

GENE-QM87

3.5" Subcompact Board

User's Manual 5th Ed

Copyright Notice

This document is copyrighted, 2015. All rights are reserved. The original manufacturer reserves the right to make improvements to the products described in this manual at any time without notice.

No part of this manual may be reproduced, copied, translated, or transmitted in any form or by any means without the prior written permission of the original manufacturer. Information provided in this manual is intended to be accurate and reliable. However, the original manufacturer assumes no responsibility for its use, or for any infringements upon the rights of third parties that may result from its use.

The material in this document is for product information only and is subject to change without notice. While reasonable efforts have been made in the preparation of this document to assure its accuracy, AAEMON assumes no liabilities resulting from errors or omissions in this document, or from the use of the information contained herein.

AAEMON reserves the right to make changes in the product design without notice to its users.

Acknowledgement

All other products' name or trademarks are properties of their respective owners.

- Microsoft Windows[®] is a registered trademark of Microsoft Corp.
- Intel[®], Pentium[®], Celeron[®], and Xeon[®] are registered trademarks of Intel Corporation
- Atom[™] is a trademark of Intel Corporation
- ITE is a trademark of Integrated Technology Express, Inc.
- IBM, PC/AT, PS/2, and VGA are trademarks of International Business Machines Corporation.

All other product names or trademarks are properties of their respective owners.

Packing List

Before setting up your product, please make sure the following items have been shipped:

Item	Quantity
● GENE-QM87 subcompact board	1
● Power cable (170204010R)	1
● Product DVD with User's Manual (in pdf) and drivers	1

If any of these items are missing or damaged, please contact your distributor or sales representative immediately.

About this Document

This User's Manual contains all the essential information, such as detailed descriptions and explanations on the product's hardware and software features (if any), its specifications, dimensions, jumper/connector settings/definitions, and driver installation instructions (if any), to facilitate users in setting up their product.

Users may refer to the AAEON.com for the latest version of this document.

Safety Precautions

Please read the following safety instructions carefully. It is advised that you keep this manual for future references

1. All cautions and warnings on the device should be noted.
2. Make sure the power source matches the power rating of the device.
3. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
4. Always completely disconnect the power before working on the system's hardware.
5. No connections should be made when the system is powered as a sudden rush of power may damage sensitive electronic components.
6. If the device is not to be used for a long time, disconnect it from the power supply to avoid damage by transient over-voltage.
7. Always disconnect this device from any AC supply before cleaning.
8. While cleaning, use a damp cloth instead of liquid or spray detergents.
9. Make sure the device is installed near a power outlet and is easily accessible.
10. Keep this device away from humidity.
11. Place the device on a solid surface during installation to prevent falls
12. Do not cover the openings on the device to ensure optimal heat dissipation.
13. Watch out for high temperatures when the system is running.
14. Do not touch the heat sink or heat spreader when the system is running
15. Never pour any liquid into the openings. This could cause fire or electric shock.
16. As most electronic components are sensitive to static electrical charge, be sure to ground yourself to prevent static charge when installing the internal components. Use a grounding wrist strap and contain all electronic components in any static-shielded containers.

17. If any of the following situations arises, please the contact our service personnel:
 - i. Damaged power cord or plug
 - ii. Liquid intrusion to the device
 - iii. Exposure to moisture
 - iv. Device is not working as expected or in a manner as described in this manual
 - v. The device is dropped or damaged
 - vi. Any obvious signs of damage displayed on the device
18. **DO NOT LEAVE THIS DEVICE IN AN UNCONTROLLED ENVIRONMENT WITH TEMPERATURES BEYOND THE DEVICE'S PERMITTED STORAGE TEMPERATURES (SEE CHAPTER 1) TO PREVENT DAMAGE.**

Warning!



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.

Caution:

There is a danger of explosion if the battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions and your local government's recycling or disposal directives.

Attention:

Il y a un risque d'explosion si la batterie est remplacée de façon incorrecte. Ne la remplacer qu'avec le même modèle ou équivalent recommandé par le constructeur. Recycler les batteries usées en accord avec les instructions du fabricant et les directives gouvernementales de recyclage.

China RoHS Requirements (CN)

产品中有毒有害物质或元素名称及含量

AAEON Main Board/ Daughter Board/ Backplane

部件名称	有毒有害物质或元素					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(VI))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
印刷电路板 及其电子组件	○	○	○	○	○	○
外部信号 连接器及线材	○	○	○	○	○	○

○: 表示该有毒有害物质在该部件所有均质材料中的含量均在 SJ/T 11363-2006 标准规定的限量要求以下。

X: 表示该有毒有害物质至少在该部件的某一均质材料中的含量超出 SJ/T 11363-2006 标准规定的限量要求。

备注: 此产品所标示之环保使用期限, 系指在一般正常使用状况下。

China RoHS Requirement (EN)

Poisonous or Hazardous Substances or Elements in Products

AAEON Main Board/ Daughter Board/ Backplane

Component	Poisonous or Hazardous Substances or Elements					
	Lead (Pb)	Mercury (Hg)	Cadmium (Cd)	Hexavalent Chromium (Cr(VI))	Polybrominated Biphenyls (PBB)	Polybrominated Diphenyl Ethers (PBDE)
PCB & Other Components	○	○	○	○	○	○
Wires & Connectors for External Connections	○	○	○	○	○	○
<p>O: The quantity of poisonous or hazardous substances or elements found in each of the component's parts is below the SJ/T 11363-2006-stipulated requirement.</p> <p>X: The quantity of poisonous or hazardous substances or elements found in at least one of the component's parts is beyond the SJ/T 11363-2006-stipulated requirement.</p> <p>Note: The Environment Friendly Use Period as labeled on this product is applicable under normal usage only</p>						

Table of Contents

Chapter 1 - Product Specifications	1
1.1 Specifications.....	2
Chapter 2 – Hardware Information	4
2.1 Dimensions	5
2.2 Jumpers and Connectors.....	7
2.3 List of Jumpers	9
2.3.1 MiniCard with mSATA / PCIe Selection (JP1).....	10
2.3.2 Touch Screen 4/5/8-Wire Selection (JP2).....	10
2.3.3 LVDS Port 1 Backlight Inverter Voltage Selection (JP3).....	10
2.3.4 LVDS Port 1 Backlight Lightness Control Mode Selection (JP4)	10
2.3.5 LVDS Port 1 Operating Voltage Selection (JP5).....	10
2.3.6 LVDS Port 2 Operating Voltage Selection (JP6).....	11
2.3.7 LVDS Port 2 Backlight Inverter Voltage Selection (JP7).....	11
2.3.8 LVDS Port 2 Backlight Lightness Control Mode Selection (JP8)	11
2.3.9 AT/ATX Power Supply Mode Selection (JP9)	11
2.3.10 Clear CMOS Jumper (JP10).....	11
2.3.11 COM2 Pin8 Function Selection (JP11).....	12
2.4 List of Connectors.....	13
2.4.1 +5VSB Output w/SMBus (CN1)	15
2.4.2 LVDS Port 2 Inverter / Backlight Connector (CN2).....	15
2.4.3 +5V Output for SATA HDD (CN3)	16
2.4.4 External +5VSB Inout (CN4).....	16
2.4.5 CPU Fan (CN5).....	16
2.4.6 SATA Port 2 (CN6).....	17

2.4.7	SATA Port 1 (CN7)	17
2.4.8	Main Power Input (+12V ONLY) (CN8)	18
2.4.9	Digital IO Port (CN9)	18
2.4.10	LVDS Port 1 Inverter / Backlight Connector (CN10).....	19
2.4.11	SPI Programming Header (Debug ONLY) (CN11)	19
2.4.12	USB 2.0 Port 3 (CN12).....	20
2.4.13	USB 2.0 Port 4 (CN13).....	20
2.4.14	LVDS Port 1 Connector (CN14).....	21
2.4.15	LVDS Port 2 Connector (CN15).....	23
2.4.16	USB 2.0 Port 5 (CN16).....	24
2.4.17	USB 2.0 Port 6 (CN17).....	25
2.4.18	USB 2.0 Port 8 (CN18).....	25
2.4.19	USB 2.0 Port 7 (CN19).....	26
2.4.20	Touch Screen Connector (CN20)	26
2.4.21	COM Port 4 (CN21)	27
2.4.22	COM Port 3 (CN22)	28
2.4.23	LPC Expansion Connector (CN23).....	29
2.4.24	COM Port 2 (RS232/485/422) (CN24)	30
2.4.25	PS/2 Keyboard/Mouse Combo Port (CN25)	31
2.4.26	Stereo Audio RIGHT Channel (CN26).....	32
2.4.27	Stereo Audio LEFT Channel (CN27).....	32
2.4.28	Front Panel (CN28)	33
2.4.29	10M/100M/1G Ethernet Port 1 (CN29)	33
2.4.30	10M/100M/1G Ethernet Port 2 (CN30)	34
2.4.31	USB 2.0/3.0 Port 1 & 2 (CN31).....	34
2.4.32	High Definition Audio (CN32)	35
2.4.33	COM Port 1 (D-SUB 9) (CN33).....	36
2.4.34	HDMI (CN34)	36

2.4.35	VGA / DVI Ports (CN35).....	37
2.4.36	UIM Socket (CN36).....	39
2.4.37	MiniCard (PCIE1).....	40
2.4.38	C-Fast (CFD1).....	42
2.4.39	DDR3L SO-DIMM Slot (DIMM1).....	43
Chapter 3 - AMI BIOS Setup		44
3.1	System Test and Initialization	45
3.2	AMI BIOS Setup	46
3.3	Setup submenu: Main	47
3.4	Setup submenu: Advanced	48
3.4.1	Advanced: ACPI Settings.....	50
3.4.2	Advanced: RTC Wake Settings	51
3.4.3	Advanced: Trusted Computing	53
3.4.4	Advanced: CPU Configuration.....	54
3.4.5	Advanced: Digital IO Configuration.....	56
3.4.6	Advanced: SATA Configuration.....	57
3.4.7	Advanced: AMT Configuration	59
3.4.8	Advanced: USB Configuration.....	60
3.4.9	Advanced: Super IO Configuration.....	62
3.4.9.1	Super IO Configuration: Serial Port Configuration	63
3.4.10	Advanced: H/W Monitor	65
3.4.10.1	H/W Monitor: Smart Fan Mode Configuration	66
3.5	Setup submenu: Chipset.....	68
3.5.1	Chipset: PCH-IO Configuration.....	69
3.5.2	Chipset: System Agent (SA) Configuration.....	71
3.5.2.1	System Agent (SA) Configuration: Graphics Configuration.....	72
3.5.2.2	System Agent (SA) Configuration: LCD Control	74

3.6	Setup submenu: Boot.....	77
3.6.1	Boot: BBS Priorities	78
3.7	Setup submenu: Security	79
3.8	Setup submenu: Save & Exit	81
Chapter 4 – Drivers Installation.....		83
4.1	Product CD/DVD	84
Appendix A - Watchdog Timer Programming.....		87
A.1	Watchdog Timer Programming	88
A.2	F81866 Watchdog Timer Initial Program	91
Appendix B - I/O Information		93
B.1	I/O Address Map	94
B.2	Memory Address Map	96
B.3	IRQ Mapping Chart.....	97
B.4	DMA Channel Assignment	100
Appendix C – Mating Connectors.....		101
C.1	List of Mating Connectors and Cables.....	102
Appendix D – Electrical Specifications for I/O Ports.....		104
D.1	Electrical Specifications for I/O Ports.....	105
Appendix E – Digital I/O Ports		107
E.1	Electrical Specifications for Digital I/O Ports.....	108

Chapter 1

Product Specifications

1.1 Specifications

System

● Form Factor	3.5"
● Processor	Intel® Core™ i5-4402E Processor
● System Memory	204-pin DDR3L 1333/1600 MHz SODIMM x 1, Max. 8GB
● Chipset	Intel® QM87 PCH
● Ethernet	Intel® I217 Gigabit PHY x1 & Intel® I211 Gigabit x 1, RJ-45 x 2
● BIOS	Plug & Play BIOS – 16MB flash
● Wake On LAN	Yes
● Watchdog Timer	Generates a time-out system reset
● H/W Status Monitoring	Supports power supply voltages and temperature monitoring
● Expansion Interface	Mini Card x 1 or mSATA (by jumper setting), SM bus, LPC interface/Sim Card Socket
● Trusted Platform Module	V1.2, Infineon SLB9635TT1.2
● Battery	Lithium Battery
● Power Requirement	+12V, AT/ATX
● Board Size	5.75" x 4" (146mm x 101.6mm)
● Gross Weight	0.88 lb (0.4Kg)
● Operating Temperature	32°F~140°F (0°C~60°C)
● Storage Temperature	-40°F~176°F (-40°C~80°C)

- **Operation Humidity** 0% ~ 90% relative humidity, non-condensing

Display

- **Chipset** Intel® QM87 integrated
- **Memory** Shared system memory up to 512 MB
- **Resolution** CRT up to 2048 x 1536
LCD, HDMI, DVI up to 1920 x 1200
- **HDMI** HDMI x 1
- **DVI** DVI x 1
- **Display Combination** Triple simultaneous display from CRT/LCD, HDMI/LCD

I/O

- **Storage** SATA 6.0Gb/s x 2 , CFast™ x 1
- **USB** USB3.0 x 2, USB2.0 x 6
- **Serial Port** RS-232 x 3;
RS-232/422/485 (auto flow) x 1
- **DI/O** 8-bit digital I/O (programmable)
- **PS/2 Port** Keyboard x 1, mouse x 1
- **Audio** Line-in, Line-out, Mic-in

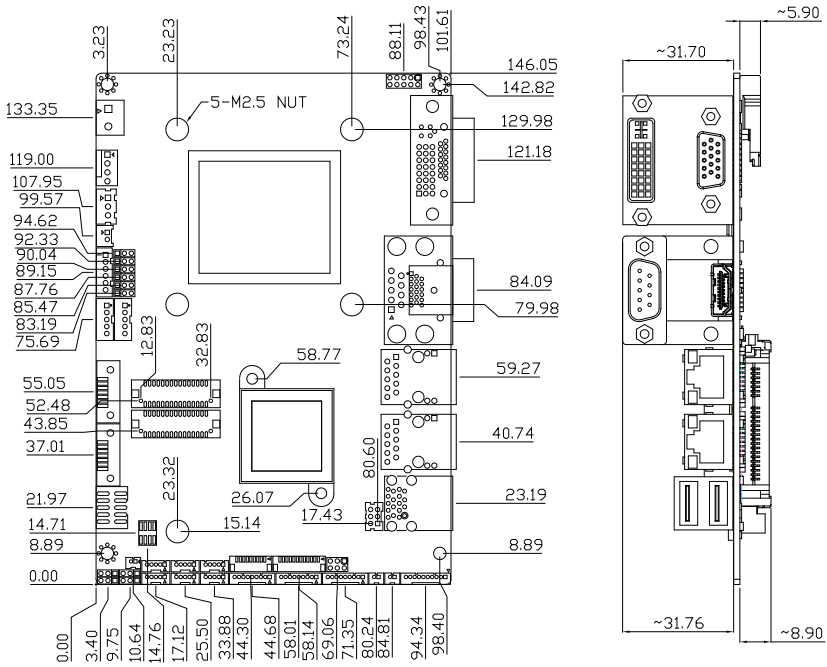
Note: A compatibility issue with the 4th generation Intel® Core™ i Series processors will cause the BIOS to not detect SATA storage (CFast/ mSATA/ SSD) and result in "SYNC fail". Please contact the storage supplier for the SATA compatible list for 4th generation Intel® Core™ i Series processor, or contact with AAEON sales for a list of Approval Venders for SATA storage.

Chapter 2

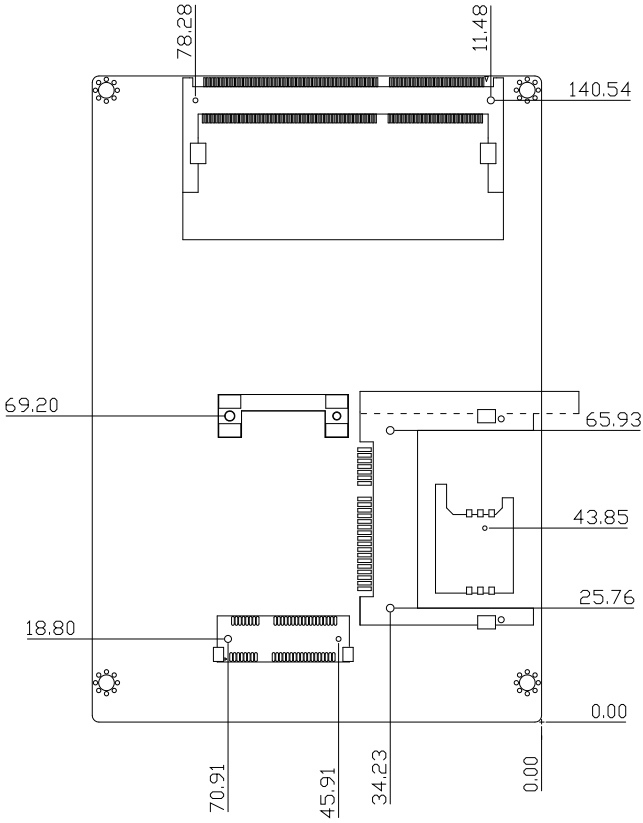
Hardware Information

2.1 Dimensions

Component Side

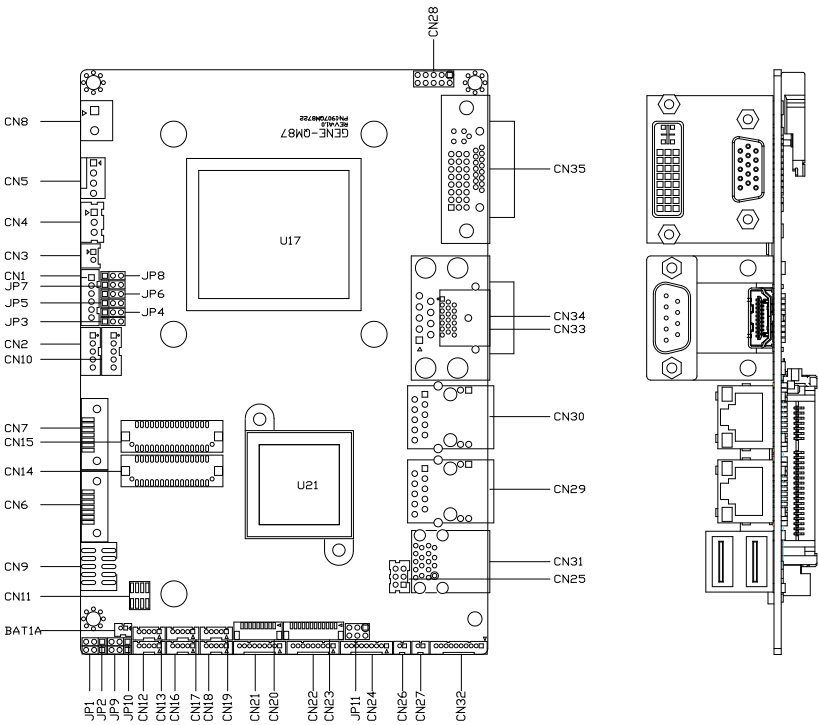


Solder Side

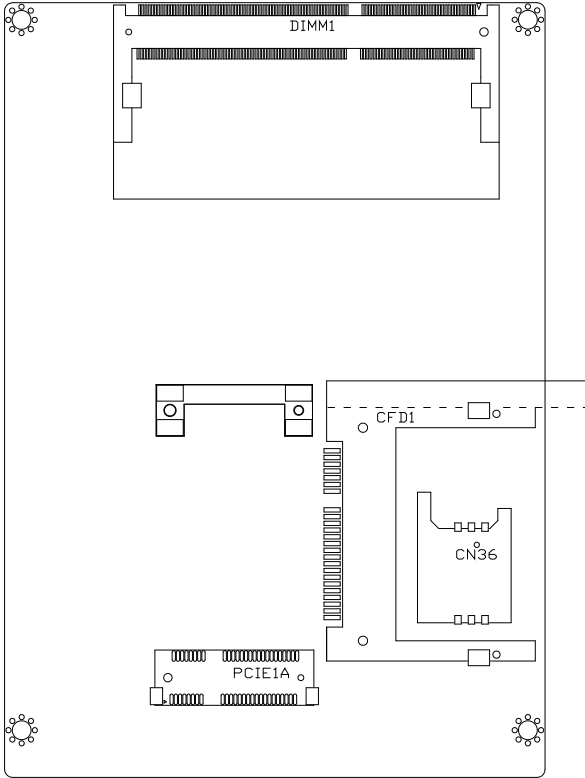


2.2 Jumpers and Connectors

Component Side



Solder Side

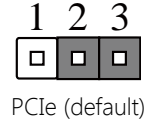
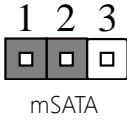


2.3 List of Jumpers

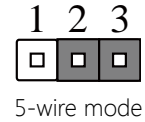
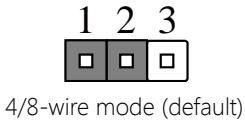
Please refer to the table below for all of the board's jumpers that you can configure for your application

Label	Function
JP1	MiniCard with mSATA / PCIe Selection
JP2	Touch Screen 4/5/8-wire Mode Selection
JP3	LVDS Port 1 Backlight Inverter Voltage Selection
JP4	LVDS Port 1 Backlight Lightness Control Mode Selection
JP5	LVDS Port 1 Operating Voltage Selection
JP6	LVDS Port 2 Operating Voltage Selection
JP7	LVDS Port 2 Backlight Inverter Voltage Selection
JP8	LVDS Port 2 Backlight Lightness Control Mode Selection
JP9	AT/ATX Power Supply Mode Selection
JP10	Clear CMOS Jumper

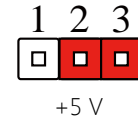
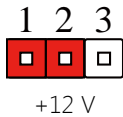
2.3.1 MiniCard with mSATA / PCIe Selection (JP1)



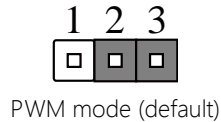
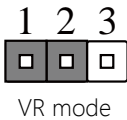
2.3.2 Touch Screen 4/5/8-Wire Selection (JP2)



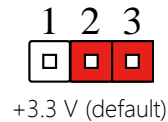
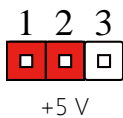
2.3.3 LVDS Port 1 Backlight Inverter Voltage Selection (JP3)



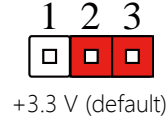
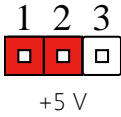
2.3.4 LVDS Port 1 Backlight Lightness Control Mode Selection (JP4)



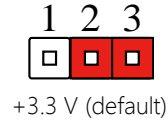
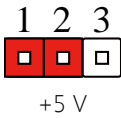
2.3.5 LVDS Port 1 Operating Voltage Selection (JP5)



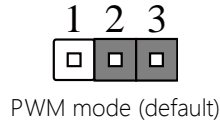
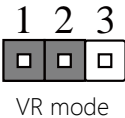
2.3.6 LVDS Port 2 Operating Voltage Selection (JP6)



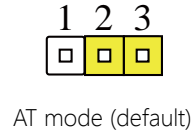
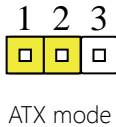
2.3.7 LVDS Port 2 Backlight Inverter Voltage Selection (JP7)



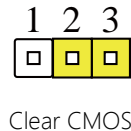
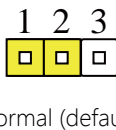
2.3.8 LVDS Port 2 Backlight Lightness Control Mode Selection (JP8)



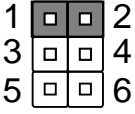
2.3.9 AT/ATX Power Supply Mode Selection (JP9)



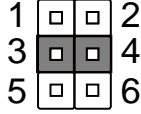
2.3.10 Clear CMOS Jumper (JP10)



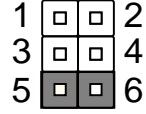
2.3.11 COM2 Pin8 Function Selection (JP11)



+12V



Ring(Default)



+5V

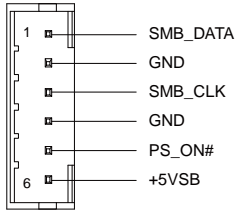
2.4 List of Connectors

Please refer to the table below for all of the board's connectors that you can configure for your application

Label	Function
CN1	+5VSB Output w/SMBus
CN2	LVDS Port 2 Inverter / Backlight Connector
CN3	+5V Output for SATA HDD
CN4	External +5VSB Input
CN5	CPU FAN
CN6	SATA Port 2
CN7	SATA Port1
CN8	Main Power Input (+12V ONLY)
CN9	Digital IO Port
CN10	LVDS Port 1 Inverter / Backlight Connector
CN11	SPI Programming Header (Debug ONLY)
CN12	USB 2.0 Port 3
CN13	USB 2.0 Port 4
CN14	LVDS Port 1
CN15	LVDS Port 2
CN16	USB 2.0 Port 5
CN17	USB 2.0 Port 6
CN18	USB 2.0 Port 8
CN19	USB 2.0 Port 7
CN20	Touch Screen Connector
CN21	COM Port 4
CN22	COM Port 3
CN23	LPC Expansion Connector

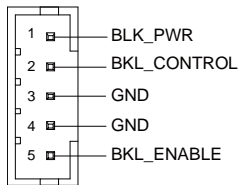
CN24	COM Port 2 (RS232/485/422)
CN25	PS/2 Keyboard/Mouse Combo Port
CN26	Stereo Audio RIGHT Channel
CN27	Stereo Audio LEFT Channel
CN28	Front Panel
CN29	10M/100M/1G Ethernet Port 1
CN30	10M/100M/1G Ethernet Port 2
CN31	USB 2.0/3.0 Port 1 & 2
CN32	High Definition Audio
CN33	COM Port 1
CN34	HDMI
CN35	VGA / DVI Ports (depend on hardware configuration)
CN36	UIM Socket
PCIE1	mini-Card
CFD1	C-FAST
DIMM1	DDR3L SODIMM

2.4.1 +5VSB Output w/SMBus (CN1)



Pin	Pin Name	Signal Type	Signal level
1	SMB_DATA	I/O	+3.3V
2	GND	GND	
3	SMB_CLK	I/O	+3.3V
4	GND	GND	
5	PS_ON#	OUT	+3.3V
6	+5VSB	PWR	+5V

2.4.2 LVDS Port 2 Inverter / Backlight Connector (CN2)



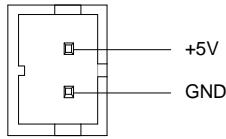
Pin	Pin Name	Signal Type	Signal Level
1	BKL_PWR	PWR	+5V / +12V
2	BKL_CONTROL	OUT	
3	GND	GND	
4	GND	GND	
5	BKL_ENABLE	OUT	+5V

Note: LVDS2/BKL_PWR can be set to +5V or +12V by JP7.

LVDS2/BKL_CONTROL can be set by JP8.

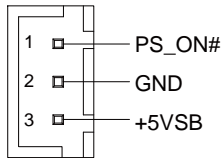
The driving current supports up to 2A.

2.4.3 +5V Output for SATA HDD (CN3)



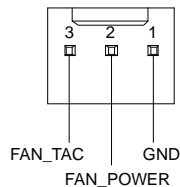
Pin	Pin Name	Signal Type	Signal Level
1	+5V	PWR	+5V
2	GND	GND	

2.4.4 External +5VSB Inout (CN4)



Pin	Pin Name	Signal Type	Signal Level
1	PS_ON#	OUT	+3.3V
2	GND	GND	
3	+5VSB	PWR	+5V

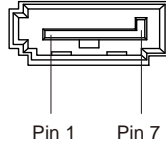
2.4.5 CPU Fan (CN5)



Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	

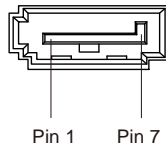
2	FAN_POWER	PWR	+12V
3	FAN_TAC	IN	
4	FAN_CTL	IN	

2.4.6 SATA Port 2 (CN6)



Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA_TX1+	DIFF	
3	SATA_TX1-	DIFF	
4	GND	GND	
5	SATA_RX1-	DIFF	
6	SATA_RX1+	DIFF	
7	GND	GND	

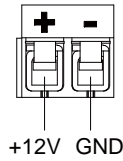
2.4.7 SATA Port 1 (CN7)



Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	SATA_TX0+	DIFF	
3	SATA_TX0-	DIFF	

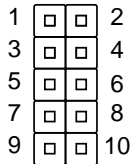
4	GND	GND
5	SATA_RX0-	DIFF
6	SATA_RX0+	DIFF
7	GND	GND

2.4.8 Main Power Input (+12V ONLY) (CN8)



Pin	Pin Name	Signal Type	Signal level
1	BKL_PWR	PWR	+5V / +12V
2	BKL_CONTROL	OUT	

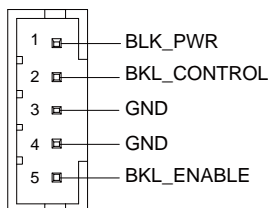
2.4.9 Digital IO Port (CN9)



Pin	Pin Name	Signal Type	Signal level
1	DIO0	I/O	+5V
2	DIO1	I/O	+5V
3	DIO2	I/O	+5V
4	DIO3	I/O	+5V
5	DIO4	I/O	+5V
6	DIO5	I/O	+5V
7	DIO6	I/O	+5V

Pin	Pin Name	Signal Type	Signal level
8	DIO7	I/O	+5V
9	+5V	PWR	+5V
10	GND	GND	

2.4.10 LVDS Port 1 Inverter / Backlight Connector (CN10)



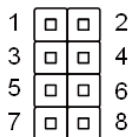
Pin	Pin Name	Signal Type	Signal Level
1	BKL_PWR	PWR	+5V / +12V
2	BKL_CONTROL	OUT	
3	GND	GND	
4	GND	GND	
5	BKL_ENABLE	OUT	+5V

Note: LVDS2/BKL_PWR can be set to +5V or +12V by JP3.

LVDS2/BKL_CONTROL can be set by JP4.

The driving current supports up to 2A.

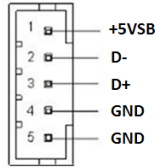
2.4.11 SPI Programming Header (Debug ONLY) (CN11)



Pin	Pin Name	Signal Type	Signal Level
1	+3.3V	PWR	+3.3V

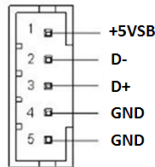
2	GND	GND
3	CS#	I/O
4	CLK	I/O
5	SO	I/O
6	SI	I/O
7	NC	
8	NC	

2.4.12 USB 2.0 Port 3 (CN12)



Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB2_D-	DIFF	
3	USB2_D+	DIFF	
4	GND	GND	
5	GND	GND	

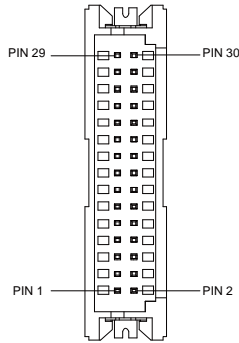
2.4.13 USB 2.0 Port 4 (CN13)



Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V

2	USB3_D-	DIFF
3	USB3_D+	DIFF
4	GND	GND
5	GND	GND

2.4.14 LVDS Port 1 Connector (CN14)



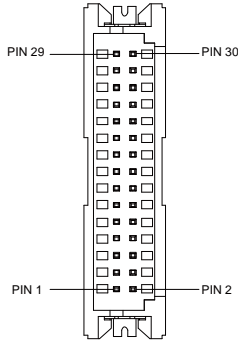
Pin	Pin Name	Signal Type	Signal Level
1	BKL_ENABLE	OUT	
2	BKL_CONTROL	OUT	
3	LCD_PWR	PWR	+3.3V/+5V
4	GND	GND	
5	LVDS_A_CLK-	DIFF	
6	LVDS_A_CLK+	DIFF	
7	LCD_PWR	PWR	+3.3V/+5V
8	GND	GND	
9	LVDS_DA0-	DIFF	
10	LVDS_DA0+	DIFF	
11	LVDS_DA1-	DIFF	
12	LVDS_DA1+	DIFF	

13	LVDS_DA2-	DIFF	
14	LVDS_DA2+	DIFF	
15	LVDS_DA3-	DIFF	
16	LVDS_DA3+	DIFF	
17	DDC_DATA	I/O	+3.3V
18	DDC_CLK	I/O	+3.3V
19	LVDS_DB0-	DIFF	
20	LVDS_DB0+	DIFF	
21	LVDS_DB1-	DIFF	
22	LVDS_DB1+	DIFF	
23	LVDS_DB2-	DIFF	
24	LVDS_DB2+	DIFF	
25	LVDS_DB3-	DIFF	
26	LVDS_DB3+	DIFF	
27	LCD_PWR	PWR	+3.3V/+5V
28	GND	GND	
29	LVDS_B_CLK-	DIFF	
30	LVDS_B_CLK+	DIFF	

Note: LVDS1 LCD_PWR can be set to +3.3V or +5V by JP5.

The max. driving current is 2A.

2.4.15 LVDS Port 2 Connector (CN15)



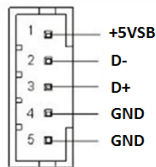
Pin	Pin Name	Signal Type	Signal Level
1	BKL_ENABLE	OUT	
2	BKL_CONTROL	OUT	
3	LCD_PWR	PWR	+3.3V/+5V
4	GND	GND	
5	LVDS_C_CLK-	DIFF	
6	LVDS_C_CLK+	DIFF	
7	LCD_PWR	PWR	+3.3V/+5V
8	GND	GND	
9	LVDS_DC0-	DIFF	
10	LVDS_DC0+	DIFF	
11	LVDS_DC1-	DIFF	
12	LVDS_DC1+	DIFF	
13	LVDS_DC2-	DIFF	
14	LVDS_DC2+	DIFF	
15	LVDS_DC3-	DIFF	
16	LVDS_DC3+	DIFF	
17	DDC_DATA	I/O	+3.3V

18	DDC_CLK	I/O	+3.3V
19	LVDS_DD0-	DIFF	
20	LVDS_DD0+	DIFF	
21	LVDS_DD1-	DIFF	
22	LVDS_DD1+	DIFF	
23	LVDS_DD2-	DIFF	
24	LVDS_DD2+	DIFF	
25	LVDS_DD3-	DIFF	
26	LVDS_DD3+	DIFF	
27	LCD_PWR	PWR	+3.3V/+5V
28	GND	GND	
29	LVDS_D_CLK-	DIFF	
30	LVDS_D_CLK+	DIFF	

Note: LVDS2 LCD_PWR can be set to +3.3V or +5V by JP6.

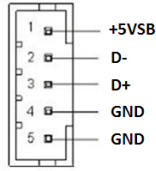
The max. driving current is 2A.

2.4.16 USB 2.0 Port 5 (CN16)



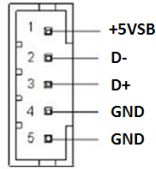
Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB4_D-	DIFF	
3	USB4_D+	DIFF	
4	GND	GND	
5	GND	GND	

2.4.17 USB 2.0 Port 6 (CN17)



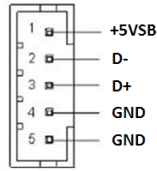
Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB5_D-	DIFF	
3	USB5_D+	DIFF	
4	GND	GND	
5	GND	GND	

2.4.18 USB 2.0 Port 8 (CN18)



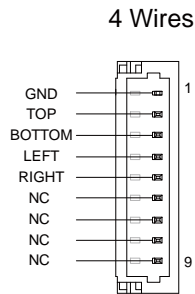
Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB7_D-	DIFF	
3	USB7_D+	DIFF	
4	GND	GND	
5	GND	GND	

2.4.19 USB 2.0 Port 7 (CN19)



Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB6_D-	DIFF	
3	USB6_D+	DIFF	
4	GND	GND	
5	GND	GND	

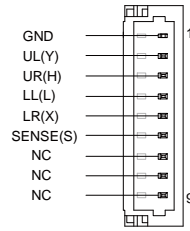
2.4.20 Touch Screen Connector (CN20)



4-wire			
Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	TOP	IN	
3	BOTTOM	IN	
4	LEFT	IN	
5	RIGHT	IN	

6	NC
7	NC
8	NC
9	NC

5 Wires

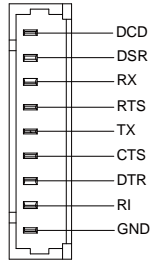


5-wire

Pin	Pin Name	Signal Type	Signal Level
1	GND	GND	
2	UL(Y)	IN	
3	UR(H)	IN	
4	LL(L)	IN	
5	LR(X)	IN	
6	SENSE(S)	IN	
7	NC		
8	NC		
9	NC		

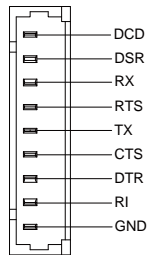
Note: Touch mode can be set by JP2.

2.4.21 COM Port 4 (CN21)



Pin	Pin Name	Signal Type	Signal Level
1	DCD	IN	
2	DSR	IN	
3	RX	IN	
4	RTS	OUT	±9V
5	TX	OUT	±9V
6	CTS	IN	
7	DTR	OUT	±9V
8	RI	IN	
9	GND	GND	

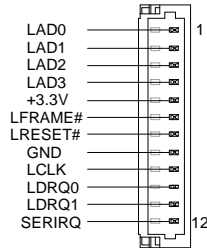
2.4.22 COM Port 3 (CN22)



Pin	Pin Name	Signal Type	Signal Level
1	DCD	IN	
2	DSR	IN	

3	RX	IN	
4	RTS	OUT	±9V
5	TX	OUT	±9V
6	CTS	IN	
7	DTR	OUT	±9V
8	RI	IN	
9	GND	GND	

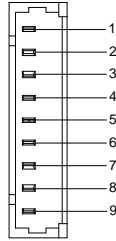
2.4.23 LPC Expansion Connector (CN23)



Pin	Pin Name	Signal Type	Signal Level
1	LAD0	I/O	+3.3V
2	LAD1	I/O	+3.3V
3	LAD2	I/O	+3.3V
4	LAD3	I/O	+3.3V
5	+3.3V	PWR	+3.3V
6	LFRAME#	IN	
7	LRESET#	OUT	+3.3V
8	GND	GND	
9	LCLK	OUT	
10	LDRQ0	IN	
11	LDRQ1 (EXT_SMI#)	IN	

12	SERIRQ	I/O	+3.3V
----	--------	-----	-------

2.4.24 COM Port 2 (RS232/485/422) (CN24)



RS-232

Pin	Pin Name	Signal Type	Signal Level
1	DCD	IN	
2	DSR	IN	
3	RX	IN	
4	RTS	OUT	±6V
5	TX	OUT	±6V
6	CTS	IN	
7	DTR	OUT	±6V
8	RI/+5V/+12V	IN/ PWR	+5V/+12V
9	GND	GND	

RS-422

Pin	Pin Name	Signal Type	Signal Level
1	RS422_TX-	OUT	±5V
2	NC		
3	RS422_TX+	IN	
4	NC		

5	RS422_RX+	OUT	±5V
6	NC		
7	RS422_RX-	IN	
8	NC/+5V/+12V	PWR	+5V/+12V
9	GND	GND	

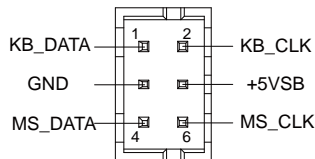
RS-485

Pin	Pin Name	Signal Type	Signal Level
1	RS422_TX-	OUT	±5V
2	NC		
3	RS422_TX+	IN	
4	NC		
5	RS422_RX+	OUT	±5V
6	NC		
7	RS422_RX-	IN	
8	NC/+5V/+12V	PWR	+5V/+12V
9	GND	GND	

Note: COM2 RS-232/422/485 can be set by BIOS setting. Default is RS-232.

Pin 8 function can be set by JP11.

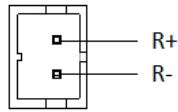
2.4.25 PS/2 Keyboard/Mouse Combo Port (CN25)



Pin	Pin Name	Signal Type	Signal Level
1	KB_DATA	I/O	+5V

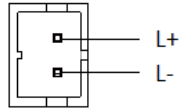
2	KB_CLK	I/O	+5V
3	GND	GND	
4	+5VSB	PWR	+5V
5	MS_DATA	I/O	+5V
6	MS_CLK	I/O	+5V

2.4.26 Stereo Audio RIGHT Channel (CN26)



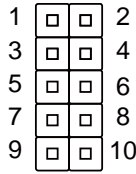
Pin	Pin Name	Signal Type	Signal Level
1	R+	OUT	
2	R-	OUT	

2.4.27 Stereo Audio LEFT Channel (CN27)



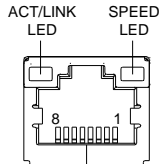
Pin	Pin Name	Signal Type	Signal Level
1	L+	OUT	
2	L-	OUT	

2.4.28 Front Panel (CN28)



Pin	Pin Name	Pin	Pin Name
1	PWR_BTN-	2	PWR_BTN+
3	HDD_LED-	4	HDD_LED+
5	SPEAKER-	6	SPEAKER+
7	PWR_LED-	8	PWR_LED+
9	H/W RESET-	10	H/W RESET+

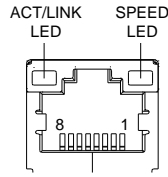
2.4.29 10M/100M/1G Ethernet Port 1 (CN29)



Pin	Pin Name	Signal Type	Signal Level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

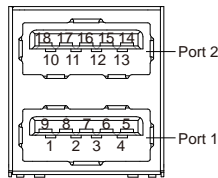
Note: The Intel/Clarkville (PHY) provides a standard IEEE 802.3 Ethernet interface for 1000BASE-T, 100BASE-TX, and 10BASE-T applications.

2.4.30 10M/100M/1G Ethernet Port 2 (CN30)



Pin	Pin Name	Signal Type	Signal Level
1	MDI0+	DIFF	
2	MDI0-	DIFF	
3	MDI1+	DIFF	
4	MDI2+	DIFF	
5	MDI2-	DIFF	
6	MDI1-	DIFF	
7	MDI3+	DIFF	
8	MDI3-	DIFF	

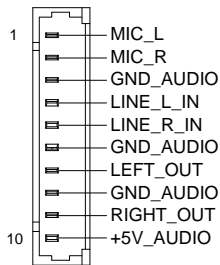
2.4.31 USB 2.0/3.0 Port 1 & 2 (CN31)



Pin	Pin Name	Signal Type	Signal Level
1	+5VSB	PWR	+5V
2	USB1_D-	DIFF	
3	USB1_D+	DIFF	
4	GND	GND	
5	USB1_SSRX-	DIFF	
6	USB1_SSRX+	DIFF	

7	GND	GND	
8	USB1_SSTX-	DIFF	
9	USB1_SSTX+	DIFF	
10	+5VSB	PWR	+5V
11	USB2_D-	DIFF	
12	USB2_D+	DIFF	
13	GND	GND	
14	USB2_SSRX-	DIFF	
15	USB2_SSRX+	DIFF	
16	GND	GND	
17	USB2_SSTX-	DIFF	
18	USB2_SSTX+	DIFF	

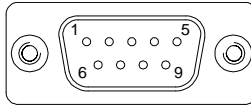
2.4.32 High Definition Audio (CN32)



Pin	Pin Name	Signal Type	Signal Level
1	MIC_L	IN	
2	MIC_R	IN	
3	GND_AUDIO	GND	
4	LINE_L_IN	IN	
5	LINE_R_IN	IN	
6	GND_AUDIO	GND	

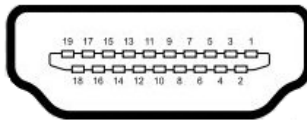
7	LEFT_OUT	OUT	
8	GND_AUDIO	GND	
9	RIGHT_OUT	OUT	
10	+5V_AUDIO	PWR	+5V

2.4.33 COM Port 1 (D-SUB 9) (CN33)



Pin	Pin Name	Signal Type	Signal Level
1	DCD	IN	
2	RX	IN	
3	TX	OUT	±9V
4	DTR	OUT	±9V
5	GND	GND	
6	DSR	IN	
7	RTS	OUT	±9V
8	CTS	IN	
9	RI	IN	

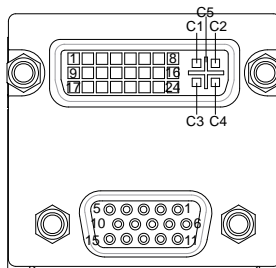
2.4.34 HDMI (CN34)



Pin	Pin Name	Signal Type	Signal Level
1	TMDS_Data2+	DIFF	
2	GND	GND	

3	TMDS_Data2-	DIFF	
4	TMDS_Data1+	DIFF	
5	GND	GND	
6	TMDS_Data1-	DIFF	
7	TMDS_Data0+	DIFF	
8	GND	GND	
9	TMDS_Data0-	DIFF	
10	TMDS_Clock+	DIFF	
11	GND	GND	
12	TMDS_Clock-	DIFF	
13	NC		
14	NC		
15	SCL	I/O	+3.3V
16	SDA	I/O	+3.3V
17	GND		
18	+5V	PWR	+5V
19	HPLG_DETECT	IN	

2.4.35 VGA / DVI Ports (CN35)



VGA

Pin	Pin Name	Signal Type	Signal Level
-----	----------	-------------	--------------

1	RED	OUT	
2	GREEN	OUT	
3	BLUE	OUT	
4	NC		
5	GND	GND	
6	RED_GND_RTN	GND	
7	GREEN_GND_RTN	GND	
8	BLUE_GND_RTN	GND	
9	+5V	PWR	+5V
10	GND	GND	
11	NC		
12	DDC_DATA	I/O	+5V
13	HSYNC	OUT	
14	VSYNC	OUT	
15	DDC_CLK	I/O	+5V

DVI

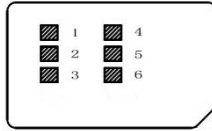
Pin	Pin Name	Signal Type	Signal Level
1	TMDS_DAT2-	DIFF	
2	TMDS_DAT2+	DIFF	
3	GND	GND	
4	VGA_DDC_CLK	I/O	
5	VGA_DDC_DATA	I/O	
6	DVI_DDC_CLK	I/O	+5V
7	DVI_DDC_DATA	I/O	+5V
8	VSYNC	OUT	
9	TMDS_DAT1-	DIFF	

10	TMDS_DAT1+	DIFF	
11	GND	GND	
12	TMDS_DAT3-	DIFF	
13	TMDS_DAT3+	DIFF	
14	+5V	PWR	+5V
15	GND	GND	
16	HPLG_DETECT	IN	
17	TMDS_DAT0-	DIFF	
18	TMDS_DAT0+	DIFF	
19	GND	GND	
20	NC		
21	NC		
22	GND	GND	
23	TMDS_CLK+	DIFF	
24	TMDS_CLK-	DIFF	

VGA

Pin	Pin Name	Signal Type	Signal Level
C1	RED	OUT	
C2	GREEN	OUT	
C3	BLUE	OUT	
C4	HSYNC	OUT	
C5	GND_ANALOG	GND	

2.4.36 UIM Socket (CN36)



Pin	Pin Name	Signal Type	Signal Level
1	UIM_PWR	PWR	
2	UIM_RST	IN	
3	UIM_CLK	IN	
4	GND	GND	
5	UIM_VPP	PWR	
6	UIM_DATA	I/O	

2.4.37 MiniCard (PCIE1)

Pin	Pin Name	Signal Type	Signal Level
1	PCIE_WAKE#	IN	
2	+3.3VSB	PWR	+3.3V
3	NC		
4	GND	GND	
5	NC		
6	+1.5V	PWR	+1.5V
7	PCIE_CLK_REQ#	IN	
8	UIM_PWR	PWR	
9	GND	GND	
10	UIM_DATA	I/O	
11	PCIE_REF_CLK-	DIFF	
12	UIM_CLK	IN	
13	PCIE_REF_CLK+	DIFF	

14	UIM_RST	IN	
15	GND	GND	
16	UIM_VPP	PWR	
17	NC		
18	GND	GND	
19	NC		
20	W_DISABLE#	OUT	+3.3V
21	GND	GND	
22	PCIE_RST#	OUT	+3.3V
23	PCIE_RX-	DIFF	
24	+3.3VSB	PWR	+3.3V
25	PCIE_RX+	DIFF	
26	GND	GND	
27	GND	GND	
28	+1.5V	PWR	+1.5V
29	GND	GND	
30	SMB_CLK	I/O	+3.3V
31	PCIE_TX-	DIFF	
32	SMB_DATA	I/O	+3.3V
33	PCIE_TX+	DIFF	
34	GND	GND	
35	GND	GND	
36	USB_D-	DIFF	
37	GND	GND	
38	USB_D+	DIFF	
39	+3.3VSB	PWR	+3.3V
40	GND	GND	

41	+3.3VSB	PWR	+3.3V
42	NC		
43	GND	GND	
44	NC		
45	NC		
46	NC		
47	NC		
48	+1.5V	PWR	+1.5V
49	NC		
50	GND	GND	
51	NC		
52	+3.3VSB	PWR	+3.3V

2.4.38 C-Fast (CFD1)

Pin	Pin Name	Signal Type	Signal Level
S1	GND	GND	
S2	SATA_TX+	DIFF	
S3	SATA_TX-	DIFF	
S4	GND	GND	
S5	SATA_RX-	DIFF	
S6	SATA_RX+	DIFF	
S7	GND	GND	
PC1	NC		
PC2	GND	GND	
PC3	NC		
PC4	NC		

PC5	NC		
PC6	NC		
PC7	GND	GND	
PC8	NC		
PC9	NC		
PC10	NC		
PC11	NC		
PC12	NC		
PC13	+3.3V	PWR	+3.3V
PC14	+3.3V	PWR	+3.3V
PC15	GND	GND	
PC16	GND	GND	
PC17	NC		

2.4.39 DDR3L SO-DIMM Slot (DIMM1)

Standard specification

Chapter 3

AMI BIOS Setup

3.1 System Test and Initialization

The board uses certain routines to perform testing and initialization. If an error, fatal or non-fatal, is encountered, a few short beeps or an error message will be outputted. The board can usually continue the boot up sequence with non-fatal errors.

The system configuration verification routines check the current system configuration against the values stored in the CMOS memory. If they do not match, an error message will be outputted, in which case you will need to run the BIOS setup program to set the configuration information in memory.

There are three situations in which you will need to change the CMOS settings:

- You are starting your system for the first time
- You have changed your system's hardware
- The CMOS memory has lost power and the configuration information is erased

The system's CMOS memory uses a backup battery for data retention, which is to be replaced once emptied.

3.2 AMI BIOS Setup

The AMI BIOS ROM has a pre-installed Setup program that allows users to modify basic system configurations, which is stored in the battery-backed CMOS RAM and BIOS NVRAM so that the information is retained when the power is turned off.

To enter BIOS Setup, press or <F2> immediately while your computer is powering up.

The function for each interface can be found below.

Main – Date and time can be set here. Press <Tab> to switch between date elements

Advanced – Enable/ Disable boot option for legacy network devices

Chipset – For hosting bridge parameters

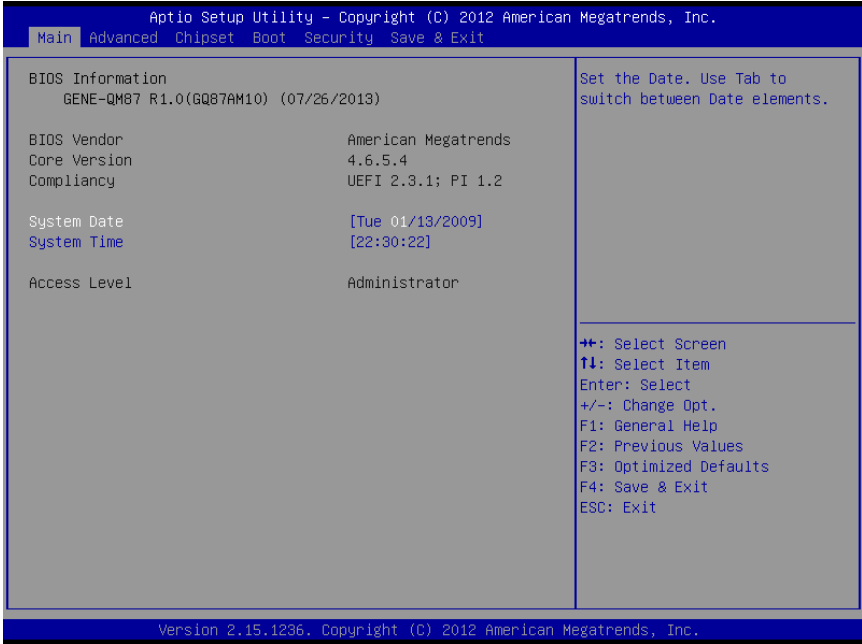
Boot – Enable/ Disable quiet Boot Option

Security – The setup administrator password can be set here

Save & Exit – Save your changes and exit the program

3.3 Setup submenu: Main

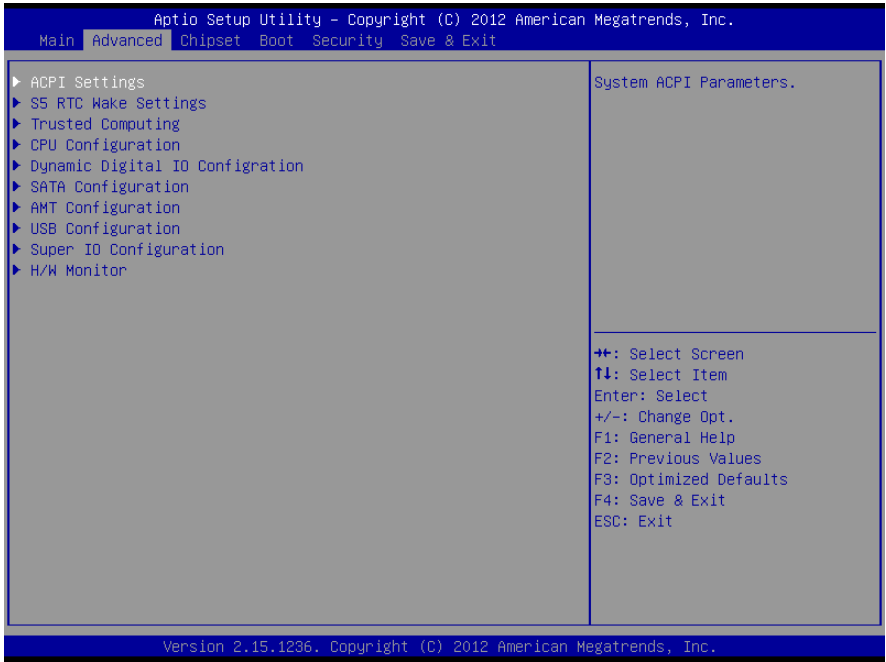
Press '*Delete*' Key to enter Setup



Options summary: **(default setting)**

System Date	Day MM:DD:YYYY	
Change the month, year and century. The 'Day' is changed automatically.		
System Time	HH : MM : SS	
Change the clock of the system.		

3.4 Setup submenu: Advanced

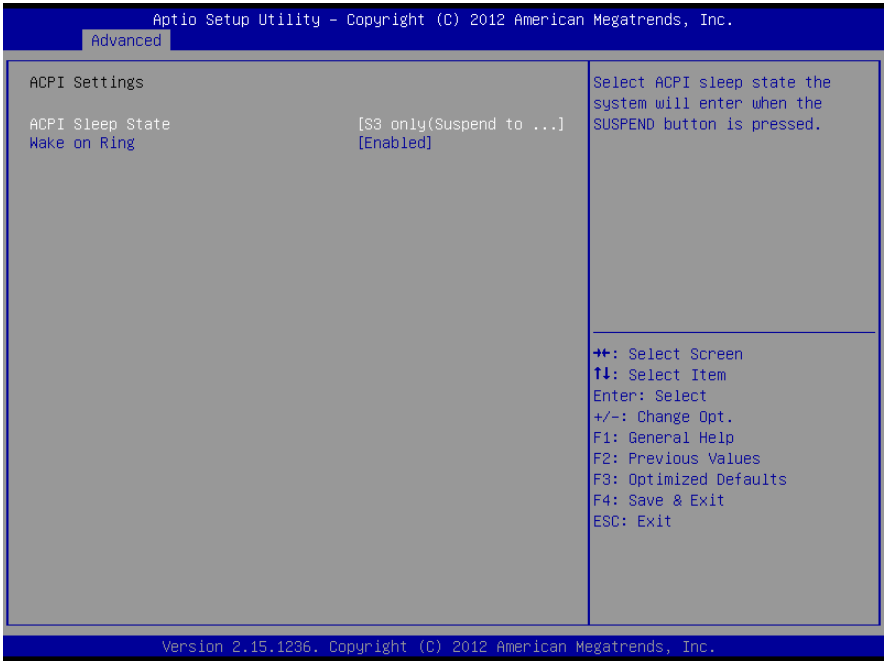


Options summary: **(default setting)**

ACPI Settings		
System ACPI Parameters		
S5 RTC Wake Settings		
Enable system to wake from S5 using RTC alarm.		
Trusted Computing		
Trusted Computing Settings		
CPU Configuration		
CPU Configuration Parameters		
Dynamic Digital IO Configuration		
DIO setting		

SATA Configuration		
SATA Device Options Settings		
AMT Configuration		
AMT Configuration Parameters		
USB Configuration		
USB Configuration Parameters		
Super IO Configuration		
Super IO Configuration Parameters		
H/W Monitor		
Monitor hardware status		

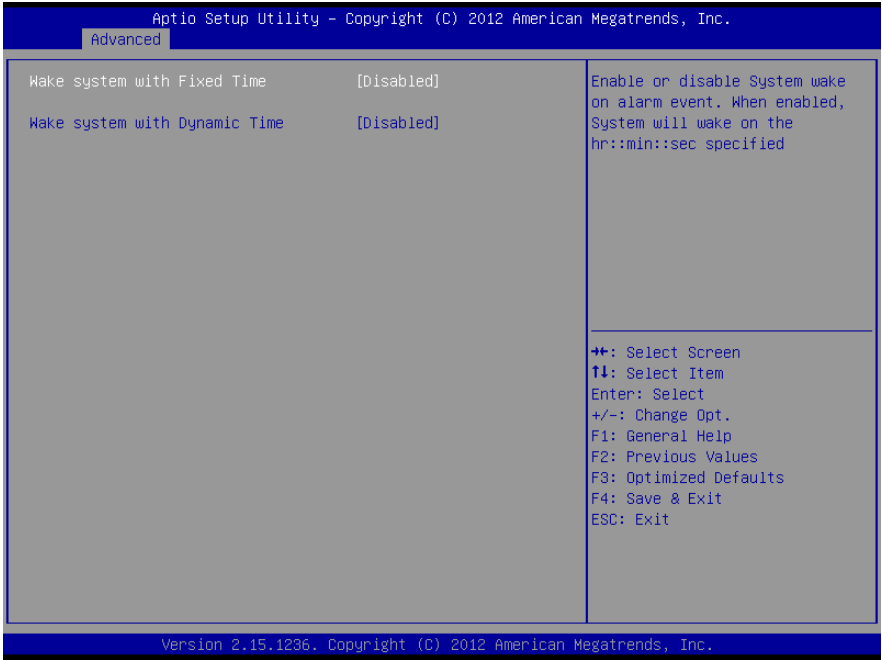
3.4.1 Advanced: ACPI Settings



Options summary: (default setting)

ACPI Sleep State	Suspend Disabled	
	S3 only(Suspend to RAM)	
Select the ACPI state used for System Suspend		
Wake on Ring	Disabled	
	Enabled	
Enable/Disable Wake on Ring function		

3.4.2 Advanced: RTC Wake Settings

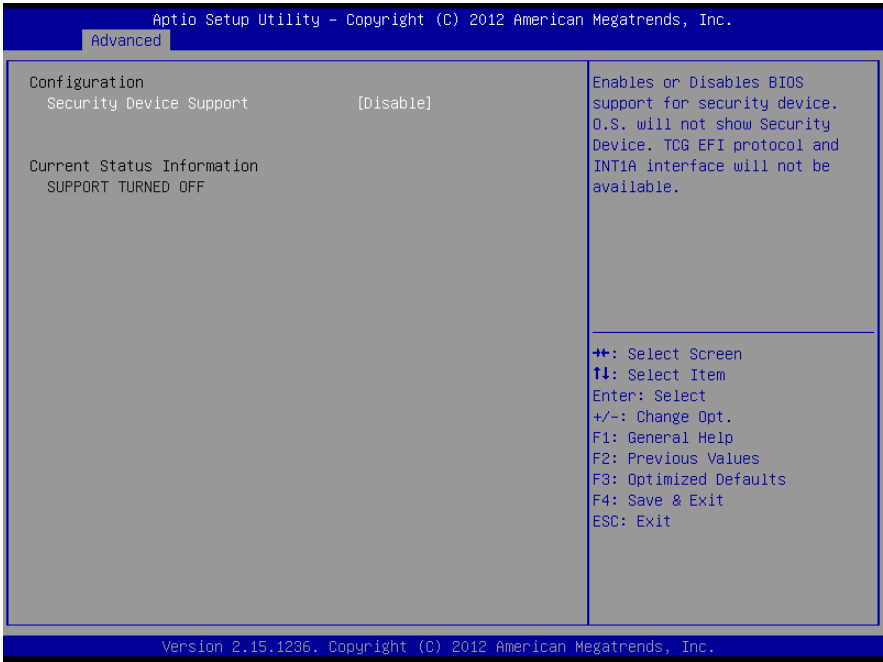


Options summary: **(default setting)**

Wake system with Fixed Time	Disabled	
	Enabled	
Enable or disable System wake on alarm event. Wake up time is setting by following settings.		
Wake up day	0-31	
Select 0 for daily system wake up		
Wake up hour	0-23	
Wake up minute	0-59	

Wake up second	0-59	
Wake system with Dynamic Time	Disabled	
	Enabled	
Enable or disable System wake on alarm event. Wake up time is current time + Increase minutes.		
Wake up minute increase	1-5	

3.4.3 Advanced: Trusted Computing



Options summary: (default setting)

Security Device Support	Disabled	
	Enabled	
En/Disable TPM support.		
TPM State	Disabled	
	Enabled	
En/Disable TPM functionality.		
Pending TPM Operation	None	
	Enable Take Ownership	
	Disable Take Ownership	
	TPM Clear	

Select one-time TPM operation. Item value returns to 'None' after next POST.

3.4.4 Advanced: CPU Configuration

Aptio Setup Utility - Copyright (C) 2012 American Megatrends, Inc.

Advanced

CPU Signature	306c3	▲ Enables or Disables Intel(R) TXT(LT) support. ⇄: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
Microcode Patch	8	
Max CPU Speed	1600 MHz	
Min CPU Speed	800 MHz	
CPU Speed	2600 MHz	
Processor Cores	2	
Intel HT Technology	Supported	
Intel VT-x Technology	Supported	
Intel SMX Technology	Supported	
64-bit	Supported	
EIST Technology	Supported	
CPU C3 state	Supported	
CPU C6 state	Supported	
CPU C7 state	Supported	
L1 Data Cache	32 kB x 2	⇄: Select Screen ↑↓: Select Item Enter: Select +/-: Change Opt. F1: General Help F2: Previous Values F3: Optimized Defaults F4: Save & Exit ESC: Exit
L1 Code Cache	32 kB x 2	
L2 Cache	256 kB x 2	
L3 Cache	3072 kB	
Hyper-threading	[Enabled]	
Active Processor Cores	[All]	
Intel Virtualization Technology	[Enabled]	
EIST	[Enabled]	
Intel TXT(LT) Support	[Disabled]	

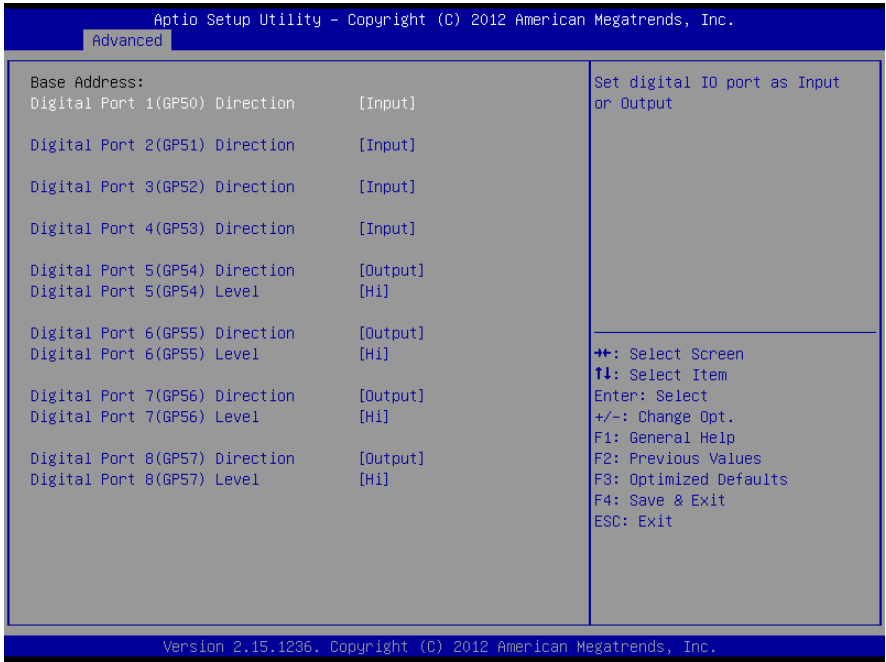
Version 2.15.1236. Copyright (C) 2012 American Megatrends, Inc.

Options summary: (default setting)

Hyper-Threading	Disabled	
	Enabled	
En/Disable CPU Hyper-Threading function		
Active Processor Cores	ALL	
	1 to Max CPU cores	
Number of CPU cores to be active.		
Intel Virtualization Technology	Disabled	
	Enabled	

En/Disable Intel VT-x function		
EIST	Disabled	
	Enabled	
En/Disable Intel SpeedStep		
Intel TXT(LT) Support	Disabled	
	Enabled	
En/Disable Intel TXT(LT)		

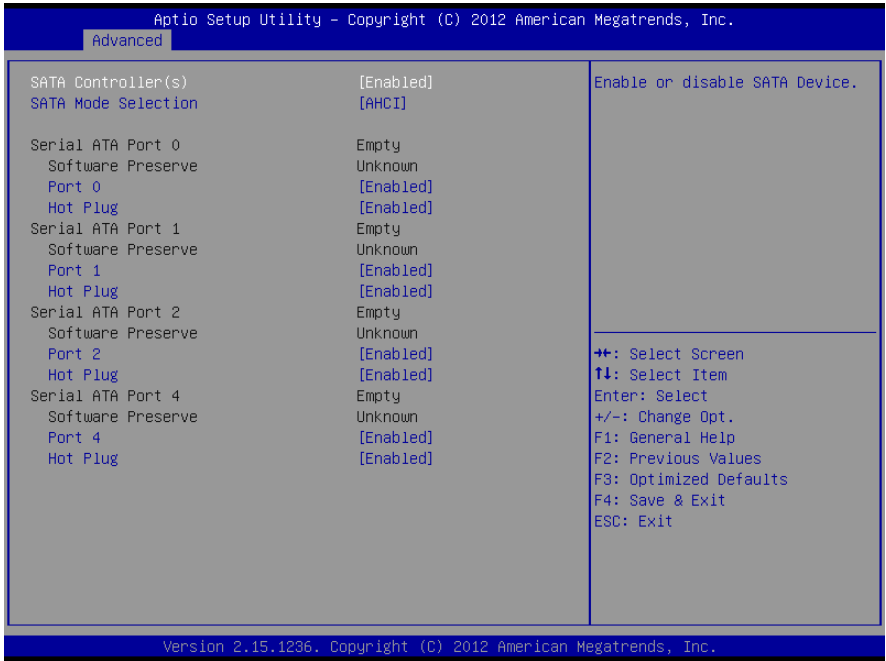
3.4.5 Advanced: Digital IO Configuration



Options summary: (default setting)

Digital Port X(GPXX) Direction	Input	
	Output	
Set GPIOx as Input or Output		
Digital Port X(GPXX) Levels	Hi	
	Low	
Set GPIO output level when used as output pin		

3.4.6 Advanced: SATA Configuration

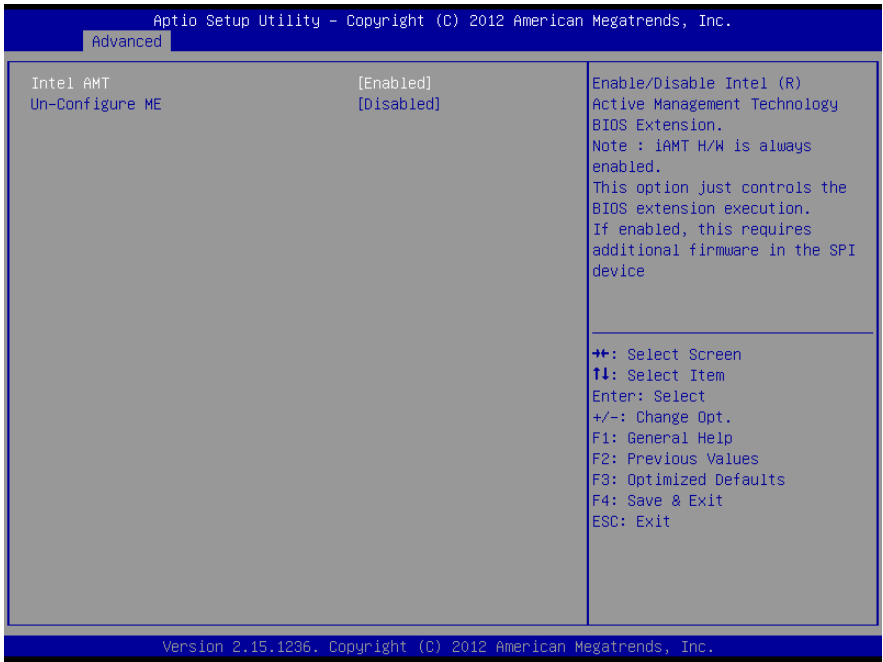


Options summary: (default setting)

SATA Controller(s)	Disabled	
	Enabled	
En/Disable SATA controller		
SATA Mode Selection	IDE	
	AHCI	
	RAID	
Configure SATA controller operating as IDE/AHCI/RAID mode.		
Port X	Disabled	
	Enabled	
En/Disable the selected port.		

Hot Plug	Disabled	
	Enabled	
En/Disable Hot Plug feature for specified port.		

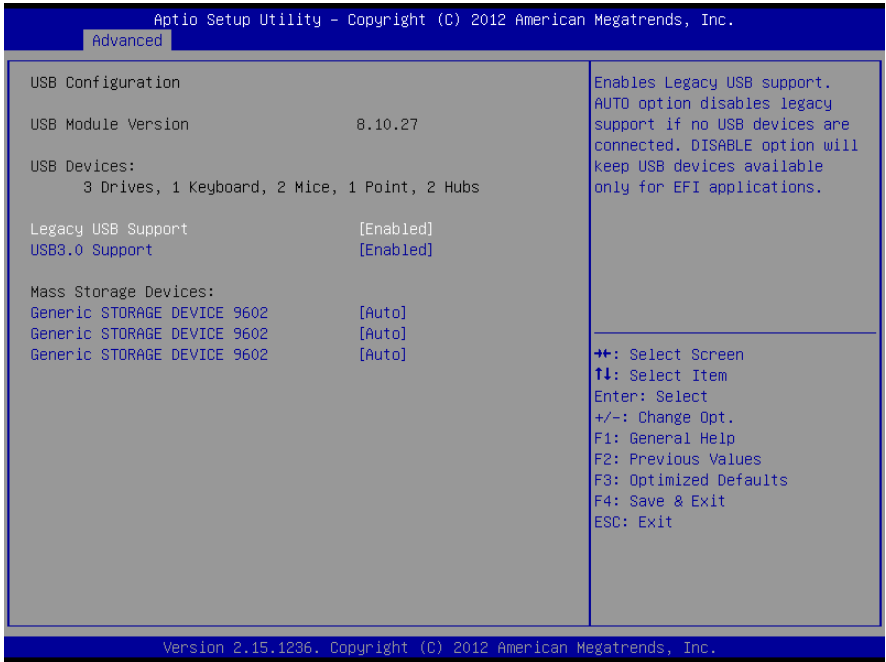
3.4.7 Advanced: AMT Configuration



Options summary: (default setting)

Intel AMT	Enabled	
	Disabled	
En/Disable Intel® Active Management Technology BIOS Extension. Note: iAMT H/W is always enabled. This option just controls the BIOS extension execution. If enabled, this requires additional firmware in the SPI device		
Un-Configure ME	Enabled	
	Disabled	
OEMFlag Bit 15: Un-Configure ME without password		

3.4.8 Advanced: USB Configuration



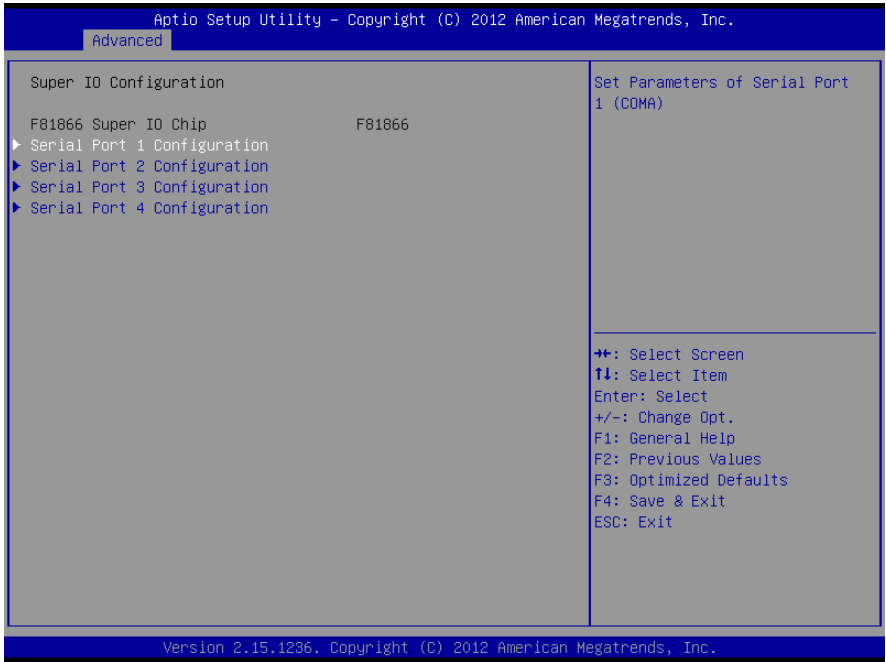
Options summary: (default setting)

Legacy USB Support	Enabled	
	Disabled	
	Auto	
Enables BIOS Support for Legacy USB Support. When enabled, USB can be functional in legacy environment like DOS. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI application		
USB3.0 Support	Enabled	
	Disabled	
Enables BIOS Support for USB3.0 (XHCI). When disabled, PCH USB3.0 controller will also be disabled.		

Device Name (Emulation Type)	Auto	
	Floppy	
	Forced FDD	
	Hard Disk	
	CD-ROM	

If Auto. USB devices less than 530MB will be emulated as Floppy and remaining as Floppy and remaining as hard drive. Forced FDD option can be used to force a HDD formatted drive to boot as FDD(Ex. ZIP drive)

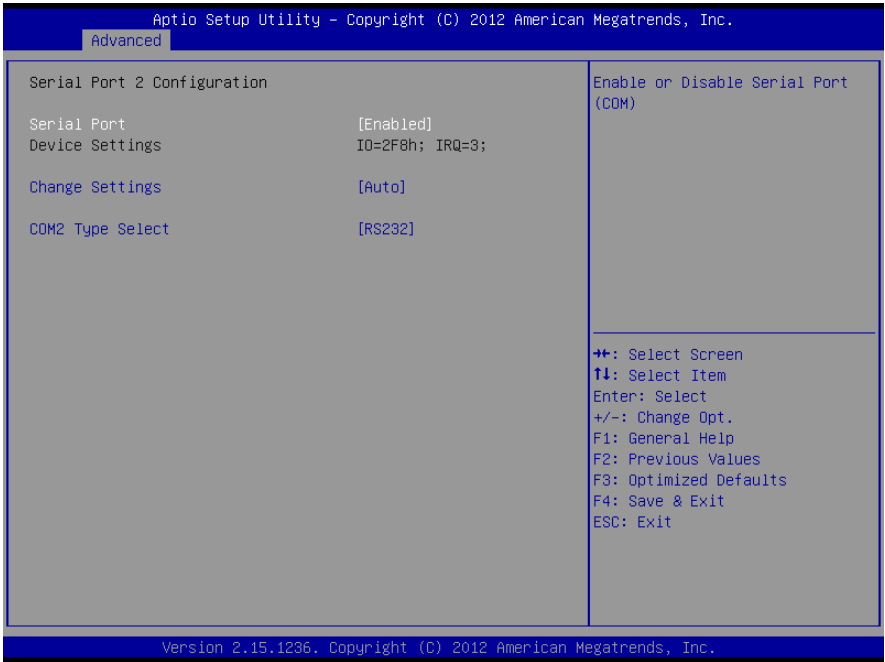
3.4.9 Advanced: Super IO Configuration



Options summary: (default setting)

Serial Port 1/2/3/4		
Configuration		
Set Parameters of Serial Port 1/2/3/4		

3.4.9.1 Super IO Configuration: Serial Port Configuration

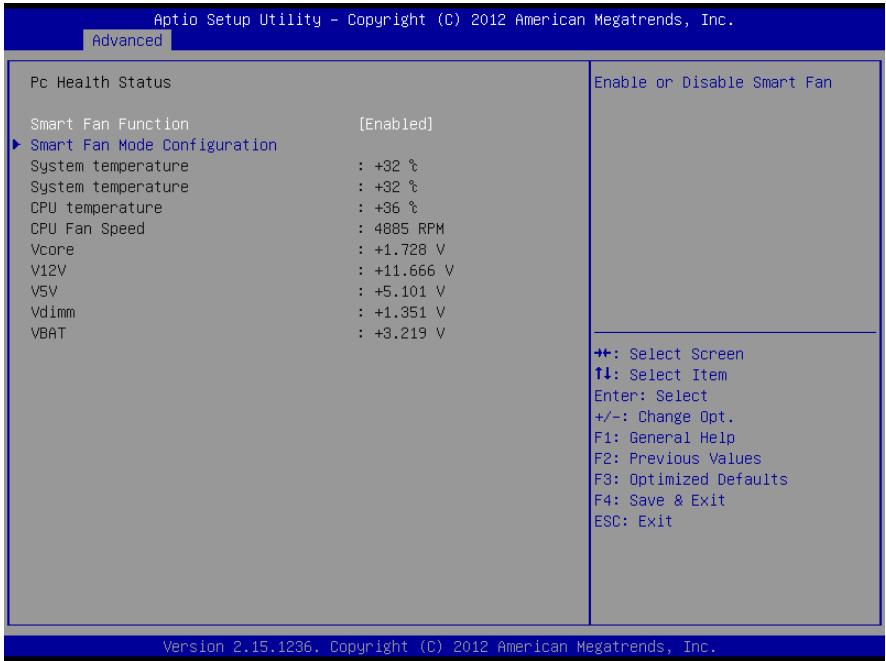


Options summary: (default setting)

Serial Port	Disabled	
	Enabled	
En/Disable specified serial port.		
Change Settings	Auto	
	IO=2F8h; IRQ=3;	
	IO=3F8h; IRQ=3,4,5,7,10,11,12;	
	IO=2F8h; IRQ=3,4,5,7,10,11,12;	
	IO=3E8h; IRQ=3,4,5,7,10,11,12;	
	IO=2E8h; IRQ=3,4,5,7,10,11,12;	
Select a resource setting for Super IO device.		

Device Type	RS232	
	RS422	
	RS485	
Configure COM2/6 operated as RS232, RS422 or RS485.		

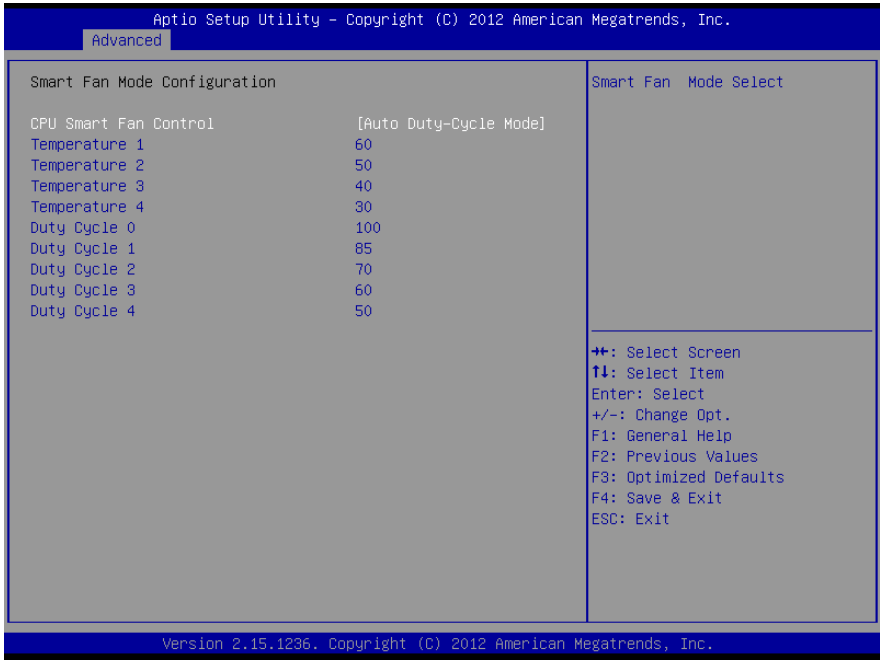
3.4.10 Advanced: H/W Monitor



Options summary: (default setting)

Smart Fan Function	Disabled	
	Enabled	
Enable or Disable Smart Fan		
Smart Fan Mode configuration		
Smart Fan Mode select		

3.4.10.1 H/W Monitor: Smart Fan Mode Configuration

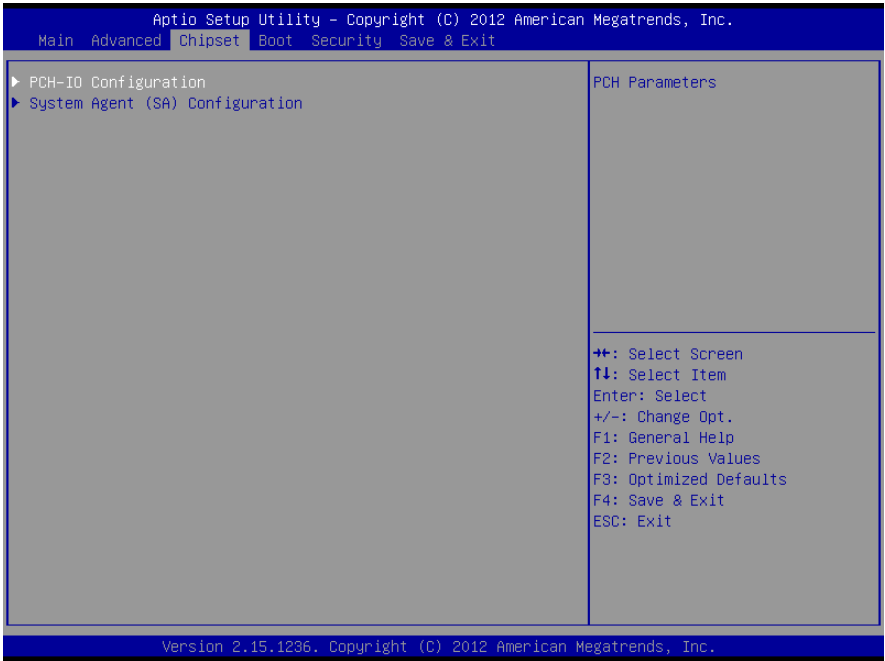


Options summary: (default setting)

CPU Smart Fan Control	Manual Duty Mode	
	Auto Duty-Cycle Mode	
Manual Duty Mode: Manually controlling the fan with a given control PWM.		
Auto Duty-Cycle Mode: Automatically controlling the fan with given parameters.		
Manual Duty Mode	1 to 100, default is 80	
Fan Speed value between 1 to 100		
Temperature 1/2/3/4	1 to 100, default is 60/50/40/30	
Auto fan speed control. Fan speed will follow different temperature by different duty cycle 1-100		

Duty Cycle 0/1/2/3/4	1 to 100, default is 100/85/70/60/50	
Auto fan speed control. Fan speed will follow different temperature by different duty cycle 1-100		

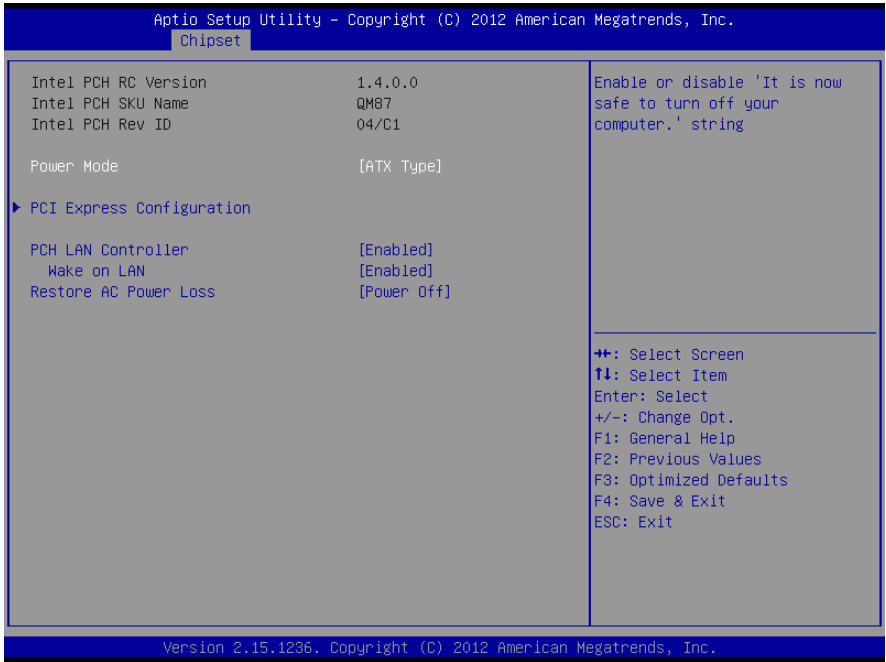
3.5 Setup submenu: Chipset



Options summary: (default setting)

PCH-IO Configuration		
South Bridge Parameters		
System Agent (SA) Configuration		
SA Parameters		

3.5.1 Chipset: PCH-IO Configuration

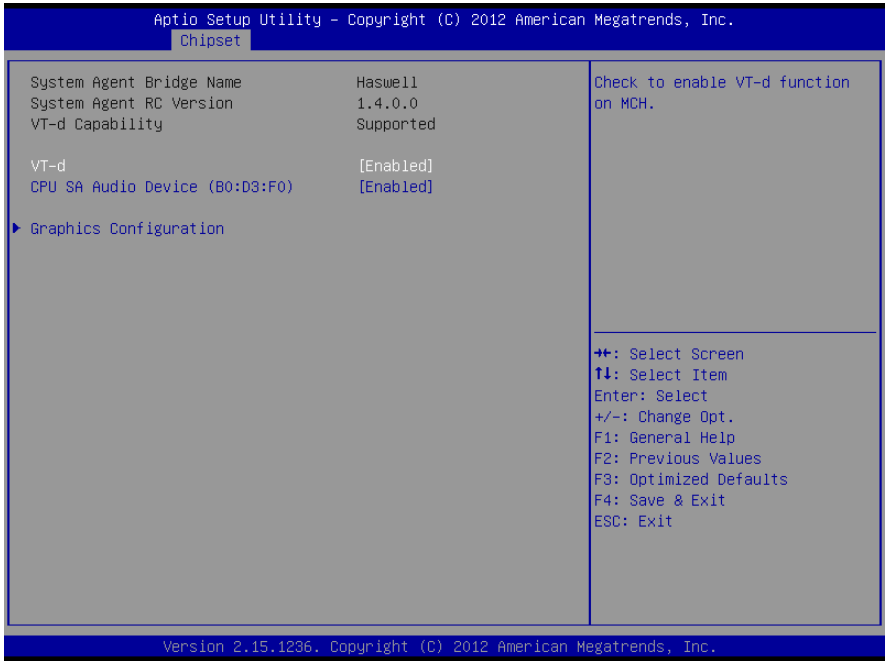


Options summary: (default setting)

Power Mode	ATX Type	
	AT Type	
Enable or disable 'It is now safe to turn off your computer.' string		
PCI Express Configuration		
PCI Express Configuration settings		
PCH LAN Controller	Enabled	
	Disabled	
En/Disabled onboard NIC		
Wake on LAN	Enabled	

	Disabled	
En/Disabled integrated LAN to wake the system. (The Wake on LAN cannot be disabled if ME is on at Sx state.		
Restore AC Power Loss	Power Off	
	Power On	
	Last State	
Select AC power state when power is re-applied after a power failure		

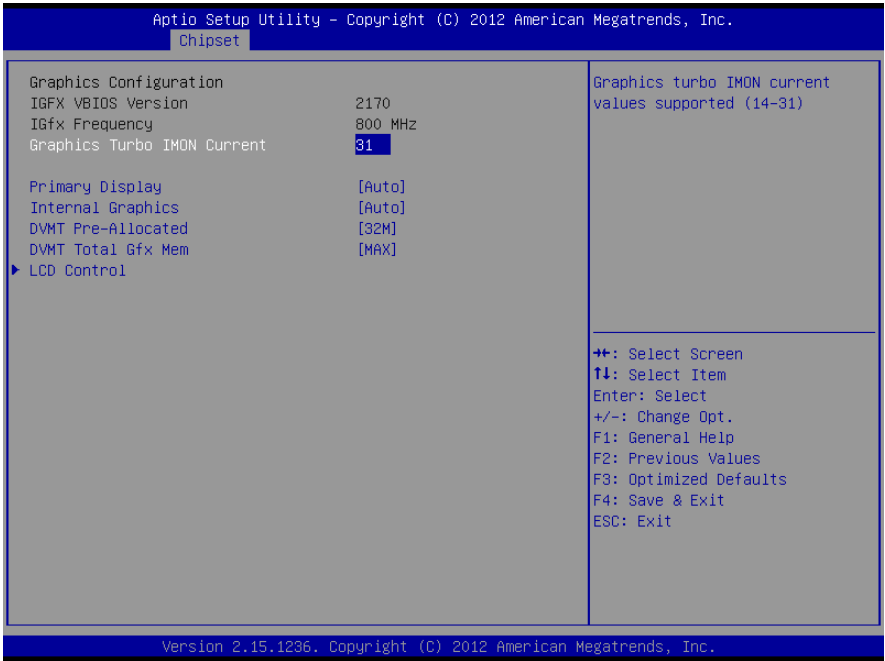
3.5.2 Chipset: System Agent (SA) Configuration



Options summary: (default setting)

VT-d	Disabled	
	Enabled	
Check to enable VT-d function on MCH		
CPU SA Audio Device (B0:D3:F0)	Enabled	
	Disabled	
En/Disable CPU SA Audio Device		
Graphics Configuration		
Config Graphics Settings		

3.5.2.1 System Agent (SA) Configuration: Graphics Configuration

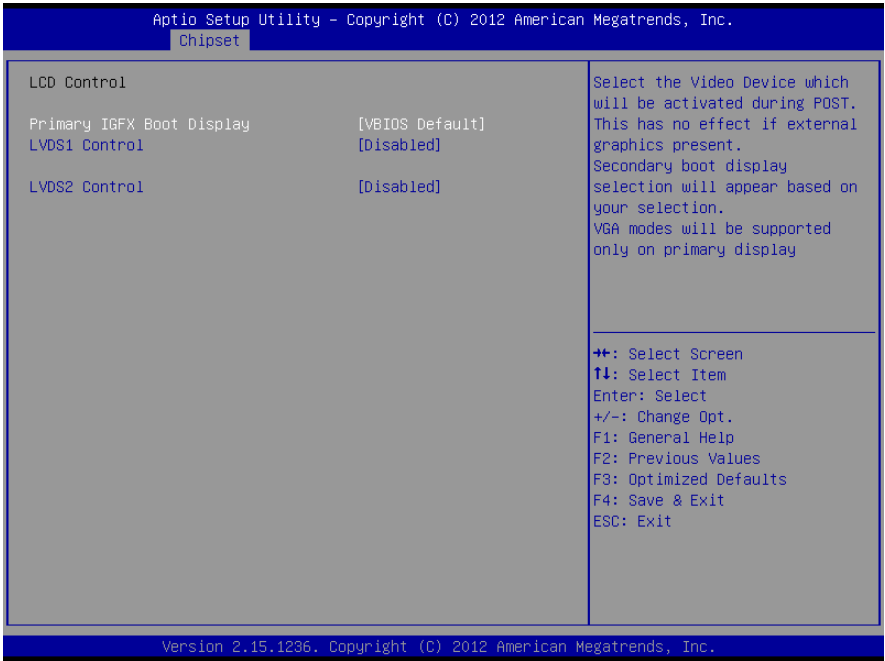


Options summary: (default setting)

Primary Display	Auto	
	IGFX	
	PEG	
	PCIE	
	SG	
Select graphic adapters to boot		
Internal Graphics	Auto	
	Disabled	
	Enabled	
En/Disabled internal graphics device		

DVMT Pre-Allocated	32MB	
	64MB~1024MB	
Select DVMT 5.0 Pre-Allocated (Fixed) Graphics Memory size used by the Internal Graphics Device.		
DVMT Total Gfx Mem	128MB	
	256MB	
	Max	
Select DVMT 5.0 Total Graphic Memory size used by the Internal Graphics Device.		

3.5.2.2 System Agent (SA) Configuration: LCD Control



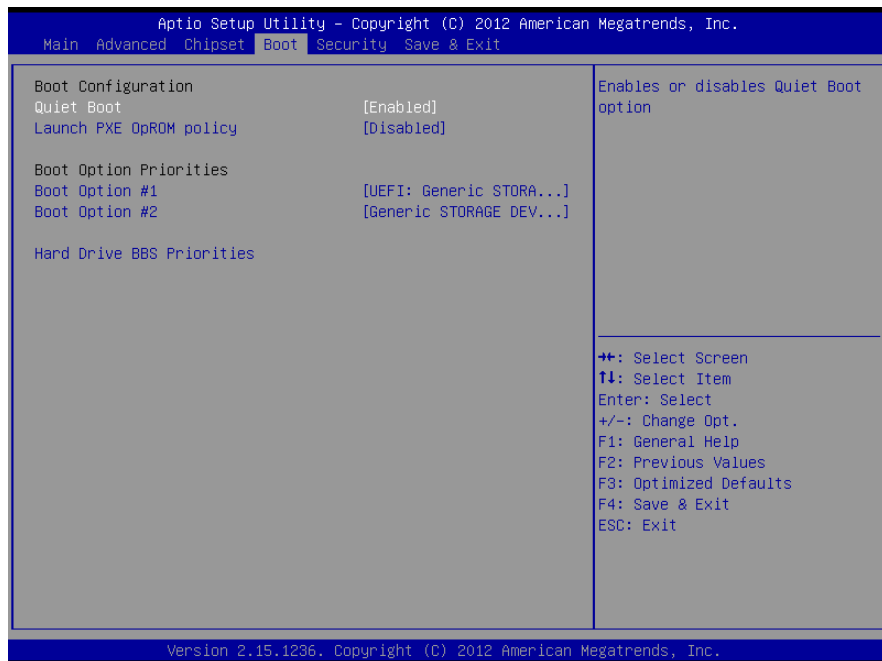
Options summary: (*default setting*)

Primary IGFX Boot Display	<i>VBIOS Defat</i>	
	CRT	
	LVDS2	
	LVDS1	
	DVI	
	HDM	
Select Primary IGFX boot display device		
LVDS1 Control	<i>Disabled</i>	
	Enabled	
Enable or Disable Onboard PTN3460(EDP)		

LVDS2 Control	<i>Disabled</i>	
	Enabled	
Enable or Disable Onboard PTN3460(DP)		
LVDS1 Panel Type	640x480,18-Bit,60Hz	
	800x480,18-Bit,60Hz	
	800x600,18-Bit,60Hz	
	1024x600,18-Bit,60Hz	
	1024x768,18-Bit,60Hz	
	1024x768,24-Bit,60Hz	
	1280x768,24-Bit,60Hz	
	1280x1024,48-Bit,60Hz	
	1366x768,24-Bit,60Hz	
	1440x900,24Bit,60Hz	
	1600x1200,48-Bit,60Hz	
	1920x1080,48-Bit,60Hz	
	640x480,24-Bit,60Hz	
	800x600,24-Bit,60Hz	
1280x768,18-Bit,60Hz		
Select LVDS1 native resolution.		
LVDS2 Panel Type	<i>800x600,18-Bit,60Hz</i>	
	1024x768,18-Bit,60Hz	
	1280x768,18-Bit,60Hz	
	1366x768,18-Bit,60Hz	
	1280x1024,48-Bit,60Hz	
	1920x1080,48-Bit,60Hz	
	1920x1200,48-Bit,60Hz	
	800x600,24-Bit,60Hz	

	1024x768,24-Bit,60Hz	
	1280x768,24-Bit,60Hz	
	1388x768,24-Bit,60Hz	
Select LVDS2 native resolution.		
LVDS1/LVDS2 Backlight	Inverted	
Type	<i>Normal</i>	
Select Backlight control type.		
Inverted: Brightest for low PWM duty cycle and low voltage.		
Normal: Brightest for high PWM duty cycle and high voltage.		
LVDS1/LVDS2 Backlight Level	100%	
	90%	
	80%	
	70%	
	60%	
	50%	
	40%	
	30%	
	20%	
	10%	
	0%	
Select Backlight Level		

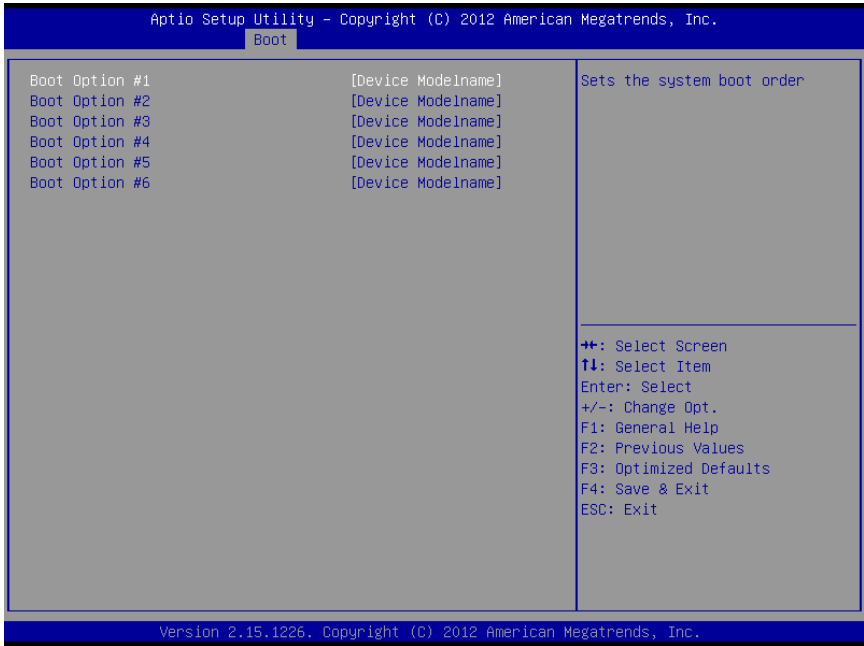
3.6 Setup submenu: Boot



Options summary: (default setting)

Quiet Boot	Disabled	
	Enabled	
En/Disable showing boot logo.		
Launch PXE OpROM policy	Disabled	
	Enabled	
En/Disable PXE boot for LAN		
Boot Option #X/ XXXX Drive BBS Priorities		
The order of boot priorities.		

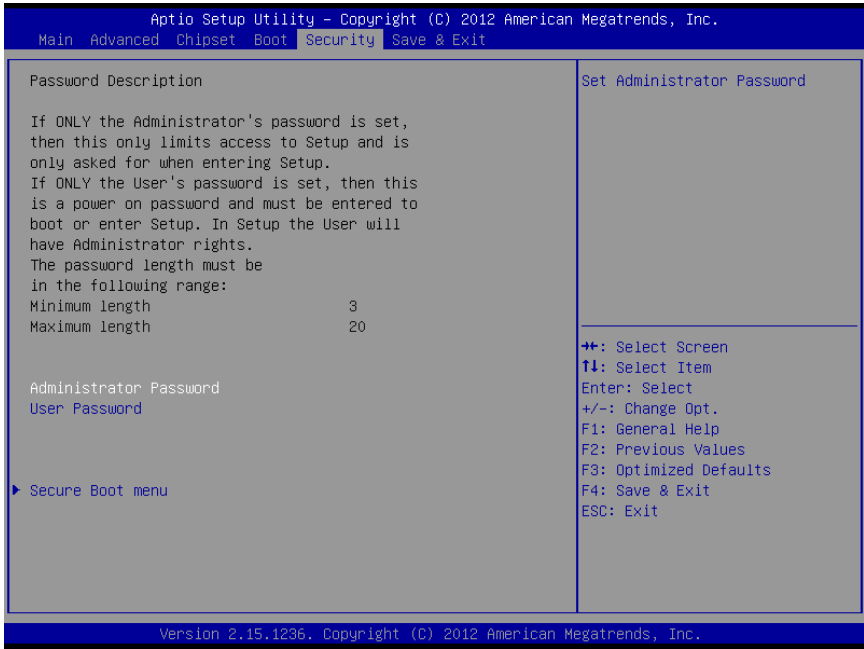
3.6.1 Boot: BBS Priorities



Options summary: (default setting)

Boot Option #x	Disabled	
	Device name	
Sets the system boot order		

3.7 Setup submenu: Security



Options summary: (*default setting*)

Administrator Password/	<i>Not set</i>	
User Password		

Change User/Administrator Password

If an Administrator Password is set, it will be required during boot up, or when the user enters the Setup utility. Please Note that a User Password does not provide access to many of the features in the Setup utility.

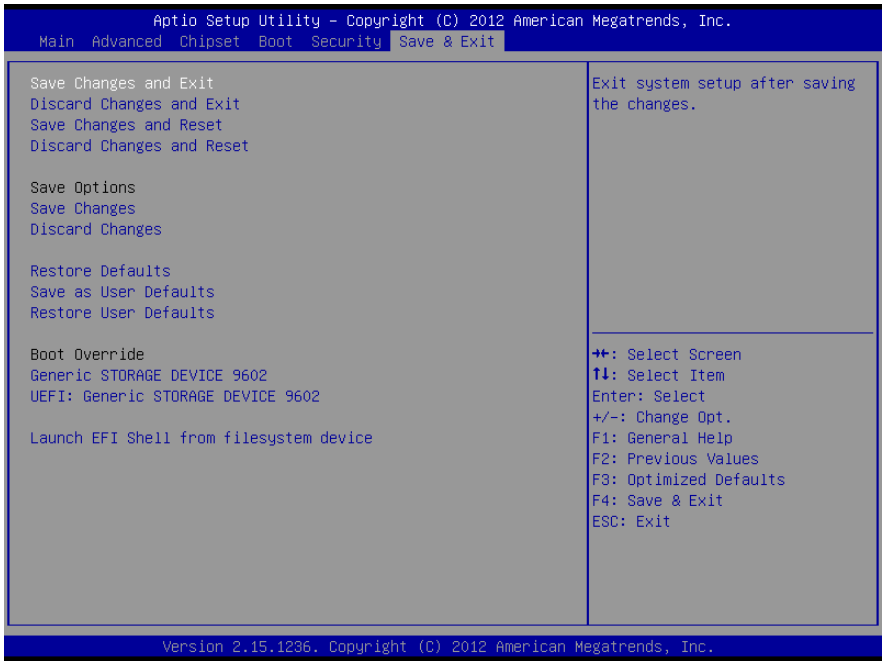
Select the password you wish to set, press Enter to open a dialog box to enter your password (you can enter no more than six letters or numbers). Press Enter to confirm your entry, after which you will be prompted to retype your

password for a final confirmation. Press Enter again after you have retyped it correctly.

Removing the Password

Highlight this item and type in the current password. At the next dialog box press Enter to disable password protection.

3.8 Setup submenu: Save & Exit



Options summary: (*default setting*)

Save Changes and Exit		
Exit system setup after saving the changes		
Discard Changes and Exit		
Exit system setup without saving any changes		
Save Changes and Reset		
Reset the system after saving the changes		
Discard Changes and Reset		
Save Changes		
Save Changes done so far to any of the setup options.		
Discard Changes		

Discard Changes done so far to any of the setup options		
Reset system setup without saving any changes		
Restore Defaults		
Restore/Load Default values for all the setup options.		
Save as User Defaults		
Save the changes done so far as User Defaults		
Restore User Defaults		
Restore the User Defaults to all the setup options		

Chapter 4

Drivers Installation

4.1 Product CD/DVD

The GENE-QM87 comes with a product DVD that contains all the drivers and utilities you need to setup your product. Insert the DVD and follow the steps in the autorun program to install the drivers.

In case the program does not start, follow the sequence below to install the drivers.

Step 1 – Install Chipset Drivers

1. Open the **Step1 - Chipset** folder and select your OS
2. Open the **infinst_autol.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 2 – Install Graphics Drivers

1. Open the **Step2 - VGA** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Note 1: This product supports VGA and LVDS display devices. In Single Display mode, use the hot keys **<Ctrl>+<Alt>+<F1>** to switch to VGA device and press **<Ctrl>+<Alt>+<F3>** to switch to LVDS device. Before removing the current display device, connect the display device that you want to use, and then press the hot keys to switch to that device.

Note 2: If you are using Windows® XP, install Microsoft.NET Framework (**dotnetfx35.exe** in folder) before installing the graphic drivers.

Step 3 – Install LAN Drivers

1. Click on the **Step3 - LAN** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 4 – Install Audio Drivers

1. Open the **Step4 - Audio** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 5 – Install ME Driver

1. Open the **Step5 – ME SW** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 6 – Install TPM Driver

1. Open the **Step6 – TPM** and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 7 – Install Touch Drivers

1. Open the **Step7 – Touch** and select your OS

2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 8 – Install USB 3.0 Driver (Windows 7 only)

1. Open the **Step8 - USB3.0** folder and select your OS
2. Open the **Setup.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 9 – Install IRST Driver

1. Open the **Step9 - IRST** folder and select your OS
2. Open the **SetupRST.exe** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Step 10 – Install Serial Port Driver (Optional)

1. Open the **Step10 – Serial Port** folder and select your OS
2. Open the **Patch.bat** file in the folder
3. Follow the instructions
4. Drivers will be installed automatically

Appendix A

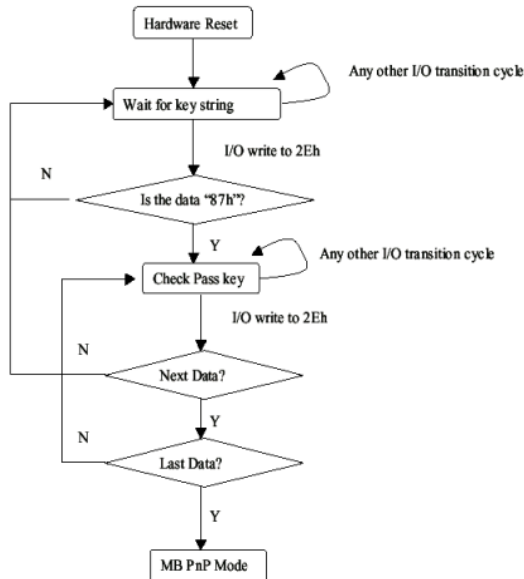
Watchdog Timer Programming

A.1 Watchdog Timer Programming

GENE-QM87 utilizes FINTEK 81866 chipset as its watchdog timer controller. Below are the procedures to complete its configuration and the AAEON initial watchdog timer program is also attached based on which you can develop customized program to fit your application.

Configuring Sequence Description

After the hardware reset or power-on reset, the FINTEK 81866 enters the normal mode with all logical devices disabled except KBC. The initial state (enable bit) of this logical device (KBC) is determined by the state of pin 121 (DTR1#) at the falling edge of the system reset during power-on reset.



There are three steps to complete the configuration setup: (1) Enter the MB PnP Mode; (2) Modify the data of configuration registers; (3) Exit the MB PnP Mode. Undesired result may occur if the MB PnP Mode is not exited normally.

(1) Enter the MB PnP Mode

To enter the MB PnP Mode, four special I/O write operations are to be performed during Wait for Key state. To ensure the initial state of the key-check logic, it is necessary to perform four write operations to the Special Address port (2EH). Two different enter keys are provided to select configuration ports (2Eh/2Fh) of the next step.

-o 4e 87

-o 4e 87 (enable configuration)

(2) Modify the Data of the Registers

All configuration registers can be accessed after entering the MB PnP Mode. Before accessing a selected register, the content of Index 07h must be changed to the LDN to which the register belongs, except some Global registers.

(3) Exit the MB PnP Mode

Write exit key 0xAA to the index port.

-o 4e aa (disable configuration)

Watch Dog Timer 1, 2, 3 Control Register (Index=F5h,F6h,FAh Default=00h)

7.8.4 Watchdog Control Configuration Register 1 — Index F5h

Bit	Name	R/W	Reset	Default	Description
7	Reserved	R	-	0	Reserved
6	WDTMOUT_STS	R/W	5VSB	0	If watchdog timeout event occurred, this bit will be set to 1. Write a 1 to this bit will clear it to 0.
5	WD_EN	R/W	5VSB	0	If this bit is set to 1, the counting of watchdog time is enabled.
4	WD_PULSE	R/W	5VSB	0	Select output mode (0: level, 1: pulse) of RSTOUT# by setting this bit.
3	WD_UNIT	R/W	5VSB	0	Select time unit (0: 1sec, 1: 60 sec) of watchdog timer by setting this bit.
2	WD_HACTIVE	R/W	5VSB	0	Select output polarity of RSTOUT# (1: high active, 0: low active) by setting this bit.
1-0	WD_PSWIDTH	R/W	5VSB	0	Select output pulse width of RSTOUT# 0: 1 ms 1: 25 ms 2: 125 ms 3: 5 sec

7.8.5 Watchdog Timer Configuration Register 2 — Index F6h

Bit	Name	R/W	Reset	Default	Description
7-0	WD_TIME	R/W	5VSB	0	Time of watchdog timer (0-255)

7.8.6 Watchdog PME Enable Configuration Register 2 — Index FAh

Bit	Name	R/W	Reset	Default	Description
7	WDT_PME	R	5VSB	0	0: No WDT PME occurred. 1: WDT PME occurred. The WDT PME is occurred one unit before WDT timeout.
6	WDT_PME_EN	R/W	5VSB	0	0: Disable Watchdog PME. 1: enable Watchdog PME.
5	Reserved	R	-	0	Reserved
4	WDT_CLK_SEL	R/W	5VSB	1	WDT Clock Source Select 0: Internal 1KHz clock. 1: 1KHZ clock driven by CLKIN.
3-1	Reserved	R	-	0	Reserved
0	WDOUT_EN	R/W	5VSB	0	0: disable Watchdog time out output via WDTRST#. 1: enable Watchdog time out output via WDTRST#.

A.2 F81866 Watchdog Timer Initial Program

```
Main(){
```

```
    aaeonSuperIOOpen();
```

```
    aaeonWdtSetCountMode(BOOL bMinute); // Set wdt count mode
```

```
    aaeonWdtSetTimeoutCount(BYTE tTimeout); // Set wdt timer
```

```
    aaeonWdtSetEnable(BOOL bEnable); // Enable wdt
```

```
    aaeonSuperIOClose();
```

```
}
```

```
Void aaeonSuperIOOpen() { // Config F81866 Entry key
```

```
    aaeonioWritePortByte(F81866_INDEX, 0x87);
```

```
    aaeonioWritePortByte(F81866_INDEX, 0x87);
```

```
}
```

```
Void aaeonWdtSetCountMode(BOOL bMinute){
```

```
    BYTE WDT_CONTROL = f81866ReadByte(F81866_WDT_CONTROL_REG);
```

```
    if(bMinute)
```

```
        f81866WriteByte(F81866_WDT_CONTROL_REG, WDT_CONTROL | 0x08);
```

```
    else
```

```
        f81866WriteByte(F81866_WDT_CONTROL_REG, WDT_CONTROL & 0xF7);
```

```
}
```

```
Void aaeonWdtSetTimeoutCount(BYTE tTimeout){
```

```
    f81866SetLdn(0x07);
```

```
    f81866WriteByte(F81866_WDT_TIME_REG, tTimeout);
```






```
}  
  
Void aaeonWdtSetEnable(BOOL bEnable){  
    f81866SetLdn(0x07);  
    if(bEnable){  
        f81866WriteByte(0x30, 0x01);  
        WDT_BASE_ADDR =  
            (f81866ReadByte(F81866_WDT_BASEADDR_REG_MSB) << 8)  
            | f81866ReadByte(F81866_WDT_BASEADDR_REG_LSB);  
        WDT_STATUS = f81866ReadByte(F81866_WDT_CONTROL_REG);  
        f81866WriteByte(F81866_WDT_CONTROL_REG, WDT_STATUS | 0x20);  
        WDT_STATUS = f81866ReadByte(F81866_WDT_PME_REG);  
        f81866WriteByte(F81866_WDT_PME_REG, WDT_STATUS | 0x01);  
    }else{  
        f81866WriteByte(0x30, 0x00);  
        WDT_BASE_ADDR = 0;  
        WDT_STATUS = f81866ReadByte(F81866_WDT_CONTROL_REG);  
        f81866WriteByte(F81866_WDT_CONTROL_REG, WDT_STATUS & 0xDF);  
        WDT_STATUS = f81866ReadByte(F81866_WDT_PME_REG);  
        f81866WriteByte(F81866_WDT_PME_REG, WDT_STATUS & 0xFE);  
    }  
}  
  
Void aaeonSuperIOClose(){  
    aaeonioWritePortByte(F81866_INDEX, 0xaa);  
}
```

Appendix B

I/O Information

B.1 I/O Address Map

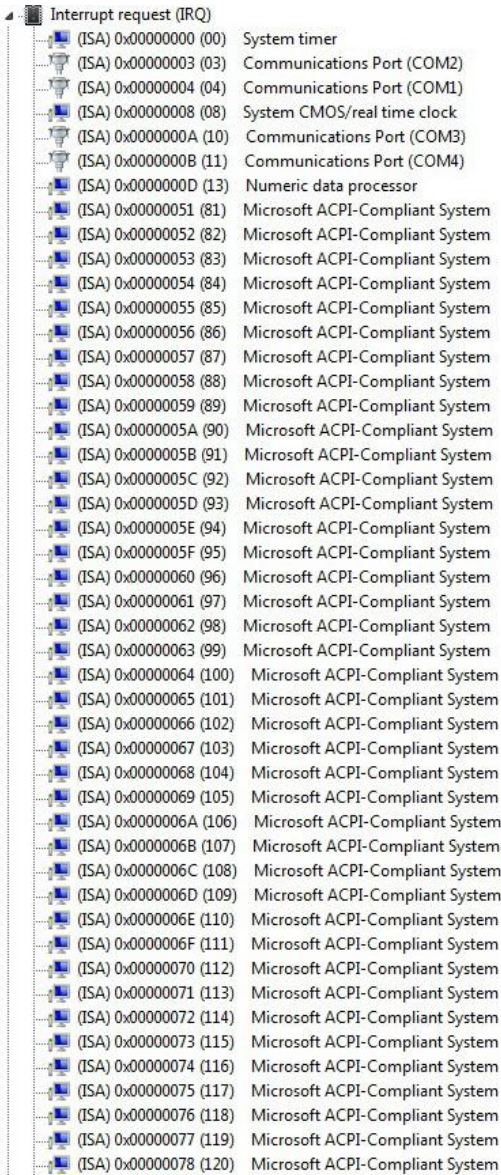
Input/output (IO)	
[00000000 - 0000001F]	Direct memory access controller
[00000000 - 000000CF7]	PCI bus
[00000010 - 0000001F]	Motherboard resources
[00000020 - 00000021]	Programmable interrupt controller
[00000022 - 0000003F]	Motherboard resources
[00000024 - 00000025]	Programmable interrupt controller
[00000028 - 00000029]	Programmable interrupt controller
[0000002C - 0000002D]	Programmable interrupt controller
[0000002E - 0000002F]	Motherboard resources
[00000030 - 00000031]	Programmable interrupt controller
[00000034 - 00000035]	Programmable interrupt controller
[00000038 - 00000039]	Programmable interrupt controller
[0000003C - 0000003D]	Programmable interrupt controller
[00000040 - 00000043]	System timer
[00000044 - 0000005F]	Motherboard resources
[0000004E - 0000004F]	Motherboard resources
[00000050 - 00000053]	System timer
[00000061 - 00000061]	Motherboard resources
[00000063 - 00000063]	Motherboard resources
[00000065 - 00000065]	Motherboard resources
[00000067 - 00000067]	Motherboard resources
[00000070 - 00000070]	Motherboard resources
[00000070 - 00000077]	System CMOS/real time clock
[00000072 - 0000007F]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000080 - 00000080]	Motherboard resources
[00000081 - 00000091]	Direct memory access controller
[00000084 - 00000086]	Motherboard resources
[00000088 - 00000088]	Motherboard resources
[0000008C - 0000008E]	Motherboard resources
[00000090 - 0000009F]	Motherboard resources
[00000092 - 00000092]	Motherboard resources
[00000093 - 0000009F]	Direct memory access controller
[000000A0 - 000000A1]	Programmable interrupt controller
[000000A2 - 000000BF]	Motherboard resources
[000000A4 - 000000A5]	Programmable interrupt controller
[000000A8 - 000000A9]	Programmable interrupt controller
[000000AC - 000000AD]	Programmable interrupt controller
[000000B0 - 000000B1]	Programmable interrupt controller
[000000B2 - 000000B3]	Motherboard resources
[000000B4 - 000000B5]	Programmable interrupt controller
[000000B8 - 000000B9]	Programmable interrupt controller
[000000BC - 000000BD]	Programmable interrupt controller
[000000C0 - 000000DF]	Direct memory access controller
[000000E0 - 000000EF]	Motherboard resources
[000000F0 - 000000F0]	Numeric data processor

	[00002E8 - 00002EF]	Communications Port (COM4)
	[00002F8 - 00002FF]	Communications Port (COM2)
	[00003B0 - 00003BB]	Intel(R) HD Graphics 4600
	[00003C0 - 00003DF]	Intel(R) HD Graphics 4600
	[00003E8 - 00003EF]	Communications Port (COM3)
	[00003F8 - 00003FF]	Communications Port (COM1)
	[000004D0 - 000004D1]	Motherboard resources
	[000004D0 - 000004D1]	Programmable interrupt controller
	[00000680 - 0000069F]	Motherboard resources
	[00000A00 - 00000A0F]	Motherboard resources
	[00000A10 - 00000A1F]	Motherboard resources
	[00000A20 - 00000A2F]	Motherboard resources
	[00000D00 - 0000FFFF]	PCI bus
	[0000164E - 0000164F]	Motherboard resources
	[00001800 - 000018FE]	Motherboard resources
	[00001854 - 00001857]	Motherboard resources
	[00001C00 - 00001CFE]	Motherboard resources
	[00001D00 - 00001DFE]	Motherboard resources
	[00001E00 - 00001EFE]	Motherboard resources
	[00001F00 - 00001FFE]	Motherboard resources
	[0000E000 - 0000EFFF]	Intel(R) 8 Series/C220 Series PCI Express Root Port #7 - 8C1C
	[0000F000 - 0000F03F]	Intel(R) HD Graphics 4600
	[0000F040 - 0000F05F]	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
	[0000F060 - 0000F07F]	Intel(R) 8 Series Chipset Family SATA AHCI Controller
	[0000F0A0 - 0000F0A3]	Intel(R) 8 Series Chipset Family SATA AHCI Controller
	[0000F0B0 - 0000F0B7]	Intel(R) 8 Series Chipset Family SATA AHCI Controller
	[0000F0C0 - 0000F0C3]	Intel(R) 8 Series Chipset Family SATA AHCI Controller
	[0000F0D0 - 0000F0D7]	Intel(R) 8 Series Chipset Family SATA AHCI Controller
	[0000F0E0 - 0000F0E7]	Intel(R) Active Management Technology - SOL (COM5)
	[0000FFFF - 0000FFFF]	Motherboard resources
	[0000FFFF - 0000FFFF]	Motherboard resources
	[0000FFFF - 0000FFFF]	Motherboard resources
















































B.2 Memory Address Map






































Address Range	Device
[000A0000 - 000BFFFF]	Intel(R) HD Graphics 4600
[000A0000 - 000BFFFF]	PCI bus
[000D0000 - 000D3FFF]	PCI bus
[000D4000 - 000D7FFF]	PCI bus
[000D8000 - 000DBFFF]	PCI bus
[000DC000 - 000DFFFF]	PCI bus
[000E0000 - 000E3FFF]	PCI bus
[000E4000 - 000E7FFF]	PCI bus
[DF200000 - FEFFFFFF]	PCI bus
[E0000000 - EFFFFFFF]	Intel(R) HD Graphics 4600
[F6800000 - F6FFFFFF]	Intel(R) I211 Gigabit Network Connection #2
[F6800000 - F70FFFFF]	Intel(R) 8 Series/C220 Series PCI Express Root Port #7 - 8C1C
[F7000000 - F703FFFF]	Intel(R) I211 Gigabit Network Connection #2
[F7400000 - F77FFFFF]	Intel(R) HD Graphics 4600
[F7800000 - F781FFFF]	Intel(R) Ethernet Connection I217-LM
[F7820000 - F782FFFF]	Intel(R) USB 3.0 eXtensible Host Controller
[F7830000 - F783FFFF]	High Definition Audio Controller
[F7834000 - F7837FFF]	High Definition Audio Controller
[F7839000 - F78390FF]	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
[F783A000 - F783A7FF]	Intel(R) 8 Series Chipset Family SATA AHCI Controller
[F783B000 - F783B3FF]	Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #1 - 8C26
[F783C000 - F783C3FF]	Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #2 - 8C2D
[F783D000 - F783DFFF]	Intel(R) Ethernet Connection I217-LM
[F783E000 - F783EFFF]	Intel(R) Active Management Technology - SOL (COM5)
[F7840000 - F78400FF]	Intel(R) Management Engine Interface
[F7FEF000 - F7FEFFFF]	Motherboard resources
[F7FF0000 - F7FF0FFF]	Motherboard resources
[F8000000 - FBFFFFFF]	Motherboard resources
[FED00000 - FED003FF]	High precision event timer
[FED10000 - FED17FFF]	Motherboard resources
[FED18000 - FED18FFF]	Motherboard resources
[FED19000 - FED19FFF]	Motherboard resources
[FED1C000 - FED1FFFF]	Motherboard resources
[FED20000 - FED3FFFF]	Motherboard resources
[FED40000 - FED44FFF]	System board
[FED45000 - FED8FFFF]	Motherboard resources
[FED90000 - FED93FFF]	Motherboard resources
[FEE00000 - FEEFFFFFFF]	Motherboard resources
[FF000000 - FFFFFFFF]	Intel(R) 82802 Firmware Hub Device
[FF000000 - FFFFFFFF]	Motherboard resources

B.3 IRQ Mapping Chart

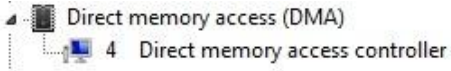


Device	IRQ
System timer	(00)
Communications Port (COM2)	(03)
Communications Port (COM1)	(04)
System CMOS/real time clock	(08)
Communications Port (COM3)	(10)
Communications Port (COM4)	(11)
Numeric data processor	(13)
Microsoft ACPI-Compliant System	(81)
Microsoft ACPI-Compliant System	(82)
Microsoft ACPI-Compliant System	(83)
Microsoft ACPI-Compliant System	(84)
Microsoft ACPI-Compliant System	(85)
Microsoft ACPI-Compliant System	(86)
Microsoft ACPI-Compliant System	(87)
Microsoft ACPI-Compliant System	(88)
Microsoft ACPI-Compliant System	(89)
Microsoft ACPI-Compliant System	(90)
Microsoft ACPI-Compliant System	(91)
Microsoft ACPI-Compliant System	(92)
Microsoft ACPI-Compliant System	(93)
Microsoft ACPI-Compliant System	(94)
Microsoft ACPI-Compliant System	(95)
Microsoft ACPI-Compliant System	(96)
Microsoft ACPI-Compliant System	(97)
Microsoft ACPI-Compliant System	(98)
Microsoft ACPI-Compliant System	(99)
Microsoft ACPI-Compliant System	(100)
Microsoft ACPI-Compliant System	(101)
Microsoft ACPI-Compliant System	(102)
Microsoft ACPI-Compliant System	(103)
Microsoft ACPI-Compliant System	(104)
Microsoft ACPI-Compliant System	(105)
Microsoft ACPI-Compliant System	(106)
Microsoft ACPI-Compliant System	(107)
Microsoft ACPI-Compliant System	(108)
Microsoft ACPI-Compliant System	(109)
Microsoft ACPI-Compliant System	(110)
Microsoft ACPI-Compliant System	(111)
Microsoft ACPI-Compliant System	(112)
Microsoft ACPI-Compliant System	(113)
Microsoft ACPI-Compliant System	(114)
Microsoft ACPI-Compliant System	(115)
Microsoft ACPI-Compliant System	(116)
Microsoft ACPI-Compliant System	(117)
Microsoft ACPI-Compliant System	(118)
Microsoft ACPI-Compliant System	(119)
Microsoft ACPI-Compliant System	(120)

	(ISA) 0x00000079 (121)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007A (122)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007B (123)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007C (124)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007D (125)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007E (126)	Microsoft ACPI-Compliant System
	(ISA) 0x0000007F (127)	Microsoft ACPI-Compliant System
	(ISA) 0x00000080 (128)	Microsoft ACPI-Compliant System
	(ISA) 0x00000081 (129)	Microsoft ACPI-Compliant System
	(ISA) 0x00000082 (130)	Microsoft ACPI-Compliant System
	(ISA) 0x00000083 (131)	Microsoft ACPI-Compliant System
	(ISA) 0x00000084 (132)	Microsoft ACPI-Compliant System
	(ISA) 0x00000085 (133)	Microsoft ACPI-Compliant System
	(ISA) 0x00000086 (134)	Microsoft ACPI-Compliant System
	(ISA) 0x00000087 (135)	Microsoft ACPI-Compliant System
	(ISA) 0x00000088 (136)	Microsoft ACPI-Compliant System
	(ISA) 0x00000089 (137)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008A (138)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008B (139)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008C (140)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008D (141)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008E (142)	Microsoft ACPI-Compliant System
	(ISA) 0x0000008F (143)	Microsoft ACPI-Compliant System
	(ISA) 0x00000090 (144)	Microsoft ACPI-Compliant System
	(ISA) 0x00000091 (145)	Microsoft ACPI-Compliant System
	(ISA) 0x00000092 (146)	Microsoft ACPI-Compliant System
	(ISA) 0x00000093 (147)	Microsoft ACPI-Compliant System
	(ISA) 0x00000094 (148)	Microsoft ACPI-Compliant System
	(ISA) 0x00000095 (149)	Microsoft ACPI-Compliant System
	(ISA) 0x00000096 (150)	Microsoft ACPI-Compliant System
	(ISA) 0x00000097 (151)	Microsoft ACPI-Compliant System
	(ISA) 0x00000098 (152)	Microsoft ACPI-Compliant System
	(ISA) 0x00000099 (153)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009A (154)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009B (155)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009C (156)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009D (157)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009E (158)	Microsoft ACPI-Compliant System
	(ISA) 0x0000009F (159)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A0 (160)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A1 (161)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A2 (162)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A3 (163)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A4 (164)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A5 (165)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A6 (166)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A7 (167)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A8 (168)	Microsoft ACPI-Compliant System
	(ISA) 0x000000A9 (169)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AA (170)	Microsoft ACPI-Compliant System

	(ISA) 0x000000A8 (171)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AC (172)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AD (173)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AE (174)	Microsoft ACPI-Compliant System
	(ISA) 0x000000AF (175)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B0 (176)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B1 (177)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B2 (178)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B3 (179)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B4 (180)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B5 (181)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B6 (182)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B7 (183)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B8 (184)	Microsoft ACPI-Compliant System
	(ISA) 0x000000B9 (185)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BA (186)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BB (187)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BC (188)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BD (189)	Microsoft ACPI-Compliant System
	(ISA) 0x000000BE (190)	Microsoft ACPI-Compliant System
	(PCI) 0x00000005 (05)	Intel(R) 8 Series/C220 Series SMBus Controller - 8C22
	(PCI) 0x00000010 (16)	High Definition Audio Controller
	(PCI) 0x00000010 (16)	Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #2 - 8C2D
	(PCI) 0x00000010 (16)	Intel(R) Management Engine Interface
	(PCI) 0x00000013 (19)	Intel(R) Active Management Technology - SOL (COM5)
	(PCI) 0x00000016 (22)	High Definition Audio Controller
	(PCI) 0x00000017 (23)	Intel(R) 8 Series/C220 Series USB Enhanced Host Controller #1 - 8C26
	(PCI) 0xFFFFFFF5 (-11)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF6 (-10)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF7 (-9)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF8 (-8)	Intel(R) I211 Gigabit Network Connection #2
	(PCI) 0xFFFFFFF9 (-7)	Intel(R) Ethernet Connection I217-LM
	(PCI) 0xFFFFF0FA (-6)	Intel(R) USB 3.0 eXtensible Host Controller
	(PCI) 0xFFFFFFF5 (-5)	Intel(R) HD Graphics 4600
	(PCI) 0xFFFFFFF0FC (-4)	Intel(R) 8 Series Chipset Family SATA AHCI Controller
	(PCI) 0xFFFFFFF0FD (-3)	Intel(R) 8 Series/C220 Series PCI Express Root Port #7 - 8C1C
	(PCI) 0xFFFFFFF0FE (-2)	Intel(R) 8 Series/C220 Series PCI Express Root Port #1 - 8C10

B.4 DMA Channel Assignment



Appendix C

Mating Connectors

C.1 List of Mating Connectors and Cables

Connector Label	Function	Mating Connector		Available Cable	Cable P/N
		Vendor	Model no		
CN1	External +5VSB Power Input and PS_ON#	JST	XHP-3	ATX Cable	170220020B
CN2	2 nd LVDS Inverter	JST	PHR-5	Invertor Cable	1705050153
CN3	+5V Output for SATA HDD using	JST	PHR-2	2 Pins For SATA Power	1702150155
CN4	+5VSB Output w/ SMBus	JST	PHR-6	ATX External 5VSB Cable	External AUX Power and PS_ON#
CN5	CPU Fan Connector	Molex	22-01-2035	N/A	N/A
CN6	SATA Port 2	Molex	887505318	SATA Cable	1709070500
CN7	SATA Port 1	Molex	887505318	SATA Cable	1709070500
CN8	External 12V Input	Molex	19211-0003	Power Cable	170204010R
CN9	Digital I/O	Molex	51110-1050	N/A	N/A
CN10	1 st LVDS Inverter	JST	PHR-5	Invertor Cable	1705050153
CN12	USB 2.0 Port #3	Molex	51021-0500	USB Wafer Cable	1700050207
CN13	USB 2.0 Port #4	Molex	51021-0500	USB Wafer Cable	1700050207
CN14	1 st LVDS (Single	HIROSE	DF13-30DS-1.25C	N/A	N/A

	channel 18/24bit)				
CN15	2 nd LVDS (Dual channel 18/24bit)	HIROSE	DF13-30DS-1.25C	N/A	N/A
CN16	USB 2.0 Port #5	Molex	51021-0500	USB Wafer Cable	1700050207
CN17	USB 2.0 Port #6	Molex	51021-0500	USB Wafer Cable	1700050207
CN18	USB 2.0 Port #8	Molex	51021-0500	USB Wafer Cable	1700050207
CN19	USB 2.0 Port #7	Molex	51021-0500	USB Wafer Cable	1700050207
CN20	Touch Screen	JST	SHR-9V-S-B	N/A	N/A
CN21	COM Port #4	Molex	51021-0900	UART Wafer Cable	1701090150
CN22	COM Port #3	Molex	51021-0900	UART Wafer Cable	1701090150
CN23	LPC Expansion I/F	JST	SHR-12V-S-B	AAEON LPC Cable	1703120130
CN24	COM Port #2	Molex	51021-0900	UART Wafer Cable	1701090150
CN25	PS/2 Keyboard & Mouse	JST	PHDR-06VS	KB/MS Cable	1700060152

Appendix D

Electrical Specifications for I/O Ports

D.1 Electrical Specifications for I/O Ports

I/O	Reference	Signal Name	Rate Output
LVDS Port 1 Inverter / Backlight Connector	CN10	VDD	+5V/2A or +12V/2A
LVDS Port 2 Inverter / Backlight Connector	CN2	VDD	+5V/2A or +12V/2A
USB 3.0 Port 1 & 2	CN31	+5VSB	+5VSB/1A (per channel)
USB 2.0 Port 3	CN12	+5VSB	
USB 2.0 Port 4	CN13	+5VSB	
USB 2.0 Port 5	CN16	+5VSB	+5VSB/0.5A
USB 2.0 Port 6	CN17	+5VSB	(per channel)
USB 2.0 Port 7	CN19	+5VSB	
USB 2.0 Port 8	CN18	+5VSB	
Audio I/O Port	CN32	+5V	+5V/0.5A
LVDS Port 1	CN14	VCC	+3.3V/2A or +5V/2A

LVDS Port 2	CN15	VCC	+3.3V/2A or +5V/2A
COM Port 2	CN24	+5V/+12V	+5V/1A or +12V/1A
Digital IO Port	CN9	D0~D7	+5V/(Open drain)
PS/2 Keyboard/Mouse Combo Port	CN25	+5VSB	+5VSB/1A
CPU FAN	CN5	VDD	+12V/0.5A
+5V Output for SATA HDD	CN3	+5V	+5V/1A
VGA / DVI Ports (depend on hardware configuration)	CN35	VGA: +5V DVI : +5V	+5V/1A (reserved) +5V/0.5A
CFast Slot	CFD1	+3.3V	+3.3V/0.5A
Mini-Card Slot	PCIE1	+3.3VSB +1.5V	+3.3V/1.1A +1.5V/0.375A
LPC Port	CN23	+3.3V	+3.3V/0.5A

Appendix E

Digital I/O Ports

E.1 Electrical Specifications for Digital I/O Ports

7.1.2 Logic Device Number Register (LDN) — Index 07h

Bit	Name	R/W	Reset	Default	Description
7-0	LDN	R/W	LRESET#	00h	00h: Select FDC device configuration registers. 03h: Select Parallel Port device configuration registers. 04h: Select Hardware Monitor device configuration registers. 05h: Select KBC device configuration registers. 06h: Select GPIO device configuration registers. 07h: Select WDT device configuration registers. 0Ah: Select PME, ACPI and ERP device configuration registers. 10h: Select UART1 device configuration registers. 11h: Select UART2 device configuration registers. 12h: Select UART3 device configuration registers. 13h: Select UART4 device configuration registers. 14h: Select UART5 device configuration registers. 15h: Select UART6 device configuration registers. Otherwise: Reserved.

GPIO5 Output Enable Register — Index A0h

Bit	Name	R/W	Reset	Default	Description
7	GPIO57_OE	R/W	LRESET#	0	0: GPIO57 is in input mode. 1: GPIO57 is in output mode.
6	GPIO56_OE	R/W	LRESET#	0	0: GPIO56 is in input mode. 1: GPIO56 is in output mode.
5	GPIO55_OE	R/W	LRESET#	0	0: GPIO55 is in input mode. 1: GPIO55 is in output mode.
4	GPIO54_OE	R/W	LRESET#	0	0: GPIO54 is in input mode. 1: GPIO54 is in output mode.
3	GPIO53_OE	R/W	LRESET#	0	0: GPIO53 is in input mode. 1: GPIO53 is in output mode.
2	GPIO52_OE	R/W	LRESET#	0	0: GPIO52 is in input mode. 1: GPIO52 is in output mode.
1	GPIO51_OE	R/W	LRESET#	0	0: GPIO51 is in input mode. 1: GPIO51 is in output mode.
0	GPIO50_OE	R/W	LRESET#	0	0: GPIO50 is in input mode. 1: GPIO50 is in output mode.

GPIO5 Output Data Register — Index A1h (This byte could be also written by base address + 5)

Bit	Name	R/W	Reset	Default	Description
7	GPIO57_DATA	R/W	LRESET#	1	0: GPIO57 outputs 0 when in output mode. 1: GPIO57 outputs 1 when in output mode.
6	GPIO56_DATA	R/W	LRESET#	1	0: GPIO56 outputs 0 when in output mode. 1: GPIO56 outputs 1 when in output mode.
5	GPIO55_DATA	R/W	LRESET#	1	0: GPIO55 outputs 0 when in output mode. 1: GPIO55 outputs 1 when in output mode.
4	GPIO54_DATA	R/W	LRESET#	1	0: GPIO54 outputs 0 when in output mode. 1: GPIO54 outputs 1 when in output mode.
3	GPIO53_DATA	R/W	LRESET#	1	0: GPIO53 outputs 0 when in output mode. 1: GPIO53 outputs 1 when in output mode.
2	GPIO52_DATA	R/W	LRESET#	1	0: GPIO52 outputs 0 when in output mode. 1: GPIO52 outputs 1 when in output mode.
1	GPIO51_DATA	R/W	LRESET#	1	0: GPIO51 outputs 0 when in output mode. 1: GPIO51 outputs 1 when in output mode.
0	GPIO50_DATA	R/W	LRESET#	1	0: GPIO50 outputs 0 when in output mode. 1: GPIO50 outputs 1 when in output mode.

GPIO5 Pin Status Register — Index A2h (This byte could be also read by base address + 5)

Bit	Name	R/W	Reset	Default	Description
7	GPIO57_ST	R	-	-	The pin status of GPIO57/WGATE#/DSR6#.
6	GPIO56_ST	R	-	-	The pin status of GPIO56/HDSEL#/DTR6#.
5	GPIO55_ST	R	-	-	The pin status of GPIO55/STEP#/CTS6#.
4	GPIO54_ST	R	-	-	The pin status of GPIO54/DIR#/RI6#.
3	GPIO53_ST	R	-	-	The pin status of GPIO53/WDATA#/DCD6#.
2	GPIO52_ST	R	-	-	The pin status of GPIO52/DRVA#/SOUT6.
1	GPIO51_ST	R	-	-	The pin status of GPIO51/MOA#/SIN6.
0	GPIO50_ST	R	-	-	The pin status of GPIO50/DENSEL#/RTS6#.

The following is a sample code for 4 in 4 out (2 low 2 high)

```
Outputb(0x2E,0x87); //enter configuration
```

```
Outputb(0x2E,0x87);
```

```
Outputb(0x2E,0x07); //set LDN
```

```
Outputb(0x2F,0x06);
```

```
Outputb(0x2E,0xA0); //GPIO set 5 register
```

```
Outputb(0x2F,0xF0);
```

```
Outportb(0x2E,0xA1); //GPIO output data register
```

```
Outportb(0x2F,0x30);
```

```
Outportb(0x2E,0xAA); //exit configuration
```