LGX Extended Temperature AU910/AU912

Fanless Intel® Core™ i5/i7 Embedded System

User's Manual

Version 1.0

CE

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Table of Contents

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FCC Class A

This device complies with Part 15 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.

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. Disconnect this equipment from the AC outlet before cleaning it. Use a moist cloth. Do not use liquid or sprayed detergent for cleaning.

7. The openings on the enclosure are for air convection and protect the

equipment from overheating. DO NOT COVER THE OPENINGS.

8. Position the power cord so that people cannot step on it. Do not place anything over the power cord.

9. If the equipment will not be used for a long time, disconnect it from the power source to avoid damage by transient overvoltage.

10. Never pour any liquid into opening. This may cause fire or electrical shock.

11. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.

12. 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.

13. The sound pressure level at the operator's position, according to

14. IEC 704-1:1982, is no more than 70dB(A).

15. 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 LGX AU910 and AU912 and components contain very delicately Integrated Circuits (IC). To protect the unit and components against damage caused by static electricity, you should always follow the precautions below:

  1. Disconnect your system 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 unit, whenever they 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 trashcan. 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.

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

http://www.logicsupply.com

e-mail:info@logicsupply.com

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 merchantibility 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.

Ordering Information

AU910	Fanless embedded controller w/ 1 x PCIe x8 slot
AU912	Fanless embedded controller w/ 1 x PCIe x1 slot + 1 x PCIe x16 slot
DMK-9XX	DIN rail kit 9XX series
WMK-9XX	Wall-mount kit of 9XX series
PW-19V6A3-T	120 W AC/DC adapter kit
44M-5xDB9F	COM converter cable (1*44-pin male to 4*DB9 male + 1*DB9 female) L=200 mm

Chapter 1
General Information

1.1 Introduction

The LGX AU910 and AU912 are targeted at many different applications. They easily meet the challenges of specific markets, such as advanced kiosks, digital signage, GSM Server, and harsh environment applications.

All-In-One Platform

The entire unit is fully integrated in order to provide a plug-and-play device.

Compact-sized

The kernel of the AU910/AU912 is a non-standard form factor embedded mainboard. The whole system takes up minimal 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. It can be easily modified to fit many different applications according to customers' requests.

Powerful Communication Capability

The AU912 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, you receive improved graphics and 3D rendering performance and supports numerous display/video output options includes VGA and DisplayPort.

Advanced Storage Solution

The AU910 and AU912 come with a CFast 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 with your local dealer or distributor. The package should contain the following items:

Standard:

- • 1 x AU910 or AU912 Embedded System
- • 1 x Accessory Box (Driver CD/User Manual/Screws/Cable/Terminal Block)

Options:

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

- • AC/DC Adapter Kit
- • DIN Rail Kit
- • Wall-mount Kit
- • COM Converter Cable (1 x 44-pin male to 4 x DB9 male + 1 x DB9 female) L=200mm

1.4 Specifications

System Kernel	
Processor	Intel® Socket G i5/i7 series processors
BIOS	AMI Flash BIOS
Chipset	Intel® QM57
Graphics	Intel® HD Graphics
System Memory	2 x 204-pin Dual-channel DDR3 SO-DIMM sockets Up to 8 GB at 800/1066 MHz
Serial ATA	2 x SATA 3 Gb/sec.
Expansion Bus	1 x PCI Express Mini Card slot; 1 x SIM socket 1 x PCI Express x8 slot w/riser card (AU910) 1 x PCI Express x16 slot w/ riser card (AU912) 1 x PCI Express x1 slot w/ riser card (AU912)
Ethernet Controller	2 x Intel® WG82574IT Gigabit Ethernet controllers
Watchdog Timer	1 ~ 255 levels reset
I/O Ports	
Serial Port	4 x Serial ports via one DB-44 female connector COM1~COM4: RS-232 COM3, 4: RS-232/485
*Selectable Port	1 x LPT 1 x 16-bit Digital I/O (8-in/8-out) 1 x DVI-D (default)
USB Port	8 x USB 2.0 ports
LAN Port	2 x RJ45
Video Port	1 x DB-15 for Analog RGB 1 x DisplayPort
KB/MS	1 x 6-pin Mini-DIN for keyboard & mouse
Audio	Mic-in/Line-out (6 W pre-amplified)
Storage	
HDD/SSD	1 x 2.5" drive bay for HDD or SSD
CF	1 x CFAST socket (externally accessible)
Safety	
FCC	Class A certified
CE	Certified

Environment	
Operating Temp.	-20ºC ~ 55ºC (-4ºF ~ 131ºF), ambient w/ air flow
Storage Temp.	-40ºC ~ 85ºC (-40ºF ~ 185ºF)
Relative Humidity	10 ~ 95% @ 40ºC (non-condensing)
Vibration	3 Grms/5 ~ 500 Hz/random operation
Shock & Crash	Operating 20 G, 11 ms; Non-operating 40 G, 11 ms (HDD)
	Operating 40 G, 11 ms; Non-operating 60 G, 11 ms (CFast/SSD)
	Crash 80 G, 11 ms
Mechanical	
Construction	Aluminum alloy
Mounting	Wall mounting and DIN rail mounting
Weight	4.5 kg (9.9 lb)
Dimensions (w x h x d)	AU910: 195 x 90 x 268 mm (7.68” x 3.54” x 10.55”) AU912: 195 x 110 x 268 mm (7.68" x 4.33" x 10.55”)

* The selectable ports, including DVI-D, LPT and Digital I/O, are options that only one of which can be equipped.

1.5 Power Information

Power Connector	1 x 4-pin DC input receptacle combined with a power on/off switch for remote control
Input Voltage	DC 10 ~ 28 V
Power Consumption	60 W (max.)

1.6 Dimensions

AU910

Dimensions (w x h x d): 195 x 90 x 268 mm (7.68" x 3.54" x 10.55")

268.00
224.00
184.00

96.00
90.00

207.00

195.00

NUT
UNC #6-32

4.00
6.00

Unit: mm
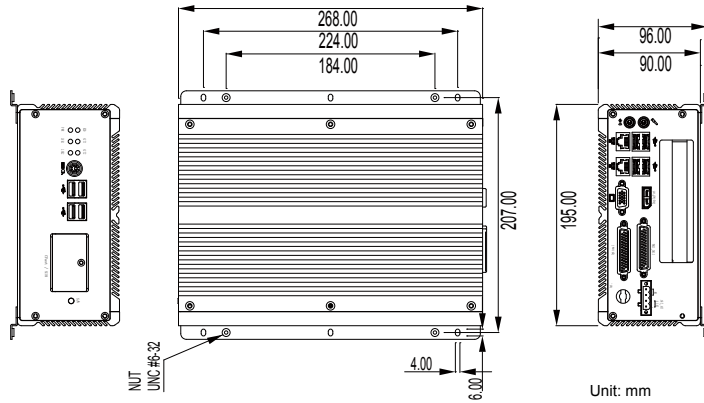
AU912

Dimensions (w x h x d): 195 x 110 x 268 mm (7.68" x 4.33" x 10.55")

268.00
224.00
184.00

116.00
110.00

207.00

195.00

NUT
UNC #6-32

4.00
6.00

Unit: mm
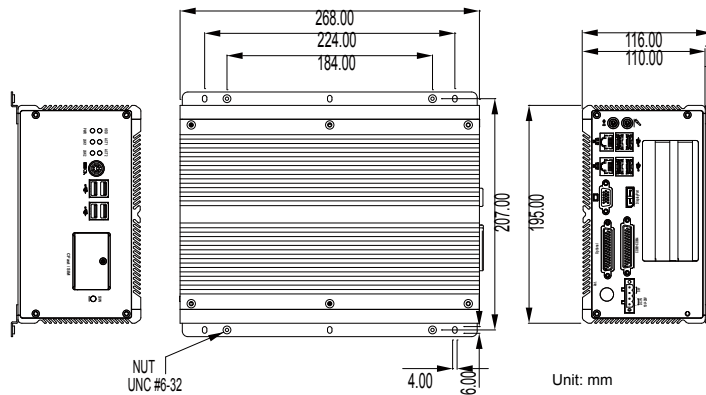
1.7 Locating Controls and Connectors

Both AU910 and AU912 have the same I/O ports and connectors at the front panel.

Please take a moment to identify those controls and connectors shown in the following figures.

Front Panel

LAN2 Active LED

LAN1 Active LED

HDD status LED

USB Ports

CFast/SIM Socket

HDD ACT1 ACT2

PWR LNK1 LNK2

S/W

CFast / SIM

Power Status LED

LAN1 Link LED

LAN2 Link LED

Keyboard/Mouse Port

Power On/Off Switch
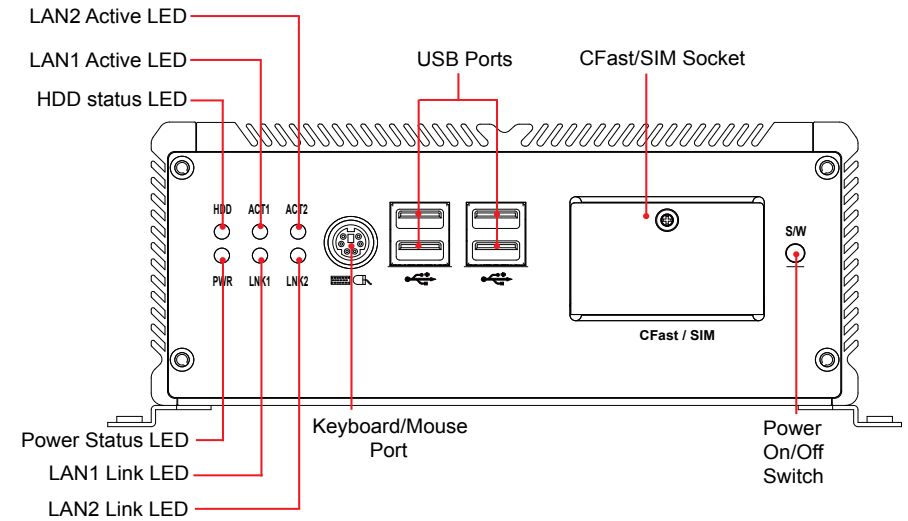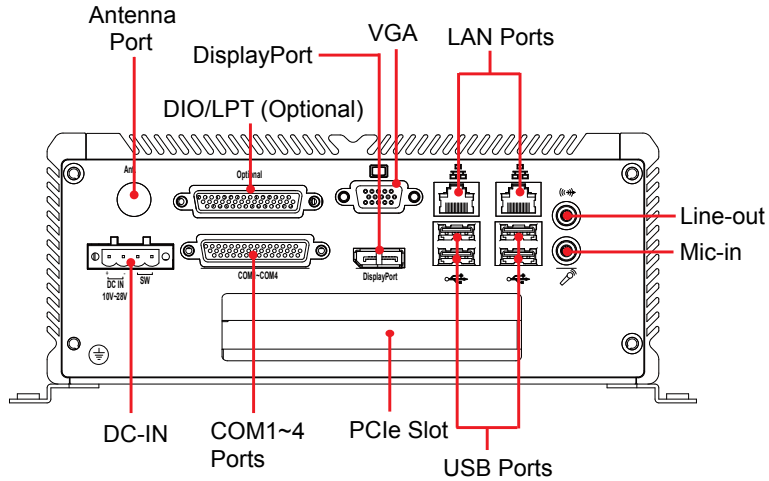
Rear Panel: AU910

Rear Panel: AU912
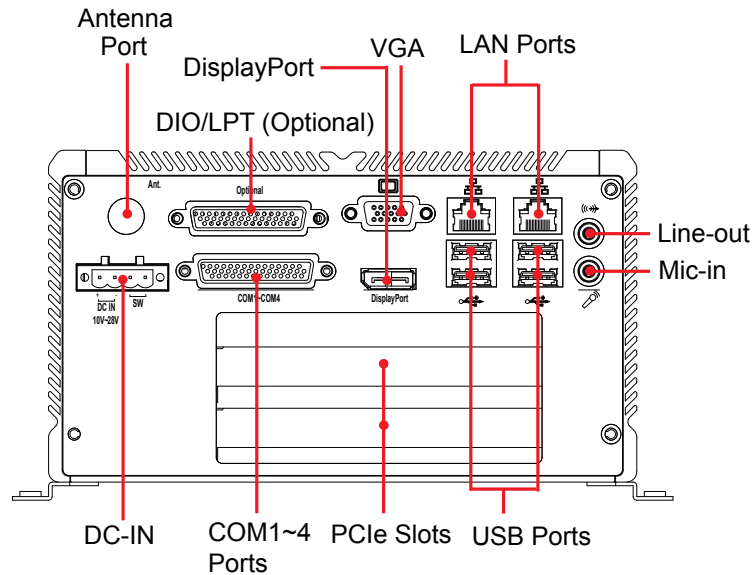
1.8 Connecting Peripherals

The user can use the I/O interfaces located at the rear side of the chassis to connect to external peripheral devices, such as a mouse, a keyboard, a monitor, serial devices or parallel printer, etc. Before connection, make sure that the computer and the peripheral devices are turned off.

1.8.1 VGA/DVI/DisplayPort Video Outputs

Both the AU910 and AU912 are equipped with two video outputs: one 15-pin VGA and one DisplayPort with an optional DVI output off the back panel.

The new DisplayPort video interface features a small USB sized connector, WQXGA High Definition (2560 x 1600), interoperability with DVI and HDMI over DisplayPort connector, etc.

AU910
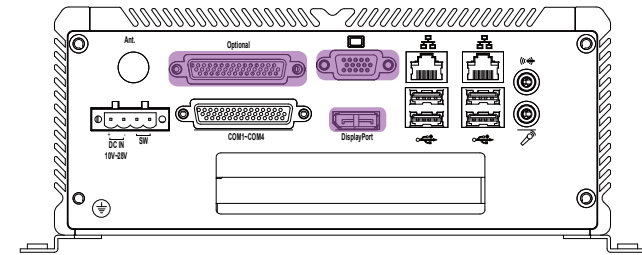
AU912
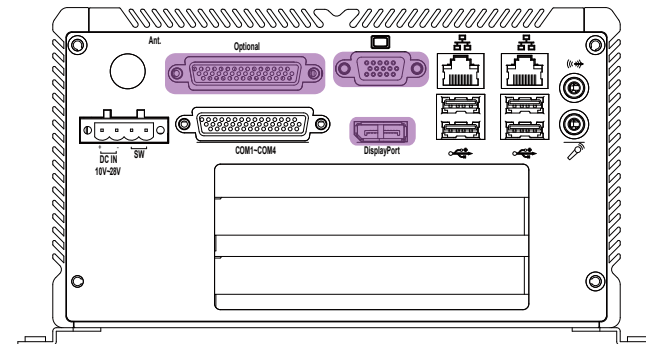
1.8.2 Serial Ports (COM1 ~4)

Both AU910 and AU912 are built with integrated serial ports that combine COM1 ~ COM4 into a D-sub 44-pin female connector. Each port supports RS-232; in addition, COM3, 4 supports RS-232/485 selectable.

To connect to any serial device, follow the steps below:

1.   Turn off the system and the serial devices.

2.   Attach the interface cable of the serial device to the serial connector. Be sure to fasten the retaining screws.

3.   Turn on the computer and the attached serial devices.

4.   Refer to the serial device's manual for instructions to configure the operating environment to recognize the new attached devices.

5.   If the serial device needs specified IRQ or address, you may need to run the CMOS setup to change the hardware device setup.

AU910
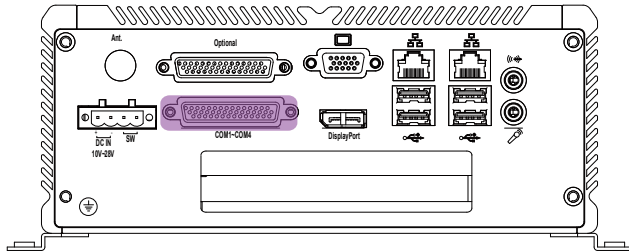
AU912
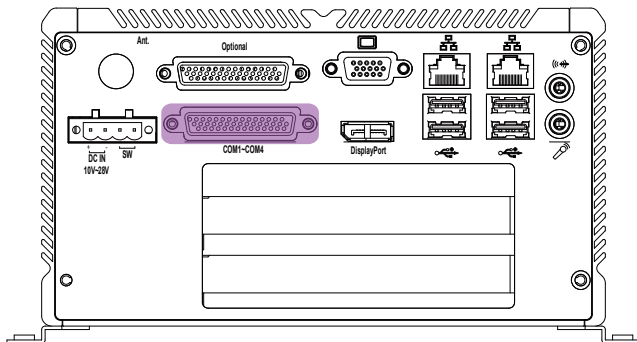
1.8.3 LAN Ports

Both AU910 and AU912 provide two Intel® WG82574IT 10/100/1000 Base-T Ethernet (RJ45) ports. For network connection, follow the instructions below:

1.   Turn off the system and the Ethernet hubs.

2.   Plug in one end of a 10/100/1000Base-T hub cable to the system's RJ45 jack.

AU910
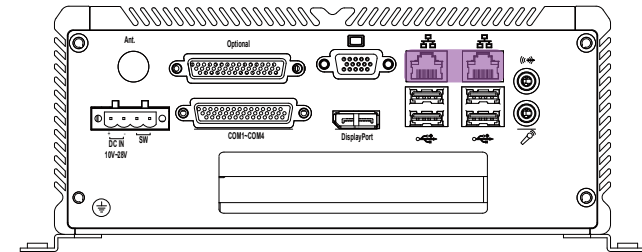
AU912
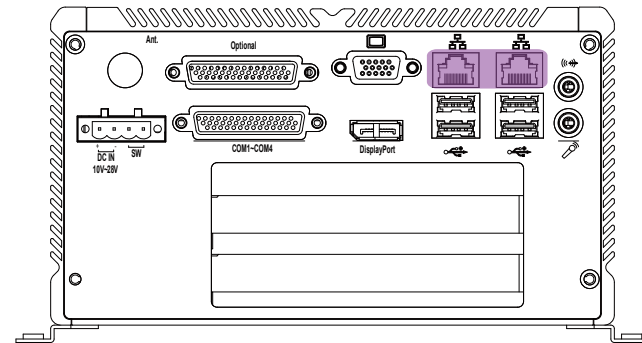
1.8.4 USB Ports

Both AU910 and AU912 have four USB ports on the front panel and four USB ports on the rear panel to connect to external USB devices. USB ports and devices are hot-pluggable. Therefore, a USB device can be connected at any time without turning off your system.

Front Panel
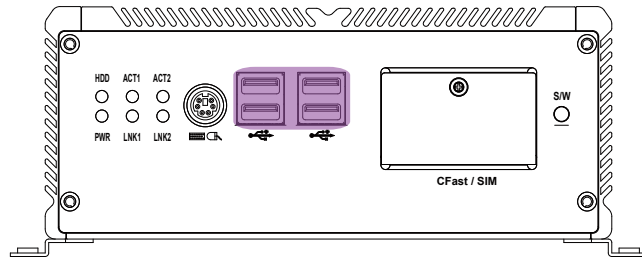
Rear Panel: AU910
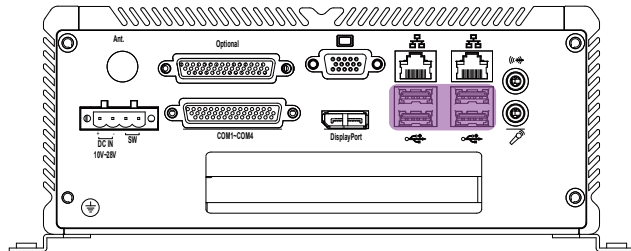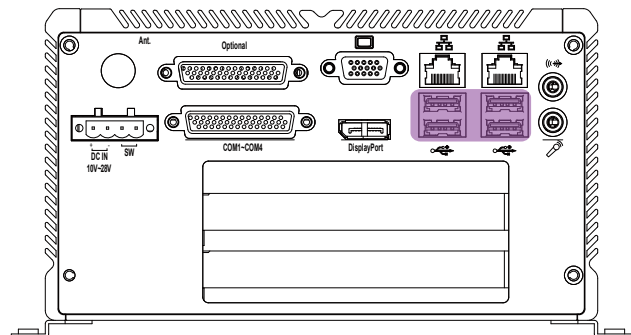
Rear Panel: AU912

1.8.5 Keyboard and Mouse

There is one PS2 keyboard/mouse connector located on the front panel.
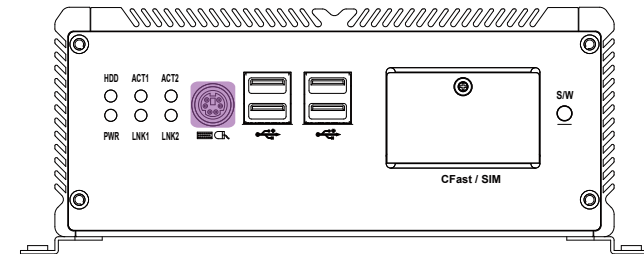
Note: To connect an AT keyboard, an adapter is required.

1.8.6 Expansion PCI Express Slots

AU910 has one expansion slot located at the rear panel, the AU912 has two.

AU910
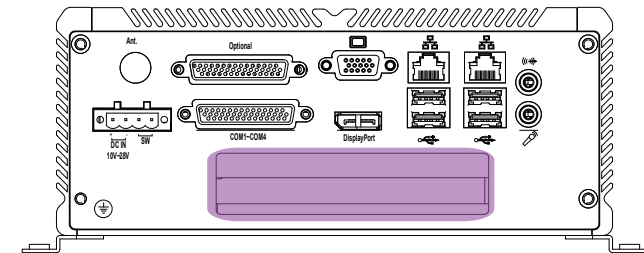
AU912
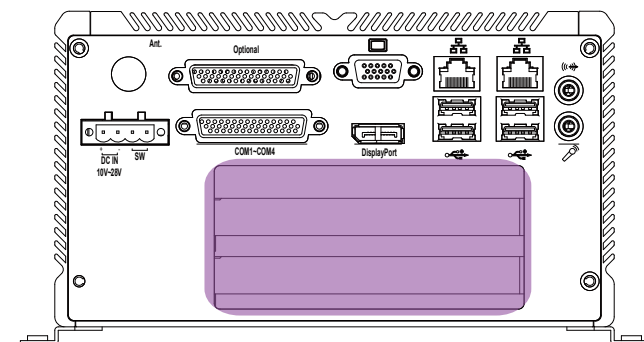
1.8.7 Audio Line-out/Mic-in

Two audio jacks for Line-out and Mic-in located at the rear panel.

AU910
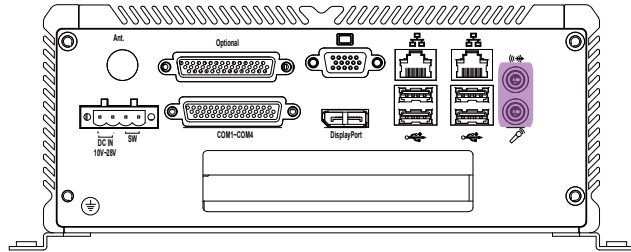
AU912
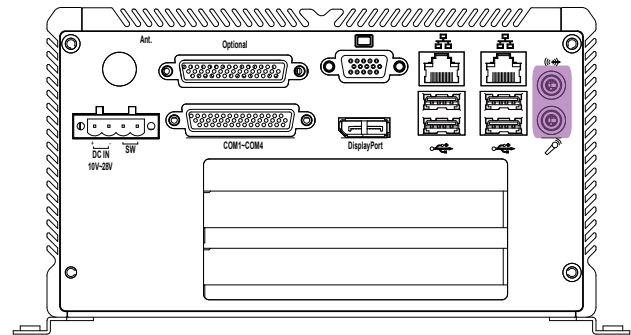
1.8.8 DC Power Input and Power ON/OFF Button

For DC power input, the computer is equipped with a 4-pin terminal block receptacle on the rear panel. The "S/W" button located on the front panel is used to power ON/OFF the computer. See the figures below.

Front Panel
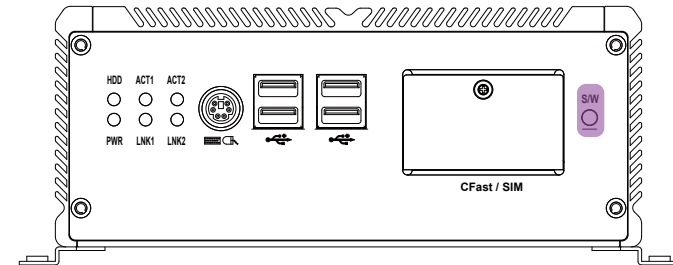
Rear Panel: AU910
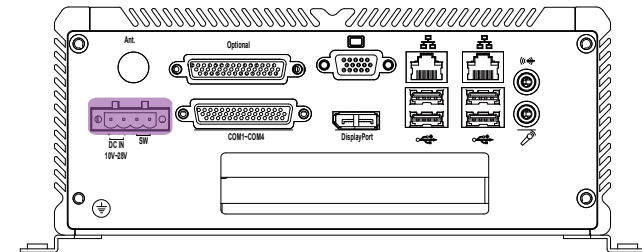
Rear Panel: AU912
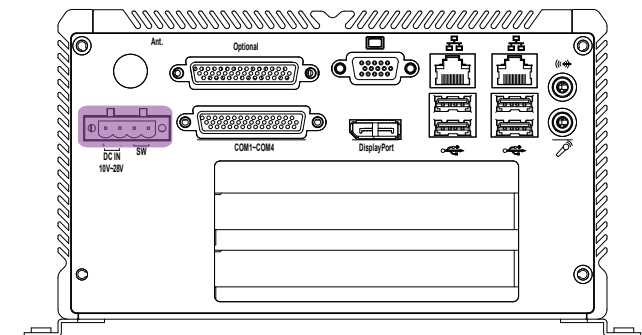
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Chapter 2
The Engine of AU910/AU912

2.1 Board Layout

The engine of AU910/AU912 is constructed by the combination of one PCBA board. Such a combination makes system customization feasible.

Mainboard Top View
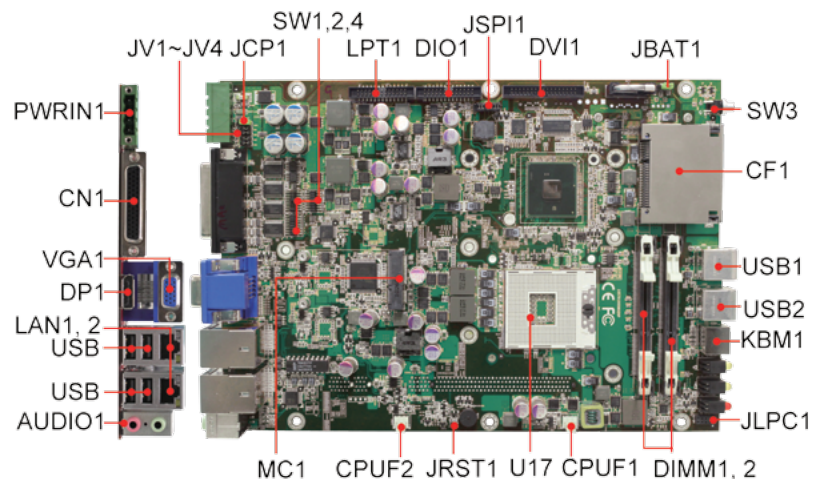
AU910/AU912 Bottom View
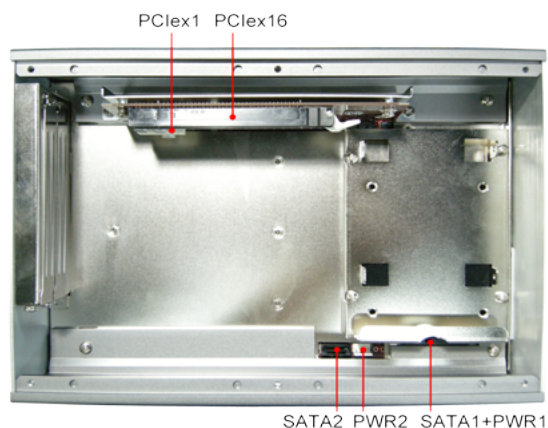
2.2 Jumpers and Connectors

2.2.1 Jumpers & Connectors List

Jumpers

Label	Function
JBAT1	Clear CMOS Setup
JCP1	COM Ports Power Selection
JV1 ~ JV4	RI/5V/12V (Pin 9) Selection for Each of the 4 COM Ports

Connectors

Label	Function	Label	Function
PWRIN1	Power Input	DVI1	DVI Display Box Header
CN1	COM1, 2: RS-232 COM3, 4: RS-232/RS-485	JSPI1	System BIOS Enable/Disable Pin Header
VGA1	CRT Display Connector	DIO1	16-bit Digital I/O Connector
DP1	DisplayPort Connector		
LAN1, 2	Ethernet Connector (includes USB Connectors)	LPT1	Parallel Port
		SW1, 2, 4	RS-232/RS-485 Select Jumper (for COM3, 4)
AUDIO1	Audio Jack Connector		
MC1	Mini Card Slot	PCIe1	PCIe x16 Interface Slot
CPUF1	CPU Fan Connector	PCIe2	PCIe x1 Interface Slot
CPUF2	System Fan Connector	SATA1	Serial ATA + Power Connectors
JRST1	Reset Pin Header		
U17	CPU Socket	SATA2	Serial ATA Connectors
DIMM1, 2	204-pin dual-channel DDR3 SO-DIMM Slot	PWR1, 2	HDD/SSD Power Connectors
JLPC1	For Debug (Factory Use Only)		
		SIM1	SIM Card Socket
KBM1	PS2 Keyboard and Mouse Connector		
USB1, 2	USB Connectors		
CF1	CFast Socket		
SW3	Power ON/OFF Button		

2.2.2 Jumper Settings

Label	Function	Jumper Settings	
JBAT1	Clear CMOS	1-2: Keep CMOS (default)	3 2 1
		2-3: Clear CMOS	3 2 1
JCP1	COM Ports Power Selection	1-2: +5V (default)	3 2 1
		2-3: +12V	3 2 1
JV1~JV4	RI/5V/12V (Pin 9) Selection for Each of the 4 COM Ports	1-2: RI (default)	3 2 1
		2-3: 5V or 12V (depends on JCP1)	3 2 1

2.2.3 Pin Assignments for Connectors

PWRIN1 (Power Input)

Power Input Terminal Block Receptacle
Connector type: 4-pin terminal block

Pin	Description
1	DC input 10~28V
2	GND
3	GND-
4	Remote Power Button
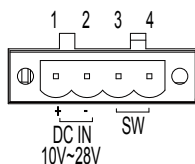
CN1 (COM1 ~ COM4)

DB-44 female connector: Serial port 1 ~ 4
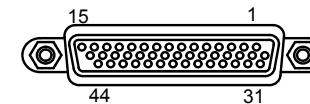
	Pin	Desc.	Pin	Desc.		Pin	Desc.	Pin	Desc.
COM1 (RS-232)	1	DCD	2	RXD	COM2 (RS-232)	11	DCD	12	RXD
	3	TXD	4	DTR		13	TXD	14	DTR
	5	GND	6	DSR		15	GND	16	DSR
	7	RTS	8	CST		17	RTS	18	CST
	9	RI	10	GND		19	RI	20	GND
COM3 (RS-232)	21	DCD	22	RXD	COM4 (RS-232)	31	DCD	32	RXD
	23	TXD	24	DTR		33	TXD	34	DTR
	25	GND	26	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					

COM3, COM4 RS-485 PIN OUT

RS-485

Pin	Signal	Description
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	

44M-5xDB9F (COM Converter Cable) (Optional)

1 to 5 COM converter cable: 4 x DB9 male and 1 x DB9 female connectors

CN4   CN6   CN3   CN5   CN2

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

Note: CN6 on DB9 Cable Controller is unworkable.

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

VGA1 (CRT Display Connector)

Three-row/15-pin VGA Connector
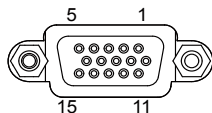
Pin	Description	Pin	Description	Pin	Description
1	RED	6	GND	11	N/C
2	GREEN	7	GND	12	VDDAT
3	BLUE	8	GND	13	HSYNC
4	N/C	9	VCC	14	VSYNC
5	GND	10	GND	15	VDCLK

DP1 (DisplayPort Connector)

Digital Audio/Video Connector
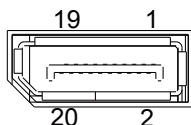
Pin	Description	Pin	Description
1	LANE_0P	11	GND
2	GND	12	LANE_3N
3	LANE_0N	13	GND
4	LANE_1P	14	GND
5	GND	15	GND
6	LANE_1N	16	COM3_CTS#
7	LANE_2P	17	AUX_N
8	GND	18	HPD
9	LANE_2N	19	RTN_PWR
10	LANE_3P	20	PWR

LAN1/2 (LAN Ports)

RJ45 Connector
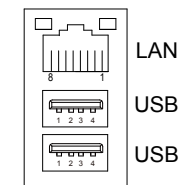
Pin	Description	Pin	Description
1	MDI0+	5	MDI2+
2	MDI0-	6	MDI2-
3	MDI1+	7	MDI3+
4	MDI10-	8	MDI3-

USB1/2 (USB Ports)

USB 2.0 type A connector

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

AUDIO1 (Audio Jacks)

Jack	Description
Green	Line-out
Pink	Microphone

MC1 (Mini Card Slot)
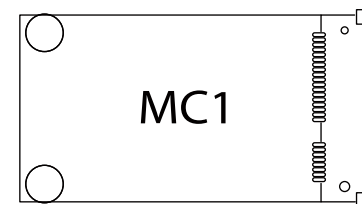
CPUF1/2 (Fan Connector)

Pin	Description
1	GND
2	+12V
3	FAN_CTL

KBM1 (Keyboard & Mouse)

PS2 keyboard & Mouse
Connector type: 6-pin Mini-DIN connector

Pin	Description
1	KB_DAT
2	MS_DAT
3	GND
4	VCC5
5	KBCLK
6	MSCLK
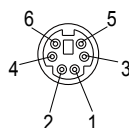
CF1 (CFast Slot)

CFast Card Type I/II slot
Connector type: 7+17-pin CFast Card connector consisting of a SATA compatible 7-pin signal connector and a 17-pin power and control connector.
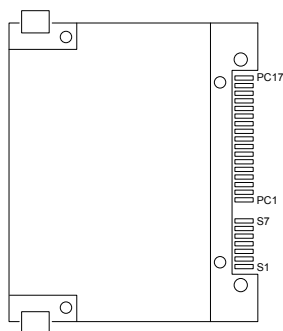
Pin	Segment	Name	Type	Description
S1	SATA	SGND	Signal GND	Ground for signal integrity
S2	SATA	A+	SATA Differential	Signal Pair A
S3	SATA	A-	SATA Differential	
S4	SATA	SGND	Signal GND	Ground for signal integrity
S5	SATA	B-	SATA Differential	Signal Pair A
S6	SATA	B+	SATA Differential	
S7	SATA	SGND	Signal GND	Ground for signal integrity
	Key			
	Key			
PC1	PWR/CTL	CDI	CMOS Input	Card Detect In
PC2	PWR/CTL	GND	Device GND	
PC3	PWR/CTL	TBD	TBD	
PC4	PWR/CTL	TBD	TBD	
PC5	PWR/CTL	TBD	TBD	
PC6	PWR/CTL	TBD	TBD	
PC7	PWR/CTL	GND	Device GND	
PC8	PWR/CTL	LED1	LED Output	LED Output
PC9	PWR/CTL	LED2	LED Output	LED Output
PC10	PWR/CTL	IO1	CMOS Input/Output	Reserved Input/Output
PC11	PWR/CTL	IO2	CMOS Input/Output	Reserved Input/Output
PC12	PWR/CTL	IO3	CMOS Input/Output	Reserved Input/Output
PC13	PWR/CTL	PWR	3.3V	Device Power (3.3V)
PC14	PWR/CTL	PWR	3.3V	Device Power (3.3V)
PC15	PWR/CTL	PGND	Device GND	Device Ground
PC16	PWR/CTL	PGND	Device GND	Device Ground
PC17	PWR/CTL	CDO	CMOS Output	Card Detect Out

DVI1 (DVI)

Onboard Digital Visual Interface Connector
Connector type: 2.00 mm pitch 2x17-pin box header

Pin	Description	Pin	Description
1	Analog GND	2	Analog GND
3	T.M.D.S. Data2-	4	T.M.D.S. Data2+
5	GND	6	N/C
7	N/C	8	DDC Clock
9	DDC Data	10	N/C
11	T.M.D.S. Data1-	12	T.M.D.S. Data1+
13	Analog GND	14	N/C
15	N/C	16	+5V
17	Analog GND	18	Hot Plug Detect
19	T.M.D.S. Data0-	20	T.M.D.S. Data0+
21	Analog GND	22	N/C
23	N/C	24	GND
25	T.M.D.S. CLK+	26	T.M.D.S. CLK-
27	GND	28	GND
29	N/C	30	N/C
31	N/C	32	Analog GND
33	Analog GND	34	N/C
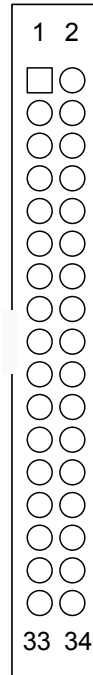
JSPI1 (System BIOS Enable/ Disable Pin Header)

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)
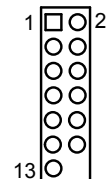
DIO1 (Digital I/O Port)

Onboard Digital I/O Connector
Connector type: 2.00 mm pitch 2x13-pin box header

Pin	Description	Pin	Description
1	DIO0	14	DIO13
2	DIO1	15	DIO14
3	DIO2	16	DIO15
4	DIO3	17	VCC5
5	DIO4	18	GND
6	DIO5	19	VCC5
7	DIO6	20	GND
8	DIO7	21	N/C
9	DIO8	22	N/C
10	DIO9	23	N/C
11	DIO10	24	N/C
12	DIO11	25	N/C
13	DIO12	26	N/C
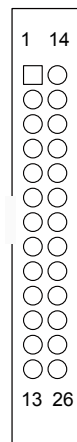
LPT1 (Parallel Port)

Onboard Parallel Port Connector
Connector type: 2.00 mm pitch 2 x13-pin box header

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	GND
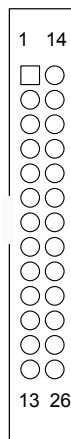
SW1, 2, 4 (RS-232/RS-485 Function Select Jumper for COM3, COM4)

SW1 Setting

COM3	RS-232	RS-485	COM4	RS-232	RS-485
1-16	ON	OFF	5-12	ON	OFF
2-15	OFF	ON	6-11	OFF	ON
3-14	OFF	ON	7-10	OFF	ON
4-13	OFF	ON	8-9	OFF	ON

SW2 Setting

COM4	RS-232	RS-485
1-16	ON	OFF
2-15	ON	OFF
3-14	ON	OFF
4-13	ON	OFF
5-12	ON	OFF
6-11	ON	OFF
7-10	ON	OFF
8-9	ON	OFF

SW4 Setting

COM3	RS-232	RS-485
1-16	ON	OFF
2-15	ON	OFF
3-14	ON	OFF
4-13	ON	OFF
5-12	ON	OFF
6-11	ON	OFF
7-10	ON	OFF
8-9	ON	OFF

SATA1/2 (Serial ATA Connectors)

Onboard Serial ATA Connector
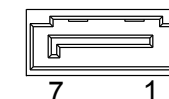
Pin	Description
1	GND
2	TX+
3	TX-
4	GND
5	RX-
6	RX+
7	GND

PWR1/2 (HDD/SSD Power Connectors)

Onboard HDD/SSD Power Connector
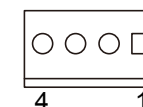
Pin	Description
1	VCC5
2	GND
3	GND
4	+12V

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Chapter 3
Installation and Maintenance

3.1 CPU and Memory Module Installation

AU910/AU912 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.
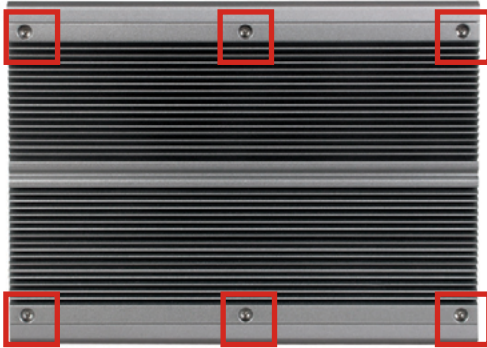
2. Use a screwdriver to remove the top cover screws. First unscrew the four screws in each corner, and then the two screws in the middle of the two sides. Keep the screws for later use. (Note: Remember to first secure the two screws in the middle and then the two sides when you install the top cover.)

3. Slightly pull the top cover upward.
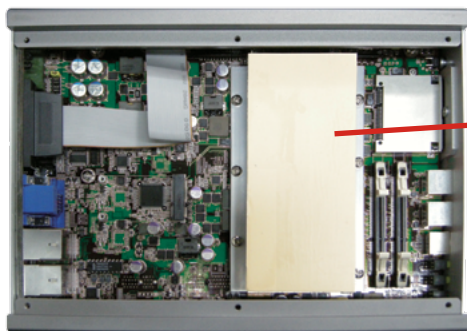
Thermal Lump
of PCH & CPU

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 keep them for later use.
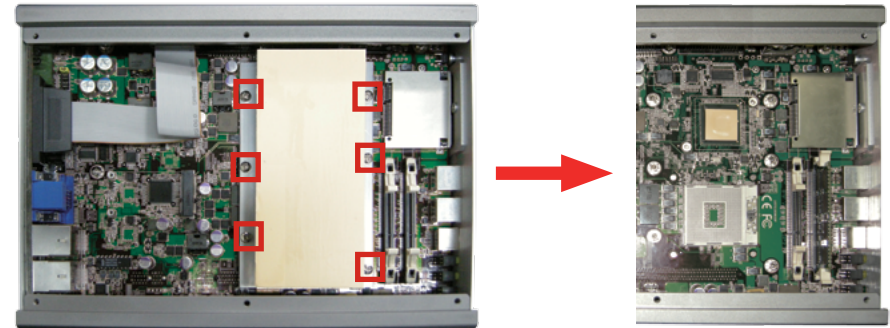
3. The processor socket comes with a screw to secure the CPU. As shown in the picture below, loosen the screw first before inserting the CPU.
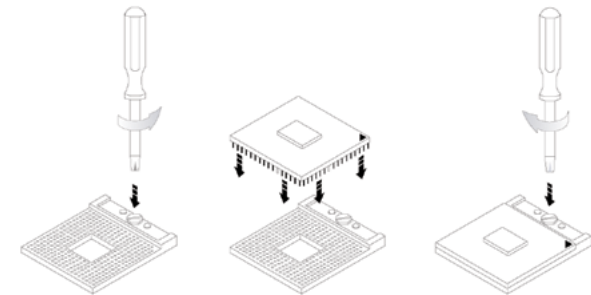
4. Place the CPU into the socket by making sure the notch on the corner of the CPU corresponds with the notch on the inside of the socket. Once the CPU is slid into the socket, lock the screw.

5. The contact area and gap between the processor and the heatsink requires a thermal pad or thermal paste. Make sure the heatsink of the CPU top surface is in complete contact to avoid overheating. If not, it would cause your system or CPU to hang, be unstable, or get damaged.

3.1.3 Installing Memory Module

1. Locate the 200-pin 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 it into the slot until the clips of the SO-DIMM slot close to lock the memory module in place.
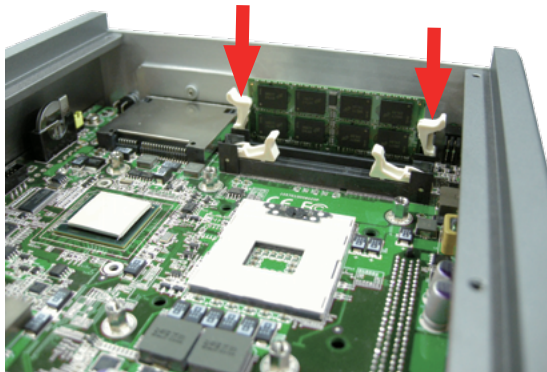
4. To remove the memory module, just press down the clips of the SO-DIMM slot with both your hands. And then the memory module will be lifted up for removing.
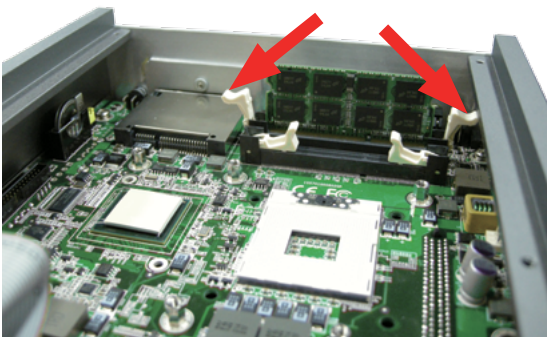
3.2 How to Access CFast/SIM Card

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 thc 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 & PCIe Card Installation

3.3.1 Removing Bottom Cover

1. Place unit upside down. Unscrew the six screws that secure bottom cover.
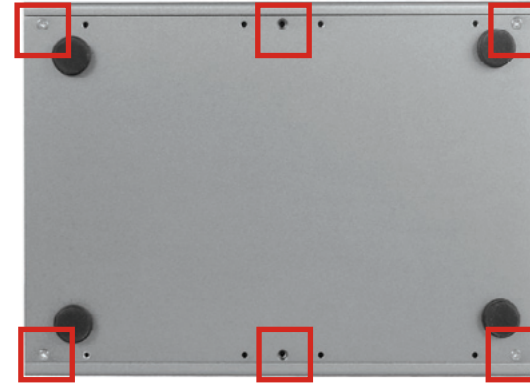
2. Use screwdriver to remove the screws and keep them for later use.

3.3.2 Installing 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. Keep the screws for later use.
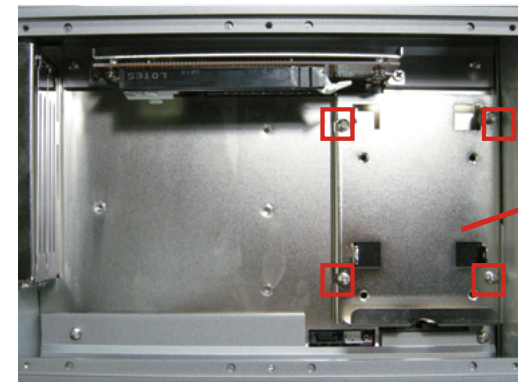
HDD Holder Bracket

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 mainboard.

3.3.3 Installing PCIe Card

1. Use a crosshead screwdriver to loosen the screw that secures the expansion slot bracket; then you can install a PCIe card to this expansion slot.
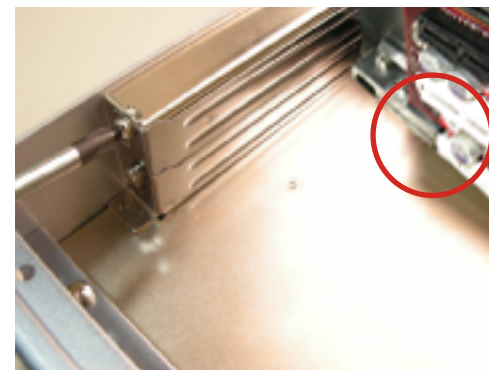
2. If you want to install the PCIe card to the lower slot, please push the rubber cover out of the unit and, through the hole, use the screwdriver to loosen the screw securing the lower expansion slot bracket.

7. Locate the four screws securing the HDD Holder Bracket to the main unit.

8. Screw the HDD Holder Bracket onto the Main Unit.
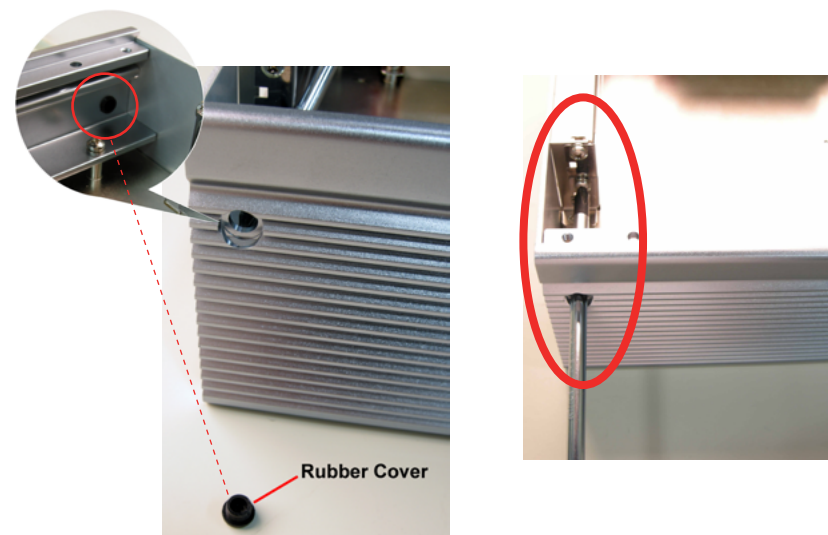
3.4 Wall Mounting (Optional)

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 the 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.
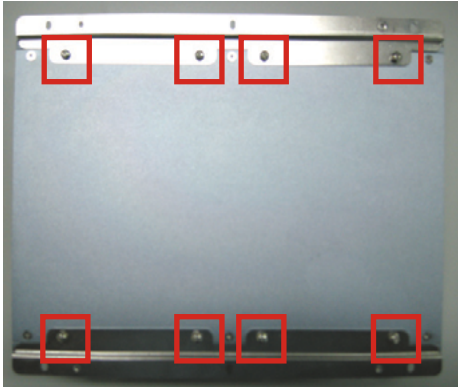
3.5 DIN Rail Mounting (Optional)

1. Please use the optional kit to mount the unit to a standard DIN rail.

2. Place the unit upside down on a flat surface and locate the 8 screw holes on the bottom cover.

3. Align the screw holes of the DIN rail bracket to those of the main unit. Secure the bracket to the main unit using the accompanying screws.
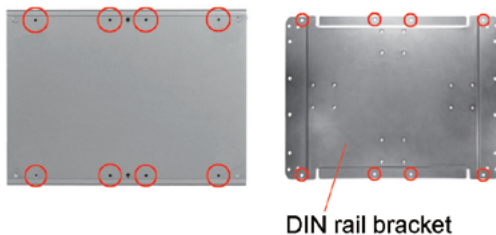
DIN rail bracket

4. You can mount the unit on a DIN rail in the horizontal or vertical direction.

5. Fasten a pair of DIN rail clips to the DIN rail bracket that was attached to the main unit from the previous steps. Refer to the following figures for horizontal and vertical orientation mounting.

3.5.1 Face-Left/Right DIN Rail Mounting

1. For panel face-left/right mounting, please secure the two DIN rail clips to the DIN rail bracket according to the illustration.

2. Position the bracket side of the unit directly in front of the DIN rail. Make sure the top of the DIN rail clip hooks over the top of the DIN rail.
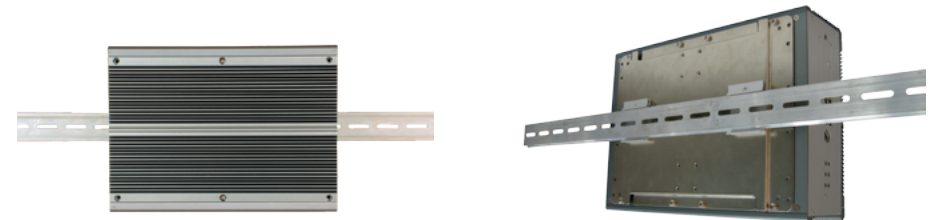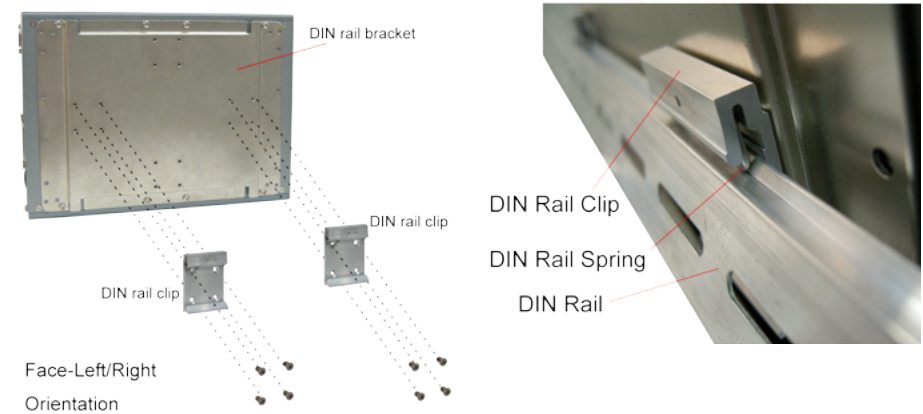
System mounted on the DIN rail

3.5.2 Face-Up/Down DIN Rail Mounting

1. For panel face-up/down mounting, please secure the two DIN rail clips to the DIN rail bracket according to the illustration.
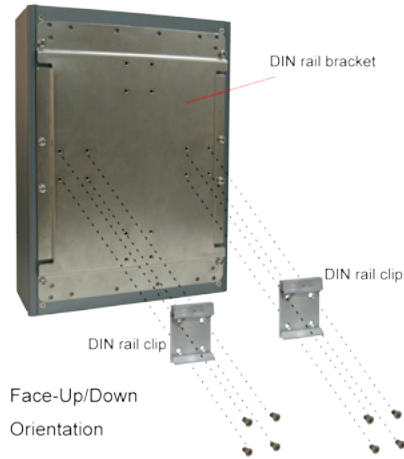
2. Position the bracket side of the unit directly in front of the DIN rail. Make sure the top of the DIN rail clip hooks over the top of the DIN rail.
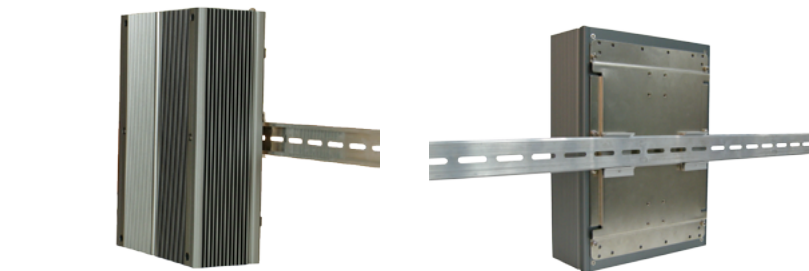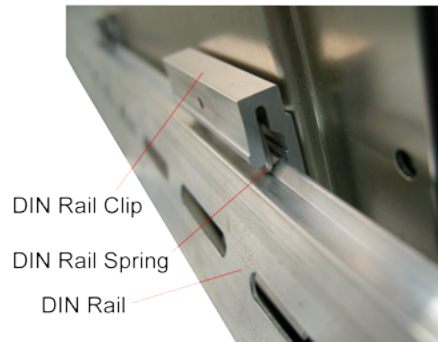
System mounted on the DIN rail

3.5.3 Removing the AU910/AU912 from the DIN Rail

1. Make sure that power is removed from the computer, and disconnect all cables from the computer.

2. Hold the unit in both hands and push downwards. As the clip releases, lift the bottom slightly.
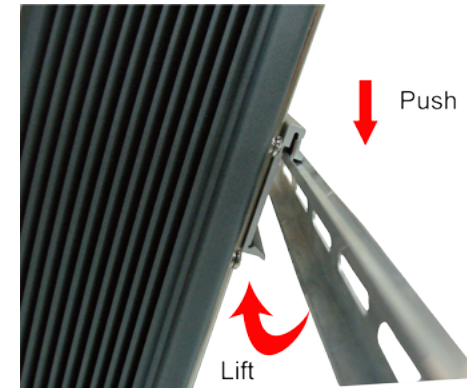
3.6 Grounding the AU910/AU912

Follow the instructions below to ground the computer on the ground. Make sure to follow any grounding requirements at your site.

Warning ⚠ When installing the unit, the ground connection must always be made first and disconnected last.
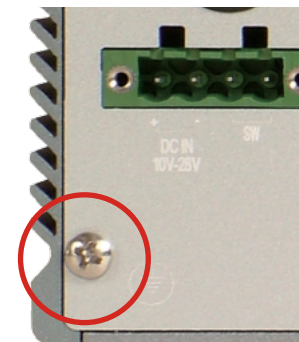
1.   As the figure illustrates above, remove the ground screw located on the bottom left of the rear panel.

2.   Attach the ground wire to the rear panel with the screw.

3.7 Wiring the DC-Input Power Source

Warning ⚠ Only trained and qualified personnel should be allowed to install or replace this equipment.

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

1. Before wiring, make sure the power source is disconnected.

2. Locate the terminal block that shipped in the accessory box with your computer.

3. Using the wire-stripping tool, strip a short piece of insulation from the output wires of the DC power source. The wire guage must be in the range between 14-22 AWG.

4. Identify the positive and negative feed positions for the terminal block connection. See the symbols printed on the rear panel indicating the polarities and DC-input power range in 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.

+ - SW

Terminal Block
+ -
DC-IN SW
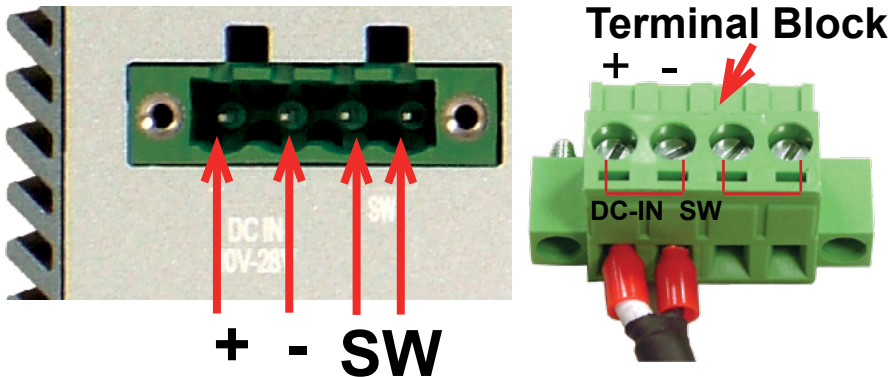
Chapter 4

BIOS

4.1 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 high-light 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 engineer-ing staff is 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.
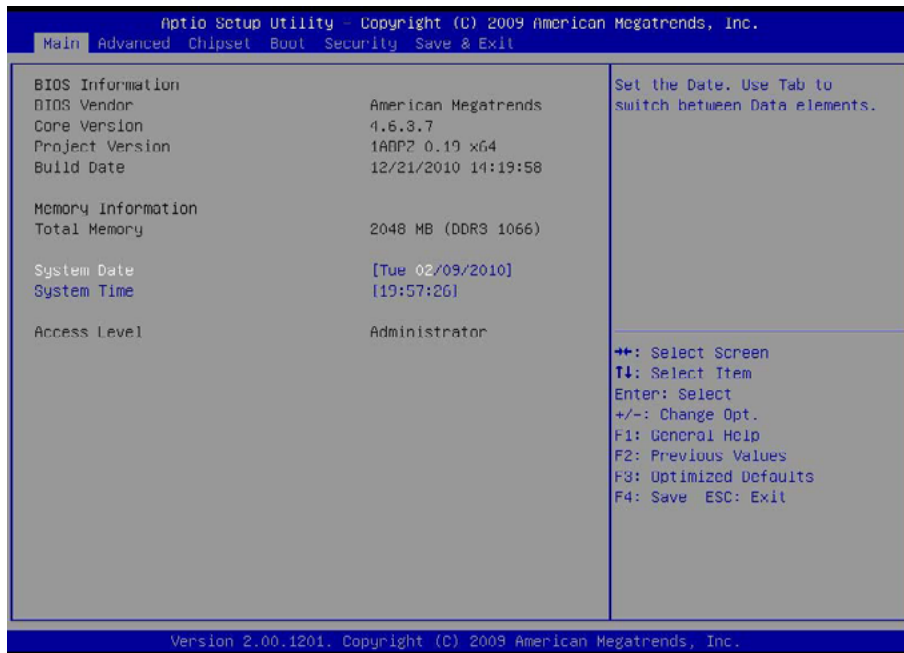
BIOS Information

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 : 1999 to 2099

System Time

Set the system time.

The time format is:	Hour : 00 to 23
	Minute : 00 to 59
	Second : 00 to 59

4.2 Advanced Settings
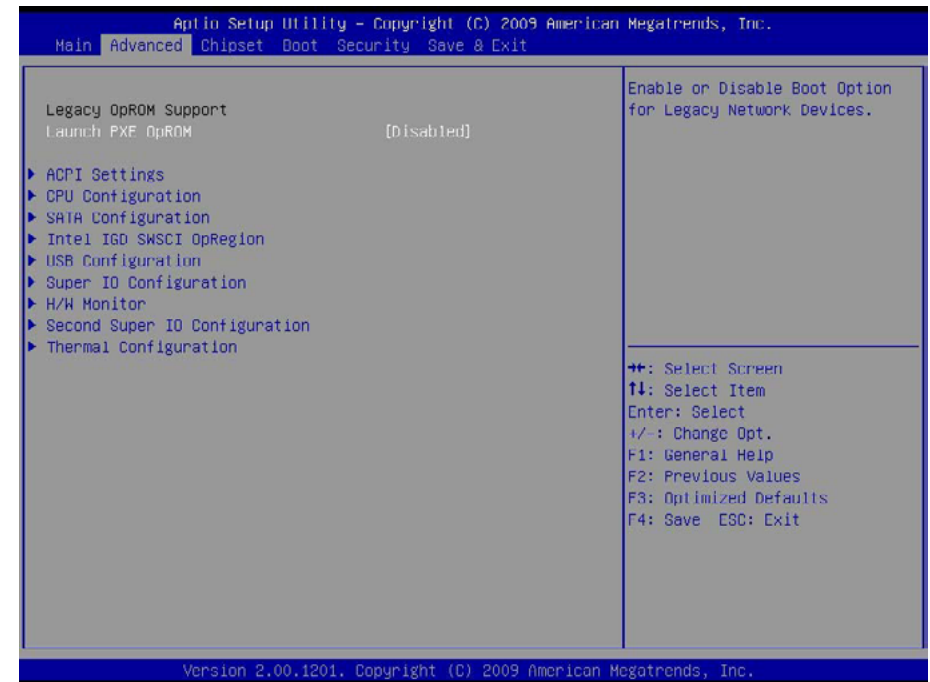
Launch PXE OpROM

Enable or disable the boot option for legacy network devices.

ACPI Settings

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

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 Intel® 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 second I/O functions supported by the onboard Super I/O chip.

Thermal Configuration

Configure the intelligent power sharing function.

4.2.1 ACPI Settings
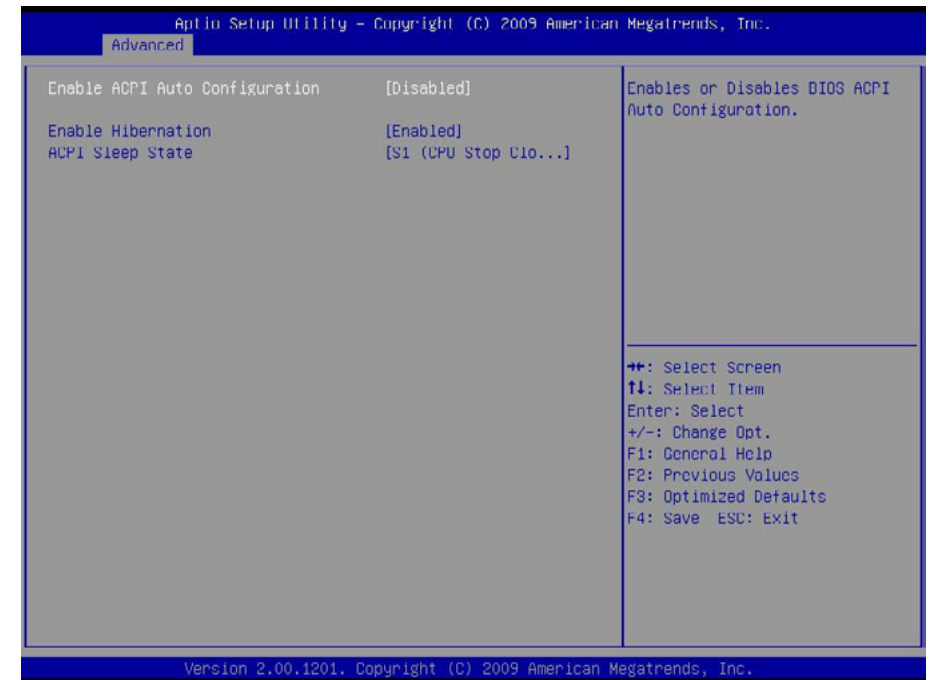
Enable ACPI Auto Configuration

This item allows you to enable/disable ACPI (Advanced Configuration and Power Interface) Auto Configuration.

> Settings: Disabled (Default), Enabled.

Enable Hibernation

Enable or disable the Hibernation function. This allows the operating system to control power to the computer's disk, monitor and peripheral devices.

> Settings: Enabled (Default), Disabled

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.

4.2.2 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                                Enabled for Windows XP and
                                                   Linux (OS optimized for
  Genuine Intel(R) CPU 000 @ 2.00GHz               Hyper-Threading Technology)
  EMT64                        Supported           and Disabled for other OS (OS
  Processor Speed              1995 MHz            not optimized for
  Processor Stepping           20651              Hyper-Threading Technology).
  Microcode Revision           ffff0012           When Disabled only one thread
  Processor Cores              2                   per enabled core is enabled.
  Intel HT Technology          Supported

  Hyper-threading              [Enabled]
  Active Processor Cores       [All]
  Limit CPUID Maximum          [Disabled]
  Hardware Prefetcher          [Enabled]          ➜←: Select Screen
  Adjacent Cache Line Prefetch [Enabled]          ↑↓: Select Item
  Power Technology             [Default]          Enter: Select
  CPU C7 report                [Enabled]          +/-: Change Opt.
                                                  F1: General Help
                                                  F2: Previous Values
                                                  F3: Optimized Defaults
                                                  F4: Save  ESC: Exit

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

Hyper-Threading

This item is used to enable or disable the processor's Hyper-threading feature.

Enabled for Windows XP and Linux (OS optimized for Hyper-threading Technology) and disabled for other OS (OS not optimized for Hyper-threading Technology).

When disabled, only one thread per enabled core is enabled.

Active Processor Cores

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

Limit CPUID Maximum

Enable or disable the Limit CPUID Maxium.

Hardware Prefetcher

Turn on or off the MLC streamer prefetcher.

Adjacent Cache Line Prefetch

Use this item to enable or disable the adjacent cache line prefetch function.

Power Technology

Configure the power management features.

CPU C7 Report

Enable or disable the CPU C7 Report.

4.2.3   SATA Configuration

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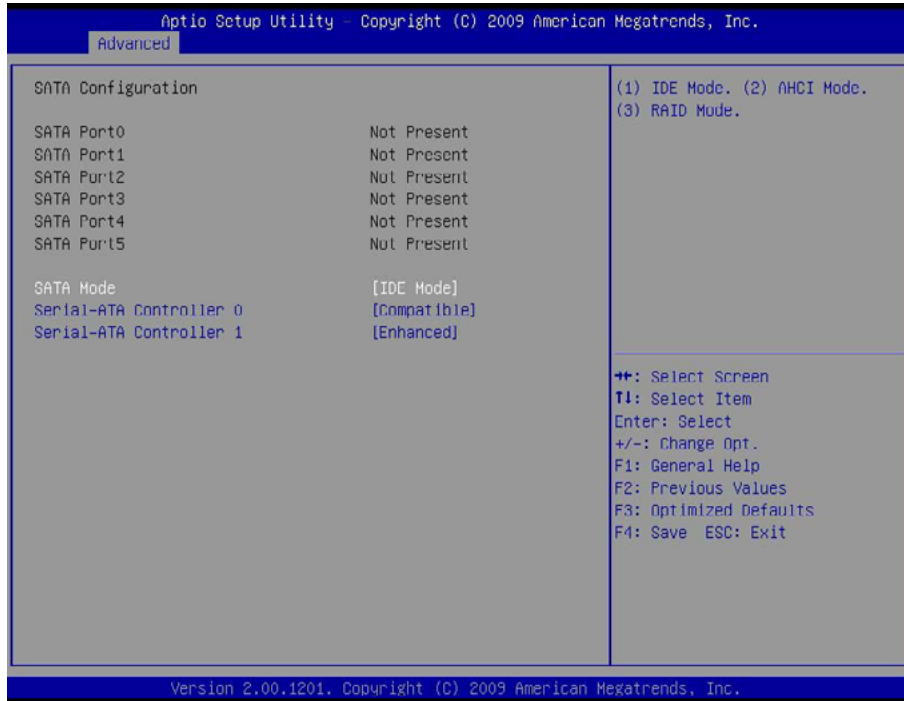
SATA Mode

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

Settings: [Disabled] [Enhanced] [Compatible]

Serial-ATA Controller 1

Settings: [Disabled] [Enhanced]

4.2.4   Intel® IGD SWSCI OpRegion Configuration

Select DVMT/FIXED mode memory size used by Internal Graphics Device.
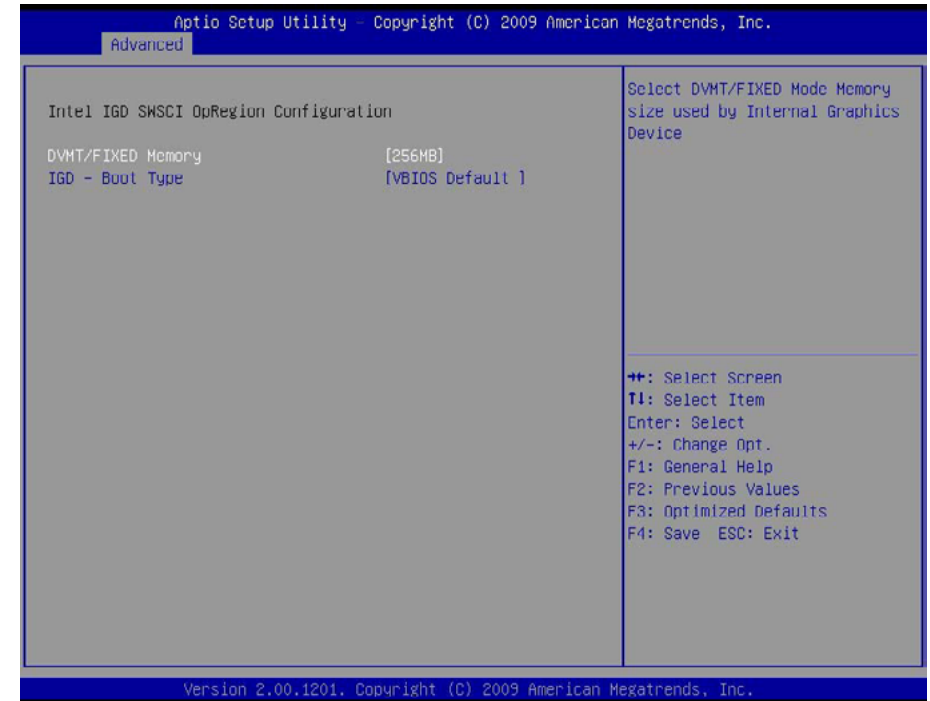
DVMT/FIXED Memory [256 MB]

IGD - Boot Type [VBIOS Default]

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

4.2.5   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, 2 Hubs            connected. DISABLE option will
                                                       keep USB devices available
  Legacy USB Support              [Enabled]            only for EFI applications.
  EHCI Hand-off                   [Enabled]

  USB hardware delays and time-outs:
  USB transfer time-out           [20 sec]
  Device reset time-out           [20 sec]
  Device power-up delay           [Auto]

  Mass Storage Devices:                              →←: Select Screen
  USB0607CFlash Disk 2.00         [Auto]             ↑↓: Select Item
                                                     Enter: Select
                                                     +/-: Change Opt.
                                                     F1: General Help
                                                     F2: Previous Values
                                                     F3: Optimized Defaults
                                                     F4: Save  ESC: Exit

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```

Legacy USB Support

Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.

Settings: Enabled (Default); Auto; Disabled

EHCI Hand-Off

Allows you to enable 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.

Settings: Enabled (Default); Disabled

USB Hardware Delays and Time-outs

USB Transfer Time-out: Default setting: 20 sec.

Device Reset Time-out: Default setting: 20 sec.

Device Power Delay: Settings: Auto (Default); Manual

Mass Storage Devices

This item displays information when USB devices are detected.

4.2.6   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 On]




                                                     →←: 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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```

Parallel Port Configuration

This allows you to set parameters of the 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.

4.2.7   PC Health Status
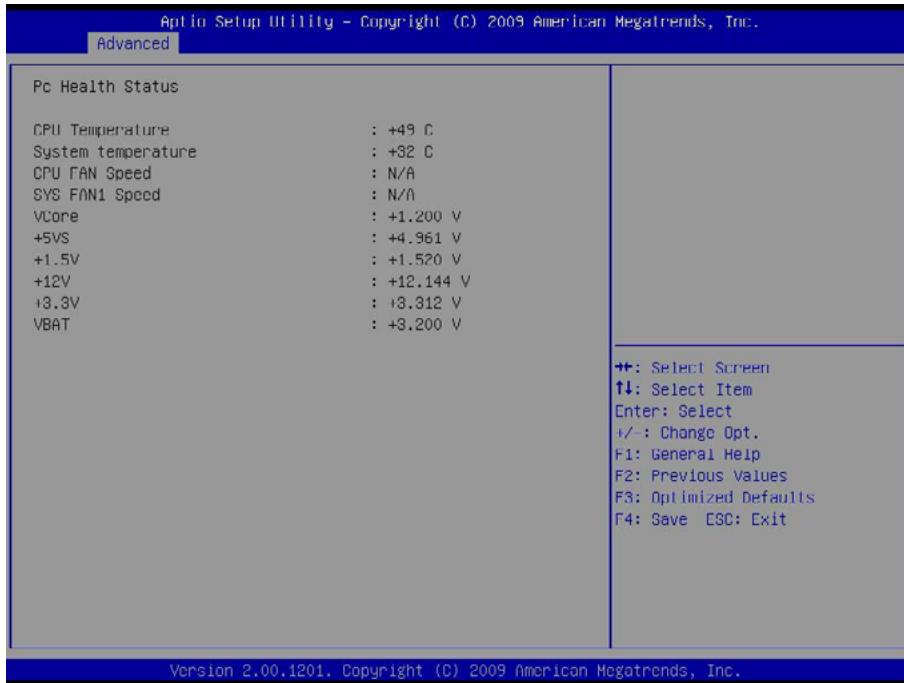
PC Health Status

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

4.2.8   Second Super IO Configuration
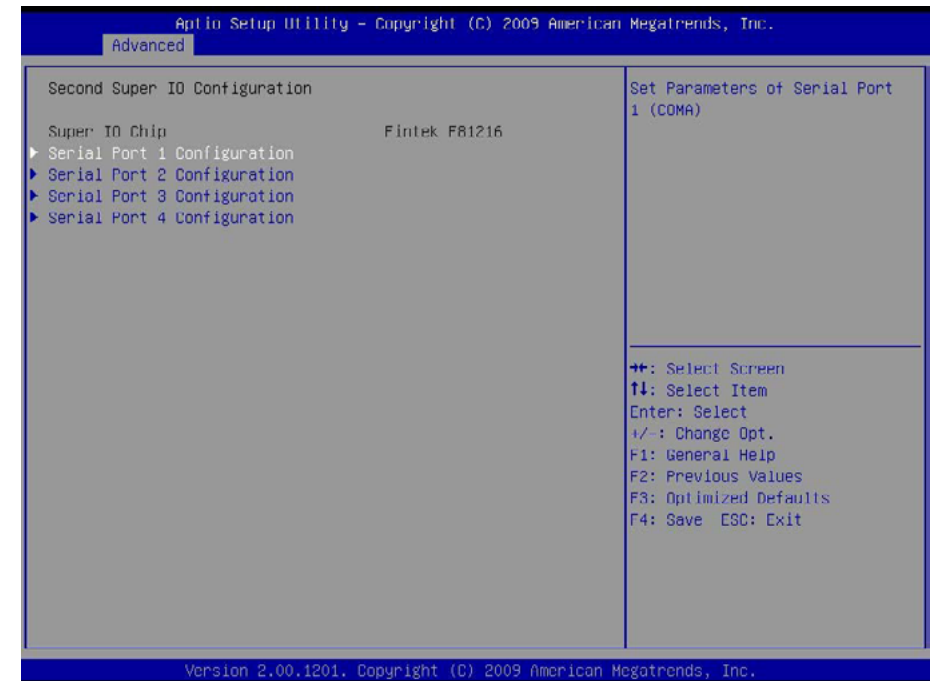
Serial Port Configuration

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

4.2.9 Platform Thermal Configuration
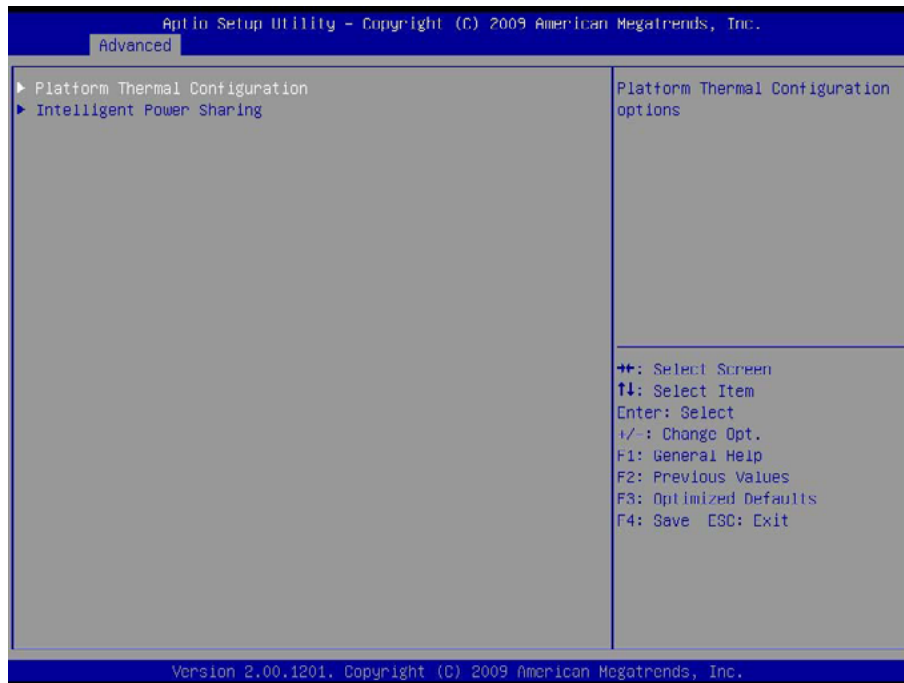
Intelligent Power Sharing

Enable or disable the power sharing function.

4.3 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.

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

4.3.1 Northbridge

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

Memory Information                                 ▲  Low MMIO resources align at
                                                      64MB/1024MB
CPU Type                       Arrandale

Total Memory                   2040 MB (DDR3 106G)

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)          0                    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                    F3: Optimized Defaults
                                                       F4: Save  ESC: Exit
Low MMIO Align                 [64M]

Initate Graphic Adapter       [PEG/IGD]
Graphics Turbo IMON Current    31                  ▼

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```

Memory Information

The item displays the detected system memory information.

Low MMIO Align

This option will determine Low MMIO resources align.

Initiate Graphics 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.

4.3.2 Southbridge Configuration

```
          Aptio Setup Utility - Copyright (C) 2009 American Megatrends, Inc.
            Chipset
                                                      Enable/Disable SMBus
SB Chipset Configuration                              Controller.
SMBus Controller              [Enable]


SLP_S4 Assertion Stretch Enable   [Enable]
 SLP_S4 Assertion Width           [4-5 Seconds]

Audio Configuration
Azalia HD Audio               [Enabled]
Azalia internal HDMI codec    [Disable]

► USB 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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```

SMBus Controller

Enable or disable the SMBus controller.

SLP_S4 Assertion Stretch Enable

Enable or disable the SLP_S4 Stretch function.

Azalia HD Audio

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

Azalia Internal HDMI Codec

Enable or disable the Azalia internal HDMI Codec.

USB Configuration

Enable or disable USB device.

4.4 Boot Settings

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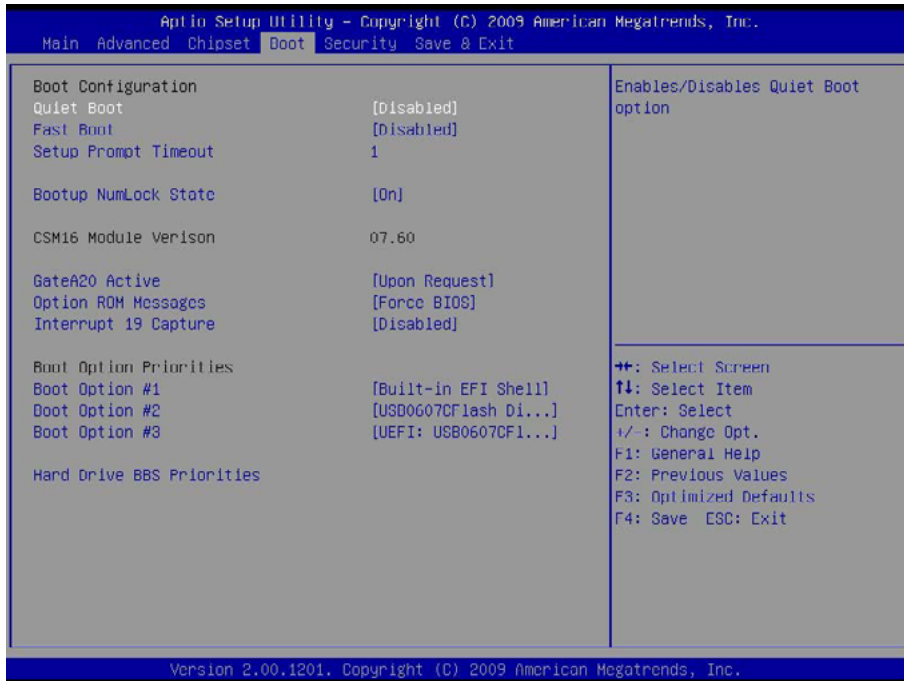
Quiet Boot

This allows you to select the screen display when the system boots.

Fast Boot

During the POST (Power On Self Test), the BIOS checks the hardware devices and counts the system memory. But all of these system tests are needed every time you boot, and can be turned off to save time. When set to Enabled, this option shortens POST by eliminating some tests.

Setup Prompt Timeout

Select the number of seconds to wait for the setup activation key.

Bootup NumLock State

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

Gate A20 Active

This item is to set the Gate A20 status.

Option ROM Messages

This item is to set display mode for Option ROM.

Interrupt 19 Capture

When enabled, it allows the optional ROM to trap interrupt 19.

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.

4.5 Security

Administrator Password

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

4.6 Save & Exit
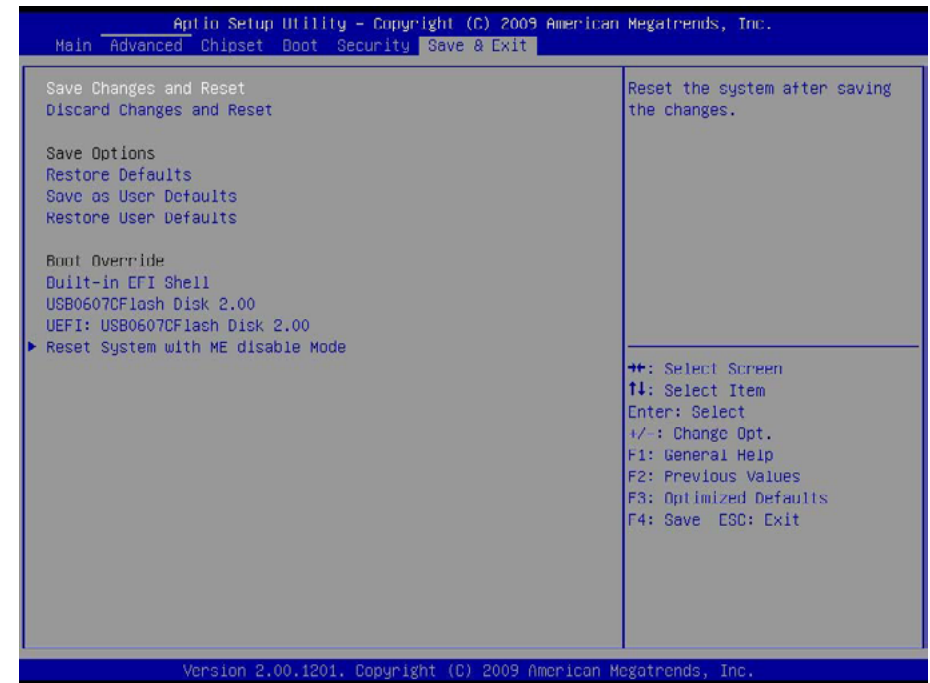
Save Changes and Reset

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.

Save as User Defaults

Save all current settings as user default. The current setup state can later be restored using Restore User Defaults.

Pressing <Enter> on this item and it asks for confirmation prior to executing this command.

Restore User Defaults

Restore system to settings previously stored by Save as User Defaults.

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.

Appendix

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
00000000 - 00000CF7	PCI bus
00000000 - 00000CF7	Direct memory access controller
00000010 - 0000001F	Motherboard resources
00000020 - 00000021	Programmable interrupt controller
00000022 - 0000003F	Motherboard resources
00000040 - 00000043	System Timer
00000044 - 0000005F	Motherboard resources
00000060 - 00000060	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
00000061 - 00000061	System speaker
00000062 - 00000063	Motherboard resources
00000064 - 00000064	Standard 101/102-Key or Microsoft Natural PS/2 Keyboard
00000065 - 0000006F	Motherboard resources
00000070 - 00000071	System CMOS/real time clock
00000072 - 0000007F	Motherboard resources
00000080 - 00000080	Motherboard resources
00000081 - 00000083	Direct memory access controller
00000084 - 00000086	Motherboard resources
00000087 - 00000087	Direct memory access controller
00000088 - 00000088	Motherboard resources
00000089 - 0000008B	Direct memory access controller
0000008C - 0000008E	Motherboard resources
0000008F - 0000008F	Direct memory access controller
00000090 - 0000009F	Motherboard resources
000000A0 - 000000A1	Programmable interrupt controller

000000A2 - 000000BF	Motherboard resources
000000C0 - 000000DF	Direct memory access controller
000000E0 - 000000EF	Motherboard resources
000000F0 - 000000FF	Numeric data processor
00000274 - 00000277	ISAPNP Read Data Port
00000279 - 00000279	ISAPNP Read Data Port
00000290 - 0000029F	Motherboard resources
000002E8 - 000002EF	Communications Port (COM4)
000002F8 - 000002FF	Communications Port (COM2)
00000378 - 0000037F	Printer Port (LPT1)
000003B0 - 000003BB	Intel(R) HD Graphics
000003C0 - 000003DF	Intel(R) HD Graphics
000003E8 - 000003EF	Communications Port (COM3)
000003F8 - 000003FF	Communications Port (COM1)
00000400 - 0000047F	System board
000004D0 - 000004D1	Motherboard resources
00000500 - 0000057F	System board
00000A79 - 00000A79	ISAPNP Read Data Port
00000D00 - 0000FFFF	PCI bus
00001180 - 0000119F	System board
0000D000 - 0000DFFF	Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 6 - 3B4C
0000D000 - 0000DFFF	Intel(R) 82574L Gigabit Network Connection
0000E000 - 0000EFFF	Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 2 - 3B44
0000E000 - 0000EFFF	Intel(R) 82574L Gigabit Network Connection #2
0000F000 - 0000F01F	Intel(R) 5 Series/3400 Series Chipset Family SMBus Controller - 3B30
0000F020 - 0000F03F	Intel(R) 5 Series 6 Port SATA AHCI Controller
0000F040 - 0000F043	Intel(R) 5 Series 6 Port SATA AHCI Controller
0000F050 - 0000F057	Intel(R) 5 Series 6 Port SATA AHCI Controller
0000F060 - 0000F063	Intel(R) 5 Series 6 Port SATA AHCI Controller
0000F070 - 0000F077	Intel(R) 5 Series 6 Port SATA AHCI Controller
0000F080 - 0000F087	Intel(R) HD Graphics

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 101/102-Key or Microsoft Natural PS/2 Keyboard
IRQ 3	Communications Port (COM2)
IRQ 3	Intel(R) 5 Series/3400 Series Chipset Family SMBus Controller - 3B30
IRQ 4	Communications Port (COM1)
IRQ 8	System CMOS/real time clock
IRQ 9	Microsoft ACPI-Compliant System
IRQ 10	Communications Port (COM3)
IRQ 11	Communications Port (COM4)
IRQ 12	Microsoft PS/2 Mouse
IRQ 13	Numeric data processor
IRQ 16	Intel(R) HD Graphics
	Intel(R) Management Engine Interface
	Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B3C
IRQ 17	Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 1 - 3B42
	Intel(R) 82574L Gigabit Network Connection #2
	Intel(R) 82574L Gigabit Network Connection
IRQ 18	Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 2 - 3B44
	Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 6 - 3B4C
IRQ 19	Intel(R) 5 Series 6 Port SATA AHCI Controller
	Standard Dual Channel PCI IDE Controller
IRQ 22	Microsoft UAA Bus Driver for High Definition Audio
IRQ 23	Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B34

Appendix C: Memory Mapping

Address	Device Description
D0000000 - FFFFFFFF	PCI bus
D0000000 - FFFFFFFF	Intel(R) HD Graphics
FB400000 - FB7FFFFF	Intel(R) HD Graphics
FBC09000 - FBC0900F	Intel(R) Management Engine Interface
FBC08000 - FBC083FF	Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B3C
FBC00000 - FBC03FFF	Microsoft UAA Bus Driver for High Definition Audio
FBA00000 - FBBFFFFF	Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 2 - 3B44
FBA00000 - FBBFFFFF	Intel(R) 82574L Gigabit Network Connection #2
FBB00000 - FBB1FFFF	Intel(R) 82574L Gigabit Network Connection #2
FBB20000 - FBB23FFF	Intel(R) 82574L Gigabit Network Connection #2
FB800000 - FB9FFFFF	Intel(R) 5 Series/3400 Series Chipset Family PCI Express Root Port 6 - 3B4C
FB800000 - FB9FFFFF	Intel(R) 82574L Gigabit Network Connection
FB900000 - FB91FFFF	Intel(R) 82574L Gigabit Network Connection
FB920000 - FB923FFF	Intel(R) 82574L Gigabit Network Connection
FBC07000 - FBC073FF	Intel(R) 5 Series/3400 Series Chipset Family USB Enhanced Host Controller - 3B34
FBC06000 - FBC067FF	Intel(R) 5 Series 6 Port SATA AHCI Controller
FBC05000 - FBC050FF	Intel(R) 5 Series/3400 Series Chipset Family SMBus Controller - 3B30
FED14000 - FED19FFF	System board
E0000000 - EFFFFFFF	System board
FED90000 - FED93FFF	System board
FED20000 - FED3FFFF	System board
FEE00000 - FEE0FFFF	System board
FED1C000 - FED1FFFF	System board
FEC00000 - FECFFFFF	System board
FED08000 - FED08FFF	System board
FF000000 - FFFFFFFF	System board

A0000 - BFFFF	PCI bus
A0000 - BFFFF	Intel(R) HD Graphics

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.

D.1 Source Code in C

```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);
```

```c
   //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.

E.1 Source Code in C

```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 */
}
```