

TECHNICAL MANUAL

Of

Intel H81/Q87 Express Chipset

Based Mini-ITX M/B

NO. G03-SYS86358-F

Revision: 1.0

Release date: August 4, 2016

Trademark:

* Specifications and Information contained in this documentation are furnished for information use only, and are subject to change at any time without notice, and should not be construed as a commitment by manufacturer.

Environmental Protection Announcement

Do not dispose this electronic device into the trash while discarding. To minimize pollution and ensure environment protection of mother earth, please recycle.



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Environmental Safety Instruction

- Avoid the dusty, humidity and temperature extremes. Do not place the product in any area where it may become wet.
- 0 to 60 centigrade is the suitable temperature. (The figure comes from the request of the main chipset)
- Generally speaking, dramatic changes in temperature may lead to contact malfunction and crackles due to constant thermal expansion and contraction from the welding spots' that connect components and PCB. Computer should go through an adaptive phase before it boots when it is moved from a cold environment to a warmer one to avoid condensation phenomenon. These water drops attached on PCB or the surface of the components can bring about phenomena as minor as computer instability resulted from corrosion and oxidation from components and PCB or as major as short circuit that can burn the components. Suggest starting the computer until the temperature goes up.
- The increasing temperature of the capacitor may decrease the life of computer. Using the close case may decrease the life of other device because the higher temperature in the inner of the case.
- Attention to the heat sink when you over-clocking. The higher temperature may decrease the life of the device and burned the capacitor.

USER'S NOTICE

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THIS MANUAL CONTAINS ALL INFORMATION REQUIRED TO USE THIS MOTHER-BOARD SERIES AND WE DO ASSURE THIS MANUAL MEETS USER'S REQUIREMENT BUT WILL CHANGE, CORRECT ANY TIME WITHOUT NOTICE. MANUFACTURER PROVIDES THIS MANUAL "AS IS" WITHOUT WARRANTY OF ANY KIND, AND WILL NOT BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING DAMAGES FOR LOSS OF PROFIT, LOSS OF BUSINESS, LOSS OF USE OF DATA, INTERRUPTION OF BUSINESS AND THE LIKE).

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Manual Revision Information

Reversion	Revision History	Date
1.0	First Edition	August 4, 2016

Item Checklist

- Motherboard
- DVD for motherboard utilities
- I/O Back panel shield

Chapter 1

Introduction of the Motherboard

1-1 Feature of Motherboard

- Intel® H81/Q87 express chipset
- Support LGA 1150 CPU socket Intel® Core™ i7 processors / Intel® Core™ i5 processors / Intel® Core™ i3 processors / Intel® Celeron™ processors
- Support 2* DDRIII 1066/1333/1600 MHz SO-DIMM up to 16GB
- Integrated with dual Intel Gigabit Ethernet LAN chips
- Integrated with RealTek HD Audio Codec
- Support USB 3.0 data transport demands.
- Support 2 * Serial ATAIII (6Gb/s) Devices
- Support 1*PCI slot and 1*full-size Mini PCI-E slot
- Support 1*full-size mSATA slot
- Support CPU Smart FAN
- Supports ACPI S3 Function
- Compliance with ErP Standard
- Support Watchdog Timer Technology

1-2 Specification

Spec	Description
Design	<ul style="list-style-type: none"> ● Mini-ITX form factor; 8-layer ; PCB size: 17.0x17.0cm
Chipset	<ul style="list-style-type: none"> ● Intel H81/Q87 Express Chipset
CPU Socket	<ul style="list-style-type: none"> ● Support Intel® LGA 1150 Socket Core™ i7 Processor, Intel® Core™ i5 Processor, Intel® Core™ i3 Processor, Intel® Celeron™ processors <p><i>* for detailed CPU support information please visit our website</i></p>
Memory Slot	<ul style="list-style-type: none"> ● 2* DDRIII SO-DIMM slot to support DDRIII 1066/1333/1600 MHz SO-DIMM, expandable to 16GB
Expansion Slot	<ul style="list-style-type: none"> ● 1*PCI slot ● 1*Full-size Mini-PCIE slot(MINIPCIE) ● 1*Full-size Mini-PCIE/MSATA selectable slot(MINI_CARD) ● 1* SIM Card Slot
Storage	<ul style="list-style-type: none"> ● 2* SATA III 6G/s Connector ● 1*Full-size Mini-PCIE/MSATA selectable slot(MINI_CARD)
Gigabit LAN Chip	<ul style="list-style-type: none"> ● Integrated with Intel i211AT Gigabit PCI-E LAN chip & Intel i217-LM Gigabit LAN PHY chip ● Support Fast Ethernet LAN function of providing 10/100/1000 Mbps Ethernet data transfer rate
Audio Chip	<ul style="list-style-type: none"> ● Realtek HD Audio Codec integrated ● Audio driver and utility included
BIOS	<ul style="list-style-type: none"> ● H81 Series Model: 32MBit Flash ROM ● Q87 Series Model: 64MBit Flash ROM
Multi I/O	<p>Rear Panel I/O:</p> <ul style="list-style-type: none"> ● 1*PS/2 keyboard & mouse combo connector ● 2* VGA port connector ● 1* HDMI port connector ● 1* RS232/422/485 serial port (COM1) ● 2*USB 2.0 port connector

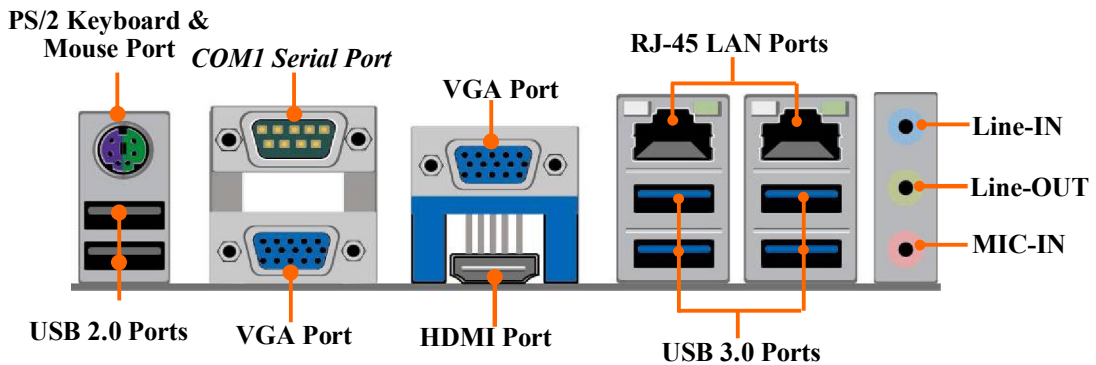
- 4*USB 3.0 port connector
- 2*RJ-45 LAN connector
- 1*3-jack audio connector (Line-in, Line-out, MIC)

Internal I/O Connectors & Headers:

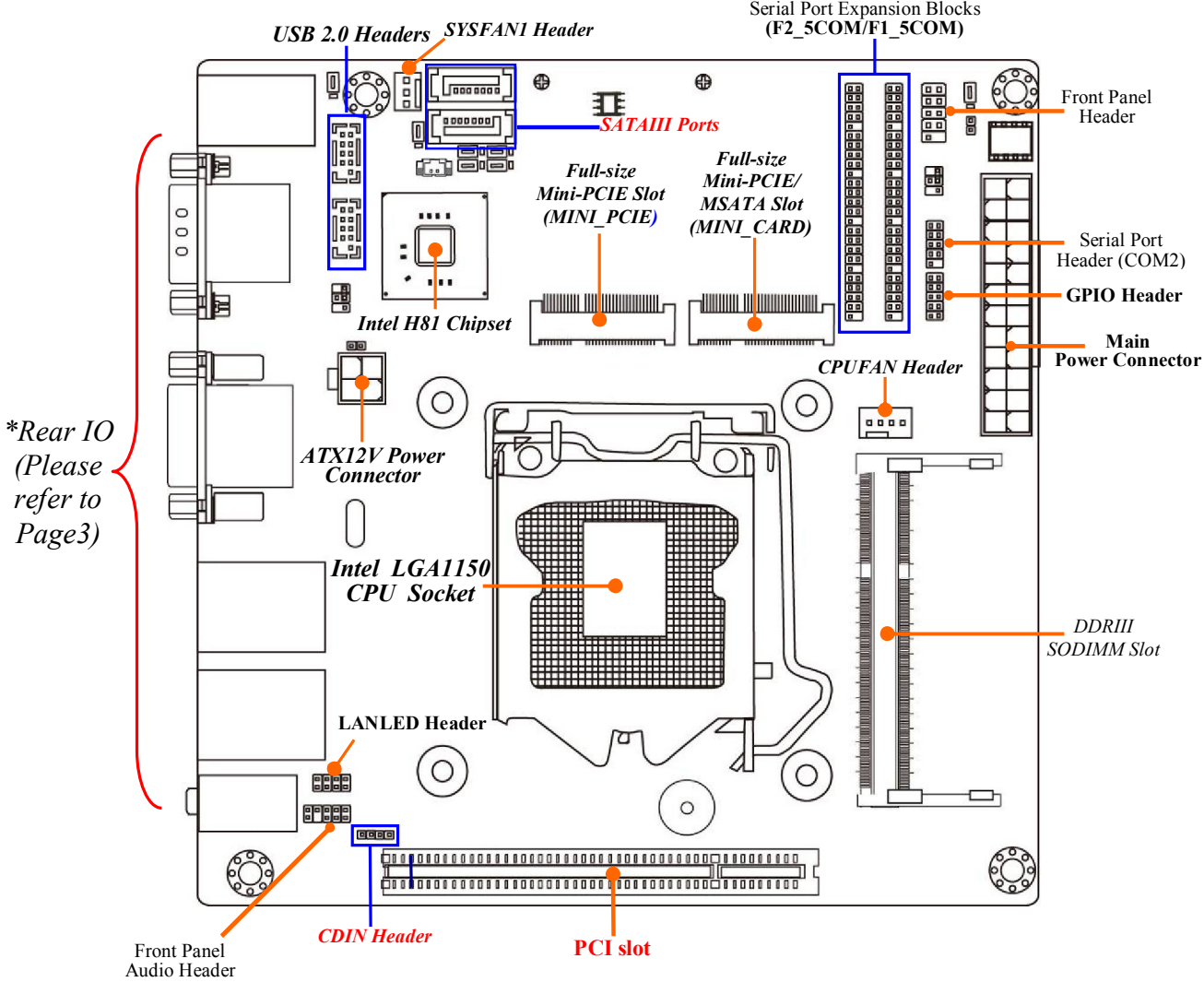
- 1 *24-pin main power connector
- 1 *4-pin 12V power connector
- 1*Front panel audio header
- 1*CDIN header
- 1*LAN activity LED header
- 2 * 9-Pin USB 2.0/1.1 header for 4* USB 2.0/1.1 ports
- 1*Front panel header
- 1* RS232/422/485 serial port header (**COM2**)
- 2* RS232 serial port expansion block (**F1_5COM/F2_5COM**)
- 1*GPIO header
- 1*CPU fan header & 1*System fan header

1-3 Layout Diagram

Rear IO Diagram

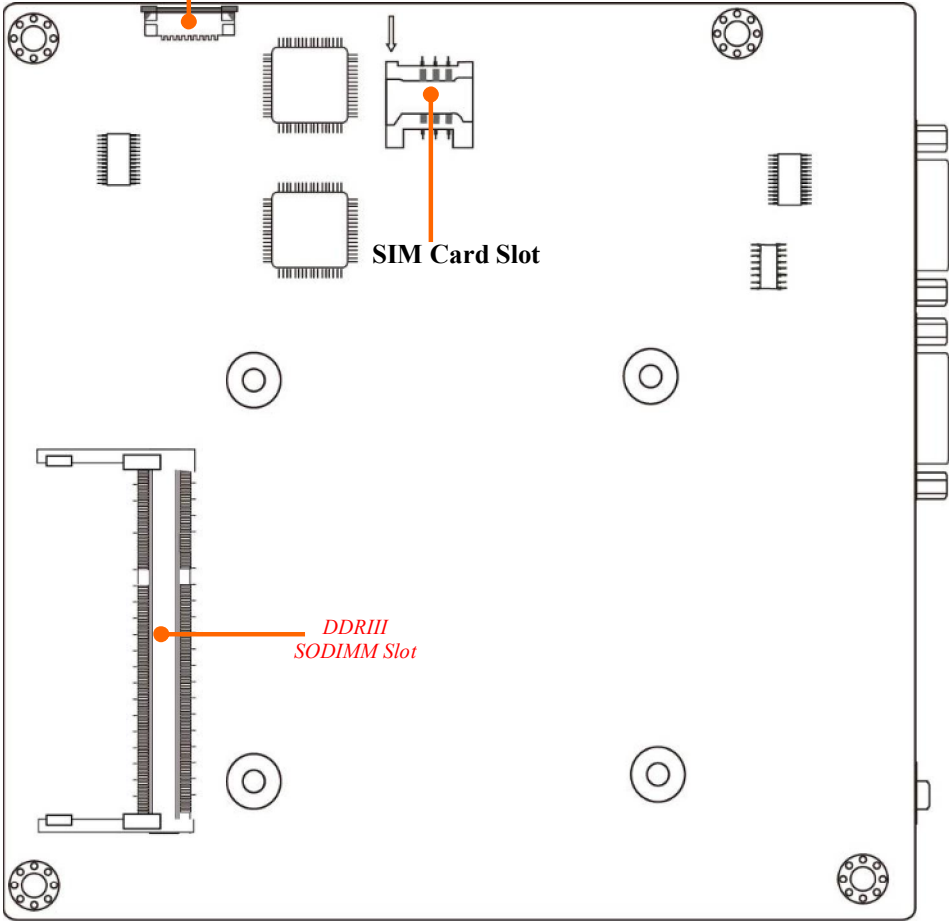


Motherboard Internal Diagram—Front

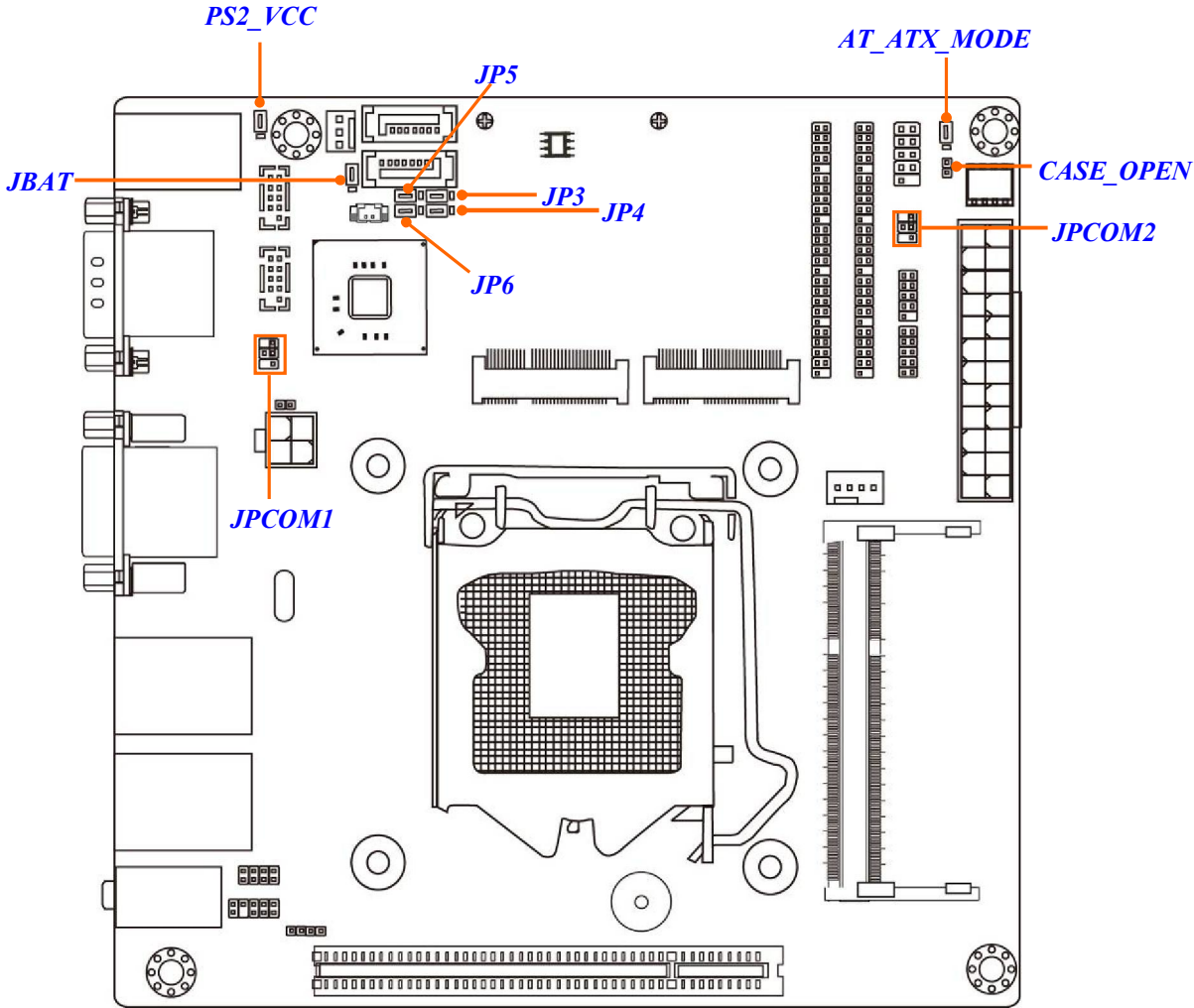


Motherboard Internal Diagram—Back

TPM Port Connector



Motherboard Jumper Position



Jumper

Jumper	Name	Description
JBAT	CMOS RAM Clear Function Setting	3-pin Block
PS2_VCC	PS2 KB/MS Power on Function Setting	3-pin Block
AT_ATX_MODE	ATX/AT Mode Select	3-pin Block
CASE_OPEN	Case Open Message Display Function	2-pin Block
JPCOM1	COM1 Port Pin9 Function Select	4-pin Block
JPCOM2	COM2 Port Pin9 Function Select	4-pin Block
JP3&JP4 &JP5&JP6	MINI_CARD Slot Mini-PCIE/MSATA Function Select	3-pin Block

Connectors

Connector	Name
ATXPWR	ATX Power Connector
ATX12V	ATX 12V Power Connector
SATA1/SATA2	SATAIII Connector X2
USB_PS2 (Top)	PS/2 Keyboard & Mouse Combo Port Connector
USB_PS2(Middle & Bottom)	USB 2.0 Port X2
CRT1_COM1(Top)	COM1 RS232/422/485 Serial Port Connector
CRT1_COM1 (Bottom)	VGA Port Connector
VGA2	VGA Port Connector
HDMI	HDMI Port Connector
UL1(Top)/UL2(Top)	RJ-45 LAN Connector X2
UL1(Middle & Bottom) /UL2(Middle & Bottom)	USB 3.0 Port Connector X4
AUDIO	Line In/ Line Out /MIC Audio Connector

Headers

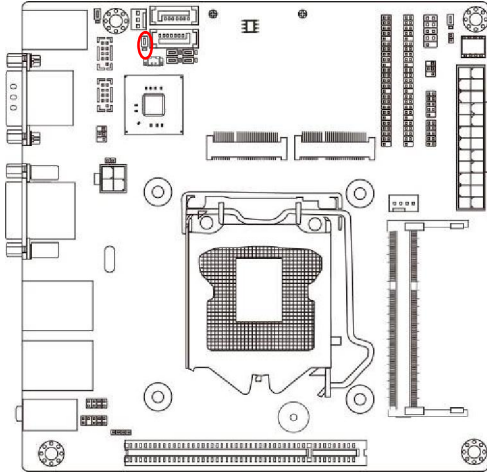
Header	Name	Description
FP_AUDIO	Front Panel Audio Header	9-pin Block
LAN_LED	LAN Activity LED Header	8-pin Block
CDIN	CDIN Header	4-pin Block
F_USB1/F_USB2	USB 2.0 Header	9-pin Block
JW_FP	Front Panel Header(PWR LED/ HD LED/ Power Button /Reset)	9-pin Block
COM2	RS232/422/485 Serial Port Header	9-pin Block
F1_5COM(COM3-COM7) /F2_5COM(COM8-COM12)	RS232 Serial Port Header Expansion Block	45-pin Block
GPIO_CON	GPIO Header	10-pin Block
SYSFAN1	System Fan Header	3-pin Block
CPUFAN	CPU Fan Header	4-pin Block

Chapter 2

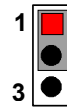
Hardware Installation

2-1 Jumper Setting

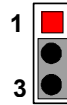
JBAT (3-pin): Clear CMOS Function Setting



JBAT

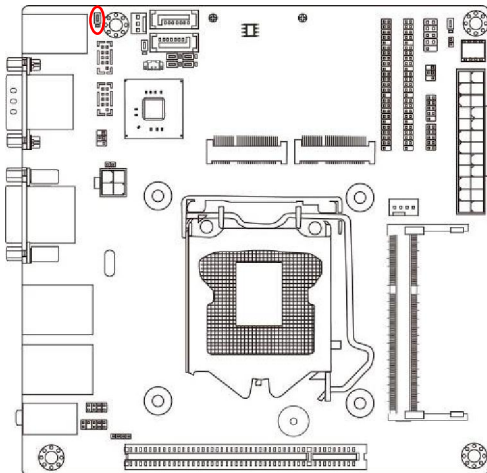


1-2 Closed: Normal;

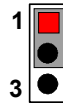


2-3 Closed: Clear CMOS.

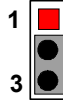
PS2_VCC (3-pin): KB/MS Power on Function Setting



PS2_VCC

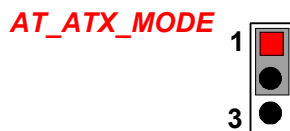
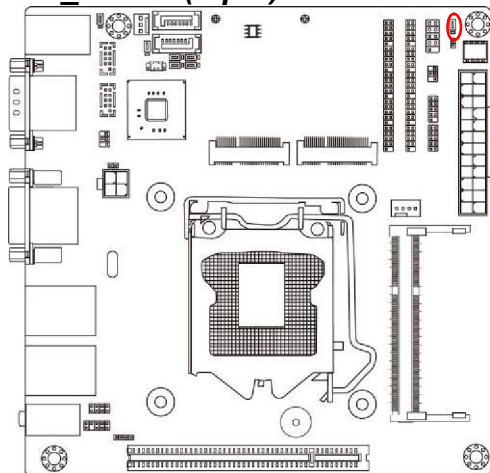


1-2 Closed: KB/MS Power on Function Disabled(default);

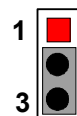


2-3 Closed: KB/MS Power on Function Enabled.

AT_ATX_MODE (3-pin): ATX Mode/AT Mode Select



1-2 Closed: ATX Mode Selected;

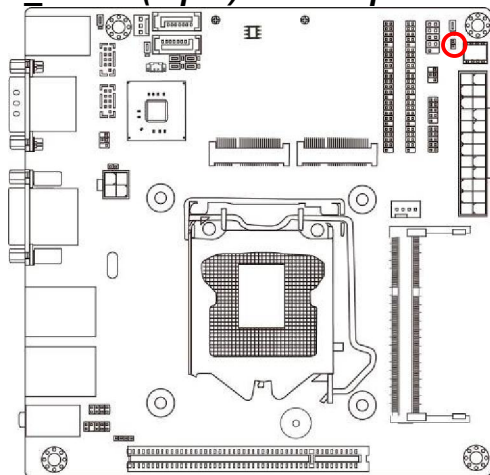


2-3 Closed: AT Mode Selected.

**ATX Mode Selected: Press power button to power on after power input ready;*

AT Mode Selected: Directly power on as power input ready.

CASE_OPEN (2-pin): Case Open Message Display Function Select



CASE_OPEN



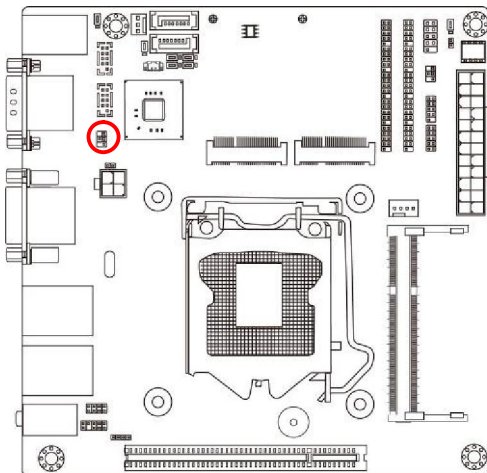
1-2 Open: Normal(Default);



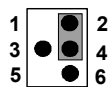
1-2 Closed: Case Open Function Selected(One Touch).

Pin 1-2 Closed: When Case open function pin short to GND, the Case open function was detected. When Used, needs to enter BIOS and enable 'Case Open Detect' function. In this case if your case is removed, next time when you restart your computer, a message will be displayed on screen to inform you of this.

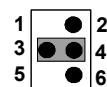
JPCOM1 (4-pin): COM1 Port Pin9 Function Select



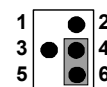
JPCOM1→COM1 Port Pin-9



2-4 Closed:
Pin9=RI;

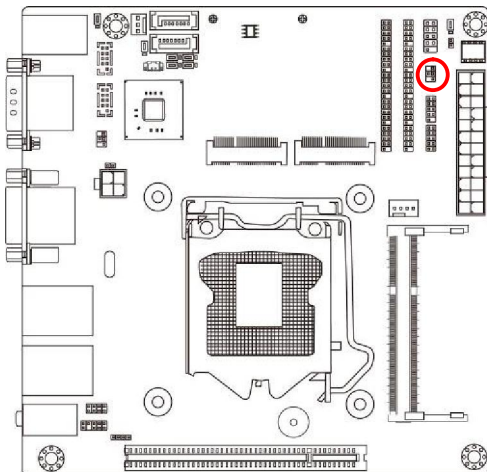


3-4 Closed:
Pin9=+5V;

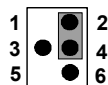


4-6 Closed:
Pin9=+12V.

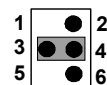
JPCOM2 (4-pin): COM2 Port Pin9 Function Select



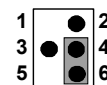
JPCOM2→COM2 Header Pin-9



2-4 Closed:
Pin9=RI;

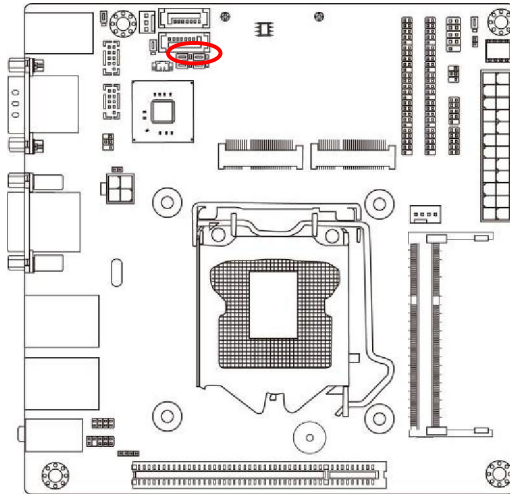


3-4 Closed:
Pin9=+5V;

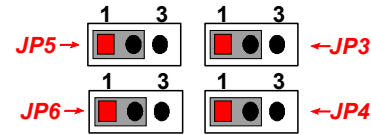


4-6 Closed:
Pin9=+12V.

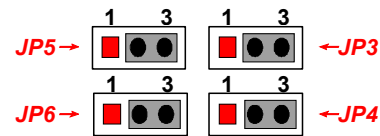
JP3&JP4&JP5&JP6 (3-pin): MINI_CARD Slot Mini-PCIE/MSATA Function Select



JP3&4&5&6 → MINI_CARD Function Select



1-2 Closed: MINI_CARD functions as MSATA interface.

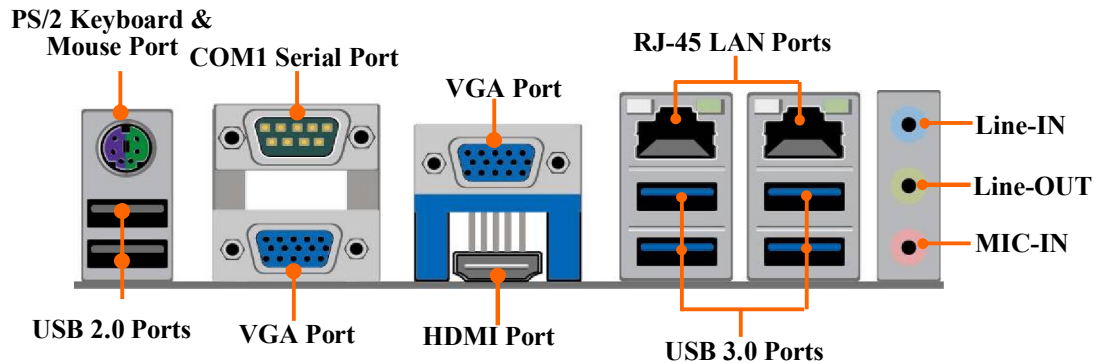










2-3 Closed: MINI_CARD functions as Mini-PCIE Slot.

2-2 Connectors and Headers

2-2-1 Connectors

(1) Rear Panel Connectors

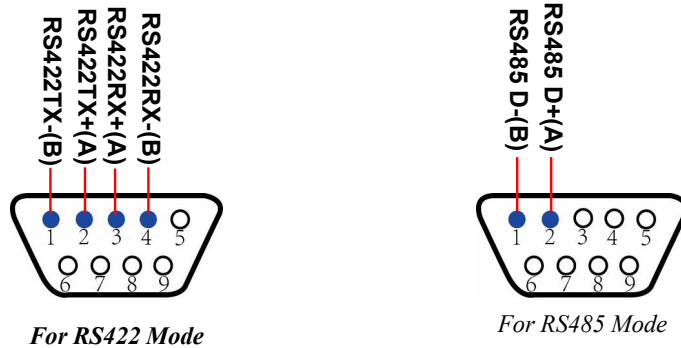


Icon	Name	Function
	PS/2 Keyboard & Mouse Combo Port	For user to connect PS/2 keyboard or PS/2 mouse device to the board.
	USB 2.0 Port	To connect USB keyboard, mouse or other devices compatible with USB specification.
	*COM1: RS232/422/485 Serial Port	Mainly for user to connect external MODEM or other devices that supports Serial Communications Interface.
	VGA	To connect display device that support VGA specification.
	HDMI Port	To connect display device that support HDMI specification.
	USB 3.0 Port	To connect USB keyboard, mouse or other devices compatible with USB specification. USB 3.0 ports supports up to 5Gbps data transfer rate.
	RJ-45 LAN Port	This connector is standard RJ-45 LAN jack for Network connection.
	3-jack Audio Connector	BLUE : Line-in Connector GREEN :Line-out Connector PINK : MIC Connector

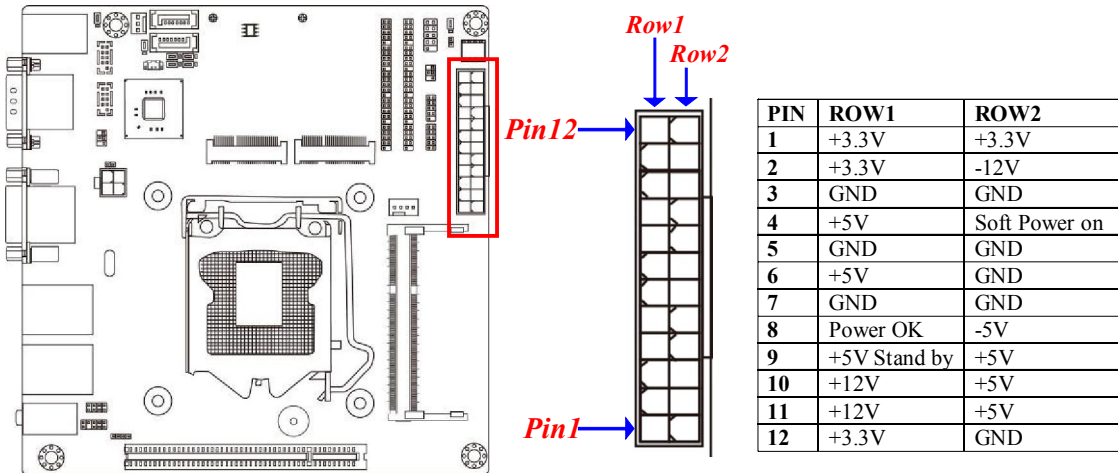
(2) COM1 (9-pin Block): RS232/422/485 Port

COM1 port can function as RS232/422/485 port. In normal settings COM1 functions as RS232 port. With compatible COM cable COM1 can function as RS422 or RS 485 port.

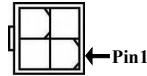
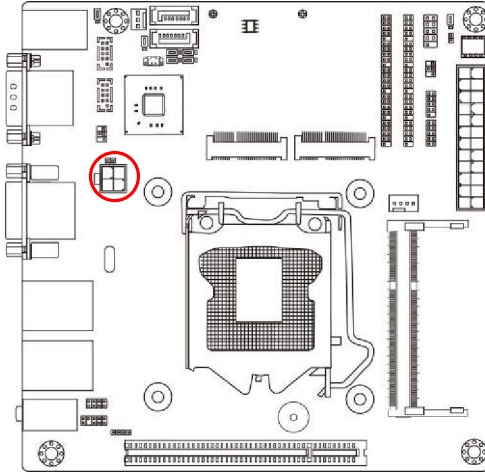
User also needs to go to BIOS to set ‘**Transmission Mode Select**’ for COM1 (*refer to Page 32 ~33*) at first, before using specialized cable to connect different pins of this port.



(3) ATXPWR (24-pin block): Power Connector



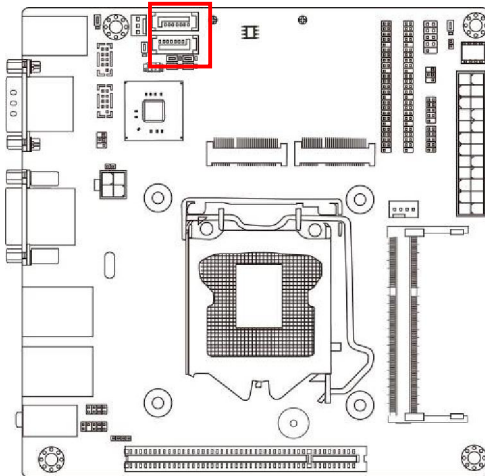
(4) ATX12V (4-pin block): ATX12V Type Power Connector



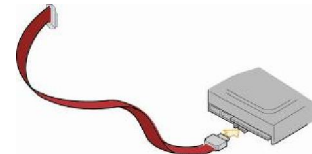
Pin No.	Definition
1	GND
2	GND
3	+12V
4	+12V

(5) SATA1/SATA2(7-pin block): SATAIII Port connector

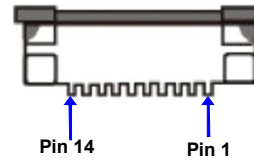
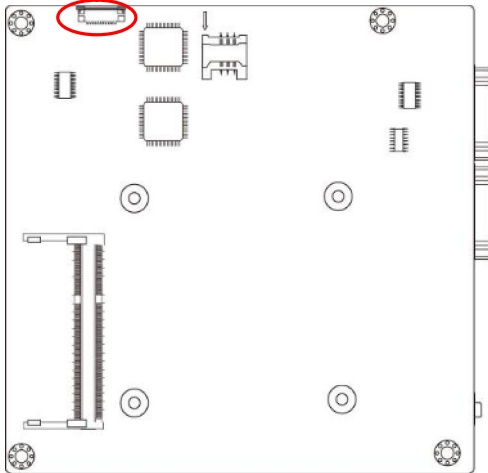
These connectors are high-speed SATAIII ports that support 6Gbps transfer rate.



Pin No.	Definition
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND



(6) TPM(14-pin block): TPM connector

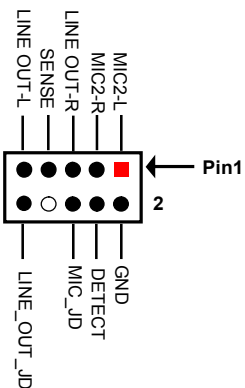
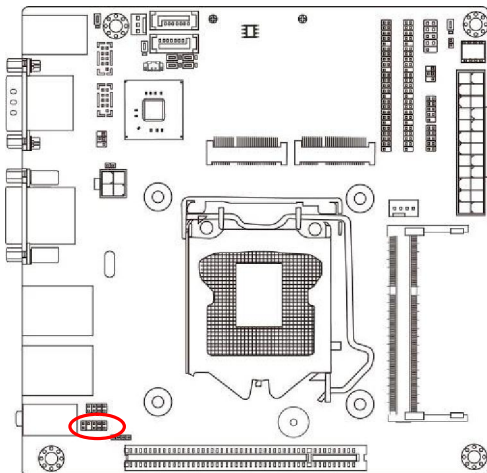


Pin.	Definition	Pin.	Definition
1	GND	8	LAD1
2	VCC3	9	LAD0
3	GND	10	DEBUG33
4	PLTRST-	11	SERIRQ
5	LFRAME-	12	CLKRUN-
6	LAD3	13	LPC_PD-
7	LAD2	14	3VSB

2-2-2 Headers

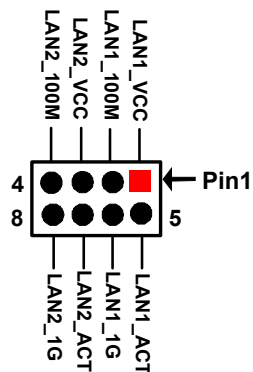
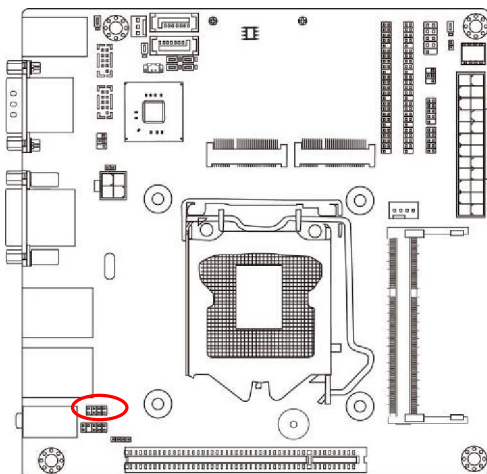
(1) FP_AUDIO (9-pin): Line-Out, MIC-In Header

This header connects to Front Panel Line-out, MIC-In connector with cable.

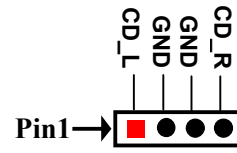
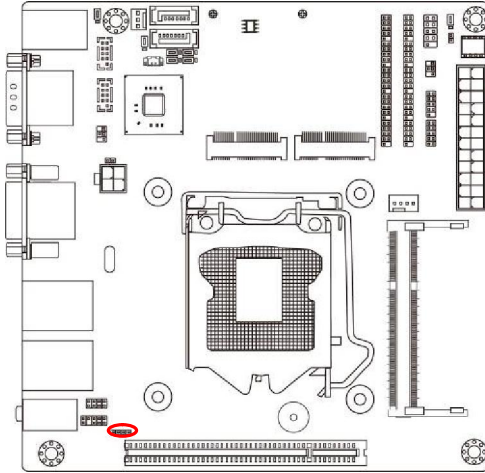


Line-Out, MIC Header

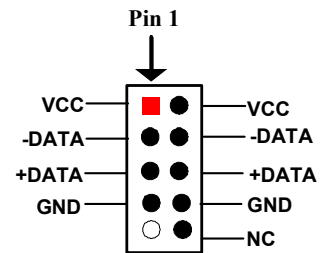
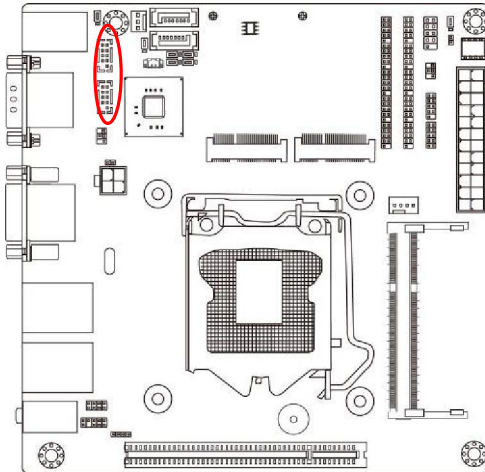
(2) LAN_LED (8-pin): LAN Activity LED Header



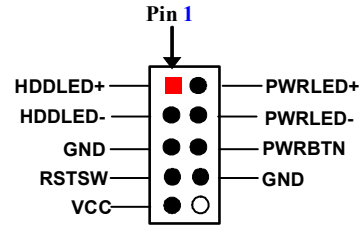
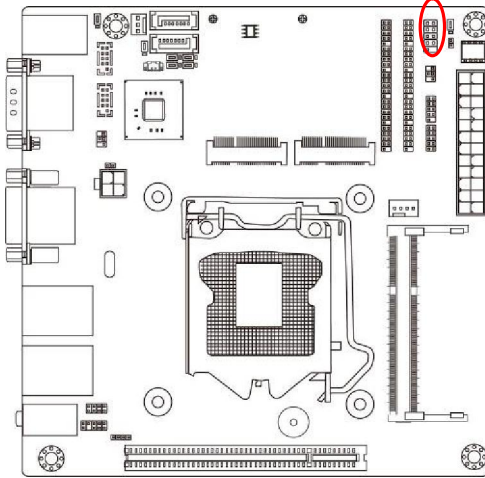
(3) CDIN (4-pin): CD AUDIO-In Header



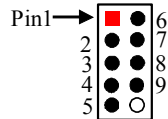
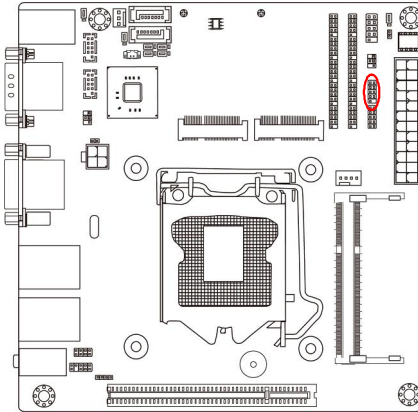
(4) F_USB1/F_USB2 (9-pin): USB 2.0 Port Headers



(5) JW-FP (9-pin): Front Panel Header



(6) COM2 (9-Pin): RS232/422/485 Serial Port Header

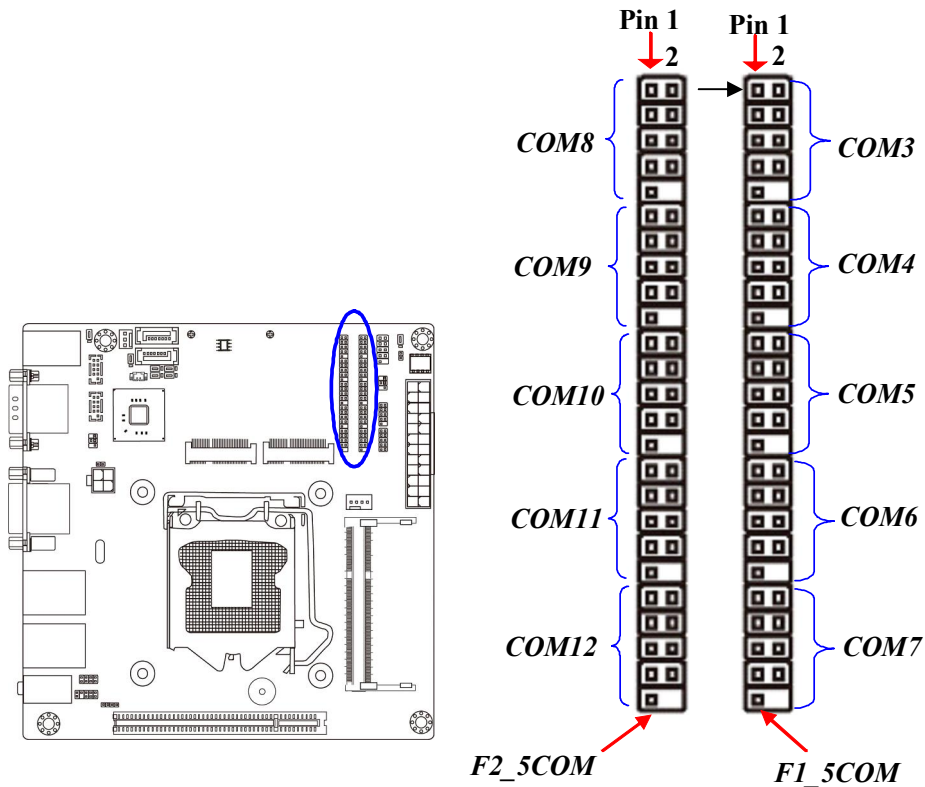


Pin NO.	RS232	*RS422	*RS485
Pin 1	DCD	TX-	DATA-
Pin 2	RXD	TX+	DATA+
Pin 3	TXD	RX+	NC
Pin 4	DTR	RX-	NC
Pin 5	GND	GND	GND
Pin 6	DSR	NC	NC
Pin 7	RTS	NC	NC
Pin 8	CTS	NC	NC
Pin 9	RI	NC	NC

***Notice:** COM2 header supports RS232/RS422/RS485 function, with compatible COM cable for RS232, RS422 or RS 485 function. User also needs to go to BIOS to set 'Transmission Mode Select' for COM2 (refer to Page 32 ~33).

(7) F1_5COM/F2_5COM (45-Pin): RS232 Serial Port Header Expansion Block

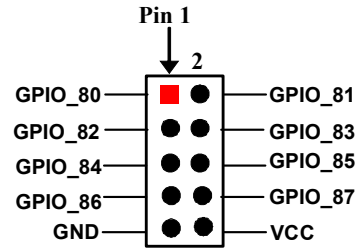
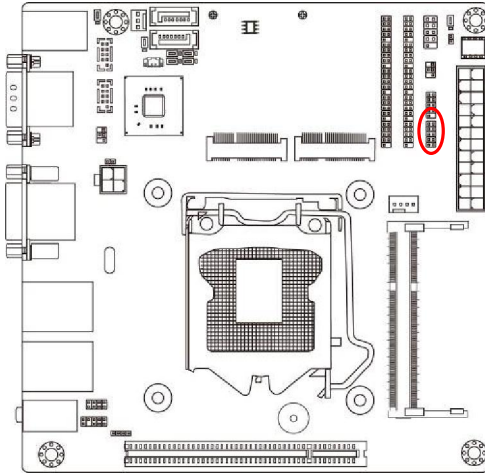
F1_5COM & F2_5COM are RS232 serial port header expansion blocks each composed of 5* RS232 serial port headers (**F1_5COM** by COM3/4/5/6/7; **F2_5COM** by COM8/9/10/11/12/13).



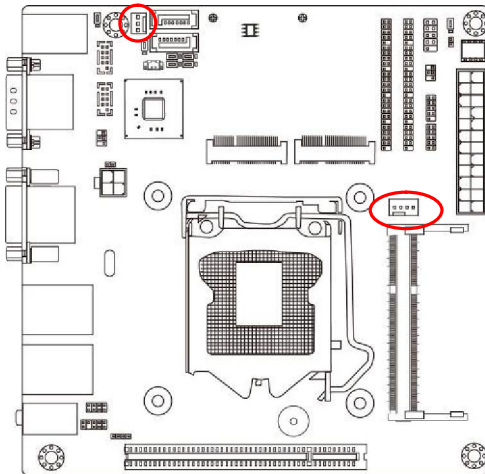
F1_5COM	Pin NO.	RS232	Pin NO.	RS232
COM3	Pin 1	DCD3	Pin 2	DSR3
	Pin3	SIN3	Pin 4	RTS3
	Pin 5	SOUT3	Pin 6	CTS3
	Pin 7	DTR3	Pin 8	RI3
	Pin 9	GND	Pin 10	N/A
COM4	Pin 11	DCD4	Pin 12	DSR4
	Pin 13	SIN4	Pin 14	RTS4
	Pin 15	SOUT4	Pin 16	CTS4
	Pin 17	DTR4	Pin 18	RI4
	Pin 19	GND	Pin 20	N/A
COM5	Pin 21	DCD5	Pin 22	DSR5
	Pin 23	SIN5	Pin 24	RTS5
	Pin 25	SOUT5	Pin 26	CTS5
	Pin 27	DTR5	Pin 28	RI5
	Pin 29	GND	Pin 30	N/A
COM6	Pin 31	DCD6	Pin 32	DSR6
	Pin 33	SIN6	Pin 34	RTS6
	Pin 35	SOUT6	Pin 36	CTS6
	Pin 37	DTR6	Pin 38	RI6
	Pin 39	GND	Pin 30	N/A
COM7	Pin 41	DCD7	Pin 42	DSR7
	Pin 43	SIN7	Pin 44	RTS7
	Pin 45	SOUT7	Pin 46	CTS7
	Pin 47	DTR7	Pin 48	RI7
	Pin 49	GND	Pin 50	N/A

F2_5COM	Pin NO.	RS232	Pin NO.	RS232
COM8	Pin 1	DCD8	Pin 2	DSR8
	Pin3	SIN8	Pin 4	RTS8
	Pin 5	SOUT8	Pin 6	CTS8
	Pin 7	DTR8	Pin 8	RI8
	Pin 9	GND	Pin 10	N/A
COM9	Pin 11	DCD9	Pin 12	DSR9
	Pin 13	SIN9	Pin 14	RTS9
	Pin 15	SOUT9	Pin 16	CTS9
	Pin 17	DTR9	Pin 18	RI9
	Pin 19	GND	Pin 20	N/A
COM10	Pin 21	DCD10	Pin 22	DSR10
	Pin 23	SIN10	Pin 24	RTS10
	Pin 25	SOUT10	Pin 26	CTS10
	Pin 27	DTR10	Pin 28	RI10
	Pin 29	GND	Pin 30	N/A
COM11	Pin 31	DCD11	Pin 32	DSR11
	Pin 33	SIN11	Pin 34	RTS11
	Pin 35	SOUT11	Pin 36	CTS11
	Pin 37	DTR11	Pin 38	RI11
	Pin 39	GND	Pin 30	N/A
COM12	Pin 41	DCD12	Pin 42	DSR12
	Pin 43	SIN12	Pin 44	RTS12
	Pin 45	SOUT12	Pin 46	CTS12
	Pin 47	DTR12	Pin 48	RI12
	Pin 49	GND	Pin 50	N/A

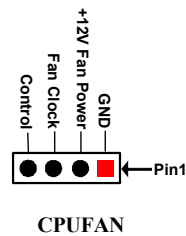
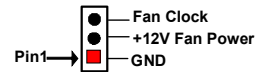
(8) GPIO_CON(10-pin): GPIO Header



(9) SYSFAN1 (3-pin)/ CPUFAN (4-pin): FAN Headers



SYSFAN1



Chapter 3

Introducing BIOS

Notice! The BIOS options in this manual are for reference only. Different configurations may lead to difference in BIOS screen and BIOS screens in manuals are usually the first BIOS version when the board is released and may be different from your purchased motherboard. Users are welcome to download the latest BIOS version form our official website.

The BIOS is a program located on a Flash Memory on the motherboard. This program is a bridge between motherboard and operating system. When you start the computer, the BIOS program will gain control. The BIOS first operates an auto-diagnostic test called POST (power on self test) for all the necessary hardware, it detects the entire hardware device and configures the parameters of the hardware synchronization. Only when these tasks are completed done it gives up control of the computer to operating system (OS). Since the BIOS is the only channel for hardware and software to communicate, it is the key factor for system stability, and in ensuring that your system performance as its best.

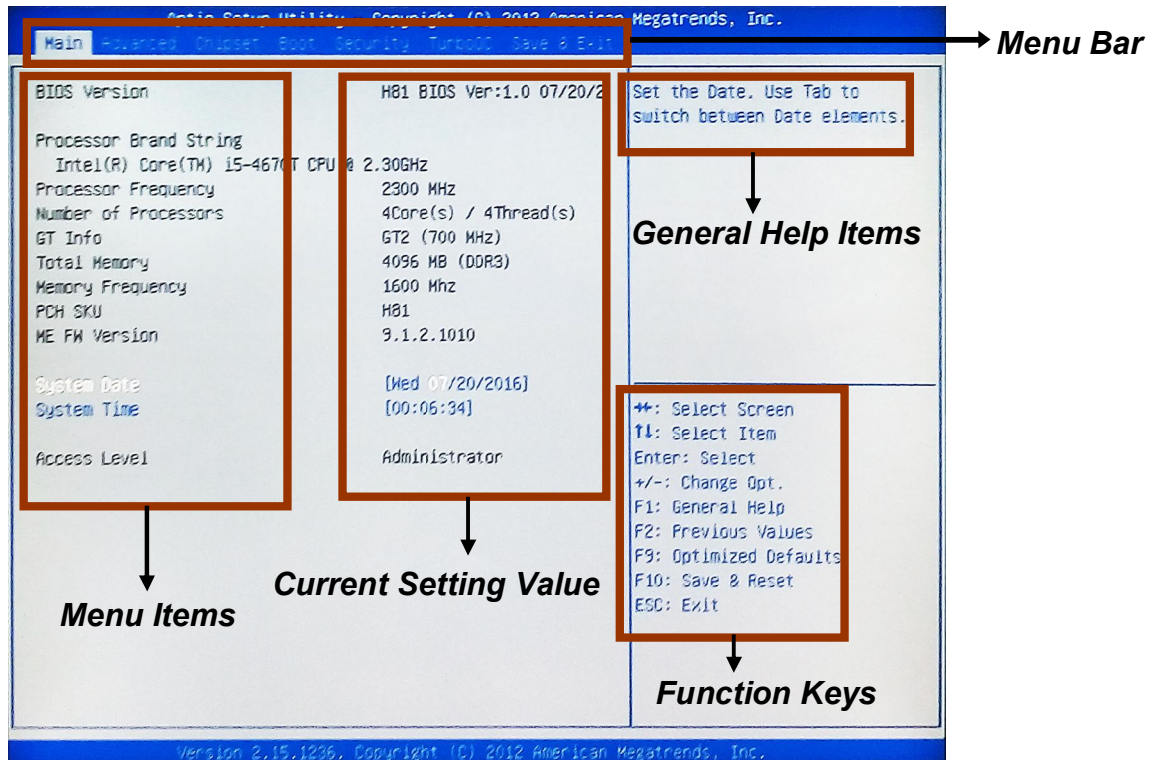
3-1 Entering Setup

Power on the computer and by pressing immediately allows you to enter Setup. If the message disappears before your respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON or pressing the “RESET” button on the system case. You may also restart by simultaneously pressing <Ctrl>, <Alt> and <Delete> keys. If you do not press the keys at the correct time and the system does not boot, an error message will be displayed and you will again be asked to

Press **** to enter Setup; press **< F7>** for Pop Menu.

3-2 BIOS Menu Screen

The following diagram show a general BIOS menu screen:



BIOS Menu Screen

3-3 Function Keys

In the above BIOS Setup main menu of, you can see several options. We will explain these options step by step in the following pages of this chapter, but let us first see a short description of the function keys you may use here:

- Press←→ (left, right) to select screen;

-
-
- Press ↑↓ (up, down) to choose, in the main menu, the option you want to confirm or to modify.
 - Press <Enter> to select.
 - Press <+>/<-> keys when you want to modify the BIOS parameters for the active option.
 - [F1]: General help.
 - [F2]: Previous values.
 - [F9]: Optimized defaults.
 - [F10]: Save & Reset.
 - Press <Esc> to quit the BIOS Setup.

3-4 Getting Help

Main Menu

The on-line description of the highlighted setup function is displayed at the top right corner the screen.

Status Page Setup Menu/Option Page Setup Menu

Press **[F1]** to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc>.

3-5 Menu Bars

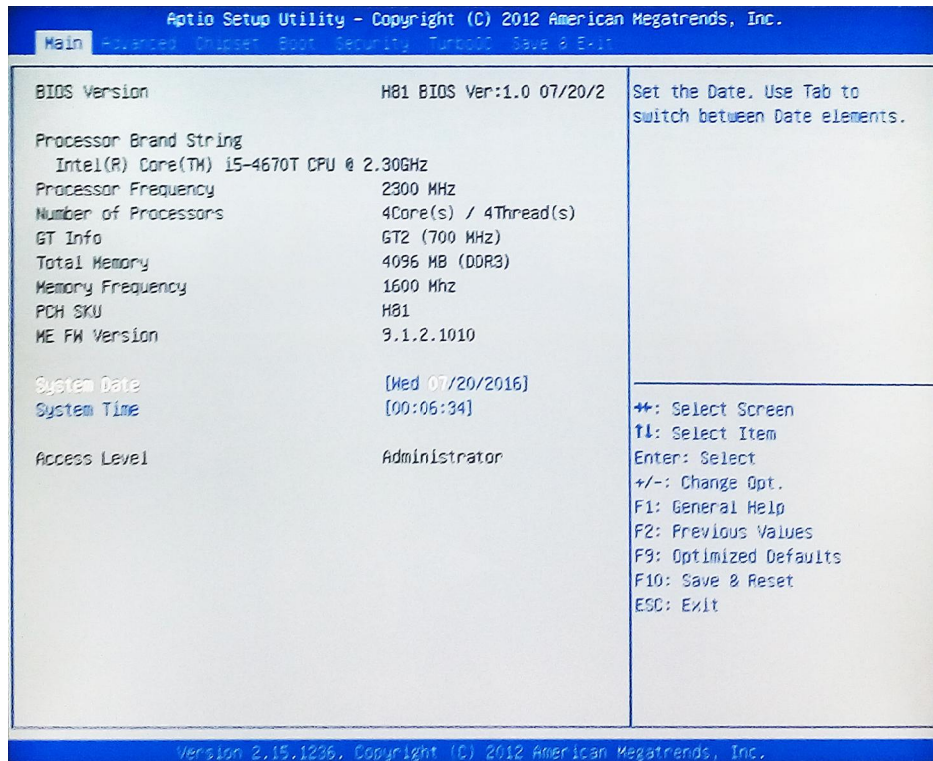
There are seven menu bars on top of BIOS screen:

Main	To change system basic configuration
Advanced	To change system advanced configuration
Chipset	To change chipset configuration
Boot	To change boot settings
Security	Password settings
TurboOC	To change TurboOC settings
Save & Exit	Save setting, loading and exit options.

User can press the right or left arrow key on the keyboard to switch from menu bar. The selected one is highlighted.

3-6 Main Menu

Main menu screen includes some basic system information. Highlight the item and then use the <+> or <-> and numerical keyboard keys to select the value you want in each item.



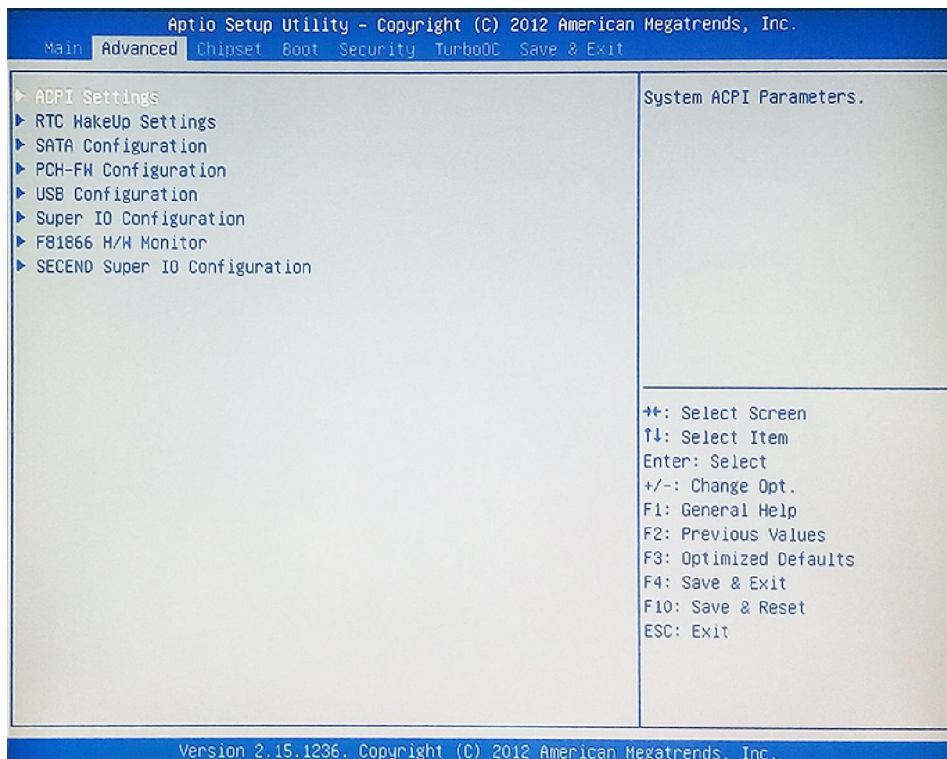
System Date

Set the date. Please use [Tab] to switch between data elements.

System Time

Set the time. Please use [Tab] to switch between time elements.

3-7 Advanced Menu



▶ **ACPI Settings**

Press [Enter] to make settings for the following sub-items:

ACPI Settings

Enable Hibernation

The optional settings: [Enabled]; [Disabled].

Use this item to enable or disable system ability to hibernate (OS/S4 Sleep State).

This option may not be effective with some OS.

ACPI Sleep State

Use this item to select the highest ACPI sleep state the system will enter when the suspend button is pressed.

The optional settings are: [Suspend Disabled]; [S1 only (CPU Stop Clock)]; [S3

only (Suspend to RAM)].

ERP Support

The optional settings: [Disabled]; [Enabled].

Use this item to enable or disable ERP function for this board.

This item should be set as [Disabled] if you wish to have active all Wake-up functions.

Wake on GBE Lan

The optional settings: [Disabled]; [Enabled].

Use this item to enable or disable GbE control PME in S1/S3/S4/S5.

**This item will only show when 'ERP Support' is set as [Disabled].*

Wake-Up by PCIE/Lan

The optional settings: [Disabled]; [Enabled].

Use this item to enable or disable PCIE device PME in S1/S3/S4/S5.

**This item will only show when 'ERP Support' is set as [Disabled].*

Wake-Up by Ring

The optional settings: [Disabled]; [Enabled].

Use this function to enable or disable wake-up by ring function.

**This item will only show when 'ERP Support' is set as [Disabled].*

Wake-Up by PS/2 Keyboard

The optional settings: [Disabled]; [Enabled].

Use this function to enable or disable PS/2 keyboard wake-up from S3/S4/S5.

**This item will only show when 'ERP Support' is set as [Disabled].*

Wake-Up by PS/2 Mouse

The optional settings: [Disabled]; [Enabled].

Use this function to enable or disable PS/2 mouse wake-up from S3/S4/S5.

**This item will only show when 'ERP Support' is set as [Disabled].*

PWRON After PWR-Fail

The optional settings: [Former-Sts]; [Always On]; [Always Off].

USB StandBy Power Support

The optional settings: [Disabled]; [Enabled].

Use this function to enable or disable USB2 standby power.

**This item will only show when 'ERP Support' is set as [Disabled].*

▶ **RTC WakeUp Settings**

Press [Enter] to make settings for the following sub-items:

Wake System with Fixed Time

Use this item to enable or disable system wake on alarm event. When set as [Enabled], system will wake on the hour/min/sec specified.

Wake System with Dynamic Time

Use this item to enable or disable system wake on alarm event. When set as [Enabled], system will wake on the current time + increased minute(s).

▶ **SATA Configuration**

BIOS options for H81 Series:

Press [Enter] to make settings for the following sub-items:

SATA Controller(s)

Use this item to enable or disable SATA device.

The optional settings: [Enabled]; [Disabled].

**When set as [Enabled], user can make further settings in the following sub-items:*

SATA Mode Selection

Use this item to determine how SATA controller(s) operate.

The optional settings are: [IDE]; [AHCI].

Smart Self Test

Use this function to run SMART self test on all HDDs during POST.

The optional settings are: [Disabled]; [Enabled].

SATA Controller Speed

Use this item to select the maximum speed the SATA controller can support.

The optional settings: [Default]; [Gen1]; [Gen2]; [Gen3].

SATA 1/SATA2/MSATA

Port Support

The optional settings: [Disabled]; [Enabled].

Use this item to enable or disable each SATA port.

Hot Plug

The optional settings: [Disabled]; [Enabled].

Use this item to designate this port as Hot Pluggable.

SATA Device Type

The optional settings: [Hard Disk Drive]; [Solid State Drive].

BIOS options for Q87 Series:

Press [Enter] to make settings for the following sub-items:

SATA Controller(s)

Use this item to enable or disable SATA device.

The optional settings: [Enabled]; [Disabled].

SATA Mode Selection

The optional settings are: [IDE]; [AHCI]; [RAID].

**When set as [AHCI] or [RAID], user can make further settings in the following available items:*

SATA Controller Speed

The item is for user to set the maximum speed the SATA controller can support.

The optional settings are: [Default]; [Gen1]; [Gen2]; [Gen3].

▶ **Intel(R) Rapid Start Technology***

Press [Enter] to go to next screen to enable or disable 'Intel(R) Rapid Start Technology'.

Intel(R) Rapid Start Technology

The optional settings: [Disabled]; [Enabled].

When set as [Enabled], user can also make further settings in the following items that appear:

Entry on S3 RTC Wake

Use this item to enable or disable RapidStart innovation upon S3 RTC wake.

Entry After

Use this item to enable RTC wake timer at S3 entry. Value ranges from 0 (immediately) to 120 minutes.

Active Page Threshold Support

Use this item to enable or disable support for RST with small partition.

**When set as [Enabled], user can also make further setting in the following item that appears:*

Active Memory Threshold

User can use this item to try to support RST when partition size is bigger than

Active Page Threshold size in MB. When setting as '0', it will be in Auto mode and check if partition size is enough at S3 entry.

Hybrid Hard Disk Support

Use this item to enable or disable Hybrid Hard Disk Support.

RapidStart Display Save/Restore

Use this function to enable or disable RapidStart Display Save/Restore function.

**When set as [Enabled], user can also make further setting in the following item that appears:*

RapidStart Display Type

The optional settings: [BIOS Save/Restore]; [DeskTop Save/Restore].

SATA 1/2/MSATA

Port Support

Use this item to enable or disable each SATA port.

The optional settings: [Disabled]; [Enabled].

Hot Plug

Use this item to designate this port as hot pluggable.

The optional settings: [Disabled]; [Enabled].

SATA Device Type

The optional settings: [Hard Disk Drive]; [Solid State Drive].

Alternate ID

The optional settings: [Disabled]; [Enabled].

** 'Alternate ID' is only available when 'SATA Mode Selection' set as [RAID].*

Smart Self Test

Use this function to run SMART self test on all HDDs during POST.

The optional settings are: [Disabled]; [Enabled].

** 'SMART Self Test' is available when 'SATA Mode Selection' set as [IDE], [AHCI], or [RAID].*

▶ PCH-FW Configuration

Press [Enter] to view current ME configuration or go to 'ME FW Image Re-Flash' to enable or disable ME FW Image Re-Flash function.

ME FW Image RE-Flash

Use this item to enable or disable ME FW Image Re-Flash function.

The optional settings: [Disabled]; [Enabled].

** In the case that user needs to update ME firmware, user should set 'ME FW Image Re-Flash' as [Enabled], save the settings and exit. The system will turn off and reboot after 4 seconds. If the user goes to BIOS screen again will find this item is set again as [Disabled], but user can still re-flash to update firmware next time.*

▶ **USB Configuration**

Press [Enter] to make settings for the following sub-items:

Legacy USB Support

The optional settings are: [Enabled]; [Disabled]; [Auto].

[Enabled]: To enable legacy USB support.

[Auto]: To disable legacy support if no USB devices are connected.

[Disabled]: to keep USB devices available only for EFI specification,

USB3.0 Support

Use this item to enable or disable USB3.0 (XHCI) controller support.

The optional settings are: [Enabled]; [Disabled].

XHCI Hand-off

This is workaround for Oses without XHCI hand-off support. The XHCI ownership change should be claimed by XHCI driver.

The optional settings are: [Disabled]; [Enabled].

EHCI Hand-off

This is workaround for Oses without EHCI hand-off support. The EHCI ownership change should be claimed by EHCI driver.

The optional settings are: [Disabled]; [Enabled].

USB Mass Storage Driver Support

The optional settings are: [Disabled]; [Enabled].

▶ **Super I/O Configuration**

Press [Enter] to make settings for the following sub-items:

Super IO Configuration

▶ **Serial Port 1 Configuration/Serial Port 2 Configuration**

Press [Enter] to make settings for the following items:

Serial Port

Use this item to enable or disable serial port (COM).

Change Settings

Use this item to select an optimal setting for super IO device.

Transmission Mode Select

The optional settings are: [RS422]; [RS232]; [RS485].

Mode Speed Select

The optional settings are: [RS232=1Mbps, RS422/RS485=10Mbps]; [RS232/RS422/RS485=250Kbps].

▶ **Serial Port 3 Configuration / Serial Port 4 Configuration/ Serial Port 5 Configuration/Serial Port 6 Configuration**

Press [Enter] to make settings for the following items:

Serial Port

Use this item to enable or disable serial port (COM).

Change Settings

Use this item to select an optimal setting for super IO device.

WatchDog Timer

Use this item to enable or disable WatchDog Timer control.

**When set as [Enabled], the following sub-items shall appear:*

WatchDog Timer Value

User can set a value in the range of [1] to [255].

WatchDog Timer Unit

The optional settings are: [Sec.]; [Min.].

Case Open Detect

This item controls detect case open function.

The optional settings: [Disabled]; [Enabled].

▶ **F81866 H/W Monitor**

Press [Enter] to view current CPU health status and make settings for the following sub-items:

Shutdown Temperature

Use this item to select system shutdown temperature.

The optional settings are: [Disabled]; [60C/140F]; [65C/149F]; [70C/158F]

[75C/167F].

CPUFAN Smart Mode

Press [Enter] to make settings for Smart Fan Configuration:

The optional settings are: [Disabled]; [Enabled].

When set as **[Enabled], the following sub-items shall appear:*

CPUFAN Highest Speed Temp

Use this item to select a value at which the fan will run at full speed when the temperature is higher than this pre-set temperature value limit.

The optional setting ranges: [Min \geq Idle Temp.] ~ [Max=100C].

CPUFAN Idle Temp

Use this item to select a value at which the fan will run at idle speed when the temperature is lower t this pre-set temperature value limit.

The optional setting ranges: [Min=0C.] ~ [Max \leq Full-speed Temp].

▶ **SECOND Super I/O Configuration**

Press [Enter] to make settings for the following sub-items:

SECOND Super IO Configuration

▶ **Serial Port 7 Configuration/Serial Port 8 Configuration/Serial Port 9 Configuration/Serial Port 10 Configuration/Serial Port 11 Configuration/Serial Port 12 Configuration**

Press [Enter] to make settings for the following items:

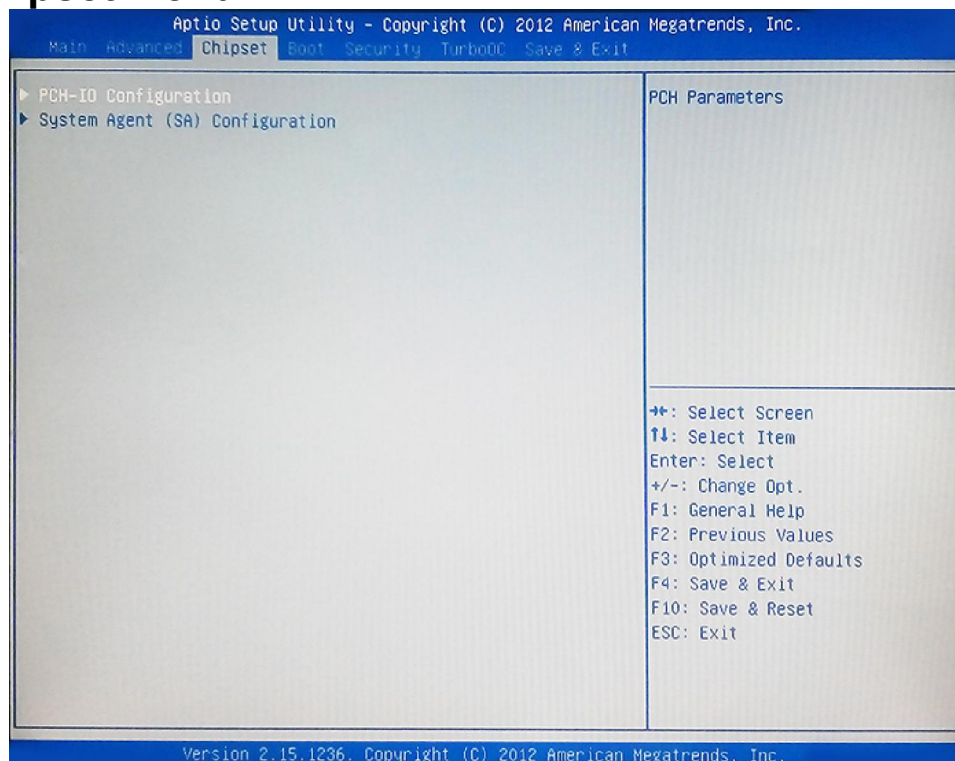
Serial Port

Use this item to enable or disable serial port (COM).

Change Settings

Use this item to select an optimal setting for super IO device.

3-8 Chipset Menu



▶ PCH-IO Configuration

Press [Enter] to make settings for the following sub-items:

▶ USB Configuration

Press [Enter] to further setting USB configuration settings.

USB Configuration

USB Precondition

Use this item to precondition work on USB host controller and root ports for faster enumeration.

The optional settings are: [Enabled]; [Disabled].

XHCI Mode

Use this item to select mode of operation of XHCI controller.

The optional settings are: [Smart Auto]; [Auto]; [Enabled]; [Disabled]; [Manual].

**When set as [Disabled], user can make settings in 'EHCI1/EHCI2' items that appear:*

EHCI1/ EHCI2

Use this item to enable or disable USB EHCI (USB 2.0) support. One EHCI controller must always be enabled.

The optional settings are: [Enabled]; [Disabled].

**When set as [Manual], user can make settings in the following items that appear:*

XHCI Pre-Boot Driver

Use this item to enable or disable XHCI pre-boot driver support.

The optional settings are: [Enabled]; [Disabled].

Route USB 2.0 pins to which HC?

The optional settings are: [Route Per-Pin]; [Route all Pins to EHCI]; [Route all Pins to XHCI].

Enable USB 3.0 pins

The optional settings are: [Select Per-Pin]; [Disable all Pins]; [Enable all Pins].

USB Ports Per-Port Disable Control

Use this item to control each of the USB ports disabling.

The optional settings are: [Enabled]; [Disabled].

▶ BIOS Security Configuration

**Note: 'BIOS Security Configuration' is only available to Q87 Series.*

Press [Enter] to further setting USB configuration settings.

BIOS Security Configuration

SMI Lock

Use this item to enable or disable SMI lockdown.

The optional settings are: [Disabled]; [Enabled].

BIOS Lock

Use this item to enable or disable BIOS lock enable (BLE) bit.

The optional settings are: [Disabled]; [Enabled].

GPIO Lock

Use this item to enable or disable GPIO lockdown.

The optional settings are: [Disabled]; [Enabled].

BIOS Interface Lock

Use this item to enable or disable BIOS Interface lockdown.

The optional settings are: [Disabled]; [Enabled].

RTC RAM Lock

Use this item to enable or disable bytes 38h-3fh in the upper and lower 128-byte bank of RTC RAM lockdown.

The optional settings are: [Disabled]; [Enabled].

PCIE2USB3.0 Support

Use this item to control the PCI Express root port.

The optional settings are: [Disabled]; [Enabled].

Onboard PCIE Lan1/ Onboard PCIE Lan2

Use this item to control the Onboard PCIE Lan.

The optional settings are: [Disabled]; [Enabled].

MINIPCIE

The optional settings are: [Disabled]; [Enabled].

MINI_CARD

The optional settings are: [Disabled]; [Enabled].

Onboard Lan BootROM

Use this item to enable or disable boot option ROM for onboard network devices.

The optional settings are: [Disabled]; [Enabled].

Subtractive Decode

Use this item to enable or disable PCI Express subtractive decode.

The optional settings are: [Disabled]; [Enabled].

**When set as [Enabled], user can make settings in the following items that appear:*

Subtractive Decode Port#

Use this item to select PCI Express subtractive decode root port.

The optional settings are: [MINIPCIE]; [MINI_CARD].

Azalia

Use this item to control the detection of the Azalia Audio device.

The optional settings are: [Disabled]; [Enabled].

[Disabled]: Azalia will be unconditionally disabled;

[Enabled]: Azalia will be unconditionally enabled;

When set as [Enabled], user can make settings in 'Azalia Internal HDMI Codec' that appears:

Azalia Internal HDMI Codec

Use this item to enable or disable internal HDMI codec for Azalia.

The optional settings are: [Enabled]; [Disabled].

▶ **System Agent (SA) Configuration**

Press [Enter] to make settings for the following sub-items:

VT-d

Use this item to enable or disable VT-d function on MCH.

The optional settings are: [Enabled]; [Disabled].

**This item might not be available depending on configuration.*

VGA1 Dummy Load/ VGA2 Dummy Load

Use this item to enable or disable VGA dummy load.

The optional settings are: [Disabled]; [Enabled].

Primary Display

The optional settings are: [Auto]; [IGFX]; [PEG].

Internal Graphics

The optional settings are: [Auto]; [Disabled]; [Enabled].

Aperture Size

The optional settings are: [128MB]; [256MB]; [512MB].

DVMT Pre-Allocated

Use this item to select DVMT 5.0 pre-allocated (fixed) graphics memory size used by the internal graphics device.

The optional settings are: [32M]; [64M]; [96M]; [128M]; [160M]; [192M]; [224M]; [256M]; [288M]; [320M]; [352M]; [384M]; [416M]; [448M]; [480M]; [512M]; [1024M].

DVMT Total Gfx Mem

Use this item to select DVMT 5.0 total graphics memory size used by the internal graphics device.

The optional settings are: [128M]; [256M]; [MAX].

RC6(Render Standby)

Use this item to enable or disable render standby support.

The optional settings are: [Disabled]; [Enabled].

DMI Link ASPM Control

The optional settings are: [Disabled]; [L0s]; [L1]; [L0sL1].

DMI Gen 2

The optional settings are: [Auto]; [Enabled]; [Disabled].

Enable PEG

The optional settings are: [Disabled]; [Enabled]; [Auto].

**When set as [Enabled] or [Auto], user can make settings in the following items that appear:*

PEG-Gen X

The optional settings are: [[Auto]; [Gen1];[Gen2];[Gen3].

Detect Non-Compliance Device

The optional settings are: [Disabled]; [Enabled].

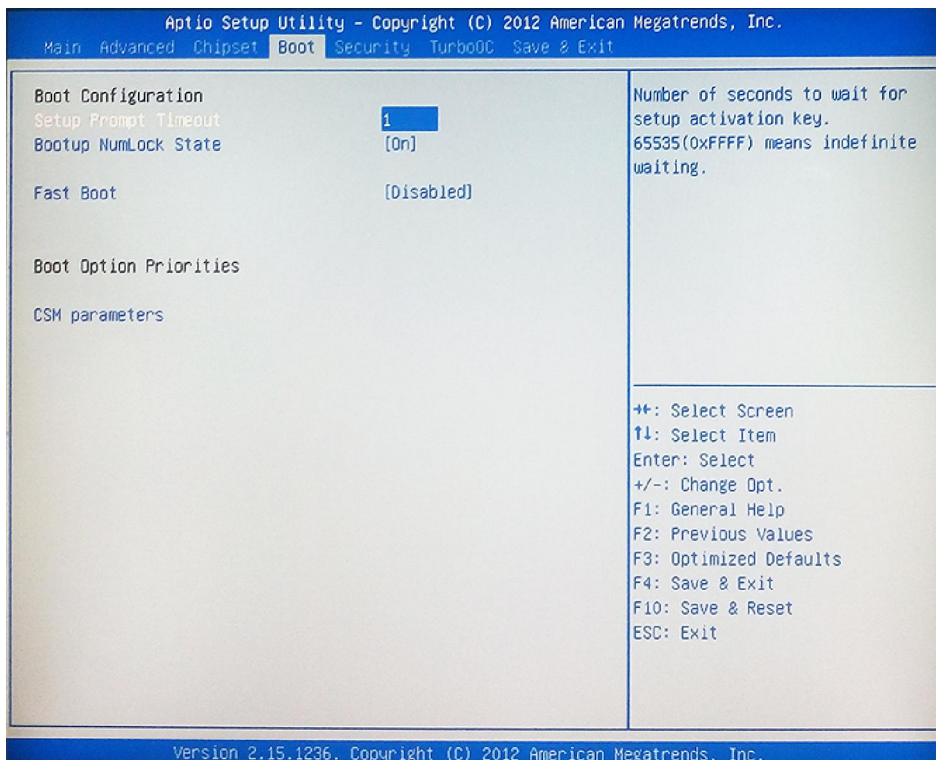
PEG-ASPM

The optional settings are: [Disabled]; [Auto]; [ASPM L0s]; [ASPM L1]; [ASPM L0sL1].

VGA2 Support

The optional settings are: [Disabled]; [Enabled].

3-9 Boot Menu



Boot Configuration

Setup Prompt Timeout

Use this item to set number of seconds to wait for setup activation key.

Bootup Numlock State

Use this item to select keyboard numlock state.

The optional settings are: [On]; [Off].

Fast Boot

The optional settings are: [Enabled]; [Disabled].

When set as [Enabled], user can make settings in the following items that appear:

SATA Support

The optional settings are: [Last Boot HDD Only];[All SATA Devices]; [HDD Only].

VGA Support

The optional settings are: [Auto]; [EFI Driver].

*When set as [Enabled], it will only install Legacy OpROM with Legacy OS and logo will not be shown during POST. EFI driver will still be installed with EFI OS.

USB Support

The optional settings are: [Disabled]; [Full Initial]; [Partial Initial].

PS2 Devices Support

The optional settings are: [Disabled]; [Enabled].

The PS2 devices will be skipped if this is set as [Disabled].

Network Stack Driver Support

The optional settings are: [Disabled]; [Enabled].

Network Stack Driver will be skipped if this is set as [Disabled].

Boot Option Priorities

Boot Option #1/...

Use this item to decide system boot order from available options.

▶ **CSM parameters**

Press [Enter] to make settings for the following sub-items:

Launch CSM

The optional settings are: [Enabled]; [Disabled].

Boot option filter

This option controls what device system can boot to.

The optional settings are: [UEFI and Legacy]; [Legacy only]; [UEFI only].

Launch Storage OpROM policy

This option controls the execution of UEFI and Legacy Storage OpROM.

The optional settings are: [Do not launch]; [UEFI only]; [Legacy only].

Launch Video OpROM policy

This option controls the execution of UEFI and Legacy Video OpROM.

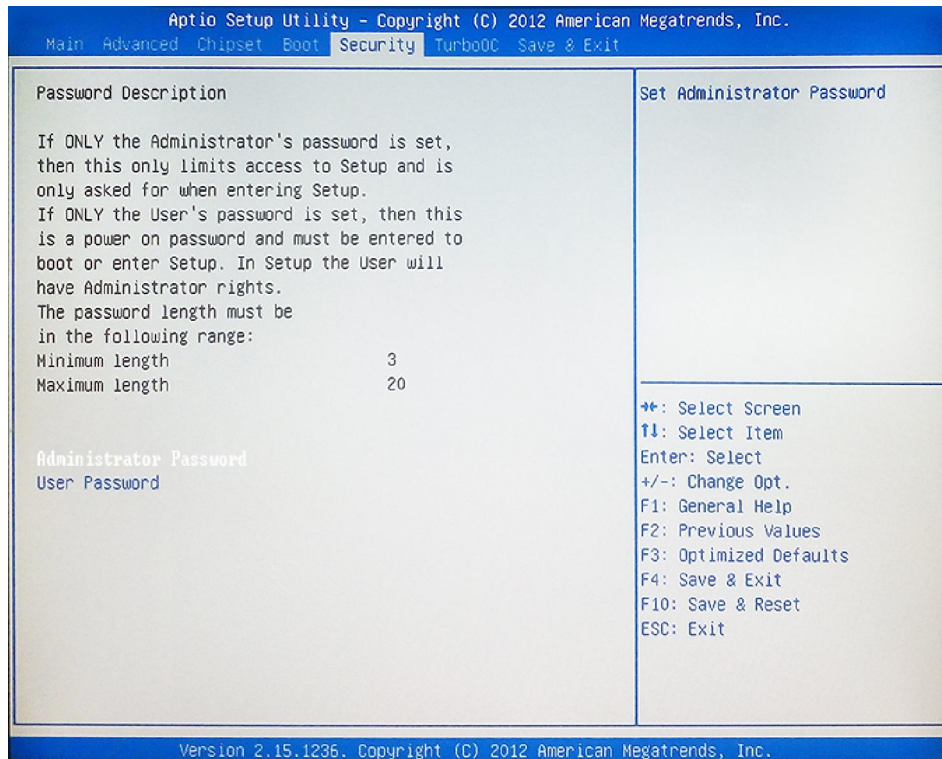
The optional settings are: [Do not launch]; [UEFI only]; [Legacy only]; [Legacy first]; [UEFI first].

Other PCI device ROM priority

This item is for PCI devices other than Network, Mass storage or video defines which OpROM to launch.

The optional settings are: [UEFI OpROM]; [Legacy OpROM].

3-10 Security Menu



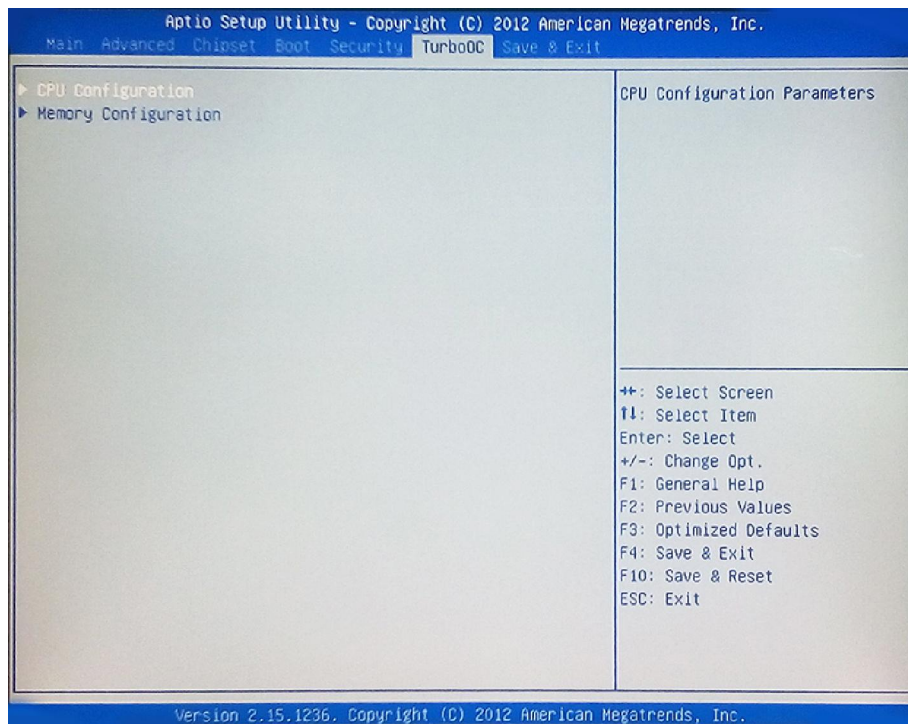
Administrator Password

This item allows user to set administrator password.

User Password

This item allows user to set user password.

3-11 TurboOC Menu



▶ CPU Configuration

Press [Enter] to view current CPU information and make settings for the following sub-items:

Active Processor Cores

Use this item to set the number of cores to enable in each processor packages.

Limit CPUID Maximum

The optional settings are: [Disabled]; [Enhanced].

This item should be set as [Disabled] for Windows XP.

Execute Disable Bit

The optional settings are: [Disabled]; [Enhanced].

Intel Virtualization Technology

The optional settings are: [Disabled]; [Enabled].

When set as [Enabled], a VHM can utilize the additional hardware capabilities provided by Vanderpool Technology.

EIST

The optional settings are: [Disabled]; [Enabled].

**When set as [Enabled], user can make settings in the following items that appear:*

Turbo Mode

The optional settings are: [Enabled]; [Disabled].

**When set as [Enabled], user can make settings in 'Torbo Core Ratio Limit':*

Turbo Core Ratio Limit

This item is for user to set Turbo core ratio. 0 means using the factory-configured value.

CPU C states

The optional settings are: [Disabled]; [Enabled].

**When set as [Enabled], user can make settings in the following items that appear:*

Enhanced C1 State

The optional settings are: [Disabled]; [Enabled].

CPU C3 Report

The optional settings are: [Disabled]; [Enabled].

Use this item to enable or disable CPU C3 report to OS.

CPU C6 Report

The optional settings are: [Disabled]; [Enabled].

Use this item to enable or disable CPU C6 report to OS.

C6 Latency

The optional settings are: [Short]; [Long].

Use this item to configure short/long latency for C6.

CPU C7 Report

The optional settings are: [Disabled]; [CPUC7]; [CPUC7s].

Use this item to enable or disable CPU C7 report to OS.

C7 Latency

The optional settings are: [Short]; [Long].

Use this item to configure short/long latency for C7.

LakeTiny Feature

Use this item to enable or disable LakeTiny for Cstate configuration.
The optional settings are: [Disabled]; [Enabled].

▶ **Memory Configuration**

Press [Enter] to make settings for the following sub-items:

DIMM profile

Use this item to select DIMM timing profile that should be used.

The optional settings are: [Default DIMM profile]; [Custom Profile].

When set as [Custom Profile], the sub-item 'Custom Profile Control**' will appear for user to manually set memory timing configuration:*

tCL

The setting range for '**Cas Latency**' is from [4] to [18].

tRCD

The setting range for '**Row to Col Delay**' is from [1] to [38].

tRP

The setting range for '**Ras Precharge**' is from [1] to [38].

tRAS

The setting range for '**Ras Active Time**' is from [1] to [586].

tWR

The setting range for '**Min Write Recovery Time**' is from [1] to [38].

tRFC

The setting range for '**Min Refresh Recovery Delay Time**' is from [1] to [9363].

tRRD

The setting range for '**Min Row Active to Row Active Delay Time**' is from [1] to [38].

tWTR

The setting range for '**Min Internal Write to Read Command Delay Time**' is from [1] to [38].

tRTP

The setting range for '**Min Internal Read to Precharge Command Delay Time**' is from [1] to [38].

tRC

The setting range for '**Min Active to Active/Refresh Delay Time(tRCmin) to Precharge Command Delay Time**' is from [1] to [586].

tFAW

The setting range for 'Min Four Activate Window Delay Time' is from [1] to [586].

tCWL

The setting range for 'Minimum CAS Write Latency Time (tCWLmin).

tREFI

The setting range for 'Maximum tREFI Time (Average Periodic Refresh Interval).

Memory Frequency Limiter

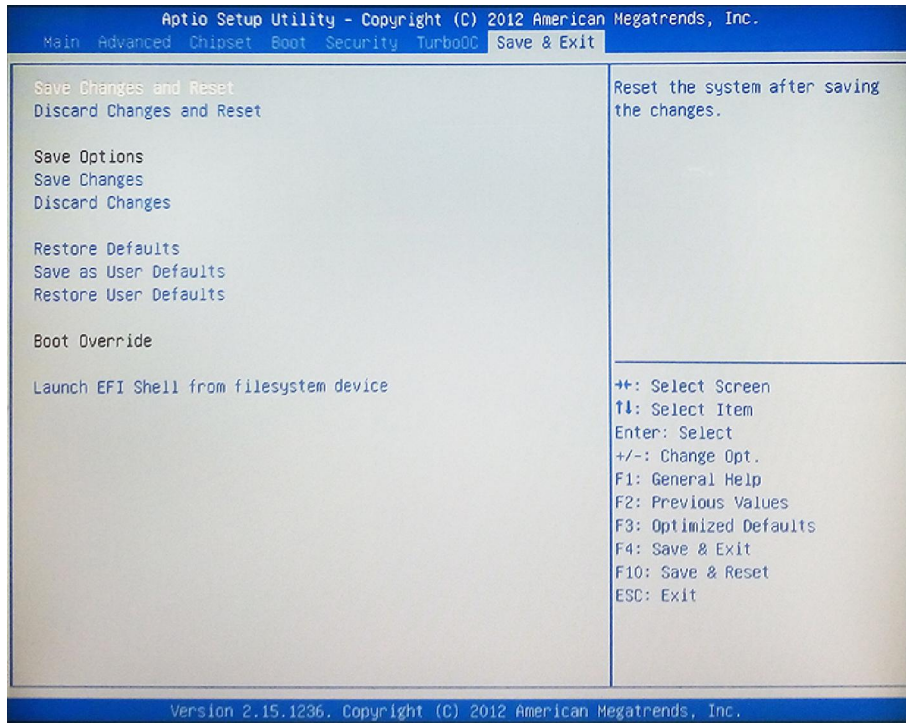
Use this item to set maximum memory frequency selection in Mhz.

The optional settings are [Auto]; [1066]; [1333] [1600].

Command Rate

The optional settings are: [Auto]; [1T]; [2T].

3-12 Save & Exit Menu



Save Changes and Reset

This item allows user to reset the system after saving the changes.

Discard Changes and Reset

This item allows user to reset the system without saving any changes.

Save Options

Save Changes

This item allows user to save changes done so far to any of the setup options.

Discard Changes

This item allows user to discard changes done so far to any of the setup options.

Restore Defaults

Use this item to restore /load default values for all the setup options.

Save as User Defaults

Use this item to save the changes done so far as user defaults.

Restore User Defaults

Use this item to restore defaults to all the setup options.

Boot Override

Launch EFI Shell from filesystem device

Use this item to launch EFI shell application (Shell x 64.efi) from one of the available filesystem devices.