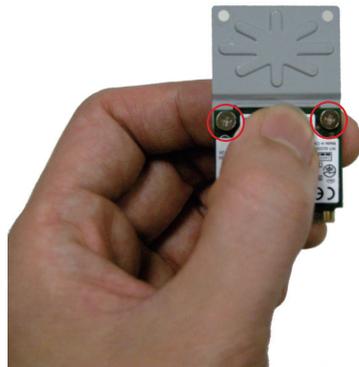
2. Locate Mini-card socket. Insert WiFi or HSUPA module into its slot at a slanted angle. Remember to align the notch with the break on slot. And then, secure two screws to fasten the module.
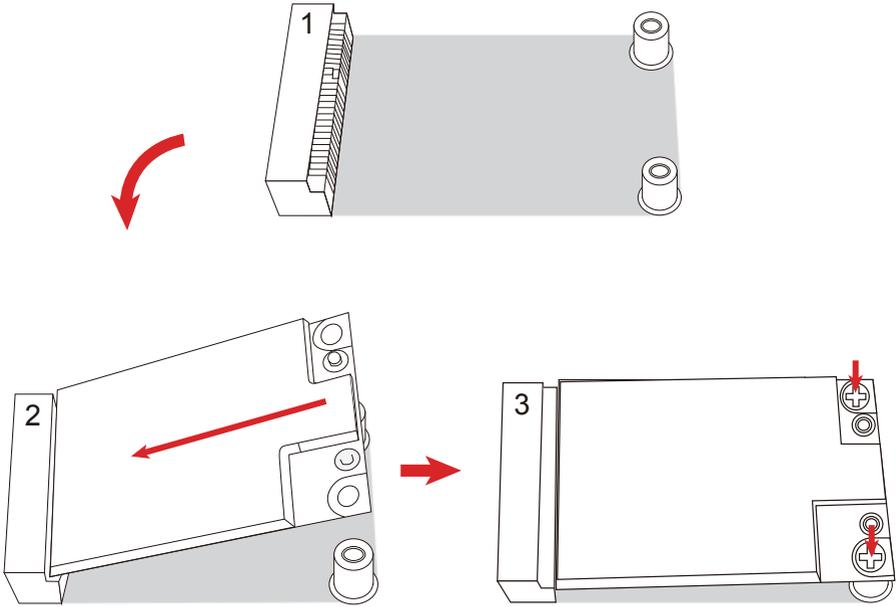
3. Press one end of the RF cable into one of the studs named MAIN.

4. Push the plastic plug outwards to remove it, so that another end of RF cable, which is a SMA connector jack, can penetrate through antenna hole located on front pane. Keep the plastic plug for later use. When you try to penetrate the SMA connector jack through antenna hole, be sure to put the flat side (in red frame) rightwards, or it'll get stuck.

Align the flat fitting side with the red flat edge of antenna hole.
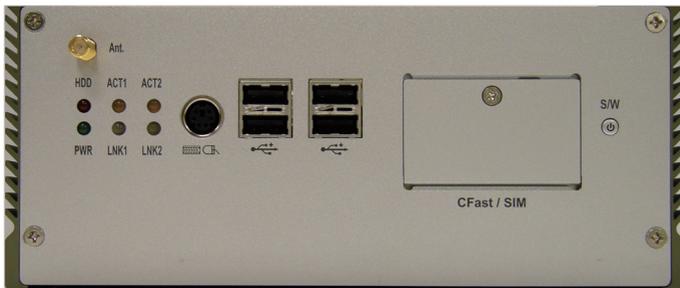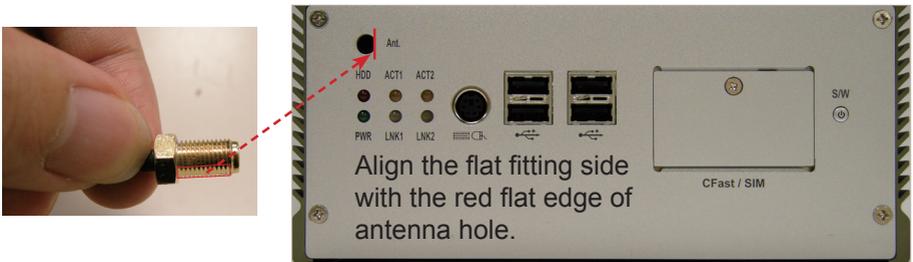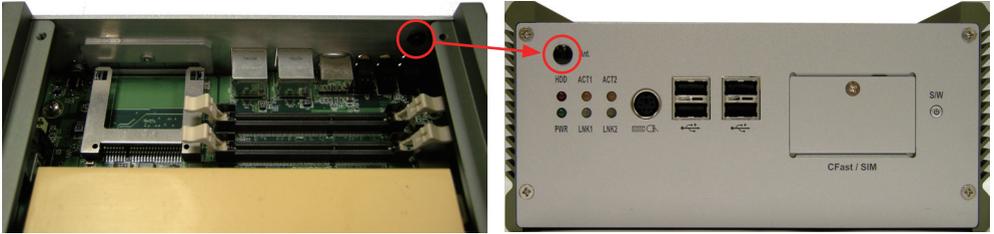
5. Mount a round washer into the SMA connector jack from outside before securing another nut into it.

6. At the end, screw antenna into the SMA connector jack and adjust antenna angle for better signal.

3.2. How to Access CFast/SIM Card

1. Make sure you have turned off the power before inserting or ejecting the CFast card (if OS is installed on CFast card).
2. Locate the CFast card door on the front panel.
3. Use a crosshead screwdriver (#1 tip) to remove the screw that secures the CFast/SIM card door. Pull down the door.

4. Insert your CFast/SIM card into the slot according to the illustration that you find close to the card holder.

Insert CFast card

Insert SIM card

5. After inserting the CFast/SIM card, close the card door and screw it on clockwise.

6. To remove the CFast card or SIM card, follow step 1, 2 and 3 above. And then push card inward to pop-out it from the slot.

remove CFast card

remove SIM card

3.3. Hard Disk Drive and PCIe Card Installation

3.3.1. Removing Bottom Cover

1. Place the Box PC upside down. Unscrew the six screws which secure the bottom cover.
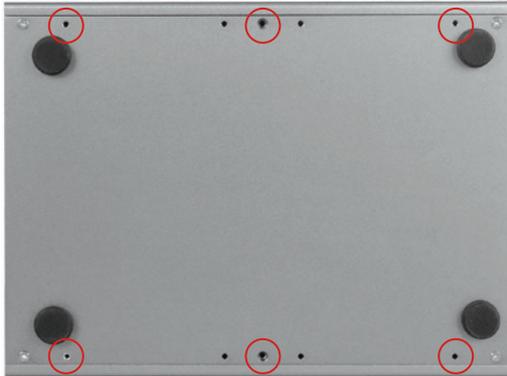
2. Use screwdriver to remove the bottom cover screws and keep them safely for later use.

3.3.2. Installing 1st Hard Disk Drive

1. Remove the Bottom Cover.
2. Locate the four screws securing the HDD Holder Bracket to the main unit.
3. Unscrew the screws and remove the HDD Holder Bracket. Lift bracket as next page shows to avoid damaging connector. Keep the screws safely for later use.

PCIe Socket
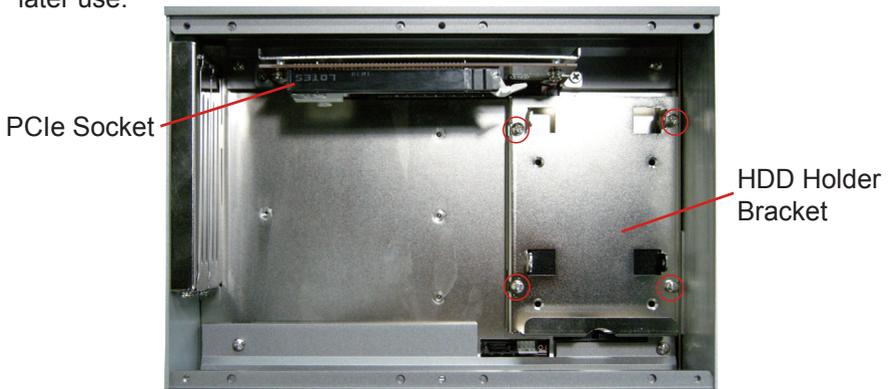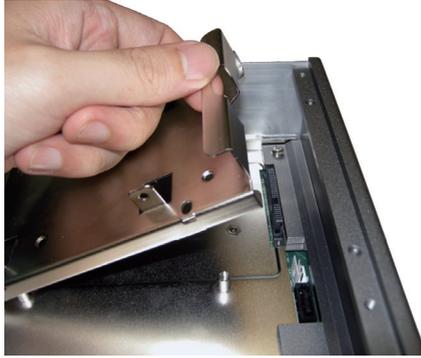
HDD Holder Bracket

4. Put the HDD into the HDD Holder Bracket and screw it on.
5. Insert HDD adapter to the HDD connector.
6. Hold the HDD Holder Bracket at an angle until the HDD adapter connects to the HDD connector on Main Board.

HDD Holder Bracket

2.5" HDD
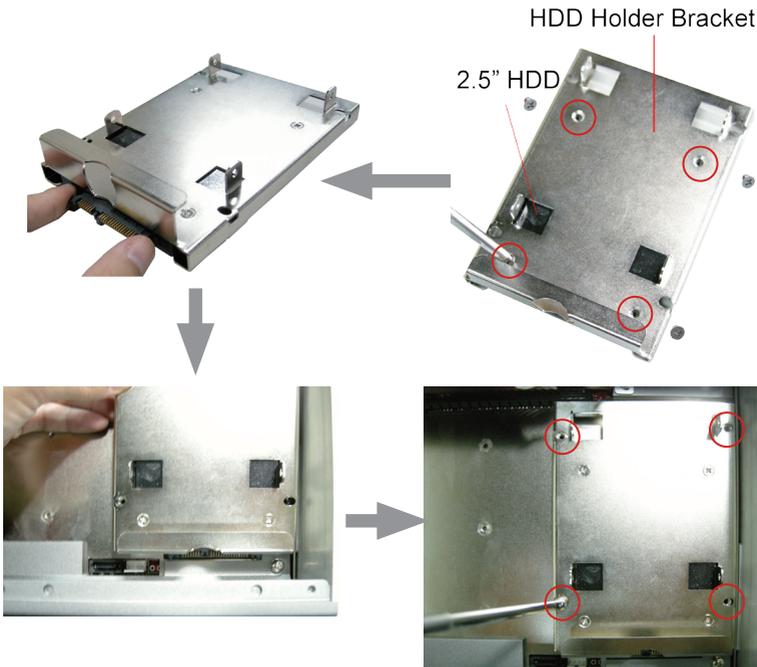
7. Locate the four screws securing the HDD Holder Bracket to the main unit.
8. Screw the HDD Holder Bracket on the Main Unit.

3.3.3. Installing 2nd Hard Disk Drive
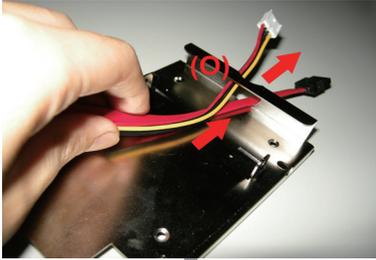
1. You may also install a second HDD. Take off the HDD Holder Bracket firstly as previous section suggests. Thread the cable used to connect main unit and HDD through the hole and secure HDD on bracket as the illustration shows.
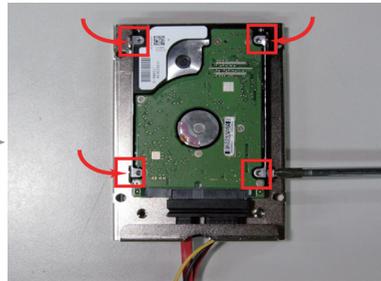
2. Unlike FPC-7512, FPC-7510 has its HDD holder bracket separated in two parts. Assemble an hard disk drive to the flat plate as shown above and assemble the two parts together later on. Reason to separate the HDD holder bracket to two parts is because FPC-7510 is not as high as FPC-7512; the height limitation makes it possbile to cause the conflict between the longer PCIe x16 card and the 2nd HDD if they are both installed. So you can only choose either one of them. That is to say, take off the flat plate as a PCIe card is installed.

3. Plug power and SATA lines in corresponding PWR2 and SATA2 connectors. If you want to remove the 2nd HDD afterwards, press the metalic clip and pull off the white plastic clip to unplug the two lines.

4. Secure bracket on main unit as below.
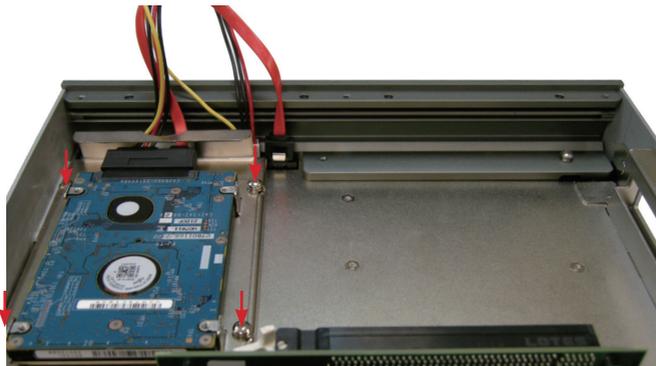
3.3.4 Installing PCIe Card

1. For 7510, use a crosshead screwdriver to loose the screw that secure the expansion slot bracket. And then you can install a PCIe card to this expansion slot.

2. For 7512, follow the same procedure to install the upper PCIe card.

3. And penetrate through the hole on case side with screwdriver to remove lower bracket and install PCIe card.

3.4. Wall Mounting (optional)

1. Place the main unit upside down on a flat surface and locate the 8 screw holes on the bottom cover.
2. Place the wall-mount brackets horizontally along with bottom cover so that the screw holes are aligned with the ones of the bottom cover.
3. Secure the brackets to the main unit with the accompanying screws.
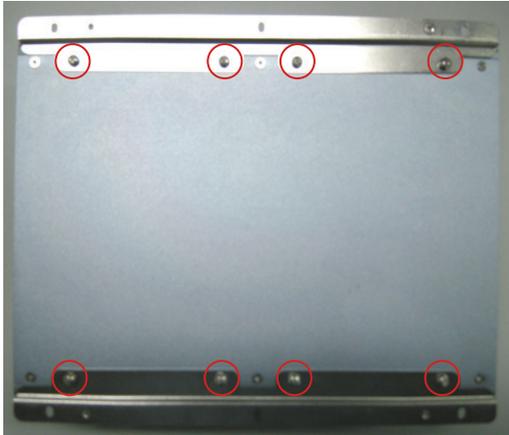
3.5. Grounding the Box PC

Follow the instructions below to ground the box PC onto land. Be sure of following any grounding requirements in your place.

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

1. As the figure illustrates above, remove the ground screw located on the bottom-left of the rear panel.
2. Attach the ground wire to the rear panel with the screw.

3.6. Wiring 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. Find the terminal block in the accessory box.

3. Use the wire-stripping tool to strip a short insulation segment from the output wires of the DC power source.

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 voltage.

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.
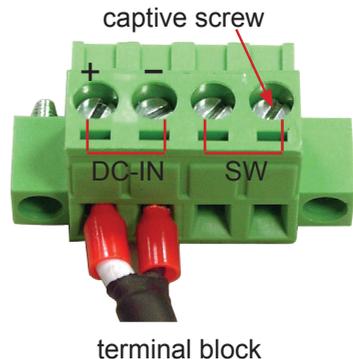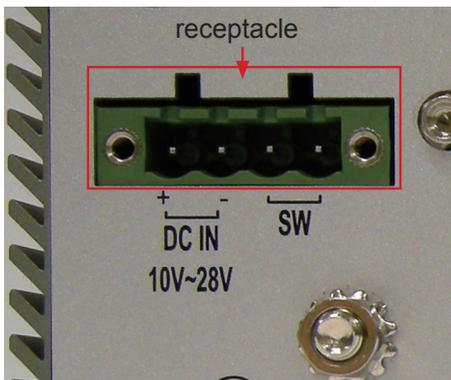
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Chapter 4

Driver & AP

4.1. Preliminary work

After everything mentioned before is settled down, and now, you need to install the necessary drivers and the application so that the box PC's functions can operate normally. The following instructions take Windows 7 as the exemplary OS. Different OS may vary slightly, but generally speaking, they are almost the same. Be assured that appropriate installation procedure is as below:

CHIPSET→Net Framework→VGA→ME→AUDIO→LAN

Please **Follow This Procedure** to install all necessary units in most cases, or you may encounter errors.

Also, the correct driver & AP paths for Windows 7 & Windows XP are listed below. You should follow the suggested paths to proceed with installation.

Windows XP

Driver	Path
CHIPSET	\CHIPSET\INTEL\XP_32_64_WIN7_32_64_SERIES
VGA	\GRAPHICS\INTEL\XP_32
LAN	\ETHERNET\INTEL\XP_32
AUDIO	\AUDIO\REALTEK\XP_32_64
ME	\ME\MEI_AMT_ALLOS_6.1.0.1042_PV
Net Framework	\Net Framework

Windows 7

Driver	Path
CHIPSET	\CHIPSET\INTEL\XP_32_64_WIN7_32_64_SERIES
VGA	\GRAPHICS\INTEL\WIN7_VISTA_32
	\GRAPHICS\INTEL\WIN7_VISTA_64
LAN	\ETHERNET\INTEL\WIN7_32
	\ETHERNET\INTEL\WIN7_64
AUDIO	\AUDIO\REALTEK\WIN7_32_64
ME	\ME\MEI_AMT_ALLOS_6.1.0.1042_PV

4.2. Drivers

4.2.1. CHIPSET

1. Execute "infinst911autol.exe" in the suggested path (\CHIPSET\INTEL\ XP_32_64_WIN7_32_64_SERIES). Always click Yes whenever Windows 7 inquires you "Do you want to allow the following programs to make changes to this computer?"
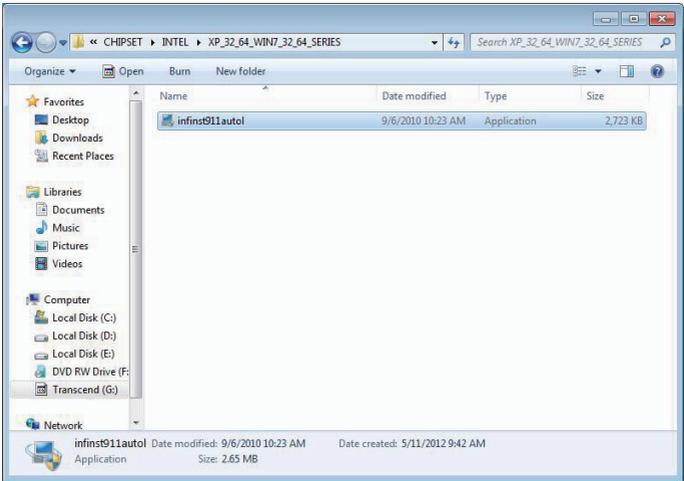
2. Click "Next >".

3. Wait for extracting.
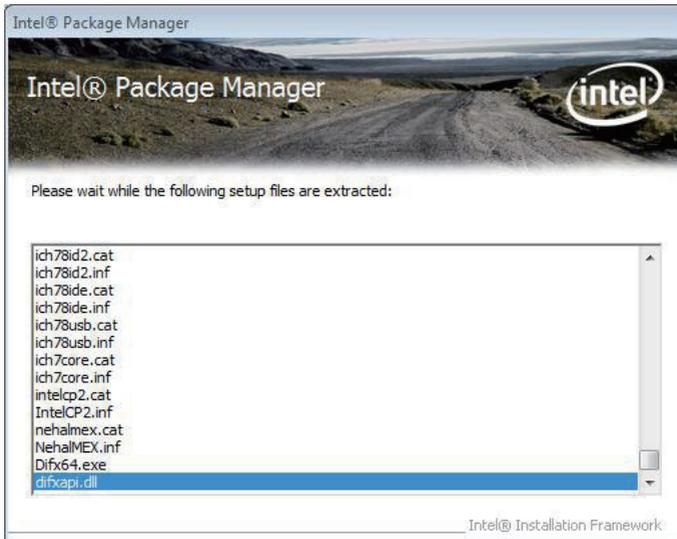
4. Click "Yes >".

5. Click "Next >".
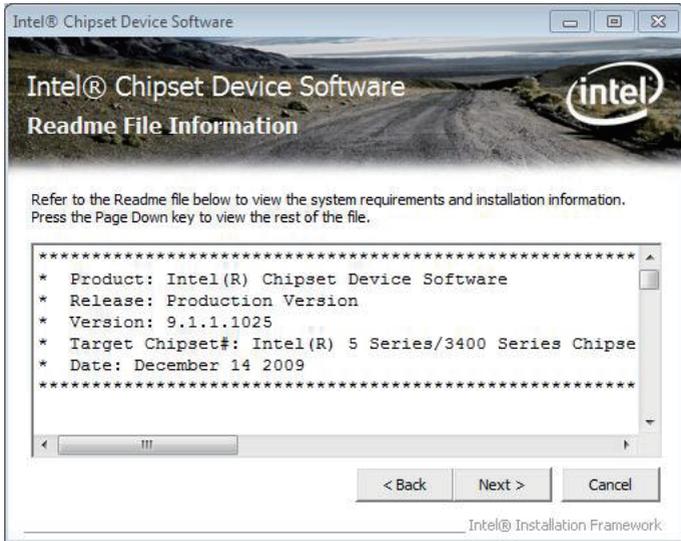
6. Wait for the process.
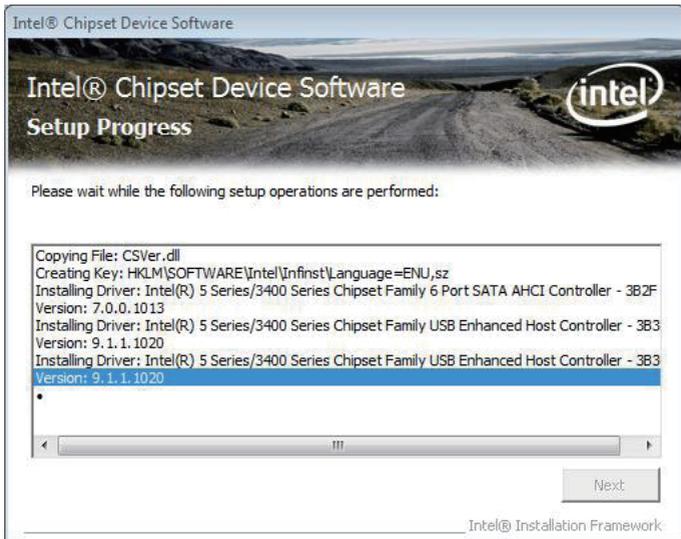
7. Click "Next >".
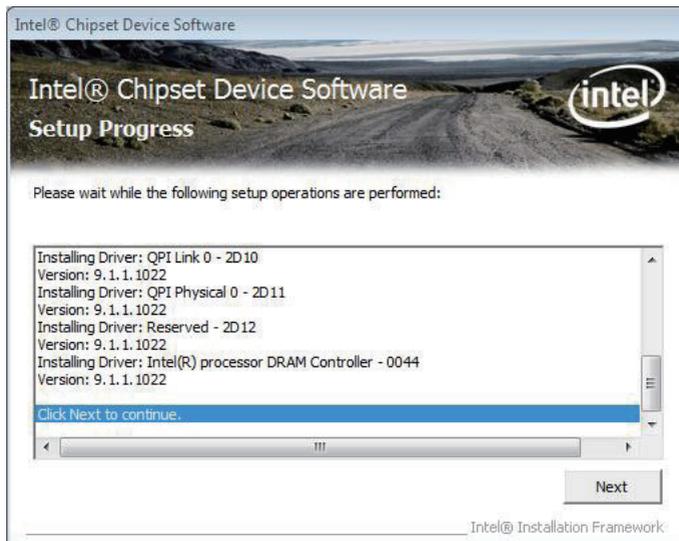
8. Choose "Yes, I want to restart this computer now." and click "Finish >".

4.2.2. Net Framework

1. For Win XP, you need to install Net Framework or VGA may not function normally. Execute "NET Framework 3.5.exe" in the suggested path (\NET Framework). Wait for extracting.

2. Choose "I have read and ACCEPT the terms of the License Agreement" and click "Install >".

3. Wait for seconds.
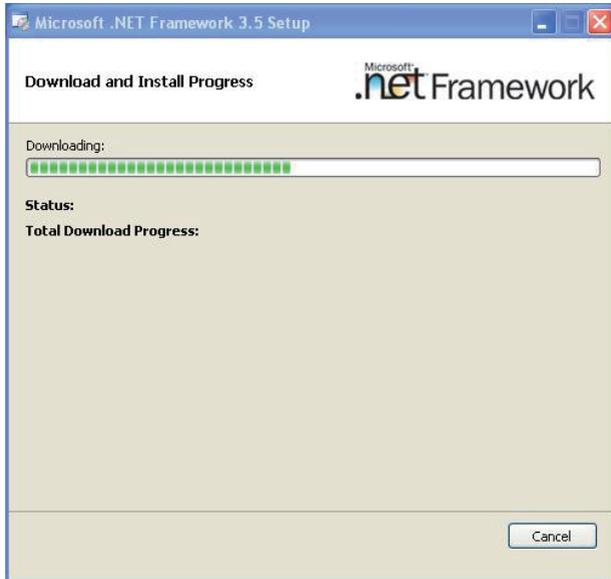
4. Click "Exit >".
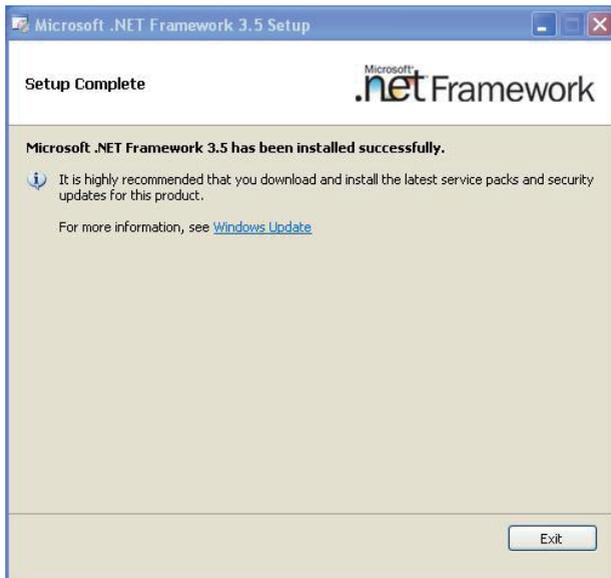
4.2.3. VGA

1. Execute "Setup.exe" in the suggested path (\GRAPHICS\INTEL_WIN7_
   VISTA_32\Win7Vista_15179).
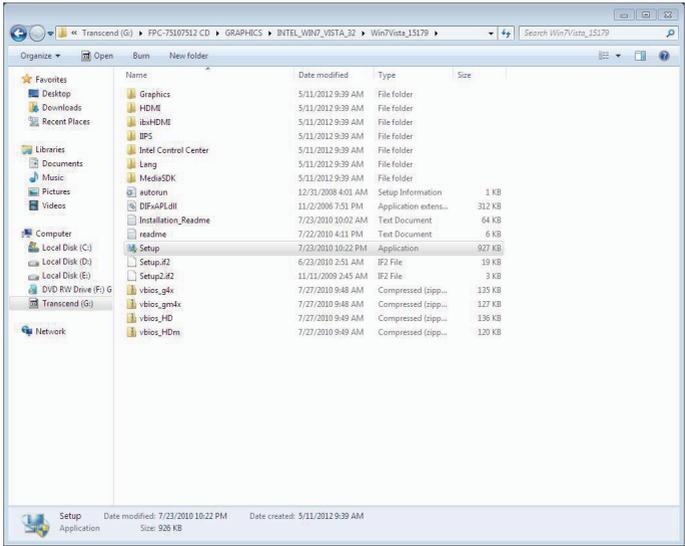
2. Check the box and click "Next >".

3. Click "Yes >".
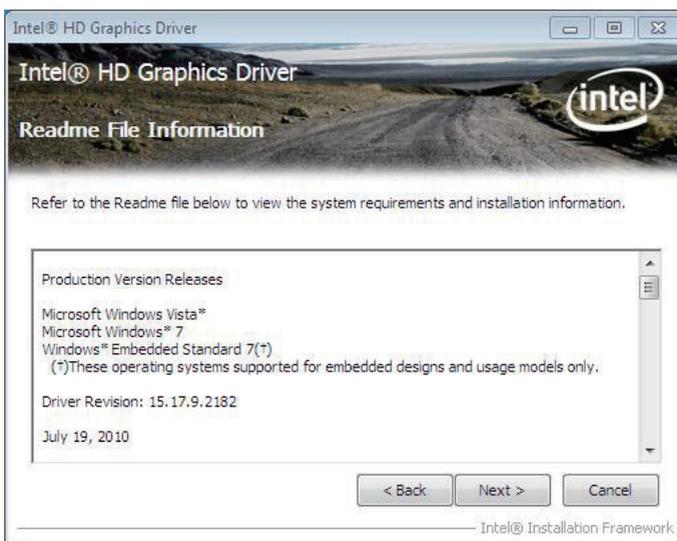
4. Click "Next >".

5. Wait for the process and click "Next >".
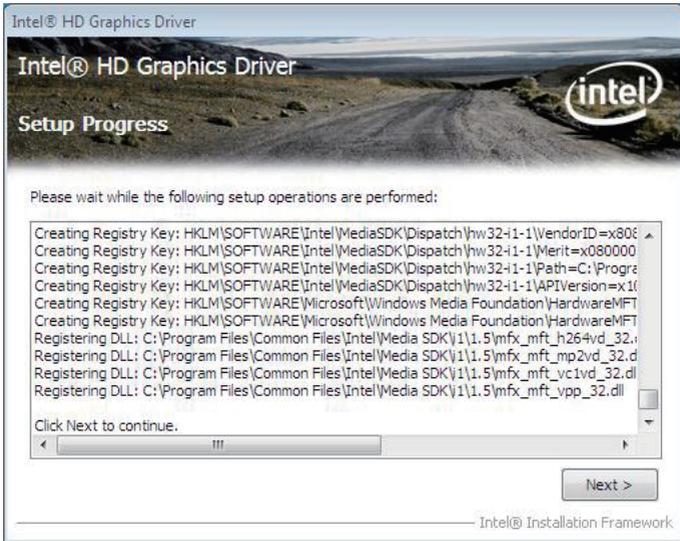
6. Choose "Yes, I want to restart this computer now." and click "Finish >".

4.2.4. ME

1. Execute "Setup.exe" in the suggested path (\ME\6.1.0.1042_PV).
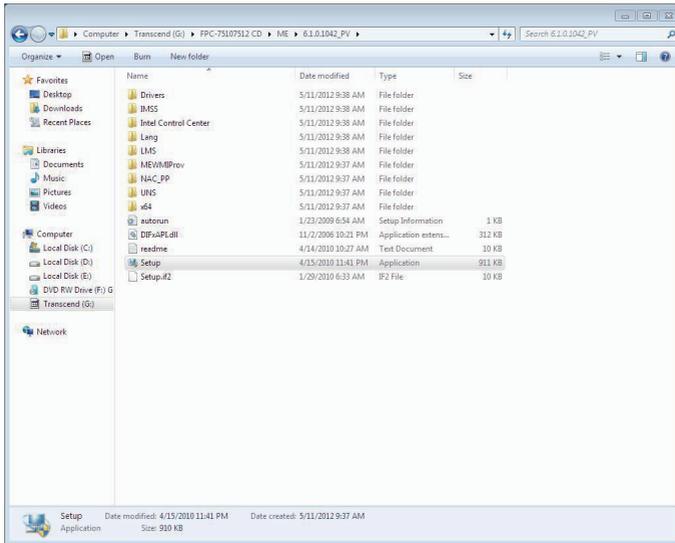
2. Check the box and click "Next >".

3. Click "Yes >".
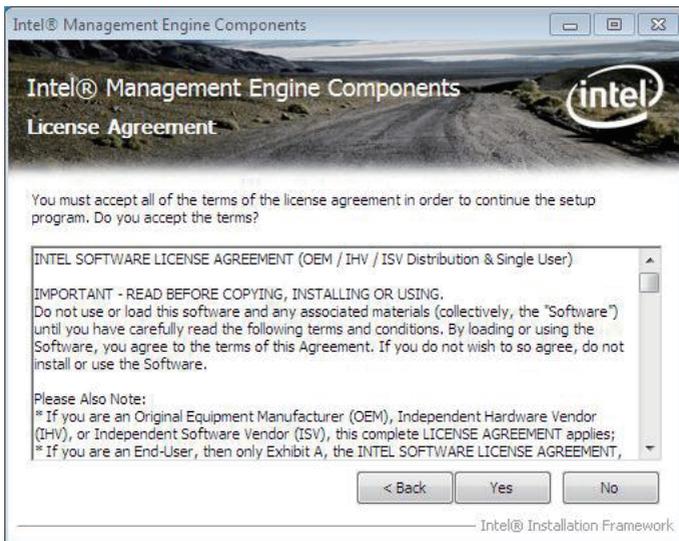
4. Click "Next >".

5. Wait for the process and click "Next >".
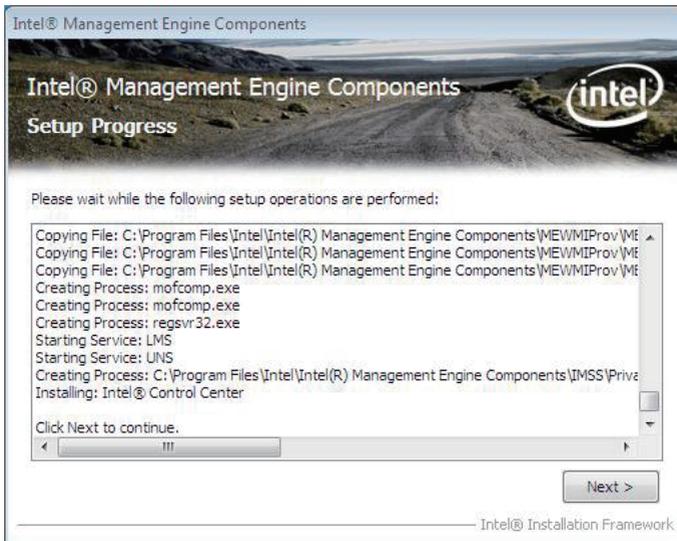
6. Click "Finish >".

4.2.5. Audio

1. Execute "Vista_Win7_R251.exe" in the suggested path (\AUDIO\ REALTEK_HD\Vista_WINDOWS7_R251).
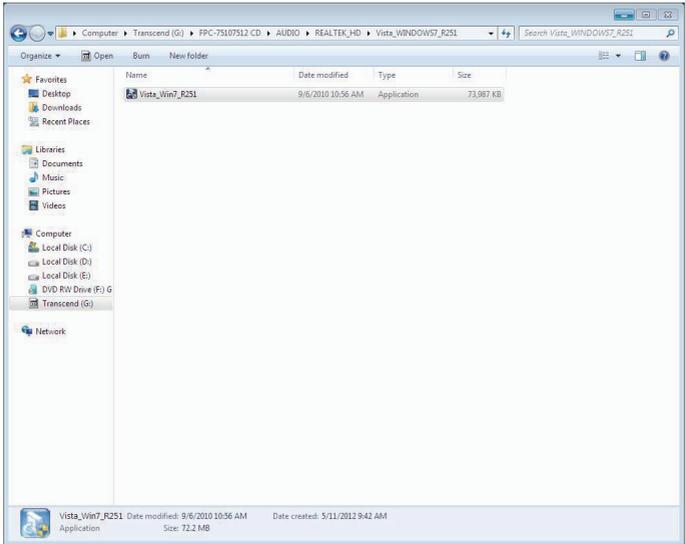
2. Wait for extracting.
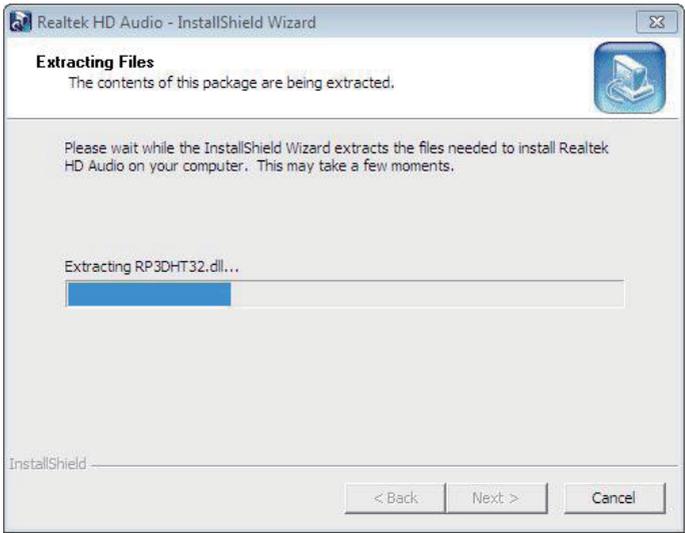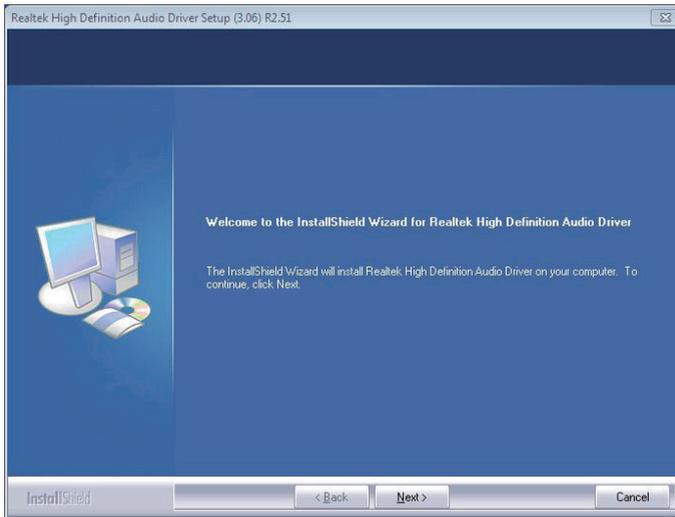
3. Click "Next >".

4. Wait for the process.
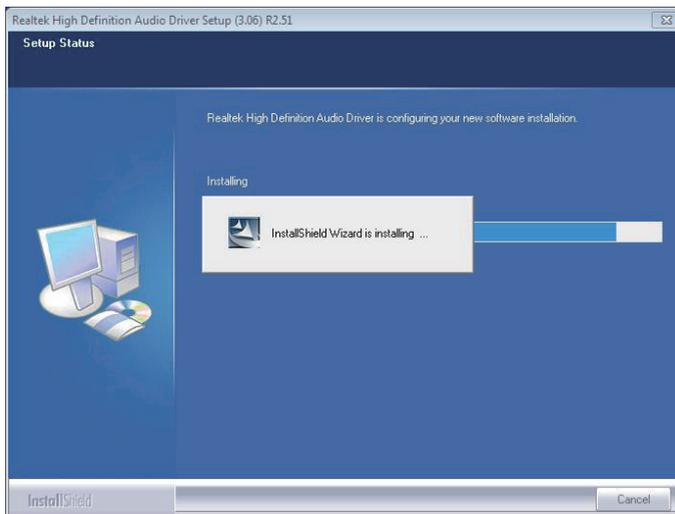
5. Choose "Yes, I want to restart my computer now." and click "Finish >".
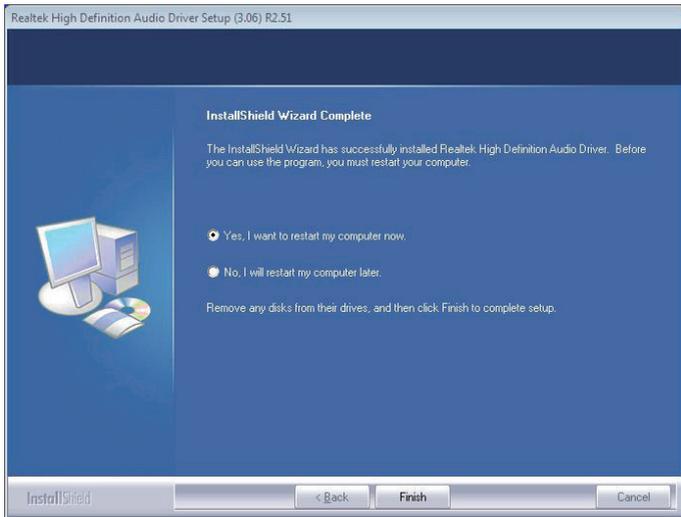
4.2.6. LAN

1. Execute "PROWin32.exe" in the suggested path (\ETHERNET\INTEL\ XP_WIN7_SERIES\32).
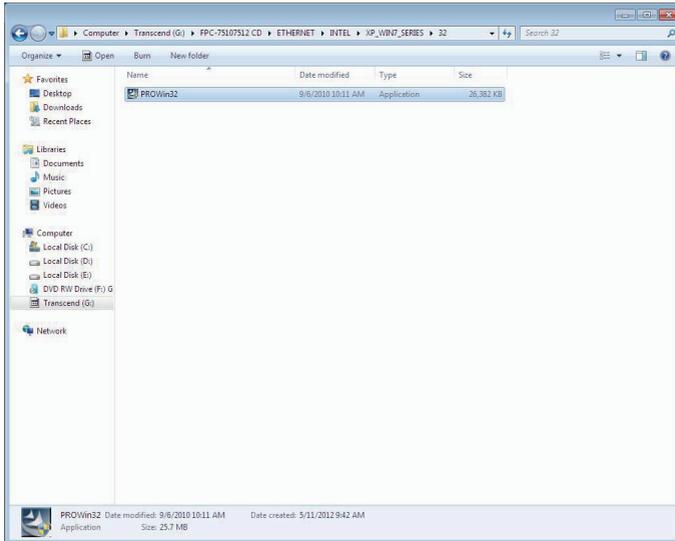
2. Wait for extracting.
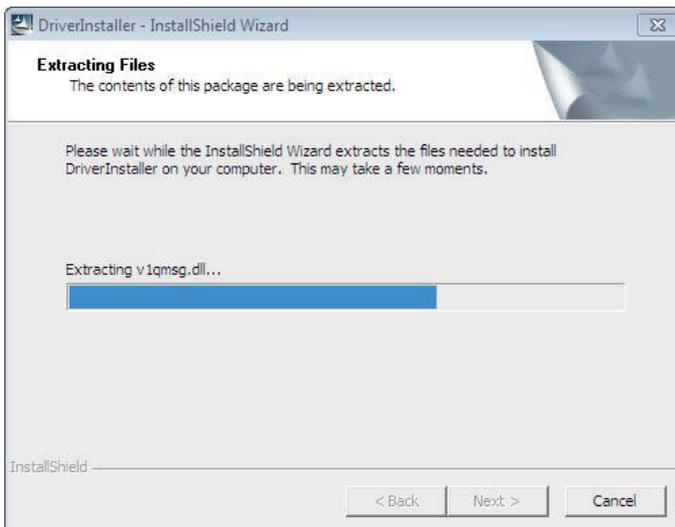
3. Click "Next >".

4. Choose "I accept the terms in the license agreement." and click "Next >".

5. Click "Next >".
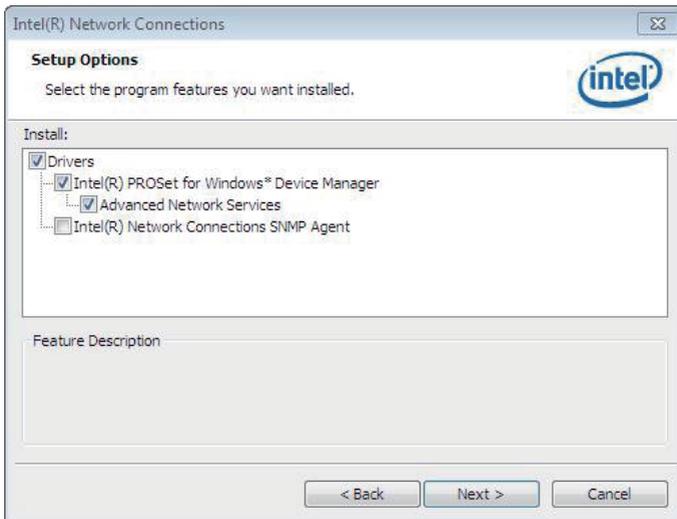
6. Click "Install >".
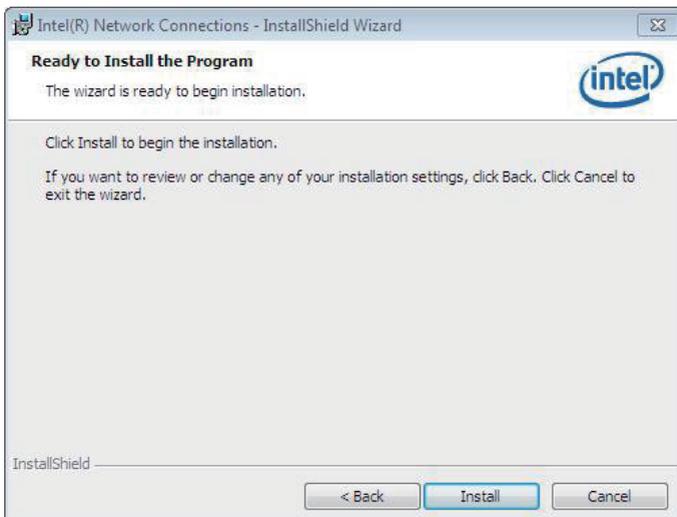
7. Wait for the process.
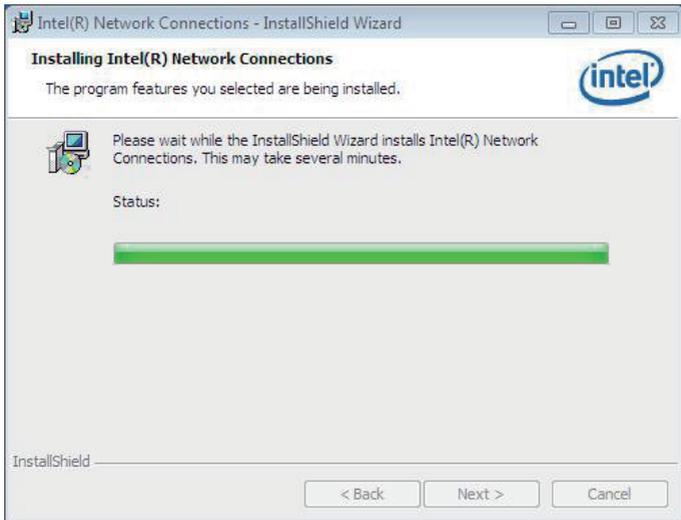
8. Click "Finish >".
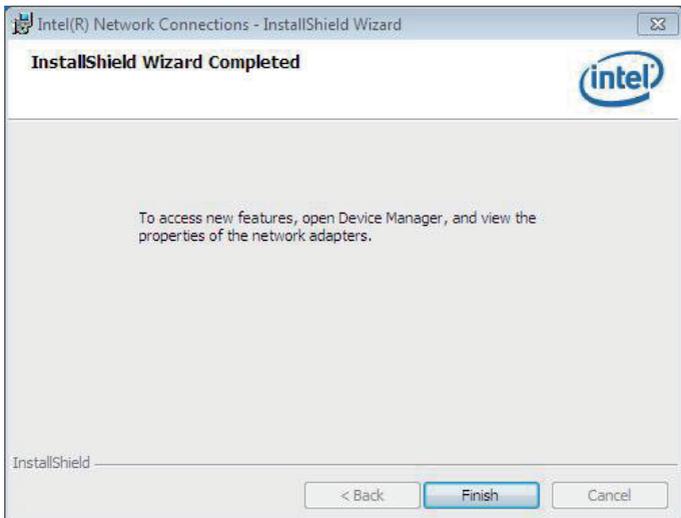
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Chapter 5

BIOS

5.1. BIOS Main Setup

The AMI BIOS provides a setup utility program for specifying the system configurations and settings which are stored in the BIOS ROM of the system. When you turn on the computer, the AMI BIOS is immediately activated. After you have entered the setup utility, use the left/right arrow keys to highlight a particular configuration screen from the top menu bar or use the down arrow key to access and configure the information below.

NOTE: In order to increase system stability and performance, our engineering staff are constantly improving the BIOS menu. The BIOS setup screens and descriptions illustrated in this manual are for your reference only, and may not completely match what you see on your screen.

```
Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
 Main  Advanced  Chipset  Boot  Security  Save & Exit

 BIOS Information                                    Set the Date. Use Tab to
 BIOS Vendor             American Megatrends         switch between Data elements.
 Core Version            4.6.3.7
 BIOS Version            FPC-751X 0.08
 Build Date              06/18/2012 09:58:05

 Memory Information
 Total Memory            2048 MB (DDR3 1066)

 System Date             [Thu 06/17/2010]
 System Time             [03:12:33]

 Access Level            Administrator
                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit Setup
                                                    ESC: Exit

           Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

BIOS Information
Display the BIOS information.

System Date

Set the system date. 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 : 2010 to 2099

System Time

Set the system time.
The time format is: **Hour :** 00 to 23
                        Minute : 00 to 59
                        Second : 00 to 59

5.2. Advanced Settings

```
            Aptio Setup Utility – Copyright (C) 2009 American Megatrends, Inc.
      Main  Advanced  Chipset  Boot  Security  Save & Exit

                                                            Enable or Disable Boot Option
      Legacy OpROM Support                                  for Legacy Network Devices.
      Launch PXE OpROM                    [Disabled]

    ▶ ACPI Settings
    ▶ S5 RTC Wake Settings
    ▶ CPU Configuration
    ▶ SATA Configuration
    ▶ Intel IGD SWSCI OpRegion
    ▶ USB Configuration
    ▶ Super IO Configuration
    ▶ H/W Monitor
    ▶ Second Super IO Configuration
                                                            →←: Select Screen
                                                            ↑↓: Select Item
                                                            Enter: Select
                                                            +/-: Change Opt.
                                                            F1: General Help
                                                            F2: Previous Values
                                                            F9: Optimized Defaults
                                                            F10: Save & Exit Setup
                                                            ESC: Exit


            Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

Launch PXE OpROM

Enable or disable the boot option for legacy network devices.

ACPI Settings

Enable/disable the Advanced Configuration and Power Interface (ACPI).

S5 RTC Wake Settings

Enable system to wake from S5 using RTC alarm.

CPU Configuration

This section is used to configure the CPU. It will also display detected CPU information.

SATA Configuration

This section is used to configure the SATA drives.

Intel® IGD SWSCI OpRegion

Configure the Inte®l graphics display.

USB Configuration

Configure the USB devices.

Super IO Configuration

This section is used to configure the I/O functions supported by the onboard Super I/O chip.

H/W Monitor

This section is used to configure the hardware monitoring events, such as temperature, fan speed and voltages.

Second Super IO Configuration

This section is used to configure the 2nd I/O functions supported by the onboard Super I/O chip.

5.2.1. ACPI Settings

```
                Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
     Advanced

  ACPI Sleep State                    [S1 (CPU Stop Clo...]    Select the highest ACPI sleep
                                                               state the system will enter,
                                                               when the SUSPEND button is
                                                               pressed.



                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F9: Optimized Defaults
                                                               F10: Save & Exit Setup
                                                               ESC: Exit



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```

ACPI Sleep State

This item allows you to select ACPI Sleep State.
ACPI sleep state enables you to send the system in a low-power consuming sleep mode.

5.2.2. S5 RTC Wake Settings

```
                 Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
      Advanced

  Wake system with Fixed Time          [Disabled]              Enable or disable System wake
                                                               on alarm event. When enabled,
  Wake system with Dynamic Time        [Disabled]              System will wake on the
                                                               hr::min::sec specified




                                                               →←: Select Screen
                                                               ↑↓: Select Item
                                                               Enter: Select
                                                               +/-: Change Opt.
                                                               F1: General Help
                                                               F2: Previous Values
                                                               F9: Optimized Defaults
                                                               F10: Save & Exit Setup
                                                               ESC: Exit



                 Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

Wake system with Fixed Time

Enable/Disable System wake on alarm event. When enabled, System will wake on the hr::min::sec specified.

Wake system with Dynamic Time

Enable/Disable System wake on alarm event. When enabled, System will wake on the current time + Increase minute(s).

5.2.3. CPU Configuration

The CPU Configuration setup screen varies depending on the installed processor.

```
              Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
        Advanced

   CPU Configuration                                        Number of cores to enable in
                                                            each processor package.
   Intel(R) Celeron(R) CPU P4500 @ 1.87GHz
   EMT64                             Supported
   Processor Speed                   1862 MHz
   Processor Stepping                20652
   Microcode Revision                d
   Processor Cores                   2
   Intel HT Technology               Not Supported

   Active Processor Cores            [All]
   Limit CPUID Maximum               [Disabled]
   Intel Virtualization Technology   [Disabled]
   Power Technology                  [Default]           ─────────────────────────
                                                          →←: Select Screen
                                                          ↑↓: Select Item
                                                          Enter: Select
                                                          +/-: Change Opt.
                                                          F1: General Help
                                                          F2: Previous Values
                                                          F9: Optimized Defaults
                                                          F10: Save & Exit Setup
                                                          ESC: Exit


              Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

Active Processor Cores

Enter the number of cores to enable in each processor package.

Limit CPUID Maximum

Enable or disable the Limit CPUID Maxium.

Intel Virtualization Technology

When enabled, a VMM can utilize the additional hardware capabilities provided by Vanderpool Technology.

Power Technology

Configure the power management features.

5.2.4. SATA Configuration

It allows you to select the operation mode for SATA controller.

```
              Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
   Advanced

   SATA Configuration                              (1) IDE Mode. (2) AHCI Mode.
                                                   (3) RAID Mode.
   SATA Port0                    Not Present
   SATA Port1                    Not Present
   SATA Port4                    Not Present

   SATA Mode                     [IDE Mode]
   Serial-ATA Controller 0       [Compatible]
   Serial-ATA Controller 1       [Enhanced]


                                                   →←: Select Screen
                                                   ↑↓: Select Item
                                                   Enter: Select
                                                   +/-: Change Opt.
                                                   F1: General Help
                                                   F2: Previous Values
                                                   F9: Optimized Defaults
                                                   F10: Save & Exit Setup
                                                   ESC: Exit


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```

SATA Port 0/1/4
Delivers the type of device attached to the serial ATA connectors.

SATA Mode
Settings: Disable; IDE Mode (Default), AHCI Mode, RAID Mode
IDE Mode: Set the Serial ATA drives as Parallel ATA storage devices.
AHCI Mode: Allow the Serial ATA devices to use AHCI (Advanced Host Controller Interface).
RAID Mode: Create RAID or Intel Matrix Storage configuration on Serial ATA devices.

Serial-ATA Controller 0/1
Enable/ Disable Serial ATA Controller 0/1.
The choice: Disable, Enhanced, Compatible

5.2.5. Intel® IGD SWSCI OpRegion Configuration

Select DVMT/FIXED mode memory size used by Internal Graphics Device.

```
            Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
    Advanced

                                                        Select DVMT/FIXED Mode Memory
                                                        size used by Internal Graphics
    Intel IGD SWSCI OpRegion Configuration              Device

    DVMT/FIXED Memory              [256MB]
    IGD - Boot Type                [DVI-I]




                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit Setup
                                                        ESC: Exit



            Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```
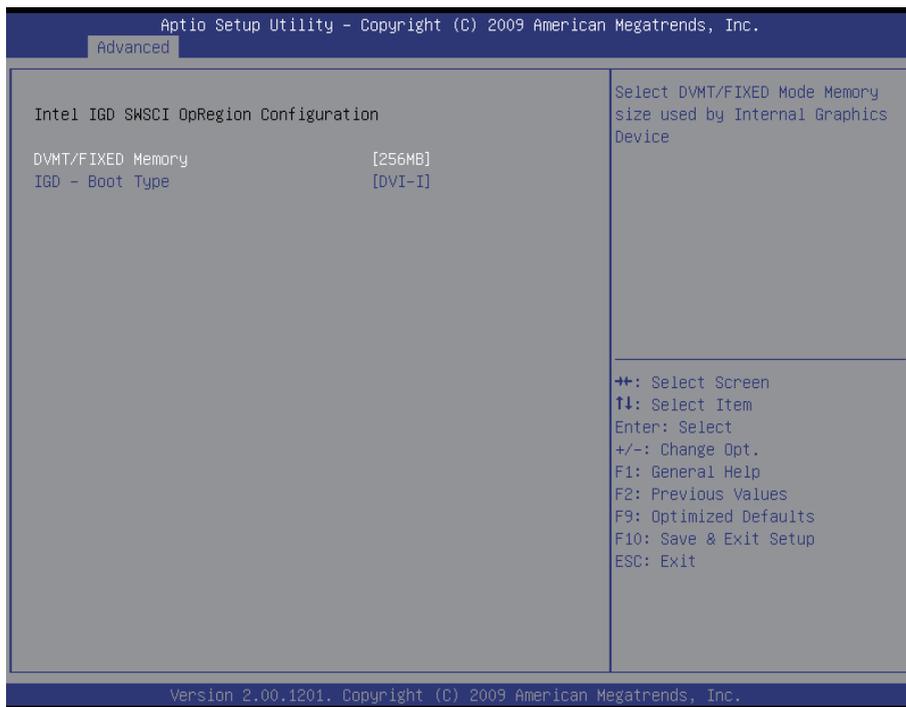
DVMT/FIXED Memory [256 MB]

IGD - Boot Type [DVI-I]

This option allows you to select the display device when you boot up the system.

5.2.6. USB Configuration

```
              Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
    Advanced

USB Configuration                                          Enables Legacy USB support.
                                                           AUTO option disables legacy
USB Devices:                                               support if no USB devices are
      1 Drive, 1 Keyboard, 1 Mouse, 3 Hubs                 connected. DISABLE option will
                                                           keep USB devices available
Legacy USB Support                    [Enabled]            only for EFI applications.
EHCI Hand-off                         [Disabled]

Mass Storage Devices:
SanDisk Cruzer Crossfire0.1           [Auto]

                                                           ↔: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F9: Optimized Defaults
                                                           F10: Save & Exit Setup
                                                           ESC: Exit



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```

Legacy USB Support

Enable/Disable support for legacy USB. AUTO option disables legacy support if no USB devices are connected.

EHCI Hand-Off

Allows you to enable/disable support for operating systems without an EHCI hand-off feature. Do not disable the BIOS EHCI Hand-Off option if you are running a Windows® operating system with USB device.

SanDisk Cruzer Crossfire0.1

The choice: Disable, Disable, Auto

5.2.7. Super IO Configuration

```
              Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
    Advanced

  Super IO Configuration                              Set Parameters of Parallel
                                                      Port (LPT/LPTE)
  Super IO Chip                  F71869E
▶ Parallel Port Configuration

  Power On After Power Fail      [Power Off]




                                                      →←: Select Screen
                                                      ↑↓: Select Item
                                                      Enter: Select
                                                      +/-: Change Opt.
                                                      F1: General Help
                                                      F2: Previous Values
                                                      F9: Optimized Defaults
                                                      F10: Save & Exit Setup
                                                      ESC: Exit



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```

Parallel Port Configuration

This allows you to set parameters of Parallel Port (LPT/LPTE).

Power On After Power Fail

After Power Failure is a power management option that will set the mode of operation if a power loss occurs.
Settings:
Power Off: Keep the power off until the power button is pressed.
Power On: Restore power to the computer.

5.2.8. PC Health Status

```
            Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
    Advanced

  Pc Health Status

  CPU Temperature                    : +66 ℃
  System Temperature                 : +28 ℃
  CPU FAN Speed                      : N/A
  SYS FAN Speed                      : 5791 RPM
  VCore                              : +1.160 V
  +5V                                : +5.003 V
  +1.5V                              : +1.520 V
  +12V                               : +11.968 V
  +3.3V                              : +3.328 V
  VBAT                               : +3.264 V

                                                    →←: Select Screen
                                                    ↑↓: Select Item
                                                    Enter: Select
                                                    +/-: Change Opt.
                                                    F1: General Help
                                                    F2: Previous Values
                                                    F9: Optimized Defaults
                                                    F10: Save & Exit Setup
                                                    ESC: Exit



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```

PC Health Status

The hardware monitor menu shows the operating temperature, fan speeds and system voltages.

5.2.9. Second Super IO Configuration

```
            Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
  Advanced

  Second Super IO Configuration                            Set Parameters of Serial Port
                                                           1 (COMA)
  Super IO Chip                     Fintek F81216
▶ Serial Port 1 Configuration
▶ Serial Port 2 Configuration
▶ Serial Port 3 Configuration
▶ Serial Port 4 Configuration



                                                           ──────────────────────────
                                                           →←: Select Screen
                                                           ↑↓: Select Item
                                                           Enter: Select
                                                           +/-: Change Opt.
                                                           F1: General Help
                                                           F2: Previous Values
                                                           F3: Optimized Defaults
                                                           F4: Save  ESC: Exit



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```

Serial Port 0~4 Configuration

Use the Serial Port option to enable or disable the serial port.

5.3. Chipset Settings

This submenu allows you to configure the specific features of the chipset installed on your system. The chipset manage bus speeds and access to system memory resources, such as DRAM. It also coordinates communications with the PCI bus.

Note: Beware of that setting inappropriate values in items of this menu may cause system to malfunction.

```
             Aptio Setup Utility — Copyright (C) 2009 American Megatrends, Inc.
      Main  Advanced  Chipset  Boot  Security  Save & Exit

   ▶ North Bridge                                    North Bridge Parameters
   ▶ South Bridge




                                                     ➔←: Select Screen
                                                     ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F9: Optimized Defaults
                                                     F10: Save & Exit Setup
                                                     ESC: Exit



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```

5.3.1. North Bridge

```
              Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
                          Chipset

  Memory Information                                    ▲  Select which Graphics
                                                           Controller to use as the
  CPU Type                             Arrandale            primary boot device.

  Total Memory                         2048 MB (DDR3 1066)

  Memory Slot0                           0 MB (DDR3 1066)
  Memory Slot1                         Not Present
  Memory Slot2                         2048 MB (DDR3 1066)
  Memory Slot3                         Not Present

  CAS# Latency(tCL)                      7
  RAS# Active Time(tRAS)                20
  Row Precharge Time(tRP)                7               ↔: Select Screen
  RAS# to CAS# Delay(tRCD)               7               ↑↓: Select Item
  Write Recovery Time(tWR)               8               Enter: Select
  Row Refresh Cycle Timea(tRFC)         86               +/-: Change Opt.
  Write to Read Delay(tWTR)              4               F1: General Help
  Active to Active Delay(tRRD)           4               F2: Previous Values
  Read CAS# Precharge(tRTP)              5               F9: Optimized Defaults
                                                         F10: Save & Exit Setup
                                                         ESC: Exit
  Initiate Graphic Adapter             [PEG/IGD]         ↑↓: Select Item
  Graphics Turbo IMON Current          31                Enter: Select
                                                         +/-: Change Opt.
  VT-d                                 [Disabled]        F1: General Help
                                                         F2: Previous Values
  PCI Express Compliance Mode          [Disabled]        F9: Optimized Defaults
                                                         F10: Save & Exit Setup
  PCI Express Port                     [Auto]            ESC: Exit
  IGD Memory                           [32M]
  PAVP Mode                            [Disabled]
  PEG Force Gen1                       [Disabled]      ▼

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```

Initiate Graphic Adapter

This item allows you to select which graphics controller to use as the primary boot device.

Graphics Turbo IMON Current

Graphics turbo IMON current values supported.

VT-d

Enable VT-d function on MCH.

PCI Express Compliance Mode

Enable/Disable PCI Express Compliance Testing Mode.

PCI Express Port

Enable/Disable PCI Express Port.

IGD Memory

Select IGD Share Memory Size.

PAVP Mode

Select PAVP Mode used by Internal Graphics Device.

PEG Force Gen1

Force PCI Express Port to Gen1.

5.3.2. South Bridge Configuration

```
            Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
                Chipset
                                                          Power-Supply Type.
      SB Chipset Configuration

      Power-Supply Type              [ATX]

      Audio Configuration
      Azalia HD Audio                [Enabled]
    ▶ USB Configuration



                                                        ↔: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit Setup
                                                        ESC: Exit



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```

Power-Supply Type

Select AT or ATX mode.

Azalia HD Audio

Use the Azalia HD Audio option to enable or disable the High Definition Audio controller.

USB Configuration

```
              Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
                Chipset

  USB Configuration                                          Enable / Disable All USB
                                                             Devices
  All USB Devices                       [Enabled]

  EHCI Controller 1                     [Enabled]
  EHCI Controller 2                     [Enabled]




                                                             →←: Select Screen
                                                             ↑↓: Select Item
                                                             Enter: Select
                                                             +/-: Change Opt.
                                                             F1: General Help
                                                             F2: Previous Values
                                                             F9: Optimized Defaults
                                                             F10: Save & Exit Setup
                                                             ESC: Exit




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```

All USB Devices

Enable/Disable all USB devices.

EHCI Controller 1/2

Enable/Disable USB 2.0 (EHCI) Support.

5.4. Boot Configuration

The Boot menu items allow you to change the system boot options.

```
        Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
   Main  Advanced  Chipset  Boot  Security  Save & Exit

   Boot Configuration                                    Select the keyboard NumLock
                                                         state
   Bootup NumLock State              [On]

   Boot Option Priorities
   Boot Option #1                    [SanDisk Cruzer C...]
   Boot Option #2                    [Built-in EFI Shell]
   Boot Option #3                    [UEFI: SanDisk Cr...]

   Hard Drive BBS Priorities

                                                         →←: Select Screen
                                                         ↑↓: Select Item
                                                         Enter: Select
                                                         +/-: Change Opt.
                                                         F1: General Help
                                                         F2: Previous Values
                                                         F9: Optimized Defaults
                                                         F10: Save & Exit Setup
                                                         ESC: Exit


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```

Bootup NumLock State

This setting determines whether the Num Lock key should be activated at boot up.

Boot Option Priorities

Select the boot sequence of the hard drives.

Hard Drive BBS Priorities

This allows you to set the hard drive boot priority. The BIOS will attempt to arrange the hard disk boot sequence automatically. You can also change the booting sequence. The number of device items that appears on the screen depends on the number of devices installed in the system.

5.5. Security

```
                  Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
     Main  Advanced  Chipset  Boot  Security  Save & Exit

     Password Description                               Set Setup Administrator
                                                        Password
     If ONLY the Administrator's password is set,
     then this only limits access to Setup and is
     only asked for when entering Setup
     If ONLY the User's password is set, then this
     is a power on password and must be entered to
     boot or enter Setup. In Setup the User will
     have Administrator rights


     Administrator Password

                                                        →←: Select Screen
                                                        ↑↓: Select Item
                                                        Enter: Select
                                                        +/-: Change Opt.
                                                        F1: General Help
                                                        F2: Previous Values
                                                        F9: Optimized Defaults
                                                        F10: Save & Exit Setup
                                                        ESC: Exit




                  Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```
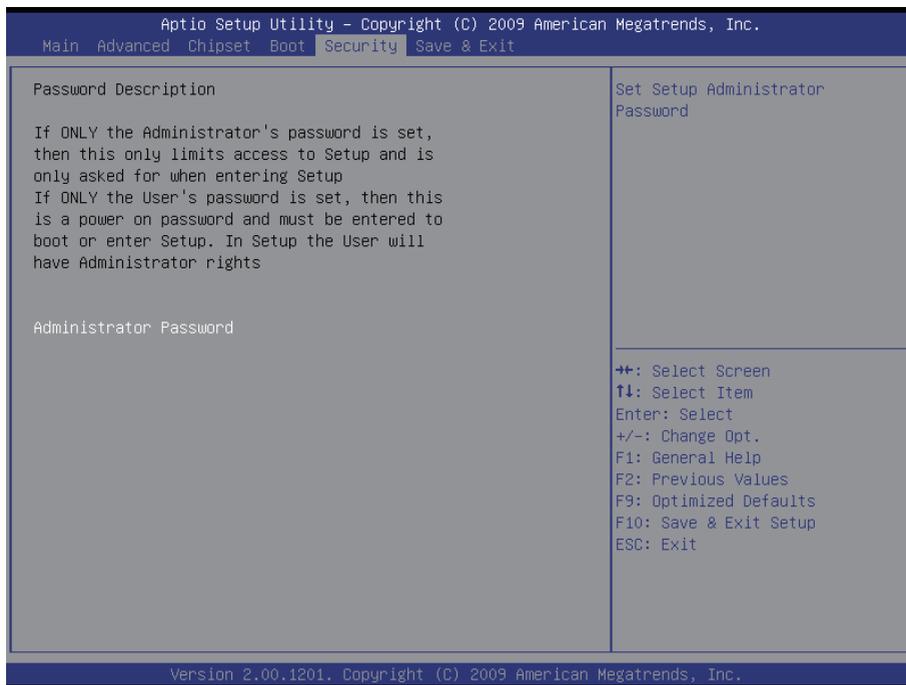
Administrator Password

Use the Administrator Password to set or change a administrator password.

ENTER PASSWORD
Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <ESC> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.
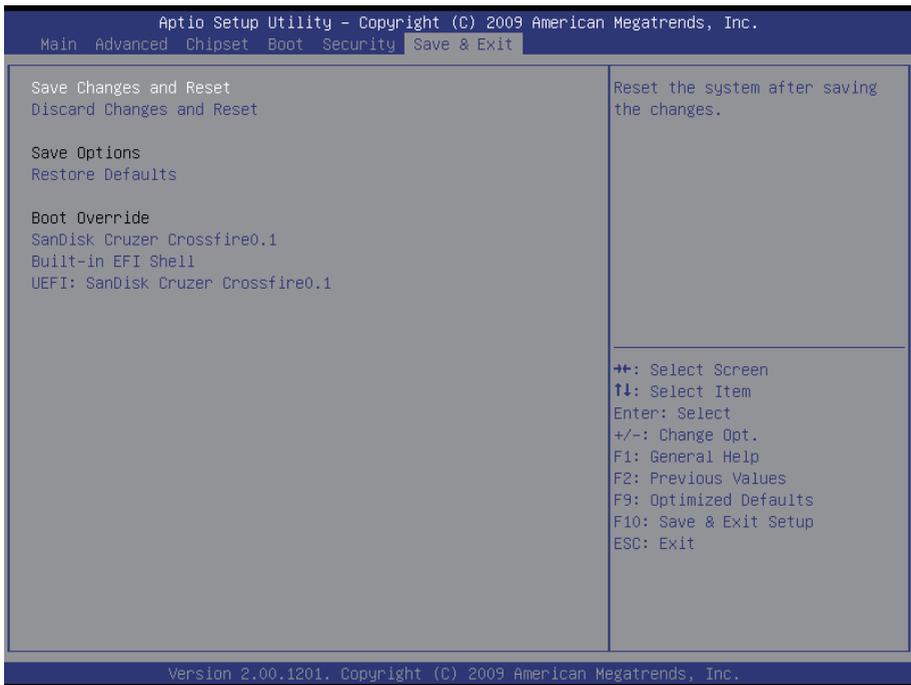
PASSWORD DISABLED
When a password has been enabled, you will be prompted to enter it every

time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You can determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to "System", the password will be required both at boot and at entry to Setup. If it's set to "Setup", prompting only occurs when trying to enter Setup.

5.6. Save & Exit

```
        Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
  Main  Advanced  Chipset  Boot  Security  Save & Exit

  Save Changes and Reset                          Reset the system after saving
  Discard Changes and Reset                       the changes.

  Save Options
  Restore Defaults

  Boot Override
  SanDisk Cruzer Crossfire0.1
  Built-in EFI Shell
  UEFI: SanDisk Cruzer Crossfire0.1

                                                  →←: Select Screen
                                                  ↑↓: Select Item
                                                  Enter: Select
                                                  +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F9: Optimized Defaults
                                                  F10: Save & Exit Setup
                                                  ESC: Exit

        Version 2.00.1201. Copyright (C) 2009 American Megatrends, Inc.
```

Save Changes and Reset

Pressing <Enter> on this item and it asks for confirmation:

Save configuration changes and exit setup?

Pressing <OK> stores the selection made in the menus in CMOS - a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Discard Changes and Reset

Exit system setup without saving any changes.
<ESC> key can be used for this operation.

Save Options

Restore Defaults
Restore system to factory default.
Pressing <Enter> on this item and it asks for confirmation prior to executing this command.

Boot Override

This group of functions includes a list of tokens, each of them corresponding to one device within the boot order. Select a drive to immediately boot that device regardless of the current boot order.

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Appendices

Appendix A: I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses which also becomes the identity of the device.
The following table lists the I/O port addresses used.

Address	Device Description
0x000002F8-0x000002FF	Communications Port (COM2)
0x000003E8-0x000003EF	Communications Port (COM3)
0x000002E8-0x000002EF	Communications Port (COM4)
0x00000061-0x00000061	System speaker
0x00000000-0x00000CF7	PCI bus
0x00000000-0x00000CF7	Direct memory access controller
0x00000D00-0x0000FFFF	PCI bus
0x0000E000-0x0000EFFF	Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 2 - 3B44
0x00000070-0x00000071	System CMOS/real time clock
0x00000400-0x0000047F	System board
0x00001180-0x0000119F	System board
0x00000500-0x0000057F	System board
0x0000F0A0-0x0000F0A7	Intel(R) HD Graphics
0x000003B0-0x000003BB	Intel(R) HD Graphics
0x000003C0-0x000003DF	Intel(R) HD Graphics
0x00000010-0x0000001F	Motherboard resources
0x00000022-0x0000003F	Motherboard resources
0x00000044-0x0000005F	Motherboard resources
0x00000062-0x00000063	Motherboard resources
0x00000065-0x0000006F	Motherboard resources
0x00000072-0x0000007F	Motherboard resources
0x00000080-0x00000080	Motherboard resources
0x00000084-0x00000086	Motherboard resources
0x00000088-0x00000088	Motherboard resources
0x0000008C-0x0000008E	Motherboard resources

0x00000090-0x0000009F	Motherboard resources
0x000000A2-0x000000BF	Motherboard resources
0x000000E0-0x000000EF	Motherboard resources
0x000004D0-0x000004D1	Motherboard resources
0x00000290-0x0000029F	Motherboard resources
0x000000F0-0x000000FF	Numeric data processor
0x0000F090-0x0000F097	Intel(R) 5 Series/3400 Series Chipset Family 6 Port SATA AHCI Controller - 3B2F
0x0000F080-0x0000F083	Intel(R) 5 Series/3400 Series Chipset Family 6 Port SATA AHCI Controller - 3B2F
0x0000F070-0x0000F077	Intel(R) 5 Series/3400 Series Chipset Family 6 Port SATA AHCI Controller - 3B2F
0x0000F060-0x0000F063	Intel(R) 5 Series/3400 Series Chipset Family 6 Port SATA AHCI Controller - 3B2F
0x0000F020-0x0000F03F	Intel(R) 5 Series/3400 Series Chipset Family 6 Port SATA AHCI Controller - 3B2F
0x00000020-0x00000021	Programmable interrupt controller
0x000000A0-0x000000A1	Programmable interrupt controller
0x0000F000-0x0000F01F	Intel(R) 5 Series/3400 Series Chipset Family SMBus Controller - 3B30
0x00000040-0x00000043	System timer
0x00000081-0x00000083	Direct memory access controller
0x00000087-0x00000087	Direct memory access controller
0x00000089-0x0000008B	Direct memory access controller
0x0000008F-0x0000008F	Direct memory access controller
0x000000C0-0x000000DF	Direct memory access controller
0x00000060-0x00000060	Standard PS/2 Keyboard
0x00000064-0x00000064	Standard PS/2 Keyboard
0x00000378-0x0000037F	Printer Port (LPT1)
0x000003F8-0x000003FF	Communications Port (COM1)

Appendix B: Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ 0	System timer
IRQ 1	Standard PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 4	Communications Port (COM1)
IRQ 8	System CMOS/real time clock
IRQ 10	Communications Port (COM3)
IRQ 11	Communications Port (COM4)
IRQ 11	Intel(R) 5 Series/3400 Series Chipset Family SMBus Controller - 3B30
IRQ 12	Microsoft PS/2 Mouse
IRQ 13	Numeric data processor
IRQ 16	Intel(R) Management Engine Interface
IRQ 16	Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B3C
IRQ 19	Intel(R) 5 Series/3400 Series Chipset Family 6 Port SATA AHCI Controller - 3B2F
IRQ 22	High Definition Audio Controller
IRQ 23	Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B34

Appendix C: Memory Mapping

Address	Device Description
0xA0000-0xBFFFF	PCI bus
0xA0000-0xBFFFF	Intel(R) HD Graphics
0xD0000000-0xFFFFFFFF	PCI bus
0xD0000000-0xFFFFFFFF	Intel(R) HD Graphics
0xD0000-0xD3FFF	PCI bus
0xD4000-0xD7FFF	PCI bus
0xD8000-0xDBFFF	PCI bus
0xDC000-0xDFFFF	PCI bus
0xE0000-0xE3FFF	PCI bus
0xE4000-0xE7FFF	PCI bus
0xFE400000-0xFE5FFFFF	Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 2 - 3B44
0xFE400000-0xFE5FFFFF	Intel(R) 82574L Gigabit Network Connection
0xFED1C000-0xFED1FFFF	System board
0xFEC00000-0xFECFFFFF	System board
0xFED08000-0xFED08FFF	System board
0xFF000000-0xFFFFFFFF	System board
0xFE620000-0xFE623FFF	High Definition Audio Controller
0xFED14000-0xFED19FFF	System board
0xE0000000-0xEFFFFFFF	System board
0xFED90000-0xFED93FFF	System board
0xFED20000-0xFED3FFFF	System board
0xFEE00000-0xFEE0FFFF	System board
0xFE000000-0xFE3FFFFF	Intel(R) HD Graphics
0xFE62A000-0xFE62A00F	Intel(R) Management Engine Interface
0xFE500000-0xFE51FFFF	Intel(R) 82574L Gigabit Network Connection
0xFE520000-0xFE523FFF	Intel(R) 82574L Gigabit Network Connection

0xFE626000-0xFE6267FF	Intel(R) 5 Series/3400 Series Chipset Family 6 Port SATA AHCI Controller - 3B2F
0xFE600000-0xFE61FFFF	Intel(R) 82578DM Gigabit Network Connection
0xFE629000-0xFE629FFF	Intel(R) 82578DM Gigabit Network Connection
0xFE625000-0xFE6250FF	Intel(R) 5 Series/3400 Series Chipset Family SMBus Controller - 3B30
0xFE627000-0xFE6273FF	Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B34
0xFE628000-0xFE6283FF	Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B3C

Appendix D: Digital I/O Setting

Digital I/O can read from or write to a line or an entire digital port, which is a collection of lines. This mechanism can be used to meet user's various applications such as industrial automation, customized circuit, and laboratory testing. The source code below written in C is the applicable sample for programming.

```c
/*----- Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

void main(void){


   int SMB_PORT_AD  = 0xF000;
   int SMB_DEVICE_ADD = 0x6E; /*75111R's Add=6eh */

   //programming DIO as output
   //0:input 1:Output

/*    Index 10, GPIO1x Output pin control  */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x10,0xff);
   delay(10);
/*    Index 20, GPIO2x Output pin control  */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x20,0xff);
   delay(10);

/*    Index 40, GPIO3x Output pin control  */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x40,0xff);
   delay(10);

   //programming DIO default LOW

/*    Index 11, GPIO1x Output Data value   */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x11,0x00);
   delay(10);
/*    Index 21, GPIO2x Output Data value   */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x21,0x00);
   delay(10);
/*    Index 41, GPIO3x Output Data value   */
   SMB_Byte_WRITE(SMB_PORT_AD,SMB_DEVICE_ADD,0x41,0x00);
   delay(10);
}
//-----------------------------------------------------------------
---------
unsigned char SMB_Byte_READ (int SMPORT, int DeviceID, int REG_INDEX)
{
   unsigned char SMB_R;
```

```
   outportb(SMPORT+02, 0x00);              /* clear */
   outportb(SMPORT+00, 0xff);              /* clear */
   delay(10);
   outportb(SMPORT+04, DeviceID+1);         /* clear */
   outportb(SMPORT+03, REG_INDEX);       /* clear */
   outportb(SMPORT+02, 0x48);              /* read_byte */
   delay(10);
   SMB_R= inportb(SMPORT+05);
   return SMB_R;
}

void SMB_Byte_WRITE(int SMPORT, int DeviceID, int REG_INDEX, int REG_
DATA)

{
   outportb(SMPORT+02, 0x00);              /* clear */
   outportb(SMPORT+00, 0xff);              /* clear */
   delay(10);
   outportb(SMPORT+04, DeviceID);           /* clear */
   outportb(SMPORT+03, REG_INDEX);       /* clear */
   outportb(SMPORT+05, REG_DATA);         /* read_byte */
   outportb(SMPORT+02, 0x48);              /* read_byte */
   delay(10);
}
```

Appendix E: Watchdog Timer (WDT) Setting

WDT is widely applied to industry computers to monitor activities of CPU. The programmed application triggers WDT with 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 counts down to zero and then reset the system automatically.

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

```c
/*----- Include Header Area -----*/
#include "math.h"
#include "stdio.h"
#include "dos.h"

/**-------- index port 0x2e ---------*/
void main()
{
        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 */
}
```